Mackas Sand 70/30

ADDRESSING THE NEEDS OF INDIVIDUAL AMENITY TURF AND LANDSCAPE MANAGERS.

- **Fast infiltration rate (HC) of 175 mm/hr**
- **Bulk Density: 1.91 g/cm^3**
- **Texture: sand**
- **pH in water (1:5): 7.8**
- **Moderate salinity (EC): 0.42 dS/m**
- **Water porosity(%v/v): 9; Air-filled porosity: 19**
- **Fineness modulus: 1.8**
- **Medium sand: 77.9% (retained by mass)**
- **Fine Sand: 17.3%**
- **Silt: 0.3%; Clay: 1.5%**

SUITABILITY.
Most sand-based sportsfields and golf greens

SPECIAL MANAGEMENT REQUIREMENTS
General mechanical maintenance to aerate turf underlay

Please call for a free consultation ▸▸▸

Mackas Sand & Supplies

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Turf Rootzone Assessment (USDA Sieves) - sport and amenity turf surfaces

Sydney Environmental and Soil Laboratory
Specialists in Soil Chemistry, Agronomy and Contamination Assessments

Sydney Environmental & Soil Laboratory Pty Ltd
ABN 70 106 810 708

Sample Drop Off:
16 Chilvers Road
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Certified System Quality ISO 9001

Batch N°: **19417** Sample N°: **3** **Report Status:** ○ Draft ◉ Final

CLIENT DETAILS:

Name: **Macka's Sand Pty Ltd**
Attn: **Robert Mackenzie**
Client Job N°:
Client Order N°:
Address: **2684 Nelson Bay Rd**
Salt Ash NSW 2318

PROJECT DETAILS:

Project Name: **Sample Received 15/8/11**

Location:
SESL Quote N°:
Date Received: **15/8/11**

SAMPLE DETAILS:

Sample Name: **70/30 Turf Underlay**

Test Type: **RSC, PSAUS, HCUSGA**

DISCUSSION AND RECOMMENDATIONS

The physical properties of this soil-compost blend was assessed to determine its likely performance characteristics as turf underlay. Based on these results, the material is considered suitable for use as construction and topdressing material on sand based sports fields as well as USGA specified sand-based golf greens.

The infiltration rate of water through the soil material is considered acceptable as it falls within the USGA specification of a minimum of 150mm/hr. However as the material settles in, the hydraulic conductivity is expected to be slower. It is therefore good practice to put in place mechanical renovation work that help maintain good aeration and internal drainage.

Suitability: All sports fields including A-grade stadiums and Golf greens

Special Management Requirement: general mechanical maintenance to ensure the turf underlay is well aerated

PARTICLE SIZE ANALYSIS

Size (mm)	Fraction	% Passing by mass	% Retained by mass	D VALUES	
3.35	Medium gravel	99.7%	0.3%	D_{100}:	4.747
2.00	Fine gravel	99.4%	0.3%	D_{90}:	0.478
1.00	V. coarse sand	98.8%	0.6%	D_{85}:	0.461
0.50	Coarse sand	97.0%	1.8%	D_{60}:	0.381
0.25	Medium sand	19.1%	77.9%	D_{50}:	0.349
0.15	Fine sand	1.8%	17.3%	D_{35}:	0.301
0.106	Fine Sand	1.4%	0.4%	D_{30}:	0.285
0.053	Very fine sand	1.2%	0.2%	D_{25}:	0.269
0.02	Silt	0.9%	0.3%	D_{15}:	0.226
0.002	Fine Silt	1.4%	-0.5%	D_{10}:	0.197
<0.002	Clay	0%	1.5%	D_5:	0.168

Coefficient of Uniformity (Cu): 1.93 - Uniform particle grading, potential surface instability.

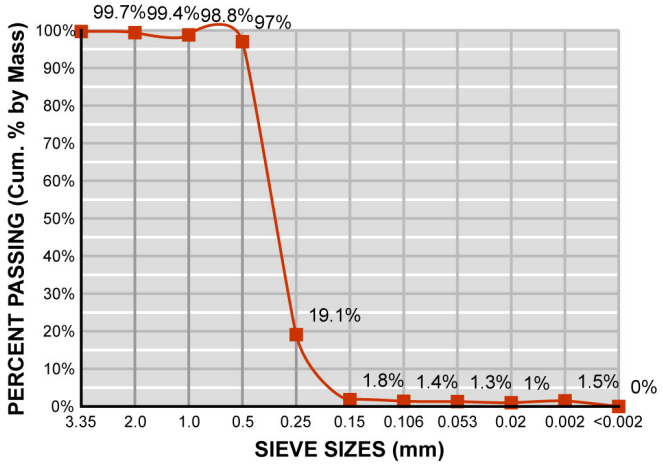
Coefficient of Curvature (Cc): 1.08

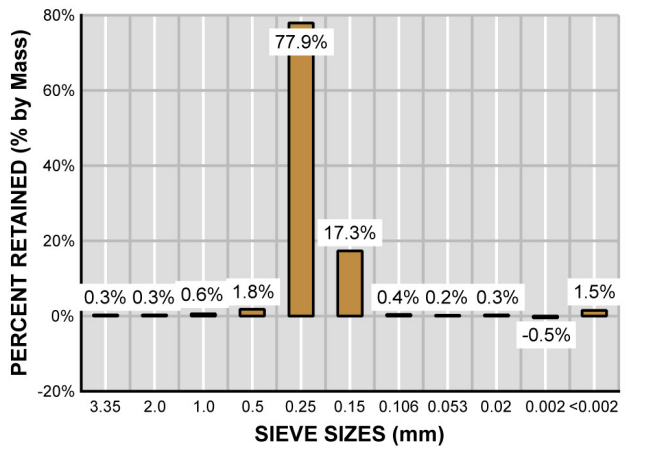
Gradation Index (Gi): 2.42 - Uniform particle grading, potential surface instability.

