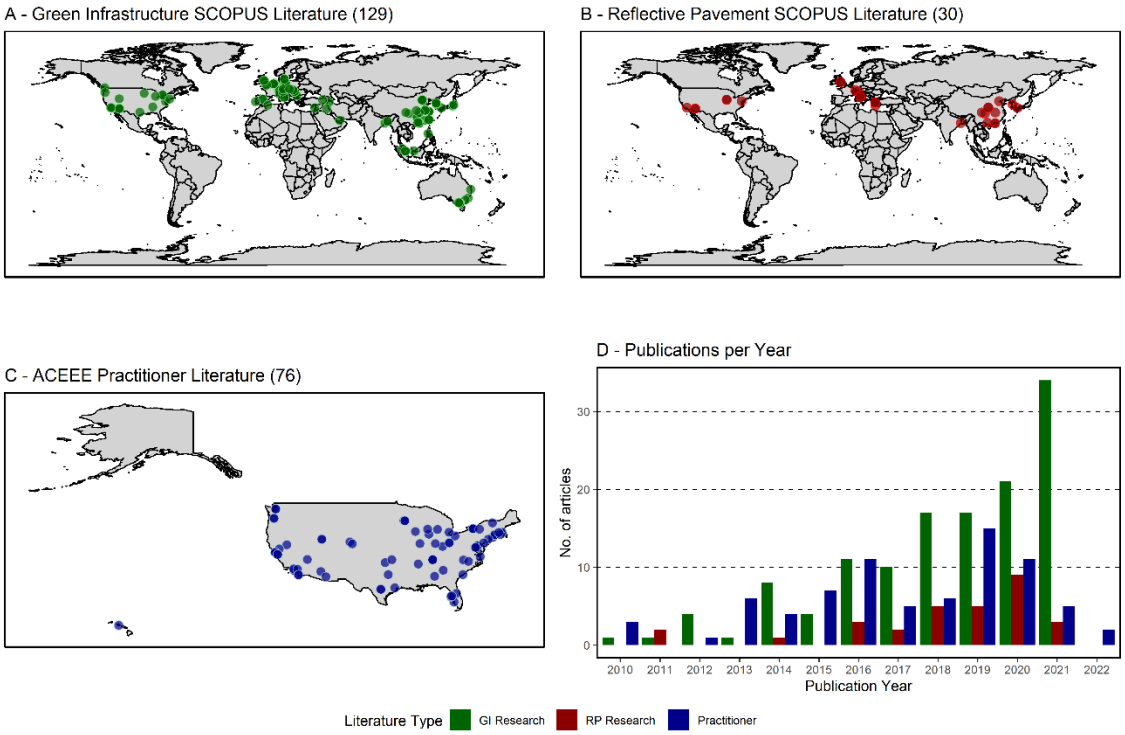
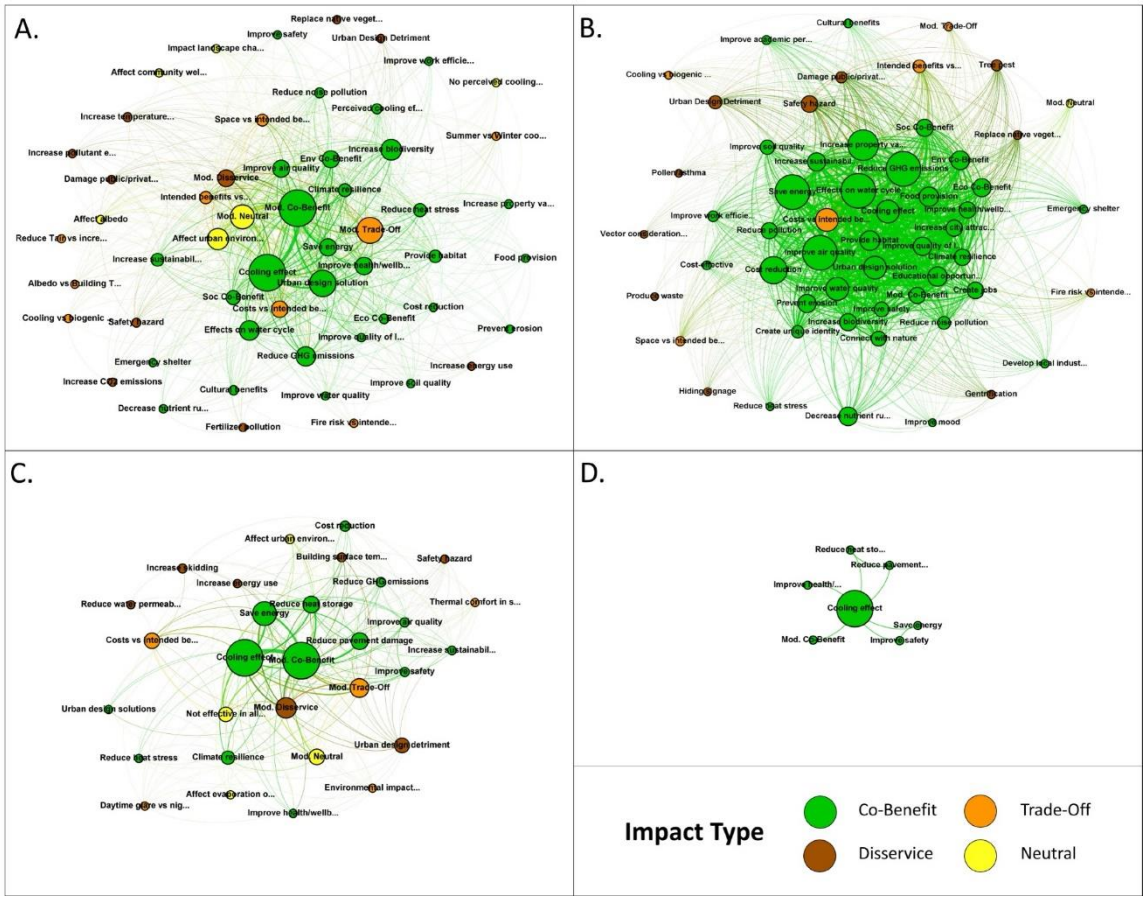
Supplementary Figures



