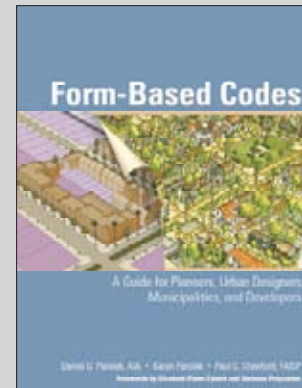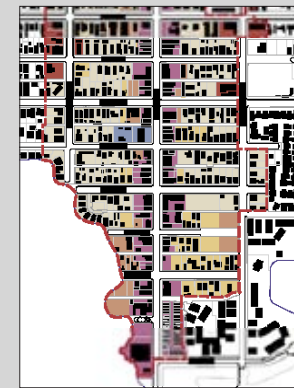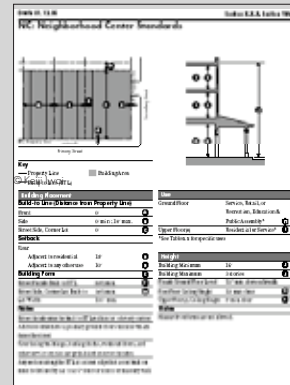# Form-Based Codes: Reinforcing Community Character and Walkable Urbanism with Zoning

Daniel Parolek, AIA
Principal
Opticos Design, Inc.
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ww.opticosdesign.com

Cincinnati Form-Based Code
Consultation
January 8, 2010

OPTICOS

New Definition

"Form-based codes foster predictable built results and a high-quality public realm by **using physical form (rather than separation of uses) as the organizing principle** for the code. They are regulations, not mere guidelines. They are adopted into city or county law. Form-based codes are an alternative to conventional zoning."

Form-Based Code Institute

Form-Based Codes | The Definition

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1

Why is it Necessary to Reconceive Zoning?

Form-Based Codes as an Alternative Approach to Zoning

A Broken System: Default is sprawl

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A Broken System: Barriers to Revitalization

Responding to a Demographic Shift

1. By 2040, 74% of American households will not have children.*

2. 75% of seniors currently live in single-family detached houses. More than 1/2 will eventually move into attached housing.*

3. 51% prefer living in a city or close to a city as opposed to the suburbs.*

4. 30-40% want walkable urbanism, while only 5-10% of housing is being provided in walkable environments.**

*C. Nelson, New Partners for Smart Growth Keynote, Jan. 2009
**C. Leinberger, New Partners for Smart Growth Keynote, Jan. 2009

2
Form-Based Code Components

A Recipe for Success

The Regulating Plan

Regulating Places, Not Uses
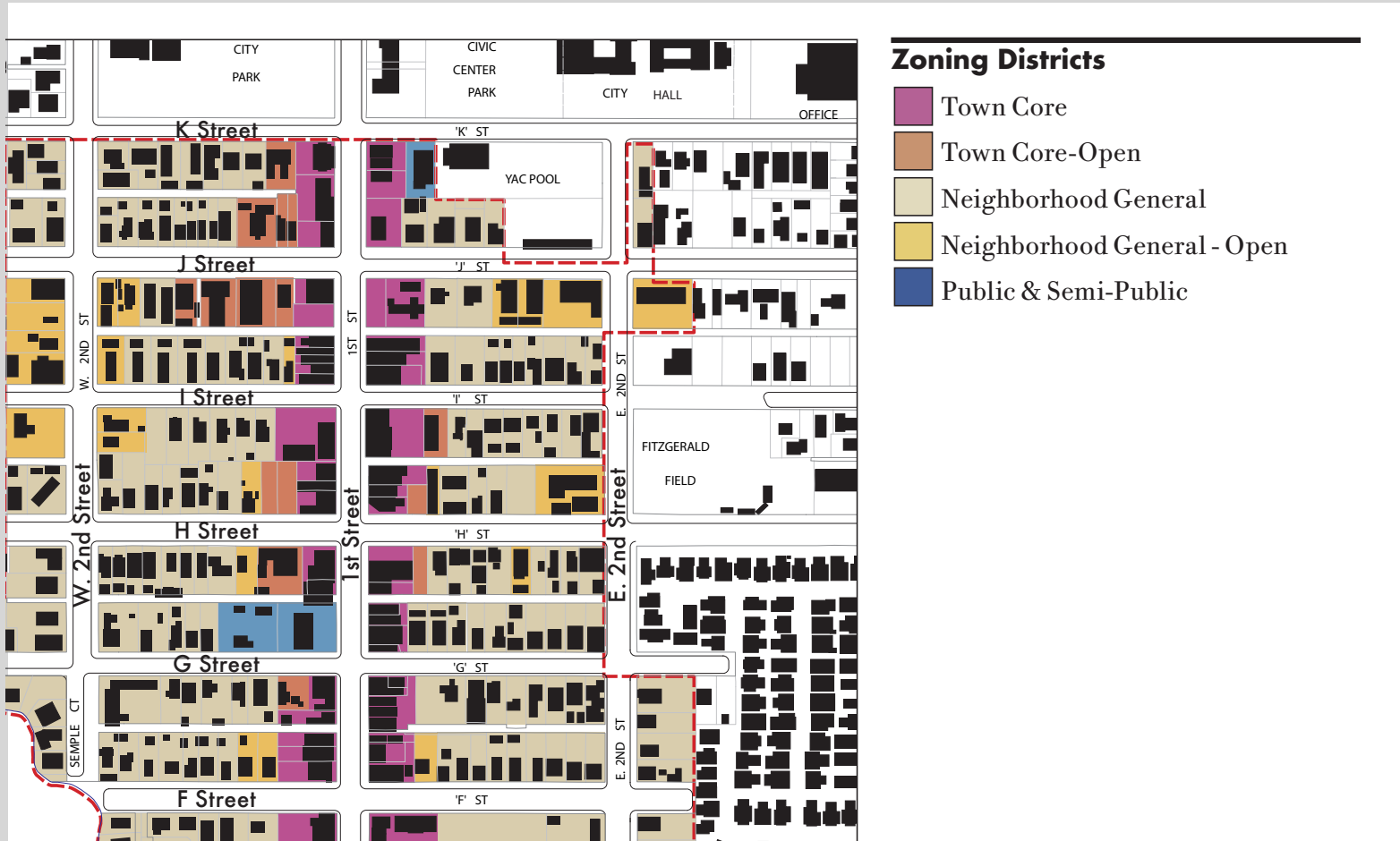
Benicia Downtown Mixed-Use Master Plan (Opticos Design and Crawford, Multari & Clark)

