BCOSSA Technical Review Committee Technical Bulletin

Title: Site Capability Tables

Subject:

Provides the Site Capability Table standards of the SPM V2 in a more accessible format, with a summary table for gravity dispersal systems.

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1. Site Capability Table 2-12

1.1 Introduction

The SPM V2 in Section 2.4 provides Site Capability tables to address sites with particular constraints (Table 2-12), and to summarize application of particular systems (Table 2-13).

The tables take a solution oriented approach, offering solutions and alternate solutions for common site constraints. Discussion of the tables is expanded in Part 3 of the SPM, Section 3.4. Section 3.4 also provides advice for other site constraints, selection of vertical separation (VS), climate and combined site constraints.

There has been some confusion over the use and reading of the tables. This Technical Bulletin presents the individual rows of Table 2-12 as separate tables, with explanatory notes where needed.

Section 2 provides a summary table for gravity dispersal systems to clarify application.

1.2 Table 2-12 individual rows

Organization of Table 2-12 in the SPM:

- Each row of the Table 2-12 starts with a soil type or other constraining condition.
- It then describes the reason or factor that constrains the use of the site.
- It then presents a solution or group of solutions.
- In most cases it then offers one or more alternative solutions.
- The last column provides clarification notes.

In all cases site and project specific design by a professional per the SPM is an alternate solution.

The individual tables below have been reorganized to show each row from Table 2-12, and some explanation added where needed. A correction to the first two rows has also been made.

Note that these tables must be used together with the other standards of the SPM—particularly the Vertical and Horizontal separation tables.

Soil type or condition	Gravel and very gravelly sand (Kfs >5,000 mm/d, Perc. <1 min/inch)
Constraining factor	Very high permeability
Solution	Pressure distribution with Timed dosing and Type 2 10/10 or Type 3 effluent. Professional design or design review needed.
Alternative solution	Sand mound or sand-lined trench with low hydraulic application rate Timed dosing and a minimum of 24" (61 cm) mound sand
Notes	

Many jurisdictions do not allow use of these soils for onsite systems, treatment in soil is severely reduced. For the alternative solution, low HAR timed dosing (at <10% of sand water holding capacity) should be used, per Section 3.8, or minimum 90cm sand depth with timed dosing per Section 3.8.

Soil type or condition	Gravelly sand (Kfs 3,501–5000 mm/d, Perc. <2 ≥1 min/inch)
Constraining factor	High permeability
Solution	Pressure distribution with Timed dosing
Alternative solution	Sand mound or sand-lined trench with Timed dosing
Notes	Except where native soil vertical separation is greater than 1.83 m (72")

Pressure distribution with timed dosing will improve pathogen removal.

Soil type or condition	Coarse to medium sand/loamy sand (Kfs 1,500–3,500 mm/d, Perc. 2–5 min/inch).
Constraining factor	High permeability
Solution	Pressure distribution
Alternative solution	
Notes	This **does not** mean Fine Sand and Loamy Fine Sand. Except where native soil vertical separation is greater than 1.83 m (72")

The exception for large VS in native soil in these two rows allows gravity dispersal to be used when the native soil VS is large enough. This is because in that case adequate pathogen removal is expected to occur despite the poor distribution.

Note the common misunderstanding about Fine Sand and Loamy Fine Sand. These soils have an expected Kfs range of 250-1500 mm/dy and are suitable for normal gravity distribution (assuming there is adequate VS per the SPM VS tables).

Soil type or condition	Over 50% of soil is rock fragments larger than gravel, or over 60% coarse gravel (or in combination over 60% total coarse gravel and rock fragments)
Constraining factor	Risk of effluent short circuiting due to large fractures, and severely reduced soil area for dispersal and treatment.
Solution	Pressure distribution with Timed dosing and Type 3 effluent (requires professional design)
Alternative solution	Only where vertical separation to water table is over 1.83 m (72"): 1. Sand mound or sand-lined trench with Timed dosing (and reduced basal loading rate). 2. Subsurface Drip Distribution, with Type 2 10/10
Notes	Base HLR and LLR on the non-gravel/rock portion of the soil and reduce loading rate by percentage of rock fragments/gravel.

In this case the large VS is again used to permit a simpler solution, note that this is separation to water table and may include separation in fractured rock as well as in soils (as long as the soil VS meets the standards of the SPM VS tables). The HLR and LLR should be reduced in proportion to the percentage of coarse fragments.

Soil type or condition	Loam, Silt Loam and Silt soils with platy structure of weak grade
Constraining factor	Requires low hydraulic application rate AND unsuitable for infiltrative surface.
Solution	System or sand mound, with infiltrative surface a minimum of 18" (45 cm) above platy layer. AND Pressure distribution with low hydraulic application rate timed dosing.
Alternative solution	For plough pan or thin layers with acceptable soils below: Remediation (where possible) OR sand-lined trenches penetrating below the layer (where suitable).
Notes	If platy structure is noted on a site, site investigation should include a minimum of 4 observation test pits in the dispersal area and two in the receiving area. Site investigation should establish that remediation has succeeded where this is used.

