

Background (Linkages to Water Quality)

- Natural lands and critical habitat form large networks of green infrastructure
- Forests, prairies, wetlands, and habitat corridors must be protected to prevent loss of critical water management functions



1: Protect Natural Resources and Open Space

1A: Sensitive Land Protection

PLAN

Identify areas ripe for development and areas for preservation

INCENTIVES

Support land trusts to acquire and manage critical areas

REGULATION

Protect steep slopes or other sensitive

Example:
Hillsborough County, FL

- Conducted a collaborative process to map areas for future growth and areas for preservation.
- The result dramatically increased the amount of open space and increased predictability for developers.

1: Protect Natural Resources and Open Space

1B: Tree Protection Standards



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1B: Tree Protection Standards

PLAN

Set urban canopy goals

INCENTIVES

Provide financial incentives for tree purchase and planting and/or provide free or reduced price trees to homeowners

REGULATION

- Count trees toward stormwater and landscaping requirements
- Require site plans or stormwater plans to include tree preservation

Example: San Jose, California gives credit for new and existing trees near impervious areas



1: Protect Natural Resources and Open Space

1B: Tree Protection Standards

General Regulatory Approaches

- Specimen and Special Trees
- Size
- Species
- Historical Associations
- Woodland Protection/Percent Tree Cover
- Distance/Buffer Requirements
- Special Area Protection
- Replacement/Mitigation Standards

Example:
Overland Park, Kansas

On sites with existing, mature trees, at least 40% of significant trees shall be preserved or transplanted on site.

- Deciduous trees with 12-inch minimum caliper,
- Evergreen trees 12 feet or more in height, or
- Groups or stands of 10 or more trees with a minimum caliper of 6 inches.

1B: Tree Protection Standards

- Enabling authority
- Construction protection
- Maintenance after development
- Exemptions
- Enforcement
- Complements to regulation



1C: Protect Water Bodies and Aquifers

PLAN

Identify key water resources for protection in local and/or regional plan

INCENTIVES

Restored degraded wetlands qualifies for additional open space credit

REGULATION

Determine riparian buffers

Example: Lenexa, KS

•Parks and trails plans has set aside protective zones around all streams (appear as green squiggly lines), as part of its city-wide inventory of existing and planned parks.

•You can start to see a network of green infrastructure emerge that includes both natural lands and built park spaces.



1D: Community Open Space & Parks Planning

REMOVE BARRIERS

Encourage retrofits of abandoned or underutilized land to serve as open space or SW management

INCENTIVES

Provide open space credit for green roofs and other green stormwater management facilities

REGULATION

Adopt policies that ensure that amenities are within a ¼ to ½ mile walking distance from every residence

Example: Cleveland, OH

•Used HUD's neighborhood stabilization funds to buy foreclosed properties to turn into small green infrastructure facilities.

- Benefit include:
 - more stable neighborhoods, and
 - progress toward decreasing their SW flows.

2. Promote Compact Development and Infill

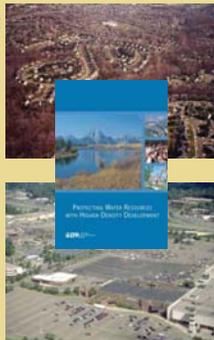
- A Support infill & redevelopment
- B Direct development to exist infrastructure
- C Encourage mixed-use development



Background (Linkages to Water Quality)

Compact, higher-density development can reduce overall impervious cover, runoff, and pollutants

- "Pervious" surfaces in low-density development often act like impervious surfaces (e.g., lawns)
- Low-density development often requires more off-site impervious infrastructure (roads, parking, shopping)
- Infill and redevelopment preserves outlying open space



2A: Support Infill and Redevelopment

PLAN

Work with economic develop entity to identify potential brownfield and greyfield sites.

INCENTIVES

Allow density bonuses and streamlined permitting for redevelopment

REGULATION

Differentiate between redevelopment and greenfield development in local codes and ordinances

Example: Greensboro, NC

Redeveloping over dilapidated housing units a five minute walk to the CBD, caused the annual tax base to go from \$400K before redevelopment (1995) to more than \$10 million after redevelopment (2003). In recent years, the residential units in this neighborhood have held or increased their value.



2B: Direct Development to Existing Infrastructure

BARRIERS

Allow accessory dwelling units (ADUs)

INCENTIVES

Density bonuses and incentives for infill or green infrastructure practices

REGULATION

Tailor development standards for redevelopment areas (parking, stormwater landscaping, setbacks, etc.) to remove unnecessary hurdles

Example: Santa Cruz, CA

ADU's offer residents new and affordable housing options. The City experienced a 5 fold increase in permits after starting the program.



Attached ADU above garage.

