YAYASAN PENDIDIKAN DAYANG SUMBI
INSTITUT TEKNOLOGI NASIONAL
LEMBAGA PENELITIAN DAN PENGABDIAN KEPADA MASYARAKAT
Jl. PHH Mustapa 23, Bandung 40124 Indonesia, Telepon: +62-22-7272215 ext 157, Fax 022-720 2892
Web site: http://www.itenas.ac.id , e-mail: lpp@itenas.ac.id

SURAT KETERANGAN

MELAKUKAN KEGIATAN PENGABDIAN KEPADA MASYARAKAT
INSTITUT TEKNOLOGI NASIONAL
No. 340/C.02.01/LP2M/IV/2018

Yang bertanda tangan di bawah ini,

Nama	: Dr. Tarsisius Kristyadi, S.T., M.T.
Jabatan	: Kepala
Unit Kerja	: LP2M-Itenas JL. P.K.H. Mustafa No.23 Bandung

Menerangkan bahwa,

No.	Nama	NPP	Jabatan
1	Emma Akmalah, S.T., M.T., Ph.D.	19941101	Narasumber
2	Bernadinus Herbudiman, S.T., M.T.	20020116	Narasumber

Telah melakukan kegiatan Pengabdian kepada Masyarakat sebagai berikut:

Nama Kegiatan	:	Sosialisasi dan Pendampingan Pelatihan Jarak Jauh Bidang Konstruksi & Seminar Infrastruktur Berkelanjutan
Tempat	:	Gedung Serbaguna Institut Teknologi Nasional Bandung
Waktu	:	24 Februari 2018
Sumber Dana	:	Kementerian Pekerjaan Umum dan Perumahan Rakyat Republik Indonesia

Demikian surat keterangan ini dibuat untuk dapat dipergunakan sebagaimana mestinya.

Bandung, 26 April 2018

Lembaga Penelitian dan Pengabdian kepada Masyarakat (LP2M) Itenas
Kepala,

itenas
LPPM

Dr. Tarsisius Kristyadi, S.T., M.T.
NPP 960604

YAYASAN PENDIDIKAN DAYANG SUMBI
INSTITUT TEKNOLOGI NASIONAL
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JL. PKH. Hasan Mustapa No. 23 Bandung 40124, Telepon : +62-22-7272215 Fax : +62-22-7202892
Web site : http://www.itenas.ac.id

Bandung, 15 Februari 2018

Nomor : 0118/F.03/FTSP/II/2018
Hal : Permohonan Pembicara Seminar
Lampiran : -

Kepada yth.

Bapak Bernardinus Herbudiman, S.T., M.T
Jurusan teknik Sipil Itenas

Di
Tempat

Institut Teknologi Nasional (Itenas) bekerja sama dengan Balai Penerapan Teknologi Konstruksi Ditjen Bina Konstruksi Kementerian Pekerjaan Umum dan Perumahan Rakyat serta Lembaga Pengembangan Jasa Konstruksi (LPJK) Prov. Jawa Barat akan menyelenggarakan kegiatan

Sosialisasi dan Pendampingan Pelatihan Jarak Jauh Bidang Konstruksi &
Seminar Infrastruktur Berkelanjutan

pada :

Hari/Tanggal : Sabtu/24 Februari 2018

Waktu : 07.30 – 15.00 wib

Tempat : Gedung Serbaguna Itenas, Jl. PHH. Mustapa No. 23 Bandung

Sehubungan dengan hal tersebut, kami mengundang Bapak untuk menjadi pembicara dan menyampaikan makalah yang berkaitan dengan infrastruktur berkelanjutan pada kegiatan tersebut.

Demikian kami sampaikan, atas perhatian dan kerja sama Bapak kami ucapkan terima kasih.

Dekan FTSP selaku Ketua Panitia

Abinhot Sihotang, S.T., M.T

Tembusan yth.:
1. Rektor Itenas
2. Kepala Balai Penerapan Teknologi Konstruksi- Ditjen Bina Konstruksi
3. Kepala LPJK Prov. Jawa Barat

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Web site : http://www.itenas.ac.id

Bandung, 15 Februari 2018

Nomor : 0118/F.03/FTSP/II/2018
Hal : Permohonan Pembicara Seminar
Lampiran : -

Kepada yth.

