Permeable Pavements for Local Streets

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38th Annual Ohio Asphalt Paving Conference
February 6, 2013

Agenda

- Benefits
- Sylvan Avenue
- Willard Street
- Maintenance
- Suggestions
- Future

Benefits of Permeable Pavement

- Improved storm water management
- *Reduced downstream impacts*
- *Improved storm water quality*
- *Winter Conditions*
- *Noise*

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Sylvan Ave - Background

Goals…

- *Improve storm water management*
  - *Infiltration or detention*
  - *Cleaning of stormwater*

- *Test case for permeable asphalt streets*

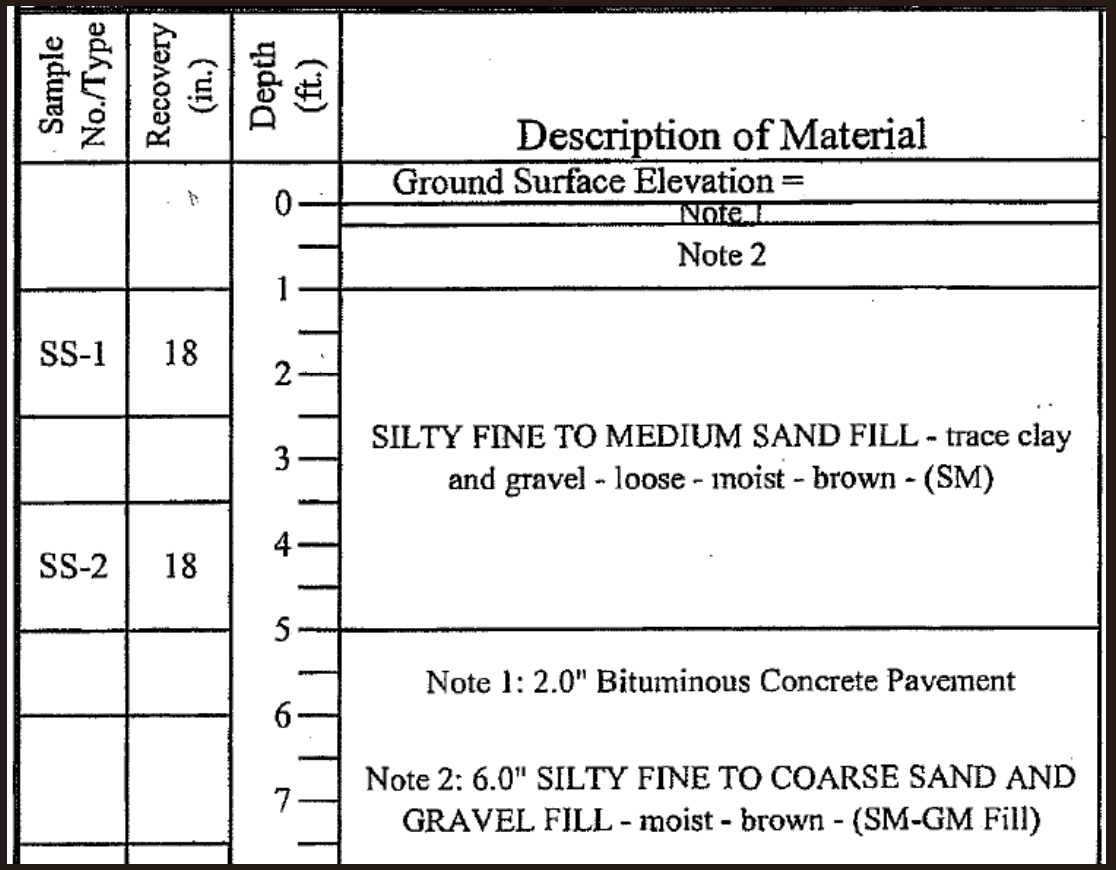
Sylvan Ave - Background

Sylvan Ave Issues…

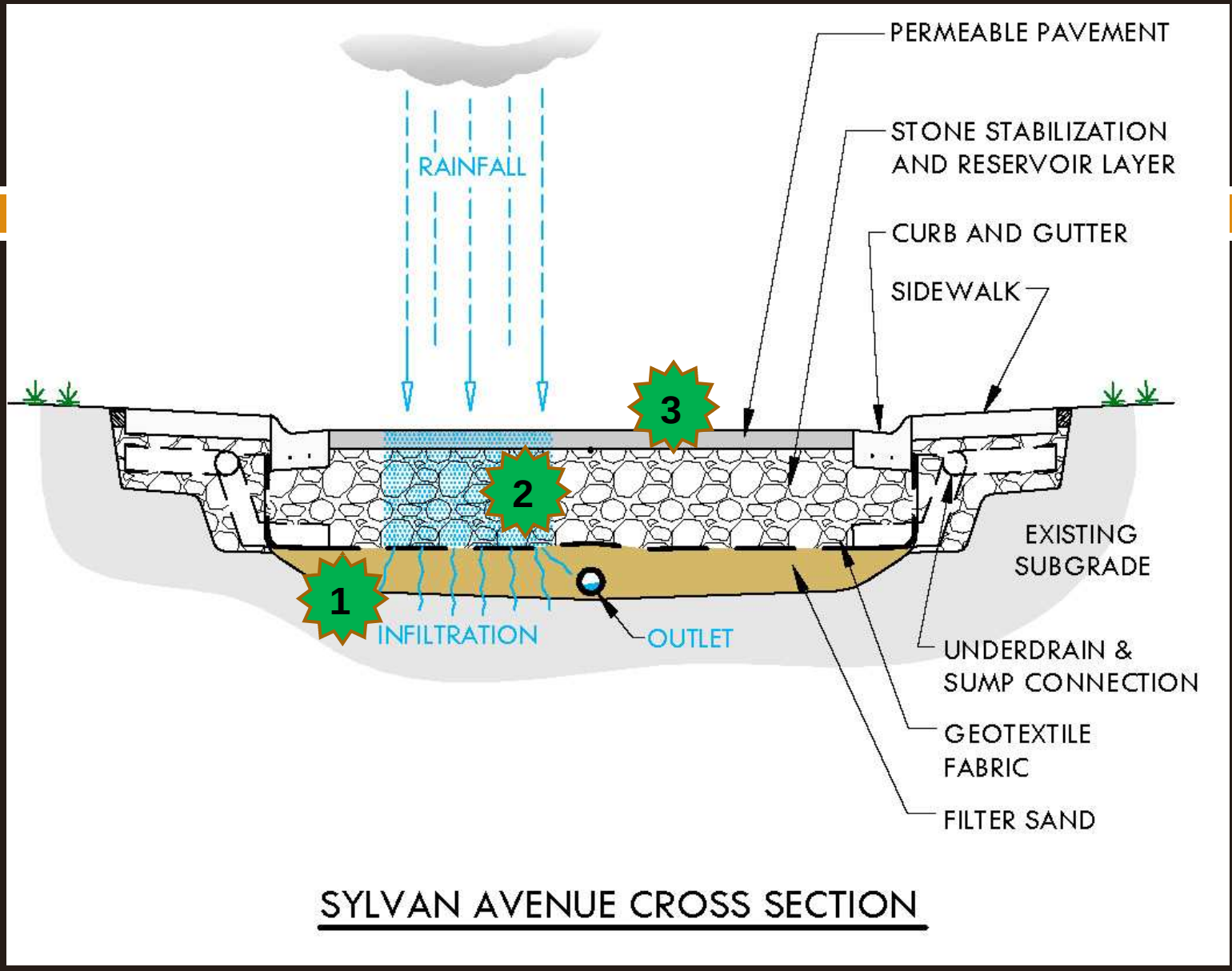
- *Flat road*
- *Narrow road*
- *Narrow ROW*
- *Ponding*

Sylvan Ave - Design

- Initial soil borings
- Deeper soil borings
- To infiltrate or not to infiltrate?



