Porous Asphalt Use In Middleton, WI

April 21, 2016
NACD Urban and Community Conservation Webinar

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Porous Asphalt in Middleton, WI

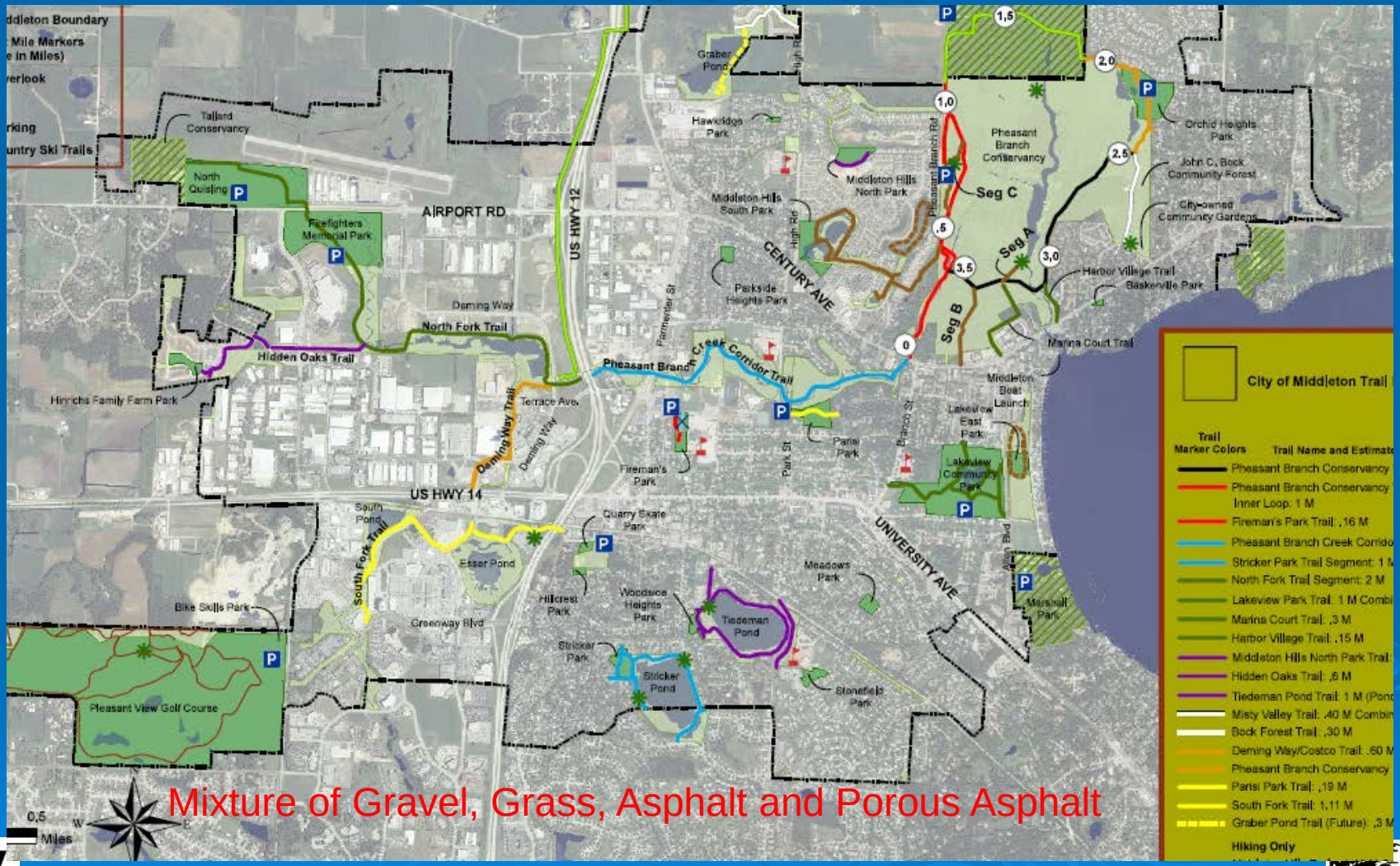
Topics

- 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

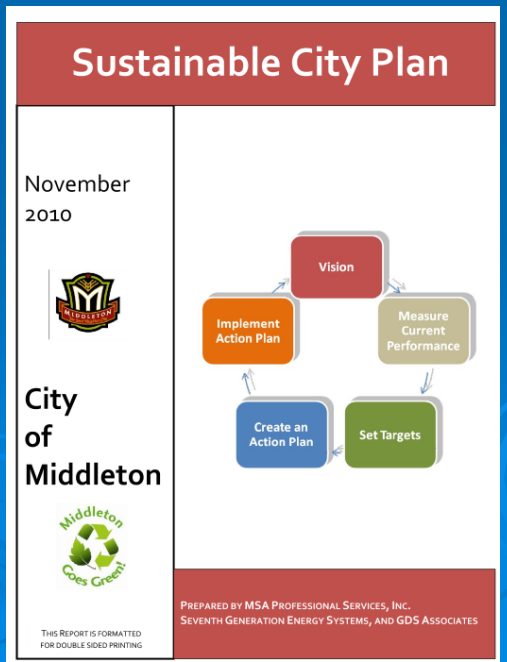
City of Middleton Trail Location



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

Technical Standard #1008 Porous Pave (WDNR) Guidelines

- 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.