1. **Ibu Emma Akmalah, S.T., M.T., Ph.D**
2. **Ibu Ratna Agustina, S.T., M.T**

Di
Tempat

Institut Teknologi Nasional (Itenas) bekerja sama dengan Balai Penerapan Teknologi Konstruksi Ditjen Bina Konstruksi Kementerian Pekerjaan Umum dan Perumahan Rakyat serta Lembaga Pengembangan Jasa Konstruksi (LPJK) Prov. Jawa Barat akan menyelenggarakan kegiatan

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Dekan FTSP

itenas FTSP

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Sertifikat

NOMOR : 02.506 / 02 / SMN / Kb1 / II / 2018
DIBERIKAN KEPADA :

Emma Akmalah, ST., MT., Ph.D

SEBAGAI NARASUMBER SEMINAR PENERAPAN TEKNOLOGI KONSTRUKSI

" INFRASTRUKTUR BERKELANJUTAN "

DISELENGGARAKAN OLEH:

BALAI PENERAPAN TEKNOLOGI KONSTRUKSI BERKERJASAMA DENGAN INSTITUT TEKNOLOGI NASIONAL BANDUNG

PELAKSANAAN	:	BANDUNG, SABTU 24 FEBRUARI 2018
MITRA KERJA	:	INSTITUT TEKNOLOGI NASIONAL, BANDUNG JAWA BARAT DAN LEMBAGA PENGEMBANGAN JASA
PENYELENGGARA		KONSTRUKSI PROVINSI JAWA BARAT
NILAI SKPK	:	10

BALAI PENERAPAN TEKNOLOGI KONSTRUKSI

Cakra Nagara, ST., MT., ME.
KEPALA

LEMBAGA PENGEMBANGAN JASA KONSTRUKSI PROVINSI JAWA BARAT

H. E. Sulaeman A. S, S.T.
KETUA

INSTITUT TEKNOLOGI NASIONAL BANDUNG

Dr. Imam Aschuri, MT
REKTOR

DAFTAR MATERI SEMINAR PENERAPAN TEKNOLOGI KONSTRUKSI

" Infrastruktur Berkelanjutan "

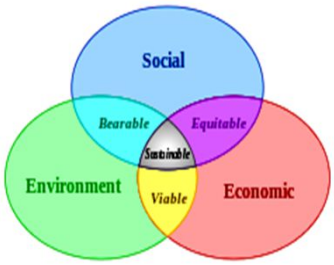
NO	MATERI	JP
1	*Introduction to Sustainable Infrastructure*	2
2	Infrastruktur Perkotaan untuk Mendukung Kota Pintar Berkelanjutan	2
3	Penjelasan Mengenai Alur Sertifikasi	2
4	Peningkatan Kompetensi Tenaga Kerja Konstruksi	2
5	Penjelasan Mengenai SIBIMA Konstruksi	1
6	Tutorial Penggunaan Aplikasi SIBIMA Konstruksi	1
	Total	10

Introduction to Sustainable Infrastructure

Bernardinus Herbudiman, ST., MT.
Emma Akmalah, Ph.D.

The Concept of Sustainability

- Sustainability is an economic state where the demands placed upon the environment by people and commerce can be met without reducing the capacity of the environment to provide or future generations.
- A diagram indicating the relationship between the "three pillars of sustainability", in which both economy and society are constrained by environmental limits.



The Concept of Sustainability

Pillars of Sustainable Development:

- A sustainable environment
  - Reduce the exploitation of natural ressources
  - Limit the pollution of the environment
- A sustainable society
  - Combat segregation and exclusion
  - Generate healthy and integrated society
  - Generate social justice in the city
- A sustainable economy
  - Create productive and sustainable ways of living, capable of surviving without the exploitation of other societies or future generations

Sustainable Development

- Sustainable development is a pattern of development that meets the needs of the present generations without jeopardizing the ability of the future generations to meet their own needs (World Commission Environmental an Development, 1987).
- Sustainable development means improving the quality of human life with living within the carrying capacity of supporting ecosystems (IUCN, UNEP, 1991)
- Sustainable development is the progressive and balanced achievement of sustained economic development, improved social equity and environmental sustainability (Moldan and Billharz, 1997).

