

What is Green Infrastructure?

Traditional "Gray" Infrastructure



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Why is Green Infrastructure Important?



When rain falls, it causes stormwater to runoff across paved surfaces such as parking lots, rooftops, and streets.

Cuando llueve, el caudal del agua corre a través de superficies pavimentadas, tales como estacionamientos, techos y calles.



Stormwater can pond on these paved surfaces, causing localized flooding of streets and neighborhoods.

Las aguas pluviales pueden estancarse sobre estas superficies pavimentadas, causando inundaciones localizadas de calles y barrios.



The stormwater also picks up trash, bacteria, and other pollutants along the way and can carry them to our streams, rivers, ponds, and lakes.

Las aguas pluviales también recogen basura, bacterias y otros contaminantes a lo largo de su trayecto y tienden a llevarlos a nuestros arroyos, ríos, estanques y lagos.



Green infrastructure captures stormwater at the source.

La infraestructura de espacios verdes captura las aguas pluviales en la fuente.



Green infrastructure allows stormwater to be absorbed and filtered by soil and plants in order to slow down and clean stormwater.

La infraestructura de espacios verdes permite que las aguas pluviales sean absorbidas y filtradas por la tierra y las plantas con el fin de desacelerar su flujo y limpiarlas.



Green infrastructure also provides many other benefits, including beautification of neighborhoods, creation of public open spaces, improvement of streets for pedestrians and bicyclists, improvements in air quality, and provisions for wildlife habitat.

La infraestructura de espacios verdes también brinda muchos otros beneficios, incluyendo embellecimiento urbano, la creación de espacios públicos abiertos, la mejora de las calles para peatones y ciclistas, la mejoría de la calidad del aire y la provisión de um hábitar bara la vida silvestre.

Green infrastructure, used in concert with traditional stormwater management facilities, is intended to reduce and infiltrate as much runoff as possible before it enters the storm sewer network. La infraestructura de espacios verdes, usada en conjunto con las instalaciones tradicionales de manejo de aguas pluviales, tiene la intención de reducir e infiltrar el máximo de la escorrentía posible antes de que entre en la red de alcantarillado.





Benefits of Green Infrastructure



MITIGATING STORMWATER/FLOODING MITIGACION DE AGUA DE TORMENTA/INUNDACIONES



REDUCING IMPERVIOUS COVER REDUCCION DE LA CUBIERTA IMPERMEABLE



PROMOTING ECONOMIC BENEFITS PROMOCION DE BENEFICIOS ECONOMICOS



ENHANCING WATER QUALITY MEJORAMIENTO DE LA CALIDAD DEL AGUA



FOSTERING CLIMATE RESILIENCE ACOGIMIENTO DE RESILIENCIA AL CAMBIO CLIMATICO



INCREASING RECREATIONAL OPPORTUNITIES AUMENTO DE OPORTUNIDADES RECREATIVAS



IMPROVING AESTHETICS MEJORAMIENTO ESTETICO



PROVIDING WILDLIFE HABITAT PROVISION DE UN HABITAT PARA LA VIDA SILVESTRE



REDUCING HEAT ISLAND EFFECT REDUCCION DEL EFECTO DE ISLA DE CALOR URBANO







The Planning Process

February 2017: Project initiation

March – June 2017: Research of existing plans and policies

May 2017: Public Meeting #1

July 2017 – March 2018: Development of draft document

<u>April – June 2018</u>: Completion of final document for NJTPA

June 2018: Public Meeting #2

July – October 2018: Final revisions to document

<u>November 2018 – January 2019</u>: Approval of document as a new element of the Passaic County Master Plan.

<u>Ongoing</u>: Development of implementation plan and revision of development review standards





Who Informed the Planning Process?

Professional Input

- Passaic County Planning & Engineering Staff
- Consultants
- Inter-Agency Team
- Technical Advisory Committee
- Engineer Focus Group
- Technical Expert Interviews

Community Input

- Public via...
 - Open House
 - Paterson SMART Event
 - Online Survey and Interactive Map
 - Public Presentation
- Community Organization Focus Group





Who Informed the Planning Process?

