Making Our Parking Lots Sustainable and Environmental Assets for our Communities

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Montgomery Co. Planning Commission

King of Prussia, 2008

Abram’s Run
PA Turnpike
US 422 Freeway
US 202 Freeway

King of Prussia Mall
M.I.A.?

Surface Parking =+/- 20% of land use area comprises parking
Great Opportunities for Green Infrastructure

Traditional Parking Lots = Big Problems

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Green Parking

- Traditional vs. Innovative Parking Lot Landscape Code
- Essentials Green practices for Green Parking
- Examples - Green Parking
- Examples of innovations in parking lot landscape code requirements
- Next steps – Opportunities, Questions?

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- Little Blue Stem – groundcover (Schizachyrium scoparium)
- River oats – groundcover (Chasmanthium latifolium)
Typical Parking lot development

- Trees & shrubs struggle for survival
- Lack of connection between rainwater & vegetation

Focus of “traditional” or “conventional” landscape codes for parking lots -

- Mitigation of impacts from conflicting land use.
- Buffers & Screens between different land uses.
- Landscape is generated by - deterministic- calculations.
- **RESULT**: Minimal environmental or ecological focus – “Landscape as decoration” vs. environmental amenity”

L. Merion Compliance Chart
Multiple Benefits of Green Parking

- Significant water quality and environmental benefits - Arkansas River.
- Attractive on-site stormwater management.
- Reduction of the heat-island effect with shading of cars and pavements.

Heifer International, Little Rock, Arkansas

Performance based parking lot landscape codes

Design Standards & Guidelines for Trees, Vegetation and Bio-Retention Facilities

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Performance-based parking lot landscape codes

Environmental Benefits:
• Address Urban Heat Island - Increase tree canopy.
• Stormwater = Rainwater viewed as a valuable resource -
• Larger Green areas - Increase permeable area in the site with larger green areas.

Aesthetics
• Mitigate vast expanse of pavement through increased interior landscape requirements.
• Improve street perimeter with trees and filter strips.

Safety
• Improve pedestrian safety & circulation.

Design Standards & Guidelines
• Trees, Vegetation Bio-retention

Green Parking Lots: The Essentials
1. Promote Infiltration of Rainwater into Bio-retention areas, rain gardens & perimeter areas.
2. Shade the Parking Lot: Greater greening & more effective shading techniques.
3. Use Environmentally Friendly Pavements.
4. Appropriate plant choices – Use appropriate plants from recommended lists.
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**Morton Arboretum, Chicago suburbs**

Visitors center -- 3+ acres of "green parking"

Absorbent island with curb cuts in planting islands

Combination of Rain Gardens and permeable pavement systems for rainwater infiltration.

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**Absorbent Bio-rentention Island**

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Environmentally-Friendly Paving Combined with Bio-retention

- Permeable Interlocking Concrete pavers
- Absorbent bio-retention area connected drainage system
- Generous Green area for bio-retention area
- 3 ft. deep Stone re-charge bed

Provide for areas to create maximum tree shade over the paved surface

- Little Blue Stem – groundcover (Schizachyrium scoparium)
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- **Appropriate Large Canopy Trees.**
- **Focus on Soils-The “Living Quarters” for trees.**
  - Surface absorbing roots in top 12-18 inches of soil
  - Larger area for horizontal root growth
  - Trees with good soil resources

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**Green Parking Lots: Value & Benefits**

Maximize “Green, pervious planting areas” for bio-retention rain gardens

*Heifer International, Little Rock, Arkansas*
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Environmentally-Friendly Paving

Interlocking Pervious Concrete Pavers for infiltration and detention of run-off

East Greenville, PA Municipal Parking Lot

Environmental Paving systems for parking lots

- Grass pavers
- PICP- Permeable Interlocking Concrete Pavers

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E.P.A. Green Infrastructure Research Program

Decade long test of permeable paving materials to determine effectiveness.

Test site at Edison, NJ Environmental Paving systems for parking lots.

Local Examples of Green Parking practices

- Chestnut Hill Academy, Science Center, LEED building with on-site integrated stormwater systems.
- East Falls Parking under Schuylkill Bridge –
- Dansko International Headquarters, West Grove, PA – LEED building.
- Willingboro, NJ Public Library – Philadelphia Sustainability Award winner.
- Bryn Mawr Hospital & Harriton High School, Lower Merion Township, PA.
Chestnut Hill Academy rain garden and parking lot development

Interconnected treatment - roof rainwater

Porous asphalt with wheel stops -
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Chestnut Hill Academy, Philadelphia, PA
The Rorer Center for Science and Technology
Completed January 2009