Sample No./Type	Recovery (in.)	Depth (ft.)	Description of Material
		0	Ground Surface Elevation =
			Note 1
		1	Note 2
SS-1	18	2	SILTY FINE TO MEDIUM SAND FILL - trace clay and gravel - loose - moist - brown - (SM)
		3	
SS-2	18	4	
		5	
		6	Note 1: 2.0" Bituminous Concrete Pavement
		7	Note 2: 6.0" SILTY FINE TO COARSE SAND AND GRAVEL FILL - moist - brown - (SM-GM Fill)



SYLVAN AVENUE CROSS SECTION

Sylvan Ave - Design

1. Filter Layer
   - Free draining sand
   - 6” Underdrain
   - Impermeable liner
2. Reservoir
   - *100 yr design storm*
   - *18-24” thickness (35-40% voids)*
   - *Open graded stone - crushed*

Sylvan Ave - Design

3. Pavement section & details
   - Permeable HMA
     - 3” thick
     - 50 gyratory mix design
     - 75-85% density; 15-25% porosity
     - AC 5.0-6.5%
     - Polymer Binder
   - Standard curb & gutter vs. spill-out

Sylvan Ave - Construction

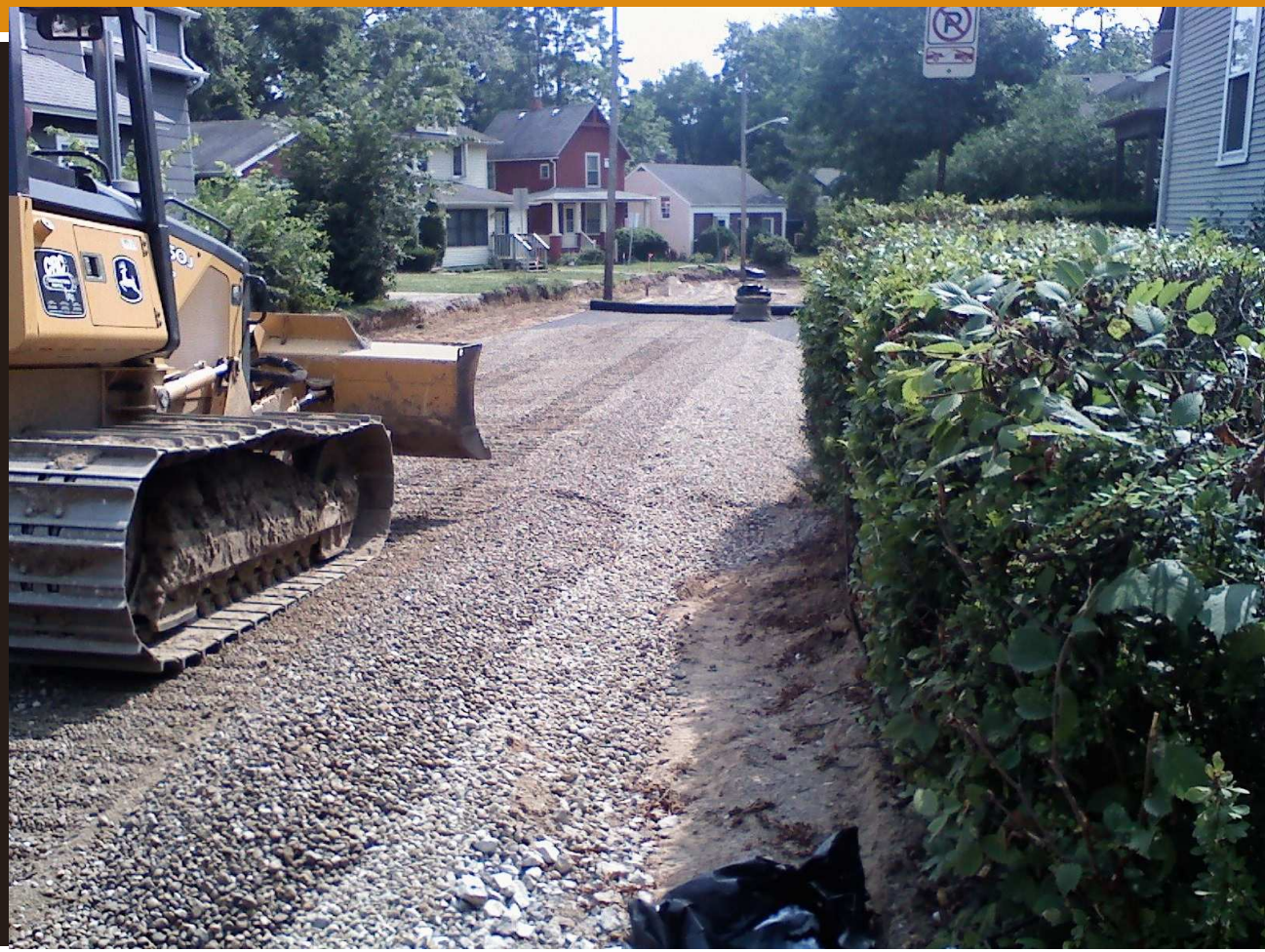
- Subgrade prep

Sylvan Ave - Construction

- Membrane & underdrains

