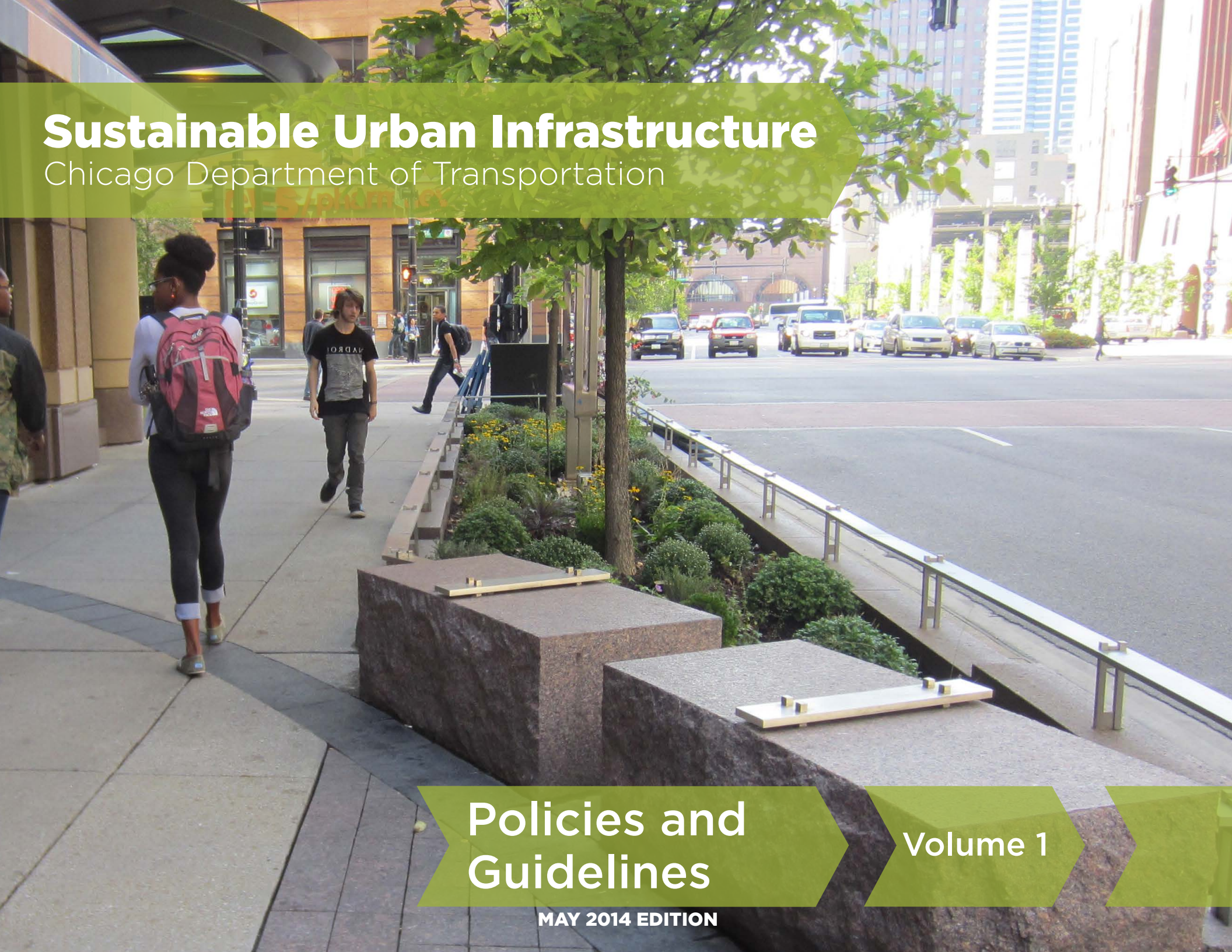


Sustainable Urban Infrastructure

Chicago Department of Transportation

Policies and Guidelines

Volume 1

MAY 2014 EDITION


ed Cakes • Wedding Cakes • Dess
es • Famous Stollen • David

TABLE OF CONTENTS

OFFICE OF THE MAYOR

City of Chicago

121 N. LaSalle Street • Chicago, Illinois 60602
www.cityofchicago.org • @chicagosmayor

Dear Fellow Chicagoans,

When we released Sustainable Chicago 2015 last year I stated that "A sustainable Chicago is a city that spends less on energy use with each passing year, creates good-paying jobs in up-and-coming industries, responsibly maintains and upgrades its infrastructure, and ensures every Chicagoan has the opportunity to live a healthy and active lifestyle."

The "Sustainable Urban Infrastructure Guidelines and Policies" fulfills many of those goals. Our city's commitment to create a sustainable city is more fully realized by implementing this document. It will help create a healthier, more beautiful city, drive the creation of new "green" jobs, and make our infrastructure more resilient.

The Chicago Department of Transportation—along with all of those who participated in creating this document—have helped advance Chicago's goal of becoming the most sustainable city in the country, and I thank you for your interest, support and commitment to our city. Working together, we make Chicago a great place to live, work, and play.

Rahm Emanuel
Mayor


BUILDING A NEW
CHICAGO
hoods | Creating Jobs | Investing in our Future
CITY OF CHICAGO
INCORPORATED 4th MARCH 1837
DEVON

CDOT
CHICAGO DEPARTMENT OF TRANSPORTATION

DEPARTMENT OF TRANSPORTATION
City of Chicago

30 N. LaSalle Street, Suite 1100 • Chicago, Illinois 60602
www.chicagodot.org • @ChicagoDOT

Dear Friends,

In 2012, Chicago Forward laid out the vision for Chicago's transportation network. It committed to "Ensure that Chicago continues to be a vibrant international city, successfully competing in the global economy with a transportation system that provides high-quality service to residents, businesses and visitors - a system that offers a solid foundation for the city, regional and national economies, yet is sensitive to its communities and environment." The report shared concrete, measurable goals to achieving that vision. More specifically, in A More Sustainable City chapter CDOT committed to continue to be a leader in innovating and demonstrating to the nation the value and viability of building sustainably.

The Sustainable Urban Infrastructure Guidelines and Policies encapsulates all of the innovative techniques we have been employing for years and expands to incorporate new elements in our work to further create a sustainable infrastructure for our residents, businesses and visitors. The purpose of the Sustainable Urban Infrastructure Guidelines was to establish an agency and city-wide approach for integrating environmental performance goals into infrastructure design. It focuses on all aspects of our infrastructure including water, energy, materials & waste, placemaking, economics, commissioning, urban ecology, and climate & air quality. These policies are fully aligned and integrated with the complete streets process and comprise a progressive set of guidelines for infrastructure and the public realm. The transportation right-of-way is an essential component for improving environmental conditions as well as mobility and accessibility in Chicago.

This August, 2014 edition of the Sustainable Urban Infrastructure Guidelines and Policies reflects the feedback from a year-long implementation phase and ensures the successful adoption of the requirements and policies set forth within this document through 2018. Additionally, we have validated through a sustainability valuation of past pilot projects that the use of sustainable practices on projects actually come in under budget and achieve innumerable economic benefits. This holistic approach to urban infrastructure will ensure a sustainable future for Chicago.

Collaboration within CDOT, numerous City Departments and partner agencies was critical to the successful development of effective design standards. We are thankful to all of our project partners who will transform these policies and guidelines into our urban landscape for decades to come.

Rebekah Scheinfeld

Commissioner

Chicago Department of Transportation


Morgan
STOP

1.0 INTRODUCTION

1.1 PHILOSOPHY

Solar/Wind Powered Light pole

GOALS FOR STREETS AND URBAN INFRASTRUCTURE

The urban form, with its density, public transit, and walkable neighborhoods, is a sustainable way for humans to live. Therefore, how to design and maintain a city is critical to creating a sustainable ecosystem—one that provides not only for today's needs but for the needs of future generations, and one that takes not only humans into account but all life. To achieve this goal, cities must end the "business as usual" approach and become caretakers for both the people they serve and the environment in which they live.

The City of Chicago is working toward this goal on many fronts. One of the most important, however, is rethinking how to plan, design, build, and maintain its public right-of-way, which represents 23 percent of its land area and more than 70 percent of its public open space. Comprising more than 4,000 miles of streets and 2,100 miles of alleys, these mostly paved surfaces contribute significantly to environmental challenges, including stormwater management, water use, urban heat island effect, energy use, and waste management.

The City of Chicago has earned national recognition for its forward-thinking commitment to urban environmental sustainability. Federal, state, and municipal decision makers look to Chicago's leadership on such issues as green roofs, green-building permitting, green alleys, sustainable streets, bicycle and public transportation planning, park and open space development, and urban wildlife habitat preservation. These guidelines build on these earlier and ongoing efforts and capture the lessons learned from hundreds of green-infrastructure pilot projects that have been installed throughout the city, as well as national best practice. They outline how green infrastructure can be fully integrated into all aspects of the public right-of-way to enrich the urban fabric and create resiliency. These guidelines establish more than 80 requirements, standards, and policies to help ensure Chicago's progressive solutions to environmental issues and its commitment to improving quality of life are integrated across the full spectrum of projects and regulatory responsibilities performed by the Chicago Department of Transportation (CDOT) and those that work in the public right-of-way.

This document supports and builds on citywide environmental plans, including the Chicago Climate Action Plan that was released in September 2008 and the recently released Sustainable Chicago 2015 Plan. This document is an action item in CDOT's Chicago Forward Action Agenda, and it works in concert with other CDOT documents—including the Complete Streets Chicago guidelines and forthcoming placemaking guidelines—to define a process and clear guidance to ensure great streets and transportation infrastructure. Furthermore, this document is supported by many program-specific plans (e.g., the Streets for Cycling Plan 2020 and Chicago Pedestrian Plan) and technical manuals (e.g., the Street Design Guidelines). Together these documents not only create safe and livable streets, they help ensure the greatest financial, social, and environmental return on investment to the city.

MISSION, PURPOSE AND NEED

It is with all of this in mind that the mission statement for this document was developed.

> The Sustainable Urban Infrastructure Guidelines and Policies will embrace and expand upon the environmental benefits of Complete Streets and Placemaking guidelines to help create and maintain a city where all Chicagoans benefit from a high quality of life without depleting our natural resources.

This mission statement is further supported by three purpose and need statements, which express the high-level outcomes and goals of the principles, objectives, requirements and processes outlined in the following chapters.

- To create a safe, livable, and sustainable city with great streets and healthy places.
- To provide simple, pointed design, construction, and maintenance guidance for the creation of a sustainable urban infrastructure for all Chicagoans.
- To prepare the city's infrastructure to respond to the challenges of climate change and enact policies to reduce its negative impacts.

Sangamon Paseo

CORE VALUES

Cafe Patio

Michigan Avenue

Street Fest

The Public Right-of-Way is Public Space:

By understanding that the public right-of-way is public space, we understand why it is critical that the right-of-way is planned, designed, built, and maintained for all Chicagoans. Public space is a valuable asset that is held in trust for the people. Consequently, it is critical that the greatest value be derived from every dollar invested in its construction and upkeep. Sustainable infrastructure is not only good for the environment, it is a good investment. Sustainable infrastructure achieves this goal because it is designed to address social, environmental, as well as economic performance.

Streets For People

As stated in Complete Streets Chicago, streets should be designed to optimize pedestrian mobility for all types of users, especially the most vulnerable. When this is done successfully, people can safely and enjoyably stroll, bike, take transit, or drive. Streets must also be designed as places—places where people want to live, work, and play—that celebrate our city's diversity, culture, and unique neighborhoods. Streets for people are designed in collaboration with communities to create a sustainable and beautiful city.

Healthy Places

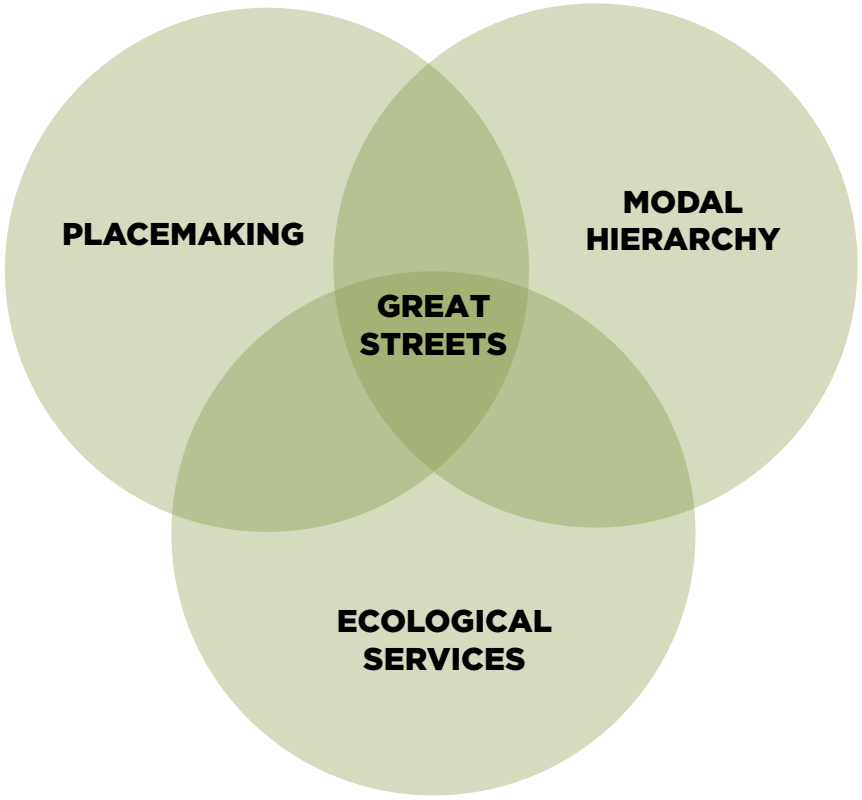
The design of the city's infrastructure can help reinforce our health and the health of our environment. Reducing the use of fossil fuels and introducing innovative materials and landscaping leads to cleaner air and better, safer facilities for walking, bicycling, and all forms of active transportation. All these activities directly link to improving individual health as well as creating a healthy ecosystem. Furthermore, "healthy places" create a healthy region by reducing combined sewer overflows and creating cleaner air and stronger regional economies.

Climate Resilience

To create infrastructure that functions under changing climactic conditions, Chicago has been leading the way on greenhouse gas mitigation and adaptation strategies, and continues to focus on reinforcing and reconceiving its civic facilities to cope with long-term trends and unexpected shocks. Climate resilience is embedded in the design philosophy of this document and is fundamental to creating sustainable infrastructure. Resilience reduces maintenance costs and liability over the lifetime of the infrastructure improvement.

THREE PARTS TO GREAT STREETS

Key to understanding the mission of this document is to understand its role and relationship to the Complete Streets and Placemaking guidelines. Together, these three documents define the key principles that CDOT believes create great streets and infrastructure. It is through the integration and careful balance of modal hierarchy, ecological services, and placemaking with good planning, design, construction, and maintenance that each individual project adds up to make a great city and provides the greatest environmental and social benefits at the least cost and with the best return on investment.



Typical Streetscape Side Street

Parkway Planter

Dedicated Bus and Bike Lanes

RETURN ON SUSTAINABLE INVESTMENT

The philosophy of this document is that while there are cost implications to some of the requirements—such as increased staff time in review and documentation, modest design fee increases while consultants adjust to new standards, and potential modest construction fee increases as the entire industry adopts and adapts to revised practice—the value of the increased investment reflected in these costs justifies the expenditure. Furthermore, many of the requirements lead to cost savings. The use of recycled materials, recycling construction waste, using energy efficient lighting, and reducing "grey" or "pipe" stormwater solutions are just a few of the examples that have been shown to reduce both capital and long term costs. For example, the successful construction bid for the Pilsen Sustainable Street Project was 21% less per block than the average per block cost of the 10 other similar projects bid that year. Soft costs can also be reduced by "adapting" our infrastructure to climate change. For example, street flooding can be eliminated or greatly reduced with stormwater best management practices. This reduces homeowner and business insurance claims, protects roadway infrastructure, maintains walkable and cycle-able sidewalks and streets, and reduces interruptions to economic activity.

Before: asphalt alley

This document took a particular look at the full cost and benefit of environmental best practices on CDOT pilot projects, which is often referred to as a sustainability valuation, sustainable return on investment, or calculation of the triple bottom line. In a fiscal reality where agencies must do more with less, investing in projects that deliver multiple benefits is the smartest approach. It is important to get the most out of every dollar invested. So when that dollar buys not just a physical project that enables mobility but also slows stormwater to reduce overflow events, improves air quality, reduces ambient temperatures for surrounding buildings, reduces energy use, and creates places where people want to live, we are making wise choices for the city's economy and future.

"Implementation of the Green Alleys program saw the cost of permeable concrete drop by 47% between original pilot alley installation and the term contract prices the very next year when it was made a program."

After: permeable paver alley

The results of the cost-benefit analysis carried out on CDOT's Pilsen Sustainable Street Project—an analysis that included valuing the cost and benefit of ecological services and measurable quality of life improvements—help communicate the full value of the investment to public and private stakeholders. This information assists CDOT and its partnering agencies as they make investment decisions through an understanding of how permeable pavement choices, infiltration planters, recycled content, plantings and placemaking elements comparatively pay back over time. The analysis also had a life-cycle cost component that included recurring maintenance and operations costs as well as disposal or replacement costs.

The Chicago region has several leaders integrating life-cycle cost analysis and environmental life-cycle assessment in decision making for infrastructure projects. The Illinois Tollway Authority has been using a framework life-cycle assessment tool to analyze various pavement choices. This means that several environmental characteristics of the material, including the impacts of extraction, processing, transportation, maintenance and disposal, are assessed and balanced to provide a score for the material. The result, ideally, is material that provides high-quality performance and has no negative cumulative impacts.

CDOT has also found that partnering with other departments and agencies enables better outcomes at lower costs. Information sharing is a hallmark of partnerships, increasing the understanding across city agencies and departments of which practices lead to the best outcomes with lower life-cycle costs. This also means that when it comes time to make citywide decisions on commodities contracts, there is greater confidence in asking for and obtaining more competitive prices for innovative materials such as recycled aggregates and porous asphalt. In addition, partnerships across agencies and departments result in standardized requirements that drive market change. For example, when every agency requires recycled content or clean fleets, contractors and suppliers respond, making the investments necessary to compete in the Chicago infrastructure market. Implementation of the Green Alleys program saw the cost of porous concrete drop by 47 percent between original pilot alley installation and the term-contract prices received the very next year when it was made into a program.

These partnerships also include working with non-governmental organizations, and educational and research institutions to carry out commissioning of projects. Partnering with these organizations helps spread the wealth of knowledge gained from one project to many throughout the region.

ACHIEVING CHICAGO AND ITS REGION'S SUSTAINABILITY PRIORITIES

The Chicago region has been on the cutting edge of sustainable infrastructure implementation through both integrated planning and project-specific mitigation. The regional and city sustainability plans form a framework for the Sustainable Urban Infrastructure Guidelines and Policies. They set the regional goals and citywide metrics that inform this documents specific performance metrics.

Strong leadership has been demonstrated through the GO TO 2040 plan—the long-range comprehensive plan for the Chicago region that includes Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will Counties. This plan was guided and endorsed by stakeholder representatives from federal, state, county, and city governments, as well as regional transportation agencies, railroad companies, and private business. GO TO 2040 demonstrates a clear need for environmental mitigation and provides regional goals to preserve and enrich our water, energy, and open space resources.

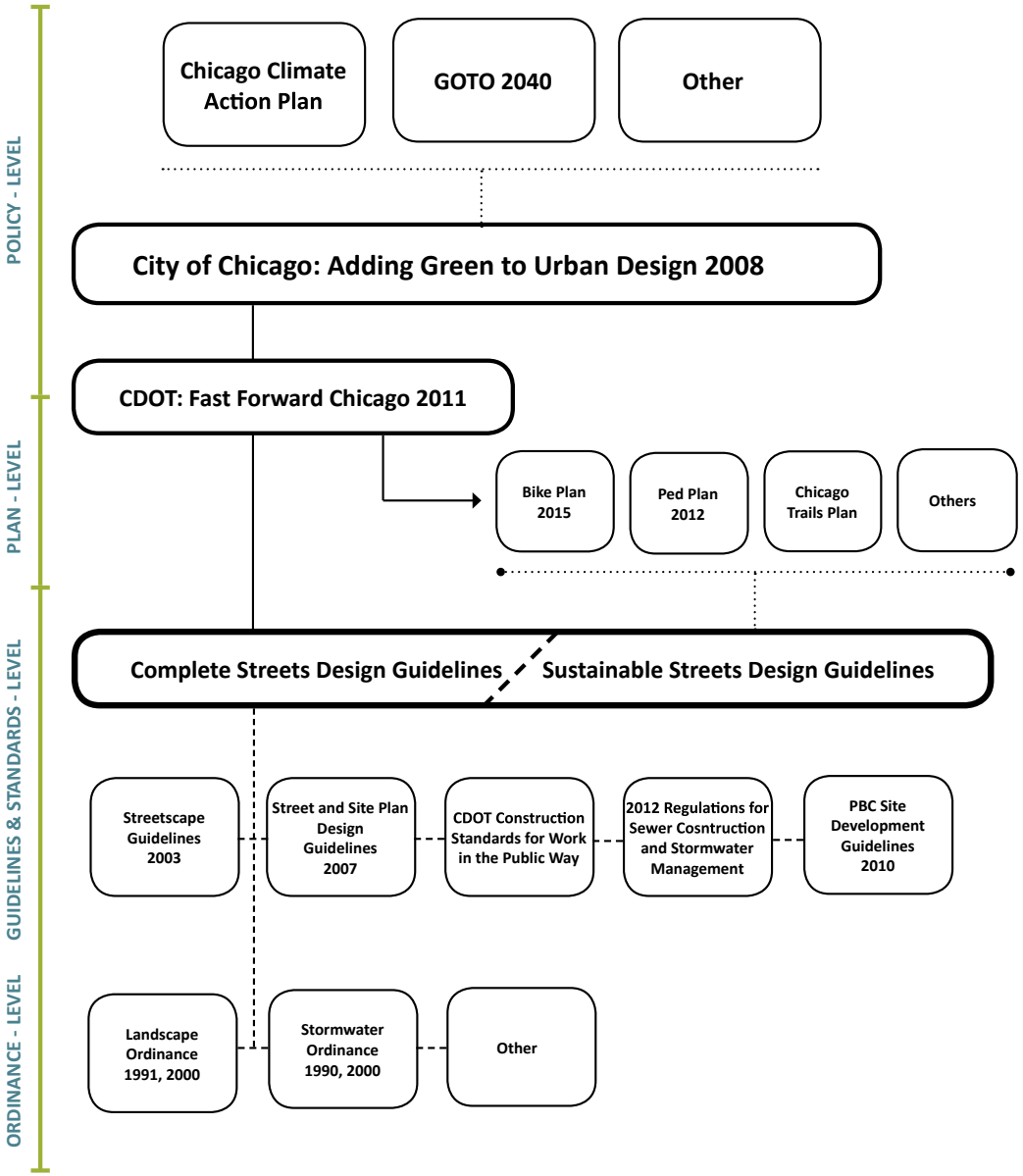
The Chicago Climate Action Plan To assess the impacts of climate change and to develop a plan for the future, the City of Chicago consulted leading scientists to describe various scenarios for Chicago's climate future and how those would affect life in the city. Chicago needs to achieve an 80-percent reduction below its 1990 greenhouse gas (GHG) emissions level by the year 2050 to do its part in avoiding the worst global impacts of climate change. Improved transportation options are one of the four GHG emissions mitigation strategies identified in the Chicago Climate Action Plan (CCAP), which estimates that 21 percent of the city's GHG emissions are produced by cars, trucks, buses, and trains. A broad set of organizations provided input throughout the CCAP transportation planning process, representing government agencies, private businesses, and non-profit stakeholders. Through this data-intensive and collaborative process, a portfolio of approximately 120 transportation ideas was generated to guide adaptation and mitigation efforts toward meeting the aggressive carbon reduction goals.

Green Infrastructure Vision
Communities, land-use planners, and conservation professionals use the Chicago Wilderness Green Infrastructure Vision (GIV) to inform their land-use planning. The GIV identifies 1.8 million acres that can be restored, protected, or connected through conservation and thoughtful, sustainable development practices. The GIV guides the protection and development of an accessible, interconnected network of healthy ecosystems that contribute to economic vitality and quality of life for all the region's residents. Chicago Wilderness members and communities implement the GIV at four scales: regional, community, neighborhood, and site.

2015 SUSTAINABLE CHICAGO
ACTION AGENDA

Sustainable Chicago 2015 The City of Chicago recently completed Sustainable Chicago 2015: Meeting the Challenge of the 21st Century. Sustainable Chicago 2015 is a sustainability roadmap that guides Chicago residents and businesses in laying out realistic and attainable steps to achieve a positive future. The plan offers a set of 24 goals and initiatives spanning seven categories that should be completed in the next three years. Several of these goals are specifically addressed through requirements detailed in the guidelines; several key actions directly correspond with the requirements and policies in these guidelines.

As well as resting within the regional and city policy and ecological framework, the Sustainable Urban Infrastructure Guidelines and Policies are part of a growing library of innovative design guidelines, manuals, handbooks, and lessons learned from various pilot projects for CDOT, described next and illustrated schematically.



PILOTS TO PROGRAMS

The City of Chicago has played an active role in project-specific mitigation efforts including the award-winning Green Alley program and Sustainable Streets program, which transformed the success of pilot projects into effective programs. Projects within these programs are redefining infrastructure in an urban environment by integrating Complete Streets and sustainable design best practices to achieve increased environmental performance from investments in transportation infrastructure.