Sustainable Development

- Sustainable development consists of balancing local and global efforts to meet basic human needs without destroying or degrading the natural environment.
- The sustainable-building movement tries to encourage the use of renewable resources instead of depleting the ones we have been consuming in our construction components.
- "Going green" in building projects has become especially important in the urban environment, where large projects and large corporations want to focus on sustainability and environmental responsiveness during the construction process.
- More and more owners as well as private and public construction programs are realizing the benefits of being recognized for their environmentally friendly approach to building or renovating structures.

What is Sustainability Design and Engineering and its role in Sustainability Revolution?

Sustainable Design

Sustainable design is the way of doing things or making things such that the result of the design meets the three pillars of sustainability – it should **NOT** cause irreversible change to the environment – locally and globally, should be functional, practical, and economically viable, and should benefit society. Sustainable design uses a holistic approach that optimizes the overall system performance, not just the product or service itself.

Design for Sustainability (D4S)

- Basic D4S techniques for products and processes include
  - increasing energy efficiency,
  - using recycled materials,
  - designing for recyclability,
  - reducing toxic materials,
  - extending product life, and
  - providing services in new ways.
- Life cycle analysis and supply chain management are more precise tools for evaluating material flows and environmental impacts in a product's life cycle, and can help designers identify additional improvements.

Principles of Sustainability Design

1. Holistic approach to environmental, social, and economic issues
2. Minimize environmental impacts (pollution, waste, disruption, etc.)
3. Use renewable energy and resources efficiently
4. Design for reuse, recycling, and emotionally and functionally durability

Sustainable Engineering

Engineering forms an interface between the design (i.e., the idea how to provide a sustainable solution to a technical problem) and Implementation and production.

Sustainable engineering is the process of using resources in a way that does **NOT** compromise the environment or deplete the materials for future generations. Sustainable engineering requires an interdisciplinary approach in all aspects of engineering. All engineering fields should incorporate sustainability into their practice in order to improve the quality of life for all.

The Sustainable Development Goals (SDGs)

- In September 2015, the United Nations General Assembly formally adopted the "universal, integrated and transformative“ 2030 for Sustainable Development, a set of 17 Sustainable Development Goals (SDGs).
- The goals are to be implemented and achieved in every country from the year 2016 to 2030.
- Achieving the sustainable development goals (SDGs) will require action by governments, non-governmental organizations and the private sector. Companies can contribute to the achievement of the SDGs by reducing the negative impact of their operations and seeking to contribute positively to the environments and communities in which they work.

17 Sustainability Development Goals (SDGs)

SDGs and Green Building

Definition of Infrastructure

- Infrastructure is the basic physical and organizational structures and facilities (e.g. buildings, roads, power supplies) needed for the operation of a society or enterprise (Oxford dictionary).
- Infrastructure is the basic systems and services, such as transport and power supplies that a country or organization uses in order to work effectively (Cambridge).
- Infrastructure is the basic physical systems of a business or nation; transportation, communication, sewage, water and electric systems are all examples of infrastructure. These systems tend to be high-cost investments; however, they are vital to a country's economic development and prosperity.

Infrastructure Development

Infrastructure Development involves fundamental structures that are required for the functioning of a community and society. This is usually referred to structures like roads, water supply, sewers, electrical grids, telecommunications, renewable energy, water sources identification and boring (wells), purification systems for clean water, hazard waste management and so on.

Types of Infrastructure

Power sector	Thermal Nuclear Hydroelectric renewables Energy efficiency transmission
Land transport	Roads Rail Tunnels and bridges Metros and light rail (LRT) Busways

Types of Infrastructure

Water industry	Water treatment Irrigation Desalination
Municipal and government	Schools, hospitals, offices Defence Waste management
Air transport	Airports Air traffic control (ATC)
Ports	Container terminals Bulk handling/oil terminals Cruise terminals
Oil and gas pipelines	Pipelines: open access

Types of Infrastructure

Oil, gas and mining	Exploration and development Single user pipelines
Process industries	Cement, steel, aluminium Petrochemicals and refineries Agro industries
Property	Hotels and tourism Offices and housing Stadiums
Telecommunications	Satellites Mobile phones Broadband infrastructure

Types of Infrastructure

Nuclear

Power Thermal

Types of Infrastructure

Hydroelectric

Water Treatment

Types of Infrastructure

Bridge

Tunnel

Types of Infrastructure

Road

Rail

Types of Infrastructure

Airport

Port

Types of Infrastructure

School, Hospital, Office

Waste Management

Definition of Sustainable Infrastructure

- Sustainable infrastructure refers to the designing, building, and operating of these structural elements in ways that do not diminish the social, economic and ecological processes required to maintain human equity, diversity, and the functionality of natural systems.
- Sustainable infrastructure is generally considered to approach development from a holistic viewpoint and based on global and domestic sustainable development goals and durability and having regard to social, financial and political issues, public health and wellbeing, as well as economic and environmental concerns.

