

Civil and Structural
Consulting Engineers

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Class 1 & 2 Road Base Material Supply Data Report



SITE: 34 JACKSON STREET, BAYSWATER

DATE OF ISSUE: 1st – March – 2021

DATE OF EXPIRY: 31st – May - 2021



Table 1: Limits on constituent materials based on material class

Material	Class 1	Class 2	PRI AVG %
	Maximum % retained on 4.75mm sieve		
Crushed Recycled Concrete (CCRB)	95	95	95.2
Recycled Asphalt Pavement (RAP)	10	15	0.4
High density clay brick & tile	10	15	3.1
High density aggregates from roads etc.	25	100	0.8
Low density materials (plastic, plaster, etc.)	1	1.5	0.2
Organic matter (wood, etc.)	0.5	0.5 as base 1.0 as subbase	0.1
Unacceptable high-density materials (metals, glass, ceramics > 4mm)	2	3	0.2
<u>Asbestos</u> and other hazardous materials	0	0	0

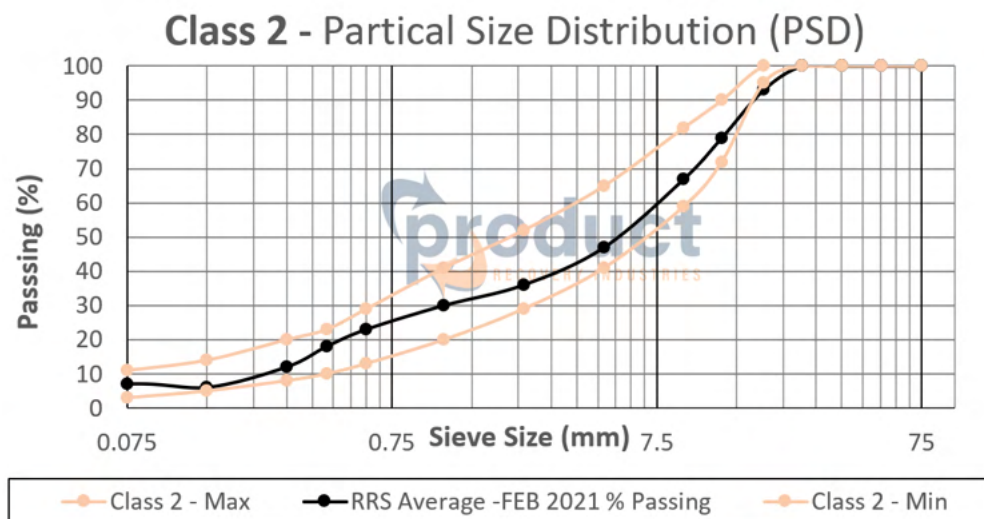
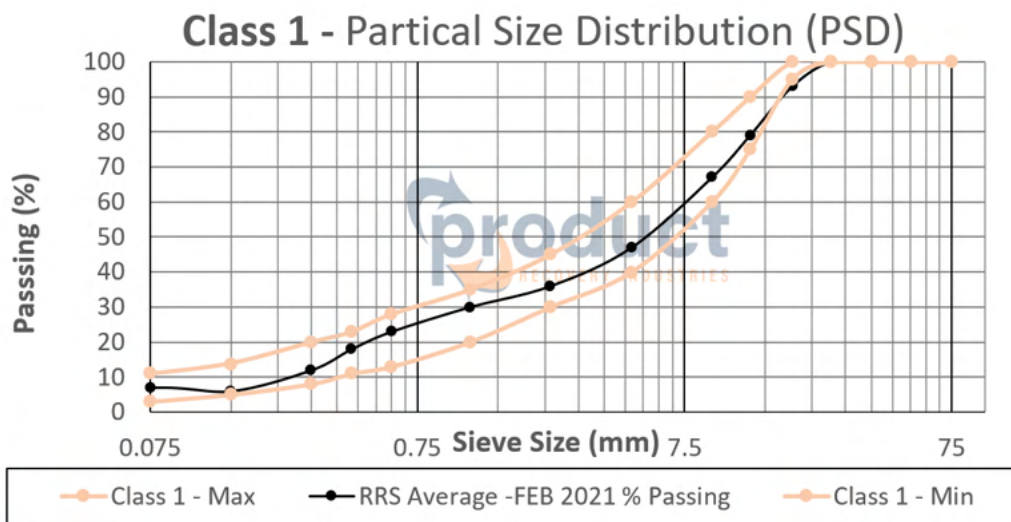


Table 2: Material class for given application

Level in pavement	Traffic (ESA/day)			
	> 500	< 500	50 - 100	< 50
Base ≤ 50mm asphalt or spray seal	Class 1	Class 1	Class 1	Class 1
Base ≥ 50mm asphalt	Class 1	Class 1	Class 1	Class 2
Subbase	Class 2	Class 2	Class 2	Class 2

