SUSTAINABLE INFRASTRUCTURE & THE ENVISION™ FRAMEWORK

PUBLIC WORKS COMMISSION
CITY OF BEVERLY HILLS

BURNS McDONNELL

SUSTAINABILITY

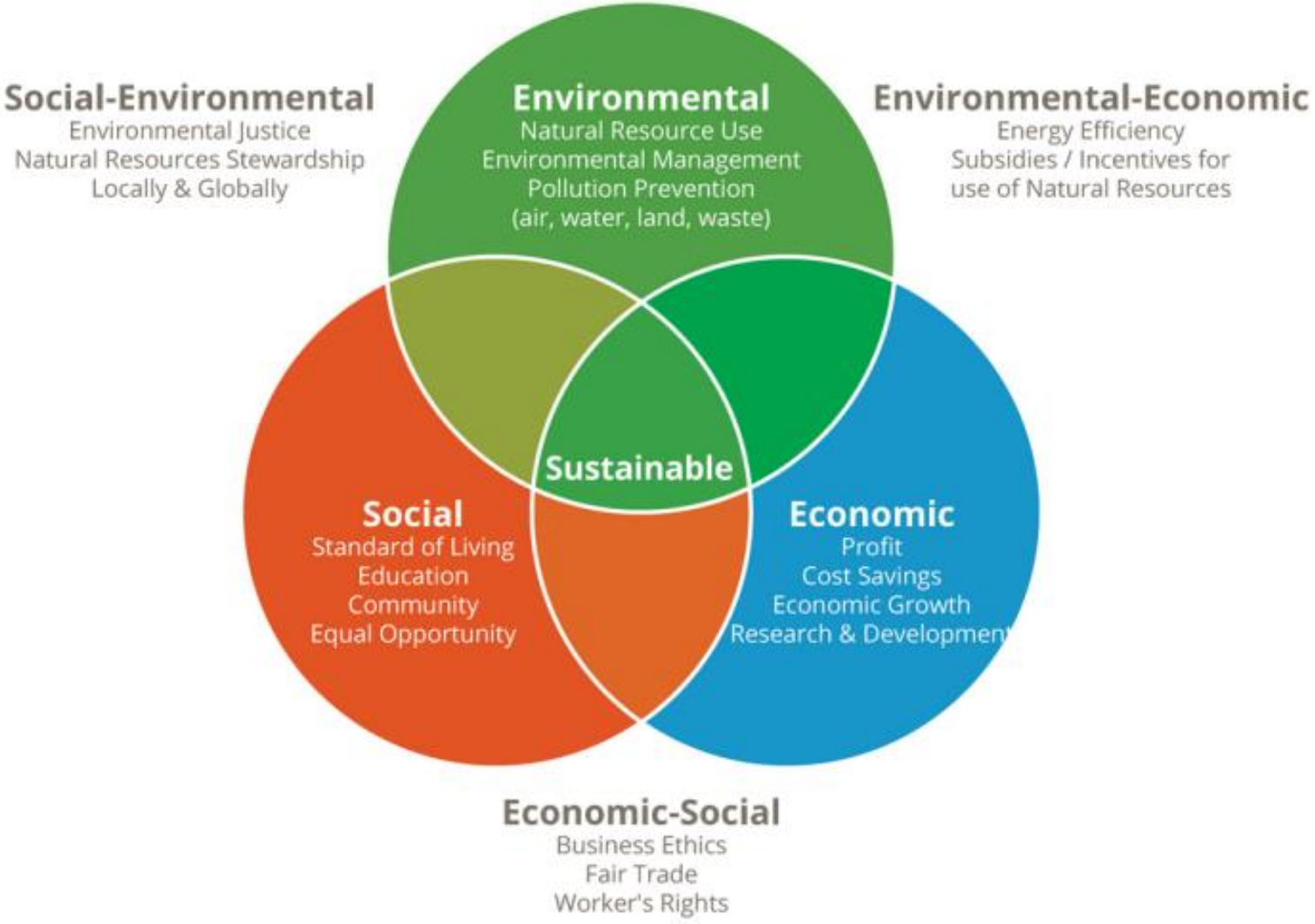


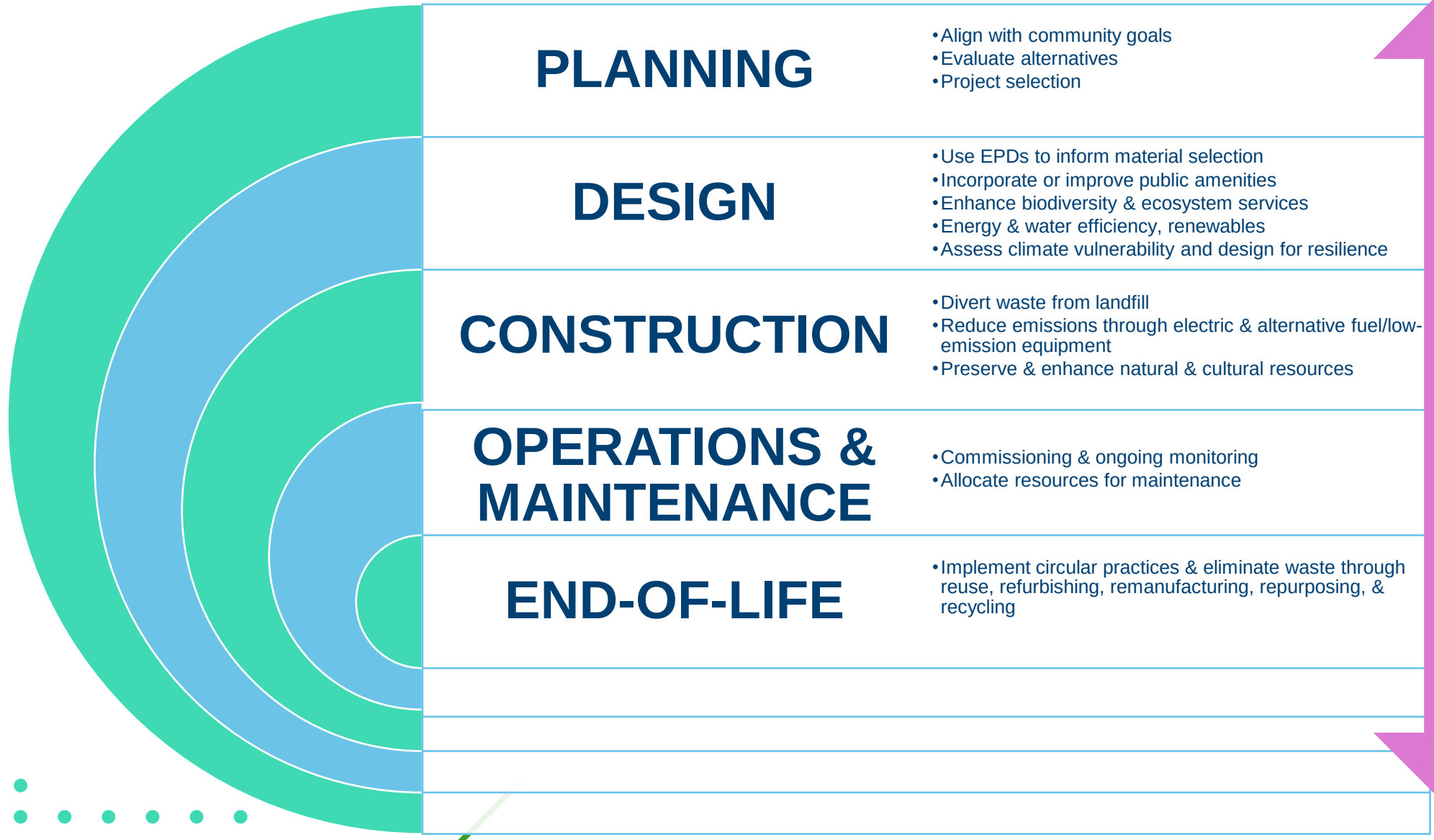
Image Source: Institute for Sustainable Infrastructure 2021, p. 6

SUSTAINABLE INFRASTRUCTURE

Infrastructure designed to **maximize environmental, social, and economic benefits** throughout the asset lifecycle