Sylvan Ave - Construction

- Aggregate

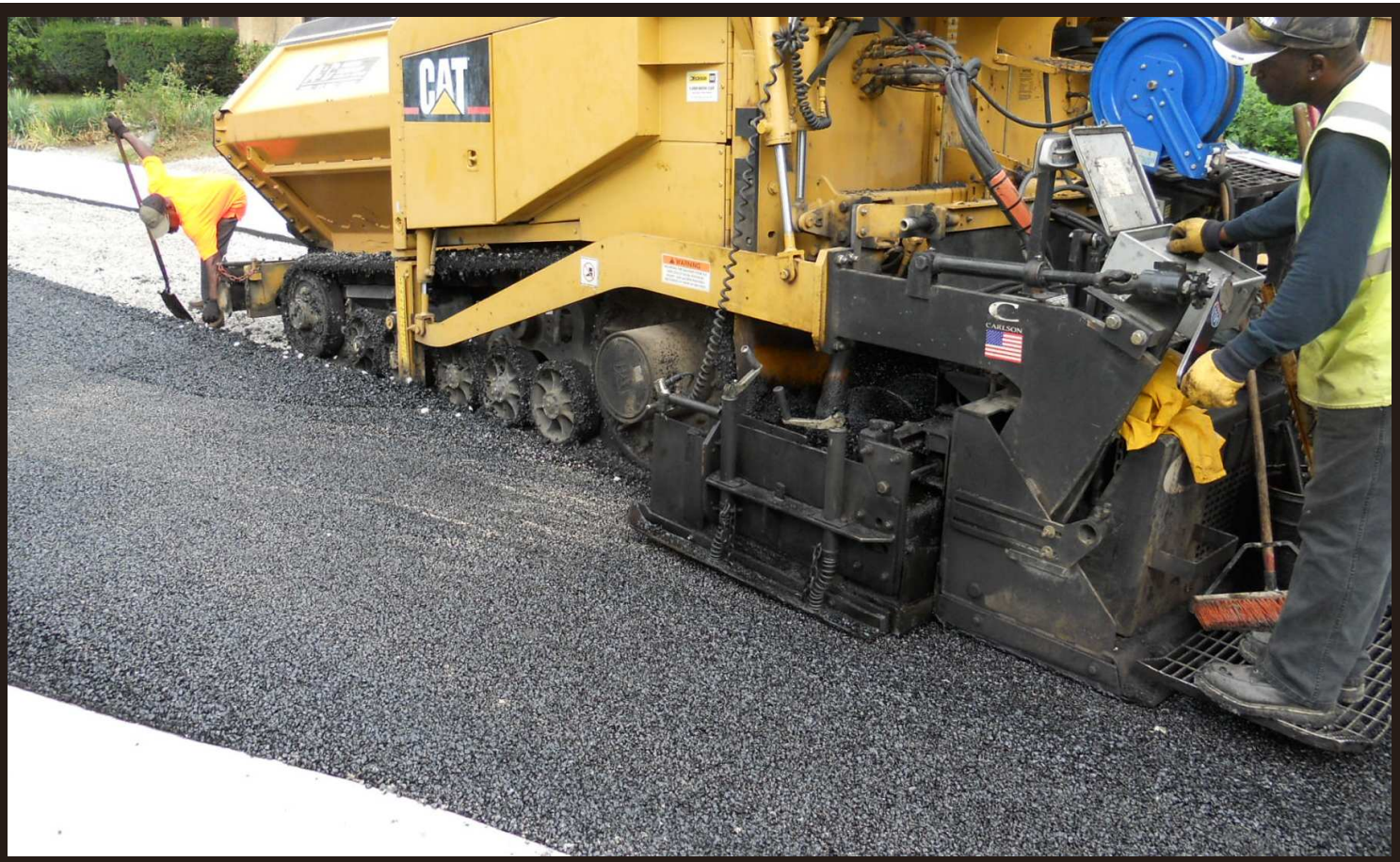


Sylvan Ave - Construction

- Curb & gutter and sidewalk

Sylvan Ave - Construction

- Paving



Sylvan Ave - Construction

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Sylvan Ave - Construction

- Permeability Test ("bucket test")

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Willard St. - Background

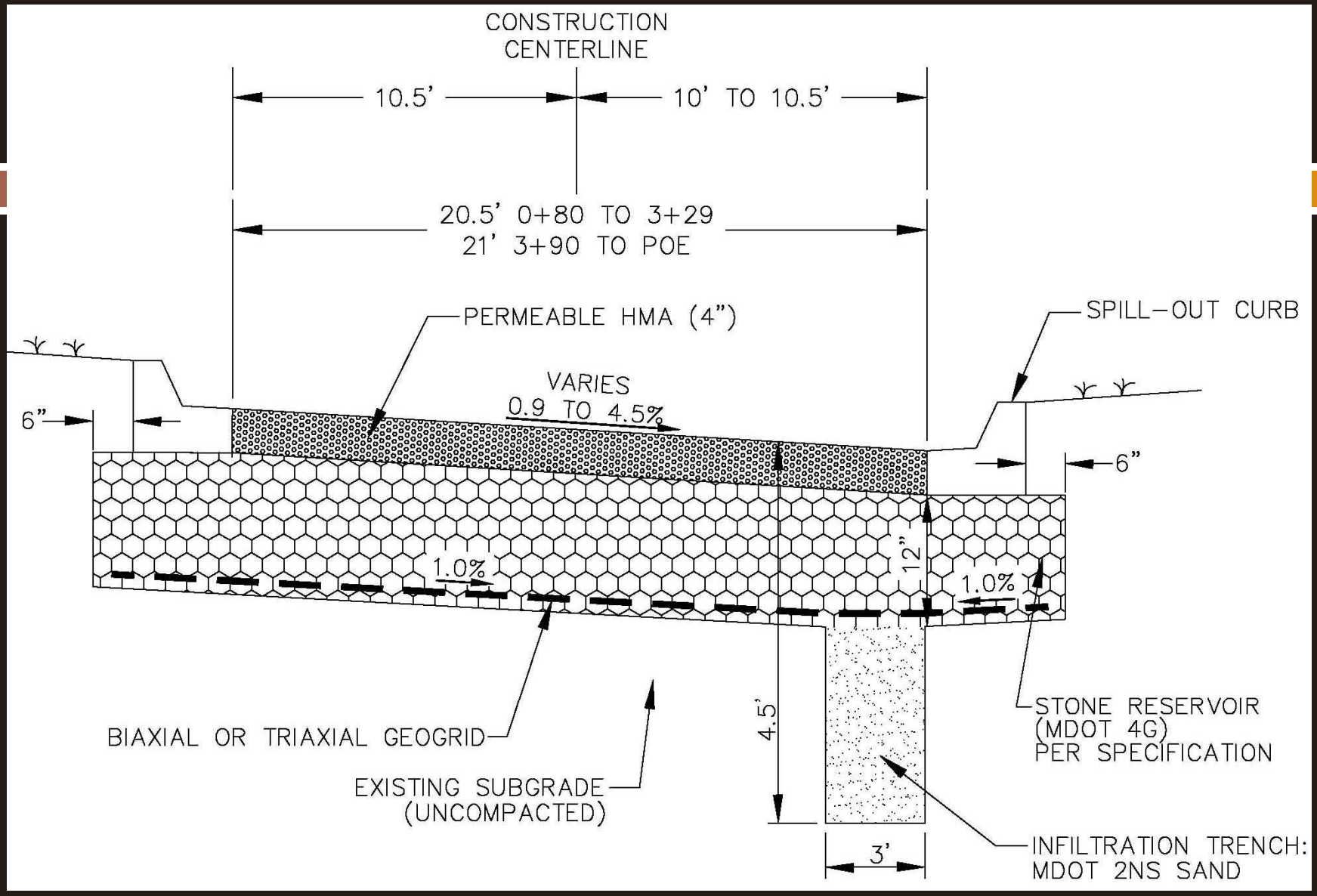
1. Different Challenges
   - Soils
   - Cross Slope
   - Traffic Volumes