Supplementary Figure 1. Distribution of literature origin and publication year sorted by green infrastructure (GI) research, reflective pavement (RP) research, and practitioner literature between 2010 and 2021 (2022 for practitioner). A) G.I. research literature origins across the world (129 articles); B) RP research literature origins across the world (30 articles); C) practitioner literature distribution within the United States; D) number of articles published by literature type for each year between 2010 and 2021 (2022 for practitioner).



Supplementary Figure 2. A) Network analysis for green infrastructure (GI) scientific research literature; B) GI city practitioner literature; C) reflective pavement (RP) scientific research literature; and D) RP city practitioner literature. Each node represents an impact; node color identifies whether the impact was determined to be a co-benefit, a trade-off, a disservice, or a neutral impact. The size of the nodes represents the degree of centrality, and the size of the edge represents the number of connections between two nodes within the given literature. Large nodes often appear across the literature. Large nodes with thick edges tend to appear together within the literature, while small nodes with thin edges tend to appear more rarely with each other, if at all.

Supplementary Tables

Supplementary Table 1. Complete list of impact codes (n=191) found for green infrastructure. Impact codes are ordered in levels 1 to 4, where level 1 is the super-code of 2, 2 is the super-code of level 3, and 3 is the super-code of level 4. Each impact code is identified as co-benefit (Cb), trade-off (To), disservice (Ds), or neutral (N).

Impact code. Definition.	**Level (1-4)**	**Super-code**	**Type**
Environmental. Super-code level 1 for all impacts with an environmental influence.	1	-	-
Impact landscape character. Description of impacting the landscape and environment.	2	self	N
Affect albedo. Description of impacting the overall albedo with no specified positive or negative effects.	2	self	N
Affect urban environment. Description of an effect on the urban environment with no specified positive or negative effects.	2	self	N
Cooling potential. Mention cooling potential but that it varies, and it is unclear whether it is effective.	3	Affect urban environment	N
Modulates surface energy balance. Mention the surface energy balance but no clarification as to how it changes.	3	Affect urban environment	N
Modification of thermal environment. Super-code for unclear effects of modifications of the thermal environment and micro-meteorological conditions.	2	self	N
Affect wind speed/direction, ventilation. Mention that wind speed or direction and thus ventilation is affected with no specified positive or negative effects.	3	Modification of thermal environment	N
Affect relative humidity. Mention of relative humidity with no specified positive or negative effects.	3	Modification of thermal environment	N
Affect thermal comfort. Mention of thermal comfort with no specified positive or negative effects.	3	Modification of thermal environment	N
Affect MRT. Mention of mean radiant temperature (MRT) with no specified effects.	3	Modification of thermal environment	N
Affect surface temperature. Mention of surface temperature (T_{sfc}) with no specified effects.	3	Modification of thermal environment	N
Affect (air) temperature. Mention of (air) temperature with no specified effects.	3	Modification of thermal environment	N
T_{air} reduction not guaranteed everywhere. Section does state that air temperature (T_{air}) cooling is not guaranteed in all background climates.	4	Affect (air) temperature	N
T_{air} reduction not guaranteed at all times. Section does state that T_{air} cooling is not guaranteed at all times of day or seasons.	4	Affect (air) temperature	N
Temperature gradient. Creates a temperature gradient between urban areas without specified effects.	4	Affect (air) temperature	N
Leaf litter deprives aquatic life of oxygen. May lead to leaf litter/green waste, which sits on the water, preventing it from absorbing oxygen.	2	self	Ds
Tree pest. Can add pests to the system, which may cause widespread loss of GI and other health concerns.	2	self	Ds
Replace native vegetation. Replaces native vegetation and takes away ecosystem value by introducing potentially invasive species.	2	self	Ds
Increase CO2 emissions. Depending on the type, i.e., soil can create a carbon source rather than sink.	2	self	Ds
Vector consideration (disease). May lead to the introduction of new vectors to spread disease.	2	self	Ds
Fertilizer pollution. Fertilizer is used to grow vegetated areas but pollutes the environment when it runs off into water and soil.	2	self	Ds
Pollen/asthma. Can introduce pollen which would reduce air quality for some, leading to asthma concerns.	2	self	Ds
Modification of thermal environment. Super-code for disservices of modifications of the thermal environment and micro-meteorological conditions.	2	self	Ds
T_{air} increase. Can maintain more heat than it cools, creating more warming in general. Includes park heat island.	3	Modification of thermal environment	Ds
T_{air} increase in low-density area. Can increase T_{air} in low density areas compared to without it.	4	T_{air} increase	Ds