Table 3: Limits for Particle Size Distribution

Material Class	Class 1	Class 2	PRI AVG %
AS sieve size (mm)	% passing by mass minimum and maximum limits		
26.5	100	100	99
19.0	95 - 100	95 - 100	93
13.2	75 - 90	72 - 90	79
9.50	60 - 80	59 - 82	76
4.75	40 - 60	41 - 65	47
2.36	30 - 45	29 - 52	36
1.18	20 - 35	20 - 41	30
0.600	13 - 27	13 - 29	23
0.425	11 - 23	10 - 23	18
0.300	8 - 20	8 - 20	12
0.150	5 - 14	5 - 14	6
0.075	3 - 11	3 - 11	7



ROAD BASE



Table 4: Limits for Linear Shrinkage

Linear Shrinkage (7 day)	Class 1 & 2		PRI AVG %
Base (%)	0.2 - 1.5		0.5
Subbase (%)	0.2 – 4.0		

Table 5: Limits for Unconfined Compressive Strength

Unconfined Compressive Strength	Class 1 & 2		PRI AVG kPa
Base (kPa)	< 1000		330
Subbase (kPa)	< 2000		

Table 6: Limits for Los Angeles Abrasion test

Los Angeles abrasion	Class 1	Class 2	PRI AVG %
Los Angeles abrasion loss (%)	< 40	< 42	42

Table 7: Limits for CBR

California Bearing Ratio	Class 1 98% MDD 100% OMC	Class 2 98% MDD 100% OMC	PRI AVG %
California Bearing Ratio (CBR) (%)	> 100	> 100	133

Table 8: Dry Density/Moisture Content Relationship of a Soil

Dry Density/Moisture Content Relationship of Material	PRI AVG
Maximum Dry Density (MDD) kN/m³	18.6
Optimum Moisture Content (OMC) %	12.8

1. General

The Specification for the supply of road making aggregates sourced from recovered by-products of the construction and demolition industry.

The material shall consist of a uniformly blended mixture of coarse and fine aggregate resulting from the crushing of recycled concrete from construction and demolition material. It may contain other materials such as clay brick and tile, sand and glass according to the limits specified in Table 1.

Based on the “change in source material” the current testing regime is in compliance with the WALGA/IPWEA Spec. This determination is based on the continuous material stream being Class I & II inert materials from the Perth C&D construction market and within a 40km radius of PRI facility.

2. Material classes

The material classes shall be determined according to the end use of the product which will be determined by the pavement design, traffic conditions and level in the pavement. The recommended material class required for a specific application is specified in

Table 2.

3. Limits on source material composition

Limits on the material composition are shown in Table 1.

4. Particle size distribution (PSD)

PSD shall conform to the limits of Table 3. The PSD curve shall be classified by the descriptive classification as shown in Table 3. The PSD shall be determined in accordance with MRWA test method WA 115.1

Coarse aggregate (retained 4.75 mm sieve) shall consist of clean, hard, durable, angular fragments of recycled concrete or asphalt produced by crushing sound recycled materials originally made from sound unweathered rock and shall not include materials which break up when alternately wetted and dried.

Fine aggregate (passing 4.75 mm sieve) shall consist of crushed rock fragments or a mixture of crushed recycled concrete, asphalt or brick fragments produced by crushing sound recycled materials originally made from sound unweathered rock, clays or natural sand.

5. Linear shrinkage (LS)

Linear shrinkage shall be determined on the portion of material passing the 0.425mm sieve in accordance with MRWA test method WA 123.1 Limits for LS are given in Table 4.

6. Unconfined Compressive Strength (UCS)

The UCS of the material when tested in accordance with MRWA test method WA 143.1 (7 days cured and 4 hours immersed) shall conform to the requirements of

Table 5.

7. Micro Deval loss or Los Angeles abrasion coarse aggregate

The Micro Deval test on coarse aggregate is determined on material retained on the 9.5 mm sieve. The test method shall be determined in accordance with ASTM D6928 - 08e1 *Standard Test Method for Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro Deval Apparatus*. Limits for Los Angeles abrasion are given in

Table 6.

8. California Bearing Ratio (CBR)

The CBR shall be determined in accordance with MRWA test method WA 141.1. The sample shall be soaked for four days. The minimum requirements for CBR are detailed in

Table 7.

9. Maximum dry density (MDD) and Optimum moisture content (OMC)

The MDD and OMC of the material shall be determined in addition to all other tests at Frequency A as outlined in A.2. MDD and OMC shall be determined in accordance with MRWA test method WA 133.2 *Dry density/moisture content relationship: modified compaction coarse grained soils*. See

Table 8.

