Planning and Designing Cost-Effective Green Streets

Case Studies and Lessons Learned

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Why Green Streets?

- They represent 25-35% of the total urban impervious area
- Opportunities often exist within the public Right-of-Way, even in confined urban areas (utilities, etc)
- Align well with urban greening efforts and goals; good for business, property values, etc
- High visibility and educational opportunities
- Enhances traffic calming and pedestrian/bicyclist safety
- Can be cost-effectively implemented by integrating with planned utility or other improvements
- Enhances urban landscapes and promotes healthier, longer-lived trees
Green Streetscapes

Green streets add aesthetic value, improve traffic calming, promote economic investment, and manage stormwater in highly urban environments (and elsewhere).

BEFORE: Stormwater enters catch basins and is directly connected to sewer

PROPOSED (Photo Simulation): Stormwater is diverted to Green Streets and only overflows to sewer when necessary

AFTER (Actual Photo): Project has been adopted* by local business to pick up litter, weed, and mulch (provided by County)
Green Streets come in varying shapes and sizes and use a variety of GI technologies...
Design and Maintenance Challenges

- Existing mature street trees
- Utilities and other infrastructure
- Street slope, limited space, subgrade conditions
- Public perception / education
- Contractor education / oversight
- Trash, sediment, debris, snow... maintenance!
- Costs (construction + maintenance)
- And the list goes on...
Making Green Street (More) Affordable

- Many factors influence Green Street costs (technology, capture goal, utility conflicts, location, soil permeability, etc.)
- Use a business case to ensure that the project remains affordable and responsive to key success factors (for CSO communities, compare to grey storage/treatment costs)
- Regional planning analysis can reveal cost-effective Green Street opportunities
- Economy of scale and changing the market
- Integrating with existing public works projects (utility work, street repaving/reconstruction, ADA ramps, street trees, traffic calming, etc.)
- Explore opportunities for large-scale O&M contracts (e.g. permeable pavements) - economy of scale
- Explore potential partnerships with local community groups, environmental organizations, etc - offset costs through low-cost or volunteer labor
City of Lancaster *Green It!* Case Studies
Early Example: Alley 148

- Before (July 2011)
  - Conventional reconstruction (8-inch reinforced concrete) ~$20.30/SF

- After (February 2012)
  - Green alley retrofit (permeable pavers with infiltration trench) ~$22.40/SF

Greened For 10% Additional Cost, Captures 200,000 Gallons Per Year
A Green Street’s Secret Weapon... Trees!

*Street trees thrive when rooting volume is maximized via soil cells or sand-based structural soils*
Walnut Street

- Infiltration Tree Trench with Soil Cells for enhanced Rooting Volume
- Passive irrigation via perforated pipes and infiltration trench
Using Traffic Safety & Transportation Funding to Reduce Accidents and Runoff While Enhancing Local Business
700-Gallon Cistern Serves as Public Art and Irrigates Planters

5 MPH reduction in average traffic speed
Mulberry Street 1-way to 2-way Conversion

- Integrates GI at pedestrian crossings and on-street parking zones.
- Improves vehicular traffic, bike and pedestrian safety, green stormwater management
- Significant cost savings by integrating green with traffic project funded with State Smart Growth funding
- Enhanced City Bike Plan
- Community Outreach
Collaboration is the Key to Success

- City Planning - Enhanced Bike Plan, Tree Planting/Protection, Community Engagement
- PennDOT - State funding impacts schedule, required additional reviews and specification revisions for Bidding
- Integrated Design - Traffic, Signals, and GI
- Utilities - Relocation and Protection
- City Public Works and Engineering - Drainage structure maintenance & utility offsets based on age/condition
Charlotte Street 1-way to 2-way Conversion: Adaptive and Dynamic Design

- Drainage structure details - Revised for easier maintenance
- Curb extension grading simplified - Helps Contractor get it Right
- Surface Pretreatment and Energy Dissipators - Modified for easier maintenance and erosion control
- Early tree assessment - City Arborist recommendations informed landscape plans
- City Engineering - Greater offsets from aging infrastructure;
- Early coordinate with Public Works to avoid impacting curbs/sidewalks in good condition and to replace damaged sidewalks
Simplified Grading
Energy Dissipaters
Questions?

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