Porous Asphalt Use In Middleton, WI

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NACD Urban and Community Conservation Webinar

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Porous Asphalt in Middleton, WI

Topics

- General Overview
- Benefits and Disadvantages of Porous Asphalt
- Construction Recommendations
- Case studies
- Lessons Learned
Where is Middleton, WI

In 2007 Voted best Place to live in America!!
Since 2005- always in Top Ten Best Places to Live in America
WDNR designated “Green Tier” Community for Environmental Excel
City of Middleton
Trail Location

Mixture of Gravel, Grass, Asphalt and Porous Asphalt
Porous Asphalt in Middleton, WI

- 22 miles of Trails w/ 11 miles of Porous Asphalt Trails
- 3 Porous Asphalt Parking Lots
- Design-for residential cul-de-sac Green street
- Porous Asphalt is major component of Sustainability Plan
Porous Asphalt
Surface Infiltration Rate of 100 inch/hour upon Installation >> Mother nature!!

Surface Infiltration Rate of 10 inch/hour throughout service life of porous pavement

Run-on for Roads < 3:1 and Parking lots/rooftops/res. driveways < 5:1 to minimize clogging

Cleaning twice/year
Benefits of Porous Asphalt

Porous Asphalt vs. Asphalt

- Softer
- Year round access
- No shoulder washouts
- No puddles/ponding on paths
- Environmental- Recycled Prod.
Benefits of Porous Asphalt

Porous Asphalt vs. Asphalt

- No crackfill required
- No heaving/buckling
- No slurry seal
- No reflective cracking
- No long term maintenance reqd
- Pavement life = regular asphalt

PB Conservancy Trails

Regular Asphalt

Firefighters Park Shelter
Benefits of Porous Asphalt

Environmental Benefits

- Stormwater management - Meets regulatory requirements for new development mitigating:
  - Infiltration decrease,
  - Quantity increase,
  - Water quality decrease,
  - Temperature increase

- Compact space requirements for BMPs
- Less salt usage - 75% to 100% reduction in salt use

Cross slope erosion  Salt and sand usage  Ruts and washouts
Benefits of Porous Asphalt

Environmental Benefits

- Porous Asphalt is considered a “Green” product
  - Porous so it isn’t considered paved surface; credit for green space
  - Uses recycled asphalt, rubber, carpet fiber and plastic polymer in asphalt mix
  - LEED certification
Disadvantages of Porous Asphalt

- Requires Annual Maintenance - Cleaning of Voids
- Better performance in sandy soils/ with low groundwater table
- Not suitable for heavily travelled roads - 4 lanes or freeways
Construction Recommendations

Porous Asphalt

- DRS Porous Asphalt Specification
  - WISDOT aggregate specs,
  - 1-3% 15-minus granulated rubber (by weight of mix),
  - 3-5 lbs high temp fibers/ ton of mix (at min 450 deg flashpt),
  - Asphalt Content 5.7%-6%, 76/28 or equivalent
  - 1500 psi minimum stability,
  - Air Void Content 15-18%
  - 10% RAP
  - Recyclable Products- Ground rubber from tire recaps, polyester fiber from carpet industry and RAP (Recycled Asphalt Product)
Construction Recommendations

Porous Asphalt Installation

- Regular Asphalt with 18% (min) void ratio ("gluing marbles together")
- Polymer modified asphalt
  - Lowers set up temperature
  - Increase strength factor
  - Improve flexibility to allow for expansion/contraction
Construction Recommendations

Porous Pavement

- 94% of rainfall in Wisconsin is under 1 inch/hour which can be contained in the asphalt section alone!

Typical Porous Pavement Installation
Construction Recommendations

Porous Asphalt Installation

- Limit size to single axle dump truck for asphalt delivery
- Spec 1-year/2-year warranty on work/materials
- City to lay subgrade and base course
Construction Recommendations

Typical Cross section

- Base course of gravel (6”) with surface course of limestone screenings for existing path

NO OPEN GRADED BASE COURSE NEEDED!!
Construction Recommendations

Cost of Porous versus Regular Asphalt

- Production cost for Porous Asphalt is $40-$50 more per ton than regular asphalt (Due to AC, Fiber, Rubber, and Polymer additive)- $2.15-$2.50/sq ft
- Porous Asphalt spreads 10%-12% farther than regular asphalt because of large air voids
- Porous cheaper than Regular asphalt when consider SWM costs
Porous Asphalt in Middleton
Case Studies

- Parisi Park (2006)
1.25 miles of porous asphalt pavement above the existing gravel trail,
- 4 ft gravel shoulder replacement for Runners
- 1 trail edge seeded with native seed mix
- 5 clear span bridges across Pheasant Branch Creek
- Minor grading for slope < 5% to accommodate ADA accessibility
- Existing wetland area preservation
Pheasant Branch Creek Corridor Trail

Construction Timeline

- DOT TE Grant awarded 2007- for Asphalt
- Planning and Engineering completed 2008- for Asphalt
- Permitting completed 2008-09- for Asphalt
- Feb 2009- City requests Change to porous Asphalt
- Bidding – August 2009- For porous Asphalt
- Construction – October-December 2009- For porous Asphalt
Pheasant Branch Creek Corridor Trail
Porous Asphalt in Middleton

Case Studies

- Conservancy Condos (2008)
Porous Asphalt in Middleton

Case Studies

Porous Asphalt in Middleton

Case Studies

- Firemens’ Park (2008)
Porous Asphalt in Middleton

Case Studies

- Middleton Highway Q Dog Park (2008)
Porous Asphalt in Middleton, WI

Case Studies

- Governor Nelson Conservancy Parking Lot (2008)
Porous Asphalt in Middleton

Case Studies

- Lakeview Park (Shelter/Paths)
Porous Asphalt in Middleton

Case Studies

➢ Graber Pond
Recently, City has experimented with placing porous asphalt directly over cracked regular asphalt surface.
Porous Asphalt in Middleton
Case Studies
Sauk Trails School
“Lessons Learned”
Porous Asphalt

- Avoid compaction during construction
- Don’t need 12”-18” stone reservoir base for trails
- If properly constructed, freeze/thaw heave is not an issue
- No winter deicing is needed
- Blowing works not vacuum sweepers for annual maintenance
FOR MORE INFORMATION
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