Fineness Modulus (Fm): 1.8 - Dominated by very fine to fine sand.
Note: Typical range for sportsfield rootzone is 1.7 to 2.5

Particle Distribution: Poorly graded
Note: Poorly graded soils are either uniformly graded or gap graded. Well graded soils have even distribution of particles across a wide range of particle sizes and are prone to dense packing. As a rule, well graded soils should be avoided for sportsfields and other high traffic surfaces that are subject to considerable compactive forces.

PARTICLE SIZE DISTRIBUTION GRAPHS





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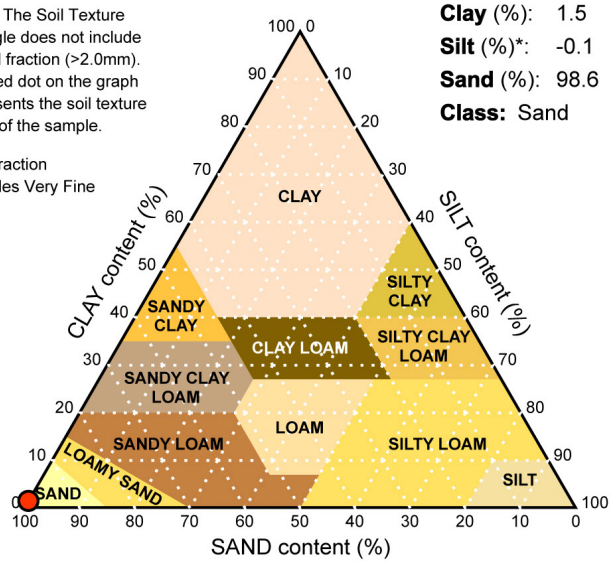
SOIL TEXTURE TRIANGLE AND DERIVED VALUES

Note: The Soil Texture Triangle does not include gravel fraction (>2.0mm). The red dot on the graph represents the soil texture class of the sample.

*Silt fraction includes Very Fine Sand



Clay (%): 1.5
Silt (%)*: -0.1
Sand (%): 98.6
Class: Sand

Predicted soil properties calculated from PSA values

Fineness Modulus (Fm):	1.8	
Effective particle diameter - D_{eff} (mm):	0.301	
Median particle diameter - D_{med} (mm):	0.349	Medium sand
Saturation (cm³ water/cm³):	0.28	
Field capacity (cm³ water/cm³):	0.09	
Permanent wilting point (cm³ water/cm³):	0.03	
Available water capacity (cm³ water/cm³):	0.06	(6% v/v)
Total porosity* (%v/v):	28	(Typically 25 – 35%v/v)
Water-filled porosity* (%v/v):	9	(Typically 8 – 15%v/v)
Air-filled porosity* (%v/v):	19	(Typically 10 – 28%v/v)
Critical Tension (mm):	237.2	

*** at Field Capacity**

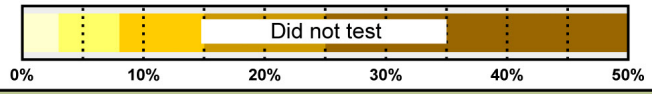
Predicted Ksat results (based on PSA)

Bulk Density (g/cm³):	1.91
Saturated Hydraulic Conductivity using D_{eff} (mm/hr):	1033
USGA Saturated Hydraulic Conductivity (mm/hr):	175

Particle shape: Shape not tested, sphericity not tested.

ORGANIC MATTER

Organic Matter (%w/v): -
Did not test



Actual Ksat results (Laboratory determination)

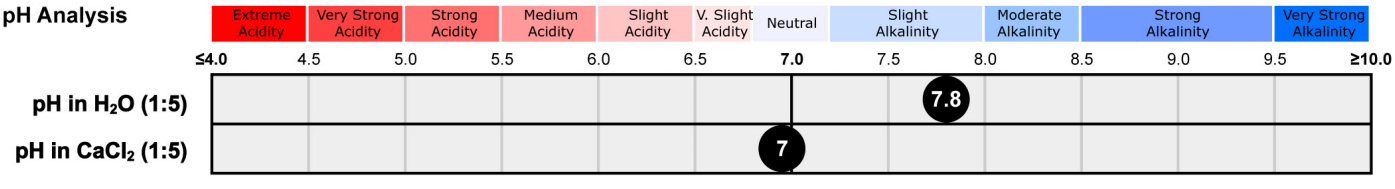
Field core method (cm/hr): Did not test.

Repacked core method:

Point	Ksat (mm/hr)	Bulk Density (g/cm³)
8 drops:	D.N.T.	Tube Nº?
16 drops:	D.N.T.	Tube Nº?
32 drops:	D.N.T.	Tube Nº?

pH and ELECTRICAL CONDUCTIVITY

pH Analysis



Electrical Conductivity (dS/m)

Electrical Conductivity by Saturated Extract (EC_e dS/m): 9.66 – Highly saline. Only tolerant plant species grow satisfactorily.

Consultant: Gus Manatsa

Authorised Signatory: Murray Fraser

Date of Report: 25/08/2011

METHOD REFERENCES:
Particle Size Analysis: ASTM F 1632-03
Organic Matter: Charman & Roper 2000
Saturated Hydraulic Conductivity and Bulk Density: Department Urban Services, ACT Government 1993. Canberra Landscape Guidelines, Soil Testing Procedure LG B22.
pH and Electrical Conductivity: Bradley et al (1983)
Effective Particle Diameter, Predicted Ksat, and Predicted Critical Tension: Stewart, V.I. (1994) Sports Turf: Science, construction, and maintenance.