Livability and Sustainable Communities

The urban form, with its density, public transit and walkable neighborhoods, is a sustainable way for humans to live. Its enhancement and maintenance for the safety and convenience of all users, is fundamental to creating a world where all humans can anticipate a good quality of life without depleting the world’s natural resources.
Urban Form and Efficiency
Public Right of Way = Public Space

- The City’s philosophy on how to design and maintain the public way is critical to its overall performance and sustainability.
Old Fashioned and New Fashioned Sustainability

Accommodate the needs of ALL users in a limited amount of space

Minimize impact on land, air and water resources
The Role of Green Infrastructure

Frequency

Intensity

Current Level of Service

Adaptation Level of Service

Green Infrastructure
The Role of Green Infrastructure

Permeable Pavement

Adaptation (Infiltration)

Mitigation (Energy use)
Getting to Great Streets

Safe Streets: A complete streets approach to designing, building & maintaining Chicago Streets

Modal hierarchy & Mode share

Ecological Services

Safe, Sustainable, Beautiful Streets

Streets for People: A placemaking guide for Chicago Streets

Sustainable Urban Infrastructure: Guidelines and policies for Chicago’s public right of way

Placemaking
CDOT Complete Streets Policy

“The safety and convenience of all users of the transportation system including pedestrians, bicyclists, transit users, freight, and motor vehicle drivers shall be accommodated and balanced in all types of transportation and development projects and through all phases of a project so that even the most vulnerable—children, elderly, and persons with disabilities—can operate safely within the public right of way.”

CDOT

CHICAGO DEPARTMENT OF TRANSPORTATION
Modal Hierarchies

Very clear default, any proposed change must be justified and approved by compliance committee

Goals

• 10% reduction in crashes & injuries each year
• 50% decrease by 2017
• Elimination of traffic fatalities by 2022
### Complete Streets Project Delivery Process

<table>
<thead>
<tr>
<th>Stage</th>
<th>Goal: Identify and promote projects that advance Complete Streets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GOAL: Identify and promote projects that advance Complete Streets</td>
</tr>
<tr>
<td>2</td>
<td>GOAL: Address all modes - consider land use and roadway context</td>
</tr>
<tr>
<td>3</td>
<td>GOAL: Address objectives defined during scoping stage</td>
</tr>
<tr>
<td>4</td>
<td>GOAL: Ensure project is built as designed for Complete Streets</td>
</tr>
<tr>
<td>5</td>
<td>GOAL: Measure the effectiveness of the Complete Street</td>
</tr>
<tr>
<td>6</td>
<td>GOAL: Ensure all users are accommodated through the projects lifespan</td>
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</table>

#### Scoping
- **Step 1:** Establish Objectives
- **Step 2:** Perform Research
- **Step 3:** Conduct Site Visits
- **Step 4:** Assemble Data
- **Step 5:** Set Mode Hierarchy
- **Step 6:** Revisit Objectives

#### Design
- **Step 1:** Draft Alternatives
- **Step 2:** Develop Design
- **Step 3:** Evaluate Impact
- **Step 4:** Obtain Feedback
- **Step 5:** Prepare Final Design

---

**Engage Public Stakeholders**
- Find key opportunities to interface with community groups, residents, and business owners - allow projects to be influenced by lessons learned through outreach efforts.

**Engage Agencies & Departments**
- Coordinate CDOT projects and measurement with external agencies and other city departments to assure the best use of resources and meet multiple objectives through complete design processes.
How Complete is your Street?

- Water
- Energy
- Economics
- Materials and Waste
- Climate & Air Quality
- Local Placemaking
- Urban Ecology
- Commissioning and Performance Standards
Sustainable Urban Infrastructure Design Standards

- Creating new sustainable infrastructure guidelines for the department
- Standards will reference state and national standards in order to compare CDOT efforts to established baselines
- Design interventions to be prioritized based on triple bottom line analysis
- Standards development to include a Task Force Advisory Committee, Stakeholder Group, brainstorming sessions, and public meetings
- Final product to include decision matrix, engineering details and specifications, maintenance requirements, and project manager implementation checklists
Mission

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

Purpose & Need

• To create a safe, livable, and sustainable City.

• 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.
Best Practices

Rating Systems

- FHWA -iINVEST
- ASCE/APWA –ENVISION
- UW – GreenRoads
- IDOT – ILAST
- Sustainable Sites
- LEED ND
Organization

Goals
- Categories
  - Objectives
    - Requirements and Policies
      - Type of project, 1, 2, and 5 year time horizon, Size of project

Process
- Matrix
  - Worksheets/Notebook
    - Compliance Committee

Technical Support
- Guidesheets
  - Data sets
  - Specifications
## Principles and Objectives

