



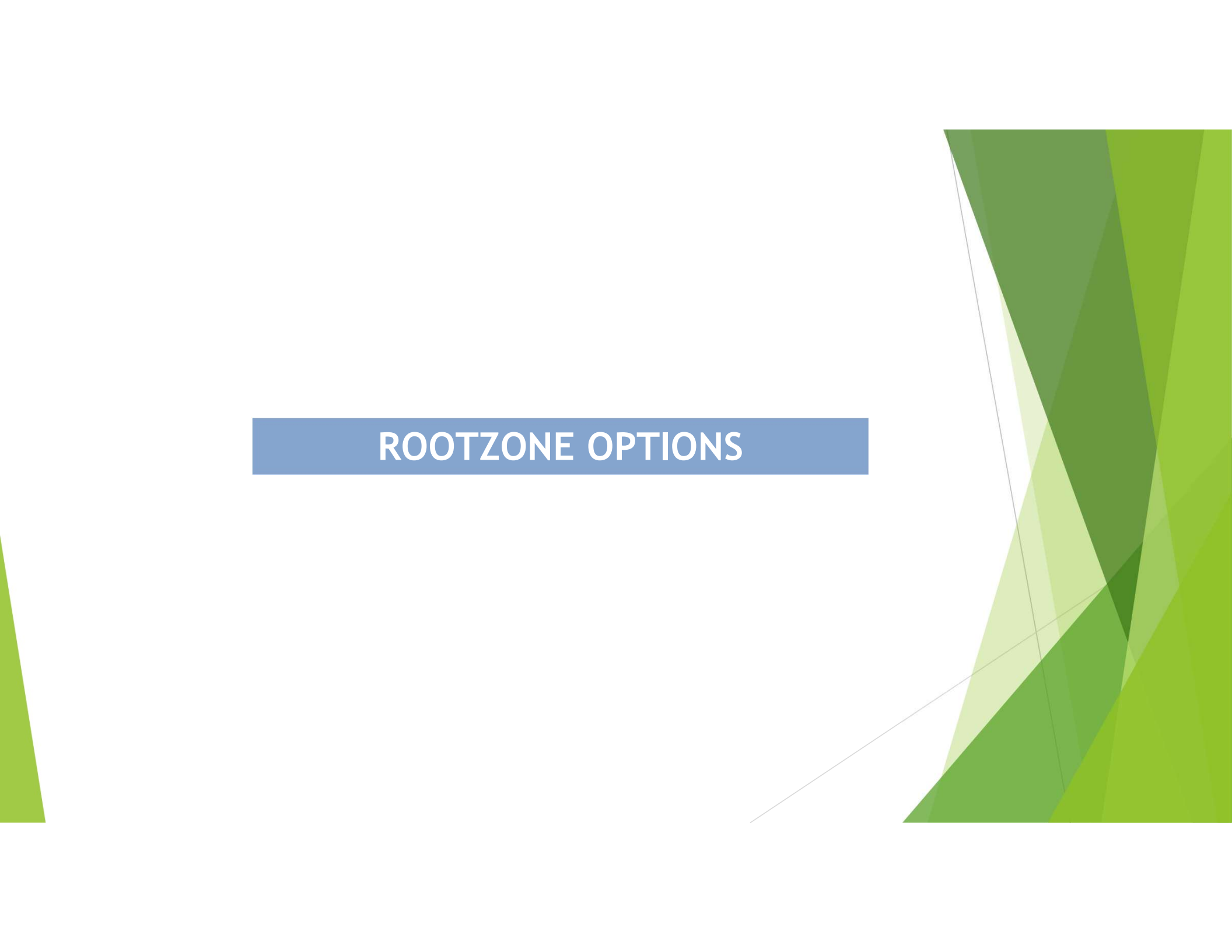
SOIL AND WATER CONSULTING

PRODUCT SELECTION REPORT

2022- 2023



ROOTZONE OPTIONS



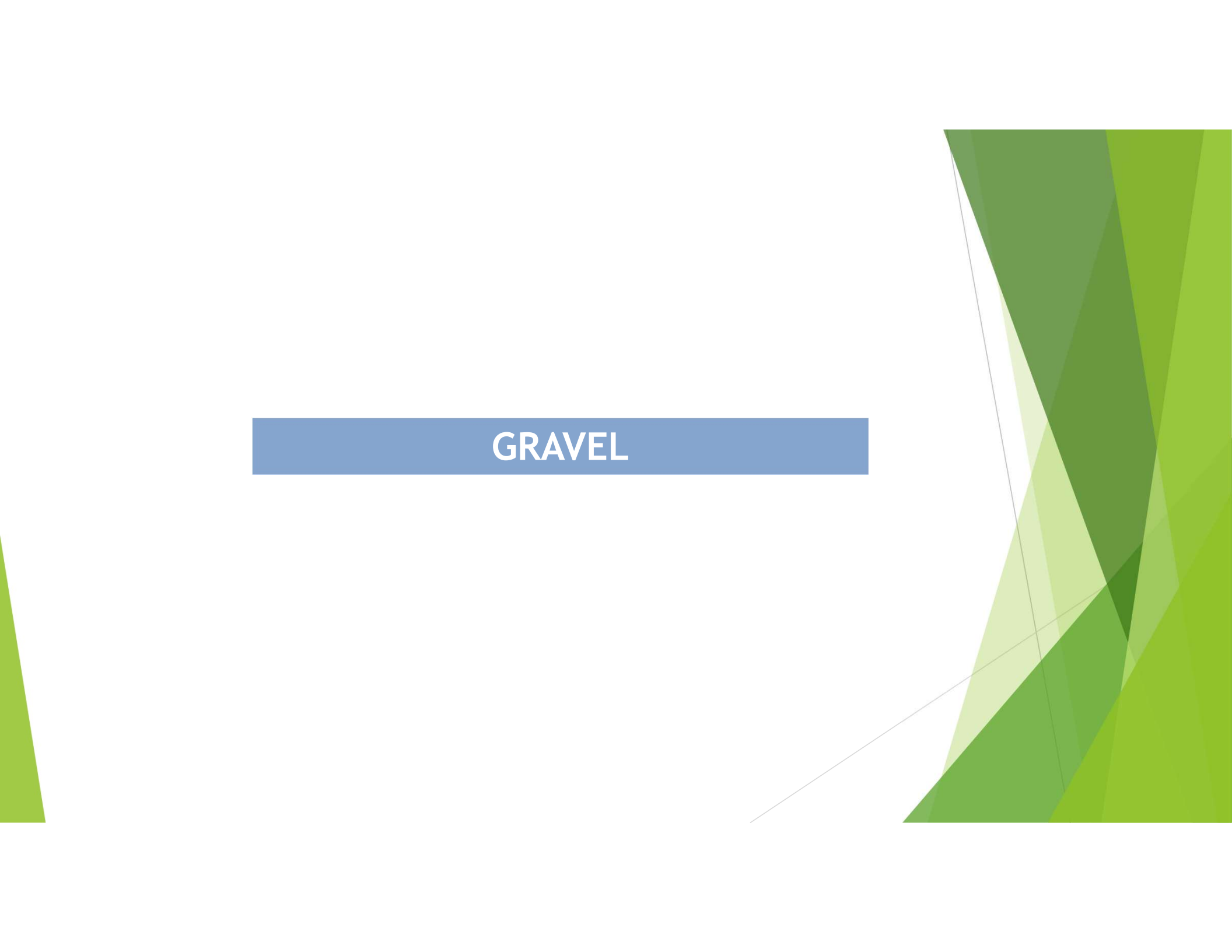
	WCS&G Straight Sand- Ventana Pile	WCS&G Straight Sand-Plant	WCS&G 90/10	Lab Mix 80/20	USGA Recommendations
Silt and Clay	1.70	1.50	2.80	4.60	<= 8.0%
Sand	98.30	98.50	97.10	94.30	94 - 100%
Gravel	0.00	0.00	0.10	1.10	
Organic Material	0.23	0.25	1.03	2.43	
<u>Sieve #:</u>					
Fine Gravel 10	0.00	0.00	0.10	1.10	2.0mm <= 3.0%
Very Coarse Sand 18	6.20	7.30	6.60	8.30	2.0mm + 1.0mm <= 10%
Coarse Sand 35	36.80	39.60	36.40	37.60	
Medium Sand 60	41.90	38.80	40.60	37.00	0.5mm + 0.25mm >= 60%
Fine Sand 100	10.30	10.60	10.30	8.60	0.15mm <= 20%
Very Fine Sand 140	2.40	1.70	2.40	2.30	0.106mm + 0.053mm <= 5.0%
Very Fine Sand 270	0.70	0.50	0.80	0.50	
Saturated Hydraulic Conductivity in/hr	53.1"	56.7"	9.3"	5.2"	Greater than 6" per hour
Coefficient of Uniformity	2.70	2.80	2.87	3.29	1.8 to 3.5 for peat and sand mixes
Recommended Depth	n/r	n/r	10.23"	?	

