

Green Infrastructure Partnership Program Design Checklist Supplemental Info Packet



**Metropolitan Water
Reclamation District
of Greater Chicago**

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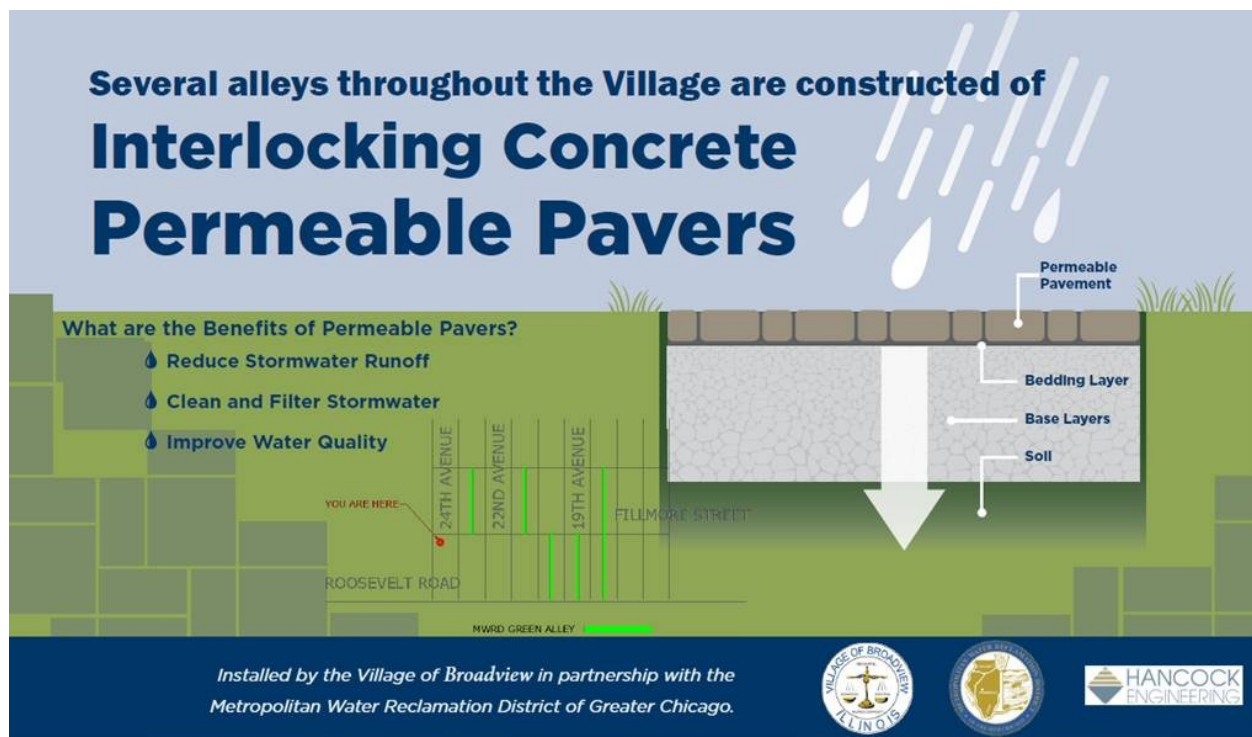
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1. Educational Signage Examples

Permeable parking lot & rain garden project



One sign for multiple permeable alleys (sign was designed to be placed at a nearby park and shows map of the alley locations):



Note: similar sign could be used without the map if located at the location of a one-alley project.

Permeable paver parking lot

Paving the Way to a Better Environment

Look down!
 You are standing on porous pavement. It improves the environment and keeps storm water out of basements.

The bricks you see, and gravel below, slow down rainwater when entering our waterways by allowing it to seep into the ground. That protects against erosion and flooding. And it filters out pollutants like car oil before they reach our water and preserves.

On hot summer days, this type of paving stays cooler than traditional blacktop, too.

FOREST PRESERVES
 of Cook County
 fpdcc.com

This project is a joint effort between the Forest Preserves of Cook County and the Metropolitan Water Reclamation District of Greater Chicago, designed to promote the use of green infrastructure as an effective means of storm water management.

Rain Garden

CHAMBER PARK PARKING LOT GREEN INFRASTRUCTURE / RAIN GARDEN

What is a Rain Garden?
 A rain garden is a shallow basin planted with deep rooted native wildflowers and grasses designed to capture, filter and absorb stormwater runoff.