Transition from porous pavement to gravel at Gaylord Nelson

Parisi Park-During Storm

Parisi Park-After Storm

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

Regular Asphalt

PB Conservancy Trails

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

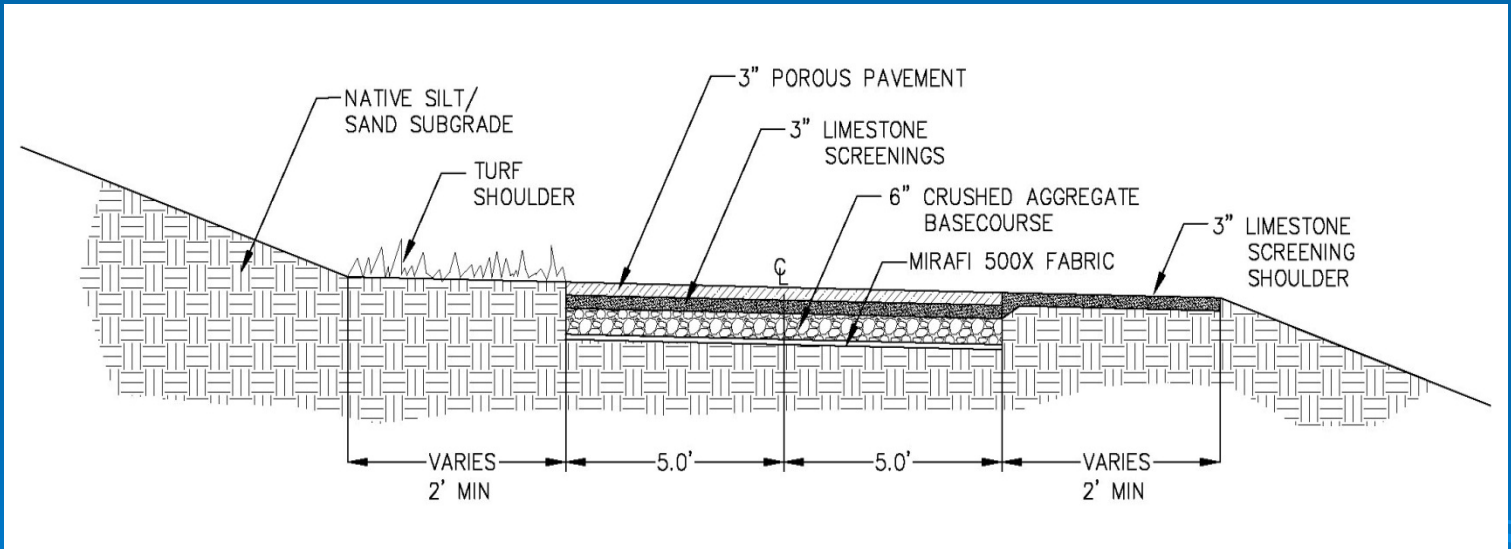
Porous Asphalt Installation

- 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

Regular Asphalt

Porous Asphalt

Porous Asphalt in Middleton

Case Studies

- Parisi Park (2006)

Case Studies
Pheasant Branch Creek Corridor Trail

- 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

- Gaylord Nelson Trail Junction (2007)

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

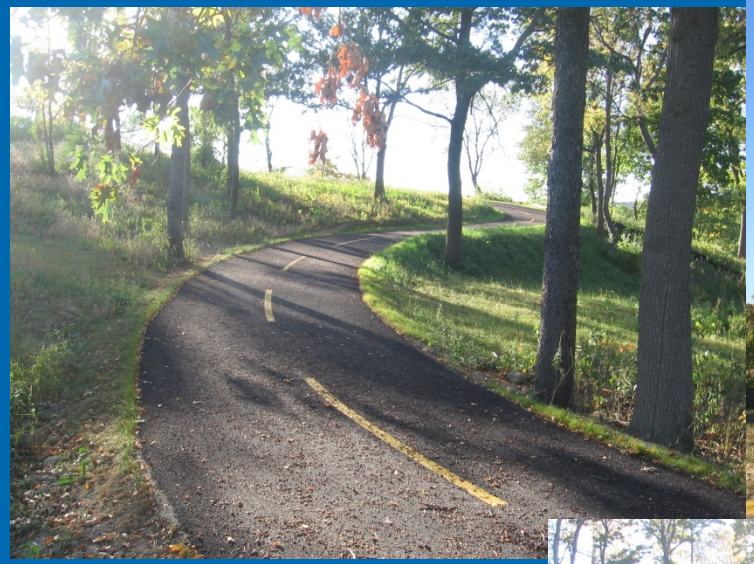
Case Studies

- Lakeview Park (Shelter/Paths)

Porous Asphalt in Middleton

Case Studies

- Graber Pond



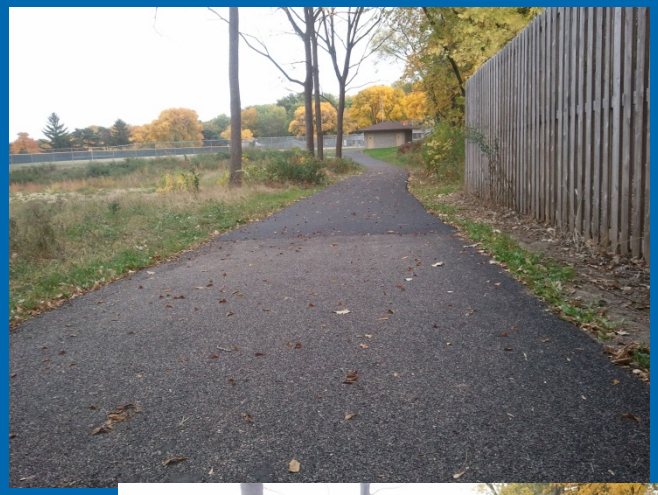
Porous Asphalt in Middleton

Lakeview Park Trail

- Recently, City has experimented with placing porous asphalt directly over cracked regular asphalt surface

Porous Asphalt in Middleton Case Sudies

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

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