Impact code. Definition.	**Level (1-4)**	**Super-code**	**Type**
T_{air} increase at night. Can increase T_{air} during nighttime compared to without it.	4	T_{air} increase	Ds
Increase humidity. Can increase relative humidity, which can increase thermal discomfort.	3	Modification of thermal environment	Ds
Decrease in wind speed, ventilation. Can decrease wind speed and thus ventilation, increasing heat load.	3	Modification of thermal environment	Ds
Globe temperature increase. Can increase globe temperature due to higher radiation exposure.	3	Modification of thermal environment	Ds
Decrease thermal comfort. Mention of decreased thermal comfort due to the implementation of GI	3	Modification of thermal environment	Ds
Increase thermal comfort index (PET., UTCI). Can cause an increase in the thermal comfort indices such as PET. or UTCI.	4	Decrease thermal comfort	Ds
T_{sfc} increase. Can increase T_{sfc} and thus longwave radiation exposure.	3	Modification of thermal environment	Ds
Fire risk vs. intended benefits. GI comes with many benefits but increases the fire risk in urban areas.	2	self	To
Intended benefits vs. water use. Description of an effect comparison between any benefit and the associated water use increase.	2	self	To
Cooling vs. water use. Description of the desired cooling effect vs. the associated water use increase.	3	Intended benefits vs. water use	To
Grass needs more water than trees. Description of a specific case illustrating that some GI (grass) needs more water than others (trees).	4	Cooling vs. water use	To
Space vs intended benefits. Description of taking up valuable space vs. any intended benefits.	2	self	To
Cooling vs. biogenic CO2 exchange. Description of providing cooling compared to conventional surface, but specific GI structures may respirate under water and heat stress, emitting more CO_2 than sequestering.	2	self	To
Modification of thermal environment. Super-code for trade-offs within the space of modification of the thermal environment and micro-meteorological conditions.	2	self	To
Shade trade-offs. Description that the implementation of thermally valuable shade comes with a trade-off.	3	Modification of thermal environment	To
Shade vs. light availability. Description that shade via canopies cools but decreases light availability below the canopy.	4	Shade trade-offs	To
Shade vs. reduced SVF. Description that shade via canopies cools but reduces the sky-view factor (SVF.) and thus increases the multi-scattering of radiation.	4	Shade trade-offs	To
Shade vs heat-trapping. Description that shade via canopies increases heat-trapping under the canopy.	4	Shade trade-offs	To
Shade vs. reduced ventilation. Description that shade via canopies cools but reduces the ventilation by blocking circulation and wind.	4	Shade trade-offs	To
Temperature trade-offs. Description that implementing GI reduces T_{air} but creates trade-offs for other temperature heat metrics.	3	Modification of thermal environment	To
Reduce T_{air} vs. PET increase at nighttime. Reducing T_{air} at the cost of increasing PET at nighttime.	4	Temperature trade-offs	To
Reduce T_{air} vs. absorb humidity. Reducing minimum T_{air} at the cost of reducing relative humidity, too, allows max T_{air} to increase due to the lower heat capacity of air.	4	Temperature trade-offs	To
Reduce T_{air} vs. increase R.H. Reducing T_{air} increases relative humidity (RH) following physical laws if adequately watered and healthy GI, leading to a decrease in thermal comfort due to higher R.H.	4	Temperature trade-offs	To
Daytime cooling vs. nighttime warming. May lead to daytime T_{air} reduction but may prevent cooling at nighttime, thus being warmer than conventional urban areas.	4	Temperature trade-offs	To
Food provision. Can be used as a source of local food in an urban environment.	2	self	Cb
Reduce GHG emissions. Reduces greenhouse gas (GHG) emissions actively or passively.	2	self	Cb
Carbon sequestration. Leads to carbon sequestration in the natural fabric.	3	Reduce GHG emissions	Cb
Improve air quality. Leads to better air quality by removing pollution or other harmful particles from the atmosphere.	2	self	Cb
Reduce pollution. Can reduce surface-level pollution.	2	self	Cb

Impact code. Definition.	**Level (1-4)**	**Super-code**	**Type**
Improve soil quality. Leads to better soil quality by filtering out pollutants or toxins.	2	self	Cb
Improve water quality. Leads to better water quality by filtering out pollutants or toxins.	2	self	Cb
Decrease nutrient runoff. Reduce the concentration of nutrients that runoff.	2	self	Cb
Prevent erosion. Can prevent soil erosion and maintains the structural integrity of the ground layer.	2	self	Cb
Climate resilience. Can lead to improved climate resilience. Offsetting the consequences of and adapting to climate change and global warming.	2	self	Cb
Disaster risk reduction. Can reduce risk of being exposed to weather disasters.	3	Climate resilience	Cb
Provide habitat. Can provide a safe habitat for flora and fauna.	2	self	Cb
Emergency shelter. Can provide an area for emergency shelter during extreme weather events.	2	self	Cb
Reduce noise pollution. Can reduce noise pollution by adding obstacles between noise sources and recipients,	2	self	Cb
Increase biodiversity. Can increase urban biodiversity.	2	self	Cb
Increase pollinator abundance. Can support the pollinator populations via urban biodiversity and bring them to urban areas.	3	Increase biodiversity	Cb
Effects on water cycle. GI implementation affects various sections of the water cycle positively.	2	self	Cb
Decrease water consumption. Reduces the amount of water used per capita by residents.	3	Effects on water cycle	Cb
Stormwater management. Regulates stormwater runoff and limits extreme flooding events.	3	Effects on water cycle	Cb
Water sequestration/groundwater recharge. Can sequester water and store it long-term, including refilling the groundwater aquifers.	3	Effects on water cycle	Cb
Mitigate precipitation anomalies. Can prevent precipitation anomalies amplified by the urban heat island effect.	3	Effects on water cycle	Cb
Modification of thermal environment. Super-code for co-benefits within the space of modification of the thermal environment and micro-meteorological conditions.	2	self	Cb
Improve microclimate. Mentions that it improves the microclimate.	3	Modification of thermal environment	Cb
Improve thermal conditions. Leads to an improvement in overall thermal conditions in general.	3	Modification of thermal environment	Cb
Improve indoor thermal comfort. Leads to an improvement in the indoor thermal comfort of neighboring buildings.	4	Improve thermal conditions	Cb
Improve outdoor thermal comfort. Leads to an improvement in the outdoor thermal comfort at/within the GI and/or in its proximity.	4	Improve thermal conditions	Cb
Improve outdoor thermal comfort during daytime. Leads to an improvement of the outdoor thermal comfort at/within the GI and/or in its proximity during the day.	4	Improve thermal conditions	Cb
Decrease thermal comfort index (PET., UTCI). GI implementation reduces thermal comfort indices such as the physiological equivalent temperature (PET), the universal thermal climate index (UTCI)…	3	Modification of thermal environment	Cb
Reduce the PMV. Leads to a reduction in the predicted mean vote (PMV).	4	Decrease thermal comfort index (PET, UTCI)	Cb
Reduce the WBGT. Leads to a reduction of the wet bulb globe temperature (WBGT).	4	Decrease thermal comfort index (PET, UTCI)	Cb
Reduce heat index (HI). Leads to a reduction in the heat index (HI).	4	Decrease thermal comfort index (PET, UTCI)	Cb
T_{air} decrease. Leads to an air temperature reduction.	3	Modification of thermal environment	Cb
T_{air} decrease in the daytime. Leads to an air temperature reduction during the day.	4	T_{air} decrease	Cb
T_{air} decrease at nighttime. Leads to an air temperature reduction during the night.	4	T_{air} decrease	Cb