2. Different Opportunities
   - *Full Infiltration*
   - *Spill-Out Curbs*

Willard St. - Design

1. Stone Reservoir
   - *Used different aggregate*
   - *Minimum 30% voids*
   - *Grid, but no liner*

2. HMA mix
   - 4” thickness


CONSTRUCTION
CENTERLINE
10.5'
10' TO 10.5'
20.5' 0+80 TO 3+29
21' 3+90 TO POE
PERMEABLE HMA (4")
SPILL-OUT CURB
VARIES
0.9 TO 4.5%
6"
6"
1.0%
12"
1.0%
BIAXIAL OR TRIAXIAL GEOGRID
EXISTING SUBGRADE
(UNCOMPACTED)
4.5'
STONE RESERVOIR
(MDOT 4G)
PER SPECIFICATION
3'
INFILTRATION TRENCH:
MDOT 2NS SAND

Willard St. - Construction

Willard St. - Construction

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Maintenance - General

Vacuum Road - twice per year (Fall and Spring)

Clogged Areas - Power wash (< 200 psi) with detergent, and vacuumed.

Planter Areas - Well maintained and confined.

Maintenance - General

Exposed Ground - Seed and mulch

Surface Sealing or Resurfacing - Not permitted

Patching (< 50 square feet) - Standard patch

Patching (> 50 square feet) – Permeable pavement

Stock Piling Materials - Not permitted

Maintenance - Winter

Plowing – Plow every 2”+ storm with a slightly raised blade

Salt – Minimal salt permitted

Sand – Not permitted

Maintenance - Residents

Leaves/Yard Waste – Bag or compost. Not in street

Contaminants – Prevent from leaving property

No Dumping - materials or liquids on road

Planter Areas - well maintained and confined

Exposed Ground – Seed and mulch at a minimum

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Suggestions

- Design by a licensed engineer
- Deep soil borings
- Careful site selection
- Full-time inspection
- Material selection
- Clear maintenance program