10. Environmental Requirements

The class 1 & 2 road base has been tested to ensure it meets the environmental guidelines set out by WA DWER guidelines for assessment of construction products. Based on a commercial / industrial site use, the following assessment criteria were adopted for chemical screening of the road base. RSA has reviewed the laboratory results supplied and conclude:

Date Tested: December 2020 ¹	Data Set	Result
NEPM 1999 - Health Investigation Level – “A” (Standard Residential)	EP2009312	Pass
Soil Health Screening Levels for vapour intrusion – “A” (Standard Residential)	EP2009312	Pass
Ecological Screening Levels for TPH, BTEX & Benzo(a)pyrene in soil	EP2009312	Pass
Roads to Reuse RCPP amended guidelines Nov. 2018	EP2009312	Pass

¹ All environmental certifications will expire on May 2021

11. Certification

RSA in conjunction with Product Recovery Industries (PRI) provides this certificate for the recycled recovered by-products produced from their facility located at 34 Jackson Street Bayswater.

This material is regularly tested to ensure compliance of the stockpiles for both structural and environmental requirements. The recycled materials from PRI being used as fill is a sustainable and a viable option with environmental benefits.

This certificate will remain current until the date on page 1 of this certificate. This certificate is intended to provide an assurance of compliance for engineered materials provided by Product Recovery Industries².

CERTIFIED



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Structural Engineer

² This certificate is intended to be a guide, projects requiring specific properties may need additional testing.

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Engineered Sand Fill Material Supply Data Report



SITE: 34 JACKSON STREET, BAYSWATER

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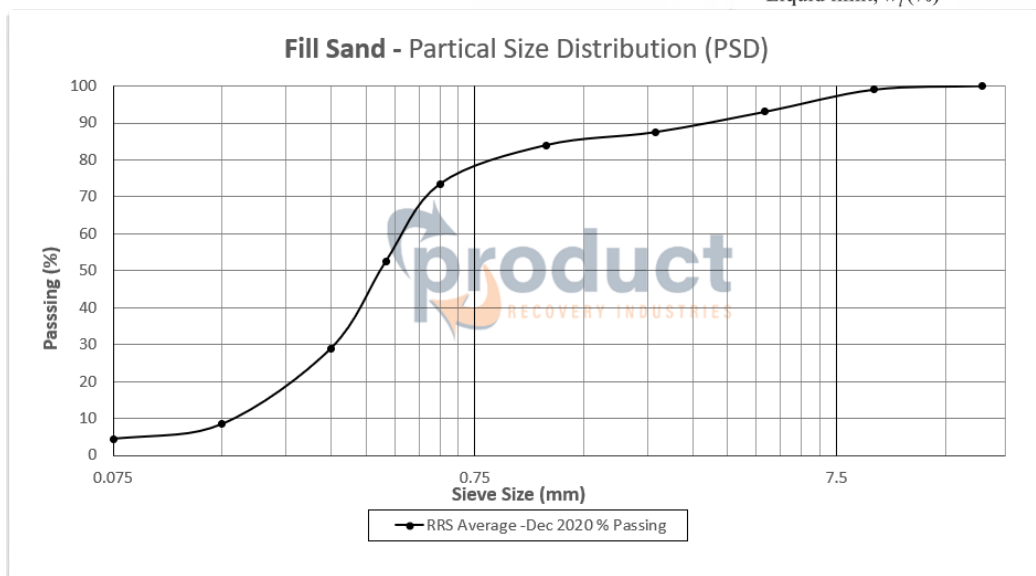
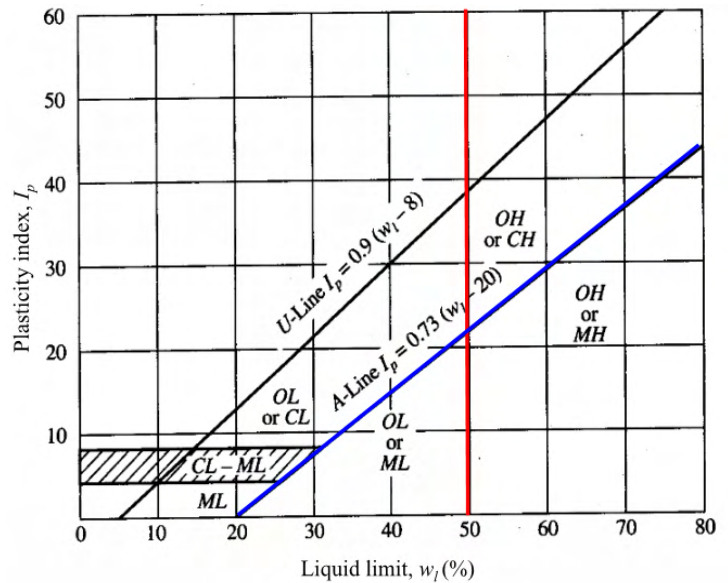
DATE OF EXPIRY: 31th – May - 2021



³ WGLS has only been engaged to provide independent testing of the PRI sand products.