Impact code. Definition.	**Level (1-4)**	**Super-code**	**Type**
Reduce daily max temp. Can decrease the daily maximum T_{air} through its cooling effect.	4	T_{air} decrease	Cb
T_{sfc} decrease. Reduces the surface temperature compared to conventional urban materials and in its proximity.	3	Modification of thermal environment	Cb
Building surface temperature decrease. Can decrease the surface temperature and thus the sensible heat flux of buildings.	4	T_{sfc} decrease	Cb
Reduces sensible heat flux. Can reduce the surface temperature and, thus, the sensible heat flux of the given surface.	4	T_{sfc} decrease	Cb
Reduce longwave radiation heat. Can decrease the amount of heat felt by people from longwave radiation exposure.	4	T_{sfc} decrease	Cb
T_{sfc} decreases during summer. Reduces the surface temperature compared to conventional materials and in its proximity during the summer.	4	T_{sfc} decrease	Cb
T_{sfc} decreases during winter. Reduces the surface temperature compared to conventional materials during the winter.	4	T_{sfc} decrease	Cb
T_{sfc} decreases at nighttime. Reduces the surface temperature compared to conventional materials at nighttime.	4	T_{sfc} decrease	Cb
Improve ventilation. Improves air flow and encourages ventilation.	3	Modification of thermal environment	Cb
Nocturnal ventilation. Improves air flow and encourages ventilation from GI to built-up areas at night.	4	Improve ventilation	Cb
Reduce wind speed. Blocks wind and reduces wind speed.	3	Modification of thermal environment	Cb
Reduce wind speed in winter. Blocks wind and reduces wind speed in winter, which affects further unwanted cooling effects.	4	Reduce wind speed	Cb
Increase humidity. Leads to an increase in humidity which adds to cooling effects.	3	Modification of thermal environment	Cb
Decrease humidity. Can decrease humidity by absorbing moisture from the air.	3	Modification of thermal environment	Cb
Reduces heat storage. Changes the material composition in the urban environment and has a lower heat storage than conventional urban materials.	3	Modification of thermal environment	Cb
Decrease thermal admittance. Absorbs and re-emits less/slower heat than conventional urban surfaces.	3	Modification of thermal environment	Cb
Reduce globe temperature. Leads to a globe temperature reduction.	3	Modification of thermal environment	Cb
Reduce MRT. Leads to a reduction of the mean radiant temperature (MRT).	3	Modification of thermal environment	Cb
T_{air} increase in winter. Leads to a beneficial increase in air temperature during the winter season.	3	Modification of thermal environment	Cb
Reduce net radiation. Reduces net radiation by decreasing incoming solar energy and increasing outgoing energy.	3	Modification of thermal environment	Cb
Minimize short-wave radiation. Can minimize incoming short-wave radiation exposure in a place next to/underneath it.	3	Modification of thermal environment	Cb
Increase albedo. Increases the albedo, reducing solar radiation absorbed at the pedestrian level (urban canopy layer).	3	Modification of thermal environment	Cb
Cooling effect. Can lead to different positive cooling effects.	2	self	Cb
Cooling effect/heat mitigation. Leads to a significant cooling effect without clarifying what heat metric is used.	3	Cooling effect	Cb
UHI mitigation. Mitigates urban heat island (UHI) effect – intended primary effect by study.	4	Cooling effect/heat mitigation	Cb
Heatwave mitigation. Mitigates extreme heat waves in their intensity.	4	Cooling effect/heat mitigation	Cb
Urban overheating mitigation. Mitigates urban overheating; a new conceptual framing of intra-urban heat.	4	Cooling effect/heat mitigation	Cb
PCI. As part of GI, urban parks create their own cooling effect called the Park Cool Island. Can also be the Urban Cooling Island (UCI).	4	Cooling effect/heat mitigation	Cb
Cooling shade. Provide a canopy, which results in shade and prevents solar radiation exposure as an additional heat stressor.	3	Cooling effect	Cb
Downwind cooling effect. Leads to a cooling effect that may be blown downwind rather than affects the local area where GI is placed.	3	Cooling effect	Cb
Cooling by evapotranspiration. Leads to a cooling effect which is created by evapotranspiration.	3	Cooling effect	Cb