This section presents successful projects from those programs, featuring the environmental elements.

Pilsen Sustainable Street Project

The City of Chicago's commitment to ecological principles is demonstrated through the Pilsen Sustainable Street Project, which funded in part through the Federal Highway Administration's (FHWA) Eco-Logical Program, has received quantifiable results by setting aggressive sustainability goals in eight performance areas such as stormwater management, material reuse, energy reduction, and placemaking. The project demonstrates a full range of sustainable design techniques that improve the urban ecosystem, promote economic development, increase the safety and usability of streets for all users, and build healthy communities. It demonstrates both mitigation and adaptation strategies by reducing its carbon footprint and integrating technologies that allow the infrastructure to address and adapt to climate change.

This recently completed project consists of streetscape improvements for Cermak Road (22nd Street) and Blue Island Avenue. Located on Cermak Road between Halsted Street and Ashland Avenue, and Blue Island Avenue between Ashland Avenue and Wolcott Avenue, this 1.5-mile-long pilot project demonstrates a full range of sustainable design techniques that improve the urban ecosystem, promote economic development, increase the safety and usability of streets for all users, and build healthy communities. This project represents the first time a comprehensive set of environmental performance goals have been integrated into a Chicago roadway project. It creates a new paradigm for infrastructure in the 21st century and helps to demonstrate how a quarter of the city's land area and infrastructure can be revitalized to address ongoing environmental issues while improving performance.

Sustainability Highlights include:

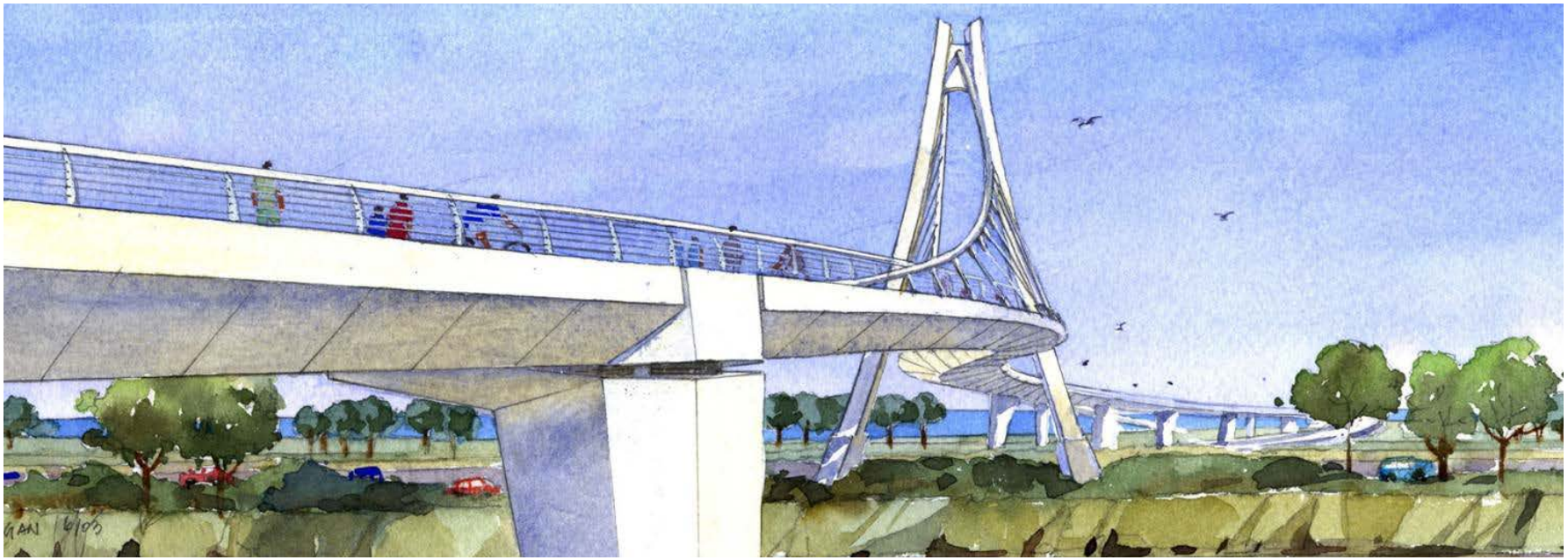
- Recycled Content: The project sought to recycle at least 90 percent of construction waste based on LEED for New Construction criteria. In addition, the project required that a minimum of 10 percent of the total materials value should be from post-consumer recycled content.
- Energy Efficiency: The project sought to reduce energy use by a minimum of 40 percent below a typical streetscape baseline and required the use of reflective surfaces on roads/sidewalks and dark-sky-friendly fixtures. To minimize transportation energy, a minimum of 40 percent of total materials was required to be extracted, harvested, recovered, and/or manufactured within 500 miles of the project site.
- Stormwater Management: The project sought to divert 80 percent of the typical average annual rainfall and at least 2/3 of rainwater falling within the catchment area into stormwater best management practices.
- Urban Heat Island Mitigation: The project sought to reduce ambient summer temperatures on streets and sidewalks through the use of high albedo pavements, roadway coatings, landscaping, and permeable pavements. The use of ultra-low-sulfur diesel and the enforcement of the city's anti-idling policy were required.
- Active and Public Transportation: The project improved bus stops with signage, shelters and lighting, and where possible, promoted cycling with a new bike lane and improved pedestrian mobility with accessible sidewalks, reduced crossing distances, and a pedestrian refuge island.
- Water Efficiency: The project required the elimination of potable water for irrigation and specified native or climate-adapted drought-tolerant plants for all landscape material. It used harvested rain water to create a stormwater feature in a public plaza.
- Education: The project provided public outreach materials and a self-guided tour brochure to highlight innovative, sustainable design features of the streetscape. The project helped create two new plazas that celebrate community, provide gathering space, and allow for interaction and observation of people and the natural world.
- Monitoring: The project was required to model stormwater best management practices (BMPs) in Infoworks to analyze results and refine the design. In addition, stormwater BMPs were monitored to ensure predicted performance and determine maintenance practices.

- Technology Innovation: Use of photocatalytic cement to help maintain a high albedo and improve air quality by filtering out smog-precursor particles.
- Process Innovation: One process innovation included incorporating environmental and social goals into the project early in design, as well as modeling stormwater BMPs using Department of Water Management resource management software.
- Market Change: New markets were developed through area suppliers, including concrete with 30-percent recycled content, permeable pavers with a smog-eating photocatalytic cement surface, and asphalt with reclaimed asphalt shingles, ground tire rubber, slag, and reclaimed pavements made using warm-mix technology. While these products were developed for this project, they were quickly integrated into the manufacturer's product lines, developing whole new markets.
- How It Creates Jobs: By introducing new products and services into the construction market, this project reinforced green construction jobs. In addition, the Political Economy Research Institute has found that pedestrian and bicycling infrastructure, such as that installed in the Pilsen Sustainable Street Project, creates 11.4 jobs for every $1 million invested—46 percent more than car-only road projects.
- Return On Investment: The results of the sustainable return on investment analysis carried out for Cermak/Blue Island have shown that for every dollar spent, there was more than a dollar returned to the Chicago economy. The bids for the project came in under the anticipated cost and 21-percent less per block than the average cost of the 10 other similar projects bid at the same time, signaling some market readiness for integrating innovative sustainability practices into business as usual, and their ability to save upfront capital costs as well as long-term life cycle costs.

130th Street and Torrence Avenue Realignment and Grade Separation

Sustainability Highlights include:

- Treatment of stormwater in a self-sustained vegetated treatment pond, where the sediment and debris are trapped in the pond and clean water is then slowly discharged through a bio-swale into the Calumet River. Previous conditions had stormwater directly discharging into the river.
- Replacement of concrete medians with landscaped medians in addition to several other areas where pavement was replaced with understory landscaping and trees, thereby increasing the green space and the number of trees in the project.
- The 9,000 feet of retaining walls have vines growing along them, increasing the volume of vegetation in the project.
- The two grade separations substantially reduce vehicle idle time, resulting in substantial reduction in emissions and time savings for travelers.
- The realigned streets reduce the number of traffic signals and allow the traffic to flow more smoothly, resulting in air quality emissions reductions.
- All the new traffic signals use LEDs, substantially saving energy.



Pedestrian Bridge at 35th Street

A new pedestrian bridge will be constructed at 35th Street over Lake Shore Drive and rail lines. This will provide a more accessible and pedestrian-friendly connection to the park for the neighborhood. The existing truss bridge and deteriorating access will be replaced with a cable stay structure, and will tie into a new streetscape in the neighborhood. The streetscape will facilitate pedestrian and cycling access and will also include infiltration planters and rain gardens. As it is constructed, the project will be able to remove and recycle existing asphalt, and incorporate new vegetation and trees, improving stormwater management.

Green Alleys

Many of the innovations in permeable and cool pavement as well as lighting requirements piloted in the Green Alleys program and documented in the Green Alleys handbook have been incorporated into the Sustainable Urban Infrastructure guidelines.

Permeable Concrete Alley

Sustainability Highlights include:

- Environmental Goals: Infiltrate stormwater to minimize basement flooding; reduce light pollution; increase recycled content in pavement materials; and employ cool pavement strategies to minimize the urban heat island effect.
- Technology Innovation: Create porous concrete and asphalt with ground tire rubber.
- Process Innovation: Monitor and work with maintenance crews to develop maintenance protocols to achieve long-term performance and work with contractors to develop installation methods.
- Market Change: Create new market for permeable pavements that previously did not exist; expand the use of recycled aggregates, slag and ground tire rubber; and help drive contractor training, leading to competitive pricing of permeable solutions and a trained vendor pool.
- How It Creates Jobs: Create new product markets such as new divisions oriented around permeable pavements; create new contractor specialties; increase demand for recycling market; spur innovation in pavement design leading to the birth of several "green" mix designs across several agencies.
- Return On Investment: Reduce basement flooding, minimizing private spending on clean up and damage; eliminate alley flooding, increasing roadway function and life span, thereby reducing life-cycle costs; reduce or make cost neutral first costs by eliminating or greatly reducing the amount of sewer infrastructure.

Permeable Asphalt Alley

1.2 DOCUMENT DEVELOPMENT

HOW TO NAVIGATE THE DOCUMENT

This document is composed of two distinct parts: Volume 1 and Volume 2.

Volume 1 lays out an understanding of how Chicago's infrastructure serves multiple objectives. At the highest level, it explains the context of Chicago's infrastructure, provides explicit sustainability goals, how the effort works in harmony with other city efforts, and how to pull sustainable ideas together into a coherent, effective project. Volume 1 details the categories of sustainability issues infrastructure can address, the prioritized objectives projects should work to achieve, and requirements that set a baseline for advancing each type of infrastructure project. Volume 1 lays out the implementation of these new requirements, and explains the matrices and worksheets that guide project managers through the selection of the requirements that are appropriate for their project. It also describes the advances of policies that are necessary to fully implement sustainable infrastructure, and illustrates how different strategies come together, complementing one another.

Volume 2 comprises specific strategies, references, and resources that are identified to help project managers, resident engineers, and interested parties accomplish the set of requirements detailed in Volume 1. Volume 2 also contains implementation matrices that lay out activities other agencies will carry out. Volume 2 will require yearly review and is subject to revision as best practices are revised and refined.

COORDINATION

Implementation of this document requires new and enriched coordination among divisions and sections of CDOT, as well as between sister agencies and other city, regional, state, and federal infrastructure departments and agencies. Sustainable urban infrastructure requires that systems think and look for synergies both between various stakeholders and within a project.

WHO IS THE AUDIENCE?

This document is intended to be a reference for anyone in the city and the region interested in advancing the design and performance of their infrastructure investments, but is specifically directed to CDOT, with the goal of integrating sustainable best practices and ecological services into all of its capital projects and maintenance efforts. It is also directed at other agencies, utilities, and departments carrying out infrastructure work in the public way. Particular audiences in mind during its development include the following:

- CDOT staff
- Consultants
- Other city infrastructure departments
- Chicago sister agencies
- Utilities
- Federal / state / county transportation departments and agencies
- Private developers
- City officials
- City residents

HOW WILL CDOT MEASURE PROGRESS?

Keeping track of innovation, collaboration, and development of best practice; incorporating new practices into projects; including contract language concerning new practices; executing new practices in design and construction; and revising maintenance practices requires a tracking mechanism. This document suggests two checklists for CDOT managers:

- A checklist to document the consideration of sustainable urban infrastructure categories and objectives.
- A whole-life project checklist that moves with the project from planning and Request for Proposal (RFP) development, through design, construction, and maintenance.

In addition,this document sets performance metrics for each strategy to allow for consistent benchmarks and ease of data collection. In turn, these metrics feed into the city's larger sustainable goals set forth in Sustainable Chicago 2015 and the Chicago Climate Action Plan.

It also recommends a series of ongoing committees to track new best practices, further develop and refine implementation processes, determine ways to track and maintain data, and ensure policy implementation.

HOW DOES ENVIRONMENTAL DATA DRIVE THIS PROCESS?

Civil engineering and urban design incorporate information into project conception and design. Part of the purpose of this document is to illustrate how and when types of environmental data should inform and enhance the planning, design, construction, and maintenance of projects. This document considers how managers obtain and use soil, climate, land use, and other data and mapping to best inform project design. In addition, this document emphasizes enhancing ongoing and creating new data sets through feedback from design, construction, commissioning, and maintenance.

HOW WAS THIS DOCUMENT DEVELOPED?

This document was produced through workshops and discussions with CDOT project managers and City of Chicago agencies as well as representatives from outside agencies, non-profits, industry, and community groups who met as a task force, or who participated as part of a group of stakeholders or at public meetings and industry presentations.

Best practices from various sustainable rating systems, similar documents from peer cities, and knowledge gleaned from CDOT's own innovative pilot projects was assimilated into a 5-year implementation plan to fully incorporate sustainable best practices into all aspects of planning, design, construction, and maintenance of transportation infrastructure projects and work in the public right-of-way. It reflects and captures the current state of practice to establish a benchmark for all projects to implement in 2013 and to be improved upon over the next 5 years, with specific goals for 2015 and 2018. In addition, it presents policies that will further enhance sustainability but that will need time and more research to effectively implement.

Infiltration Test in Cermak Planter

PROCESS ROLL-OUT

The requirements and policies will be implemented over a 5-year horizon. They will evolve, turning policies into initiatives and increasing the intensity of the requirements. The following is the 5-year plan to implement these ideas and gradually evolve "business as usual".

2013 - 2014

- Roll-out implementation
- Incorporate requirements into all new RFPs
- Review case studies of applications and performance data
- Refine requirements based on pilot applications to CDOT projects
- Pilot sustainability valuation and apply lessons learned
- Institute committees to ensure implementation and continue to refine and define process, performance metrics, specifications, detail data, and RFP language

2015

- Apply refined requirements, or intensify requirements
- Achieve mid-term policy goals
- Apply sustainability valuation for major projects
- Incorporate findings from committees as appropriate
- Review type and role of committees to determine if changes need to be made

2018

- Apply refined requirements
- Intensify appropriate requirements
- Achieve longer-term policy goals
- Review requirements and policies to determine ongoing viability or need for improvement and new initiatives
- Develop new policies as appropriate for next 5-year horizon
- Investigate the need to publish new edition

The Sustainable Urban Infrastructure Guidelines and Policies are a tool to advance CDOT project implementation using cutting-edge sustainable practices. They also help to fulfill citywide environmental planning goals, and will be used by CDOT to track the future environmental performance of the public right-of-way.

It is both a policy document that explains the overarching philosophy and high-level policy goals, and an implementation tool that involves business as usual.

While these requirements and policies may look strikingly aggressive, they are often codifying principles that are effective and feasible through exemplary pilot projects or that represent the logical next step. They also attempt to encapsulate principles that may have received extensive discussion for years but have never been written down as policy.

Congress Parkway Streetscape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2.0 PRIORITIES + POLICIES

2.1 SUSTAINABLE INFRASTRUCTURE PERFORMANCE STANDARDS

Why not a rating system?

An important first step in developing the Sustainable Urban Infrastructure Guidelines and Policies involved the review of state, national, and international best practices in the area of sustainability assessment or rating systems. Rating systems provide useful benchmarks to express industry standards of what constitutes a sustainable project and help establish standards for quantifying benefits; when appropriate, this document incorporates best practices that have arisen from these systems.

Current rating systems range from roadway-specific to encompassing all aspects of infrastructure projects (from site design to building focused). They outline requirements with a number of optional points to obtain an overall environmental "score" for the project. Many rating systems for infrastructure are still emerging, and while they help communicate what has occurred on a project and its success, this is true only if the value of the rating system is clear and established to a broad audience. Furthermore, these rating systems often require specific training and self-direction on the part of the project team to successfully implement and are not tailored to unique local conditions and regional climates.

To counter some of the limitations of rating systems, cities throughout the U.S. have adopted guidelines and requirements for infrastructure that reflect their specific environmental and social circumstances. This approach takes some of the guesswork out of what targets a project should aim toward, and can enable clearer signals to consulting engineers, contractors, and materials producers and suppliers. These guidelines and requirements take advantage of leadership stemming from successful Chicago pilot projects and spread success and best practices throughout CDOT's projects, as well as to other agencies and city departments. The City of Chicago may elect to have projects meet a specific rating system at some future point, as there is nothing in this document that precludes the use of any rating system. Rather, it refines a range of systems to the specific needs of the city and the region.

For the purposes of this document, CDOT's objectives focused on transportation infrastructure, not just roads—a 5-year plan to quickly and meaningfully ramp up efforts to focus on where CDOT started (specific to the city's and region's unique environmental issues), to tailor CDOT project types and other's doing work in the public way, and to provide specific guidance to project managers and other implementers.

Range of Projects and Implementation Mechanisms

These guidelines apply to small- and large-scale projects so that every project that CDOT carries out can achieve a relevant sustainability impact. The method to winnow the entire set of requirements down to a given project is detailed in the implementation section. The application of requirements to projects was reviewed and refined by the task force.

Prescriptive or Performance?

These guidelines contain both prescriptive and performance requirements because CDOT engages in a range of routine infrastructure rehabilitation and maintenance, competitively bid projects, and standing term contracts. For projects where a range of circumstances affect design, performance criteria enable designers to work creatively toward solutions. For standard projects, where CDOT applies a consistent specification or construction methodology, prescriptive requirements provide clarity to project designers and the construction market.

2.2 ENVIRONMENTAL CATEGORIES, OBJECTIVES, REQUIREMENTS, ORGANIZATION

The design of Chicago's right-of-way has a significant impact on the livability of the city as well as the health, safety, and welfare of its citizens. The public right-of-way, which mostly comprises streets and alleys, is a large part of the public realm and provides substantial open space, including view corridors and green space. This chapter contains a collection of sustainability priority categories, or themes, that apply to infrastructure planning, design, and construction, and points the way for new policies.

The categories, objectives, and requirements detailed in this section provide the user with sustainability options where they are not precluded by regulation and steer the user toward selections of practices that have the optimal sustainability impacts for the type of project and the region. They organize ecological services around transportation infrastructure and provide clear direction on what sustainable objectives are to be addressed, and specific requirements and policies to be implemented.

CATEGORIES

The categories are environmental themes that are fundamental to CDOT's understanding of sustainable urban infrastructure and street design. These categories were developed through a review of national and international best practices and CDOT's own experience. This collection was then filtered through an understanding of the specific needs and vision for Chicago, and the role of this document as part of a tri-partite with complete streets and placemaking guidelines. The resulting eight categories are the broad initiatives that organize the specific environmental objectives of CDOT and the city, as well as form the organizational backbone of this document.

OBJECTIVES

The objectives reflect the environmental imperatives and social and economic priorities of each category. They are prioritized based on Chicago regional and city-specific context. They are the goals and purpose of the requirements and policies. Objectives help a project manager think through what is important in their specific project context. As a prioritized list, they direct a project manager to select solutions and strategies that achieve multiple objectives and result in the most impact.

REQUIREMENTS AND POLICIES

The requirements and policies are at the heart of this document and provide the road map to achieve the objectives and environmental benchmarks identified by CDOT and the city as a whole. These requirements take the objectives and link them with specific, project-level actions or policies. Requirements provide an exact direction for the project manager to follow and are specific to different types of infrastructure projects. Not all requirements apply to all projects. This is made clear in the requirement matrices (Section 4), one for each category, which lists the different projects types and the requirements and policies that apply.

The policies themselves play a special role: They represent sustainability initiatives that do not necessarily require a specific metric, or an idea that requires further investigation before a requirement can be developed. The policies are a road map for innovation. Finally, both the policies and requirements are organized around a 5-year horizon with early adoption in 2013, with many initiatives ramping up or coming online in 2015 and 2018.

STRATEGIES AND BEST PRACTICES

The selected strategies help project teams think through and select methods, calculations, and procedures to achieve the requirements. The strategies demonstrate various ways to implement the requirements and achieve the objectives. They highlight the synergies between objectives and provide design considerations, best practices, and references. They also set specific performance metrics for each strategy as appropriate. They are located in Volume 2 to allow them to be updated independently and periodically.

CATEGORIES		OBJECTIVES
Water	W	1. Reduce basement and street flooding 2. Reduce combined sewer overflow (CSO) events and volumes 3. Reduce potable water use 4. Clean and direct stormwater to natural water bodies 5. Reduce non-point source pollution to natural water bodies 6. Ensure erosion and sediment control
Energy	EN	1. Reduce energy use 2. Use clean and renewable energy 3. Use the public right-of-way to generate and transmit renewable energy
Economics	EC	1. Quantify the environmental value of infrastructure investment 2. Coordinate capital improvements with other city departments and agencies to maximize environmental benefits 3. Streamline utility coordination and installation to minimize environmental impact 4. Maximize implementation of adaptation strategies to ensure public health and safety and to protect the capital investment 5. Support economic development and enhance property values 6. Support green-collar job creation
Materials and Waste	MW	1. Maximize construction-waste reduction and recycling 2. Maximize the reuse of materials and the use of recycled materials 3. Minimize transport distance of materials and incentivize local and regional extraction and manufacture of materials 4. Support sustainable production practices

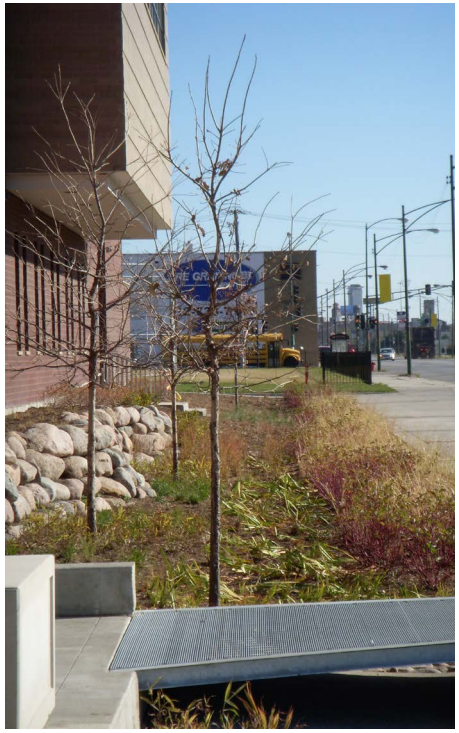
OBJECTIVES	CATEGORIES
1. Reduce urban heat-island effect 2. Use low-emitting materials 3. Promote alternative fuel use 4. Reduce emissions related to construction activity	CA **Climate and Air Quality**
1. Implement the Complete Streets policies and Placemaking polices (in progress) 2. Create unique, quality spaces within the public right-of-way that reflect the local neighborhood 3. Educate and promote environmental awareness and the environmental benefits of the projects 4. Include stakeholder input in project decision making process	BC **Beauty and Community**
1. Create and support natural habitat 2. Protect and restore natural habitat 3. Allow for interaction and observation of both people and the natural world	UE **Urban Ecology**
1. Maintain the site year-round to ensure environmental benefits 2. Identify and develop design tools to predict performance 3. Evaluate, verify, and document performance and update design tools	C **Commissioning**

W WATER

OBJECTIVES

REQUIREMENTS

	W1a	W1b	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16
Reduce basement and street flooding	✓	✓	✓	✓	✓			✓				✓	✓				✓
Reduce (CSO) events and volumes	✓	✓	✓	✓	✓			✓				✓	✓				✓
Reduce potable water use									✓	✓	✓			✓			
Clean stormwater to natural water bodies					✓	✓									✓	✓	
Reduce non-point source pollution						✓	✓	✓							✓		✓
Ensure erosion and sediment control							✓	✓					✓			✓	



CATEGORY: WATER

Water refers primarily to stormwater and how infrastructure projects should manage those stormwater flows in order to improve water quality in local water bodies, reduce flooding, and anticipate more frequent, intense storm events. This category also refers to water used for irrigation and the reduction of potable water use.

Water quality for the Chicago River is threatened by numerous sources, including point discharge from combined sewer overflows (CSOs) and urban runoff. CSOs degrade water quality in the Chicago River, which is being increasingly turned to as a place for recreation. Several pilot projects have demonstrated that reducing CSOs with green infrastructure is a feasible option, even in a densely populated and impervious urban area like Chicago.

The public right-of-way and infrastructure plays a crucial role in stormwater management in the city, since in most instances, streets convey stormwater directly into the combined sewer system. Using these streets, instead, to slow the flow, capture, and then recharge or discharge, provides the system with more time to manage storm events. All projects should target green infrastructure on the CSO and sewer-shed level as well as address localized flooding.