Table 9, Sand Particle Size Distribution

Material Class	PRI
AS sieve size (mm)	AVG %
19.0	100
9.50	100
4.75	95
2.36	91
1.18	89
0.600	79
0.425	57
0.300	28
0.150	7
0.075	3



Soil Properties

Max Dry Density	18. kN/m ³	Unified soil classification	SP
Optimum Moisture Content	12.3%	Factored bearing capacity (compaction dependant)	150 kPa
Internal friction angle	39°	CBR Value @ 2.5mm:	14%
Cohesion (C)	0.0 kPa	CBR Value @ 5.0mm:	21%
Liquid Limit	26%	Organic Content	1.5%
Plastic Limit	Non-Plastic	Foreign Materials Content	%
Plasticity limit	Non-Plastic	Type 1: Metal, Glass, Asphalt, Stone, Ceramics and Slag (other than blast furnace slag)	10.1
Linear Shrinkage	0.00%	Type 2: Plaster, Clay Lumps and other Friable Material	0.2
Permeability	19.9 cm/hr	Type 3: Rubber, Plastic, Bitumen, Paper, Cloth, Paint, Wood and other Vegetable Matter	1.4

12. General

RSA in conjunction with Product Recovery Industries (PRI) provides this certificate for the recycled sand by-product produced from **34 Jackson Street Bayswater** recycling facility.

This material is regularly tested to ensure compliance of the changing stockpile for both structural and environmental requirements. The recycled sand from PRI being used as fill is a sustainable and a viable option with environmental benefits.

Based on the “change in source material” the current testing regime is in compliance with the WALGA/IPWEA Spec. This determination is based on the continuous material stream being Class I & II inert materials from the Perth C&D construction market and within a 40km radius of PRI facility.

13. Environmental Requirements

The recycled fill has been tested to ensure it meets the environmental guidelines set out by WA DWER guidelines for assessment of construction products. Based on a commercial / industrial site use, the following assessment criteria were adopted for chemical screening of the recycled sand. RSA has reviewed the laboratory results supplied and conclude:

Date Tested: December 2020 ⁵	Data Set	Result
NEPM 1999- Health Investigation Level – “A” (Standard Residential)	EP2009312	Pass
Soil Health Screening Levels for vapour intrusion – “A” (Standard Residential)	EP2009312	Pass
Ecological Screening Levels for TPH, BTEX and Benzo(a)pyrene in soil	EP2009312	Pass
Uncontaminated Fill Classification Definition (C.D) April 2018, Table 6 ⁵	EP2009312	Pass

14. Structural requirements

RSA has reviewed the laboratory results supplied and conclude this soil is suitable as a construction material and has comparable properties to Class ‘A’ soil. Given its consistent nature the soil strength if required for a specific project can be significantly improved.

The recycling process operates such that the amount of clay and silt fines are constantly low, making for a consistent quality engineered fill. See previous pages of this report for the relevant structural soil properties and classification.

⁴ All environmental certifications will expire on May 2021

⁵ Fill C.D are PRI prescribed batch plant test results

15. Permeability

The permeability of the soil has been measured using a Falling Head Permeability test as per AS 1289.6.7.2.

16. Particle Size Distribution (PSD)

The PSD of the sand fill material has been tested by an independent laboratory in accordance with AS 1289.3.6.1

17. Friction Angle

The internal friction angle of the sand fill material has been tested by an independent laboratory in accordance with AS 1289.6.2.2-1998. The direct shear test using a shear box is used.

18. Maximum dry density (MMDD) and Optimum moisture content (OMC)

The MMDD and OMC of the sand fill material has been tested by an independent laboratory in accordance with AS 1289.5.4.2-2007.

19. Atterberg limits

The Atterberg limits (Plasticity Index, linear shrinkage & liquid limit) of the sand fill material has been tested by an independent laboratory in accordance with AS1289.3.9.2, .3.2.1, .3.3.2 & .3.4.1

20. Certification

RSA in conjunction with Product Recovery Industries (PRI) provides this certificate for the recovered by-products produced from their facility located at **34 Jackson Street Bayswater**.

This material is regularly independently tested to ensure compliance of the stockpiles for both structural and environmental requirements. The recycled materials from PRI being used as fill is a sustainable and a viable option with environmental benefits.

This certificate will remain current until the date on engineered sand fill cover page. This certificate is intended to provide an assurance of compliance for engineered materials provided by Product Recovery Industries⁶.



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⁶ This certificate is intended to be a guide, projects requiring specific properties may need additional testing.