Labels in diagram: STORMWATER RUNOFF, DEEP ROOTED NATIVE PLANTS, OVERFLOW PIPE

Why Native Plantings?
 Plants that are native to this region are well adapted to local conditions and have the ability to thrive with very little care once established. These are some of the flowering plants you might find here which also provide essential food and habitat for local wildlife such as birds, butterflies and other insects.

Prairie Blaze Star	Spotted Joe Pye	Mountain Mint	Green Bulrush	Cardinal Flower	Blue-Stemmed Goldenrod	Wild Bergamot

Wheeling Park District
Where People Thrive

This project is a joint effort between the Wheeling Park District and the Metropolitan Water Reclamation District of Greater Chicago, designed to promote the use of green infrastructure as an effective means of stormwater management




























Metropolitan Water Reclamation District of Greater Chicago

2. Native Plant Guide for Plant-Based GI

Plant List for Part to Full Shade































The following tables list native plants that stay relatively low and should perform well in rain gardens in this area.

PLANT LIST FOR PART TO FULL SHADE

	Spring	In Bloom	Fall
<p><i>Asarum canadense</i> Wild Ginger Bloom Time: April-May Height: 0.5'-1.0'</p>			
<p><i>Chrysogonum virginianum var. australe</i> Golden Star Bloom Time: May-October Height: 0.5'-1.0'</p>			
<p><i>Carex 'Ice Dance'</i> Ice Dance Sedge Bloom Time: April-July Height: .8'-1.0'</p>			
<p><i>Carex flacca 'Blue Zinger'</i> Blue Sedge Bloom Time: July-August Height: 1.0'-1.5'</p>			
<p><i>Iodanthus pinnatifidus</i> Purple Rocket Bloom Time: May-June Height: 1.0'-3.0'</p>			
<p><i>Chelone glabra</i> White Turtlehead Bloom Time: August-October Height: 2.0'-3.0'</p>			
<p><i>Osmunda regalis</i> Royal Fern Bloom Time: n/a Height: 2.0'-3.0'</p>			
<p><i>Polygonatum biflorum</i> Solomon's Seal Bloom Time: May-June Height: 3.0'-4.0'</p>			
<p><i>Hydrangea arborescens 'NCHA1'</i> Invincibelle Spirit Hydrangea Bloom Time: June-September Height: 3.0'-4.0'</p>			

Plant List for Full Sun

PLANT LIST FOR FULL SUN

	Spring	In Bloom	Fall
<p><i>Packera aurea</i> Golden Ragwort Bloom Time: April Height: 0.5'-2.5'</p>			
<p><i>Amsonia 'Blue Ice'</i> Blue Ice Bloom Time: May Height: 1.0'-2.0'</p>			PHOTO NOT AVAILABLE
<p><i>Monarda bradburiana</i> Eastern Beebalm Bloom Time: May Height: 1.0'-2.0'</p>			
<p><i>Tradescantia</i> Snowcap Spiderwort Bloom Time: May-July Height: 1.0'-2.0'</p>			
<p><i>Liatris spicata</i> Blazing Star 'Kobold' Bloom Time: July-August Height: 1.5'-2.5'</p>			
<p><i>Zizia aurea</i> Golden Alexander Bloom Time: May-July Height: 1.5'-2.5'</p>			PHOTO NOT AVAILABLE
<p><i>Iris versicolor</i> Blue Flag Iris Bloom Time: May-June Height: 2.0'-2.5'</p>			
<p><i>Baptisia sphaerocarpa</i> Yellow Wild Indigo Bloom Time: May-June Height: 2.0'-3.0'</p>			
<p><i>Panicum virgatum</i> Cheyenne Sky Switch Grass Bloom Time: July-February Height: 2.0'-3.0'</p>			
<p><i>Vernonia fasciculata</i> Common Ironweed Bloom Time: July-September Height: 2.0'-4.0'</p>			PHOTO NOT AVAILABLE
<p><i>Eutrochium dubium</i> Joe Pye Weed Bloom Time: July-September Height: 3.0'-4.0'</p>			