Sustainable solutions should intercept runoff on-site and either retain it or detain it to reduce peak flow. This is achieved by minimizing impermeable surfaces, increasing infiltration through recharging groundwater, conserving ecosystems, reducing the use of pipes, and increasing natural channels such as bioswales or infiltration gardens. In addition to managing peak storms and flood protection, the minor storms—because of their frequency and cumulative impacts—make the largest contribution to total annual runoff volume and often carry heavy pollutant loads, and therefore have a large impact on water quality. Water quality is improved by reducing the possibility of CSO and by decreasing non-point source pollution.

Water is vital for establishing healthy, robust, long-lived street trees and plantings, which contribute to clean air and beautiful places. However, irrigation practices must observe the best available conservation technology so that potable water use is reduced. This goes hand in hand with stormwater BMPs, as the use of stormwater for irrigation can address both issues with a single strategy. When potable water is needed, it is important to use it wisely. Smart irrigation systems can allow CDOT personnel to shut off systems when they are not needed and supplement them during times of drought.

The six objectives for water have been prioritized so that the crucial goals to solving the regions stormwater challenges are emphasized on every possible project. Eliminating flooding basements and streets reduces costs, supports economic development, and helps ensure transportation access for all uses even during storms and emergency events. It reduces long-term fixed costs for conveying and cleaning stormwater and creates more beautiful environments while doing it, which support habitat and economic development.

These objectives and their associated requirements and policies are then translated physically into permeable pavements in roads, parkways that are bioswales, tree planters, rain-garden planters, landscaped medians, planted rainwater bumpouts, green alleys, and permeable walkways.

REQUIREMENTS: WATER

CODE	EFFECTIVE JULY 2013	EFFECTIVE JANUARY 2015	EFFECTIVE JANUARY 2018
W1a	**Rate Control**: Green Infrastructure shall be used to control stormwater from all the public way that can be made tributary to best practices as outlined in Volume II of this document. The target release rate for the total project's right-of-way shall be 0.9 cfs/acre for the 5-year event. The release rate shall be met using a combination of strategies including limiting the size of the underdrain, limiting the amount and location of underdrain, and use of restrictors as further discussed in Volume II of this document. The City of Chicago Stormwater Tool spreadsheet shall be used to calculate the required volume for the 5-year event to meet the target release rate. The required 5-year volume shall be provided without on-street storage. The calculations shall be based on runoff from the Right-of-way and consider private property and other catchment area outside the project Right-of-way as described in Volume II of this document. See Volume II of this document for special treatment of this requirement in the Central Business District. See W3 for additional stormwater control requirements.		
W1b	**Rate Control**: Install green infrastructure to provide rate control to the maximum extent practicable through the implementation of stormwater best practices as outlined in Volume II of this document.		
W2	**Volume Control**: To the extent practicable, green infrastructure systems shall be installed as outlined in Volume II of this manual and shall be used to intercept runoff immediately upstream of Right-of-way catch basins to maximize the area available for infiltration and water loss through evapotranspiration. Stormwater Best Management Practices (BMPs) shall maximize lateral distribution of stormwater storage and inter-connect individual BMPs to increase opportunities for infiltration and to minimize points of overflow into the sewer system. No exclusive volume control storage is required unless soils meet requirements in W3.		

REQUIREMENTS: WATER

CODE	EFFECTIVE JANUARY 2013	EFFECTIVE JANUARY 2015	EFFECTIVE JANUARY 2018
W3	**Soils**: Where the soil map (see Figure 3-2 in Chicago January 2012 Stormwater Manual) and/or **borings indicate sandy soils or where infiltration tests indicate soils with infiltration rates of 1.4 inches per hour or better**, both volume control and rate control measures shall be implemented. The minimum volume control provided shall be 0.5 inches on at-grade impervious surfaces. Rate control volume shall be provided per requirement W1a.	**Soils**: The 2013 requirements shall apply. Project experience will be used to evaluate potential increases in the requirement	**Soils**: The 2015 requirements shall apply. Project experience will be used to evaluate potential increases in the requirement
W4	**Proximity to a Waterway**: Projects located within 0.25 mile of a waterbody or a separate storm sewer that drains to a waterway must conduct an assessment to determine feasibility of diverting stormwater runoff to the waterway or storm sewer. If feasible, stormwater shall be diverted to a waterway or separated storm sewer. In cases of overland overflow, erosion control must be considered as part of the design of the project. Projects located within 0.125 mile of a waterbody or a separate storm sewer that drains to a waterway shall divert runoff to the waterway or separate storm sewer. In cases of overland overflow, erosion control must be considered as part of the design of the project. Projects adjacent to a waterbody or a separate storm sewer shall discharge runoff to such outlets. This requirement may be waived in areas of the City where it has been shown that this requirement would exacerbate overbank flooding and not improve conditions in the combined sewer system.		
W5	**Water Quality Treatment**: If a project discharges to a waterway, or separate storm sewer system draining to a waterway, 80-percent of total suspended solids must be removed from the discharged water. Projects utilizing stormwater landscapes and/or stormwater pavements meeting the rate and volume requirements, as outlined in W1A or W3 may be assumed to meet this requirement for the area served by these features.		

REQUIREMENTS: WATER

CODE	EFFECTIVE JULY 2013	EFFECTIVE JANUARY 2015	EFFECTIVE JANUARY 2018
W6	**A Stormwater Pollution Prevention Plan** shall be prepared if the project involves soil disturbance, major reconstruction or grinding and resurfacing adjacent to proposed stormwater BMPs or water bodies and as required by Illinois EPA. All existing stormwater features, including permeable paving and bioretention shall be protected from construction site runoff and debris.		
W7	**Existing Stormwater BMPs** shall be protected during maintenance activities. All maintenance and repair work (including utilities) shall replace existing stormwater landscapes and stormwater paving in-kind. Infiltration rates and grades are to be repaired or maintained to ensure function as originally designed and constructed. Required and appropriate measures shall be taken to manage stormwater if work is being done within the contributing area of the BMP.		
W8	**Passive Irrigation**: All landscape areas shall be designed with passive irrigation and, where possible, runoff shall be directed toward the landscape area to supplement rainfall. Designs should provide additional soil volume or storage below or adjacent to the root zone to provide moisture retention in between storm events.		
W9	**Rainwater Reuse**: When needed and where feasible, rainwater collection and reuse systems shall be evaluated to supplement irrigation needs beyond rainfall and passive irrigation.		
W10	**Smart Irrigation Systems**: If an irrigation system is required, the systems shall consider incorporating smart irrigation technologies that apply water based on soil moisture requirements.		

REQUIREMENTS: WATER

Policies

CODE	EFFECTIVE JANUARY 2013	EFFECTIVE JANUARY 2015	EFFECTIVE JANUARY 2018
W11	**Sustainable Backyards**: CDOT will cross-promote Sustainable Backyards programs to encourage adoption of green infrastructure practices on adjacent residential properties. In partnership with the Sustainable Backyards program, CDOT will: • Reach up to 500,000 residents annually via advertisements and 2,500 via events • Promote program at 20 partner events and hold 20 workshops annually • Target adoption of green infrastucture on up to 50 properties near to CDOT projects • Hold up to 3 Green Training-the-Vendors workshops annually at the Chicago Center for Green Technology		
W12	**BMP Education**: CDOT will provide training on how to design, construct and maintain stormwater BMPs. Develop educational programs for: • Contractors • Resident Engineers • Engineers • Maintenance Personnel • Utilities		
W13	**Creative Stormwater Use**: CDOT will encourage and promote the creative use of stormwater for fountains, public display, education and public art. CDOT will work to develop a requirement to incentivize these types of stormwater BMPs in future projects in conjunction with other agencies, as appropriate.		
W14	**Agency Coordination**: Within sensitive areas as identified by the DWM sewer sensitivity model and mapping, CDOT will coordinate project planning and design with DWM to evaluate opportunities to enhance project performance to achieve shared objectives.		
W15	**BMP Mapping and Protection**: CDOT will develop stormwater BMP mapping and a moratorium to ensure BMP protection and coordination within the Right-of-way. This data will be used to facilitate interagency coordination and interaction of past, present, and future BMP designs to optimize system performance.		
W16			**Legislation**: CDOT will explore the development of new legislation allowing for public and private stormwater to be combined within the public way, in coordination with other city agencies, as appropriate.

Policies

EN ENERGY OBJECTIVES

REQUIREMENTS

	EN1	EN2	EN3	EN4	EN5	EN6	EN7	EN8	EN9	EN10	EN11	CA8	CA9
Reduce energy use	✓			✓	✓	✓		✓	✓	✓		✓	✓
Use clean and renewable energy							✓						
Generate and transmit renewable energy											✓		

CATEGORY: ENERGY

Energy, and its heavy reliance on the use of fossil fuels, which create air quality and climate change impacts, refers both to the direct energy consumed by CDOT projects and the sourcing or siting of renewable energy facilities.

Lighting is the most significant direct consumer of electricity in the public right-of-way. Reduced energy use promotes a sustainable environment by reducing the consumption of non-renewable fuels and thus the release of carbon emissions. Light pollution is also reduced by the efficient use of street lighting that uses cut-off fixtures, which direct light downwards—where it is helpful—rather than in all directions.

These energy objectives translate into physical elements such as different light fixtures, a change in the color of light, solar panels, and wind turbines on stand-alone lights, the incorporation of electricity fueling stations in parking lanes and beneath the pavement (such as a series of pipes and conveyances for district cooling and heating), and the use of street foundation as a geothermal field. The energy objectives also translate into smarter light fixtures that can let CDOT personnel know when they are not functioning properly, control luminance levels, and provide information about energy use. This not only helps reduce energy use, it reduces maintenance costs and improves safety by helping to ensure that lights are on when they need to be and off when they do not need to be. Wind and solar light fixtures can be installed without expensive underground wiring systems and can operate even during power outages.

REQUIREMENTS: ENERGY

CODE	EFFECTIVE JULY 2013	EFFECTIVE JANUARY 2015	EFFECTIVE JANUARY 2018
	Light appearance: All lighting shall use white light and shall have a color temperature between 4,000 and 4,600 Kelvin with a color rendition index of 85 or greater.		
EN1	**Lighting Assembly**: Bulb life shall be equal to or greater than **30,000** hours for high intensity discharge or induction sources and 60,000 hours and a 10-year warranty for LED systems including driver. Light assembly system should comply with Illuminating Engineering Society (IES) LM-79, LM-80, and T-71.	**Lighting Assembly**: Bulb life shall be equal to or greater than **40,000** hours for high intensity discharge or induction sources and 60,000 hours and a 10-year warranty for LED systems including driver. Light assembly system should comply with (IES) LM-79, LM-80, and T-71.	**Lighting Assembly**: Bulb life shall be equal to or greater than **50,000** hours for high intensity discharge or induction sources and 60,000 hours and a 10-year warranty for LED systems including driver. Light assembly system should comply with (IES) LM-79, LM-80, and T-71.
	Brightness and Glare: **Retrofitted and new arterial, viaduct, and alley street lighting** should be designed to meet the most recent edition of the recommended (IES) minimum guidelines. Lighting should meet these minimums at 70% of max output to allow for flexibility in lighting levels due to community needs.	**Brightness and Glare**: Retrofitted and new arterial, viaduct, **residential**, and alley street lighting should be designed to meet the most recent edition of the recommended IES minimum guidelines. Lighting should meet these minimums at 70-percent of maximum output to allow for flexibility in lighting levels due to community needs.	
EN2	**Lighting Cutoff**: All new or retrofitted **arterial lighting will be cut-off, including pedestrian, alley, and viaduct fixtures**. All above-ground CTA platforms shall use full-cut off lighting.	**Lighting Cutoff**: All new or retrofitted arterial lighting including pedestrian, alley, viaduct **and residential lighting** will be cut-off. All above-ground CTA platforms shall use full-cut off lighting.	

REQUIREMENTS: ENERGY

CODE	EFFECTIVE JANUARY 2013	EFFECTIVE JANUARY 2015	EFFECTIVE JANUARY 2018
EN3	**Light Trespass**: No light trespass shall be allowed into environmentally sensitive areas, as calculated in Volume II. Light trespass should be limited to the values recommended in the Illuminating Engineering Society RP-33 Lighting for Exterior Environments or TM-11 Light Trespass Recommendations.		
EN4	**LED**: All new or retrofitted traffic signals, pedestrian countdown signals, and bike signals shall be light-emitting diode (LED).		
EN5	**CTA Lighting**: All CTA station light fixtures should be LED and should comply with CTA light levels as published in CTA guidelines.		
EN6	**Smart Lighting**: All new and replacement or retrofitted light fixtures (on poles installed within the last 10 years) will be **equipped with the capacity for wi-fi smart grid** technology at the time of installation, replacement or retrofit.	**Smart Lighting**: All new and replacement or retrofitted light fixtures (on poles installed within the last 10 years) will be **equipped with wi-fi smart grid** technology at the time of installation, replacement or retrofit. Smart grid technology shall identify each unique fixture whenever possible.	
EN7	**Alternative Energy**: Whenever feasible, use alternative energy source for bus stops, Intelligent Transportation Systems, and warning signs. Maximize on-site renewable energy generation for energy needs. See Volume II for details on alternative energy source.		

REQUIREMENTS: ENERGY

Policies

CODE	EFFECTIVE JANUARY 2013	EFFECTIVE JANUARY 2015	EFFECTIVE JANUARY 2018
EN8	**Education of Public**: CDOT will create an education/media campaign to explain the benefits of white light and reduced energy use, dark skies and cut off fixtures. This effort will be tied into efforts by the Chicago Center for Green Technology.		
EN9	**Street Lighting Pilots**: CDOT will **pilot the use** of LED streetlight fixtures including arterial, residential, viaduct and pedestrian lighting. CDOT will work with advocacy organizations to do an economic analysis to match its technical analysis for LED lighting. CDOT will inventory all existing fixtures and update its atlases and establish inventory management process.	**Street Lighting Pilots**: CDOT will **create and implement a plan** to upgrade and retrofit city street lighting to dramatically reduce energy use compared to 2012 baseline. CDOT will use the Infrastructure Trust to help fund these improvements through energy and maintenance savings based on data gathered between 2013 and 2015. Energy savings must achieve a minimum of 35-percent reduction in costs. Special consideration should be given to fixtures that achieve more savings while meeting IES standards for roadway areas.	
EN10		**Lighting Smart Grid**: CDOT plans to **issue an RFP** for a comprehensive, open platform, wi-fi smart technology platform. Smart controllers should include remote dim/bright, individual reporting of fixtures and lumen output, wattage, voltage, and amperage. This system must be open platform and shall address other systems besides lighting, including but not limited to security and irrigation.	**Lighting Smart Grid**: CDOT will have a **fully operational smart grid** for lighting.
EN11			**Legislation**: CDOT will explore the development and introduction of legislation to permit district heating and cooling within the public way.

Policies

EC ECONOMICS

OBJECTIVES

REQUIREMENTS

	EC1	EC2	EC3	EC4	EC5	EC6	EC7	EC8	UE4	UE7	CM3
Quantify the environmental value of investment	✓		✓					✓	✓	✓	✓
Maximize environmental benefits						✓					
Streamline utilities to minimize environmental impact		✓		✓		✓					
Ensure public health and safety to protect investment										✓	
Enhance property values and economic development					✓						
Support green-collar job creation						✓	✓				✓

CATEGORY: ECONOMICS

Economics (and economic development)is one of the classic trio (economics, society, environment) that comprise sustainability. Considering the whole-life cost and complete economic impact of actions should be reflexive when long-term infrastructure investments are considered. Economics covers activities such as coordination of projects to achieve economies of scale and avoid re-work, as well as the quantification of environmental and social benefits—sometimes referred to as externalities—so that the full value of a project can be expressed. For the purposes of these guidelines, climate adaptation strategies are noted under economics, given the importance of resiliency to ensure public health and safety as well as to protect capital investment.

These objectives are not necessarily physical components of the project, though the analysis behind many of them will inform design choices. Quantification of environmental value is the top priority, due to the need to consider full life-cycle costs and the full range of benefits provided when considering infrastructure investments. The cheapest solution is not always the best economic value.

REQUIREMENTS: ECONOMICS

CODE	EFFECTIVE JULY 2013	EFFECTIVE JANUARY 2015	EFFECTIVE JANUARY 2018
EC1	**Sustainability Valuation**: Conduct a Sustainability Valuation analysis **for a pilot project** in conjunction with a Value Engineering study per FHWA requirements.	**Sustainability Valuation**: Perform and maximize a sustainability cost-benefit analysis **for all bridge projects over $20M** that perform a Value Engineering (VE) study and roadway projects over $25M that perform a VE study.	**Sustainability Valuation**: Perform and maximize a sustainability cost-benefit analysis **for all projects over $10M.**
EC2	**Agency Coordination**: Identify and review current and future projects with the Office of Underground Coordination and the Infrastructure Management Conflict Resolution Database. Coordinate efforts with the Department of Planning and Development, and the Public Building Commission to identify potential synergies and/or construction conflicts.		
EC3	**Documentation**: Collect and document in the Complete Streets project notebook the individual project data in accordance with CDOT environmental performance measures (as referenced in various strategies).		
EC4		**Implementation Plan**: Establish a plan for implementation of shared utilities trenches within the public Right-of-way.	
EC5	**Economic Development**: Support economic development efforts and ongoing economic activity near a project through consultation with surrounding residents and business owners during design and construction.		
EC6	**Term Contracts**: Progressively update any term and commodities contracts used by CDOT to incorporate the sustainable requirements outlined in SUIG.		
EC7	**Greencorps**: CDOT will partner with Greencorps Chicago to train workers and fill job opportunities with city residents • Improve public safety by training and employing individuals with barriers to employment through CDOT's Greencorps Chicago program. • Identify other opportunities for training and employment within CDOT and with CDOT contractors for Greencorps Chicago graduates.		
EC8			**Sustainable CBA Tool**: CDOT will work to develop a sustainable cost-benefit analysis tool for CDOT projects to facilitate value planning.

Policies

Policies

MW MATERIALS AND WASTE

OBJECTIVES

REQUIREMENTS

	MW1	MW2	MW3	MW4	MW5	MW6	MW7	MW8	MW9	MW10	MW11	MW12	MW13	MW14
Maximize waste reduction and recycling	✓	✓												✓
Maximize the recycled content of materials			✓	✓	✓									✓
Incentivize local materials											✓		✓	
Support sustainable production practices						✓	✓	✓	✓	✓	✓	✓	✓	✓

CATEGORY: MATERIALS AND WASTE

Materials and waste address the type of materials selected in design to be used on projects and how all materials are dealt with during construction.

Material recycling conserves natural resources and reduces landfill waste. Material recycling is another area of sustainability that can be incorporated into almost every project by means of two specific methods. The first method requires that contractors either reuse or recycle a significant amount of demolition materials. These materials then can be reutilized for roadway reconstruction or sent to recycling facilities for reuse, rather than extracting and hauling virgin materials. The second method utilizes recycled materials or industrial by-products in specified items and materials. This is especially pertinent for pavement mixes and aggregates. Asphalt pavements can greatly reduce their carbon footprint and cost by using ground tire rubber, asphalt shingles, and reclaimed asphalt pavement to offset the use of virgin binder. Concrete can greatly reduce its carbon footprint and cost by using cement replacements such as ground gas-furnace slag, fly ash, or limestone. Concrete can also contain recycled wash water, and both asphalt and concrete can contain recycled aggregates.

Materials also address the use of local materials and the environmental impact of their transportation to the project site. Materials that are manufactured and extracted within a limited distance from the project site reduce emissions, support the local and regional economy, and often reduce costs.

The urban heat island effect is becoming an increasing problem in large cities during summer months. This phenomenon is the inflation of hot temperatures in cities when compared with surrounding rural and suburban areas and is caused by the built-up environment and concentration of human activities. Material choice in pavements can have an impact on the urban heat island effect. By using more-reflective pavement surfaces, permeable pavements, and increased landscaping coverage these “cool pavement strategies” can benefit air quality and energy consumption (through decreased air conditioning needs) and can enhance human health and comfort.

When these objectives take physical form, they do not look remarkably different from current projects; however, their design and production can be significantly different. This can affect testing, quality control, and installation methods, but should not reduce performance requirements.

REQUIREMENTS: MATERIALS AND WASTE

	CODE	EFFECTIVE JULY 2013	EFFECTIVE JANUARY 2015	EFFECTIVE JANUARY 2018
waste management	MW1	**Diversion**: Projects shall divert **50%** construction and demolition waste volumes, as calculated in Volume II, from landfills.	**Diversion:** Projects shall divert **65%** construction and demolition waste volumes, as calculated in Volume II, from landfills.	**Diversion**: Projects shall divert 7**5%** construction and demolition waste volumes, as calculated in Volume II, from landfills.
	MW2	**Plan**: Develop a waste management plan that diverts waste from landfills.		
recycled material	MW3a	**Recycled Material**: 20% of the total materials value of projects over **$5M** shall be from recycled materials, as calculated in Volume II.	**Recycled Material**: 20% of the total materials value of projects over **$3M** shall be from recycled materials, as calculated in Volume II.	**Recycled Material**: 20% of the total materials value of projects over **$1M** shall be from recycled materials, as calculated in Volume II.
	MW3b	**Recycled Material**: Projects under **$5M** shall specify materials so that 10% of the total materials value is comprised of post-consumer or pre-consumer recycled content.	**Recycled Material**: Projects under **$3M** shall specify materials so that 10% of the total materials value is comprised of post-consumer or pre-consumer recycled content.	**Recycled Material**: Projects under **$1M** shall specify materials so that 10% of the total materials value is comprised of post-consumer or pre-consumer recycled content.
	MW4	**Recycled Material**: When asphalt is used a minimum asphalt binder replacement of **20%** is required.	**Recycled Material**: When asphalt is used a minimum asphalt binder replacement of **30%** is required.	**Recycled Material**: When asphalt is used a minimum asphalt binder replacement of **40%** is required.
	MW5	**Recycled Material**: When concrete is used, a minimum of **20%** recycled content is required. A minimum of **5%** of the cementicious materials shall be from recycled content.	**Recycled Material**: When concrete is used, a minimum of **30%** recycled content is required. A minimum of **15%** of the cementicious materials shall be from recycled content.	**Recycled Material**: When concrete is used, a minimum of **40%** recycled content is required. A minimum of **30%** of the cementicious materials shall be from recycled content
Cool Pavement	MW6	**Cool Pavement**: **Maximize** use of cool pavement strategies within project area.	**Cool Pavement**: Implement at least **one** cool pavement strategy.	**Cool Pavement**: Implement at least **two** cool pavement strategies.

REQUIREMENTS: MATERIALS AND WASTE

	CODE	EFFECTIVE JANUARY 2013	EFFECTIVE JANUARY 2015	EFFECTIVE JANUARY 2018
Policies	Cool Pavement (cont.)			
	MW7	When concrete is used, a minimum initial albedo of **0.3** is required.		When concrete is used, a minimum initial albedo of 0.3 is required, with a minimum albedo of **0.2** after 1-year.
	MW8	Reduce the mixing temperature of all hot mix asphalt to **330 degrees** from April to October and to **340 degrees** between November and March.	Reduce the mixing temperature of all hot mix asphalt to **310 degrees** from April to October and to **320 degrees** between November and March.	Reduce the mixing temperature of all hot mix asphalt to **290 degrees** from April to October and to **300 degrees** between November and March.
	MW9		**Albedo**: A minimum albedo of 0.3 is required for a 100% of non-roadway pavement surface area or **25%** of non-roadway pavement surface must be a porous paver.	**Albedo**: A minimum albedo of 0.3 is required for 100% of non-roadway pavement surface area or **50%** of non-roadway pavement surface must be a porous paver.
	Air Quality			
	MW10	**VOCs**: Require the use of **low and/or no** volatile organic compounds (VOCs) in paints, sealants, adhesives, coatings, as defined in Volume II.		**VOCs**: **Eliminate** the use of VOCs in paints, sealants, adhesives, coatings, as defined in Vol. II.
	MW11	**Transport Distance**: **15%** of all materials must be manufactured or extracted from within a distance as specified in Volume II.	**Transport Distance**: **30%** of all materials come from within a distance as specified in Volume II.	**Transport Distance**: **45%** of all materials come from within a distance as specified in Volume II.
Policies	MW12	**Ternary Mixes**: Investigate and develop a policy for use of ternary mixes in non-high performance concretes.		
	MW13	**Climate Change Adaptation**: CDOT will consider climate change adaptation in the selection of materials.		
	MW14	**Piloting**: Work with IDOT to continually pilot new materials and techniques and set minimum performance standards within specifications.		

CA CLIMATE AND AIR QUALITY

OBJECTIVES

REQUIREMENTS

	CA1	CA2	CA3	CA4	CA5	CA6	CA7	CA8	CA9	CA10	CA11	CA12	CA13	CA14	CA15	MW3	MW6	MW7	MW8	MW9	MW10	MW12	MW13	MW14	UE1
Reduce urban heat island effect							✓	✓					✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Use low-emitting materials															✓	✓					✓	✓	✓	✓	
Promote alternative fuel use										✓	✓	✓													
Reduce emissions	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓				✓						✓				

CATEGORY: CLIMATE AND AIR QUALITY

Climate and air quality requirements primarily cover construction activities that improve air quality and reduce greenhouse gas (GHG) emissions. They also address the vehicles that use the roads and how the design and maintenance of transportation infrastructure can greatly reduce emissions.

Studies have shown that construction activity has a significant carbon footprint and can greatly decrease air quality in the immediate surroundings. Reducing idling, requiring equipment and fleets that reduce exhaust pollutants, and using alternative fuels can greatly improve air quality and reduce fossil fuel use. Paying attention to where equipment is staged, shortening construction duration, and taking measures to control dust also have a big impact on localized air quality. Often these objectives can be achieved without changing the design, but can be achieved through careful planning and forethought before and during construction.

