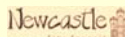


## **Sustainable Construction**

- Case studies from a highways perspective
- Practicalities of using recycled and sustainable materials in construction

*Peter White  
Project Engineer  
Newcastle City Council  
Engineering & Design Services*

*May 2007*



---

---

---

---

---

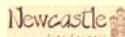
---

---

---

## **Scotswood Road Improvement (SRI)**

- 3km single carriageway upgraded to dual c/w
- Driven by new commercial developments and traffic flows
- Started design work in 2002
- Finished construction late 2006
- Adv cost £1.3m (plus £2m utility diversions)
- Main cost £6.7m



---

---

---

---

---

---

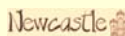
---

---

## **The Blaydon Races**

Oh me lads, you should've seen us gannin'  
Passing the folks along the road  
And all of them were starin'  
All the lads and lasses there  
They all had smilin' faces

**Gannin along the Scotswood Road  
To see the Blaydon Races**



---

---

---

---

---

---

---

---

Scotswood Road 1950's



Newcastle

---

---

---

---

---

---

---

---

Scotswood Road 2007



Newcastle

---

---

---

---

---

---

---

---

The Design Team



Newcastle

---

---

---

---

---

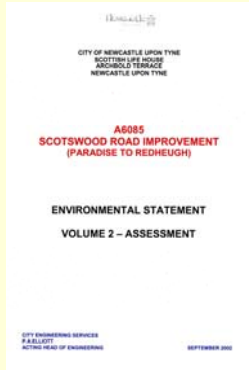
---

---

---

**Environmental Statement.**

Used to identify potential environmental impacts of the scheme.



---

---

---

---

---

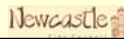
---

---

---

**SRI Environmental Statement.**

- Contents included a study of;
  - Historical Background / Land Use.
  - Archaeological Assessment
  - Landscape
  - Ecology and Nature Conservation
  - Economic Development
  - Air and Climate
  - Noise



---

---

---

---

---

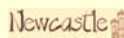
---

---

---

- Previous Land Uses:
  - Colliery
  - Brickworks, Cement Works
  - Fishery
  - Railway, Stations, Sidings
  - Timber Yard
  - Housing, Pubs, Clubs, Inns, Cinemas
  - Glue Factory
  - Industrial Works
  - Crucible Manufactory
  - Baths and Public Wash Houses

Most of these were demolished in the 1950's and 60's



---

---

---

---

---

---

---

---

# Peter White – Breakout B

Historical records indicated that most of the demolition waste remained insitu



Newcastle

---

---

---

---

---

---

---

---

Scotswood Road over the last few decades - A single carriageway with wide grass verge



Newcastle

---

---

---

---

---

---

---

---

Typical trial hole



Newcastle

---

---

---

---

---

---

---

---

### Advanced contract

- 8,000t topsoil set aside for reuse
- 70,000t recycled (into capping / GSB)
- On-site plant saved approx 8,200 wagon movements



Newcastle

---

---

---

---

---

---

---

---

### Innovative Drainage

#### Problems

- Northumbrian Water concern about vastly increased runoff from new carriageway
- Maintenance implications of numerous road gullies
- Also the carriageway long-fall was problematic regarding drainage

Newcastle

---

---

---

---

---

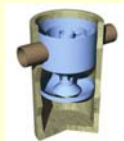
---

---

---

### Drainage solutions

- Underground storm water storage
- and hydraulic flow control devices
- Separators for removal of silts and floating matter



Newcastle

---

---

---

---

---

---

---

---

**Main contract**

- 32,000t of carriageway recycled into new base material for C/W and F/W
- HDM equivalent foam mix - cold laid
- Recycling plant just 1 mile offsite (saved 1,000s of haulage miles)
- Different specification for F/W material



Newcastle

---

---

---

---

---

---

---

---

**Wildlife & Habitat**

- SNCI (Site of Nature Conservation Importance)
- Wildlife corridor
- Dingy Skipper butterfly (protected species)
- Pheasant & Song Thrush
- Verge planting very low maintenance with wild grasses & flowers to create new habitat