Public Meetings

- Open House
 - May 24, 2017
- Paterson SMART Event
 - Sept. 13, 2017
- Public Presentation/Q&A Session
 - June 11, 2018
- Public Hearing (Master Plan Adoption)
 - Nov. 29, 2018







What Did We Hear From Stakeholders?

Professional Input

- County regulations should apply to development at thresholds below NJDEP standards (1/4 acre of new impervious surfaces / 1 acre of disturbance)
- Cost of construction and maintenance are major concerns
- Need to assign responsible party for maintenance
- Provide as much guidance and technical data as possible to make it easier for engineers to implement
- Provide guidance documents to municipalities to encourage local implementation

Community Input

- Localized flooding and pooling of water in the streets is both dangerous and inconvenient
- Inadequate stormwater management leads to property damage (landscape degradation, structural damage, water in basements)
- Need to assign responsible party for maintenance

Survey Results

(Ranking of Green Infrastructure Benefits)

- 1. Improved Water Quality
- 2. Improves Air Quality
- 3. Reduces Stormwater and Localized Flooding
- 4. Tied for 4th
 - Economic Benefits
 - Improves Aesthetics
 - $\circ \quad \mbox{Increased Recreational Opportunities}$
- 5. Increased Wildlife Habitat Area





Green Infrastructure Element

Development Review Recommendations

• Analyzed the last 10 years of Site Plan and Subdivision review (2007-2017)

- Categorized site area and square footage of new impervious area created, in order to determine the appropriate regulatory cut-off that would exclude development of smaller parcels and site plans for renovations/minor additions
- **<u>Recommendation</u>**: Require stormwater mitigation using Green Infrastructure for sites proposing 2,500 sq. ft. or more new impervious area
 - Focuses regulations on larger impact sites with more involved engineering
 - The mitigation requirement would only apply to the additional impervious area and not to entire sites
 - \circ \quad Would require maintenance plan and be reported on annually by Planning staff





Green Infrastructure Element

Stormwater Management Guidance Manual







Green Infrastructure Element: Bioretention



Stormwater flows downhill into garden from surrounding area. Stormwater is piped from the street to the garden.

Plants filter water and enhance streetscape. Water filters through soil.









Green Infrastructure Element: Pervious Paving









Green Infrastructure Element: Other Grass Swale Wet Pond **Constructed Wetlands**





Green Infrastructure Element

Green Streets Guidelines





Green Infrastructure Element:

Green Streets





































Stormwater ROW Bumpout

Downspout Planter

Stormwater Tree Pit









Digital Version

• Visit the project website to view the full plan: <u>http://www.passaiccountynj.org/government/departments/planning</u> <u>and economic development/green infrastructure.php</u>





Haledon Avenue (Paterson) Green Streets Pilot Project







Green Streets

• Green Street: "...a transportation corridor that incorporates low-impact design elements and promotes non-vehicular forms of transportation."

A green street should:

- Reduce stormwater flow
- Improve water quality
- Reduce urban heating
- Enhance pedestrian safety
- Reduce carbon footprint
- Beautify neighborhoods





The Project

\$330,572 in funding from NJDEP Nonpoint Source Pollutions Control Grants (319h) program

The Project Corridor: Haledon Avenue, Paterson

- Between E. Main Street and N. 2nd Street (roughly 1/5-mile)
- Stormwater flows to the Passaic River to the SE

The project entailed:

- Replacement of sidewalks, curbing, and ramps
- Installation of curb "bump outs" and high-visibility crosswalks
- Removal of unused/redundant curb cuts
- Addition of stormwater planters and rain garden
- Planting of shade trees, shrubs, and grass

















Implementing a monitoring plan to determine the effectiveness of the project

- Stormwater management: tracking the progress of the soil infiltration rate of stormwater
- Urban Heat Island effect: tracking air temperature
- Vehicular safety & traffic calming: Crash data and speed surveys

The County is working with community groups to coordinate on maintenance of plantings and pick-up of litter

Identifying additional projects as part of Green Stormwater Infrastructure Element implementation

- Lakeview Avenue, also in Paterson, is a priority project
- The County has formed a Green Stormwater Infrastructure Committee to identify opportunities to incorporate GSI into County facilities
- Green Streets practices will also be incorporated into future County resurfacing projects







Questions?

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