Furthermore, while how we design, build, and maintain transportation infrastructure has a significant impact on the environment, the vehicles that use them have an even more significant impact. Using synchronized traffic signals to keep vehicles moving at consistent target speeds and performing regular maintenance to ensure smooth pavements can greatly improve the fuel efficiency of vehicles. Encouraging public transportation and other modes of transportation that do not rely on fossil fuels also reduces carbon emissions and traffic congestion, and supports healthy lifestyles. Robust pedestrian, bicycle, rail, and public transit infrastructure provide low- to no-carbon emission transportation choices. Transit demand management policies and access to real-time traffic and transit information allows users to make informed transportation decisions.

REQUIREMENTS CLIMATE AND AIR QUALITY

CODE	EFFECTIVE JULY 2013	EFFECTIVE JANUARY 2015	EFFECTIVE JANUARY 2018
CA1	**Fuels and Idling**: Require ultra-low-sulfur diesel for all on-site equipment over 50hp and enforce the 3-minute anti-idling ordinance during construction.		
CA2	**Clean Fleet**: Effective January **2014**: Pre-1998 trucks and Pre-Tier 1 non-road equipment prohibited if not retrofit. Clean Fleet Score of **2.1** required.	**Clean Fleet:** Effective January **2017**: Pre-1998 trucks and Pre-Tier 1 non-road equipment prohibited if not retrofit. Clean Fleet Score of **3.0** required.	**Clean Fleet:** Effective January **2020**: Pre-1998 trucks and Pre-Tier 1 non-road equipment prohibited if not retrofit. Clean Fleet Score of **4.0** required.
CA3	**Deconstruction vs. Demolition:** Promote deconstruction over demolition where feasible.		
CA4	**Truck Staging:** Areas & Equipment Site Placement Designated construction vehicle staging areas shall be identified in locations that are away from any building's air ventilation intake system and subject to city's idling reduction ordinance. Vehicles and equipment on-site shall be located away from building air intake systems whenever possible.		
CA5	**Dust Control:** Employ site dust control best practices, minimizing water usage. Protect existing or planned stormwater best management practices from runoff.		
CA6	**Air Quality Action Days:** If an Air Quality Action Day is predicted, the project shall encourage site workers to reduce emissions and/or delay work for that particular day.		
CA7	**Signal Work**: All projects that include new signal work should design signal timing to minimize traffic congestion and idling while supporting pedestrian movements and safety. Projects over one mile in length **should** consider incorporating synchronized signal timing to reduce traffic congestion and idling.		**Signal Work**: All projects that include new signal work should design signal timing to minimize traffic congestion and idling while supporting pedestrian movements and safety. Projects over one mile in length **and over $3M shall** consider incorporating synchronized signal timing to reduce traffic congestion and idling.
CA8	**Pavement Restoration:** Maintenance protocols and utility restoration should ensure smooth and even pavement surfaces to reduce rolling resistance of vehicles, control noise, and increase safety.		

CODE	EFFECTIVE JULY 2013	EFFECTIVE JANUARY 2015	EFFECTIVE JANUARY 2018
CA9	**Traffic management plans** shall be designed to minimize traffic congestion and vehicle idling and reduce construction schedules to the extent possible, while minimizing impacts to local businesses and the community.		
CA10	**Alternative Fuel Vehicles**: Develop CDOT policies to integrate alternative vehicle fueling or electric charging stations at project sites		
CA11	**Green Fleet**: Work with the Department of Fleet and Facility Management (2FM) to develop ways to green CDOT's heavy vehicle fleet.		
CA12	**Alternative Fuels Pilots**: Work with city procurement and sister departments to incentivize use of alternative fuels in construction vehicles and pilot enforcement in 2015.		
CA13	**Public Transportation Infrastructure**: Support Public Transportation infrastructure and use through the inclusion of bus rapid transit infrastructure, improvements in seating and protection at bus stops, connections between bus, bike and rail especially at improved and new train stations.		
CA14	**CREATE**: Advocate for and support CREATE projects and policies.		
CA15	**TDM Program**: Develop and launch a regional Transportation Demand Management Program to reduce single occupancy vehicle trips region-wide. Implement employer-based, neighborhood-based and consumer-based tools and strategies that reduce traffic congestion and improve air quality.		

Policies

Policies

BC BEAUTY AND COMMUNITY

OBJECTIVES

REQUIREMENTS

	BC1	BC2	BC3	BC4	BC5	BC6	BC7	BC8	BC9	BC10	BC11	BC12	W11	W12	UE1	UE5	UE7	EN3
Implement the Complete Streets policies									✓									
Create unique and quality spaces					✓	✓	✓	✓				✓			✓	✓	✓	✓
Promote environmental awareness	✓	✓	✓	✓	✓	✓				✓	✓		✓	✓				
Include stakeholder input		✓	✓	✓	✓	✓		✓										

CATEGORY: BEAUTY AND COMMUNITY

Educating the public about the sustainable strategies used on a project is often at the heart of its success. Sustainable solutions, design, and construction methods may not be obvious or understood by the public. For a project to include new technologies and ideas that support and protect the environment, community support may be required. People cannot expect to support or maintain what they do not understand; therefore, educating the public, local community groups, and users is critical for project success. Public meetings, flyers, tours, exhibits, and project signs enhance how the community supports changes to the built environment. It is critical that these strategies and others are implemented throughout the life of a project. It is also important to educate designers, resident engineers, contractors, and maintenance personnel so that they, too, understand the importance of environmental best practices and why and how they can best be implemented to ensure that the goals and objectives of this document are met.

Furthermore, the public right-of-way represents over 70 percent of the publicly owned open space in the city and is a part of the everyday experience of its citizens. Its beauty and sense of place is therefore fundamental to creating a high quality of life for those that live, work, and play in the city. Beauty is not just a nice extra, it is fundamental to creating a sustainable city. It is one of the key elements that attracts and retains citizens as well as businesses, leading to healthy communities and economies. Creating complete streets with a strong sense of place that support and protect the environment is part of this equation. Incorporating landscaping, art, community identity and programming is also important.

It is also important to look beyond the public right-of-way and at the community as a whole. There are many environmental best management practices that can be implemented by homeowners, businesses, and institutions that expand the impact of improvements made in the public way. CDOT administers several programs, including the Chicago Conservation Core and Sustainable Backyards program that support these initiatives. Just as critical is project coordination with adjacent public or private development. This can lead to efficient use of resources, opportunities for greater environmental impact, and development of open space.

These objectives are demonstrated in the quality of the elements in projects, as well as through educational elements. Objectives speak to how the project is carried out, the process of delivery, and guide outreach during project delivery.

REQUIREMENTS: BEAUTY AND COMMUNITY

CODE	EFFECTIVE JULY 2013	EFFECTIVE JANUARY 2015	EFFECTIVE JANUARY 2018
BC1	**Public Education**: Provide project-specific public education about environmental sustainability through outreach materials and/or public outreach process.		
BC2		**Onsite Signage**: For all projects over **$20M** provide permanent onsite signage or other educational materials for sustainability. For any project with stormwater Best Management Practices (BMPs) that will be maintained by the community, provide education on environmental function and maintenance.	**Onsite Signage**: For all projects over **$10M** provide permanent onsite signage or other educational materials for sustainability. For any project with stormwater (BMPs) that will be maintained by the community, provide education on environmental function and maintenance.
BC3	**CSS**: For projects over **$10 M**, design the project according to the principles of Context Sensitive Solutions (CSS).	**CSS**: For projects over **$5 M**, design the project according to the principles of CSS.	**CSS**: For projects over **$1 M**, design the project according to the principles of CSS.
BC4	**Stakeholder Involvement Plan**: Create a Stakeholder Involvement Plan		
BC5	**Community Partnership**: Partner with community groups to maximize environmental benefits and objectives outside of the public right-of-way		
BC6	**Inventory of Opportunities**: Conduct an inventory of adjacent properties and the public right-of-way for potential to create additional and improved public spaces, and coordinate with relevant agencies on opportunities.		
BC7	**Public Art**: For projects between $3M and $20M, dedicate 1% of total budget to art or community identifiers, culture installations or programming. Projects over $20M do not have to exceed $200,000. Federal contributions to the project will not be required to assign 1% to art.		
BC8	**Noise Mitigation**: Create a construction noise mitigation plan for projects near identified sensitive receptors.		
BC9	**Guideline Implementation**: Follow complete streets and placemaking guidelines		

REQUIREMENTS: BEAUTY AND COMMUNITY

CODE	EFFECTIVE JULY 2013	EFFECTIVE JANUARY 2015	EFFECTIVE JANUARY 2018
BC10	**Training: Integrate** SUIG training and education into offerings at Chicago Center for Green Technology (CCGT). • Develop content for specialized SUIG Green Tech U programs. • Hold at least 150 Green Tech U programs annually (including SUIG) both at CCGT and offsite. • Create educational kiosk for display at CCGT. • Hold annual resident engineer trainings on BMP installation at CCGT.		
BC11	**Conservation Corps**: Through project delivery, support community-based, volunteer-led events and trainings to promote the City's SUIG and other related environmental practices through the Chicago Conservation Corps (C3), sustainable backyards and other appropriate programs.		
BC12	**Pilots for Noise Reduction**: Pilot the use of open graded pavement for noise reduction. Consider noise reduction strategies for Lake Shore Drive.		

Policies

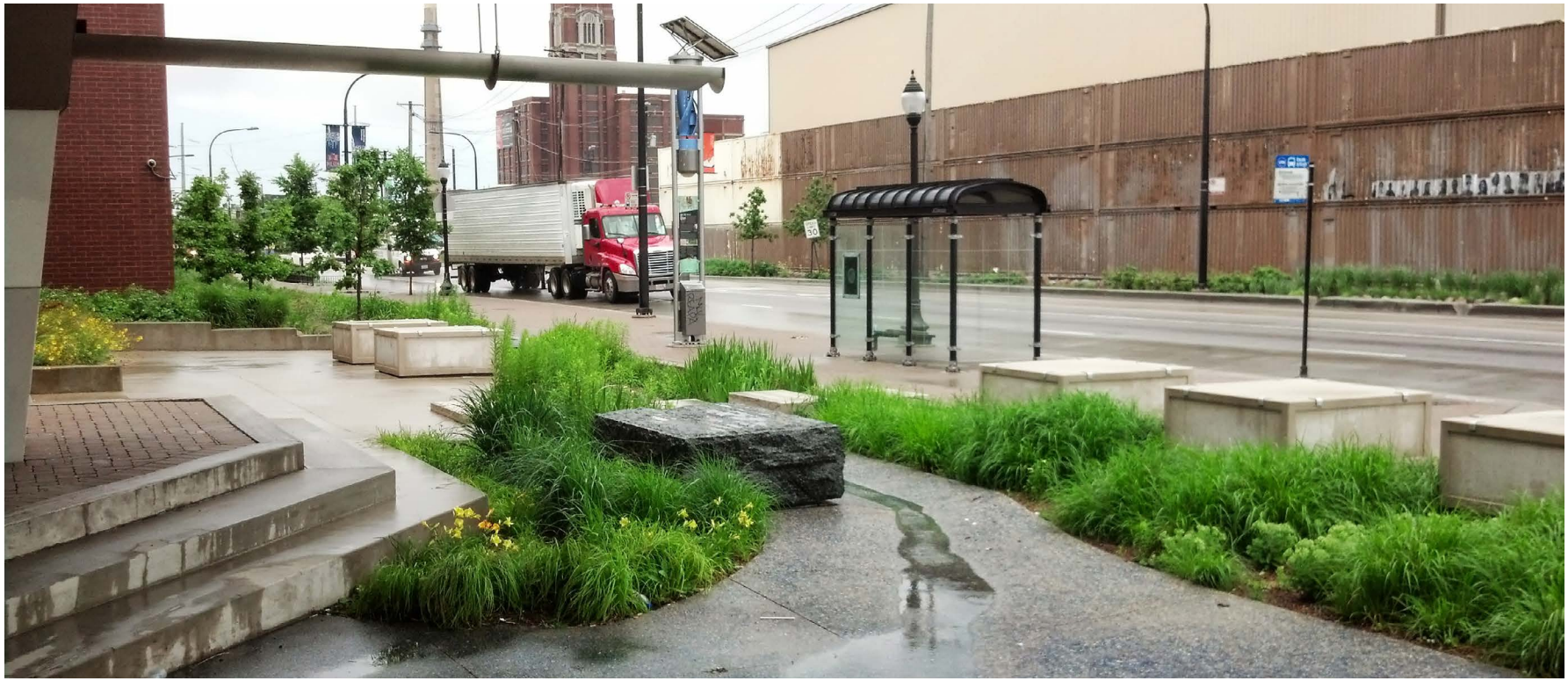
Policies

UE URBAN ECOLOGY

OBJECTIVES

REQUIREMENTS

	UE1	UE2	UE3	UE4	UE5	UE6	UE7	UE8	UE9	UE10	EN2	EN3	W4
Create and support natural habitat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Protect and restore natural habitat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Allow interaction and observation to nature	✓			✓			✓						



CATEGORY: URBAN ECOLOGY

Urban ecology refers to plant and tree selection and planting design, the soil that supports them, and creating healthy habitats that support a wide range of biodiversity. Projects contribute to citywide goals for enriching the urban ecosystem.

Physically, on projects, these strategies will be apparent in the types of plants selected, the method and manner in which they are planted, and the positioning of planted areas within the infrastructure right-of-way. A thorough understanding of what constitutes urban ecology—and what the balance is among different types of plantings deployed in different areas throughout the city—is important. Infrastructure rights-of-way provide unique opportunities to create continuous areas of habitat or links between habitats that provide ecological services, beauty, and health to residents.

Urban ecology strategies provide multiple co-benefits, including filling in and expanding the existing tree canopy and supporting existing habitat against changes in weather patterns. They support animal habitat and strive to improve unique habitats for both plants and animals. They are closely related to water, beauty and community strategies and support policies developed and implemented by other departments, such as the Chicago Landscape Ordinance and Guidelines, the Calumet Plan, and the Chicago River Plan.

Requirements and policies are supported by existing initiatives such as the climate-ready roadway plant list, the Chicago Wildlife Green Infrastructure Plan, and Chicago Conservation Corp.

REQUIREMENTS: URBAN ECOLOGY

CODE	EFFECTIVE JANUARY 2013	EFFECTIVE JANUARY 2015	EFFECTIVE JANUARY 2018
UE1	**Trees**: The project shall meet or exceed the tree count, removal, protection, canopy and other parkway planting requirements of the City of Chicago Landscape Ordinance and the Bureau of Forestry.		
UE2	**Stormwater**: Landscape areas shall be designed to maximize the acceptance of stormwater runoff from adjacent surfaces within the Right-of-way.		
UE3	**Soil**: The project shall provide adequate soil medium and soil volume for all landscape and tree planting zones per the City of Chicago Landscape Ordinance or in consultation with the Bureau of Forestry or the Green Streets Program, and shall be designed to accommodate bioretention, maximize tree root zone, enhance soil fertility and microbial activity, and help meet stormwater infiltration and storage requirements.		
UE4	**Soil Management Plan**: Projects over $3M with any proposed planting, landscaping or bioretention shall create a Soil Management Plan. The Soil Management Plan shall prevent compaction, erosion and disturbance of existing soils to the degree possible, establish suitable soils for intended plantings, and shall include salvage and remediation of local on-site soils where feasible.		
UE5	**Drought Tolerance**: All plant material specified shall be drought-tolerant native or adapted species. Refer to CDOT's Roadway Plant list for invasive plants that are considered acceptable or are currently under evaluation.		
UE6	**Climate Change Adaptation**: Incorporate climate change adaptation into overall project designs including plant and material choices. Consult the Chicago Climate Wilderness Action Plan for Nature to determine whether the project is within a recommended Resource Protection Area and implement appropriate design strategies.		
UE7	**Water Body Protection**: Projects near a body of water should protect and enhance the riparian zone and shoreline and encourage and develop habitat in these areas whenever possible. Ensure that roadway performance does not negatively impact wetland areas and mitigate or restore wetlands where feasible. (i.e., Calumet Plan wetland requirements).		

REQUIREMENTS URBAN ECOLOGY

CODE	EFFECTIVE JULY 2013	EFFECTIVE JANUARY 2015	EFFECTIVE JANUARY 2018
Policies UE8	**Methodology Development: Biological Studies**: CDOT **will develop a methodology** for conducting a pre-development biological study and current condition assessment of the project site and surrounding ecosystem or watershed, in order to implement a project-specific restoration plan that enhances or restores ecosystem functionality.		*Policies*
UE9	**Methodology Development: Wildlife Assessment:** CDOT **will develop a methodology** for determining when a site-specific wildlife assessment should be required in coordination with analysis of recommendations in the Chicago Wilderness Plan and the City of Chicago's Nature & Wildlife Plan for non-NEPA projects.		**Wildlife Assessment**: A **site-specific** wildlife assessment should be used to inform the design of nesting locations where feasible, provide protection for endangered species where required by the Endangered Species Act and avoid Wildlife disruption during construction.
UE10	**Roadway Plant List**: Update roadway plant list with stormwater tolerant plants.		

CM COMMISSIONING

OBJECTIVES

REQUIREMENTS

	CM1	CM2	CM3	CM4	CM5	CM6	CM7	CM8	CM9	CM10	CM11
Ensure environmental benefits		✓		✓							✓
Predict performance	✓	✓	✓		✓	✓	✓	✓			✓
Document performance and design tools	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓

CATEGORY: COMMISSIONING

Evaluating the performance of applied strategies is critical to informing maintenance practices and guiding future implementation of sustainable design techniques. To improve the current design and ensure the successful expansion of these practices, commissioning of the project must take place to test design assumptions, determine the long-term performance of the project, and establish maintenance protocols.

Commissioning—via modeling, monitoring, and testing—confirms that particular elements have been properly installed, have performed well, and have provided data to inform and refine subsequent design decisions. Progressive improvement is central to the concept of sustainability. The following objectives are carried out most often as reports and documentation, but there are monitoring elements that can be physically embedded in the project.

REQUIREMENTS COMMISSIONING: MODELING

CODE	EFFECTIVE JULY 2013	EFFECTIVE JANUARY 2015	EFFECTIVE JANUARY 2018
CM1		**Model BMPs**: For projects over **$10M**, model stormwater Best Management Practices (BMPs) in conjunction with the Department of Water Management's (DWM) sewer model, to analyze effectiveness of design and modify design to improve effectiveness.	**Model BMPs**: For projects over **$5M**, model stormwater Best Management Practices (BMPs) in conjunction with DWM's sewer model, to analyze effectiveness of design and modify design to improve effectiveness.
CM2	**Project Team and Documentation**: Projects of **$5 million** or more shall have a LEED-accredited professional on the RE and contractor team, create a monitoring and commissioning plan, and perform project commissioning 1 year after project completion to ensure goals have been met.		
CM3	**Performance Data Collection**: Collect performance metric data for project-specific strategies, as outlined in Volume II and report on an annual basis.		
CM4	**Maintenance Plan**: Develop a maintenance plan, during the design phase and identify responsible parties.		
CM5	**BMP Methodology**: CDOT will develop a methodology for projects to evaluate the effectiveness of stormwater BMPs in conjunction with the DWM.		
CM6	**New Materials**: Incorporate successful pilot materials and SUIG requirements into standard specifications.		
CM7		Develop P**avement Management Plan.**	Begin implementation of **Pavement Management Plan.**
CM8	Include **monitoring and commissioning curriculum** in training for contractors and consultants.		
CM9	**Track maintenance** costs on pilot projects.	**Incorporate lessons learned** from pilot projects into subsequent projects and refine maintenance protocols.	**Develop maintenance protocols** for stormwater BMPs.
CM10	Create a **project delivery documentation** system.	**Create a platform** for project-specific data to be housed.	**Integrate data platform** with sister agencies and departments.
CM11	Develop a **sustainability life cycle assessment** for CDOT projects based on data and software from tollway authority, to be used for decision making about project materials and implementation of the Chicago Climate Action Plan.		

Policies

Policies

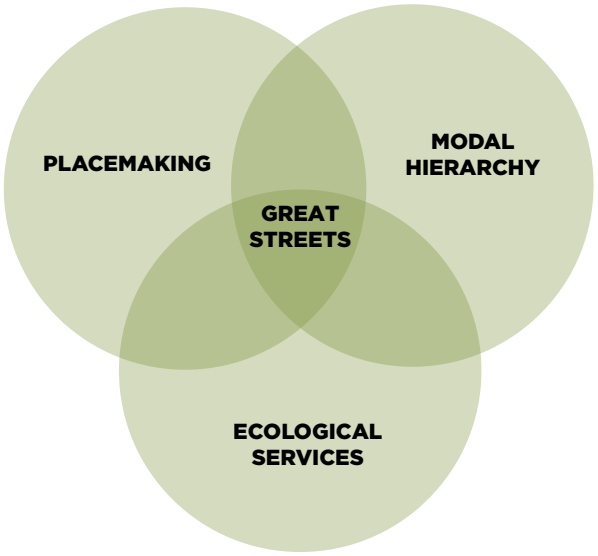

PAY FOR
BOX
TOW ZONE

3.0 METHODOLOGY

3.1 APPLYING SUSTAINABILITY TO CHICAGO STREETS

Chicago has a range of street types, with varying right-of-way dimensions, adjacent land uses, types of users and traffic volumes. Street characterization can be further refined based on location of the street within the city, density of surrounding neighborhoods, special neighborhoods, as well as adjacent conditions such as a landmark parks or natural areas and the underlying soil and hydrology. Design solutions for streets that incorporate environmental data have been piloted throughout the city. These pilot studies inform the methodology discussed in this section. However, certain best practices may not be appropriate for all street typologies. The specifics of the type of street (as well as the environmental and community conditions that characterize that street) should collectively inform the sustainable design solutions proposed to create a great street.

This section discusses the typologies identified and explored through CDOT's recent Complete Streets initiative and how those typologies and a specific modal hierarchy should inform design decisions for Chicago's transportation infrastructure and public right-of-way. This section also discusses how environmental data informs the three-dimensional component of infrastructure design to get to great streets and presents strategies that can achieve the objectives and requirements of sustainable design.



CHICAGO STREET TYPOLOGIES

Nuances characterize streets and their use and performance. A roadway's form and function usually starts the design discussion, and as the following typologies illustrate, land use and surrounding building form and function provide another level of characterization. All of these elements influence which best practices should be applied.

It is important to keep in mind that typologies do not define specific places but help to cluster similar characteristics into general groups. As the Complete Streets document notes, these typologies provide an impression of the current state of the regional street network in scoping future work in conjunction with a range of data points. Designers should rely on field visits and fine-grained data to best approach the design of infrastructure in a specific locality.

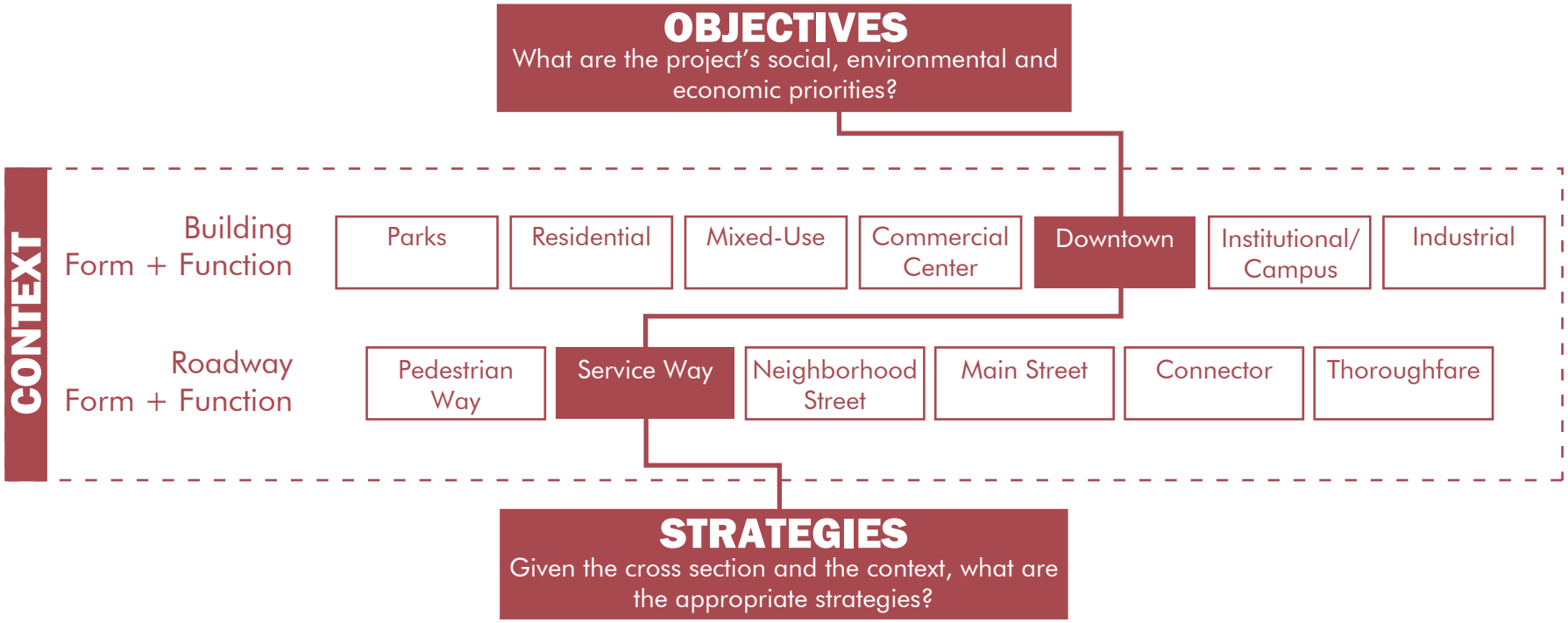
The typologies below were identified for Chicago streets:

Thoroughfare
Connector
Main Street
Neighborhood Streets
Service Ways
Pedestrian Ways

CROSS WALK FROM TYPOLOGIES TO BUILDING FORM AND FUNCTION

As noted in the Complete Streets document, functional classification is required by the Federal Highway Administration for projects that use federal funds. This classification system is largely auto-centric, which limits its usefulness in an urban context. The typologies presented in the Complete Streets document are an alternative organization that steers designers to consider the wider context of the infrastructure, while still linking them to federal categories to clarify the linkage when the city applies for and receives federal money.

