

Metropolitan Road Improvement Alliance

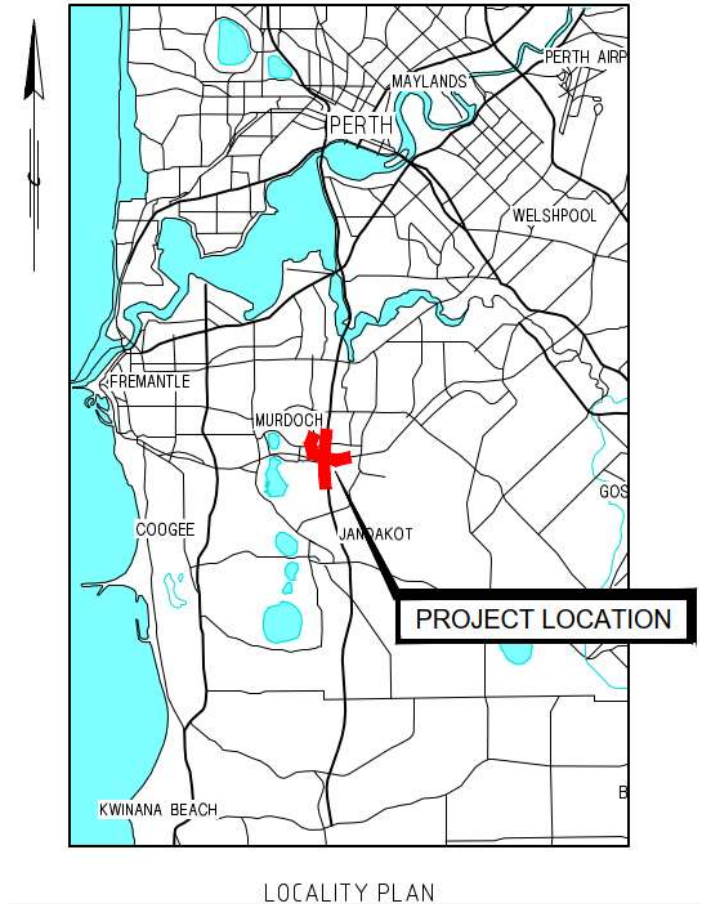
Murdoch Drive Connection (MDC)

Crushed Recycled Concrete (CRC) Pavement Trial

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Date: 19th August 2020

MDC Project Location & Objectives

- Project Objectives:
 - Relieve congestion on:
 - Murdoch Drive
 - South Street
 - Kwinana Freeway
 - Improve journey times to Murdoch Precinct
 - Support the ongoing development of MAC



MDC Project Scope

- Dual lane carriageway connecting Murdoch Drive to Roe Highway

Commenced: Feb 2018
Completed: Apr 2020



- New Roe Hwy / Kwinana Fwy Interchange
- Widening of Kwinana Freeway Northbound Carriageway – Bolderwood Reserve to Farrington Rd Ramp

Introduction of CRC on the Project

- May 2019 MRIA MDC was invited by MRWA to participate in the pilot project
- Criteria for material supply:
 - RtR Product Specification
 - CRC Pilot Project Spec 501
- Criteria for placement locations:
 - Substitute limestone under Full Depth Asphalt (FDA)
 - At least 100m away from wetlands/watercourses
- Project identified that it could use approximately 4,000T of CRC



CRC Material Details

- Crushed Recycled Concrete (CRC) produced from construction and demolition waste.
- Source material is crushed and screened to achieve a compliant product

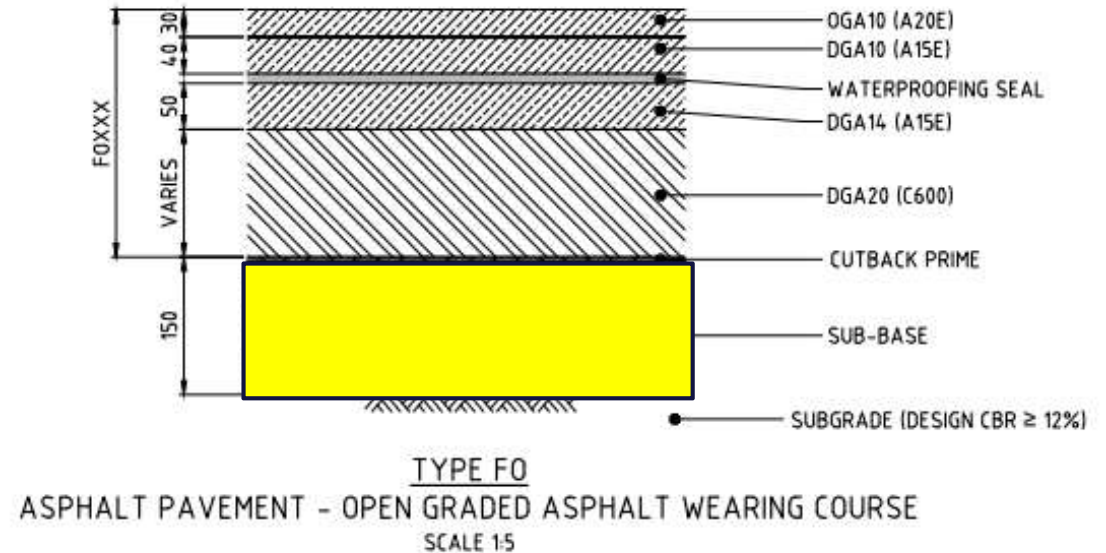
CRC material comprises:

- Crushed concrete
 - Recycled asphalt pavement (max 15%)
 - High density material e.g. brick and tile (max 15%)
 - Low density materials (e.g. plastic/ plaster) limited to 1.5%
 - Fibrous asbestos and asbestos fines limited to 0.001% in accordance with DWER safe exposure guidelines
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- CRC typical density 2.0 T/m³
 - CRC typical Optimal Moisture Content 11%



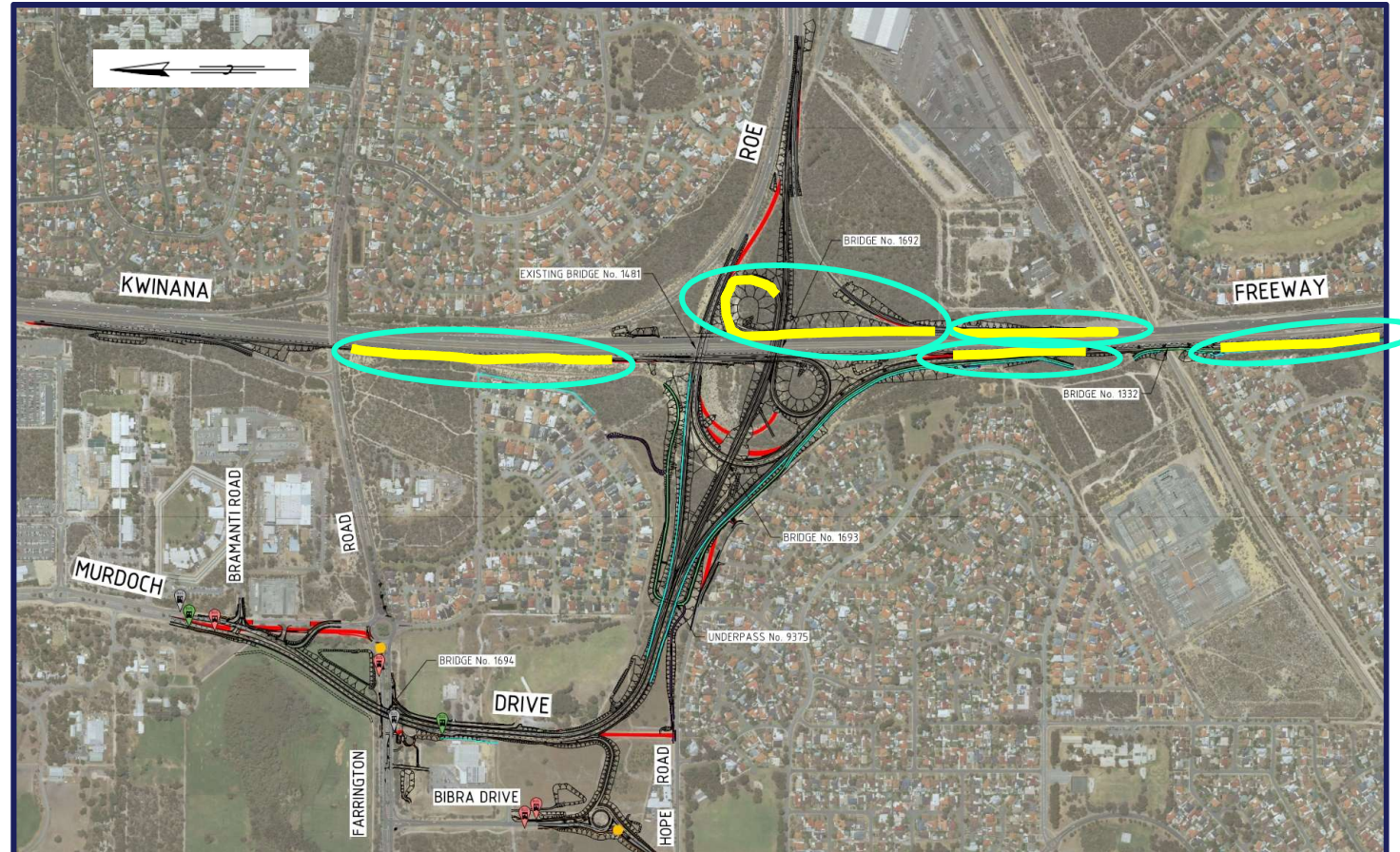
CRC Pavement

- CRC was used as a direct substitute of the limestone sub-base on the Kwinana Freeway and Murdoch Drive / Kwinana Freeway Southbound Ramp under FDA pavements.
- Same thickness and compaction criteria.



CRC Pavement – Locations Used

- Commenced placement of material in July 2019
- Last of the CRC placed in October 2019
- Overall, **7,300 Tonnes** of CRC imported to project



CRC Placement

Construction Sequence:

- Pushed / levelled out with loader
- Moisture conditioning and blade mixing using 6 wheel water cart and grader (leaving 30mm high above design level)
- Compaction using 12T smooth drum roller (8 passes)
- Trimmed to final design level with grader
- Finishing surface with 12T smooth drum roller & water cart
- Swept with tractor broom prior to application of prime



CRC Placement - Photos



CRC Placement - Photos



CRC Placement

Learnings:

- Surface finish was acceptable but contained small tear marks from the larger stone being trimmed off.
- CRC retains moisture longer than limestone - for dry back additional 1-2 days required
- Best surface finish achieved if given several days to bake out prior to sweeping and prime application.
- Surface requires a firm broom to remove fines created during compaction.



Conclusion – Successful Trial



- For workability purposes CRC product is sufficiently consistent
- Constituents in CRC material delivered was within specification parameters
- CRC is a viable pavement material option as sub-base for FDA pavement
- Provides an opportunity to achieve positive sustainability outcomes