

Permeable Pavement for Stormwater

MIDS Group, May 18, 2012



**Minnesota Pollution
Control Agency**

Work Order Status

- Permeable Pavement Tech Team prepared two drafts of Design Guidance
- Core team members reviewed and commented, out to full team for review shortly
- Wenck team working with Tech Team, MPCA, and Barr to review and comment on guidance and calculator
- Collecting cost data and case studies
- Finalize package for discussion at June meeting

Review of Permeable Pavement Design Guidance

- Developed by Permeable Pavement Tech Team
- Based on guidance from State of Virginia
- Has been initially reviewed by industry leaders
- Comments incorporated into Draft 2
- Today: review key parts of the Guidance



Permeable Pavement



Porous
asphalt

Permeable
interlocking
concrete
pavement
(PICP)

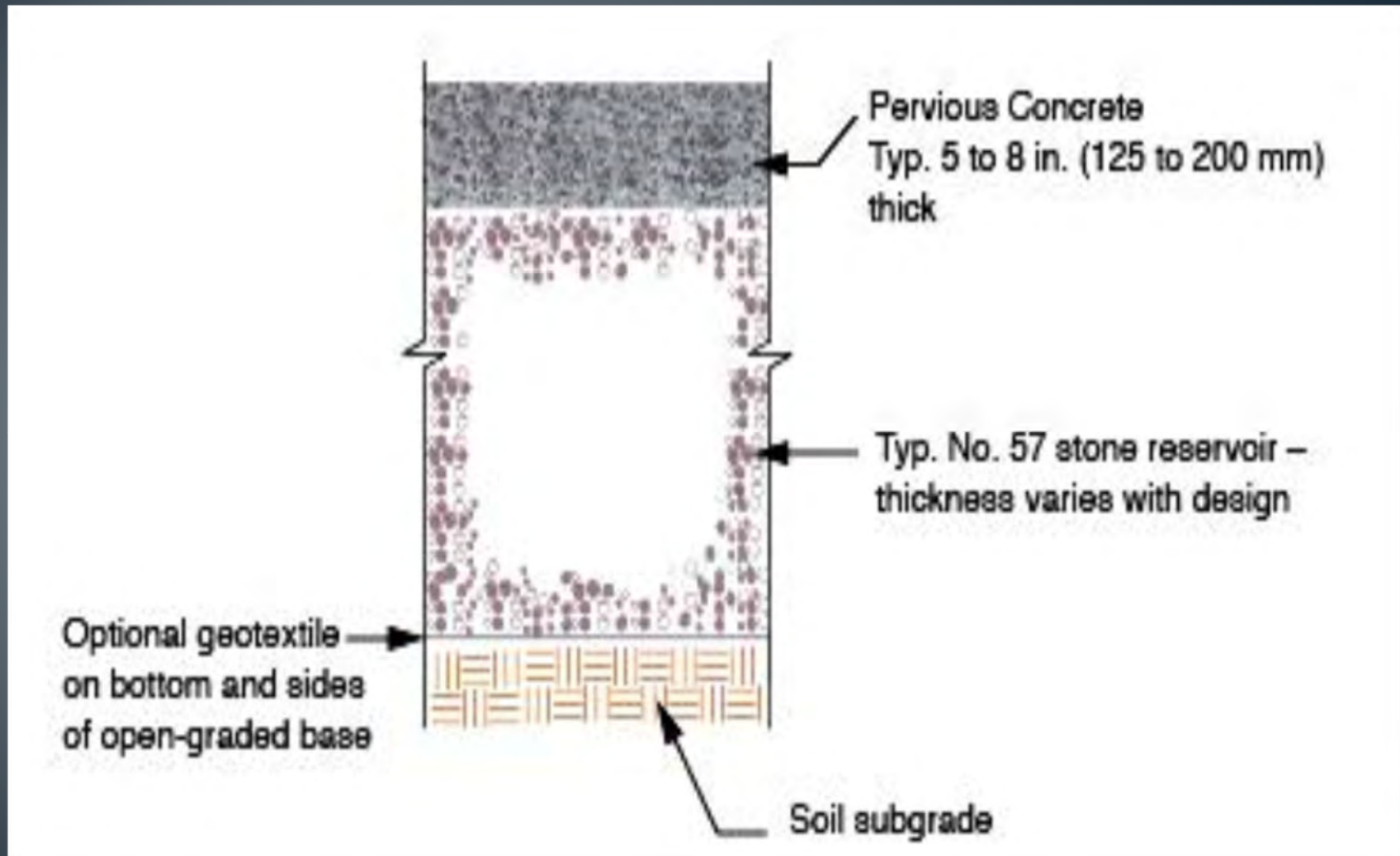


Pervious
concrete

Performance

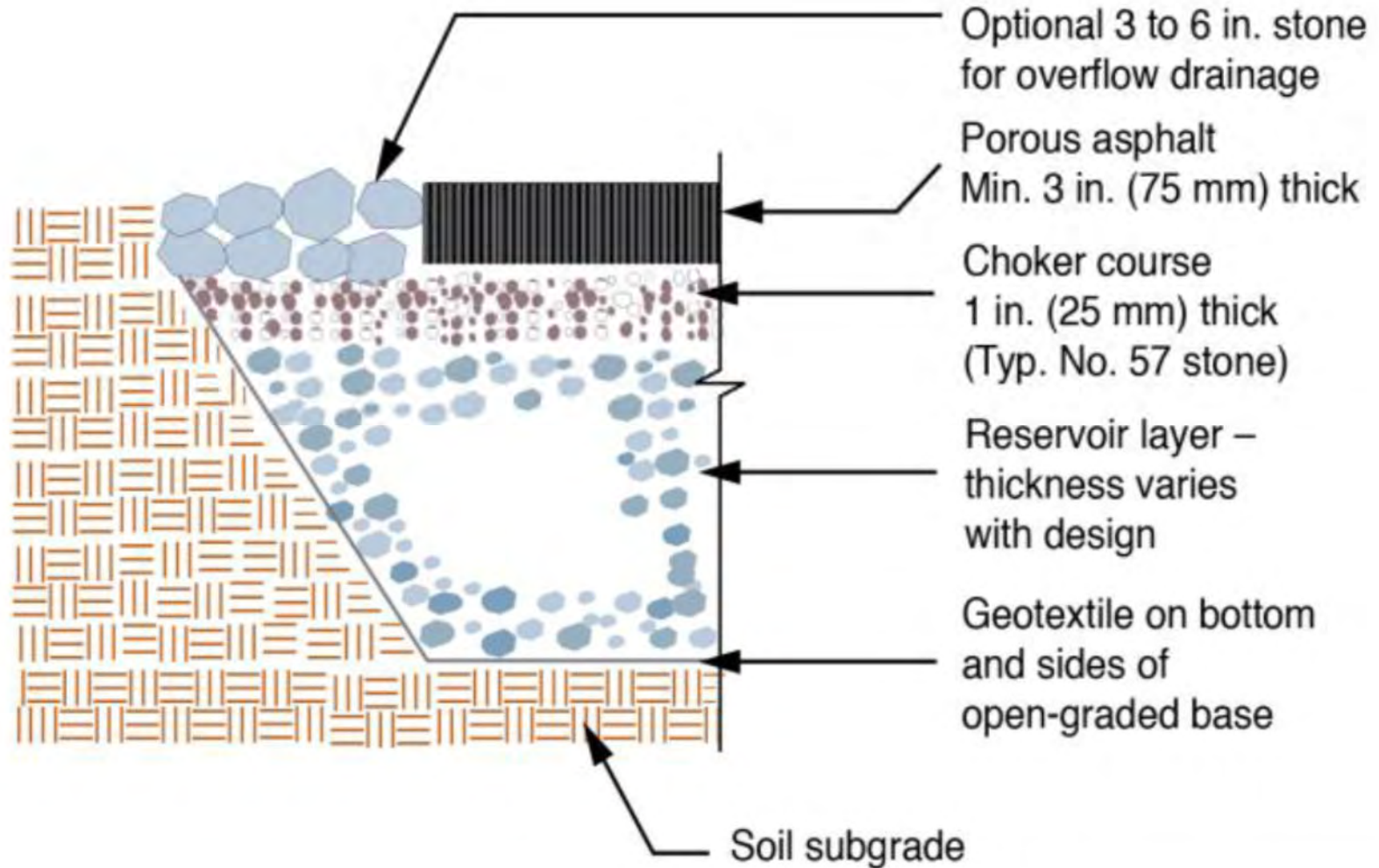
- Full infiltration – 100% of the runoff volume to 1.1 inch depth is retained; 100% pollutant reduction for that volume
- Partial infiltration – less than 100% is retained; some part is collected and discharged; pollutant reduction depends on volume retained
- Overflow volume from larger events directed into overflow system with no pollutant reduction for that volume