To best implement ecological services in the public way, it is vital that project managers and designers consider the adjacent land use and building form and function: cross walk between the Chicago-specific typology and the Chicago-specific land use. Land use varies significantly as streets roll out across the city. The changing context reinforces that there is no simple assumption for land use: projects have to respond to individual intersections and blocks.

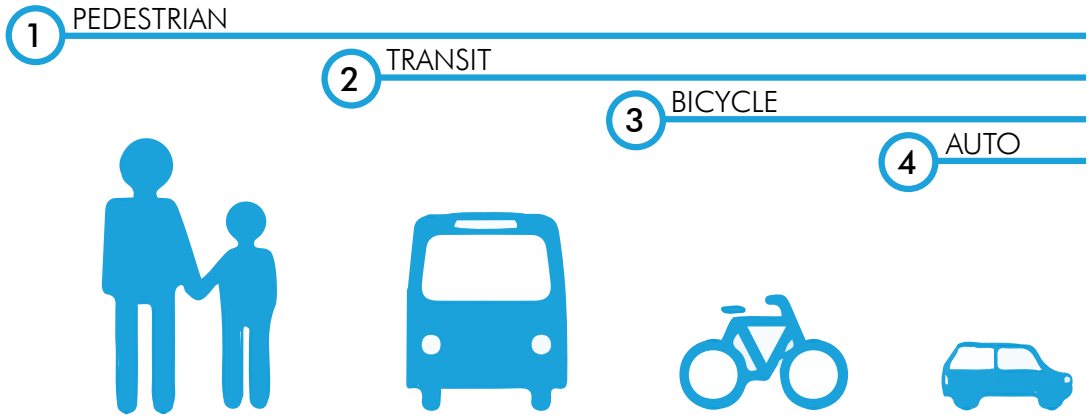


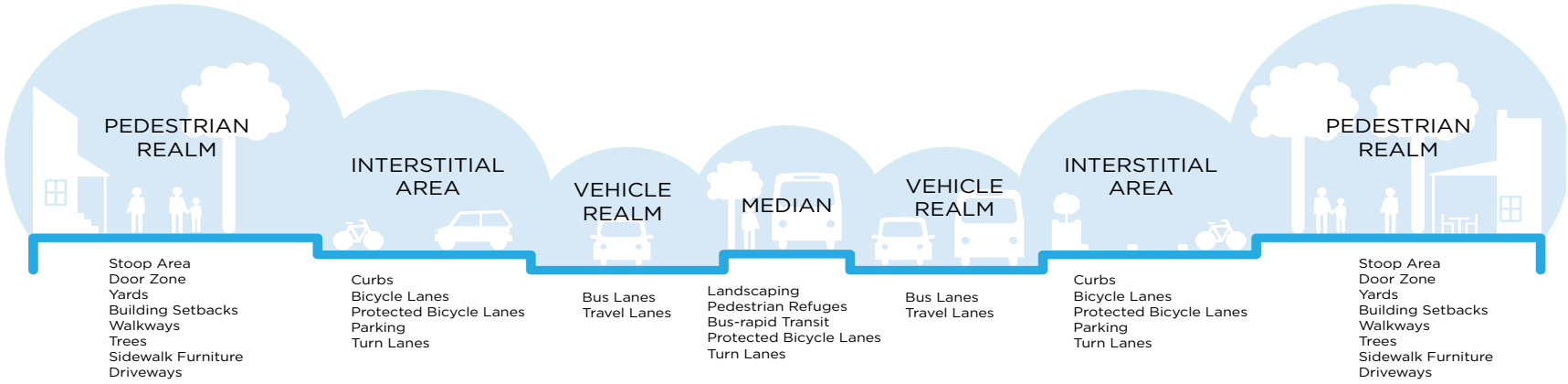
3.2 STRATEGIES

MOVING FROM TWO TO THREE DIMENSIONS

Within Complete Streets Chicago, information is provided for the horizontal arrangement of travel modes within the street. These recommendations set the modal hierarchy and provide suggestions on widths, arrangement, and additional safety features, creating a safe and efficient travel experience while lessening conflicts among modes. As noted, a modal hierarchy that prioritizes the safe movement of pedestrian and transit users—combined with a consideration of the community context—inverts the classic infrastructure design process. However, to achieve a great street, the design of that space must include information to shape a quality place and provide an ecological service.

These guidelines incorporate both the two-dimensional programming of Chicago's streets, providing for safe and adequate space for travel, while widening the consideration to three dimensions to enrich that space with ecological services and other elements that create a quality space.





Sustainable Urban Infrastructure Perspective

Data helps a designer to effectively enrich the complete cross section (above and below grade). Designers should reach for plans and GIS layers—which explain where urban heat island hot spots are located, what specific soil conditions are, what the surrounding land uses are—so that these points inform the calculations made to ensure that the design will perform as needed, achieving critical objectives.

LIST OF STRATEGIES

The following sample of strategies help a designer implement new requirements.

The strategies listed in this section are a sample of the full list of strategies outlined in Volume II. They demonstrate for the designer, the interested community member, the local official, and the project implementers the various ways to achieve the objectives listed under each category. Some strategies, as shown in their arrangement and consolidation in Volume 2, work together seamlessly to achieve multiple objectives: achieving more with one action.

W Water

- **1.1** Stormwater Pavement
- **1.2** Stormwater Landscape
- **1.3** Irrigation
- **1.4** Stormwater Pollution Plan

MW Materials and Waste

- **4.1** Waste Management and Reduction
- **4.2** Recycled Materials
- **4.3** Cool Pavement
- **4.4** Transport Distance
- **4.5** Warm Mix Asphalt
- **4.6** Low VOCs

UE Urban Ecology

- **7.1** Soil Composition and Quality
- **7.2** Site Vegetation
- **7.3** Tree Planting and Canopy

EN Energy

- **2.1** Lighting
- **2.2** Alternative Energy Use

CA Climate and Air Quality

- **5.1** Construction Air Quality
- **5.2** Pavement Mangement

C Commissioning

- **8.1** Commissioning and Monitoring Plan
- **8.2** Maintenance Plan

EC Economics

- **3.1** Sustainability Valuation

BC Beauty and Community

- **6.1** Noise Mitigation Plan
- **6.2** Education Outreach
- **6.3** Stakeholder Involvement Plan
- **6.4** Arts Integration

PERFORMANCE MEASURES

In addition to local attention and need for information on how well projects perform, the Federal government, and other grant agencies have also begun requiring performance metrics. Given the strong interest in knowing project performance in quantitative terms, a series of performance metrics have been identified for each strategy. These are provided in detail in Volume 2, along with each strategy. Below is a selection of performance measures for the strategies.

W Water

Gallons of stormwater released
Gallons of stormwater stored
Area of permeable asphalt installed
Area of permeable pavers installed
Area of permeable concrete installed
Gallons of stormwater released
Gallons of stormwater stored
Area of infiltration planters installed
Gallons of potable water use reduced (compared to spray head irrigation)

EN Energy

Reduction in killowatt hours used per year
Killowatt hours generated per year

MW Materials and Waste

Percent of waste diverted from landfill by volume or weight
Percent Post-industrial materials by material cost
Total % of Recycled material by material cost
Cubic Yards of concrete that meets recycled content requirement
Percent of cementitious material replacement
Type of material used
Percent of ABR achieved.
Tons of asphalt installed.
Area of high albedo pavement installed
Type of high albedo pavement installed
Percent of local materials used
Percent of regional materials used
Total percent of local & regional materials used
Tons of asphalt installed w/ mixing temperature of 330 degreees or less
Type of WMA technology used
Gallons of low VOC paints, sealants, adhesives, coating.

CA Climate and Air Quality

What is current Pavement Index Rating (See PMP)
Impact of improvements on vehicle use miles (MPG conversion)

BC Beauty and Community

Area of property converted to Public Right-of-way
Number of meetings held w/ public
Number of partnerships to maximize Placemaking & Complete Streets Benefits
Dollar amount for project allocated Community identification and art
Number of artists engaged/contracted

UE Urban Ecology

Volume of adequate soil medium per tree
Area of Landscaping provided
Type of Landscaping
Net new trees
Area protected and/or restored


Columbia

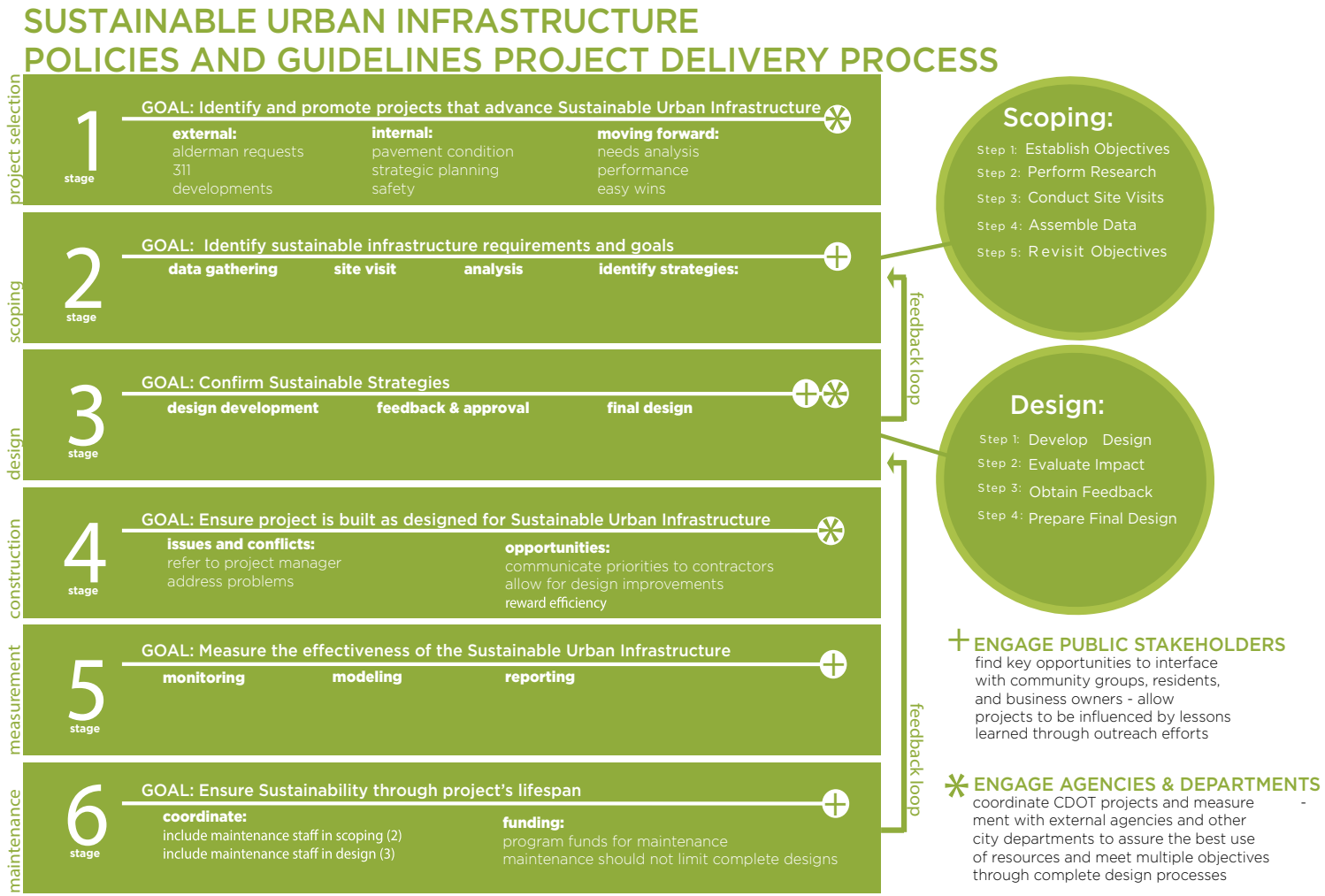
4.0 IMPLEMENTATION

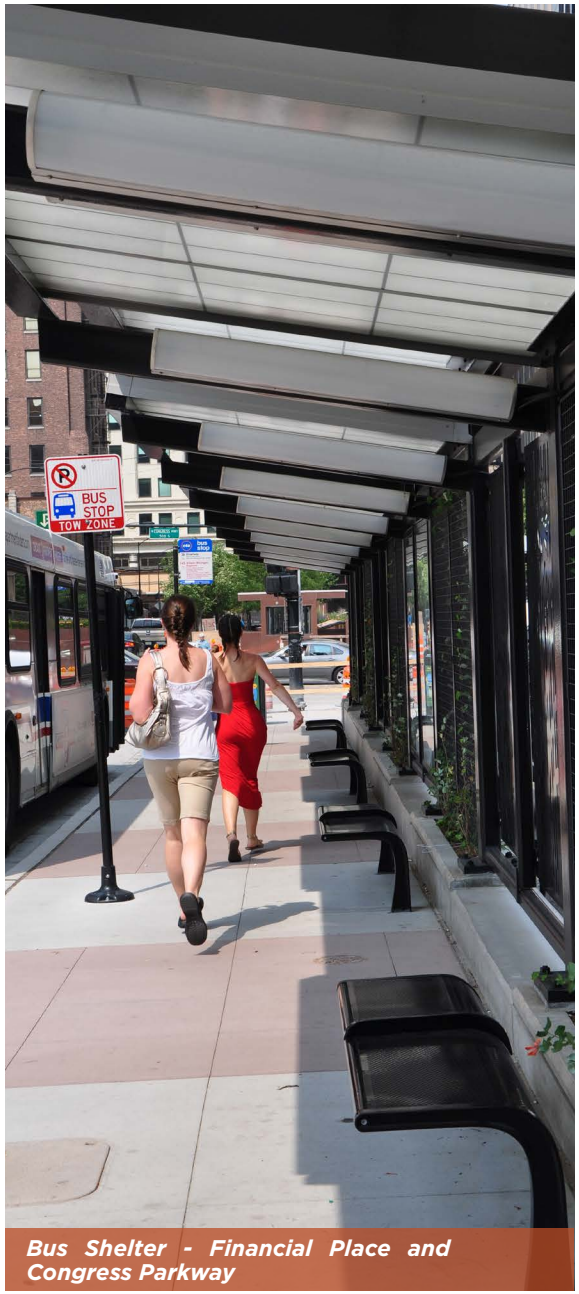
4.1 PROCESSES

COMPLETE STREETS

The sustainable design goal setting and requirements identified in this document will be seamlessly woven into the project delivery process identified in the Complete Streets project delivery process.

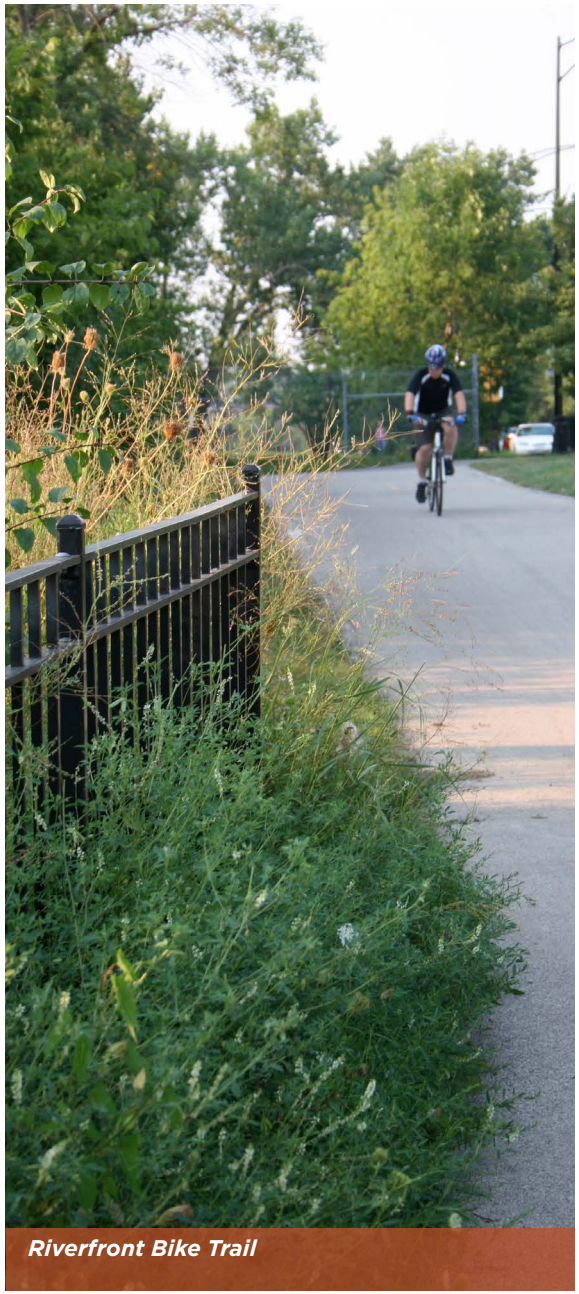
Sustainable Infrastructure Process Diagram





Bus Shelter - Financial Place and Congress Parkway

Native Planter and Neighborhood Banner Identifier



Riverfront Bike Trail

4.2 MATRICES

Project managers want to understand at a glance what requirements apply to their project to quickly assess whether their scope and budget can accommodate these actions. The matrices in this section show how the requirements, organized by category, apply (or do not!) to each CDOT program area.

TABLE 1: WATER REQUIREMENT MATRIX

CDOT Project Type	W1a	W1b	W2	W3	W4	W5	W6	W7	W8	W9	W10
Signal											
Red Light Running Cameras											
Signage & Pavement Marking Improvements											
Lighting Projects											
Tree Planting		●	●				●	●	●	●	●
ADA Ramp Improvements							●	●			
Pedestrian Safety Infrastructure Improvements							●	●	●		
Arterial Resurfacing		●	●				●	●	●		
Bike Facility Projects (primarily striping)							●	●	●		
Bridge Repair (not replacement)							●	●			
Sidewalk and Miscellaneous Concrete Projects		●	●				●	●			
Vertical Clearance improvements		●	●		●	●	●	●	●		
Landscaped Median Improvements		●	●				●	●	●		●
Traffic Calming		●	●				●	●	●		
Transit Projects		●	●		●	●	●	●	●	●	●
City Funded Capital Projects		●	●				●	●	●	●	●
CREATE/Rail Projects		●	●		●	●	●	●	●	●	●
Alley Improvements	●		●	●	●	●	●	●			
Streetscape Projects	●		●	●	●	●	●	●	●	●	●
Federal Aid Capital Projects (highways)	●		●	●	●	●	●	●	●	●	●
WPA/Industrial Streets	●		●	●	●	●	●	●	●	●	●
Bike Stations		●	●		●	●	●	●	●	●	●
Development Funded								●	●		
Major Roadway Realignment	●		●	●	●	●	●	●	●	●	●
Major Roadway Reconstruction	●		●	●	●	●	●	●	●	●	●
Bridge Replacement	●		●	●	●	●	●	●	●	●	●
Riverwalk	●		●	●	●	●	●	●	●	●	●
Pedestrian Safety Zone		●	●				●	●			

TABLE 2: ENERGY REQUIREMENT MATRIX

CDOT Project Type	EN1	EN2	EN3	EN4	EN5	EN6	EN7
Signal			●	●		●	
Red Light Running Cameras						●	
Signage & Pavement Marking Improvements				●		●	
Lighting Projects	●	●	●	●		●	
Tree Planting							
ADA Ramp Improvements							
Pedestrian Safety Infrastructure Improvements	●	●	●	●		●	
Arterial Resurfacing							
Bike Facility Projects (primarily striping)						●	
Bridge Repair (not replacement)	●	●	●	●		●	
Sidewalk and Miscellaneous Concrete Projects							
Vertical Clearance improvements	●	●	●	●		●	
Landscaped Median Improvements	●	●		●		●	
Traffic Calming						●	
Transit Projects	●	●	●	●	●	●	●
City Funded Capital Projects	●	●	●	●		●	
CREATE/Rail Projects	●	●	●	●		●	
Alley Improvements	●	●		●		●	
Streetscape Projects	●	●	●	●		●	
Federal Aid Capital Projects (highways)	●	●	●	●		●	
WPA/Industrial Streets	●	●	●	●		●	
Bike Stations	●	●		●		●	●
Development Funded	●	●		●		●	
Major Roadway Realignment	●	●	●	●		●	
Major Roadway Reconstruction	●	●	●	●		●	
Bridge Replacement	●	●	●	●		●	
Riverwalk	●	●	●	●		●	●
Pedestrian Safety Zone							

TABLE 3: ECONOMICS REQUIREMENT MATRIX

CDOT Project Type	EC1	EC2	EC3
Signal		●	
Red Light Running Cameras		●	
Signage & Pavement Marking Improvements		●	
Lighting Projects		●	
Tree Planting		●	
ADA Ramp Improvements		●	
Pedestrian Safety Infrastructure Improvements		●	●
Arterial Resurfacing		●	
Bike Facility Projects (primarily striping)		●	●
Bridge Repair (not replacement)		●	
Sidewalk and Miscellaneous Concrete Projects		●	
Vertical Clearance improvements	●	●	●
Landscaped Median Improvements	●	●	●
Traffic Calming		●	
Transit Projects	●	●	●
City Funded Capital Projects	●	●	●
CREATE/Rail Projects	●	●	●
Alley Improvements	●	●	
Streetscape Projects	●	●	
Federal Aid Capital Projects (highways)	●	●	
WPA/Industrial Streets	●	●	
Bike Stations	●	●	●
Development Funded	●	●	●
Major Roadway Realignment	●	●	●
Major Roadway Reconstruction	●	●	●
Bridge Replacement	●	●	●
Riverwalk	●	●	●
Pedestrian Safety Zone		●	●

TABLE 4: MATERIALS AND WASTE REQUIREMENT MATRIX

CDOT Project Type	MW1	MW2	MW3a	MW3b	MW4	MW5	MW6	MW7	MW8	MW9	MW10	MW11
Signal											●	
Red Light Running Cameras											●	
Signage & Pavement Marking Improvements											●	
Lighting Projects	●	●	●		●	●					●	●
Tree Planting					●	●	●					
ADA Ramp Improvements				●	●	●	●	●	●	●		
Pedestrian Safety Infrastructure Improvements				●	●	●	●	●	●	●	●	
Arterial Resurfacing	●	●	●		●	●	●	●	●	●	●	●
Bike Facility Projects (primarily striping)	●	●		●			●	●	●	●	●	
Bridge Repair (not replacement)	●	●		●			●	●	●	●	●	●
Sidewalk and Miscellaneous Concrete Projects	●	●		●	●	●	●	●	●	●		●
Vertical Clearance improvements	●	●	●		●	●	●	●	●	●	●	●
Landscaped Median Improvements	●	●	●		●	●	●	●	●	●		●
Traffic Calming	●	●	●	●	●	●	●	●	●	●		●
Transit Projects	●	●	●		●	●	●	●	●	●	●	●
City Funded Capital Projects	●	●	●		●	●	●	●	●	●	●	●
CREATE/Rail Projects	●	●	●		●	●	●	●	●	●	●	●
Alley Improvements	●	●	●	●	●	●	●	●	●	●		●
Streetscape Projects	●	●	●		●	●	●	●	●	●	●	●
Federal Aid Capital Projects (highways)	●	●	●		●	●	●	●	●	●	●	●
WPA/Industrial Streets	●	●	●		●	●	●	●	●	●	●	●
Bike Stations	●	●	●			●	●	●		●		
Development Funded	●	●										
Major Roadway Realignment	●	●	●			●	●	●			●	
Major Roadway Reconstruction	●	●	●			●	●	●			●	
Bridge Replacement	●	●	●			●	●	●		●	●	
Riverwalk						●	●	●		●	●	
Pedestrian Safety Zone												

TABLE 5: CLIMATE AND AIR QUALITY REQUIREMENT MATRIX

CDOT Project Type	CA1	CA2	CA3	CA4	CA5	CA6	CA7	CA8	CA9
Signal	●	●		●		●	●		
Red Light Running Cameras	●	●		●		●	●		
Signage & Pavement Marking Improvements	●	●		●		●	●		●
Lighting Projects	●	●		●	●	●	●		●
Tree Planting	●	●		●	●	●	●		
ADA Ramp Improvements	●	●		●	●	●	●	●	
Pedestrian Safety Infrastructure Improvements	●	●		●	●	●	●		
Arterial Resurfacing	●	●		●	●	●	●		●
Bike Facility Projects (primarily striping)	●	●		●		●	●		●
Bridge Repair (not replacement)	●	●		●		●	●	●	
Sidewalk and Miscellaneous Concrete Projects	●	●		●	●	●	●		
Vertical Clearance improvements	●	●		●	●	●	●		●
Landscaped Median Improvements	●	●		●	●	●	●		●
Traffic Calming	●	●		●	●	●	●		
Transit Projects	●	●	●	●	●	●	●		●
City Funded Capital Projects	●	●		●	●	●	●		●
CREATE/Rail Projects	●	●		●	●	●	●		●
Alley Improvements	●	●		●	●	●	●		●
Streetscape Projects	●	●		●	●	●	●		●
Federal Aid Capital Projects (highways)	●	●		●	●	●	●		●
WPA/Industrial Streets	●	●		●	●	●	●		●
Bike Stations	●	●	●			●	●		
Development Funded	●	●				●	●		
Major Roadway Realignment	●	●			●	●	●		
Major Roadway Reconstruction	●	●	●			●	●		
Bridge Replacement	●	●			●	●	●		
Riverwalk	●	●			●				
Pedestrian Safety Zone									