Definition of Sustainable Infrastructure

Sustainable infrastructure is:

- **Socially sustainable**: sustainable infrastructure is inclusive and respects human rights.
- **Economically sustainable**: sustainable infrastructure provides jobs and helps boost GDP.
- **Environmentally sustainable**: sustainable infrastructure mitigates carbon emissions during construction and operation and contributes to the transition to a lower-carbon economy.

Sustainable Infrastructure and Sustainable Development Goals

Sustainable Infrastructure and Sustainable Development Goals

Sustainable and Green - the difference

- Although the words “green” and “sustainable” are often used interchangeably, there are several differences between them, meaning that a “green” building is not always “sustainable”.
- For example, bamboo flooring is a popular green material, but it is not sustainable. The air pollution caused and the fuel used to transport the material turn it into the opposite of a sustainable material, since it contributes to global climate change.
- While wood is generally considered an eco-friendly or green product, it is not always sustainable. Wood is sustainable if the company that cuts down the trees does not permanently deplete the forest. If it is harvested in an environmentally irresponsible way, it is not sustainable at all.

Sustainable and Green - the difference

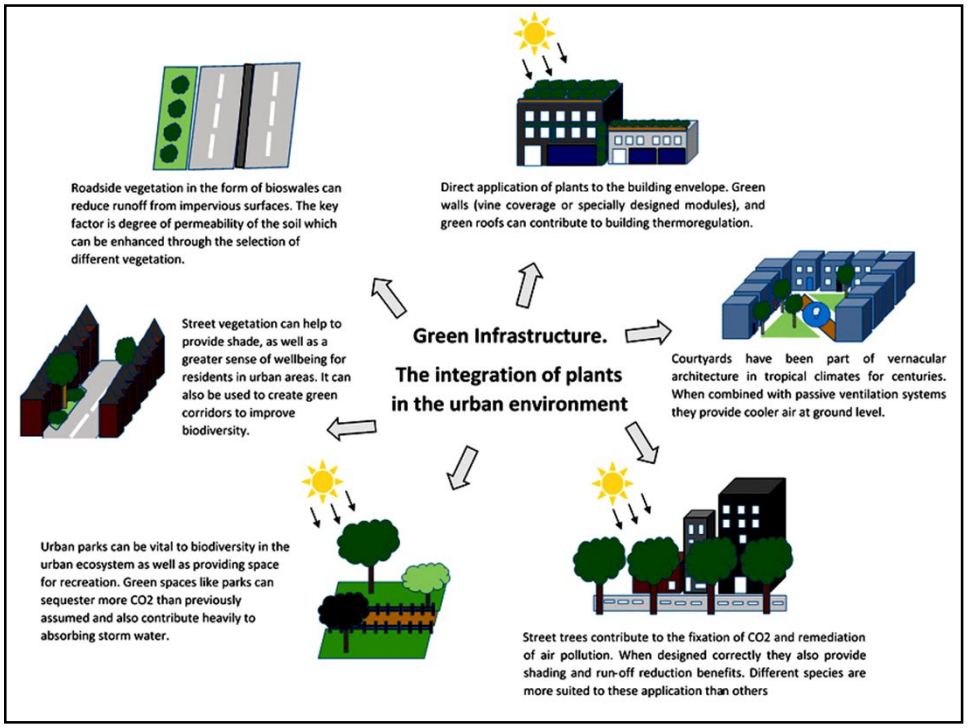
- The importance of sustainability lies in the “future” factors, which set a higher standard than those used to define green building.
- Sustainable products reduce the impact on the environment by using responsibly-sourced products; those that are either completely renewable or sustainably harvested. A sustainably harvested source material is gathered in a way that does not affect the surrounding area, pollute the air or permanently reduce the supply.
- The use of materials and resources that are sustainable, have low embodied energy, and produce a minimal environmental impact are key elements in green construction, as is the efficient use of water by appliances, faucets and shower heads, the recycling of grey water, and the reuse of rain water for landscaping and other non-potable purposes.