BURNS McDONNELL®

ASSET LIFECYCLE



PLANNING

- Align with community goals
- Evaluate alternatives
- Project selection

DESIGN

- Use EPDs to inform material selection
- Incorporate or improve public amenities
- Enhance biodiversity & ecosystem services
- Energy & water efficiency, renewables
- Assess climate vulnerability and design for resilience

CONSTRUCTION

- Divert waste from landfill
- Reduce emissions through electric & alternative fuel/low-emission equipment
- Preserve & enhance natural & cultural resources

OPERATIONS & MAINTENANCE

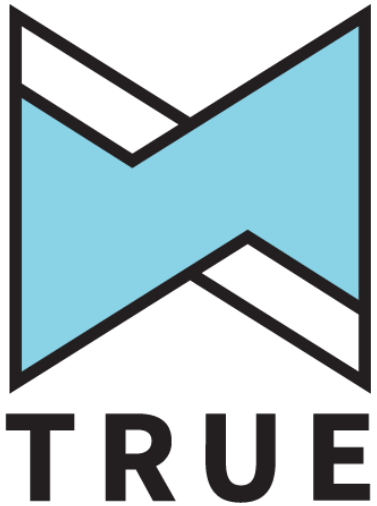
- Commissioning & ongoing monitoring
- Allocate resources for maintenance

END-OF-LIFE

- Implement circular practices & eliminate waste through reuse, refurbishing, remanufacturing, repurposing, & recycling

STAKEHOLDER ENGAGEMENT

GUIDING FRAMEWORKS



ENVISION™

A framework for sustainable infrastructure.

Governing organizations

Institute for Sustainable Infrastructure

ZOFNASS PROGRAM FOR SUSTAINABLE INFRASTRUCTURE
Graduate School of Design
Harvard University

ISI Founding Organizations

AMERICAN PUBLIC WORKS ASSOCIATION
APWA
Your Comprehensive Public Works Resource

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

ACEC
AMERICAN COUNCIL OF ENGINEERING COMPANIES

Source: Institute for Sustainable Infrastructure 2019, slide 2

INFRASTRUCTURE TYPES






Energy

Distribution
Hydroelectric
Coal
Natural Gas
Wind
Solar
Biomass

Water

Treatment
Distribution
Capture / Storage
Stormwater
Flood Control
Nutrient Management

Waste

Solid waste
Recycling
Hazardous
Waste
Collection & Transfer

Transportation

Airports
Roads / Highways
Bikes / Pedestrians
Railways
Transit
Ports
Waterways

Landscape

Public Realm
Parks
Ecosystem Services
Natural Infrastructure
Environmental Remediation

Information

Telecom
Cables
Internet
Phones
Data Centers
Sensors

Image Source: Institute for Sustainable Infrastructure 2018, p. 7

CATEGORIES

Quality Of Life
14 Credits

WELLBEING
QL1.1 Improve Community Quality of Life
QL1.2 Enhance Public Health & Safety
QL1.3 Improve Construction Safety
QL1.4 Minimize Noise & Vibration
QL1.5 Minimize Light Pollution
QL1.6 Minimize Construction Impacts

MOBILITY
QL2.1 Improve Community Mobility & Access
QL2.2 Encourage Sustainable Transportation
QL2.3 Improve Access & Wayfinding

COMMUNITY
QL2.1 Advance Equity & Social Justice
QL2.2 Preserve Historic & Cultural Resources
QL2.3 Enhance Views & Local Character
QL2.4 Enhance Public Space & Amenities

QL0.0 Innovate or Exceed Credit Requirements

Leadership
12 Credits

COLLABORATION
LD1.1 Provide Effective Leadership & Commitment
LD1.2 Foster Collaboration & Teamwork
LD1.3 Provide for Stakeholder Involvement
LD1.4 Pursue Byproduct Synergies

PLANNING
LD2.1 Establish a Sustainability Management Plan
LD2.2 Plan for Sustainable Communities
LD2.3 Plan for Long-Term Monitoring & Maintenance
LD2.4 Plan for End-of-Life

ECONOMY
LD3.1 Stimulate Economic Prosperity & Development
LD3.2 Develop Local Skills & Capabilities
LD3.3 Conduct a Life-Cycle Economic Evaluation