TABLE 7: BEAUTY AND COMMUNITY REQUIREMENT MATRIX

CDOT Project Type	BC1	BC2	BC3	BC4	BC5	BC6	BC7	BC8	BC9
Signal	●								●
Red Light Running Cameras	●								●
Signage & Pavement Marking Improvements	●								●
Lighting Projects	●			●	●				●
Tree Planting	●				●				●
ADA Ramp Improvements	●				●				●
Pedestrian Safety Infrastructure Improvements	●			●	●				●
Arterial Resurfacing	●			●	●				●
Bike Facility Projects (primarily striping)	●			●	●				●
Bridge Repair (not replacement)	●				●				●
Sidewalk and Miscellaneous Concrete Projects	●				●				●
Vertical Clearance improvements	●	●	●	●	●		●		●
Landscaped Median Improvements	●		●	●	●		●		●
Traffic Calming	●			●	●	●			●
Transit Projects	●	●	●	●	●	●	●		●
City Funded Capital Projects	●	●	●	●	●	●	●		●
CREATE/Rail Projects	●	●	●	●	●	●			●
Alley Improvements	●		●	●	●	●			●
Streetscape Projects	●	●	●	●	●	●	●	●	●
Federal Aid Capital Projects (highways)	●	●	●	●	●	●	●	●	●
WPA/Industrial Streets	●	●	●	●	●	●		●	●
Bike Stations	●	●	●	●	●	●	●	●	●
Development Funded	●	●	●	●	●	●	●	●	●
Major Roadway Realignment	●	●	●	●	●	●	●	●	●
Major Roadway Reconstruction	●	●	●	●	●	●	●	●	●
Bridge Replacement	●	●	●	●	●	●	●	●	●
Riverwalk	●	●	●	●	●	●	●	●	●
Pedestrian Safety Zone	●	●	●	●	●	●	●	●	●

TABLE 6: URBAN ECOLOGY REQUIREMENT MATRIX

CDOT Project Type	UE1	UE2	UE3	UE4	UE5	UE6	UE7
Signal							
Red Light Running Cameras							
Signage & Pavement Marking Improvements							
Lighting Projects							
Tree Planting	●	●	●	●			
ADA Ramp Improvements							
Pedestrian Safety Infrastructure Improvements	●	●	●	●	●		
Arterial Resurfacing	●		●	●			●
Bike Facility Projects (primarily striping)							
Bridge Repair (not replacement)							
Sidewalk and Miscellaneous Concrete Projects		●	●				
Vertical Clearance improvements	●	●	●	●			
Landscaped Median Improvements	●	●	●	●	●	●	●
Traffic Calming	●	●	●	●	●	●	●
Transit Projects	●	●	●	●	●	●	●
City Funded Capital Projects	●	●	●	●	●	●	●
CREATE/Rail Projects	●	●	●	●	●	●	●
Alley Improvements							
Streetscape Projects	●	●	●	●	●	●	●
Federal Aid Capital Projects (highways)	●	●	●	●	●	●	●
WPA/Industrial Streets	●	●	●	●	●	●	●
Bike Stations	●		●				●
Development Funded							●
Major Roadway Realignment	●		●				●
Major Roadway Reconstruction	●		●				●
Bridge Replacement	●		●				●
Riverwalk	●		●				●
Pedestrian Safety Zone							

TABLE 8: COMMISSIONING REQUIREMENT MATRIX

CDOT Project Type	CM1	CM2	CM3	CM4
Signal		●	●	●
Red Light Running Cameras		●	●	●
Signage & Pavement Marking Improvements		●	●	●
Lighting Projects		●	●	●
Tree Planting		●	●	●
ADA Ramp Improvements		●	●	●
Pedestrian Safety Infrastructure Improvements		●	●	●
Arterial Resurfacing		●	●	●
Bike Facility Projects (primarily striping)		●	●	●
Bridge Repair (not replacement)		●	●	●
Sidewalk and Miscellaneous Concrete Projects		●	●	●
Vertical Clearance improvements	●	●	●	●
Landscaped Median Improvements	●	●	●	●
Traffic Calming		●	●	●
Transit Projects	●	●	●	●
City Funded Capital Projects	●	●	●	●
CREATE/Rail Projects	●	●	●	●
Alley Improvements		●	●	●
Streetscape Projects	●	●	●	●
Federal Aid Capital Projects (highways)	●	●	●	●
WPA/Industrial Streets	●	●	●	●
Bike Stations	●	●	●	●
Development Funded	●	●	●	●
Major Roadway Realignment	●	●	●	●
Major Roadway Reconstruction	●	●	●	●
Bridge Replacement	●	●	●	●
Riverwalk	●	●	●	●
Pedestrian Safety Zone	●	●	●	●


S/pharmacy

4.3 WORKSHEETS

DESIGN CHECKLIST

Project managers use an electronic notebook to plan projects, comply with CDOT's policies, and to organize field notes, reports, and project documentation. They should first go to http://sharepoint.cityofchicago.local/sites/cdot/projectdev/Complete%20Streets/SitePages/Home.aspx. Then, follow the simple steps in "How to Create a Complete Streets Project Folder" to create a project folder labeled with your CDOT project number and name.

CDOT COMPLETE STREETS SUSTAINABILITY PROJECT DELIVERY NOTEBOOK

Project Name	0
Step is indicated as required, optional, or n/a based on project type	Fields highlighted in blue indicate data entry. Please enter your responses in these fields, using drop down menus where provided.
	Fields highlighted in orange indicate summary or pre-populated questions. When finished with each section, please answer the summary questions. Summary responses will populate the Summary page as well.

2 SCOPING

n/a **2.1 DEFINE INITIAL PROJECT GOALS & REQUIREMENTS**

List initial goals based on Chicago Forward, Complete Streets Chicago Design Guidelines (CSDG; p. 130) and Project Initiation. Recommended citywide Chicago Forward goals are filled in for you; you can edit and add project-specific measurable goals. Sustainable Urban Infrastructure Guidelines and Policies (SUIG) Volume 1 are filled in for you, based on project type selected. (Additional guidance for Step 5, Measurement, to come.)

	Metrics	Chicago Forward Citywide Goal	Will your project contribute to the Citywide goal?
Safety	Percent reduction in pedestrian and bicycle crash injuries (# pedestrian and bicyclist K, A, & B injuries) within project area	50%	(select one)
Safety	Percent reduction in total crash injuries (K, A, B), from all crash types, within project area	50%	(select one)
Safety	Percent reduction in total crashes	50%	(select one)
Mode Share	Percent of people bicycling, walking, taking transit to work and working from home	50%	(select one)
Mode Share	**Percent of trips under 5 miles taken by bicycle**	**5%**	(select one)
Project Specific Objective 1			
Project Specific Objective 2			

	Environmental Category	**Requirement (From SUIG, Vol. 1 - Sect. 2.2)**
	Your SUIG requirements are filled in below, based on the project type selected. You can review requirement details in SUIG Volume I, Section 2.2. If SUIG requirements can not be met, that will be addressed later in project delivery.	
1	Water	n/a
2	Energy	n/a
3	Economics	n/a
4	Materials and Waste	n/a
5	Climate and Air Quality	n/a
6	Beauty and Community	n/a
7	Urban Ecology	n/a
8	Commissioning	n/a

SUMMARY SHEET

Project managers should keep this notebook and requested project documents in this folder or applicable sub-folders. The notebook should be checked back in to Sharepoint at 30% design if not sooner. Project managers select their project type within the Steps by Project Type tab, which automatically shows them which steps are required, optional, or not applicable for their project type. As seen in the previous matrices, not all steps are required for each project.

CDOT COMPLETE STREETS & SUSTAINABILITY PROJECT DELIVERY: SUMMARY

Project Name		**Consultants**		**Source of Funds 1**	$0.00	0	**Project Scope (160 or fewer characters):**
Project Number		**Consultants**		**Source of Funds 2**	$0.00	0	
Chief Project Manager		**Roadway Jurisdiction**		**Source of Funds 3**	$0.00	0	
CDOT Project Type	(select one)			**Project Budget**	$0.00		

Stages 1-3: Planning and Design		**Stage 4: Construction**		**Stage 5: Measurement**		**Stage 6: Maintenance**	
Project Manager		Project Manager		Project Manager		Project Manager	
Consultant(s)		Consultant(s)		Consultant(s)		Consultant(s)	

Instructions for Summary: Please refer to Steps by Project Type to see which steps below, from planning through maintenance, need to be completed for your project type. Then fill out the Notebook Stages 1-6 workbooks throughout project delivery. The "Summary" questions will automatically populate here. Check your work and provide the requested explanations on lines 8 and 9 on this page for management review. Project Managers are responsible for seeing projects through all stages.

1: Project Selection	**2: Scoping**						**3: Design**								
Goal: Identify, promote projects that advance Complete Streets	Goal: Address all needs identified during scoping						Goal: Address all needs identified during scoping								
Steps 1.1-1.2	Steps 2.1 to 2.5						Steps 3.1 to 3.5 (Substeps formatted 3.X.X)								
1	2.1	2.2	2.2	2.3	2.4	2.5	3.1	3.1	3.2	3.2.3	3.2.4	3.2.5	3.3	3.4
Does this project rank as a High Impact Improvement with the Community Development and Pavement Condition Index ratings?	Established project goals & sustainability requirements	Conducted research: crash analysis, neighborhood and modal plans, roadway projects, developments, transportation studies, soil maps, sewer sensitivity map, urban heat island map, public engagement	Evaluated synergies, coordinated with CDOT PMO to avoid inefficiencies; partnered with community and property owners to maximize co-benefits & long-term maintenance	Completed & documented site visits, typology, segment and intersection worksheets or drawings, as required by project type	Completed mapping, preliminary sustainability strategies, and outreach plan?	Does this project follow Ped-Transit-Bike-Auto hierarchy?	Created draft alternatives: Developed cross sections, including sustainable strategies, ranked alternatives and labeled prefered cross section in Sharepoint?	Analyzed research, performed sustainability calculations, created monitoring or performance plan, and engaged the public, as required by project type?	Schematic Design: Analyzed research, performed sustainability calculations, created performance plan and engaged public	Geometric Layout, intersection design, signal timing, and traffic impact studies. Is project requesting exception to design values?	Geometric Layout. Is project following complete streets traffic control device policies?	Does this project meet applicable sustainability requirements?	Obtained feedback and approvals (external and internal)	Evaluated Impacts: MMLOS, stormwater modeling, and sustainability valuation.
(select one)	0	(select one)	(select one)	(select one)	(select one)	(select one)	(select one)	(select one)	(select one)	(select one)	(select one)	(select one)	(select one)	(select one)
If no, please briefly explain below (160 or fewer characers):	If no, please briefly explain below (160 or fewer characters):	If no, please briefly explain below (160 or fewer characters):	If no, please briefly explain below (160 or fewer characters):	If no, please briefly explain below (160 or fewer characters):	If no, please briefly explain below (160 or fewer characters):	If variance requested, received Compliance Committee approval? Enter date.	If cross section was reviewed by Compliance Committee during a spot-check, enter date of review here.	If no, please briefly explain below (160 or fewer characters):	If no, please briefly explain below (160 or fewer characters):	If variance requested, received Compliance Committee approval? Enter date.	If variance requested, received Compliance Committee approval? Enter date.	If variance requested, received Compliance Committee approval? Enter date.	If no, please briefly explain below (160 or fewer characters):	If no, please briefly explain below (160 or fewer characters):
						0				0	0	0		

4.4 ILLUSTRATIVE SCENARIOS

This document proposes a change in our understanding of what infrastructure can achieve, and is illustrated in the cross-sections in this section.

The designer needs to keep the specifics of the site in mind as they explore which best practices to attempt. For example, having a project in a sewer or flood-sensitive area increases the need for flood control and stormwater management techniques. Proximity to a landmark park or natural area will influence the design of stormwater techniques, plant selection, and location, as well as lighting type and location. In every case, which techniques are used should relate specifically to the underlying environmental conditions as well as surrounding land use and planned development. As these cross sections illustrate, typology influences how and which best practices are implemented.

KEY PRINCIPLES

Don't put it back the same way. This a new day for Chicago—a day in which we will not keep putting back 19th- or even 20th-century technologies in our streets, but instead will be implementing features that will enhance the performance of the streets, turning them from a liability to highly performing infrastructure in the city. Chicago's streets will not only move people through the city but will improve the environment and provide better-quality places for residents and businesses.

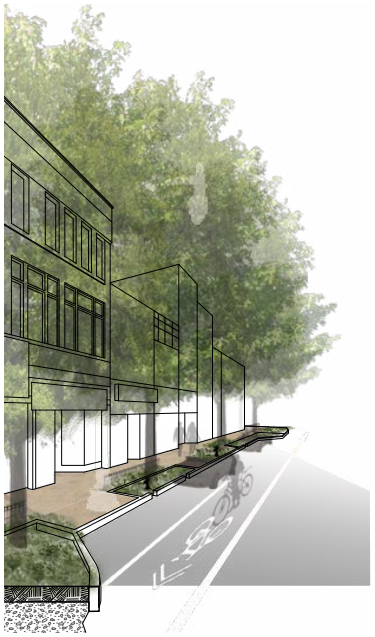
One size does not fit all. Street types and adjacent uses vary widely across the city. The appropriate design will be developed once an understanding of the users and specific site conditions and needs are understood. A series of questions and list of resources are provided within the checklist/process.

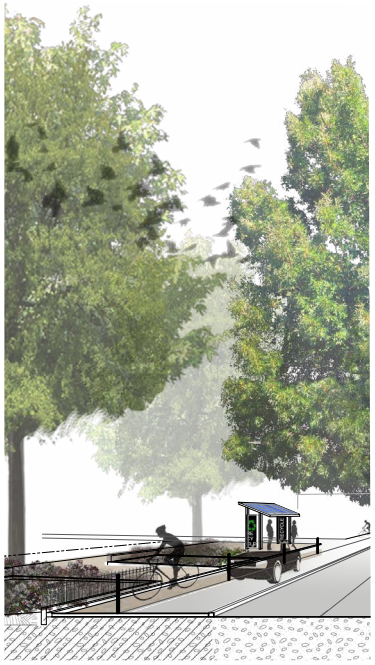
Green infrastructure is not an option; it is an integral part of CDOT's work and will be folded into every project. Implementation of green infrastructure will most often be of a surgical manner on the wide range of individual projects CDOT carries out every day. In addition to satisfying the need of that specific work order, designers will find ways to implement green infrastructure. While reconstruction of the full-street right-of-way offers the optimal situation for implementation, it is not always possible. However, something can be done on every project.

OPPORTUNITIES ACROSS THE CITY

The vision for Chicago's street infrastructure builds on the key principles. The key to long-term implementation lies in keeping a strong vision while finding opportunities to implement projects at a range of scales across the city that will cumulatively create a strong green infrastructure throughout Chicago's streets.

A key part of the design approach advocated in these guidelines is to identify within each typology those elements to be redesigned or enhanced for environmental performance. It is these elements that receive technical attention within the design manual (Volume 2). For example, a bumpout can be implemented and designed to accept and filter stormwater from the street. A utility cut to replace a water main can be backfilled with gravel and paved with permeable pavers to infiltrate water from the roadway. These methods of redesigning the street through the discrete elements in the right-of-way will cumulatively begin to address the environmental challenges we face relative to stormwater, energy usage, urban heat island, and so on.





Full reconstruction of the right-of-way from building to building provides the best opportunity for implementing the full spectrum of sustainability practices: Those that will achieve all environmental goals while supporting neighborhood quality and economic development. This vision comprises all possible elements a street is capable of including to be a great street—from accommodating safer travel to developing tree canopy and infiltrating water to closing the loop on materials and energy usage. Achieving these goals lies in identifying opportunities within each CDOT project to have an environmental effect (e.g., replacing impervious pavement with pervious; developing better soils for our street trees; providing bumpouts and refuge islands for pedestrian safety that also serve to infiltrate water). Each project can put something back that performs better in the short-and long-term.

EXAMPLE 1 : NEIGHBORHOOD/RESIDENTIAL STREET, 66-FOOT RIGHT-OF-WAY

Chicago is a residential and very livable city, with neighborhoods that are characterized by a local character and a vibrant culture. Residential streets comprise a great percentage of the streets in Chicago. The opportunities to implement green infrastructure design in residential streets is high since overall traffic volumes are lower and there is often more space within the right-of-way to design ecological features such as stormwater and planting features.

The example of a 66-foot right-of-way is in a residential context. The section shows a full reconstruction wherein all sections (travelway, interstitial/eco-zone, and sidewalk zone) are redesigned for ecological purposes that improve the character and quality of the street

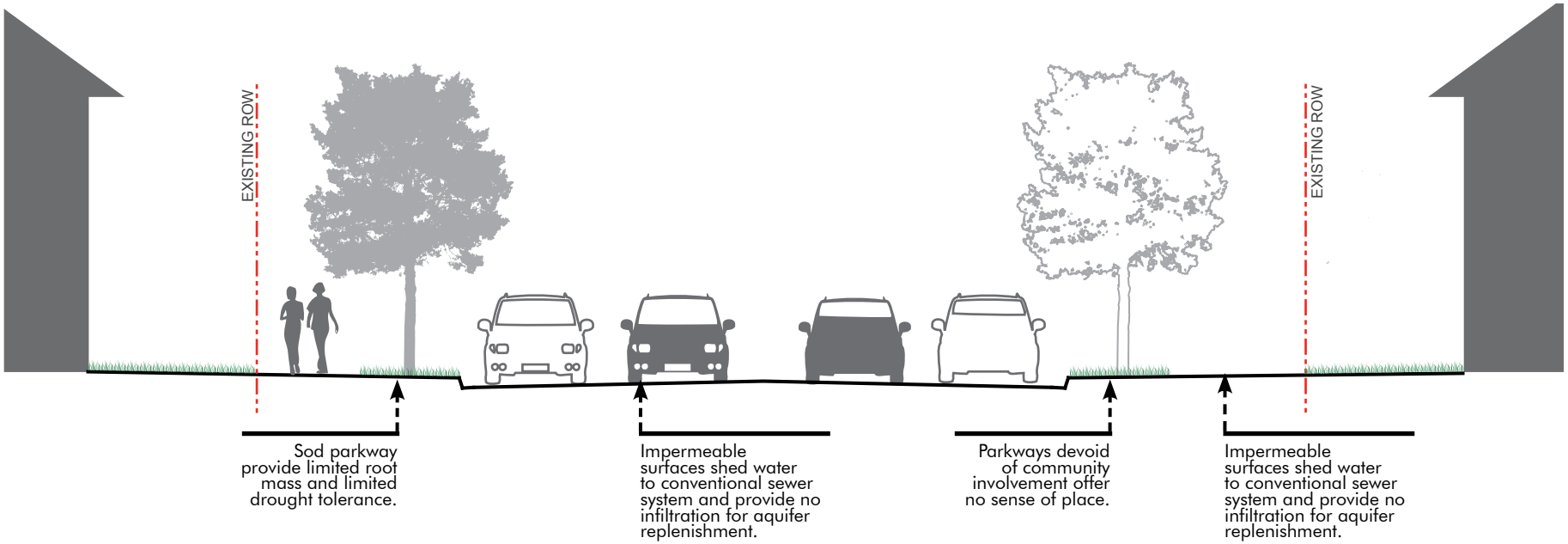
.

Requirements of the project:

1. Capture, store, and infiltrate stormwater (W1A, W2, W3, W6, W8)
2. Increase planting mass and urban ecological performance and quality for the neighborhood (BC4, UE1, UE2, UE3, UE5,UE6)
3. Accommodate cyclists safely in the roadway
4. Reduce urban heat island effect and improve air quality (MW6, MW7, MW10)
5. Maximize the use of local and recycled materials (MW3, MW11)
6. Minimize energy use through efficient lighting (EN1, EN2, EN4, EN7, EN6)
7. Monitor the performance of the project (CM1, CM2, CM3, CM4)

The design does this by:

1. Enhancing parkway planters as bioswales to increase tree canopy and shrub layer at the ground plane.
2. Replacing adjacent pavements in the sidewalk and parking lane and using structural soil in the subgrade to infiltrate water and expand the root-zone area.
3. Providing bumpouts where possible to increase planting density and infiltration area, and thus shortening street-crossing distance for pedestrians.
4. Shedding water from the travelway to these infiltration areas.
5. Situating benches and other neighborhood markers logically to enhance a sense of place.
6. Using recycled aggregates and water in the pavement.
7. Using lamps that meet Illuminating Engineering Society standards and using fixtures that eliminate glare and bleed.
8. Employing sensors to monitor pavement performance.



NEIGHBORHOOD STREET - BEFORE

NEIGHBORHOOD STREET - BEFORE

EXAMPLE 1 : NEIGHBORHOOD/ RESIDENTIAL STREET, 66-FOOT RIGHT-OF-WAY

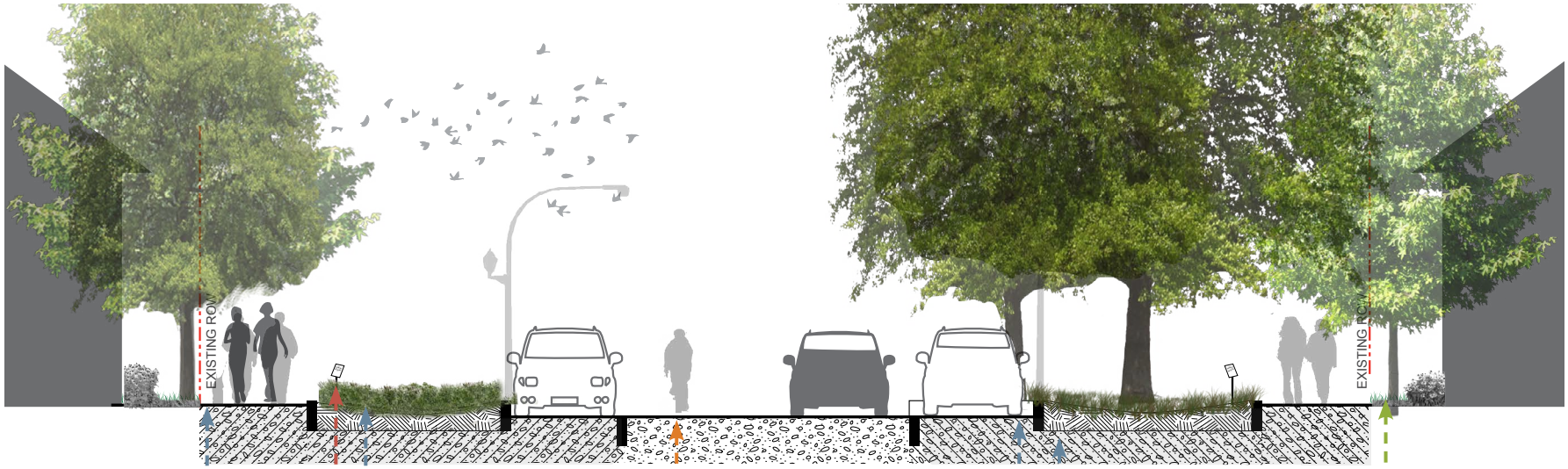
W
Native parkway bioswale (captures stormwater for storage and infiltration)

BC
Public art/ interpretive signage opportunities for public education

CA
Marked shared lanes for bicyclists in residential areas

W
Permeable parking lane with bumpouts (infiltrate into subgrade storage, curb cuts provide additional runoff)

W
Permeable sidewalks (infiltrate water to subgrade for storage and infiltration)



W Permeable sidewalks (infiltrate water to subgrade for storage and infiltration)

BC Public art/ interpretive Signage opportunities for public education

W Native parkway bioswale (captures stormwater for storage and infiltration)

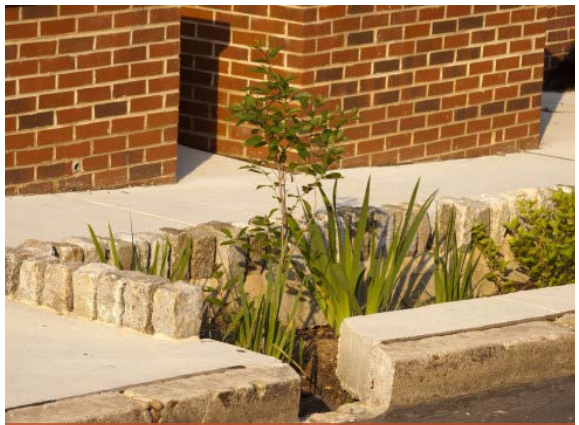
CA Marked shared lanes for bicyclists in residential areas

W Permeable parking lane with bumpouts (infiltrate into subgrade storage, curb cuts provide additional runoff)

W Parkway stormwater swale provides continuous rootzone for trees and shrubs and an expanded stormwater storage and infiltration area. (See Volume 2 Section 1.2 for design and construction details)

UE System of residential trees enhanced and protected by street tree planting creating ecological corridors for birds and other species

NEIGHBORHOOD / RESIDENTIAL STREET - AFTER



Infiltration Planter at Herring Run

Infiltration Planter in Portland

Parkway Swale in Seattle

NEIGHBORHOOD / RESIDENTIAL STREET - PRECEDENTS

EXAMPLE 2 : MAIN/COMMERCIAL STREET, 80-FOOT RIGHT-OF-WAY

Requirements apply to commercial streets, and the goals project managers select may not vary dramatically from those selected for neighborhood, corridor, or special district areas. However, space may be tighter because of travel demands and higher volume of users of the right-of-way, including the need to preserve pavements for sidewalk activities such as bus stops, cafes, or vendor space.

