Complete Streets:

When Cars, Bikes, Peds and Transit Play Nice

Tim Papandreou- Moderator
Darby Watson
Jim Stickley
Dennis Woods

October 16, 2012
Introductions

• Policy & Planning
• Design
• Implementation
Complete Streets Policy
Complete Streets - National Coalition

Serve

Safety

Change

Policy
Serve all users

- Modes: walkers, drivers, bicycle riders, transit riders, people who deliver goods

- Populations: children, seniors, people with disabilities
Ensure safety, convenience, and accessibility for all

Hit by a vehicle traveling at 20 MPH:
9 out of 10 pedestrians survive.

Hit by a vehicle traveling at 30 MPH:
5 out of 10 pedestrians survive.

Hit by a vehicle traveling at 40 MPH:
Only 1 out of 10 pedestrians survives.

© Peds.org
Change how transportation agencies and communities approach street projects

Roosevelt Blvd. and Sandpoint Way, Seattle
Complete Streets- Seattle Definition

Seattle's Complete Streets guiding principle is to design, operate and maintain Seattle's streets to promote safe and convenient access and travel for all users --- pedestrians, bicyclists, transit riders, and people of all abilities, as well as freight and motor vehicle drivers

Prioritize:

1. Safety
2. Mobility
(A) Commencing January 1, 2011, upon any substantial revision of the circulation element, the legislative body shall modify the circulation element to plan for a balanced, multimodal transportation network that meets the needs of all users of the streets, roads, and highways for safe and convenient travel in a manner that is suitable to the rural, suburban, or urban context of the general plan.

(B) For the purposes of this paragraph, “users of streets, roads, and highways” means bicyclists, children, persons with disabilities, motorists, movers of commercial goods, pedestrians, users of public transportation, and seniors.
Complete Streets- California

AB 1358 CA Complete Streets Act

Goals

1. Reduce GHG
2. Safety
3. Public Health
4. Economic Development
Complete Streets- California

AB 1358 CA Complete Streets Act

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Goals

1. Reduce GHG
2. Safety
3. Public Health
4. Economic Development
Additions

- Green Stormwater Infrastructure
- Climate Action
- GHG Offsets
Exemptions

City of Seattle: Director’s approval
Planning
Comprehensive Planning

Mode Choice Goals for Work Trips to Seattle & its Urban Centers

Proportion of work trips made using Non-SOV Modes

<table>
<thead>
<tr>
<th>Urban Center</th>
<th>2000*</th>
<th>2010 Goal</th>
<th>2020 Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Downtown</td>
<td>56%</td>
<td>62%</td>
<td>70%</td>
</tr>
<tr>
<td>First Hill/Capitol Hill</td>
<td>31%</td>
<td>37%</td>
<td>50%</td>
</tr>
<tr>
<td>Uptown/Queen Anne</td>
<td>33%</td>
<td>37%</td>
<td>50%</td>
</tr>
<tr>
<td>South Lake Union</td>
<td>30%</td>
<td>37%</td>
<td>50%</td>
</tr>
<tr>
<td>University District</td>
<td>56%</td>
<td>62%</td>
<td>70%</td>
</tr>
<tr>
<td>Northgate</td>
<td>26%</td>
<td>30%</td>
<td>40%</td>
</tr>
<tr>
<td>Seattle</td>
<td>39%</td>
<td>42%</td>
<td>45%</td>
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</tbody>
</table>

* 2000 mode choice numbers are from the U.S. Census for the year 2000 journey to work data by place of employment.
Modal Planning

- Pedestrians
- Bicyclists
- Transit
- Goods Movement
Seattle Pedestrian Master Plan

Prioritizing Investments

- Building Blocks
- Contribution to Total Score
- High Priority Areas
- Needs Assessment

Project Priorities

Demand: 40%

Equity: 35%

Corridor Function: 25%

Along the Roadway Score

- Prioritize projects in areas where people need to be able to walk the most

- AND

- Where conditions are difficult

Planning
Transit Plans
Goods Movement and Freight Planning

Freight Mobility Strategic Action Plan
June 2005

SDOT
Seattle Department of Transportation

Planning
Neighborhood Plans

T2: Valley Street Mobility Hub — This hub would be on Valley Street near Lake Union Park where the Lake Union Streetcar intersects with the Lake-to-Ray Loop Trail and the Cheshiahud Loop Trail. It is also in close proximity to Lake Union Ferry service and Kenmore Air Harbor.

