

Objective

The objective of this project is to demonstrate the beneficial use of CCPs heavy duty pavement applications to dTMR standards, as part of a broader initiative to increase CCP utilization in our built environment..

Designed and Built to dTMR Standards

With the goal of demonstrating the performance of CCPs on heavy duty pavements, the control and experimental pavement profiles on this project were developed in accordance with Transport for Main Roads Pavement Design Supplement, Transport for NSW Standards and Austroads Guide to Pavement Technology Structural Design.

Sustainability Targets

To maximise the use of CCPs for sustainability-driven projects, the pavements utilise between **40** and **490** kg of CCP per m^2 (of pavement). Notably, the intersection pavement utilises bottom ash as for all structural layers. Current use of CCPs is around **35** kg/ m^2 - our approach has increased the sustainability calculation.







METHODOLOGY

Pavement Selection

To accurately evaluate the performance of the CCPs, each experimental pavement modifies a single layer of the control pavements, thus isolating only one CCP variable per pavement.

Control vs Experimental Pavements

Two <u>control</u> pavements were established for this trial:

- Flexible granular pavement + asphalt surfacing
- Rigid plain concrete pavement (PCP)

Three <u>experimental</u> pavements were established:

- Flexible bottom ash base and subbase layers
- Rigid bottom ash and RoS fly ash as sand
- Rigid Bottom Ash as improved layer









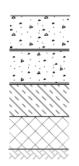








Sustainability - CCP usage per m² pavement



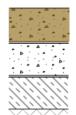
175 mm PLAIN CONCRETE PAVEMENT (MRTS40)

DE-BONDING TREATMENT NOM. 7 mm LOW CUTTER SEAL C170 SIS (MRTS39). REFER TO NOTE 3 CURING (WAX EMUL SIDN)

PRIME PLUS NOM. 10 mm C170 S/S SEAL (MRTS11) 150 mm LIGHTLYBOUND IMPROVED LAYER, SUBTYPE 2.3 (MRTS10)

150 mm SUBGRADE TREATMENT TYPE C (MRTS04) REPLACE WITH TYPE 2.5 MATERIAL (MRTS05) MIN. 97% STANDARD COMPACTION

SUBGRADE CBR $_{\rm 2}$ 5%, SWELL $_{\rm 2}$ 2.5% RIP AND RECOMPACT IN SITU SUBGRADE TO A MINIMUM DEPTH OF 150 mm IN ACCORDANCE WITH TREATMENT TYPE A (MRTS04).



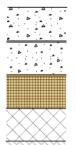
175 mm CONCRETE PAVEMENT COARSE SAND FROM FURNACE BOTTOM ASH AND FLY ASH

150 mm LEAN-MIX CONCRETE SUBBASE (MRTS39) PRIME PLUS NOM. 10 mm C170 S/S SEAL (MRTS11)

150 mm LIGHTLYBOUND IMPROVED LAYER, SUBTYPE 2.3 (MRTS10)

150 mm SUBGRADE TREATMENT TYPE C (MRTS04) REPLACE WITH TYPE 2.5 MATERIAL (MRTS05)) MIN. 97% STANDARD COMPACTION

SUBGRADE CBR \geq 5%, SWELL \leq 2.5% RIP AND RECOMPACT IN SITU SUBGRADE TO A MINIMUM DEPTH OF 150 mm IN ACCORDANCE WITH TREATMENT TYPE A (MRTS04).



175 mm PLAIN CONCRETE PAVEMENT (MRTS40)

150 mm LEAN-MIX CONCRETE SUBBASE (MRTS39)

PRIME PLUS NOM. 10 mm C170 S/S SEAL (MRTS11)

150 mm SUBGRADE TREATMENT TYPE C (MRTS04) REPLACE WITH TYPE 2.5 MATERIAL (MRTS05)) MIN. 97% STANDARD COMPACTION

SUBGRADE CBR $_2$ 5%, SWELL $_2$ 2.5% RIP AND RECOMPACT IN STUTU SUBGRADE TO A MINIMUM DEPTH OF 150 mm in ACCORDANCE WITH TREATMENT TYPE A (MRTS04).



R - PLAIN CONCRETE PAVEMENT (CONTROL)



RB - CONCRETE PAVEMENT COARSE SAND FROM BOTTOM ASH AND FLY ASH



RU - PLAIN CONCRETE PAVEMENT WITH BOTTOM ASH IMPROVED LAYER

FLYASH	45	112	45
BOTTOMASH	0	39	293



50 mm AC14M (C320) WEARING COURSE (MRTS30)

120 mm TYPE 2.1 GRANULAR BASE (MRTS05) MIN. 100% STANDARD COMPACTION

110 mm TYPE 2.3 SUBBASE (MRTS05) MIN. 100% STANDARD COMPACTION

NOM. 10 mm C170 S/S SEAL (MRTS11)

150 mm SUBGRADE TREATMENT TYPE C (MRTS04) REPLACE WITH TYPE 2.5 MATERIAL (MRTS05) MIN. 97% STANDARD COMPACTION

SUBGRADE CBR $_2$ 8%, SWELL $_2$ 2.5% RIP AND RECOMPACT IN SITU SUBGRADE TO A MINIMUM DEPTH OF 150 mm IN ACCORDANCE WITH TREATMENT TYPE A (MRTS04). F - UNBOUND GRANULAR BASE

(CONTROL)



50 mm AC14M (C320) WEARING COURSE (MRTS30) PRIME PLUS 10 mm NOM. C170 S/S SEAL (MRTS11)

120 mm BOTTOM ASH BASECOURSE MIN. 100% STANDARD COMPACTION

110 mm BOTTOM ASH SUBBASE MIN. 100% STANDARD COMPACTION

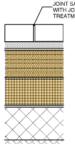
NOM. 10 mm C170 S/S SEAL (MRTS11)

150 mm SUBGRADE TREATMENT TYPE C (MRTS04) REPLACE WITH TYPE 2.5 MATERIAL (MRTS05) MIN. 97% STANDARD COMPACTION

SUBGRADE CBR ≥ 8%, SWELL ≤ 2.5% RIP AND RECOMPACT IN SITU SUBGRADE TO A MINIMUM DEPTH OF 150 mm IN ACCORDANCE WITH TREATMENT TYPE A (MRTS04).



FB - BOTTOM ASH PAVEMENT



80 mm INTERLOCKING PAVERS

25 mm BEDDING SAND/ PRIME PLUS 10 mm NOM. C170 S/S SEAL (MRTS11)

120 mm BOTTOM ASH BASECOURSE MIN. 100% STANDARD COMPACTION

125 mm BOTTOM ASH SUBBASE MIN. 100% STANDARD COMPACTION

SUBGRADE CBR $_{\rm 2}$ 8%, SWELL $_{\rm 2}$ 2.5% RIP AND RECOMPACT IN SITU SUBGRADE TO A MINIMUM DEPTH OF 150 mm IN ACCORDANCE WITH TREATMENT TYPE A (MRTS04).



FI - BOTTOM ASH INTERSECTION

NOTE: 1. REFER TO QA SPECIFICATION FOR JOINTING AND BEDDING SAND REQUIREMENTS FOR INTERLOCKING PAVERS

FLY ASH 0 0 **BOTTOMASH** 0 487 449