Chestnut Hill Academy rain garden and parking lot development

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Chestnut Hill Academy

- Entry Courtyard with outdoor environmental classroom, rain garden connected to roof drains, at Chestnut Hill Academy, Philadelphia, PA

East Falls “Green Parking Lot” with filter strip

- Switchgrass (Panicum virgatum)

Rain garden utilizing native grasses and shrubs next to Kelly Drive

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East Falls “Green Parking Lot”

View of Summersweet in rain garden area (*Clethra alnifolia*)

Dansko USA, West Grove, PA: LEED Certified Gold with sustainable site development & parking
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Dansko’s innovative site strategies

Extra Large - Bio-retention/rain garden

Dansko’s Green Roof and bio-retention/rain garden

Grass Pavement (plastic grid reinforced pavers) for reserve parking & extensive rain garden area with curb inlets

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Facility Renovation/Expansion with new Parking Lot Bio-retention & 300,000 SF of Asphalt Removed!

Before

After

McKenney’s Inc.,
Atlanta, GA

Utilize shade trees and maker larger planting spaces for them.

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Willingboro, NJ Public Library site

Generous areas for bio-retention
-- Interconnected treatment stream for rainwater

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Harriton High School Development

Parking Lot
Bio-swales

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Innovative Parking Lot Strategy using two technologies

Bryn Mawr Hospital Parking lot with Rain Garden

Tree Trench - Structural soils

Wynnewood Square Sh. Ctr. – 8 trees in interior parking area.
373 parking spaces;
96% impervious cover

Retrofit Opportunities
Challenges & Opportunities

Create incentives for Retrofits for ‘Green Parking’

Innovations in Parking Landscape Code are widespread

- Charlotte, NC
- Athens-Clarke Co, GA
- Chapel Hill, NC
- Sacramento, CA
- Austin, TX
- New York City
- San Mateo County, CA
- Columbus, Ohio
Charlotte, NC

Requirements for effective shading of the interior of parking areas.

.21-94: Tree Planting Requirements for parking areas:

- Trees must be planted so that a parking space is within at least 60 ft (tree island).
- 75% of trees to be planted must be large shade trees
- Specify Minimum Planting Area for planting island - 274 Sq. Ft.
- Requirements to amend the soil to a depth of 18”.

New York City: Commercial and Institutional areas

Extensive parking lot landscape requirements

Applicability
All parking areas of 36 spaces or more, or at least 12,000 sq. ft. in area shall provide at least one tree for every eight parking spaces.

Minimum Size of planted islands
Island with at least 150 sq.ft. of planting area.

Special requirements for Big Box parking lots
For parking lots of 150,000 sq. ft. -- Required that every other row of parking spaces shall abut a planting island (planting strip). The island shall be 8 ft. minimum in width and extend the entire row of parking spaces. The island can be traversed by a sidewalk no more than 3 ft. in width.
Portland, OR Parking Lot

Planting Requirements for Bio-Retention Facilities

- Grading and drainage: Perimeter areas and islands may be designed to accept run-off of the parking areas. Run-off to drain into all perimeter landscape and planting islands.
- Curbs separating landscape areas from parking may allow stormwater to pass through with curb cuts.
- All perennial/grass plantings should be no greater than 30” O.C. – or Provide dense cover, and reach their mature width within 2 years.
- The plantings utilized in bio-retention selected from the Bio-retention Planting List

Strategies to improve your communities parking lots

• Establish environmental criteria within your parking lot landscape code- lay out environmental goals in the purpose/preface statement.

• Look for places where there are obstacles for incorporating green practices – curbing, allowing drainage to rain gardens, bio-swales, perimeters areas of parking.

• Insure of your landscape code encourages, promotes the incorporation of environmental sustainable elements – Do the EASY things first- Remove obstacles!
### NEXT STEPS

Recommendations for improvements to Parking Lot Landscape code---

- **Trees**: Make Parking Lots – Tree Friendly.
- **Shading**: Establish performance measures for shading a certain “X” percentage attained after “X” years.
- **Appropriate Greening Choices**: Establish a recommended Plant List for parking lots.
- **Bio-retention**: Promote bioretention in parking areas where appropriate of rain gardens and depressed tree islands.
- **Environmentally friendly pavements**: Promote their use and flexibility in design of various areas.
- **Insure** zoning ordinance amendments have green site sustainable requirements and parking design guidelines.

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**Include a Approved Plant List**

Use appropriate BioRetention

Trees/Shrubs/Grasses

Parking lot rock garden with too few appropriate tress, shrubs & grasses.

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Urban Land Institute is projecting during a “jobless recovery”- Green Building Activity will grow +60%.

*Focus on green technology is what many REITs see in today’s competitive and fickle real estate market as their competitive edge.”*