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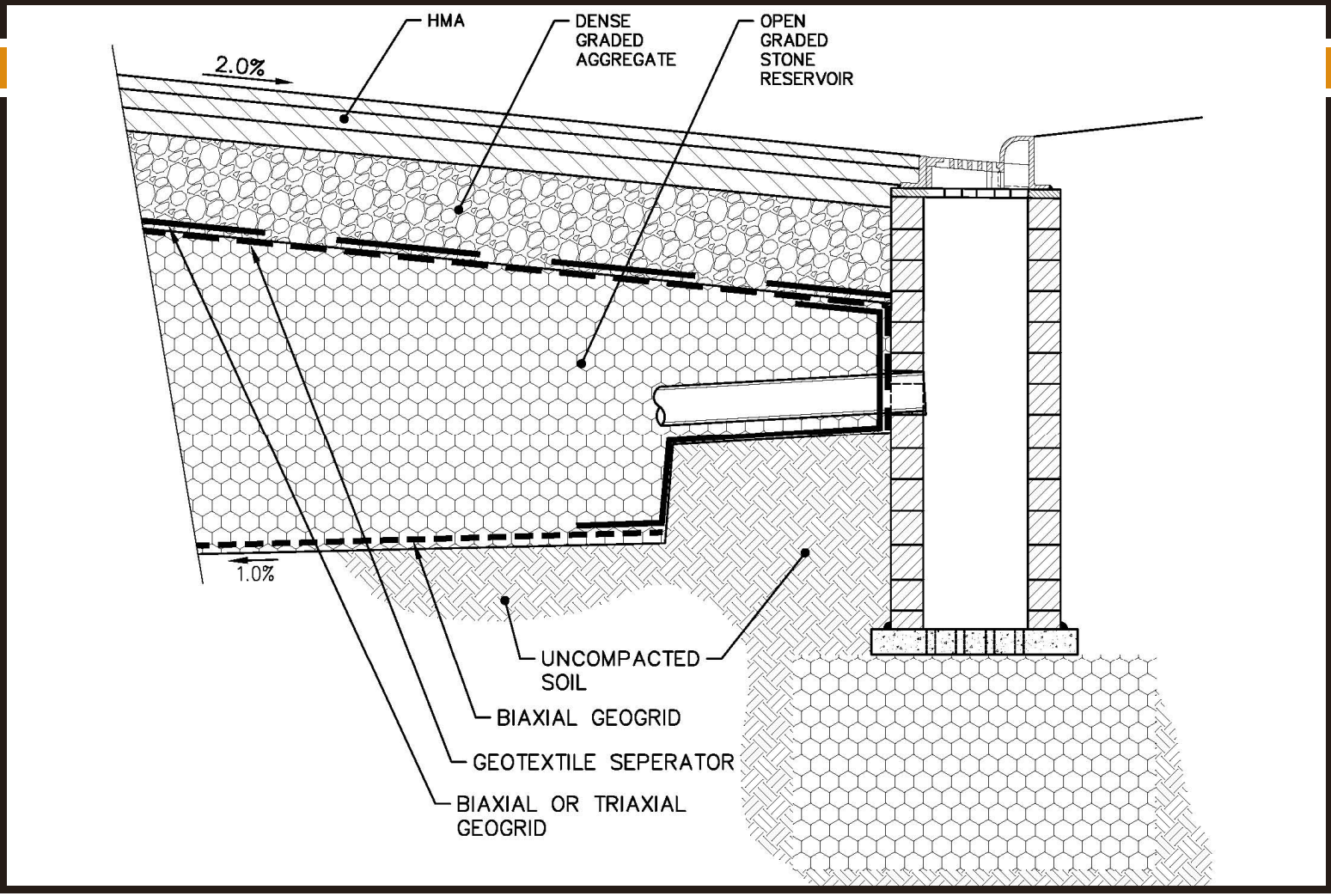
Future

- Future of permeable pavement in Ann Arbor?
  - ***Test case results***
  - ***Possible future projects***
  - ***Another option for stormwater infiltration***

Future


HMA
DENSE GRADED AGGREGATE
OPEN GRADED STONE RESERVOIR
2.0%
1.0%
UNCOMPACTED SOIL
BIAXIAL GEOGRID
GEOTEXTILE SEPERATOR
BIAXIAL OR TRIAXIAL GEOGRID

Questions?

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