Impact code. Definition.	**Level (1-4)**	**Super-code**	**Type**
Absorb heat. Cools by absorbing heat directly from the air around it.	3	Cooling effect	Cb
Reduce # of hot days. Impact on urban temperature metrics reduces the # of hot days and thus heat mortality/morbidity.	3	Cooling effect	Cb
Reduce # of tropical nights. Impact on urban temperature metrics reduces the # of tropical nights and thus heat mortality/morbidity.	3	Cooling effect	Cb
Social. Super-code level 1 for all impacts with a social influence.	1	-	-
No perceived cooling effect. Mention modulation of the thermal environment but that the actual person may not feel cooler.	2	self	N
Affect community welfare. Impact on people's well-being in general with no specification of any positive or negative effects.	2	self	N
Urban design detriment. Urban design features may create social detriments.	2	self	Ds
Block view. May block the view of other (urban) features or landscapes.	3	Urban design detriment	Ds
Visually unattractive. May be visually unattractive and unappealing.	3	Urban design detriment	Ds
Safety hazard. Can pose a threat to safety.	2	self	Ds
Harm residents. Can physically harm residents or people when breaking/collapsing (tree) due to insufficient maintenance or extreme events.	3	Safety hazard	Ds
Increase likelihood of accidents. Can increase the likelihood of accidents when blocking the view of intersections, driveways, etc., due to missing maintenance.	3	Safety hazard	Ds
Increase pollutant exposure. May increase pollutant concentration and exposure due to reduced ventilation.	2	self	Ds
Increase temperature inequities. May magnify temperature inequities within a city, resulting in unequal benefits and consequences for residents.	2	self	Ds
Cultural benefits. Can create general cultural benefits for the local population.	2	self	Cb
Create unique identity. Create a space that has a unique identity based on GI and provides a sense of place.	2	self	Cb
Sense of pride. Can foster a sense of pride in a community's urban landscape.	3	Create unique identity	Cb
Connect with nature. It allows people to immerse themselves in nature and connect with nature, including enjoyment.	2	self	Cb
Improve academic performance. Can improve the academic performance of scholars due to the GI's mental and physical support pathways.	2	self	Cb
Educational opportunities. Provides educational space and opportunities for people through increased interactions and understanding of nature.	2	self	Cb
Improve health. Can improve the health of citizens, both mentally and physically, including general well-being.	2	self	Cb
Reduce heat mortality. Reduces stressors that affect heat mortality and thus reduces heat deaths.	3	Improve health	Cb
Reduce heat morbidity. Reduces stressors that affect heat morbidity (illness) and thus reduces the number of people seeking help for heat illness.	3	Improve health	Cb
Reduce stress. Can reduce stress experienced by people in everyday life.	3	Improve health	Cb
Reduce heat stress. Can lead to a reduction of heat stress and, thus, physiological stress.	2	Self	Cb
Reduce outdoor human heat stress in daytime. Leads to reducing outdoor human heat stress and, thus, physiological stress during the day.	3	Reduce heat stress	Cb
Reduce outdoor human heat stress at nighttime. Leads to reducing outdoor human heat stress and, thus, physiological stress during the night.	3	Reduce heat stress	Cb
Perceived cooling effect/psychology. Leads to a perceived cooling effect by the local population. Not necessarily physical cooling.	2	self	Cb
Improve mood. Makes people feel happier, calmer, and rejuvenated.	2	self	Cb
Urban design solution. An urban design solution that improves social circumstances and outcomes.	2	self	Cb

Impact code. Definition.	**Level (1-4)**	**Super-code**	**Type**
Recreation. Provide a place for people to enjoy and spend time. Includes gathering space.	3	Urban design solution	Cb
Encourage physical activity. Encourages physical activity and thus improves health.	3	Urban design solution	Cb
Aesthetic value. City additions appeal to people's aesthetic values and make areas more scenic.	3	Urban design solution	Cb
Alternative transportation. Encourages using alternative transportation such as biking, walking, and public transportation rather than the car.	3	Urban design solution	Cb
Orientation landmarks. Can be used as a landmark and thus is beneficial for orientation purposes of individuals.	3	Urban design solution	Cb
Reduce perceived travel time/improve walkability. Affects the psychology of individuals so that they perceive a reduction in travel time and/or walkability.	3	Urban design solution	Cb
Improve equity. Implementation in neglected areas can address disparities and make cities more equitable.	3	Urban design solution	Cb
Community-wide asset. Considered a community-wide asset that creates benefits for everyone in the community.	3	Urban design solution	Cb
Increase sense of community. Nurtures a sense of community as a gathering space by building social capital and organizational capacity.	3	Urban design solution	Cb
Reduce glare. Shade reduces glare and blocks diffuse light easing views.	3	Urban design solution	Cb
Block view of city. Can block the view of the city and thus create a psychologically more comfortable space being in nature and disconnected from the city.	3	Urban design solution	Cb
Improve safety. Can improve safety for the local population in general.	2	self	Cb
Safe transit paths. Create corridors or areas that provide a safe place for pedestrians to travel through (instead of walking on sidewalks next to streets).	3	Improve safety	Cb
Calm traffic/Road safety. Calms traffic and improves road safety for all stakeholders (cars, bikes, people).	3	Improve safety	Cb
Reduce crime. GI implementation is tied to a reduction in crime rates.	3	Improve safety	Cb
Economic. Super-code level 1 for all impacts with an economic influence.	1	-	-
Produce waste. Produces waste from falling leaves, branches, and other decomposing organic matter.	2	self	Ds
Gentrification. Can cause gentrification by pushing lower-income residents out of certain areas due to increased property values.	2	self	Ds
Damage public/private property. Can unintentionally cause the destruction of or damage to public or private belongings.	2	self	Ds
Damage infrastructure. Can unintentionally cause the destruction of or damage to public infrastructure in the future.	3	Damage public/ private property	Ds
Damage private property. Can unintentionally cause the destruction of or damage of private property in the future.	3	Damage public/ private property	Ds
Increase energy use. Can increase energy use due to higher humidity that needs to be filtered out of indoor spaces.	2	self	Ds
Hiding signage. Can be perceived as detrimental to business owners since GI can cover signage, thus hiding it from potential customers.	2	self	Ds
Albedo vs building T_{sfc}. Canopy can increase the overall albedo and reduce energy input to pedestrian level, but reflected solar radiation might increase the heat load on surrounding buildings.	2	self	To
Summer vs. winter cooling. Cooling effects are beneficial in hot summer but could be detrimental in cold winter.	2	self	To
Reduced T_{air} vs. increased energy use. Can reduce $T_{air,}$ but it may enhance energy use due to providing water and energy to maintain GI	2	self	To
Costs vs. intended benefits. GI has many benefits, but building and maintaining spaces is costly.	2	self	To
Maintenance/management. Implementation comes with more maintenance and management of the sites, thus including cost and time.	3	Costs vs. intended benefits	To
Increase sustainability. Can increase sustainability efforts in the area.	2	self	Cb
Recycle green waste. Leads to large amounts of organic matter that can be used for composting.	3	Increase sustainability	Cb
Sustainable solution. GI is a sustainable solution assisting with Sustainable Development Goals and city development.	3	Increase sustainability	Cb