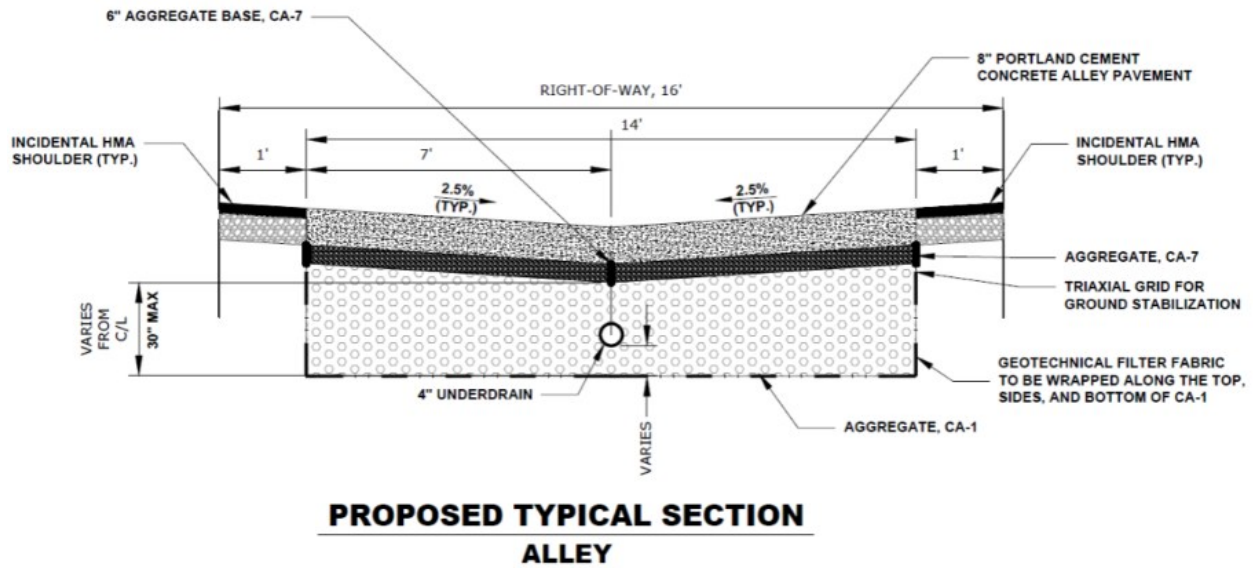
3. Striping for Permeable Paver Parking Lots

We have seen parking lots use white-colored pavers as all of the parking space markings, rather than using epoxy/paint. It preserves more open joints for surface infiltration and will save money on future paint striping maintenance.



4. Alternate Low-Maintenance Green Alley Design

Proposed Typical Section



Link to example detail: <https://mwr.org/media/17476>

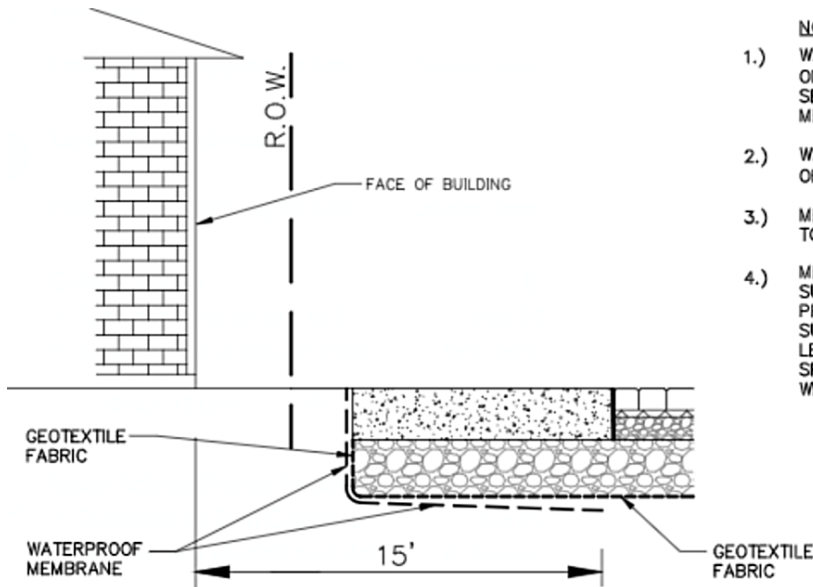
Possible benefits to the alternative green alley design

- Lower maintenance for asphalt paving as opposed to permeable pavers
 - Permeable pavers often get clogged with sediment and debris as well as weeds
- Reduced training for maintenance personnel
 - Typical asphalt paving with inlets that may be vacuumed similar to other sewer inlets
- Reduced maintenance equipment
 - Snow removal equipment for typical asphalt paving versus the need for special equipment for permeable pavers
- Potential cost savings related to reduced maintenance compared to traditional permeable pavement green alleys

5. Miscellaneous

Waterproof Liner Detail Example

(can also be applied in a bioswale/rain garden project):



NOTES:

- 1.) WATERPROOF MEMBRANE TO BE ATTACHED BY NAIL OR SCREW WITH WATER AT 12" C-C. MASTIC JOINT SEALER SHALL BE APPLIED BETWEEN EDGE OF MEMBRANE BEFORE ATTACHING TO CONCRETE ALLEY.
- 2.) WATERPROOF MEMBRANE SHALL EXTEND FROM EDGE OF ALLEY TO 15' FROM FACE OF BUILDING
- 3.) MEMBRANE SHALL SLOPE TOWARDS INSIDE OF ALLEY TO MATCH GRADING OF PROPOSED ALLEY.
- 4.) MEMBRANE MAY BE INSTALLED ON THE APPLICATION SURFACE EITHER BY HAND OR BY MECHANICAL METHODS, PROVIDED THAT THE FABRIC IS NOT TORN OR THE SURFACE RUTTED. MEMBRANE OF INSUFFICIENT WIDTH OR LENGTH TO FULLY COVER THE SPECIFIED AREA SHALL BE SPLICED USING SPLICE TAPE OR LAPPED IN ACCORDANCE WITH THE INSTRUCTIONS BY THE MANUFACTURER.

WATERPROOF MEMBRANE DETAIL

Waterproof Membrane Spec

Description: This work shall consist of furnishing and installing waterproof membrane in subgrades.

Materials: Materials shall be according to the following. The fabric for waterproof membrane shall be a GeoGard™ EPDM Platinum™ Membrane or approved equal. The membrane shall be according to the following.

Property	Test Method	Min ASTM Performance	Typical Values
Tensile Strength	ASTM D-412 (Die C)	9.0 MPa (1305 psi)	9.8 MPa (1425 psi)
Factory Seam Strength	ASTM D-816 (Modified)	9 kN/m (51 lb/in) or Sheet Failure	Sheet Failure
Elongation	ASTM D-412 (Die C)	300%	450%
Puncture Resistance	ASTM D-120	NA	.085 kN (19.2 lbf)
Tear Resistance	ASTM D-624 (Die C)	26.3 kN/m (150 lb/in)	35.0 kN/m (200 lb/in)
Shore A Durometer	ASTM D-2240	65 +/- 10	62
Ozone Resistance	ASTM D-1149	No Cracks	No Cracks
Heating Aging	ASTM D-573		
Tensile Strength	ASTM D-412 (Die C)	8.3 MPa (1205 psi)	9.7 MPa (1415 psi)
Elongation	ASTM D-412 (Die C)	200%	290%
Tear Resistance	ASTM D-624 (Die C)	21.9 kN/m (125 lb/in)	31.5 kN/m (180 lb/in)
Linear Dimensional Change, max, %	ASTM D-1204	+/- 1.0	<1.0
Brittleness Temp.	ASTM D-746	-45° C (-49° F)	-53° C (-63° F)
Water Absorption	ASTM D-471	+8, -2	+1.73
Water Vapor Permeability, max.	ASTM E-96	2.0	1.93
Tolerance on Nominal Thickness, %	ASTM D-412	+/- 10	+/- 10

Installation Requirements: Membrane shall be delivered to the jobsite in such a manner as to facilitate handling and incorporation into the work without damage. Material shall be stored in such a manner as to prevent exposure to direct sunlight, ignition sources and damage by other construction activities.

Prior to installation of the fabric, the applications surface shall be cleared of debris, sharp objects and trees. Tree stumps shall be cut to the level of the ground surface. If stumps cannot be cut to the ground level, they shall be completely removed. In the case of subgrades, all wheel tracks or ruts in excess of 3in. (75mm) in depth shall be graded smooth or otherwise filled with soil to provide reasonably smooth surface.

Membrane may be installed on the application surface either by hand or by mechanical methods, provided that the fabric is not torn or the surface rutted. Membrane of insufficient width or length to fully cover the specified area shall be spliced using splice tape or lapped in accordance with instructions by the manufacturer.

Method of Measurement: Waterproof membrane will be measured for payment in place and the area computed in square yards.

Basis of Payment: Waterproof membrane will be paid for at the contract unit price per square yard for WATERPROOF MEMBRANE.

