Recycling in local authority highway works in Scotland

Dr Mike Winter
Regional Manager, TRL Scotland
Outline Of Presentation

• Introduction; why bother?
• Case studies in Scotland
  • West Lothian Recycling
  • Linear Quarry Products
  • Tayside Contracts
  • Others
• Situation in England
• Conclusions
• Further information
Introduction: Why Bother?

- UK Sustainable Development Strategy
- Scottish Executive included
- Priority Areas
  - Sustainable consumption and production
  - Natural resource protection
- Expands “A better quality of life”, 1999 UK strategy for sustainable development
- Recycling in highways meets these objectives
The Waste Hierarchy

- Reduce the generation of waste
- Reuse materials for the same or a different purpose
- Recycle the materials to recover value
- Dispose, using the best practical environmental option
- Included in the National Waste Strategy for Scotland
Glasgow City Council

- Glasgow Sustainable Construction Policy
- Spokesperson for Environmental Sustainability
- Adopted 10% target for minimum recycled material content by value in all major construction projects
- Project with WRAP to assess levels of recycled content in new Primary School
- Achieved 20% recycled content by value
- Could have achieved 27% at no extra cost
Specifications and Standards

- Specification for Highway Works has permitted use of recycled aggregates and cold recycling techniques since 2001
- European Standards for aggregates
  - Do not discriminate between primary and recycled aggregates
- Design guides and specifications available
  - TRL 611 A guide to the use and specification of cold recycled materials for the maintenance of road pavements, 2004
  - NetPave Guidance Document, 2006
- WRAP quality protocol for the production of aggregates from inert waste in Scotland
the quality protocol

for the production of aggregates from inert waste in Scotland
Case Studies in Scotland

- **West Lothian Recycling**
  - Unbound granular materials, compost

- **Linear Quarry Products**
  - Cold mix exsitu recycled asphalt in base & binder course

- **Tayside Contracts**
  - Recycled aggregates
  - Reclaimed asphalt
  - Cold mix exsitu recycling for remote sites

- **Others**
  - Echline trial road
  - Spent oil shale
  - Tyre bales in roads over soft ground
West Lothian Recycling

- Joint venture between West Lothian Council and Tarmac
- Accepts mixed construction and demolition waste, recycled asphalt planings and green waste
  - Incoming 100,000 tonnes/year (29,000 tonnes green waste)
  - Outgoing 74,000 tonnes/year
- West Lothian Council specify all excavated material must go to West Lothian Recycling for processing
- Produce Type 1 sub-base, 6F2 capping, engineering fill, unbound footway surfacings, wood mulch, peat free compost, soil enhancers
West Lothian Recycling
Frogston Road Footpath

- **Upgrading of an existing footpath in Edinburgh**
  - Client Edinburgh City Council
  - Contractor Edinburgh Road Services
  - Supplier Linear Quarry Products – LQP Durafoam

- **Ex situ cold recycled bitumen bound material**
  - Road planings with foamed bitumen binder; 250 tonnes
  - Cement based material used to cope with wet weather during contract in October 2001
  - Oven cured stiffness 2400 to 3000 MPa
  - Heavy overnight rain had no effect on surface where the material was well compacted
Frogston Road Footpath
Access Roads for Industrial Estates

- Use of cold recycled bitumen bound material by Linear Quarry Products
- Need to keep depots open while works in progress
- Cement enhanced material (DURAFOAM) used to give early strength to allow trafficking by heavy plant
- New wearing course applied after all damaged areas treated
- 200 tonnes, May 2004
Tayside Contracts

- Commercial arm of Perth & Kinross, Angus & Dundee City Councils
- Screening plant for CD&EW & RAP at five depots
- Potential to process 72,000 tonnes per year
- Unbound material used as general fill, Type 1 sub-base, pipe bedding, drainage/filter media
- Asphalt plant at Collace Quarry; incorporates 10% processed RAP/CD&EW into all new asphalt
- Could increase to 20%
Knowledge Transfer Partnership

- 3 year contract funded by DTI and Tayside Contracts
- Tayside Contracts and Dundee University
- Develop mobile plant for cold recycling of asphalt
- Designed for use in remote areas such as rural Scotland
- Trials in 2005 using high level of RAP in footpaths in Dundee
- Main road trials proposed for Spring 2006
Trials Carried Out

Footpath trials have been carried out in Dundee using high level of RAP under controlled conditions.
Others

- **Echline Recycled Road**
  - Demonstration project for Scottish Office by Tarmac & TRL
  - Innovative design approaches and use of recycled materials
  - Spent oil shale, CD&EW, RAP, steel slag, PFA, stabilisation
  - Savings in primary aggregates, energy use & cost
  - Has anyone noticed?