Pervious Concrete Typical Section



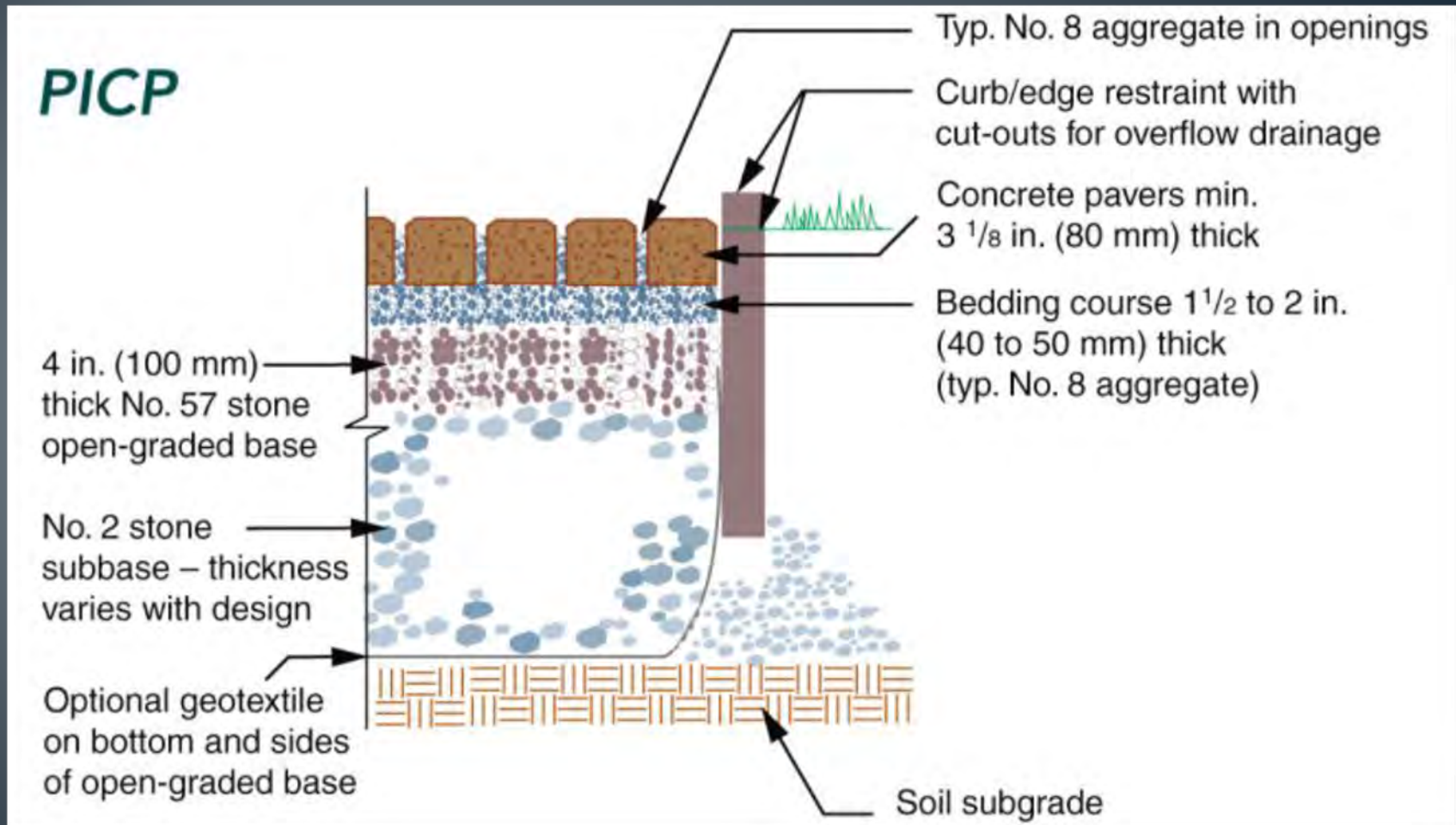
MIDS Permeable Pavement Design Specification

