



# The Commercial and Environmental Benefits of Recycled Civil Construction Materials



# Overview:



- Local history - recycled concrete & asphalt
- Compare conventional to recycled in VicRoads Material Specifications
- Carbon reduction in roads
- Examples of projects and testing
- Future R&D for resource preservation



# History - Asphalt

- Early 70's – VicRoads (CRB) spec Asphalt
- 1992 RAP included in specifications (Section 407)
- 2005 Glass in Asphalt proven
- 2009 Production capacity 380,000 tonnes
  - 165,000 tonnes sold in 09 of material containing RAP & Glass
  - RAP a common additive across industry (0-30%)
  - 25 Mix registrations in place, 20 containing RAP from 10-30%

# History – Crushed Concrete



- 1989 - project based concrete recycling
- 1993 - VicRoads spec for Crushed Concrete
  - Western Ring Road 200,000 tonnes Class 3
- 2008 - 20 million tonnes reached
- 2009 - Production capacity 2.5 million tonnes
- 2010 - Large scale plants, producing to VicRoads spec
  - 16 mix registrations in place
  - Many small mobile plants producing fill

# Recycling Today



Ecobuy - Green Roads & Footpaths Forum  
July 2010

# Recycling Today



# Comparing Specifications



## 1

### Crushed Concrete Compared to Crushed Rock

Traditional Specification for Materials Sourced from Crushed Rock	Specification for Materials Sourced from Crushed Concrete	Example Application
Section 812 - Class 2, 3 & 4	Section 820 - Class 2, 3 & 4	Flexible road pavement (untreated) construction: <ul style="list-style-type: none"> <li>- Base</li> <li>- Subbase</li> <li>- Drainage</li> <li>- Bedding</li> <li>- Kerbs &amp; Footpath bedding</li> </ul>
Section 815 - Class 2 & 3	Section 821 - Class 2 & 3	Stabilised pavement construction: <ul style="list-style-type: none"> <li>- Base and subbase</li> </ul>
Class 2 recycled crushed concrete must be used in accordance with the light duty base requirements of section 820		

## 2

### Asphalt

Recycled content can be supplied in the following asphalt types in accordance with VicRoad Specification Section 407 provided the asphalt supplier has the appropriate mix registrations with VicRoads.		Glass
Type L	Up to 20% Recycled Content	✓
Type N	Up to 15% Recycled Content	✓
Type H	Up to 10% Recycled Content	n/a
Type SI	Up to 20% Recycled Content	✓
Type SF	Up to 30% Recycled Content	✓

# Carbon Footprint



- **Life Cycle Analysis comparing Quarried Rock and Recycled Crushed Concrete**

Indicates Crushed concrete 65% less than quarried rock

- **Indicative study comparing against Virgin Asphalt**

Asphalt including Rap 7% benefit on Global Warming

Asphalt Warm Mix RAP 10% benefit on Global Warming

Asphalt including Glass & RAP 12% benefit on Global Warming

# Project Snapshot



- **Class 3 Crushed Concrete**
  - Western Ring Road 1993
  - Eastlink 200 000 tonnes
    - Class 3 x 3% & Class 4
  - Western Highway Realignment 2010



- **20mm Type SI Glass Inc. RAP**  
(Over 30% Recycled Content - VicRoads Registered)
  - Gourlay Road Melton
  - Bell Street Preston.

# Ongoing Research Testing



- **Laverton Entry Rd**
  - ARRB Wet Pendulum
  - Skid Resistance
  - Density
  - Bitumen Content
  - Grading
  - Regular visual inspections



- **Hoppers Crossing ARRB**

# Research and Development



- Recent
  - Brick in Road Base
  - Recycled glass in Road Base
  - Recycled glass in Footpaths
- Current
  - Warm Mix Asphalt – inc Glass
  - Higher Rap %
  - Glass in concrete





# Market Acceptance

- Acceptance from users
- Wording of contract and specification documents to allow equivalent recycled class or mix design.
- Ongoing education with VicRoads involvement
- Ongoing work on specifications with ARRB, RMIT, Swinburne, Vicroads, Sustainability Victoria etc.

# Disposal versus Recycling





# Useful tools on the website

[www.alexfraser.com.au](http://www.alexfraser.com.au)

Invitation to visit  
Alex Fraser facilities



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