In a commercial application, stormwater infiltration and storage may need to be handled primarily through permeable pavements with gravel storage placed below grade. Permeable pavements adjacent to street tree plantings can be designed with structural soil that will allow for an expanded root zone. Developing a mature canopy is critical to reducing the urban heat island effect in a paved roadway. The shading and cooling provided by evapotranspiration will improve the quality of streets for people.

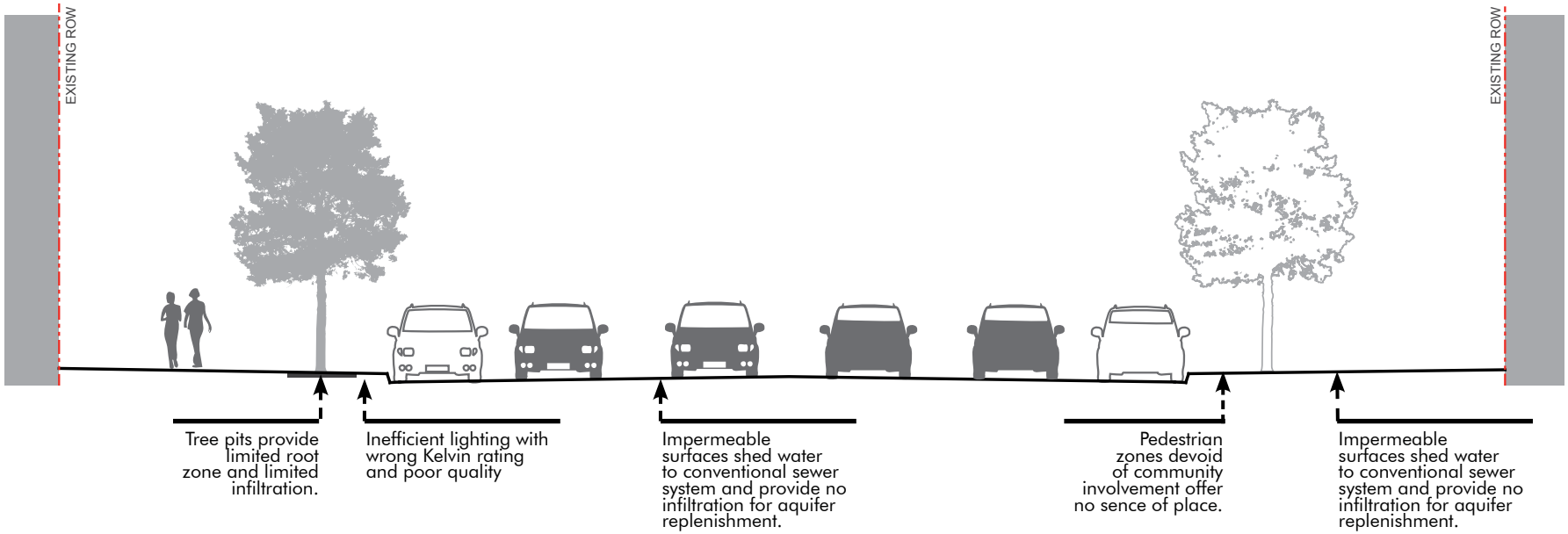
Commercial streets also present placemaking opportunities, reflecting neighborhood history and character and drawing pedestrians and cyclists into local shopping and services.

Requirements of the project:

1. Capture, store, and infiltrate stormwater (W1A, W2, W3, W6, W8)
2. Increase planting mass and urban ecological performance and quality for the neighborhood (BC4,UE1, UE2, UE3, UE5, UE6)
3. Accommodate cyclists safely in the roadway
4. Reduce urban heat island effect and improve air quality (MW6, MW7, MW10)
5. Maximize the use of local and recycled materials (MW3, MW11)
6. Minimize energy use through efficient lighting (EN1, EN2, EN4, EN7, EN6)
7. Monitor the performance of the project (CM1, CM2, CM3, CM4)

The design does this by:

1. Enhancing parkway planters as bioswales to increase tree canopy and shrub layer at the ground plane.
2. Replacing adjacent pavements in the sidewalk and parking lane and using structural soil in the subgrade to infiltrate water and expand the rootzone area.
3. Providing bumpouts where possible to increase planting density and infiltration area, and thus shortening street-crossing distance for pedestrians.
4. Shedding water from the travelway to these infiltration areas.
5. Situate benches and other neighborhood markers logically to enhance a sense of place.
6. Using recycled aggregates and water in the pavement.
7. Using lamps that meets Illuminating Engineering Society standards and using fixtures that eliminate glare and bleed.
8. Employing sensors to monitor pavement performance.



MAIN/COMMERCIAL STREET - BEFORE

MAIN/COMMERCIAL STREET - BEFORE

EXAMPLE 2 : MAIN/COMMERCIAL STREET, 80-FOOT RIGHT-OF-WAY

UE CM
Parkway planters with continuous root zones increase tree canopy

UE W
Bumpouts to increase planting density and infiltation area

W UE
Parkway planter (captures stormwater for storage and infiltration enhanced tree growth)

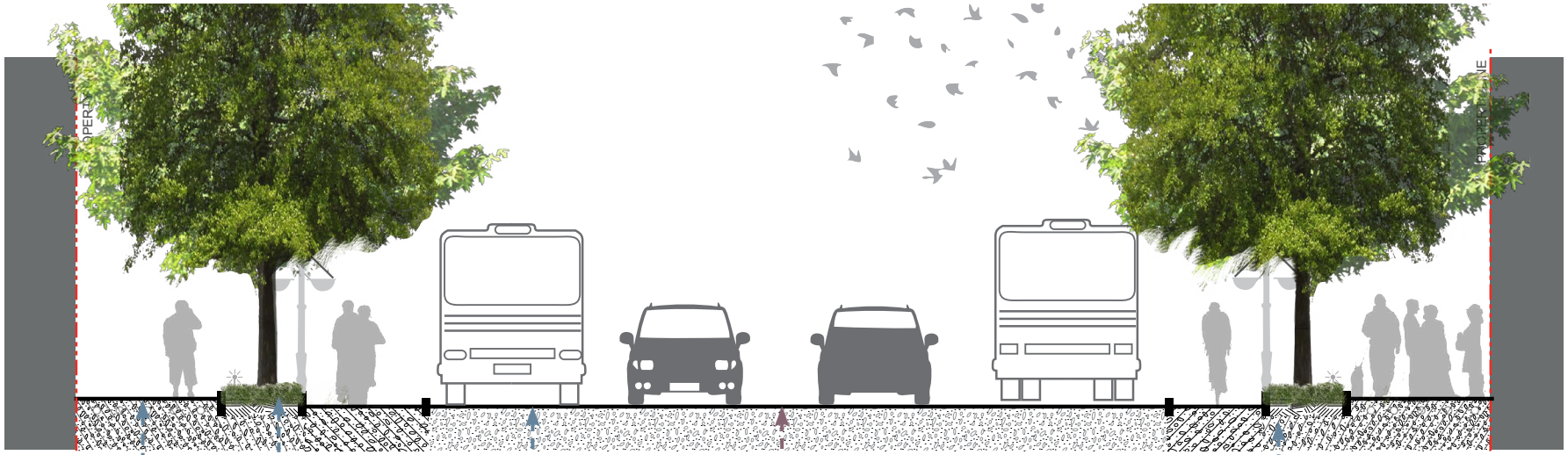
W
Parkway stormwater design provides continuous root zone for trees and shrubs and an expanded stormwater storage and infiltration area. (See Volume 2 for design and construction details)

W
Curb cuts to shed water from travelway to infiltration zones

W
Permeable sidewalks (infiltrate water to subgrade for storage and infiltration)

MW
Minimize transport distance of materials, reduce VOCs, recycled content

W
Although travel lanes will typically be designed to shed water to the roadway edges, gravel provided under the roadway will increase stormwater storage



W
Permeable sidewalks (infiltrate water to subgrade for storage and infiltration)

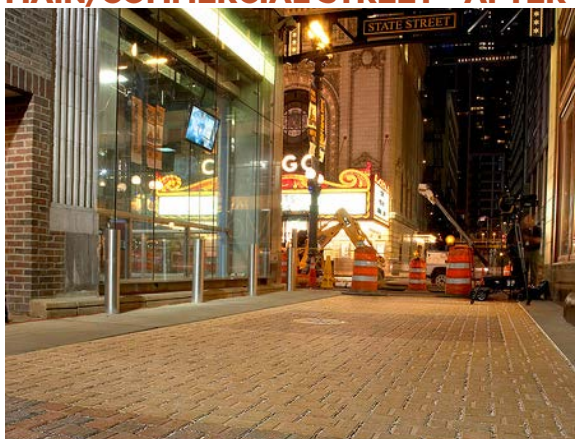
W UE
Parkway planter (captures stormwater for storage and infiltration enhanced tree growth)

W
Although travel lanes will typically be designed to shed water to the roadway edges, gravel provided under the roadway will increase stormwater storage

MW
Minimize transport distance of materials, reduce VOCs, recycled content

W
Parkway stormwater design provides continuous root zone for trees and shrubs and an expanded stormwater storage and infiltration area.

MAIN/COMMERCIAL STREET - AFTER



Couch Place

Water Feature along Cermak Rd.

Planters along Milwaukee Ave.

MAIN/COMMERCIAL STREET - PRECEDENTS

EXAMPLE 2 : MAIN/COMMERCIAL STREET, 80-FOOT RIGHT-OF-WAY

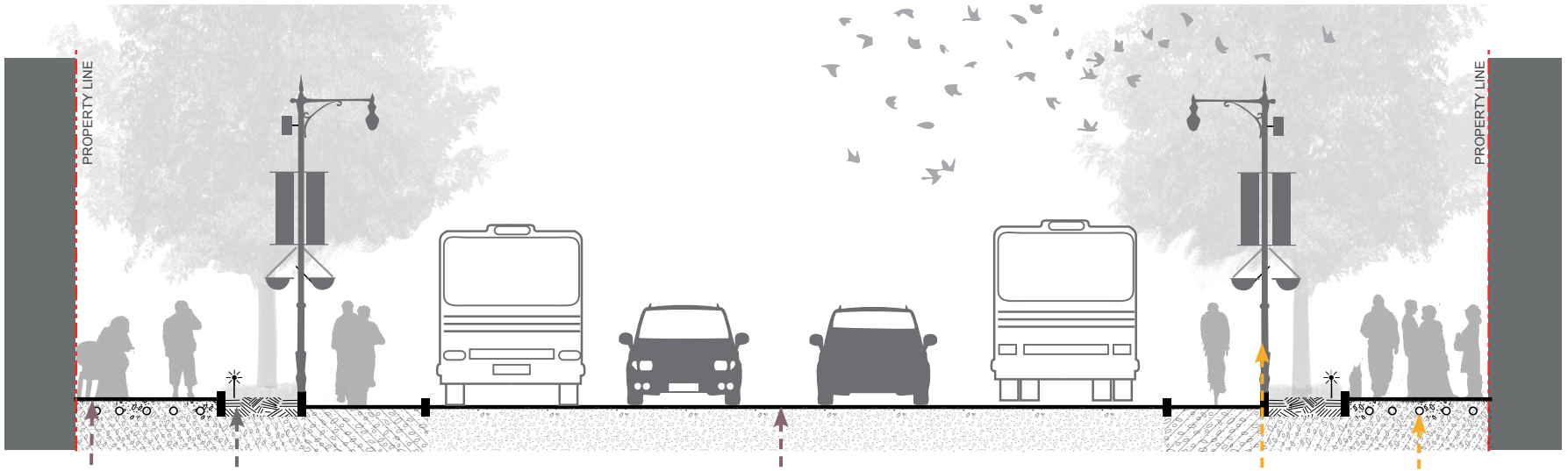
CM
Sensors to monitor water infiltration and pavement performance

EN
White light no greater than 500K, bulb life greater than 30,000 hours. Use most recent IES guidelines

BC
Community banners to enhance a sence of place

M+W
Street furniture including recycled content, regionally sourced, using no VOCs

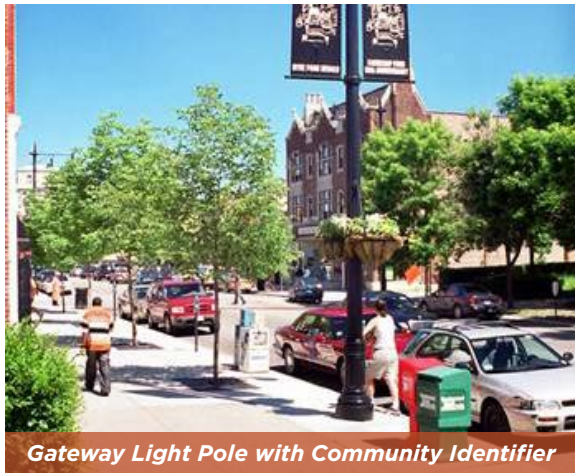
EN
District heating and cooling infrastructure within public Right-of-way



MAIN/COMMERCIAL STREET - AFTER


Gateway Decorative Light Pole

Broadway Streetscape


Gateway Light Pole with Community Identifier

MAIN/COMMERCIAL STREET - PRECEDENTS

EXAMPLE 3 : THOROUGHFARE/MIXED-USE, 100-FOOT RIGHT-OF-WAY

This example illustrates strategies tailored for a thoroughfare in a mixed land-use typology. The example illustrates a complete reconstruction, to which a wide set of requirements apply. The surrounding land use, though, informs the strategies that will apply those requirements. Given the surrounding land use, which is a lower density mix of industrial, residential, and commercial uses, and the type of travel volume—more cars than pedestrians though with a bus rapid transit (BRT) stop—the application of strategies to meet the requirements will need to balance priorities.

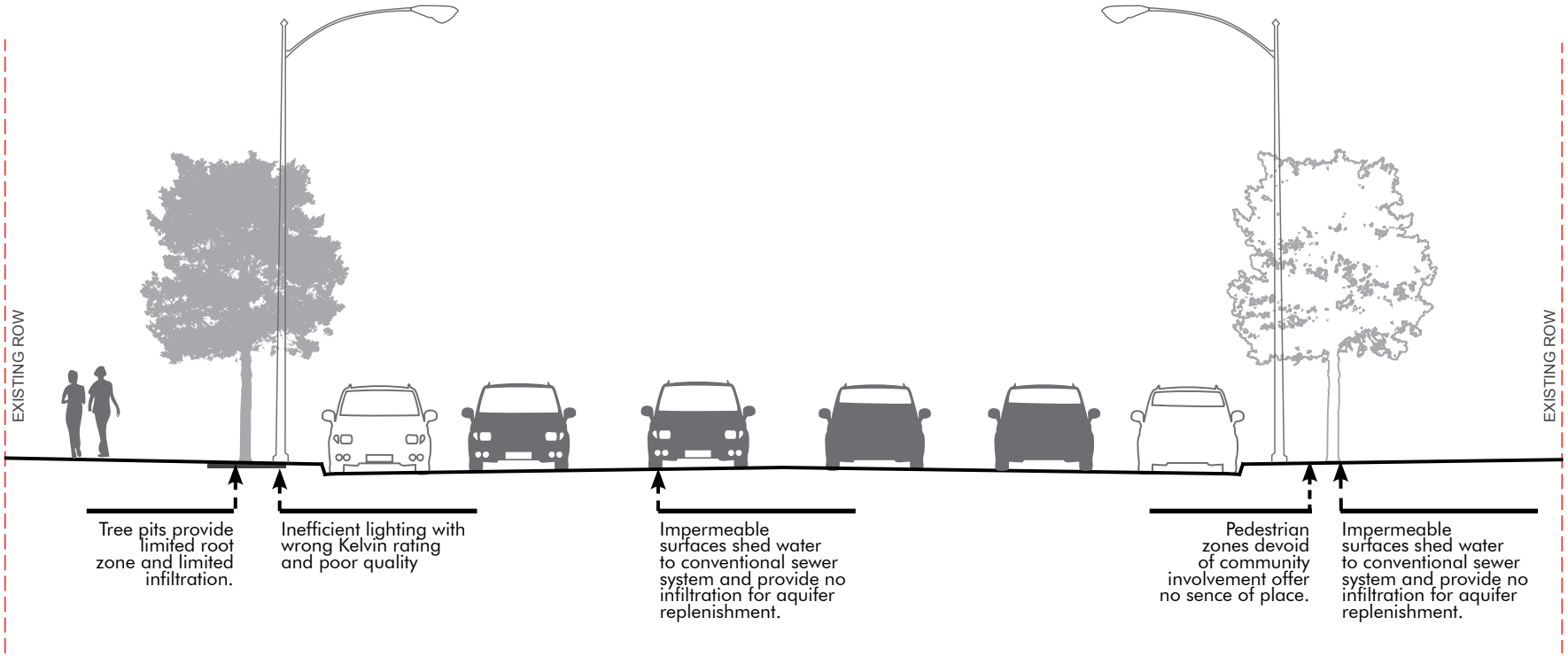
For example, soil data shows excellent soils, which indicates that a bioswale could be used effectively within the parkway, along with trees selected to tolerate bioswale conditions. Cool pavement strategies, including extensive tree planting in the sidewalk, will help to diminish the effect of the existing hot spot. The sidewalk realm also presents opportunities for placemaking and district identifiers at the BRT stop.

Requirements of the project:

1. Capture stormwater and maximize infiltration (W1A, W2, W3, W6, W8)
2. Energy efficient lighting (EN1, EN2, EN4, EN7, EN6)
3. Sustainability Valuation applied (EC1)
4. Waste diversion during construction, and incorporation of cool pavement strategies and recycled materials (MW1, MW2, MW4, MW5, MW6, MW7, MW10, MW9)
5. Construction work follows requirements (CA1, CA2, CA3, CA4, CA5, CA6)
6. Increased plantings and trees (UE1, UE2, UE3, UE4, UE5, UE6, UE7)
7. Effective outreach, coordination, and education and incorporation of public art (BC4, BC5, BC6)
8. Commission special elements of the project, including permeable pavers, and monitor performance (CM1, CM2, CM3, CM4)

The design does this by:

1. Creating a bioswale median and increasing the infiltration area.
2. Creating a continuous tree pit, with appropriate crossing spaces, to enable tree canopy that enhances cool pavement strategies.
3. Replacing adjacent sidewalk pavements with permeable pavers and using structural soil in the subgrade to infiltrate water and expand the root zone area.
4. Shedding water from travelway into infiltration areas.
5. Using recycled aggregates in pavements, as well as high albedo pavement.
6. Using lamps that meet IES standards and using cut-off fixtures.
7. Installing sensors to monitor pavement performance.
8. Developing a monitoring plan with adjacent property owners to maintain tree pits.
9. Using high albedo pavement in travelway, including the BRT running in outside lanes.
10. Incorporating living walls into BRT shelter, and photovoltaics into the canopy.
11. Identifying locations for public art and education opportunities.



THOROUGHFARE STREET - BEFORE

THOROUGHFARE STREET - BEFORE

EXAMPLE 1 : THOROUGHFARE/MIXED-USE, 100-FOOT RIGHT-OF-WAY

UE
Maximize tree canopy

BC
Effective outreach, coordination, and education

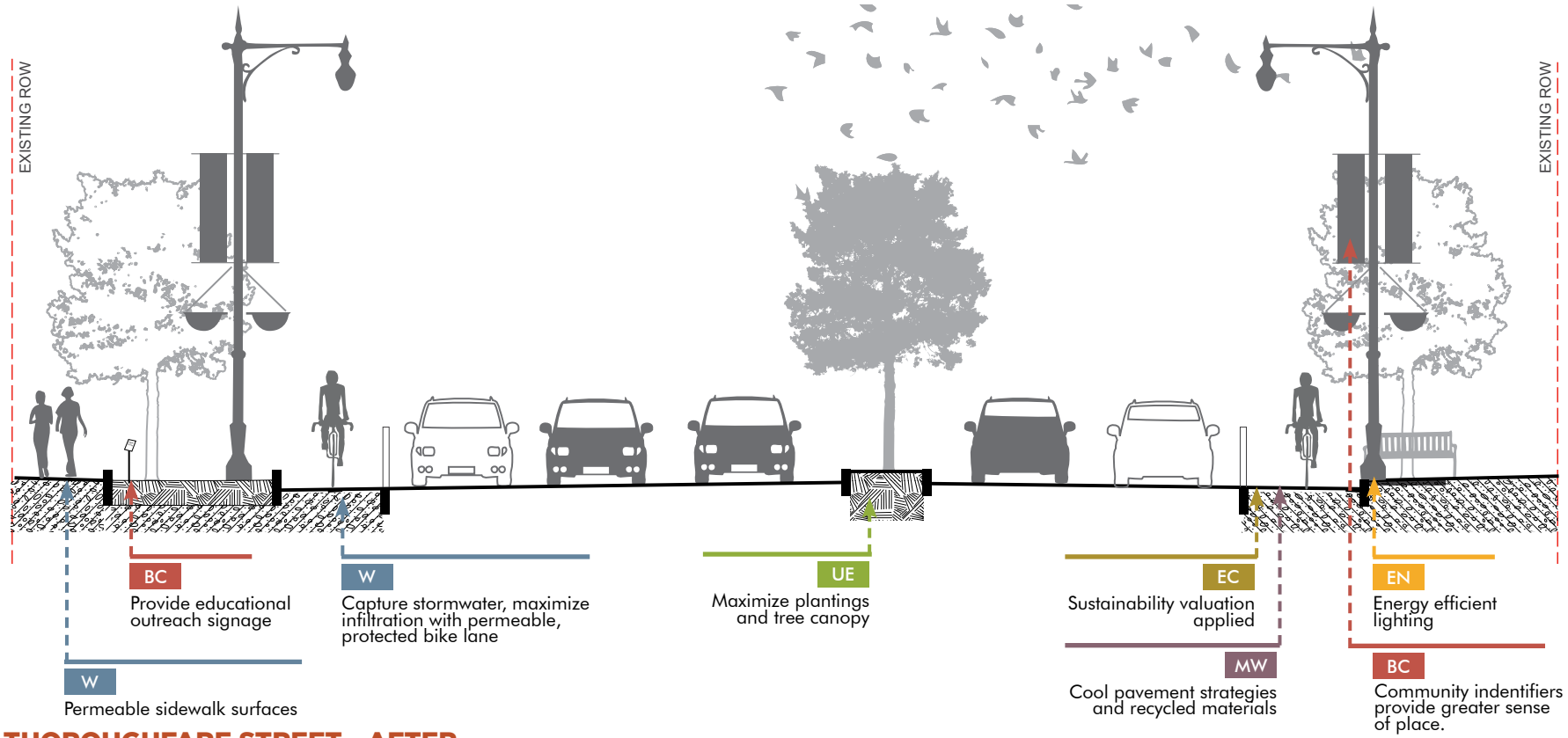
EN
Photovoltaics on bus canopies provide renewable energy source

UE
Maximize plantings

MW
Cool pavement strategies and recycled materials

W
Capture stormwater, maximize infiltration

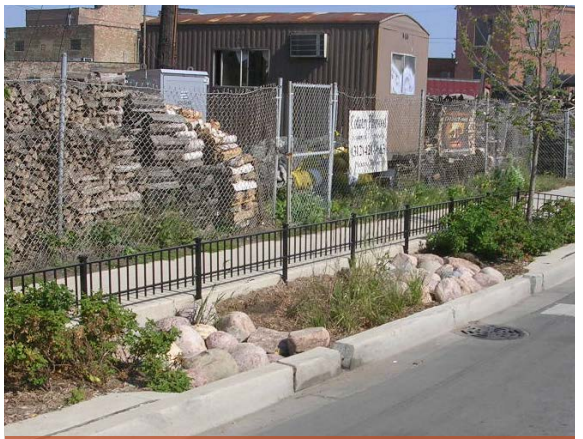
W
Permeable protected bike lane and sidewalk surfaces