- There is approximately 0.25% organic matter in the Straight sand. We need to investigate where that comes from, and BJ Kerzetski is working on that.
- The 90/10 is a viable option for your greens-mix.
- The Lab Mix 80/20 could be used but we would need to see an actual blend of the 80/20 from the plant in Phoenix before we could accept it. A lab mix is very accurate, but also very specific to the part of the sample from the bag. What you can see is a reduced Sand content, increased Silt and Clay content and Organic material at a level that makes the mix slower to drain and requiring much less water.
- ON August 1st, 2022, it was decided to use an 85/15 greens-mix from WCS&G as it will be produced for another golf course around the same time TCC will need some. This is looked at as a 'trial' for the upcoming course greens renovation.

ROOTZONE QUALITY CONTROL



	WCS&G 90/10 7/2022	WCS&G 90/10 QC #1 6/2023	WCS&G 90/10 QC #2 9/2023	WCS&G 90/10 QC #3 7/2023	WCS&G 90/10 QC #4 7/2023	WCS&G 90/10 QC #5 8/2023	WCS&G 90/10 QC #6 8/2023
Silt and Clay	2.80	3.00	3.20				
Sand	97.10	96.80	96.70				
Gravel	0.10	0.20	0.10				
Organic Material	1.03	1.00	0.86				
<u>Sieve #:</u>							
Fine Gravel 10	0.10	0.20	0.10				
Very Coarse Sand 18	6.60	6.00	7.40				
Coarse Sand 35	36.40	35.70	39.60				
Medium Sand 60	40.60	42.30	40.40				
Fine Sand 100	10.30	9.70	7.10				
Very Fine Sand 140	2.40	2.40	1.60				
Very Fine Sand 270	0.80	0.70	0.60				
Saturated Hydraulic Conductivity in/hr	9.3"	14.7"	14.4"				
Coefficient of Uniformity	2.87	2.77	2.75				
Recommended Depth	10.23"	n/r	n/r				

The background features a light gray gradient. On the right side, there are several overlapping, semi-transparent green triangles and polygons in various shades of green, ranging from light lime to dark forest green. A solid blue horizontal bar is positioned in the center-left area.

GRAVEL

	WCS&G PHX Gravel 8/2022	WCS&G PHX Gravel 9/2022	WCS&G PHX Gravel QC #1 6 /2023	WCS&G PHX Gravel QC #2 /2023	WCS&G PHX Gravel QC #3 /2023
<u>Sieve #:</u>					
12.5	0.00	0.00	0.00		
9.5	0.80	0.70	0.20		
6.35	34.80	30.40	22.70		
4.75	30.20	23.00	25.60		
2.36	33.80	41.50	44.10		
2	0.10	1.40	0.90		
1	0.10	1.80	2.10		
<1.0	0.20	1.20	4.40		
Coefficient of Uniformity	2.55	2.78	2.94		

Gravel Compatibility for WCS&G 85/15

WCS&G PHX

Bridging Number needs to be less than 7.44	3.39
Adequate Permeability Number needs to be greater than 1.20	3.39
Uniformity Coefficient Number needs to be less than 3.0	2.56

- The WCS&G PHX Gravel makes a bridge with any of the WCS&G sand or sand and Dakota Peat mixes. We have not tested with the 85/15 proposed for September 2022 and new Practice green, but the assumption is that it will. We should test again prior to shipping.