LD0.0 Innovate or Exceed Credit Requirements

Resource Allocation
14 Credits

MATERIALS
RA1.1 Support Sustainable Procurement Practices
RA1.2 Use Recycled Materials
RA1.3 Reduce Operational Waste
RA1.4 Reduce Construction Waste
RA1.5 Balance Earthwork On Site

ENERGY
RA2.1 Reduce Operational Energy Consumption
RA2.2 Reduce Construction Energy Consumption
RA2.3 Use Renewable Energy
RA2.4 Commission & Monitor Energy Systems

WATER
RA3.1 Preserve Water Resources
RA3.2 Reduce Operational Water Consumption
RA3.3 Reduce Construction Water Consumption
RA3.4 Monitor Water Systems

RA0.0 Innovate or Exceed Credit Requirements

Natural World
14 Credits

SITING
NW1.1 Preserve Sites of High Ecological Value
NW1.2 Provide Wetland & Surface Water Buffers
NW1.3 Preserve Prime Farmland
NW1.4 Preserve Undeveloped Land

CONSERVATION
NW2.1 Reclaim Brownfields
NW2.2 Manage Stormwater
NW2.3 Reduce Pesticide & Fertilizer Impacts
NW2.4 Protect Surface & Groundwater Quality

ECOLOGY
NW3.1 Enhance Functional Habitats
NW3.2 Enhance Wetland & Surface Water Functions
NW3.3 Maintain Floodplain Functions
NW3.4 Control Invasive Species
NW3.5 Protect Soil Health

NW0.0 Innovate or Exceed Credit Requirements

Climate and Resilience
10 Credits

EMISSIONS
CR1.1 Reduce Net Embodied Carbon
CR1.2 Reduce Greenhouse Gas Emissions
CR1.3 Reduce Air Pollutant Emissions

RESILIENCE
CR2.1 Avoid Unsuitable Development
CR2.2 Assess Climate Change Vulnerability
CR2.3 Evaluate Risk & Resilience
CR2.4 Establish Resilience Goals and Strategies
CR2.5 Maximize Resilience
CR2.6 Improve Infrastructure Integration

CR0.0 Innovate or Exceed Credit Requirements

Image Source: Institute for Sustainable Infrastructure 2018, p. 18-19

EXAMPLE CREDIT

RESOURCE ALLOCATION: WATER

RA3.1 Preserve Water Resources

12 POINTS

INTENT

Assess and reduce the negative net impact on fresh water availability, quantity, and quality at a watershed scale to positively impact the region's water resources.

METRIC

The extent to which the project considers and contributes to positively addressing broader watershed issues.

LEVELS OF ACHIEVEMENT

IMPROVED	ENHANCED	SUPERIOR	CONSERVING	RESTORATIVE
A + B	A + B + C	A + B + C + D	A + B + C + D + E	A + B + C + D + E + F
(3) Increased Awareness Of Watershed Issues	**(5) Good Water Resource Management**	**(7) Wise Water Resource Management**	**(9) Total Water Management**	**(12) Positive Impact**

(A) Assess the project's watershed context and the watershed-scale fresh water issues, including location, type, quantity, rate of recharge, and quality of water resources, as well as source and impacts of water used and the destination and impacts of wastewater.

(B) Estimates of water usage and wastewater generation over the life of the project.

(C) The project has features intended to reduce the identified negative impacts of water usage, and/or improve watershed-scale issues.

(D) The project has a net-zero impact on the quantity and availability of fresh surface water and groundwater supplies without compromising water quality.

(E) The project is part of, or contributes to, a watershed or regional water plan.

(F) The project makes a direct and significant net-positive improvement to the watershed.

Image Source: Institute for Sustainable Infrastructure 2018, p. 112

EXAMPLE CREDIT

CLIMATE AND RESILIENCE: RESILIENCE

CR2.3 Evaluate Risk and Resilience

26 POINTS

INTENT

Conduct a comprehensive, multihazard risk and resilience evaluation.

METRIC

Scope and comprehensiveness of the multihazard risk and resilience evaluation.