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Reduce basement and street flooding</td>
<td>Reduce energy use</td>
<td>Quantify the environmental value of infrastructure investment</td>
<td>Maximize construction waste reduction and recycling</td>
<td>Reduce urban heat island effect</td>
<td>Implement the Complete Streets Design Guide</td>
<td>Create and support natural habitat</td>
<td>Maintain the site team round to ensure environmental benefits</td>
</tr>
<tr>
<td>Reduce CSO events and volumes</td>
<td>Use clean and renewable energy</td>
<td>Coordinate capital improvements with other City departments and agencies to maximize environmental benefits</td>
<td>Maximize the reuse of materials and the use of recycled materials</td>
<td>Use Low-emitting materials</td>
<td>Create unique and quality spaces within the public right-of-way that reflect the local neighborhood</td>
<td>Protect and restore natural habitat</td>
<td>Identify and develop design tools to predict performance</td>
</tr>
<tr>
<td>Reduce potable water use</td>
<td>Use the public ROW to generate &amp; transmit renewable energy</td>
<td>Streamline utility coordination and installation to minimize environmental impact</td>
<td>Support sustainable production practices</td>
<td>Promote alternative fuel use</td>
<td>Educate and promote environmental awareness and the environmental benefits of the projects</td>
<td>Allow for interaction and observation of both people and the natural world</td>
<td>Evaluate, verify and document performance and update design tools</td>
</tr>
<tr>
<td>Clean and direct stormwater to natural water bodies</td>
<td>Maximize implementation of adaptation strategies to ensure public health and safety and protect the capital investment</td>
<td>Reduce emissions related to construction activity</td>
<td>Include stakeholder input in the decision making process</td>
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<tr>
<td>Reduce non-point source pollution to natural water bodies</td>
<td>Support Green Collar Job Creation</td>
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<tr>
<td>Ensure erosion and sediment control</td>
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</tbody>
</table>
Project Implementation

Green Alleys

Parking Lots

Diagonal Parking Areas

Parking/Bike Lanes
Project Implementation

- Plazas
- Sidewalk Parkways
- Bump-outs
- Residential Parking Lanes
Maxwell Street Permeable Market Plaza

- .89 acres of permeable, high albedo pavers
- Pavers have initial SRI of .30 or 32%
- .19 acres of adjacent bioswale
Market Plaza: Preliminary Monitoring Results

1/16/09 (temp in degrees)
- Air: -7.0
- Deep: 38.6
- Middle: 34.1
- Shallow: 33.4

EPA Research Questions
- Runoff Volume and Rate
- Surface Water Quality
- Ground Water Quality
- Freeze/Thaw Performance
The Cermak / Blue Island Sustainable Streetscape
**Project Sustainable Goals**

<table>
<thead>
<tr>
<th><strong>Stormwater Management</strong></th>
<th>Divert 80% of the typical average annual rainfall and at least 2/3 of rainwater falling within catchment area into stormwater best management practices.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water Efficiency</strong></td>
<td>Eliminate use of potable water for irrigation, specify native or climate adapted, drought tolerant plants for all landscape material.</td>
</tr>
<tr>
<td><strong>Transportation</strong></td>
<td>Improve bus stops with signage, shelters and lighting where possible, promote cycling with new bike lanes, improve pedestrian mobility with accessible sidewalks.</td>
</tr>
<tr>
<td><strong>Energy Efficiency</strong></td>
<td>Reduce energy use by min. 40% below a typical streetscape baseline, use reflective surfaces on roads/sidewalks, use dark sky-friendly fixtures. Min. 40% of total materials will be extracted, harvested, recovered, and/or manufactured within 500 miles of the project site.</td>
</tr>
<tr>
<td><strong>Recycling</strong></td>
<td>Recycle at least 90% of construction waste based on LEED NC criteria, Post/Pre-Consumer recycled content must be min. 10% of total materials value.</td>
</tr>
<tr>
<td><strong>Urban Heat Island, Air Quality</strong></td>
<td>Reduce ambient summer temperatures on streets and sidewalks through use of high albedo pavements, roadway coatings, landscaping, and permeable pavements. Require ultra low sulfur diesel and anti-idling.</td>
</tr>
<tr>
<td><strong>Education, Beauty &amp; Community</strong></td>
<td>Provide public outreach materials/self-guided tour brochure to highlight innovative, sustainable design features of streetscape. Create places that celebrate community, provide gathering space, allow for interaction and observation of people and the natural world.</td>
</tr>
<tr>
<td><strong>Commissioning</strong></td>
<td>Model Stormwater BMP’s in Infoworks to analyze and refine design. Monitor stormwater BMP’s to ensure predicted performance and determine maintenance practices.</td>
</tr>
</tbody>
</table>
Juarez Water Feature
Juarez Water Feature
Integrated Design: Blue Island Cross Section

- Permeable Pavement for Stormwater Management
- Photocatalytic for Air Quality
- High SRI for Lighting and UHI
- Bike/ Parking Lane
Sidewalk Planter
Permeable Parking/Bike Lane
Stormwater Storage Extends to Planted Area
Western Avenue Plaza
Education: Informational Kiosks with Interpretive Graphics, Lightpole Identifiers, and Walking Tour
## Commissioning - Construction Goals

<table>
<thead>
<tr>
<th>Category</th>
<th>Overall Project Goal</th>
<th>Percent of Materials Installed as of Jun 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Materials</td>
<td>40%</td>
<td>76%</td>
</tr>
<tr>
<td>Recycled Content</td>
<td>10%</td>
<td>23%</td>
</tr>
<tr>
<td>Construction Waste</td>
<td>90%</td>
<td>60%</td>
</tr>
</tbody>
</table>
Commissioning- Monitoring Plan

- Assess individual and sequential BMPs relative to stormwater flow and pollutant load reduction.

- Determine pollutant load and flow control of the BMP(s) under typical operating conditions relative to current background conditions.

- Determine the BMP(s) response to varying storm characteristics and antecedent weather conditions.

- Determine BMP integrity over the course of the study.

- Air quality testing for depolluting pavers.
So, How Complete is your Street?

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Streetscape and Sustainable Design Program  |  312-744-5900