This does not prevent use of gravity dispersal with Loam, Silt Loam and Silt soils with more favourable structure (example blocky). See SPM Appendix Q for discussion of Hydraulic Application Rate.

Soil type or condition	Sandy clay, silty clay or clay soils (with moderate or strong BK, GR or P structure) (Kfs 20–60 mm/d, Perc >60 min/inch)
Constraining factor	Low permeability
Solution	Pressure distribution with Type 2 10/10 or 3 effluent and timed dosing
Alternative solution	Sand mound, OR Lagoon, where appropriate, OR ET/ETA bed, where appropriate
Notes	In the majority of cases these soils will have a clay content of over 40% (see row on clay soils)

Soil type or condition	Sandy clay, silty clay or clay soils (with weak BK, GR or P structure)
Constraining factor	Low permeability, requires low HAR and unsuitable for infiltrative surface
Solution	System (Type 2 or 3) or Sand mound, with infiltrative surface a minimum of 18" (45 cm) above these soils AND pressure distribution with timed dosing
Alternative solution	Lagoon, where appropriate, OR ET/ETA bed, where appropriate
Notes	In the majority of cases these soils will have a clay content of over 40% (see row on clay soils)

This will require use of sand fill or sand mound with these soils.

Soil type or condition	Soil contains greater than 40% clay OR Kfs less than 20 mm/day, 120 min/inch Perc
Constraining factor	HLR table and LLR tables should be reduced
Solution	Pressure distribution with Timed dosing (low HAR timed dosing recommended), and Type 2 10/10 or Type 3 effluent **Professional design or design review**
Alternative solution	Sand mound with Timed dosing and a minimum of 24" mound sand. **Professional** to establish basal HLR and LLR; OR Lagoon or ET/ETA bed, where appropriate
Notes	Also applies where soil contains significant amounts of expandable clay minerals

SPM Appendix I provides further information on expanding clay soils. An ROWP could design the alternative solution as long as the professional provided the loading rates. Some clay soils are shown as "not recommended" or "not suitable" in Table 28 (see below).

Soil type or condition	Organic soils, peat
Constraining factor	Difficulty in establishing a suitable HLR
Solution	Professional to establish HLR and LLR
Alternative solution	
Notes	

These soils may also indicate water table issues.

Soil type or condition	Soils labelled as 'not recommended' in the HLR or LLR tables, or where the HLR or LLR tables show a zero
Constraining factor	Low permeability
Solution	Pressure distribution with Timed dosing and Type 2 10/10 or Type 3 effluent. **Professional design or design review**
Alternative solution	Sand mound with Timed dosing and a minimum of 24" mound sand. **Professional** to establish basal HLR and LLR; OR Lagoon, where appropriate, OR ETA bed, where appropriate
Notes	

An ROWP could design the alternative solution as long as the professional provided the loading rates.

Soil type or condition	Soils with a consistency stronger than moderately hard (dry), firm (moist), or of any cemented class
Constraining factor	HLR table and LLRs should be reduced
Solution	Professional design or design review and Professional to establish HLR and LLR
Alternative solution	Lagoon or ET/ETA bed, where appropriate
Notes	

Soil type or condition	Depth of SHWT or low permeability layer less than 18" (45 cm) below surface
Constraining factor	Low vertical separation
Solution	Pressure distribution with Type 3 effluent, plus sand fill
Alternative solution	Sand mound per SPM standards, where appropriate
Notes	See VS tables (Table 2-4 and 2-5 of the SPM).

2. Summary table for gravity systems

2.1 Introduction

Table 2-13 includes a summary of constraints for gravity systems, there are also some other key factors elsewhere in the SPM. This has led to some confusion, so this summary table extracts the key factors for selection of a gravity system.

2.2 Summary table for gravity systems

Soil type or condition	Other factors	Gravity system?
Fine sand/fine loamy sand; Sandy loam; Loam; Silt loam; silt	36″ or over VS in native soil (can include blinding layer)	OK
Loam; Silt Loam; Silt	Platy structure	NO
Clay loam;, sandy clay loam; silty clay loam; Sandy clay, silty clay or clay		NO
Gravel and very gravelly sands		NO
Gravelly sand; Coarse to Medium sand/sandy loam	VS is over 1.83 m (72") in Native Soil	OK
Fill below system	Other than blinding layer	NO
Blinding layer	Up to 10cm (4″) of C33 sand or Mound Sand	OK
Slope over 15%	Trickling Dosed to D Box	NO
	Dosed serial or sequential	OK
Infiltrative surface over 93 m^2 (1,000 ft^2)	Trickling	NO
	Dosed	OK