**Porous Asphalt Pavement**

- Open-Graded HMA ~ 6 cm
- \(\frac{1}{2}\)" Agg. ~ 3 – 5 cm
- Uniform Graded ~ 10 – 20 cm
- Clean Crushed Agg. ~ 40% Voids
- Non-Woven Geotextile
- Uncompacted Subgrade
Reservoir Capacity Needed

- Rainfall
  - Typical designs for 2-year/24-hr storm
  - Conservative design for 25-year/24-hr storm
- Meet Local & Provincial runoff mitigation requirements

Can Include Roof Water and Runoff Adjacent Land
Water Flows Through

Winter Climate Acceptable

Post Office Parking Lot

> Porous asphalt in parking area
**Cost**

- Pavement structure cost more
- May be offset by reducing drainage structure costs

**Keys to Success**

- Acceptable Site Conditions
  - Permeability
  - Depth to groundwater
  - Design
    - Limit surface slope
    - Control run off from adjacent areas

**Keys to Success**

- Construction
  - Don’t compact subgrade
  - Protect from contamination
    - Build porous pavement late
  - Maintenance
    - Do not sand pavements
    - Can patch with conventional asphalt < 10%

**Roads**

- Challenges
  - Cuts and fills
  - Slope
  - Variable soil conditions
  - Utilities
  - Limited use
“Green Streets” in Oregon Community

Pringle Creek Subdivision, Salem, Oregon

Primary Benefits
- Runoff control
- Aquifer recharge
- Reduced drainage structures
- More land available for “other” uses if detention facility is not needed
- More friendly to our environment

open graded mixtures

Use by State DOTs (2002)
**Reasons for Use**

- Noise Reduction
- Marking Visibility
- Driver Visibility
- Friction

**Georgia specification for Porous European Mix**

**Wet Weather Visibility**

- Water sits on the road
- Splashed into where a mist
- Droplets are larger than fog
  - Denser and restricts visibility more than fog
  - droplets small enough to remain airborne for several seconds

**Wet Weather Visibility**

- Water spray on porous asphalt mixture
- 5 to 10 percent
- Of water spray on a dense-graded surface
Noise Reduction

- Noise reductions at highway speeds are typically 3.0 dB(A)
- Low speed – mostly mechanical noise
- High speed – mostly tire noise

Tire Noise

Destructive Interference

![Graph showing excess attenuations vs. frequency.](image)

Noise Reduction (80 km/h)

![Graph showing sound pressure vs. age.](image)
Current Technology

- modified asphalt binder
  - increases durability because of increased asphalt content and reduced drain down
- increased air voids
  - increases noise reduction and creates self cleaning pores
- increased aggregate size
  - increases pore size which are more resistant to plugging with debris

Summary

- higher air voids
- modified asphalt
- less plugging
- longer life
- less dramatic failure

Open Graded Asphalt
A New Environment

Thanks