THOROUGHFARE STREET - AFTER

Educational signage - Maplewood and Diversey

Curb Cut - Maxwell Street Market



Infiltration Planter - Pilsen

THOROUGHFARE STREET - PRECEDENTS

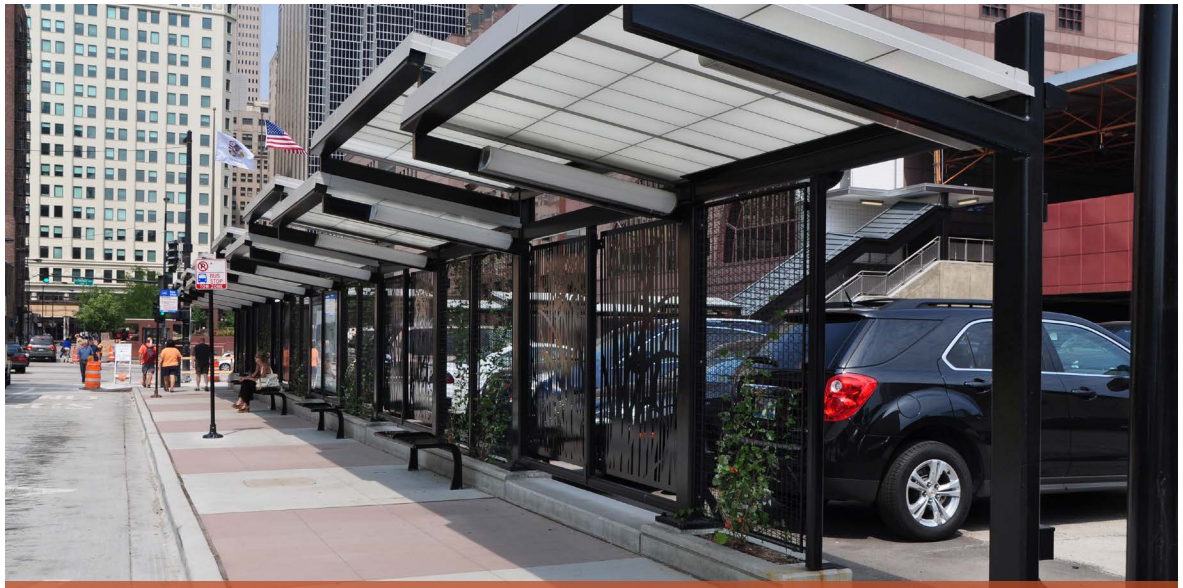
OTHER STREET DESIGN ELEMENTS

The following elements influence the potential for redesign. Some of them are a direct opportunity to redesign while others may be adjusted to accommodate a new feature:

- Curb ramps
- Crosswalks
- Driveway widths, offsets, flares and radii design, sight triangles
- Alleys and on-street parking and loading areas, parking spaces, drop-off pickup, etc. diagonal parking
- Fire access requirements
- Street furniture, bus shelters, newspaper boxes, benches, trash, bollards, tree grates
- Advertising signs, traffic light poles and controls
- Sidewalk cafes (6-foot-clear walkway required), bollards, tree grates

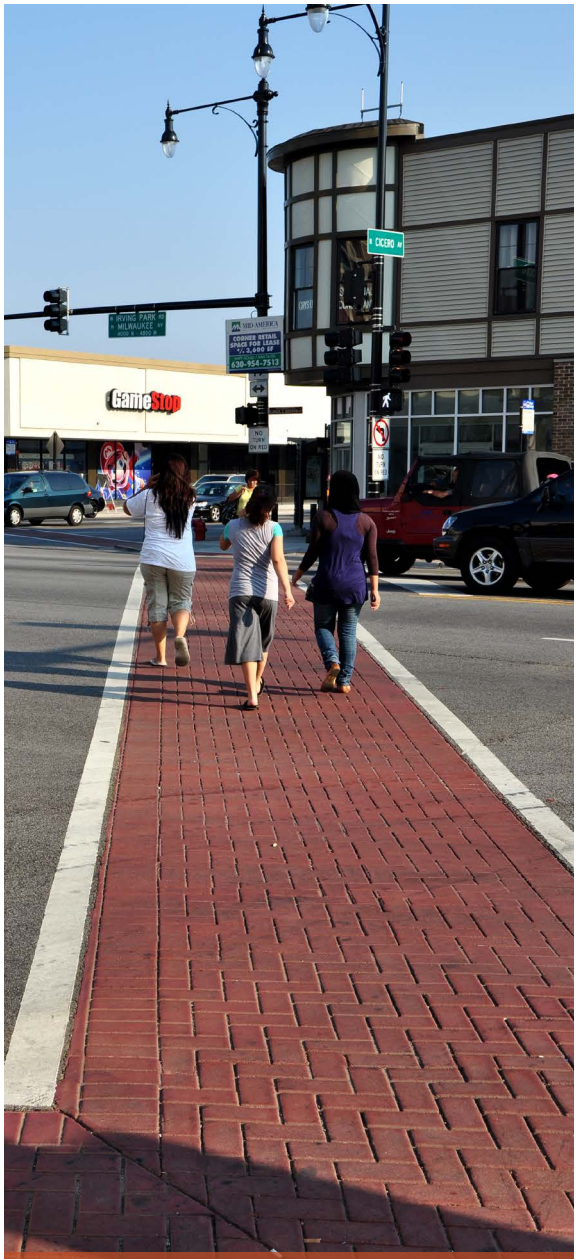
Maxwell Street Market Permeable Paver Lot

Solar/Wind Powered light



Bus Shelter with Greenwall Trellis - Financial Place and Congress Parkway

Permeable Paver Diagonal Parking - North Maplewood Ave.



Textured Asphalt Crosswalk

4.5 USE OF THIS MANUAL

Within the city of Chicago, the "public way" is defined as city highways, streets, alleys, and public Rights-of-way dedicated or commonly used for utility purposes and water. CDOT manages and regulates the public way, and although CDOT performs the majority of work within the public way, many other private companies and public departments and agencies also work within this area.

The table below identifies the trial requirements by project type for sister departments, agencies, utilities, and private developers who work in the public way. Prior to formally adopting these requirements, CDOT will perform pilot studies with these organizations, incorporating their feedback and lessons learned before finalizing a mandatory set of requirements.

PROPOSED REQUIREMENTS

	Water	Materials and Waste	Energy	Urban Ecology	Commissioning
Department of Water Management					
Capital Water Projects	W1b, W2, W6, W7, W8, W9, W5	All MW Requirements			CM4
Capital Sewer Projects	W1b, W2, W6, W7, W8, W9, W5	All MW Requirements			CM4
Water Repair Projects	W7	All MW Requirements			CM4
Sewer Repair Projects	W7	All MW Requirements			CM4
Utilities	W7	All MW Requirements			CM4
PBC	W1b, W2, W6, W7, W8, W9, W5	All MW Requirements		All UE Requirements	CM4
CTA	W1b, W2, W6, W7, W8, W9, W5	All MW Requirements	EN1, EN2, EN3-EN7	All UE Requirements	CM4
Development Funded	W7, W8	All MW Requirements	EN1, EN2, EN3-EN7	All UE Requirements	CM4

CDOT The main audience for this manual is CDOT, so the use of this manual by CDOT will follow the process identified in Sections 4.1 to 4.3.

PRIVATE DEVELOPMENT Private developers within Chicago often perform work within the public way managed by CDOT. The scopes of work within the public way will vary based on the development proposal, but they will frequently include streetscape improvements.

Depending on the scope of work within the public way, the requirements outlined in Section 2.2 of this manual will apply to work performed by private developers within the public way. The developer will work with CDOT's Complete Streets director to establish the list of requirements that apply for each individual project

UTILITIES Utility agencies that service Chicago frequently require access to the public way, since many of their utilities are located below grade within the public way. Typical utilities include, but are not limited to gas mains and services; electrical manholes and conduits; telecommunication manholes and conduits; utility poles; and aerial cable television and telecommunications cables.

Depending on the scope of work within the public way, the requirements outlined in Section 2.2 of this manual will apply to work performed by utility agencies within the public way. The individual utility will work with CDOT's Complete Streets director to establish the list of requirements that apply for each individual project.

SISTER AGENCIES The City of Chicago has an established list of sister agencies that include the following:

- Chicago Public Schools (CPS)
- Cook County of Illinois
- Chicago Housing Authority (CHA)
- Chicago Park District (CPD)
- Chicago Transit Authority (CTA)
- City Colleges of Chicago (CCC)
- Metropolitan Pier & Exposition Authority (MPEA)
- Metropolitan Water Reclamation District of Greater Chicago (MWRDGC)
- Public Building Commission (PBC)

Depending on the scope of work within the public way, the requirements outlined in Section 2.2 of this manual will apply to work performed by sister agencies within the public way. The sister agencies will work with CDOT's Complete Streets director to establish the list of requirements that apply for each individual project.

GOVERNMENTAL AGENCIES
Governmental agencies include other federal and state agencies that are not considered sister agencies that perform work within the public way. Examples include the Illinois Department of Transportation, the Illinois Department of Natural Resources, and the U.S. Environmental Protection Agency.
Depending on the scope of work within the public way, the requirements outlined in Section 2.2 of this manual will apply to work performed by governmental agencies within the public way. The governmental agencies will work with CDOT's Complete Streets director to establish the list of requirements that apply for each individual project.

SISTER DEPARTMENTS Sister departments include the many other departments with Chicago that perform work that affects the public way (e.g., Chicago Department of Water Management, Chicago Department of Housing and Economic Development, etc.).

Depending on the scope of work within the public way, the requirements outlined in Section 2.2 of this manual will apply to work performed by sister departments within the public way. The sister departments will work with CDOT's Complete Streets director to establish the list of requirements that apply for each individual project.

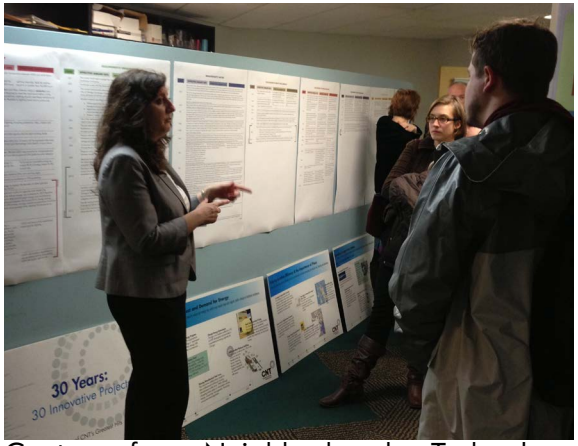

4528

5.0 CONCLUSION

5.1 PUBLIC PROCESS AND PROFESSIONAL CONTRIBUTIONS

This document was produced and refined through workshops and discussions with CDOT project managers, agencies, non-profit organizations, and industry. Also, a series of public meetings were held in 2014 that provided key public input into the document.

Peggy Notebaert Nature Museum January 29th



Center for Neighborhood Technology January 29th

Chicago Center for Green Technology January 30th

Chicago Metropolitan Agency for Planning, January 31st

Southeast Environmental Task Force, February 6th

Greater Auburn Gresham Development Corporation, February 7th

5.2 ONGOING COMMITTEES

A series of committees have been identified to continue the refinement of the sustainable infrastructure process for CDOT. These committees will help to define additional CDOT policies related to sustainable infrastructure. These committees will review the commissioning data from new projects that follow these requirements and strategies and help to refine the existing requirements as a result of the data.

The committees organized for continuing work include:

Project Delivery, Documentation, & Tracking: This workgroup will clarify the proposed checklists, confirm the tracking process within the department, and confirm the appropriate project assignments for the requirements.

Policy Implementation: This workgroup will identify and clarify appropriate policies, refine policy language, and map out and initiate policy implementation

Data & Performance Metrics, Commissioning: This workgroup will coordinate with other groups and efforts to identify existing data sets and owners, confirm the access to data and clarify the best way to deploy within the department, ensure the data is easily accessible, clarify performance metrics for requirements, and develop the process for commissioning data to be fed into and inform future design processes.

Outside Stakeholder: This workgroup will confirm appropriate submittals and the process for accommodating requirements among private developers and other agencies and departments, confirm specific projects to pilot the requirements, and develop a process to clarify projects that must adhere to the guidelines.

Specifications & Details: This workgroup will determine which of the department's standard specifications need to be revised, develop a list of proposed revisions and initiate the revision process, determine which standard drawings need revision and initiate those revisions, and identify near-term opportunities for the inclusion of specifications.

5.3 ACKNOWLEDGEMENTS

In addition to the Task Force mentioned above, CDOT would like to thank the many dedicated staff and members of the professional community and interested citizens who contributed to the success of this document.

ACKNOWLEDGEMENTS
Rahm Emanuel, Mayor
Gabe Klein, CDOT Commissioner

Project Managers
Gerardo Garcia
David Leopold

Project Director
Janet Attarian

Consultant Team
Parsons Brinckerhoff
Conservation Design Forum
Site Design Group, Ltd.
Metro Strategies

5.4 TASK FORCE MEMBERS

CDOT SUSTAINABLE STREETS DESIGN GUIDELINES TASK FORCE MEMBERS

Name	Agency
Michael Alvino	CLOCC
Jay Behnke	State Testing/IRTBA
Michael Berkshire	Chicago Housing and Urban Development
Deeta Bernstein	PBC
Scott Bernstein	CNT
Karen Bielarz	LAW
Andrew Billing	Water
Dan Burke	CDOT - Engineering
Suzanne Carlson	CDOT- Project Development
Tom Carney	CDOT in house construction
William Cheaks	
Josh Ellis	MPC
Doug Farr	Farr & Assoc
Mark Fornaciari	CDOT In-house Construction
John Fortmann	IDOT Bureau of Local Roads and Streets
Steve Gillen	Tollway
Jon Grosshans	EPA Region 5
Zubair Haider	IDOT: Bureau of Local Roads and Streets
Benet Haller	DHED
Luann Hamilton	CDOT - Project Development
Aaron Joseph	
Gabe Klein	CDOT - Commissioner and Honorary Chair
Aaron Koch	
Scott Kubly	CDOT
Paul Lippens	Active Transportation Alliance
Amy Malick	Aviation/O'Hare - Dep Commr Sustainability
Mark Maloney	
Joe McCarthy	City of Chicago Dept. of Streets & San; Forestry
Marty Mele	Pan Oceanic Engineering
Bob Myers	CDOT - DEO
John Murray	MWRD
Bob Newport	EPA Region 5
Marisa Novara	MPC
Sid Osakada	Sewer
Karl Peet	CTA
Melinda Pruett-Jones	Chicago Wilderness
Robert Richardson	
John Sadler	CDOT- Engineering
Christina Schroeder	MWRD
Julian Silva	CDOT- Engineering
Peter Skosey	MPC
David St. Pierre	Executive Director, MWRD
Mason Throneberg	Ch2MHill
Tom Van Dam	CTL Group
Rick Wanner	IDOT - Landscape Architect
Karen Weigert	City of Chicago Mayor's Office
Maureen West	CDOT-Project Development
Sean Wiedel	CDOT - Commissioner's Office
Cindy Williams	CDOT - Senior Project Director
Nancy Williamson	IDNR Green Cities Campaign Manager
Ryan Wilson	CNT
John Yonan	Cook County
Chris Holt	IDOT

STAKEHOLDER ORGANIZATIONS

2im
49th Ward Green Corps
Active Transportation Alliance
AIA Chicago
Alliance for a Greener South Loop
Alta Manu
AAA Engineering
APA Chicago
ASCE Illinois
ASCE TD & I Chair
ASCE Sustainability Committee
Bigane Paving
Black Contractors United
Camiros
Cannon
CBBEL
Portland Cement Association
Ch2MHill
Chicago Botanic Gardens
Chicago Loop Alliance
Chicagoland Chamber of Commerce
Ciorba
CMAP
Center for Neighborhood Technology (CNT)
CNU
Huff & Huff
Hyde Park Community Council
CTE
DHED
Edgewater Environmental Sustainability Project
FHWA Resource Center
Field Museum
Friends of the Parks
Federal Transit Authority (FTA)
Garfield Park Conservatory Alliance (NCP)
Green Leaf Advisors
HACIA/Hispanic American Construction Industry Association
HDR
Illinois Department of Transportation (IDOT)
Infrastructure Engineering
IRTBA
Knight Engineers & Architects
KSA Lighting
Logan Square Neighbors Association
Morton Arboretum
National Complete Streets Coalition
Complete Streets Coalition consultant
Northwestern
Openlands
Ozinga
Patrick Engineering
PBC/Cannon
Purdue University
Philips
Pizzo
Southeast Environmental Task Force
Stanley Consultants
Studio Gang
Terra Engineering
The Care of Trees
T.Y. Lin International Group
University of Illinois at Chicago (UIC)
Unilock
University of Chicago
University of Michigan
UrbanLabs
USDA
USGS
Vulcan Materials
WES Landscape Architects
Wicker Park/Bucktown Chamber of Commerce
Wight & Company
Will Group
WRD Environmental
Hoerr Schaudt Design
Loyola
F H Paschen, SN Nielsen & Associates
Civiltech Enginering
K-Five Construction
Chicago Testing Laboratory
HNTB Corporation
Alfred Benesch & Company
Gallagher Asphalt & Company
V3 Companies of IL
James McHugh Construction
Thomas Enginering Group
Trice Construction company
Ciorba Group
STV Inc.
Autumn Construction Services
Burns & McDonnell
Kiewit Infrastructure
Aldridge Electric
Prairie Materials
Rubinos and Mesia Engineers
STATE Testing
OMEGA
Regina Webster & Associates
Stanley Consultants
DuSable, Inc.

Special Thanks to the Following Organizations for Volunteering Their Time and Efforts at the Outreach Events

Center for Neighborhood Technology (CNT)
Illinois Road & Transportation Builders Association (IRTBA)
Peggy Notebaert Nature Museum
Center for Neighborhood Technology
Chicago Center for Green Technology
Chicago Metropolitan Agency for Planning
Southeast Environmental Task Force
Greater Auburn Gresham Development

5.5 GLOSSARY

Bioswales: Bioswales are landscape elements that remove silt and pollution from surface runoff water. From: http://en.wikipedia.org/wiki/Bioswale

Combined Sewer Overflows: Combined Sewer Overflows are part of a combined sewer system that collects waste water and storm run offs and takes them to a water treatment facility. However when the water entering the sewers exceeds the combined sewer's capacity, the CSOs divert the excess water directly to a body of water. This untreated water can pollute our waters and environments. From: http://www.epa.ohio.gov/dsw/cso/csoindex.aspx

Life Cycle Cost: The amortized annual cost of a product, including capital costs, installation costs, operating costs, maintenance costs, and disposal costs discounted over the lifetime of the product.

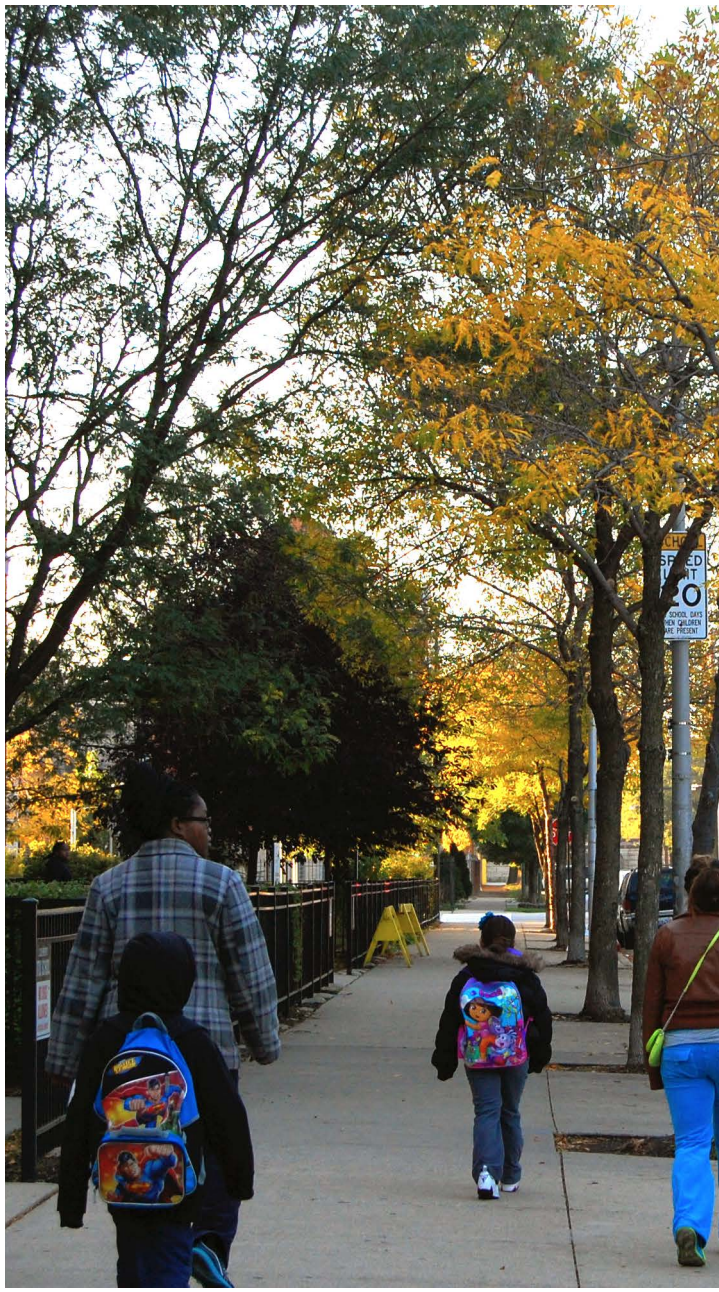
Permeable: Permeable pavement allows stormwater to be filtered as it goes through the pavement's surface.

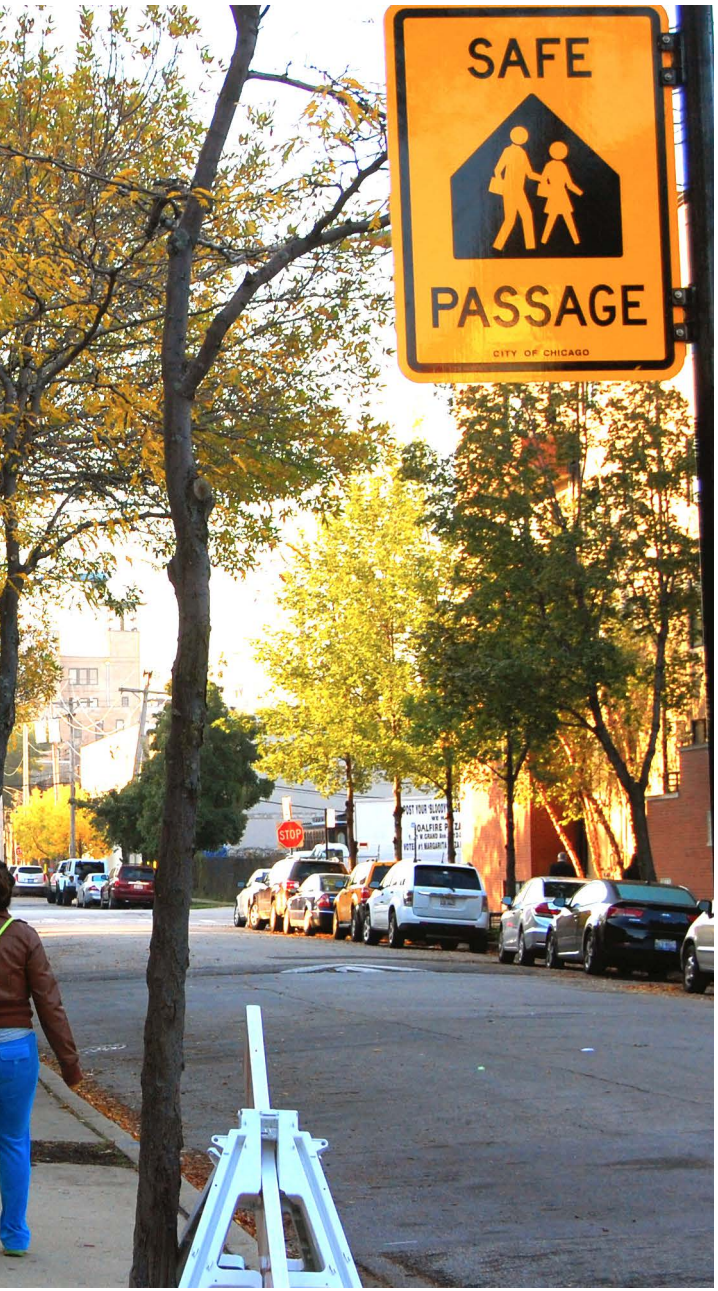
Post-Consumer Recycled Content: Post-consumer material is material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item.

Pre-Consumer Recycled Content: Pre-consumer material is material diverted from the waste stream following an industrial process, excluding reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process. Synonyms include post-industrial and secondary material.

Recycling: The series of activities—collection, separation, and processing—by which products or other materials are recovered from the solid waste stream for use in the form of raw materials in the manufacture of new products other than fuel for producing heat or power by combustion.

Renewable Energy: Energy resources such as wind power or solar energy that can be produced indefinitely without being depleted.





Sustainability Valuation: Sustainability Valuation is a way to assess sustainability performance through values and opportunity costs rather than burdens. This incorporates environmental costs and benefits in dollars to make a cost-benefit ratio. From: SUIG presentation SUIG presentation

Sustainability: Sustainability is the capacity to endure. Practical application of sustainability thinking recognizes how current decisions affect the capacity of current and future generations to lead healthy and rewarding lives.

Sustainable Transportation: Transportation that does not rely on the use of fossil fuels.

Sustainable Urban Infrastructure Guidelines (SUIG): The Sustainable Urban Infrastructure Guidelines and Policies is a document by the Chicago Department of Transportation (CDOT). It is to aid in the integration of sustainability into planning, design, construction and maintenance. From: SUIG Presentation

5.6 PHOTO CREDITS

Cover Photos
- Front - Rodger's Park Streetscape
- Back - Rodger's Park Streetscape

Chapter Cover Photos:
- Chapter 1 - Western Avenue Rain Garden
- Chapter 2 - Maxwell Street Market
- Chapter 3 - Infiltration Swale along Cermak Road
- Chapter 4 - Water Feature at Juarez High School
- Chapter 5 - Cermak Streetscape planters in Autumn

All photography has been provided by Chicago Department of Transportation, Parsons Brinckerhoff, and Site Design Group except the following:

Google Street View
- Page 95, 99 and 105 (existing conditions photos)

CDOT
CHICAGO DEPARTMENT
OF TRANSPORTATION