**TRANSIT + TRANSPORTATION**
- A1: South Lake Union Streetcar
- A2: Bus to Ballard, Fremont and Greenlake (Future potential streetcar)
- A3: Private-shuttle bus stop
- A4: Transit information kiosk
- A5: Kenmore Air Harbor
- A6: Lake Union Foot Ferry (Potential)

**PEDESTRIAN + BICYCLE**
- B1: Pedestrian amenities and improvements
- B2: Bike lanes
- B3: Lake-to-Ray Loop Trail
- B4: Cheshiahud Trail
- B5: Bike Station

**CIVIC + COMMUNITY**
- C1: Lake Union Park
- C2: Center for Wooden Boats Education Center (Future)
- C3: Museum of History and Industry (MOHAI)
- C4: Northwest Native canoe Center (Future)
- C5: Special event opportunity at surface parking

*Image: HEFFRON TRANSPORTATION - VIA ARCHITECTURE*
Infrastructure Planning

SDOT Arterial Asphalt and Concrete Program
Current Paving Schedule 2012-2015

Legend:
- BTG / AAC Paving Plan
- 2007 - 2015
- Completed Projects
- 2012
- 2013
- 2013 (pending funding)
- 2014
- 2015
- 2015 (pending funding)
- Arterial Streets
- Non-Arterial Streets
Intro

Complete Streets *Plus* *(CS+)*

Modal-balance +

social &

ecological function

Design
Intro
Modal Balance +......
Intro
Modal Balance +.....
Intro
Modal Balance +.....
Intro
Modal Balance +...
Intro
Modal Balance + ….

Service / Delivery
Intro
Modal Balance +.....
Intro
Modal Balance +.....
Intro
Modal Balance +......
Intro
Modal Balance +.....
Intro
Social function +.....
Intro

Social function +.....
Intro
Social function +...
Intro
Social function +......

Design

Commerce

Socializing
Intro
Social function +

Design

- Commerce
- Dining
- Socializing
Intro
Social function + ...
Intro

Ecological Function
Intro
Ecological Function
Intro
Ecological Function
Intro
Ecological Function

Habitat
Intro
Ecological Function

Habitat

Passive Cooling / Heat Island Effect

Stormwater Management
Intro
Complete Streets Plus (CS+)

Modal Balance + Social Function + Ecological Function
CASE STUDIES
CPMC Cathedral Hill Streetscape
CASE STUDIES

CPMC Cathedral Hill Streetscape
CASE STUDIES

CPMC Cathedral Hill Streetscape

Modal Balance

Design
CASE STUDIES

CPMC Cathedral Hill Streetscape

Emergency Access

Modal Balance
Case Studies: CPMC Cathedral Hill Streetscape

- Emergency Access
- Lobby Entrances

Modal Balance
CASE STUDIES

CPMC Cathedral Hill Streetscape

Emergency Access
Lobby Entrances
Drop – off Areas

Modal Balance
CASE STUDIES

CPMC Cathedral Hill Streetscape

Emergency Access  
Transit / Shuttle  
Lobby Entrances  
Drop – off Areas  
Modal Balance
CASE STUDIES

CPMC Cathedral Hill Streetscape

Modal Balance

Emergency Access
Lobby Entrances
Drop – off Areas

Transit / Shuttle
Parking Entry / Exit
CASE STUDIES

CPMC Cathedral Hill Streetscape

- Emergency Access
- Lobby Entrances
- Drop – off Areas
- Transit / Shuttle
- Parking Entry / Exit
- Service / Delivery / Loading

Modal Balance
CASE STUDIES

CPMC Cathedral Hill Streetscape

Social Function

Design
CASE STUDIES

CPMC Cathedral Hill Streetscape

WHERE’S THE “THERE” THERE?