Impact code. Definition.	**Level (1-4)**	**Super-code**	**Type**
Improve building lifetime. Reduces stressors on building materials and thus increases the lifetime of a building.	3	Increase sustainability	Cb
Extends life of asphalt paving. Provides shade to street asphalt/urban surfaces, reducing temperature fluctuation ranges and thus increasing the material's lifetime.	3	Increase sustainability	Cb
Increase city attractiveness. Gi can increase city attractiveness in general for all areas.	2	self	Cb
Increase city attractiveness to business. GI may increase the area's attractiveness and thus attract businesses and their sales.	3	Increase city attractiveness	Cb
Attract retail activity. Leads to people spending more time and money shopping at local businesses.	3	Increase city attractiveness	Cb
Attract tourists. Leads to beautification or unique places that attract tourists, which provides an economic benefit.	3	Increase city attractiveness	Cb
Create jobs. GI can increase economic prosperity by creating jobs for their service.	2	self	Cb
Improve work efficiency. May improve the work efficiency of individuals due to a generally improved well-being.	2	self	Cb
Cost-effective. GI is considered a cost-effective, sustainable solution that potentially provides long-term benefits.	2	self	Cb
Develop local industries. Can increase economic prosperity by developing new local industries related to GI	2	self	Cb
Increase property values. Implementation in residential areas can increase the value of the property it is implemented on or nearby.	2	self	Cb
Cost reduction. Leads to a general cost reduction.	2	self	Cb
Cost reduction per house. Can lead to reduced cost per house and household and thus on the individual based on energy and water use.	3	Cost reduction	Cb
Reduce maintenance costs. Can lead to a reduction of maintenance costs due to shading and temperature reduction of public infrastructure.	3	Cost reduction	Cb
Save energy. Leads to energy savings.	2	self	Cb
Reduce energy consumption of buildings. Reduces high energy consumption of buildings, including in high-density built-up areas.	3	Save energy	Cb
Reduce AC use. Reduces AC use due to temperature and heat load reduction, thus yielding energy savings.	3	Save energy	Cb
Reduce indoor heat gain. Protects buildings from direct solar and thermal radiation and thus reduces indoor heat gain.	3	Save energy	Cb
Moderate winter heat loss. Regulates heat losses in winter and maintains more heat in the cold.	3	Save energy	Cb

Supplementary Table 2. Complete list of impact codes found (n=93) for Reflective Pavement (RP). Impact codes are ordered in levels 1 to 4, where level 1 is the super-code of 2, 2 is the super-code of level 3, and 3 is the super-code of level 4. Each impact code is identified as co-benefit (Cb), trade-off (To), disservice (Ds), or neutral (N).