Zoning Districts

- Town Core
- Town Core-Open
- Neighborhood General
- Neighborhood General - Open
- Public & Semi-Public

Form-Based Codes | The Regulation Plan

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Use vs Place

**Auto-Dependent:
Primarily about use**

**Walkable Urbanism: Intended
place is primary intended use
is tiertiary**

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Building Form Standards

Graphic and Easy to Understand

1" = 15'-0"

Property Line   Street
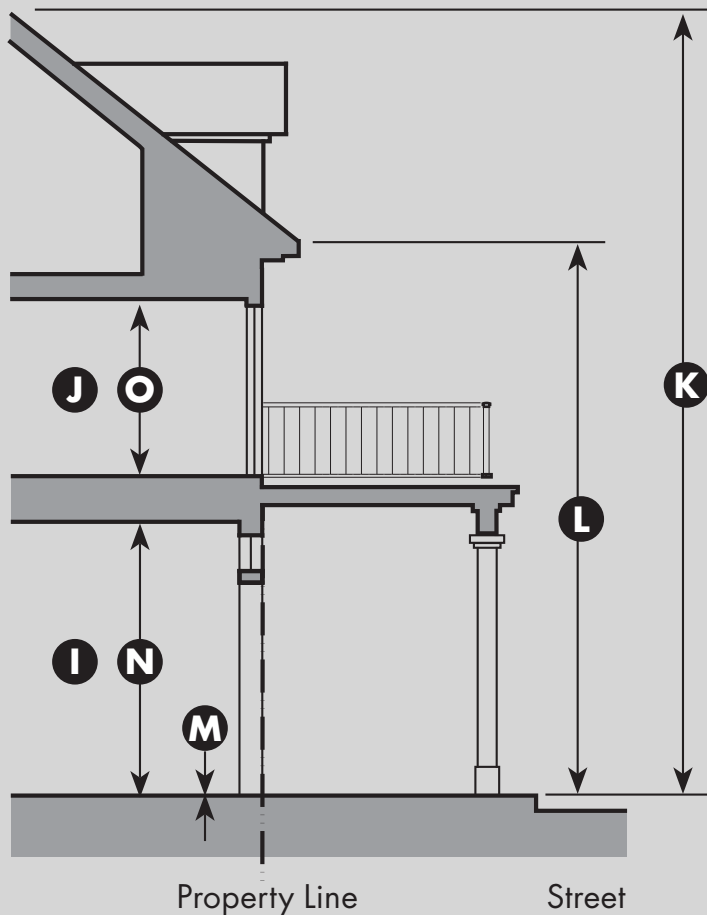
Use		
Ground Floor	Service, Retail, or Recreation, Education & Public Assembly*	**I**
Upper Floor(s)	Residential or Service*	**J**

*See Table 4.1 for specific uses. Ground floors that face the waterfront shall be nonresidential and shall not include parking, garages, or similar uses.