2C: Encourage Mixed-use Development

PLAN

Local capital improvement funding is targeted to areas appropriate for mixed use

INCENTIVES

Credit given for adjacent on-street parking, which can count for local parking requirements

REGULATION

Adopt minimum density requirements

Example: Arlington, VA

Market Common, which includes includes stores, residences, single family homes, parking garages, and a one-acre park, was built on a former Sears store and parking lot. Arlington now generates 33 percent of county revenues from 8 percent of the land by targeting development around five Washington Metrorail stops, which allows Arlington to have the lowest property tax in Northern VA.



3. Design Complete Streets

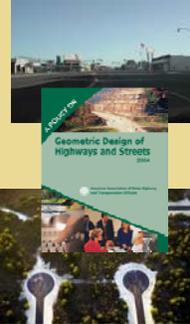
- A. Street design
- B. Green infrastructure elements and street design (Green Streets)



Background (Linkages to Water Quality)

Traditionally, street dimensions and layout governed by:

- AASHTO's Green Book
 - Many street standards adopted for rural and suburban roads & later applied to urban streets
- Level of Service (LOS) Standards
 - Congestion management given grades (A, B,...F)--faster and wider is better
 - Wider streets can mean faster speeds and more hard surfaces
- Fire and Access
 - Wide lanes and turning radii



3A. Street Design

PLAN

Adopt a "safe routes to school" program or pedestrian/bike safety initiatives

BARRIERS

Permit shared and two-track driveways

INCENTIVES

Developments with approved comprehensive transportation plans allowed to build narrower street widths

REGULATION

Revamp local street standards to allow context-sensitive design (See ITE manuals)

Example:



3B. Green infrastructure elements and street design (Green Streets)

Integrating green infrastructure with street design is a Green Street.

- It is designed to incorporate a system of stormwater treatment within its right-of-way
- It is one component of a larger, watershed approach to improving a community's water quality
- Makes visible a system of "green infrastructure"
- Incorporates the stormwater system into the aesthetics of the community
- Maximizes the use of street tree coverage for stormwater and climatic reasons
- Requires a broad-based alliance for its planning, funding, maintenance, and monitoring

Example: Los Angeles, CA

Ankrom Moisan Architects



3B. Green Streets



3B. Green Streets

BARRIERS

Street-side swales can replace curb and gutter for streets with lower traffic speeds such as residential streets.

Example:

Pleasanton, CA (Left)
Wells, ME (Right)



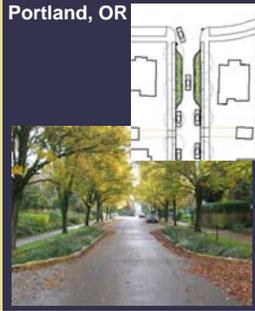
3B. Green Infrastructure Elements and Street Design

BARRIERS

- Add raingardens to residential streets without removing curbs.
- Stormwater flows into raingarden and is allowed to infiltrate.

Added benefit of calming traffic on residential streets and providing more greenery.

Example:
Portland, OR



3B. Green Streets

- Rain gardens can be added to pedestrian bulb-outs on busier commercial streets.
- Stormwater is allowed to infiltrate but the added benefit is reduced crossing distances for pedestrians.

Example:

Kansas City, MO



3B. Green Streets

- Look for opportunities to remove impervious surfaces with attractive gardens.

Example:
San Francisco, CA



3B. Green Streets

- Alleys typically have low volumes of traffic at lower speeds; they can be the "low hanging fruit" in greening streets.
- Water infiltrates through permeable pavement or infiltration basins, alleviating flooding and reducing alley runoff.

Example:

Chicago, IL



3B. Green Streets

PLAN

Transportation plans promote green infrastructure practices

INCENTIVES

Develop formal incentive program
•Cost sharing, reduction in street widths and parking requirements, assisting with maintenance

REGULATION

Adopt green infrastructure retrofit requirements for major street projects

Example: Covington, KY

Facing a consent decree, the Sanitation District #1 wanted to develop a range of strategies to manage stormwater but also to encourage economic development for its 32 communities. The resulting regional, neighborhood, and site strategies have become a national model.



4. Encourage Efficient Parking

- A Reduced Parking Requirements
- B Transportation Demand Management Alternatives
- C Minimize Stormwater from Parking lots



Background (Linkages to Water Quality)

- Parking creates a lot of impervious surface
- ITE Parking Generating guidance
- Local codes and ordinance
- Economic implications
 - Savings from fewer spots, smaller stalls



Local parking requirements often mean developers must supply parking to meet peak demand, e.g., the day after Thanksgiving. This often creates a more supply than demand, and in turn, unnecessary impervious surface

4A. Reduced Parking Requirements

BARRIER

Allow flexibility in meeting parking requirements through shared parking, off site parking or other approaches

INCENTIVES

- Grant automatic parking reductions for mixed-use and TOD projects

REGULATION

- Adopt parking maximums
- Allow credit for adjacent on-street parking

Example: San Francisco, CA

The City introduced parking maximums for Mission Bay redevelopment to maximize the amount of new housing, make the most of the new Third Street Light Rail line and minimize traffic impacts to congested streets. Residential parking maximums were set at one space per unit. With fewer parking spaces, more space was available for a childcare center and retail stores at ground level. The 17 would-be parking spaces were converted to retail space that is expected to generate revenues of \$132,000 annually for the project.

