Pervious Pavement
Advanced Design Seminar

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Native Soil Section
(Natural Conditions)

Porous Pavement Section
(Built Conditions)

Concepts shown, not all will be present on each design...

Porous Concrete Pavement
Impervious Surface Reduction Strategies

**DESIGN CRITERIA**

- Soil
  - Soil’s infiltration rate
  - Soil’s structural capacity (CBR rating)
  - Soil’s susceptibility to swelling
  - Site location (slope stability)
- Applications
  - High or low traffic
  - Sources of contamination (i.e. industrial)
  - Maintenance
- Mix Design
  - Strength of section

Design Options

- Aggregate
  - No. 8 and 89, well graded (current standard mix)
  - 3/8” - No. 4, poorly graded (“shopping cart friendly”),
    (not always available)
- Color
- Proprietary products
  - Stoneycrete
  - Percocrete
- Thickness of pavement and base
- Edge detailing options
  - Channelization issues
  - Prevent contamination from landscaping materials
POROUS CONCRETE PAVEMENT
Base Design
- Base acts as drainage reservoir and structural support
- Typically washed large Chipped rock (3/4” – 1½”)
- Need long term soil infiltration rate and design storm intensity
- ~6” – ~8” (~10”?) depending on site conditions
- Fabric may be used with some sub-grades
- Under-drains may be needed...

POROUS CONCRETE PAVEMENT
Pavement Thickness Design
- Need:
  - Soil Strength
  - Anticipated loading
  - Assumptions about Modulus of Rupture of Pavement
- Portland Cement Concrete Pavement Association method
- Florida Concrete Products Association method
- Typical Results
  - ~ 4” residential driveways
  - ~ 6” parking lots and very low volume streets
  - ~ 7-8” streets low volume streets
- Thickened Edge

PERVIOUS CONCRETE PAVEMENT
Testing and Verification
- The verification of specified design parameters is a recognized problem
- ASTM tests do not yet exist for pervious concrete pavement
- Some proxy values are used
  - Unit weights from cores
  - Aesthetics (uniformity of surface, etc.)
- Test panels

PERVIOUS CONCRETE PAVEMENT
Site Prep and placement of the base rock

PERVIOUS CONCRETE PAVEMENT
Placement Movie 1: delivering, screeding, and raking

PERVIOUS CONCRETE PAVEMENT
Placement Movie 2: floating
PERVIOUS CONCRETE PAVEMENT
Placement Movie 3: finishing

PERVIOUS CONCRETE PAVEMENT
Cover and Protect

PERVIOUS INTERLOCKING PAVERS
Pavement Design Considerations
- Edge Restraint
  - Concrete curbing
  - Plastic angle edging
- Shape of area / edges
- Base thickness (hydraulics and soil strength)
- Infill materials
  - Grass
  - Course sand (3-5mm)

INTERLOCKING CONCRETE PAVERS
Example Project – Typical Section

REINFORCED GRASS PAVING
Pavement Design Considerations
- Slope
- Vehicle loading
- Traffic volume
- Base thickness (hydraulics and soil strength)
- Grass Mix
- Establishment of grass & watering
- Likelihood of Maintenance

PERVIOUS PAVEMENT
Construction Considerations
- Protect the subgrade
- Excavation timing
- Construction vehicle loading & compaction issues
- Subgrade contamination
- Staging of materials
- Protect the installed crushed rock base
- Sacrificial wearing course?
- Protect the installed pavement
- Landscaping
- Erosion Control
This will not be an engineering design presentation.

The modeling of pervious pavements is an emerging field; much is not known yet.

There are flow control credits (approved modeling assumptions) available in various jurisdictions.

- 50% grass / 50% impervious as an example.

Depends heavily on soil type and other design parameters.

Using pervious pavements should reduce the required detention by some amount on most projects.

**PERVIOUS PAVEMENT**

Some thoughts on modeling...

**PERVIOUS PAVEMENT**

APPROXIMATE relative costs for Comparison

- Pervious Concrete pavement, in place
  - $4 – $5 / sf plus base and site prep.

- Pervious Interlocking concrete pavers
  - $5 – $6 / sf plus base and site prep.

- Reinforced Grass Paving
  - $4 – $6 / sf plus base and site prep.

- Reinforced gravel
  - ?? Kathy ??