Social Function
Design
CASE STUDIES

CPMC Cathedral Hill Streetscape

Social Function

Design
CASE STUDIES

CPMC Cathedral Hill Streetscape

Social Function
CASE STUDIES

CPMC Cathedral Hill Streetscape

Social Function
CASE STUDIES

CPMC Cathedral Hill Streetscape

Ecological Function
CASE STUDIES

CPMC Cathedral Hill Streetscape

Design

Ecological Function
CASE STUDIES

CPMC Cathedral Hill Streetscape

Ecological Function

Design
CASE STUDIES
Washington Avenue – St Louis
CASE STUDIES
Washington Avenue – St Louis
CASE STUDIES
Washington Avenue –
St Louis
CASE STUDIES

Washington Avenue – St Louis
CASE STUDIES

GreenPlan – Philadelphia

Design
CASE STUDIES

GreenPlan – Philadelphia
## CASE STUDIES

### GreenPlan – Philadelphia

#### Benefits Matrix

<table>
<thead>
<tr>
<th>ELEMENTS OF GREEN PLACES</th>
<th>ENVIRONMENT</th>
<th>ECONOMY (PRODUCTIVE LAND USE)</th>
<th>QUALITY OF LIFE</th>
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<td>Trees</td>
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## CASE STUDIES

**GreenPlan – Philadelphia**

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*Design*
CASE STUDIES

GreenPlan – Philadelphia
CASE STUDIES

GreenPlan – Philadelphia

Design
CASE STUDIES

GreenPlan – Philadelphia
CASE STUDIES

Castro Valley Boulevard

Rain Garden
This landscape feature is planted with native plants and is used to filter pollutants from storm water runoff. Provide seating to accommodate street activities.

Bike Lane
Provide designated striping, signing, and colored paving. This portion of the street delineates the zone assigned to bicyclists while visually and physically narrowing the vehicular zone.

Crosswalk
Highly visible crosswalk markings are combined with colored and textured asphalt.

Bike Parking
The dedicated and unobtrusive bike parking zone helps keep bicycles off the sidewalk. Bollards are used to clearly delineate the space and provide protection from parking motorists. Additional bike racks may be provided at select retail destinations.

Parallel Parking
This option effectively achieves compression by physically narrowing the roadway and using decorative paving materials to visually expand the pedestrian realm.

Bulb-out
This sidewalk extension improves pedestrian crossings by reducing the pedestrian crossing distance and visually and physically narrowing the roadway. This bulb-out incorporates ADA compliant ramps and bollard protection.
CASE STUDIES

Castro Valley Boulevard

Design
CASE STUDIES

Castro Valley Boulevard

Design
CASE STUDIES

Castro Valley Boulevard
CASE STUDIES

Miller Avenue – Mill Valley

Design
CASE STUDIES

Miller Avenue – Mill Valley

Gateway

ECOLOGICAL ENHANCEMENT

Design
CASE STUDIES

Miller Avenue – Mill Valley

Main Street

ENHANCE MAINSTREET
VITALITY & BEAUTY

Design
CASE STUDIES

Miller Avenue – Mill Valley

Parkway

ENHANCE THE "ARBORETUM"
CASE STUDIES

Miller Avenue – Mill Valley

MAINTAIN RURAL CHARACTER

Design

Passage
CASE STUDIES

Miller Avenue – Mill Valley

Design
CASE STUDIES

Miller Avenue – Mill Valley

Design
**CASE STUDIES**

**Function**

“Parklets are intended to provide space for people to sit, relax, and enjoy the city around them...

... “Parklets must remain free and open for any member of the public to use.”

... “Parklets are intended to be aesthetic improvements to the streetscape... Greening is an important aspect of this beautification. Materials are high-quality, durable, and beautiful.”

- San Francisco Pavement to Parks Program
CASE STUDIES

Townsend Street Park-let

Contributors

Telling the story of Town’s End...