- **Spent oil shale**
  - Extensively used in local area, including M8

- **Tyre bales over soft ground**
  - Used to construct low traffic volume roads over peat and soft ground in Highlands and North East
Situation in England

- Recycling in highways much more widely accepted
- Highways Agency and Local Authorities
- 60% of Local Authorities using recycled in highways
- Generally greatest in South East
- Wide range of applications used
- Examples
  - Major projects: M25 J12 to 15; A38 Peartree to Drybridge
  - Local Authorities: Hampshire and Staffordshire
M25 Junction 12 to 15 Widening

- Clients: Highways Agency & Heathrow Airport Ltd
- Contractor: Balfour Beatty Civil Engineering Ltd
- Jan 2004 to Dec 2005
- Recycled aggregate from site and local CD&EW
- Used nearly 900,000 tonnes in range of unbound applications
- 90% recycled
M25 J 12 to 15: Advantages of Recycled Aggregates

- Coarse grading, hence free draining
- Enabled earthworks to continue throughout year
- Up to £4 per tonne cheaper than primary aggregates
- Able to generate a number of products
- Highways Magazine Excellence in Recycling Award 2005
A38 Peartree to Drybridge

• Ex situ recycling of 8km of trunk road in Devon
• Cold recycled bitumen bound material as road base
• Uniformity of existing road suited recycling
• September 2005 to March 2006
• Saved 70,000 tonnes of primary aggregate compared to conventional reconstruction
• Savings of 50% on CO₂ emissions compared to use of hot asphalt
• Estimated saving of around £300,000
A38 Peartree to Drybridge
Hampshire County Council

- Environmental sustainability in Council’s objectives
- Included in policies for highway maintenance
- Partnership with Raynesway Construction and Foster Yeoman for highway maintenance
- Maximised use of recycled aggregates
  - Cold exsitu recycling of asphalt arisings in highways
  - Processing and reuse of crushed kerbs and other arisings
  - Use of locally available recycled materials
  - Stabilisation of material in-situ with lime or cement
  - Reuse of surface dressing sweepings
- Six case studies on AggRegain
Staffordshire County Council

- Partnership ‘Staffordshire Highways’ formed April 2004 following Best Value Review
  - ACCORD Operations Ltd: principally maintenance
  - Wrekin Construction Ltd: principally new construction
  - Staffordshire County Council
- Early contractor involvement and flexible working allows effective planning and problem resolution
- Ability to develop specifications and techniques, e.g. Granular Material Treated with Fly Ash (GFA)
- Uses locally available asphalt planings and PFA in combined base and sub-base layer
Applications of GFA

• Used in two local developments in 2005
  • Kingswood Lake Development & Rugeley ByPass
  • Traffic loads up to 12 msa
  • Asphalt planings and PFA
  • Over 16,000 tonnes and 2km of carriageway
  • Cost savings of 40% on base and sub-base layers
  • Further applications planned for 2006
Conclusions

• Wide range of applications possible, but largely not taken up in Scotland; why?
• Specifications and design guides are available, but often ignored; why?
• Availability of cheap crushed rock and cheap landfill?
• 10.8 million tonnes of CD&EW in Scotland in 2003
• Too easy to stick with established methods?
• The tide is turning; high level policies will increasingly drive recycling as a first choice option
Conclusions cont’d

- Recycling is most effective when driven by the client, especially if related to corporate objectives.
- Early contractor involvement, through partnering or other arrangements, encourages innovation.
- Significant cost savings possible as well as environmental benefits.
- The challenge; embrace recycling and deliver sustainable development.
- Or wait until you are forced to do it anyway.
Further Information

- **AggRegain web site** ([www.aggregain.org.uk](http://www.aggregain.org.uk))
  - Case studies
  - Specifier
  - Supplier directory
  - Quality protocol for Scotland
  - Modules on range of activities
  - Publications: NetPave Report, CD&EW arisings for Scotland
  - Links to other web sites

- **Other resources**
  - CIRIA internet register of recycling sites ([www.ciria.org/recycling](http://www.ciria.org/recycling))
  - For particular sites, BREMAP (part of BRE SMARTWaste package) ([www.bremap.co.uk](http://www.bremap.co.uk))