Porous Asphalt Typical Section



MIDS Permeable Pavement Design Specification

PICP Typical Section

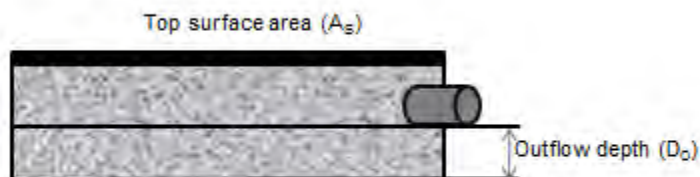


MIDS Permeable Pavement Design Specification

Permeable Pavement Volume Retention Calculator

Permeable Pavement

$$V = [A_s * D_o * n]$$



Notes

If outflow drain tile does not exist set outflow depth equal to total depth

	1 - Pervious pavement	
Required treatment volume (RV) [ft ³]	92	
Top surface area (A_s) [ft ²]	100	
Outflow depth (D_o) [ft]	2	
Media porosity (n) [ft ³ /ft ³]	0.4	
Volume reduction capacity of BMP (V) [ft ³]	80	
Volume of retention provided by BMP (BMPV) [ft³]	80	

Legend

User input cells

Calculation cells

Constant values

Value obtained from upstream value

Value obtained from another sheet

No data needed

Site Selection

- Best candidates:
 - Low volume residential
 - Alleys
 - Parking lots
- Best performance with HSG A or B soils
- Less successful candidates:
 - High volume streets, highways
 - Pavement with heavy truck traffic
 - Areas with short turning radius

Stormwater Management Functions

DRAFT

Stormwater Management Function	Full Infiltration	Partial Infiltration
Annual Runoff Volume Retained		
Total Phosphorus (TP) Removal	Composite: 100% for infiltrated volume, minimal for bypassed large event volume	Composite: 100% for infiltrated volume, minimal for bypassed volume
Total Suspended Solids (TSS) Removal	Composite: 100% for infiltrated volume, minimal for bypassed large event volume	Composite: 100% for infiltrated volume, minimal for bypassed volume
Winter Maintenance Impacts	Potential reduction in chloride application for ice control	
Channel Protection	Design additional (optional, as needed) storage in reservoir layer to accommodate larger storm volumes	
Flood Mitigation	Partial. May be able to design additional storage into the reservoir layer by adding base depth/storage or by using underground storage chambers.	

Ongoing Issues

- Agreement on scientific basis of annual volume and pollutant load removal numbers for calculator
- Technical issues:
 - Consistency with wellhead protection guidance
 - Use in sensitive karst areas
 - Post-construction acceptance criteria
 - De-icer use and other maintenance issues
 - Mn/DOT specification development
 - Definitions and language consistency