Design
CASE STUDIES

Townsend Street Park-let

Precedents and Inspirations

- Maritime/Shoreline
- Rail/Industry
- Crossroads/Terminus

Design
CASE STUDIES

Townsend Street Park-let

Design
CASE STUDIES

Townsend Street Park-lot

Design
CASE STUDIES

Townsend Street Park-let

Design
CASE STUDIES

Townsend Street Park-let

Design
Intro

Complete Streets *Plus* *(CS+)*

Modal-balance +

social &

ecological function

Design

South Street Streetscape @ Windsor Town Green, Windsor, CA
Complete Streets Implementation
Introduction

Sustainable Living Street
Dennis L. Woods

Project Team:

- Borderline Neighbors
- Nelson-Nygaard
- Blackbird Architects
- Van Atta & Associates
- Sherwood Design Engineers
- Miramontes Construction
Location
History & Place

Red Car Line
History & Place
Borderline Neighborhood
Sustainable Living Street

- Starbucks
- Auto Dealership
- Restaurant
- Lincoln Blvd. (Pacific Coast Highway)
- Auto Dealership
- Big Blue Bus to LAX and Downtown Santa Monica to Expo Line
- Restaurant
- Whole Foods
- Ozone Park
- Ozone St.
- Navy St.
- Marine St.
Description of Area

- Small lots
- Existing sidewalks not ADA accessible
- Narrow right-of-way 40’ wide
- Paved with asphalt
  No sidewalks or landscaping
Problems/Issues

- Crime
- Speeding
- Traffic Related Issues
- Encroachment of Business Activities
- Parking Encroachments
- Damage to Vehicles and Property
- Trash Dumping
- Lack of ADA Access
- Lack of Delineation Between Pedestrians, Traffic & Parking
- Pedestrian Safety
- Lack of Landscaping
Problems/Issues
Process

- 20 years of attempted mitigation
- Requested geometric changes
  - Long lasting mitigation
  - Reduce reliance on City resources
  - Expand open space & parks
  - Sustainability
- Outside support
- Tours of area
- Requested funding for feasibility study
- Requested funding for construction
- City Council awards construction contract
- Ribbon Cutting
Conventional streets are designed by professionals from various fields who operate in disconnected “silos” of expertise such as traffic engineering, road pavement design, sidewalk design and landscaping. The neighborhood streets resulting from this design process optimize vehicle circulation at the expense of the health and safety of children, pedestrians, cyclists, the local community and the environment.

Photo: FHWA
In contrast, **living street designs** combine planning, engineering, design and ecological considerations to create a space that can be safely shared by all users.

Living streets have no separate sidewalks or curbs and gutters, but rather provide a shared space that is safe and accessible for pedestrians, wheelchairs, cyclists and low-speed vehicles. They also allow for integrated percolation and drainage through centerline drainage, landscaping and the use of porous paving materials.

![Photo: Smart Growth America](image1.jpg)

![Photo: Blackbird Architects America](image2.jpg)
Living Street Desired Outcomes

- Woonerf Concept
- Walkability
- Communal “Front Yard”
- Urban Park
- Traffic Calming
- Reclaim Street for Residents
- Reduce Crime
- Neighborhood Entry
- ADA Accessible
- Emergency Vehicle Access
- Access for City Services
- Sustainable Design
Sustainability

The most popular definition of sustainability can be traced to a 1987 UN conference. It defined sustainable developments as those that "meet present needs without compromising the ability of future generations to meet their needs" (WECD, 1987).

These well-established definitions set an ideal premise, but do not clarify specific human and environmental parameters for modeling and measuring sustainable developments. The following definitions are more specific:

"Sustainable means using methods, systems and materials that won't deplete resources or harm natural cycles" (Rosenbaum, 1993).