LEVELS OF ACHIEVEMENT

IMPROVED	ENHANCED	SUPERIOR	CONSERVING	RESTORATIVE
A + B + C + D + E	A + B + C + D + E	A + B + C + D + E	A + B + C + D + E + F	NOT AVAILABLE
(11) Project Evaluation	**(18) System Evaluation**	**(24) Community Evaluation**	**(26) Integrated and Inclusive Approach**	
(A) The project team draws the assessment boundary for subsequent criteria (B, C, D, and E) around the project and its site.	**(A)** The project team draws the assessment boundary for subsequent criteria (B, C, D, and E) around the interdependencies of the project and its associated/connected infrastructure system/network.	**(A)** The project team draws the assessment boundary for subsequent criteria (B, C, D, and E) around the interdependencies of the project, its associated/connected infrastructure system/network, and the broader community.		
(B) Understand the Asset: The project team identifies the objectives and performance goals of the project and related systems. It also identifies the critical assets, systems, and networks that are essential to meeting objectives and performance goals. This should include the associated dependencies and interdependencies within the system. **(C)** Identify Threats/Hazards: The project team identifies threats/hazards (natural hazards and human-induced threats). Project teams may reference existing studies or assessments if relevant to the project and its context. Threats should include both acute shocks and chronic stressors. **(D)** Identify Vulnerability: The project team identifies the vulnerabilities of the critical functions and dependencies of the infrastructure asset and its primary components identified in criterion B to the threats/hazards identified in criterion C. **(E)** Evaluate Risk: The project team evaluates the project risk by determining the likelihood/probability of a threat/hazard occurring and the associated consequences/impacts. Consequences and impacts should be classified as social, environmental, and/or economic/financial.				
			(F) The project team conducts the risk evaluation with the owner and a diverse and integrated team of key stakeholders.	

Image Source: Institute for Sustainable Infrastructure 2018, p. 172

ENVISION™ BENEFITS

- Enhanced social, economic, & environmental outcomes
- Improved climate resiliency
- Alignment with community goals
- Cost savings through efficiency gains, enhanced resiliency, & improved stakeholder support

HOW IS ENVISION™ USED?

- Verified awards
- Design guidelines
- Community ordinances
- Request for proposals
- Project management tool
- Individual training (ENV SP)

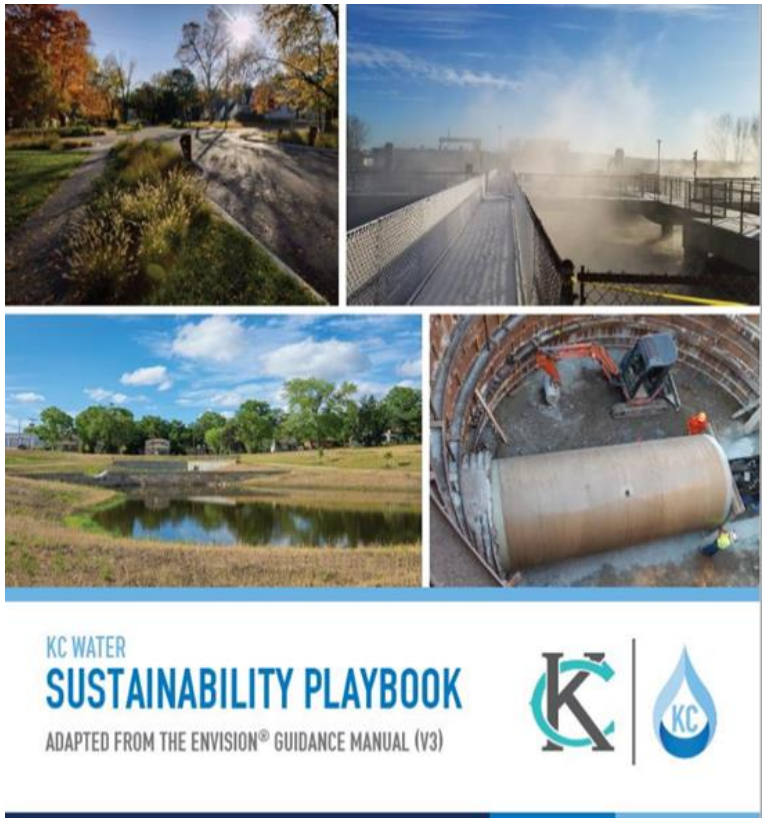


Image Source: Bond et al. 2021, slide 5

ENVISION™ VERIFIED PROJECTS

[Middle Blue River Green Infrastructure]
Kansas City, MO
Envision Platinum, 2016

[Holland Area Water Reclamation Facility]
Holland, MI
Envision Gold, 2023

[Tucannon River Wind Farm]
Dayton, WA
Envision Gold, 2015

[Taylor Yard Pedestrian Bikeway Bridge]
Los Angeles, CA
Envision Bronze, 2022

Image Sources:
1. Institute for Sustainable Infrastructure 2018, p. 145; 2. ISI 2023; 3. ISI 2015; 4. ISI 2022

QUESTIONS?