Impact code. Definition.	**Level (1-4)**	**Super-code**	**Type**
Environmental. Super-code level 1 for all impacts with an environmental influence.	1	-	-
Affect evaporation of vegetation fraction. Materials can affect the evaporation abilities of vegetation fractions within the neighborhood.	2	self	N
Affect urban environment. Description of an effect on the urban environment with no specified positive or negative effects.	2	self	N
Alter surface energy balance. Mentions alteration of the surface energy balance but not specific.	3	Affect urban environment	N
Not effective in all conditions. Mentions that RP will not always achieve its purpose unless used in certain conditions or in coordination with other strategies.	2	self	N
No cooling at night. No cooling effects during the nighttime without stating a negative effect.	3	Not effective in all conditions	N
Modification of thermal environment. Super-code for neutral impacts within the space of modification of the thermal environment and micro-meteorological conditions.	2	self	N
Affect T_{air}. Influences air temperature (T_{air}) but not specific on positive or negative.	3	Modification of thermal environment	N
Affect thermal comfort. Mention of thermal comfort being affected by RP but no clarification as to how.	3	Modification of thermal environment	N
Increase atmospheric stability. Can increase atmospheric stability via temperature reduction, yet not specified whether that is good or bad.	3	Modification of thermal environment	N
Reduce water permeability. Can seal surfaces and make them more impermeable to water, reducing water throughout and increasing runoff.	2	self	Ds
Building surface temperature increase. May increase reflected heat and causes nearby building surface temperature to increase.	2	self	Ds
Increase skidding. May decrease friction and increase the skidding of vehicles driving on the surface.	2	self	Ds
Modification of thermal environment. Super-code for disservices within the space of modification of the thermal environment and micro-meteorological conditions.	2	self	Ds
Increase thermal comfort index (PET, UTCI). Can cause an increase in the thermal comfort indices such as PET. or UTCI.	3	Modification of thermal environment	Ds
Increase PMV. May increase the predicted mean vote (PMV).	4	Increase thermal comfort index (PET, UTCI)	Ds
Decrease thermal comfort. May decrease thermal comfort by changing other parameters than just T_{air}.	3	Modification of thermal environment	Ds
Increase MRT. May increase the mean radiant temperature (MRT).	3	Modification of thermal environment	Ds
Increase albedo/reflect radiation. RP increases the albedo of surfaces, reflecting more solar radiation and heating surroundings and decreasing thermal comfort.	3	Modification of thermal environment	Ds
T_{sfc} increase. May increase the surface temperature in dry conditions.	3	Modification of thermal environment	Ds
T_{air} increase. May increase the air temperature in certain conditions, i.e., when surrounded by walls or vegetation.	3	Modification of thermal environment	Ds
Environmental impact vs. intended benefits. RP has many benefits but does not last forever, and the materials used may have harmful environmental impacts.	2	self	To
Thermal comfort in shade vs. discomfort in the sun. Can improve thermal comfort when used in collaboration with shade, but it harms thermal comfort when located in direct sunlight.	2	self	To
Modification of thermal environment. Super-code for trade-offs within the space of modification of the thermal environment and micro-meteorological conditions.	2	self	To
Albedo trade-offs. RP reflection (albedo) as a cooling mechanism but by doing so creates trade-offs.	3	Modification of thermal environment	To

Impact code. Definition.	**Level (1-4)**	**Super-code**	**Type**
Increase albedo vs. decrease thermal comfort. Higher albedo properties decrease T_{air} and T_{sfc} but decrease thermal comfort due to higher solar radiation exposure.	4	Albedo trade-offs	To
Increase albedo vs. increase UV radiation. Reflective properties decrease T_{air} and T_{sfc} but increase reflected U.V. radiation.	4	Albedo trade-offs	To
Increase albedo vs. heat surroundings. Reflects radiation due to its high albedo, which decreases T_{sfc} but reflected energy might heat up surrounding air, surfaces, and beings.	4	Albedo trade-offs	To
T_{air} decrease vs. MRT/glare increase. RP's reflective properties decrease surrounding T_{air} but increase reflected radiation, impacting MRT and glare/visibility.	3	Modification of thermal environment	To
T_{sfc} decrease vs. MRT/glare increase. RP's reflective properties decrease surrounding T_{sfc} but increase reflected radiation, impacting MRT and glare/visibility.	3	Modification of thermal environment	To
Reduce GHG emissions. Implementation reduces greenhouse gas (GHG) emissions actively and passively.	2	self	Cb
Reduce CO2 emissions. Helps prevent the formation of urban pollution due to decreasing energy use and, thus, a decrease in CO2 emissions.	3	Reduce GHG emissions	Cb
Climate resilience. Can offset the consequences of and adapts to climate change and global warming, thus building climate resilience.	2	self	Cb
Reduce heat storage. Changes the material composition in the urban environment and has a lower heat storage than conventional urban surface materials.	2	self	Cb
Improve air quality. Reduces air pollutants due to RP implementation; thus, air quality improves.	2	self	Cb
Reduce NO2. RP helps prevent the formation of urban pollution due to decreasing energy use and, thus, a decrease in NO_2 emissions.	3	Improve air quality	Cb
Reduce Ozone. Due to heat reflection, RP reduces the ozone concentration in the urban canopy layer.	3	Improve air quality	Cb
Cooling effect. Can lead to different positive cooling effects.	2	self	Cb
Cooling effect/heat mitigation. Leads to a significant cooling effect without clarifying what heat metric is used; includes terms like reducing "urban temperatures".	3	Cooling effect	Cb
UHI mitigation. Mitigates the urban heat island (UHI) effect, including mitigation of urban warming.	4	Cooling effect/heat mitigation	Cb
Heatwave mitigation. Mitigates extreme heat waves in their intensity.	4	Cooling effect/heat mitigation	Cb
Downwind cooling effect. Implementation cools the air above it, which then is being advected downwind, so the cooling effect is rather downwind than where RP is placed.	3	Cooling effect	Cb
Increase albedo. Increased albedo reflects more solar radiation and thus energy. Less energy absorption creates a cooling effect.	3	Cooling effect	Cb
Increase emissivity. Higher emissivity increases the amount of emitted energy from the surface and adds to the cooling effect.	3	Cooling effect	Cb
Increase thermal inertia. Can cool during the day via increased thermal inertia (heat conduction to lower levels) and thus reduce T_{sfc}.	3	Cooling effect	Cb
Modification of thermal environment. Super-code for co-benefits within the space of modification of the thermal environment and micro-meteorological conditions.	2	self	Cb
T_{air} decrease. Leads to an air temperature (T_{air}) reduction.	3	Modification of thermal environment	Cb
T_{air} decrease indoors. Leads to an air temperature reduction indoors in nearby buildings.	4	T_{air} decrease	Cb
T_{air} decrease at night. Reduces T_{sfc} during the day and thus the heat load on the pavement, which leads to less sensible heat flux and lower T_{air} at night.	4	T_{air} decrease	Cb
T_{sfc} decrease. Leads to a reduction of the surface temperature (T_{sfc}).	3	Modification of thermal environment	Cb
T_{sfc} decrease during day. Reduces the surface temperature during the day compared to conventional urban surface materials.	4	T_{sfc} decrease	Cb
T_{sfc} decrease during night. Reduces the surface temperature during the night compared to conventional urban surface materials.	4	T_{sfc} decrease	Cb
Decrease sensible heat flux. Reduces the surface temperature and thus the sensible heat flux.	4	T_{sfc} decrease	Cb

