Brookside LABS
200 White Mountain Drive
New Bremen, OH 45869
Tel: (419) 977-2766
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Date: 05/22/2024
Client Name: Freestone Club
File Number: 91984
Consultant: Soil and Water Consulting

Greensmix : Lab #2 CS&G GREENS-M SAND
Gravel: Lab #1296 HOLSEY PEA GRAVEL

GREENSMIX & GRAVEL COMPATIBILITY

Rootzone Sieve Analysis	Particle Diameter (%)							
	2.0 mm	1.0 mm	0.5 mm	0.25 mm	0.15 mm	0.106 mm	0.053 mm	Silt/Clay
% Retained	0.2	5.6	21.2	56.3	13.3	2.3	0.3	0.8

Gravel Sieve Analysis	Particle Diameter (%)							
	12.5 mm	9.5 mm	6.35 mm	4.75 mm	2.36 mm	2.0 mm	1.0 mm	< 1.0 mm
% Retained	0.0	15.6	61.5	18.5	3.6	0.1	0.2	0.5

1. **For Bridging to Occur.** D15(gravel) <= 8 x D85(rootzone)

D15(gravel) = 5.67
D85(rootzone) = 0.78

5.67 mm <= 6.24 mm

These Results show that the D15(gravel) at 5.67mm **IS** less than or equal to (<=) 8 x D85(rootzone), which was 8 x 0.78mm = 6.24mm. Therefore, bridging of the coarsest 15% rootzone particles **SHOULD** occur with the finest 15% of gravel particles. This gravel **IS** compatable with sand.

2. **For Adequate Permeability.** D15(gravel) >= 5 x D15(rootzone)

D15(gravel) = 5.67
D15(rootzone) = 0.24

5.67 mm >= 1.20 mm

These Results show that the D15(gravel) at 5.67mm **IS** >= 5 x D15(rootzone), which was 5 x 0.24mm = 1.20mm. Therefore, adequate permeability **SHOULD** occur with this gravel and rootzone sand.

3. **Uniformity Coefficient of Gravel** D90(gravel)/D15(gravel) <= 3.0

D90(gravel) = 10.58
D15(gravel) = 5.67

1.87 mm <= 3.00mm

These Results show that the D90(gravel)/D15(gravel) is 1.87mm which **IS** less than or equal to 3.0. Therefore, the Uniformity Coefficient of gravel **PASSES** this criterion.

Furthermore, the gravel should have 100% particles < 12mm, <= 10% particles < 2mm, and <= 5% particles < 1mm.

Reviewed by: Erica Schenk

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Greensmix : Lab #108 ENNIS PLANT CAPPING MATERIAL
Gravel: Lab #1296 HOLSEY PEA GRAVEL

GREENSMIX & GRAVEL COMPATIBILITY

Rootzone Sieve Analysis	Particle Diameter (%)							
	2.0 mm	1.0 mm	0.5 mm	0.25 mm	0.15 mm	0.106 mm	0.053 mm	Silt/Clay
% Retained	0.3	0.6	5.0	56.8	27.8	5.9	0.7	2.9

Gravel Sieve Analysis	Particle Diameter (%)							
	12.5 mm	9.5 mm	6.35 mm	4.75 mm	2.36 mm	2.0 mm	1.0 mm	< 1.0 mm
% Retained	0.0	15.6	61.5	18.5	3.6	0.1	0.2	0.5

1. **For Bridging to Occur.** D15(gravel) <= 8 x D85(rootzone)

D15(gravel) = 5.67
D85(rootzone) = 0.46

5.67 mm <= 3.68 mm

These Results show that the D15(gravel) at 5.67mm **IS NOT** less than or equal to (<=) 8 x D85(rootzone), which was 8 x 0.46mm = 3.68mm. Therefore, bridging of the coarsest 15% rootzone particles **SHOULD NOT** occur with the finest 15% of gravel particles. This gravel **IS NOT** compatable with sand.

2. **For Adequate Permeability.** D15(gravel) >= 5 x D15(rootzone)

D15(gravel) = 5.67
D15(rootzone) = 0.17

5.67 mm >= 0.85 mm

These Results show that the D15(gravel) at 5.67mm **IS** >= 5 x D15(rootzone), which was 5 x 0.17mm = 0.85mm. Therefore, adequate permeability **SHOULD** occur with this gravel and rootzone sand.

3. **Uniformity Coefficient of Gravel** D90(gravel)/D15(gravel) <= 3.0

D90(gravel) = 10.58
D15(gravel) = 5.67

1.87 mm <= 3.00mm

These Results show that the D90(gravel)/D15(gravel) is 1.87mm which **IS** less than or equal to 3.0. Therefore, the Uniformity Coefficient of gravel **PASSES** this criterion.

Furthermore, the gravel should have 100% particles < 12mm, <= 10% particles < 2mm, and <= 5% particles < 1mm.

Reviewed by: Erica Schuck