GRAVEL QUALITY CONTROL

The background features abstract geometric shapes in various shades of green and blue. A prominent blue rectangle contains the title text. To the right, there are large, overlapping green triangles and polygons. A thin white line extends from the bottom right towards the center.

Gravel Compatibility for WCS&G 80/20

Bridging Number needs to be less than 7.20				
Adequate Permeability Number needs to be greater than 1.35				
Uniformity Coefficient Number needs to be less than 3.0				

- asf

BUNKER SAND

	50W Bunker Sand 8/2022	<u>USGA/Brown and Thomas Recommendations</u>
Silt and Clay	3.10	Less than or equal to 3%
Sand	95.20	Greater than or equal to 95%
Gravel	1.70	Less than or equal to 2%
Organic Material	0.11	
<u>Sieve #:</u>		
Fine Gravel 10	1.70	Less than or equal to 2%
Very Coarse Sand 18	21.60	Less than or equal to 15%
Coarse Sand 35	43.60	35+60+100+ 140 between 78% and 100%
Medium Sand 60	27.70	
Fine Sand 100	1.00	
Very Fine Sand 140	0.60	
Very Fine Sand 270	0.70	Less than or equal to 5%
Saturated Hydraulic Conductivity in/hr	103.9"	
Coefficient of Uniformity	2.77	
Recommended Depth	6.7"	
Ball Lie Rating	2.5	Greater than 2.4
Visual Classification	subangular to subrounded	Subrounded/Mixed or Angular

BUNKER SAND QUALITY CONTROL

	50W Bunker Sand QC#1 4/2023	50W Bunker Sand QC#2 6/2023	<u>USGA/Brown and Thomas Recommendations</u>
Silt and Clay	1.30	3.10	Less than or equal to 3%
Sand	98.60	96.40	Greater than or equal to 95%
Gravel	0.10	0.50	Less than or equal to 2%
Organic Material	0.12	0.16	
<u>Sieve #:</u>			
Fine Gravel 10	0.10	0.50	Less than or equal to 2%
Very Coarse Sand 18	12.20	15.60	Less than or equal to 15%
Coarse Sand 35	45.70	43.50	35+60+100+ 140 between 78% and 100%
Medium Sand 60	38.80	34.40	
Fine Sand 100	1.10	1.50	
Very Fine Sand 140	0.40	0.70	
Very Fine Sand 270	0.40	0.70	Less than or equal to 5%
Saturated Hydraulic Conductivity in/hr	96.6"	97.6"	
Coefficient of Uniformity	2.37	2.6	
Recommended Depth	6.3"	6.6"	
Ball Lie Rating	2.5	2.5	Greater than 2.4
Visual Classification	subangular to subrounded	subangular to subrounded	Subrounded/Mixed or Angular

TEE-MIX SAND

	Pioneer Tee Sand #1 9/2022	Pioneer Tee Sand #1 /2023	<u>USGA Recommendations</u>
Silt and Clay	3.40		$\leq 8.0\%$
Sand	93.80		94 - 100%
Gravel	2.80		
Organic Material	0.12		
<u>Sieve #:</u>			
Fine Gravel 10	2.80		2.0mm $\leq 3.0\%$
Very Coarse Sand 18	15.00		2.0mm + 1.0mm $\leq 10\%$
Coarse Sand 35	27.90		
Medium Sand 60	31.00		0.5mm + 0.25mm $\geq 60\%$
Fine Sand 100	11.80		0.15mm $\leq 20\%$
Very Fine Sand 140	5.10		0.106mm + 0.053mm $\leq 5.0\%$
Very Fine Sand 270	3.00		
Saturated Hydraulic Conductivity in/hr	15"		Greater than 6" per hour
Coefficient of Uniformity	4.39		1.8 to 3.5 for peat and sand mixes
Recommended Depth	13"		