Impact code. Definition.	**Level (1-4)**	**Super-code**	**Type**
Reduce outgoing longwave radiation. Reduces the surface temperature, and thus the body emits less longwave radiation.	4	T_{sfc} decrease	Cb
Decrease MRT. Leads to a mean radiant temperature (MRT) reduction.	3	Modification of thermal environment	Cb
Improve thermal comfort. Leads to an improvement in thermal comfort.	3	Modification of thermal environment	Cb
Improve outdoor thermal comfort. Leads to an improvement of the outdoor thermal comfort at/within the RP and/or in its proximity.	4	Improve thermal comfort	Cb
Improve indoor thermal comfort. Leads to an improvement in the indoor thermal comfort of neighboring buildings.	4	Improve thermal comfort	Cb
Decrease thermal comfort index (PET, UTCI). Can decrease PET, UTCI, and other thermal comfort indicators (e.g., MOCI, ITS).	3	Modification of thermal environment	Cb
Decrease thermal comfort index at night (PET, UTCI). Can decrease PET, UTCI, and other thermal comfort indicators at night (e.g., MOCI, ITS).	4	Decrease thermal comfort index (PET, UTCI)	Cb
Decrease thermal comfort index for shaded locations. Can decrease PET, UTCI, and other thermal comfort indicators (e.g., MOCI, ITS) for shaded locations where solar effects play no role.	4	Decrease thermal comfort index (PET, UTCI)	Cb
Reduce net radiation. Reduces the net radiation of the surface and thus leads to a lower surface temperature.	3	Modification of thermal environment	Cb
Decrease thermal admittance. Absorbs less heat than conventional surfaces of urban spaces.	3	Modification of thermal environment	Cb
Social. Super-code level 1 for all impacts with a social influence.	1	-	-
Urban design detriment. Urban design features may create social detriments.	2	self	Ds
Decrease outdoor recreation. May decrease people's ability/desire to participate in outdoor activities due to thermal discomfort created by RP	3	Urban design detriment	Ds
Increase glare. May increase light reflection, which can harm pedestrians and drivers due to increased glare.	3	Urban design detriment	Ds
Increase PTT. May increase the psychologically perceived travel time (PTT).	3	Urban design detriment	Ds
Safety hazard. Can pose a threat to safety.	2	self	Ds
Reduce visibility of white line. Brighter surface color may reduce the contrast to white road lines, which is a safety concern.	3	Safety hazard	Ds
Daytime glare vs. nighttime visibility. Can create glare during the day due to its high albedo, but it may be beneficial at night to increase visibility.	2	self	To
Reduce heat stress. Leads to the reduction of heat stress and physiological stress.	2	self	Cb
Improve health/well-being. Provides general public health benefits via cooling mechanisms.	2	self	Cb
Urban design solution. An urban design solution that improves social circumstances and outcomes.	2	self	Cb
Aesthetic value. Can appeal to some people's aesthetic values and make areas more scenic and beautiful.	3	Urban design solution	Cb
Decrease PTT. May decrease the psychologically perceived travel time (PTT).	3	Urban design solution	Cb
Improve safety. Can improve safety for the local population in general.	2	self	Cb
Improve nighttime visibility. Reflective materials may improve nighttime visibility for drivers due to their reflective nature.	3	Improve safety	Cb
Economic. Super-code level 1 for all impacts with an economic influence.	1	-	-
Increase energy use. Can increase energy use due to reflecting solar radiation away from the urban area leading to unintended side effects.	2	self	Ds
Increase surrounding building cooling load. Increases reflected heat and causes nearby building surfaces to become hotter, which transfers the heat indoors and thus asks for a higher cooling load.	3	Increase energy use	Ds
Increase heating demand in winter. Increases the reflection of solar radiation to the atmosphere and thus prevents it from heating the neighborhood to a thermally comfortable level. Houses need more heating to reach comfortable temperature.	3	Increase energy use	Ds

Impact code. Definition.	**Level (1-4)**	**Super-code**	**Type**
Costs vs. intended benefits. RP has benefits, but effectively building and maintaining these strategies is costly.	2	self	To
Management/maintenance. Implementing RP comes with the trade-off of more maintenance and management of the sites (cost, time…).	3	Costs vs. intended benefits	To
Weatherization. Implementing RP comes with the known fact that its effectiveness decreases over time due to weatherization and requires constant upkeep and maintenance.	3	Costs vs. intended benefits	To
Save energy. Implementation may save energy, including improving energy efficiency.	2	self	Cb
Reduce AC use. May reduce indoor AC use and thus saves energy based on neighborhood air temperature reduction.	3	Save energy	Cb
Reduce energy building consumption. Can reduce building energy consumption.	3	Save energy	Cb
Reduce pavement damage. RP coatings on pre-existing surfaces can protect the pavement from damage.	2	self	Cb
Increase pavement lifespan. Due to less pavement damage, pavement can last longer due to RP	3	Reduce pavement damage	Cb
Cost reduction. May reduce fiscal costs for pavement.	2	self	Cb
Decrease maintenance cost. Because of less damage, the RP application can decrease the cost of maintenance, thus saving money in the long run.	3	Cost reduction	Cb
Increase sustainability. Can increase sustainability efforts in urban environments.	2	self	Cb
Reduce waste. Less damage and a longer pavement lifespan due to RP will create less waste from maintenance and resurfacing.	3	Increase sustainability	Cb