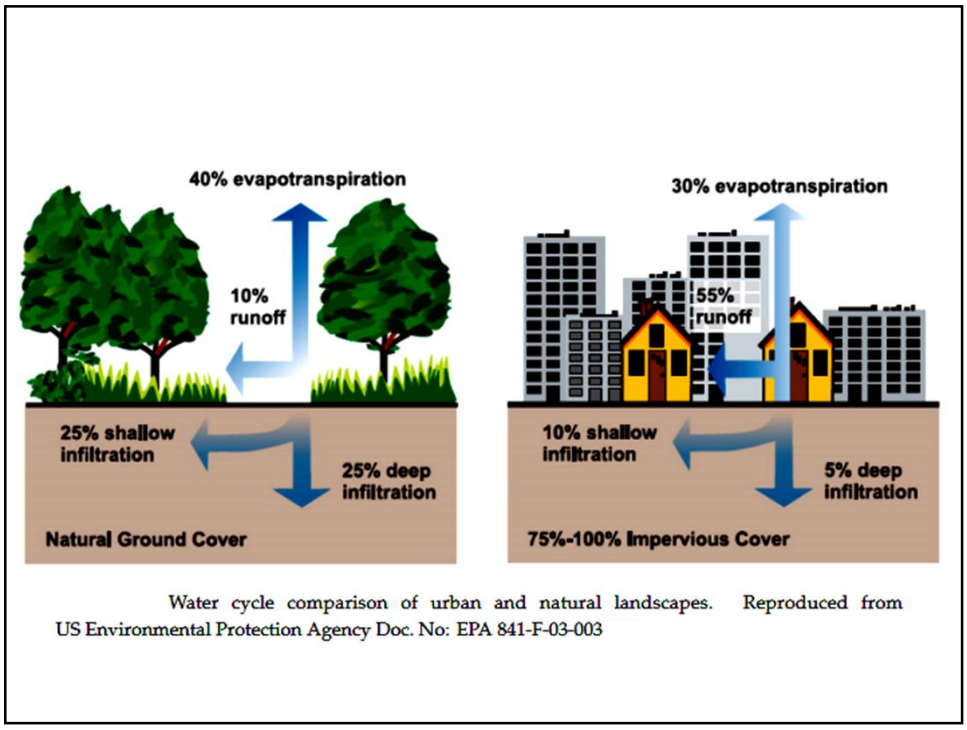
Green Infrastructure

- Green infrastructure is a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services such as water purification, air quality, space for recreation and climate mitigation and adaptation. This network of green (land) and blue (water) spaces can improve environmental conditions and therefore citizens' health and quality of life. It also supports a green economy, creates job opportunities and enhances biodiversity.
- Green Infrastructure or blue-green infrastructure is a network providing the “ingredients” for solving urban and climatic challenges by building with nature. The main components of this approach include stormwater management, climate adaptation, less heat stress, more biodiversity, food production, better air quality, sustainable energy production, clean water and healthy soils.