Paver Installation Recommended Criteria

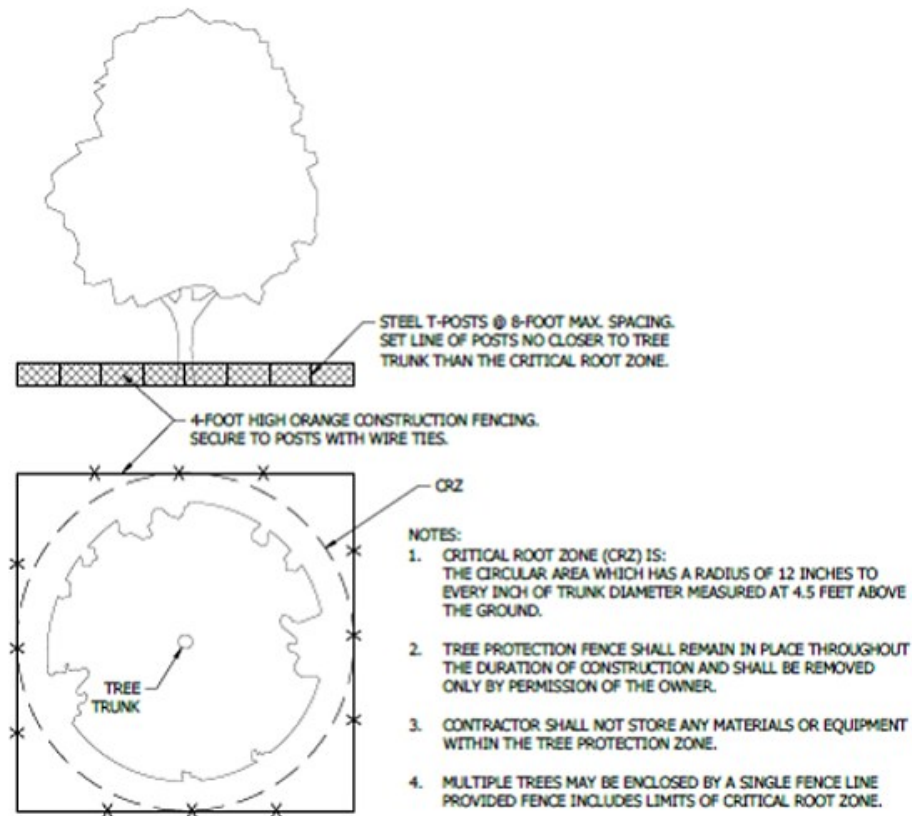
“Paver Installation: Spread the bedding aggregate evenly over the base course and screed to a nominal 1 ½ in. to 2 in. (28 mm to 51 mm) thickness. The bedding aggregate should not be disturbed. Place sufficient bedding aggregate to stay ahead of the laid pavers. Do not use the bedding aggregate to fill depressions in the base surface. Pavers shall be free of foreign material before installation. Compaction of pavers and joint material will occur after the joint material has been placed. Units cut no smaller than one-third of a whole paver will be accepted along edges subject to vehicular traffic. Pavers to be placed along the edge shall be cut with a masonry saw. The edges abutting conventional concrete are not unrestrained and should be fully compacted all the way to the edge. Upon completion of cutting, the area must be swept clean of all debris to facilitate inspection and to ensure pavers are not damaged during compaction. Low amplitude, high frequency plate compactor shall be used to compact the pavers. Use of a urethane plate compactor pad is recommended to minimize any scuffing of the paving stone surface. The pavers shall be compacted, and the bedding aggregates shall be swept into all joints and void openings until they are full. This will require at least two or three passes with the compactor. Do not compact within 3 ft. (1 m) of the unrestrained edges of the paving units. All work to within 3 ft. (1 m) of the laying face must be left fully compacted at the completion of each day.”

Geotechnical Fabric Recommendation

A woven geotextile fabric with apparent opening size of 0.5mm meeting IUM Material Specification 592:

https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_016396.pdf

Tree Protection for Critical Root Zone



TREE PROTECTION DETAIL

Approximate the size of the drip line, or better, the Critical Root Zone (above). Excavation within the drip line and CRZ should be minimized, and if needed, 6" max depth by hand, water, or air excavation. When encountered, roots should be pruned and treated. This is to preserve the health of the trees, which provide rainwater interception volume and help to infiltrate water.

Inlet Sumps

Please consider adding a small sump at rain garden inflow area, to minimize future maintenance. It could be built using pre-cast slabs or a large window well with concrete pavers at bottom. Overflow can still be lined with river rock to prevent erosion. This way, maintenance will be easy to remove sediment at inflow area, and will keep rain garden free of this sediment, decreasing maintenance and preserving infiltration rates over time.

Filter Baskets for Stormwater Inlets

Utilizing a filter basket or gutter bin in the stormwater inlet or grate can help collect sediment or debris to prevent it from clogging the downstream pipes or storage area. This can also help reduce maintenance by emptying the filter basket periodically to maintain flow to the stone and/or underdrain.