Newcastle

---

---

---

---

---

---

---

---

**Scotswood Road 1950's**



Newcastle

---

---

---

---

---

---

---

---

Scotswood Road 2007



Newcastle

---

---

---

---

---

---

---

---

Scotswood Road 2007



Newcastle

---

---

---

---

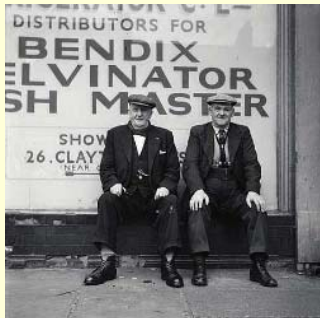
---

---

---

---

The Design Team



Newcastle

---

---

---

---

---

---

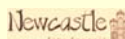
---

---

### Scotswood Road Improvement



Green Apple Award



---

---

---

---

---

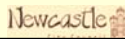
---

---

---

### Other highways projects

- Recycled materials
- Recycling processes
- Sustainable construction



---

---

---

---

---

---

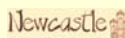
---

---

### Envirokerb



- Recycled plastic drainage kerb
- Manufactured from 100% materials destined for land fill – and less quarried products for concrete production
- 70% lighter than concrete equivalent, can be hand laid
- Mechanical lifting not essential
- Looks like concrete but will not chip or crack



---

---

---

---

---

---

---

---

**Envirokerb – Civic Centre**



Newcastle

---

---

---

---

---

---

---

---

**Envirokerb – Civic Centre**



Newcastle

---

---

---

---

---

---

---

---

**McPhee's Yard**

- Large car park in the Ouseburn Valley
- EA concerns re possibility of flooding due to high volume discharge into the burn



- Tidal tributary of the Tyne
- Storage required
- Slow discharge

Newcastle

---

---

---

---

---

---

---

---

- Pavement foundation 'drainage blanket'
- Porous block paving surface
- Filtration of pollutants



Sustainable Urban Drainage System (SUDS)

Newcastle

---

---

---

---

---

---

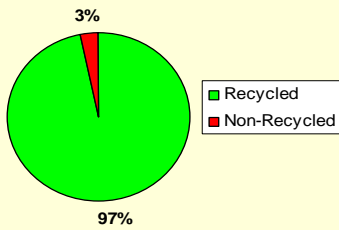
---

---

### In-house Recycling

Highways & Traffic Signals (HTS)

HTS Construction Waste Recycling  
April 2005-March 2006



**30,000t of waste**

- Bituminous
- Concrete
- Rubble & Soil

**every year**

Newcastle

---

---

---

---

---

---

---

---

### **Mobile Concrete Crusher**



saving approximately £30,000 and over 2,000 wagon miles per annum

Newcastle

---

---

---

---

---

---

---

---

### Rhinopatch

- 5 yr relationship with Asphalt Systems International (ASI)
- 100% insitu recycling of bituminous materials
- 10,000 sqm repaired pa



Annual saving against conventional patch repairs

- 1,000t of waste saved from removal off site
- 900t of virgin material not required
- 2,500 wagon miles

Newcastle

---

---

---

---

---

---

---

---

### Traffic Signals

#### National Trials

- Extra Low Voltage (ELV)
- Light Emitting Diode (LED) signal heads



- Power usage for typical junction installation to be reduced from 3,000 Watts to 750 Watts
- Reduced energy & maintenance (and safer)

Newcastle

---

---

---

---

---

---

---

---

### Road Resurfacing



Approx 300,000 sqm pa

Newcastle

---

---

---

---

---

---

---

---

Some quick examples of good practice from elsewhere in our Neighbourhood Services Directorate

Newcastle

---

---

---

---

---

---

---

---

### Recycled Materials



Newcastle

---

---

---

---

---

---

---

---

### Green Energy



Recycling



Newcastle

---

---

---

---

---

---

---

---

Sustainable Fleet



Newcastle

---

---

---

---

---

---

---

---

Practicalities of using recycled and sustainable materials in construction

What do you need?

- The materials
- The incentive
  - legislation?
  - often financial benefits
- The confidence
- The knowledge / expertise
- The desire (ISO 14001 / EMAS)

Newcastle

---

---

---

---

---

---

---

---