4B. Transportation Demand Management Alternatives

BARRIERS

De-bundle parking spaces from apartments and condos

INCENTIVES

Allow developers to make in-lieu fee payments for parking

REGULATION

Create a parking district to allow/require businesses to support public garages rather than their own on site parking

Example: Bethesda, MD

Montgomery County, MD encourages structured parking by charging a special parking assessment on new development near metro stations. This strategy is designed to support transit, walking, and other transportation options, thus reducing overall parking need.



4C. Efficient Parking – Green It!



4C: Green Parking Lots

Simple Retrofit

- 1 New Swale
- 4 Reduced parking stalls (8.5'x15')
- 7 New raingarden
- 8 Trench drain
- 10 New stormwater planter



4C. Green Parking Lots



New swale



New stormwater planter

4C. Green Parking Lots



4C. Minimize Stormwater from Parking

PLAN

Comprehensive plans call for landscaping in parking lots

BARRIERS

Allow for innovative landscaping that provide stormwater management to count towards landscaping requirements

REGULATION

Adopt standards requiring minimum area of lot to drain into landscaped areas

Examples:



5. Green Infrastructure on Site

- A.Green Infrastructure Practices
- B.Maintenance/ Enforcement



Background (Linkages to Water Quality)

- Uses vegetation and soils in urban and suburban areas to manage and treat precipitation naturally rather than collecting it in pipes.
- Preserves natural systems and uses engineered systems such as green roofs, rain gardens, and vegetated swales to mimic natural functions.
- Includes approaches that infiltrate, evapotranspire and capture and re-use stormwater.
- Economic benefits



5B. Maintenance and Enforcement

PLAN/EDUCATE

- Provide model checklist
- Demonstration projects

BARRIERS

Ensure that local agencies have authority and resources to enforce

Example: Portland, OR

To have more control over maintenance, Portland is transforming its roads right a ways. By using green approaches, Portland estimates it can save \$63 million in capital costs



Over 200 Policy Suggestions across multiple departments

Five Topics:

1. Protect natural resources and open space
 - What strategies best fit your community?
2. Promote compact development and infill
 - Where is the low hanging fruit?
3. Design complete smart streets that reduce imperviousness
 - What development projects are coming up?
4. Encourage efficient parking supply
 - What policies are being developed?
5. Adopt green infrastructure stormwater provisions
 - What's the next step?

Short Term Strategies: CODE REVISION CHECKLIST

1. Protect Natural Resources and Open Space

- A. Sensitive Land Protection
 - Identify areas ripe for development and areas for preservation
 - Support land trusts to acquire and manage critical areas
 - Protect steep slopes or other sensitive natural lands
- B. Tree Protection Standards
 - Set urban canopy goals
 - Provide financial incentives for tree purchase and planting and/or provide free or reduced price trees to homeowners
 - Count trees toward stormwater and landscaping requirements
 - Require site plans or stormwater plans to include tree preservation
- C. Protect Water Bodies and Aquifers
 - Identify key water resources for protection in local and/or regional plan
 - Restore degraded wetlands qualifies for additional open space credit
 - Determine riparian buffers
- D. Community wide open space and parks plan
 - Encourage retrofits of abandoned or underutilized land to serve as open space or SW management
 - Provide open space credit for green roofs and other green stormwater management facilities
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Short Term Strategies: CODE REVISION CHECKLIST

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- C. Encourage mixed-use development
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 - Develop formal incentive program
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Short Term Strategies: CODE REVISION CHECKLIST

5. Green Infrastructure on Site

A. Green Infrastructure Practices

- Legalize, incentivize, and require green infrastructure
- Update stormwater fees
- Provide "green tape" program for development projects using green infrastructure
- Adopt a performance standard and allow reductions for land use strategies that meet WQ goals

B. Maintenance/ Enforcement

- Provide model checklist
- Demonstration projects
- Ensure that local agencies have authority and resources to enforce

Resources

- www.epa.gov/greeninfrastructure
 - Lots of tools, cost data, case studies, and guidance on regulatory integration
- www.cnt.org/greeninfrastructure
- US EPA Water Quality Scorecard and green infrastructure publications. (See <http://cfpub.epa.gov/npdes/greeninfrastructure/munichandbook.cfm>)
- http://www.epa.gov/owow/NPS/lid/gj_case_studies_2010.pdf

Comments and Questions?



What are the strategies that are most compelling to you?