200 White Mountain Drive
New Bremen, OH 45869
Tel: (419) 977-2766
Fax: (419) 977-2767

Date: 5/6/2024
Client Name: Freestone Club
File Number: 91984
Consultant: Soil and Water Consulting

Greensmix : Lab #103 CS&G GREENS-MIX SAND
Gravel: Lab #1061 CS&G 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	0.0	3.6	16.4	60.5	15.5	2.2	0.4	1.4

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	1.1	37.0	35.0	26.5	0.3	0.1	0.0

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

D15(gravel) = 3.68
D85(rootzone) = 0.65

3.68 mm <= 5.20 mm

These Results show that the D15(gravel) at 3.68mm **IS** less than or equal to (<=) 8 x D85(rootzone), which was 8 x 0.65mm = 5.20mm. 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) = 3.68
D15(rootzone) = 0.22

3.68 mm >= 1.10 mm

These Results show that the D15(gravel) at 3.68mm **IS** >= 5 x D15(rootzone), which was 5 x 0.22mm = 1.10mm. Therefore, adequate permeability **SHOULD** occur with this gravel and rootzone sand.

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

D90(gravel) = 8.74
D15(gravel) = 3.68

2.38 mm <= 3.00mm

These Results show that the D90(gravel)/D15(gravel) is 2.38mm 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: _____

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Date: 5/6/2024
Client Name: Freestone Club
File Number: 91984
Consultant: Soil and Water Consulting

Greensmix : Lab #105 SOLAR SANDS GREENS-MIX SAND
Gravel: Lab #1061 CS&G 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	3.0	17.9	54.8	14.9	4.3	1.7	3.2

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	1.1	37.0	35.0	26.5	0.3	0.1	0.0

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

D15(gravel) = 3.68
D85(rootzone) = 0.67

3.68 mm <= 5.36 mm

These Results show that the D15(gravel) at 3.68mm **IS** less than or equal to (<=) 8 x D85(rootzone), which was 8 x 0.67mm = 5.36mm. 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) = 3.68
D15(rootzone) = 0.19

3.68 mm >= 0.95 mm

These Results show that the D15(gravel) at 3.68mm **IS** >= 5 x D15(rootzone), which was 5 x 0.19mm = 0.95mm. Therefore, adequate permeability **SHOULD** occur with this gravel and rootzone sand.

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

D90(gravel) = 8.74
D15(gravel) = 3.68

2.38 mm <= 3.00mm

These Results show that the D90(gravel)/D15(gravel) is 2.38mm 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.

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Date: 5/6/2024
Client Name: Freestone Club
File Number: 91984
Consultant: Soil and Water Consulting

Greensmix : Lab #108 ENNIS PLANT CAPPING MATERIAL
Gravel: Lab #1061 CS&G 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	1.1	37.0	35.0	26.5	0.3	0.1	0.0

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

   D15(gravel) = 3.68

   D85(rootzone) = 0.46

   3.68 mm <= 3.68 mm

   These Results show that the D15(gravel) at 3.68mm **IS** 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** 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) = 3.68

   D15(rootzone) = 0.17

   3.68 mm >= 0.85 mm

   These Results show that the D15(gravel) at 3.68mm **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) = 8.74

   D15(gravel) = 3.68

   2.38 mm <= 3.00mm

   These Results show that the D90(gravel)/D15(gravel) is 2.38mm 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.

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