Green Infrastructure

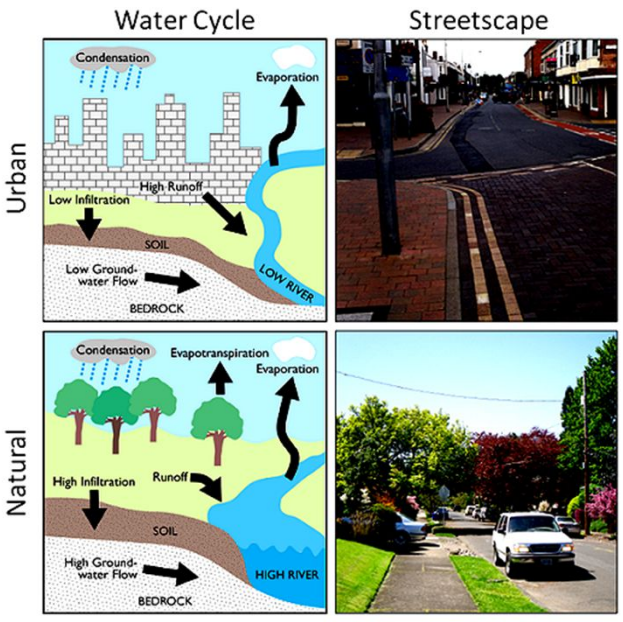
- A robust infrastructure system that supports sustainable development is essential to national prosperity, personal and public health, community vitality, and economic competitiveness. Green infrastructure systems are a critical element of sustainable development.
- Green infrastructure solutions can be applied on different scales, from the house or building level, to the broader landscape level. On the local level, green infrastructure practices include rain gardens, permeable pavements, green roofs, infiltration planters, trees and tree boxes, and rainwater harvesting systems. At the largest scale, the preservation and restoration of natural landscapes (such as forests, floodplains and wetlands) are critical components of green infrastructure.





Water cycle comparison of urban and natural landscapes. Reproduced from US Environmental Protection Agency Doc. No: EPA 841-F-03-003

Typical Components and Interfaces of Green Infrastructure



BLUE- **GREEN**

Green Infrastructure - Examples

Rainwater Harvesting

Rainwater harvesting systems collect and store rainfall for later use. When designed appropriately, they slow and reduce runoff and provide a source of water. This practice could be particularly valuable in arid regions, where it could reduce demands on increasingly limited water supplies.

Source:
https://www.epa.gov/green-infrastructure/what-green-infrastructure

Green Infrastructure - Examples

Rain Gardens

Rain gardens are versatile features that can be installed in almost any unpaved space. Also known as bioretention, or bioinfiltration, cells, they are shallow, vegetated basins that collect and absorb runoff from rooftops, sidewalks, and streets. This practice mimics natural hydrology by infiltrating, and evaporating and transpiring—or "evapotranspiring"—stormwater runoff.

Source:
https://www.epa.gov/green-infrastructure/what-green-infrastructure

Green Infrastructure - Examples

Planter Boxes

Planter boxes are an attractive tool for filtering stormwater as well as reducing the runoff that goes into a sewer system. Planter boxes are urban rain gardens with vertical walls and either open or closed bottoms. They collect and absorb runoff from sidewalks, parking lots, and streets and are ideal for space-limited sites in dense urban areas and as a streetscapping element.

Source: https://www.epa.gov/green-infrastructure/what-green-infrastructure

Green Infrastructure - Examples

Bioswales

Bioswales are essentially rain gardens placed in long narrow spaces such as the space between the sidewalk and the curb. Bioswales are vegetated, mulched, or xeriscaped channels that provide treatment and retention as they move stormwater from one place to another. Vegetated swales slow, infiltrate, and filter stormwater flows. As linear features, they are particularly well suited to being placed along streets and parking lots.

Source: https://www.epa.gov/green-infrastructure/what-green-infrastructure

Green Infrastructure - Examples

Permeable Pavements

Permeable pavement is a good example of a practice that catches water where it falls. Permeable pavements infiltrate, treat, and/or store rainwater where it falls. They can be made of pervious concrete, porous asphalt, or permeable interlocking pavers. This practice could be particularly cost effective where land values are high and flooding or icing is a problem.

Source: https://www.epa.gov/green-infrastructure/what-green-infrastructure

Green Infrastructure - Examples

Green Roofs

A green roof system atop a building helps manage stormwater and reduce energy costs for cooling. Green roofs are covered with growing media and vegetation that enable rainfall infiltration and evapotranspiration of stored water. They are particularly cost-effective in dense urban areas where land values are high and on large industrial or office buildings where stormwater management costs are likely to be high.

Source: https://www.epa.gov/green-infrastructure/what-green-infrastructure

Green Infrastructure - Examples

Land Conservation

Land conservation is another good tool for communities to use for reducing the risks of stormwater runoff and sewer overflows. The water quality and flooding impacts of urban stormwater also can be addressed by protecting open spaces and sensitive natural areas within and adjacent to a city while providing recreational opportunities for city residents. Natural areas that should be a focus of this effort include riparian areas, wetlands, and steep hillsides.

Source: https://www.epa.gov/green-infrastructure/what-green-infrastructure

Thank You