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Sources

- Alliance for Water Stewardship. 2022. “The AWS Standard 2.0.” https://a4ws.org/the-aws-standard-2-0/
- Bond, Matt, Jeff Martin, Srini Vallabhaneni. 2021. “KC Water FY22-FY23 Capital Improvements Program.” https://www.kcwater.us/wp-content/uploads/2021/05/FY22-CIP-Presentation.pdf
- EnvironmentAnalyst. 2017. “Sustainability benchmarking of infrastructure investment rising through GRESB.” *Environment Analyst*, April 5, 2017. https://environment-analyst.com/global/54968/sustainability-benchmarking-of-infrastructure-investment-rising-through-gresb
- GBCI. 2023 “The Sustainable SITES Initiative.” https://sustainablesites.org/
- GBCI. 2023 “Resources for the TRUE Construction pilot.” https://true.gbci.org/resources-true-construction-pilot
- GBCI. n.d. “TRUE: Redesign. Rethink. Reduce. Reuse. Go Beyond Recycling.” https://true.gbci.org/sites/default/files/resources/TRUE%20Zero%20Waste_one-pager.pdf . Accessed February24, 2023.
- GRESB. 2019. “GRESB Infrastructure.” https://gresb.com/wp-content/uploads/resources-2019-about-gresb-infrastructure-presentation.pdf
- Institute for Sustainable Infrastructure (ISI). 2023. “Holland Area Wastewater Reclamation Facility Anaerobic Digester Project.” https://sustainableinfrastructure.org/project-awards/holland-area-wrf-anaerobic-digester/
- ISI. 2022. “Taylor Yard Pedestrian Bikeway Bridge.” https://sustainableinfrastructure.org/project-awards/taylor-yard-pedestrianbikeway-bridge/
- ISI. 2021. “Envision Sustainability.” https://sustainableinfrastructure.org/wp-content/uploads/2021/11/EnvisionPacket-Final.pdf
- ISI. 2020. “Sustain or Explain Toolkit.” https://sustainableinfrastructure.org/wp-content/uploads/2023/02/Sustain_or_Explain_Advocacy_Toolkit-Fullversion.pdf
- ISI. 2019. “Sustainability and the Role of Envision.” https://sustainableinfrastructure.org/resource/presentations/
- ISI. 2018. *Envision: Sustainable Infrastructure Framework Guidance Manual Version 3.* Washington, DC: Institute for Sustainable Infrastructure. https://sustainableinfrastructure.org/wp-content/uploads/EnvisionV3.9.7.2018.pdf
- ISI. 2016. “Los Angeles City Council Adopts Envision as a Policy.” https://sustainableinfrastructure.org/los-angeles-city-council-adopts-envision-as-a-policy/
- ISI. 2016b. “Kansas City’s Middle Blue River Green Infrastructure Receives Envision Platinum Award.” https://sustainableinfrastructure.org/project-awards/middle-blue-river-green-infrastructure-project-pilot-059-069/
- ISI. 2015. “Portland General Electric’s Tucannon River Wind Farm Earns ISI’s Envision® Sustainable Infrastructure Gold Award.” https://sustainableinfrastructure.org/project-awards/tucannon-river-wind-farm/
- Kansas City Missouri. n.d. “Smart Sewer: Approach.” https://www.kcsmartsewer.us/our-approach. Accessed February, 24, 2023.
- U.S. Green Building Council. 2023 “What is LEED Certification?.” https://support.usgbc.org/hc/en-us/articles/4404406912403-What-is-LEED-certification-
- World Economic Forum. 2022. “The circular economy: how it can lead us on a path to real change.” https://www.weforum.org/agenda/2022/05/the-circular-economy-how-it-can-be-a-path-to-real-change/

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