Sustainability "identifies a concept and attitude in development that looks at a site's natural land, water, and energy resources as integral aspects of the development" (Vieira, 1993)

"Sustainability integrates natural systems with human patterns and celebrates continuity, uniqueness and placemaking" (Early, 1993)
Sustainable Design

Stormwater Management
  • Permeable Pavement
  • Planting Areas
  • Native Landscaping

Solar Power

Placemaking

Context Sensitive Design
Pervious pavement consists of permeable or perforated paving materials or pavers with spaces that allow transmission of water to aggregate base and sub-soils. Runoff is temporarily stored in the base before infiltration into the sub-soils and/or slow release to storm drain system. Common types of pervious pavement include plastic rings planted with grass, stone or concrete blocks with pore spaces backfilled with gravel or sand, porous asphalt, and porous concrete.
Sustainability through Stormwater Management – Permeable Pavement

Design Guidelines for Subsurface Infiltration

- Riverjacks open into recharge bed
- Uncompacted subgrade is critical for proper infiltration
- Filter fabric lines the subsurface bed
- Porous asphalt pavement
- Uniformly graded stone aggregate with 40% void space for stormwater storage and recharge

Pennsylvania Storm Water Best Practices
Sustainability through Stormwater Management – Planting Areas
Sustainability through Native Landscaping

- Landscaping as added site amenity and potential for wildlife habitat.
- Native plantings reduce irrigation and fertilization requirements, as well as the use of fossil fuels and air pollution, relative to turf landscapes that require regular watering, mowing and maintenance.
- Reduces runoff volumes.
- Increases permeability of compacted soils, thereby, increasing infiltration rates.
- Increases organic content of soils.
- Increases ability to remove nutrients.
Sustainability through Solar
“The design of a street is only one aspect of its effectiveness. How the street fits within the surrounding transportation network and supports adjacent land uses will also be important to its effectiveness.” — Charlotte “Urban Street Design Guidelines”
Rule One: Think of Streets as Public Spaces

Rule Two: Plan for Community Outcomes

Rule Three: Design for Appropriate Speeds

Moving Beyond Complete Streets to Build Communities
Sustainability through Placemaking

- Urban Park
- Communal “Front Yard”
- Art Elements
- Elements from Main St., Disneyland
Sustainability through Context Sensitive Design

**What is Context Sensitive Design?** *(www.cts.umn.edu/education/csd/index.html)*
By the Minnesota Department of Transportation

Context Sensitive Design (CSD) is the art of creating public works projects that meet the needs of the users, the neighboring communities, and the environment. It integrates projects into the context or setting in a sensitive manner through careful planning, consideration of different perspectives, and tailoring designs to particular project circumstances.

Context Sensitive Design uses a collaborative, interdisciplinary approach that includes early involvement of key stakeholders to ensure that transportation projects are not only “moving safely and efficiently,” but are also in harmony with the natural, social, economic, and cultural environment.

CSD requires an early and continuous commitment to public involvement, flexibility in exploring new solutions, and an openness to new ideas. Community members play an important role in identifying local and regional problems and solutions that may better meet and balance the needs of all stakeholders. Early public involvement can help reduce expensive and time-consuming rework later on and thus contributes to more efficient project development.
Sustainability through Context Sensitive Design

Context Sensitive Design promotes 6 key principles:

1. Balance safety, mobility, community, and environmental goals in all projects.
2. Involve the public and affected agencies early and continuously.
3. Use an interdisciplinary team tailored to project needs.
4. Address all modes of travel.
5. Apply flexibility inherent in design standards.
6. Incorporate aesthetics as an integral part of good design.
Design Features

- 14’ Wide Carriageway
- (2) 8’ Wide Parking Lanes
- (2) 5’ Wide Landscape Areas
- Variety of Paving Materials, Patterns & Textures
- Shielded Solar Powered Lighting
- Native Plantings
- Drip Irrigation
- Framed Street signs
- Pole-top Finials
- Art Element
Before

Intersection of
Longfellow and Ozone

After
Intersection of Longfellow and Navy
Intersection of Longfellow & Navy Street
Intersection of Longfellow & Navy Street

Photo: Blackbird Architects
Intersection of Longfellow & Navy Street

Photo: Blackbird Architects
Intersection of Longfellow & Navy Street

Photo: Blackbird Architects