Height		
Building Min.	22'	**K**
Building Max.	2.5 stories and 40'	**K**
Max. to Eave/Top of Parapet	35'	**L**
Ancillary Building Max.	2 stories and 25'	
Finish Ground Floor Level	6" max. above sidewalk	**M**
First Floor Ceiling Height	12' min. clear	**N**
Upper Floor(s) Ceiling Height	8' min. clear.	**O**

Form-Based Codes | Building Form Standards

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Building Form Standards: 4-Page Template

17.21.050 - Neighborhood Center (NC) Standards

Key
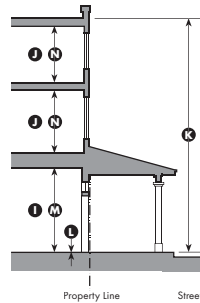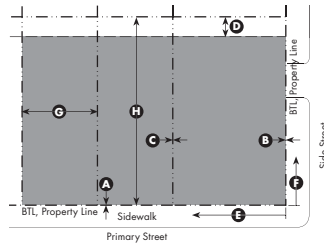
---•--- Property Line   --- Setback Line
-- -- Build-to Line (BTL)   ▨ Building Area

Building Placement		
Build-to Line (Distance from Property Line)		
Front	0′	Ⓐ
Side Street, corner lot	0′	Ⓑ
Setback		
Side	0′	Ⓒ
Rear		
Adjacent to residential	10′	Ⓓ
Adjacent to any other use	5′	Ⓓ
Building Form		
Primary Street built to BTL	80% min.*	Ⓔ
Side Street, Corner Lot built to BTL	30% min.*	Ⓕ
Lot Width	75′ max.	Ⓖ
Lot Depth	150′ max.	Ⓗ
* Street facades must be built to BTL within 30′ of every corner.		

Notes

All floors must have a primary ground-floor entrance which faces the street.

Rear facing buildings, loading docks, overhead doors, and other service entries are prohibited on street facades.

Use		
Ground Floor	Service, Retail, or Recreation, Education & Public Assembly*	Ⓘ
Upper Floor(s)	Residential or Service*	Ⓙ
*See Table 2.2 for specific uses.		

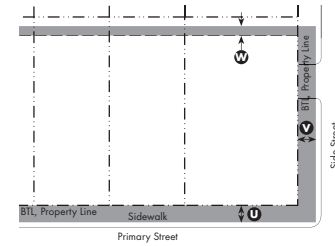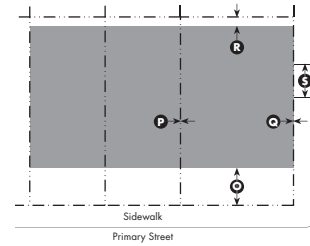| Height		
Building Minimum	16′	Ⓚ
Building Maximum	3 stories*	Ⓚ
Finish Ground Floor Level	12″ max. above sidewalk	Ⓛ
First Floor Ceiling Height	12′ min. clear	Ⓜ
Upper Floor(s) Ceiling Height	8′ min. clear	Ⓝ
*4 stories for approved affordable and/or senior housing		

Notes

Mansard roof forms are not allowed.

Buildings greater than 16 units must provide adequate common space for residents in the form of community rooms, roof terraces, or courtyards.

Any section along the BTL not defined by a building must be defined by a 4′ to 6′ high fence or stucco or masonry wall.

Key

---•--- Property Line   --- Setback Line
▨ Parking Area

Parking		
Location (Distance from Property Line)		
Front Setback	20′	Ⓞ
Side Setback	0′	Ⓟ
Side Street Setback	5′	Ⓠ
Rear Setback	5′	Ⓡ
Required Spaces		
Ground Floor		
Uses < 3,000 sf	No off-street parking required	
Uses > 3,000 sf	1 space/500 sf	
Upper Floor(s)		
Residential uses	1 space/unit; .5 space/studio	
Other uses	1 space/300 sf	

Notes

Parking Drive Width	15′ max.	Ⓢ

On corner lots, parking drive shall not be located on primary street. Ⓣ

Shared drives are encouraged between adjacent lots to minimize curb cuts along the street.

Parking may be provided off-site within 1,300′ or as shared parking .

Bicycle parking must be provided and in a secure environment. See Chapter 17.36 for further parking specifications.

Key

---•--- Property Line   --- Setback Line
-- -- Build-to Line (BTL)   ▨ Encroachment Area

Encroachments		
Location		
Front	12′ max.	Ⓤ
Side Street	8′ max.	Ⓥ
Rear	4′ max.	Ⓦ

Notes

Canopies, Awnings, and Balconies may encroach over the BTL on the street sides and into the setback on the rear, as shown in the shaded areas. Only Balconies are allowed at the rear encroachment.

Upper story galleries facing the street must not be used to meet primary circulation requirements.

| Frontage Types		
Canopies		
Clearance	1′ min. back from curb line	
Height	9′ min. clear, 2 stories max.	
Awnings		
Depth	10′ max.	
Forecourts		
Depth	20′ min., not to exceed width	
Width	20′ min., 50% of lot width max.	

Form-Based Codes | Building Form Standards

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Building Form Standards: 4-Page Template

Table 2.2: Neighborhood Center (NC) Zone Allowed Land Uses and Permit Requirements

Land Use Type[1]	Permit Required	Specific Use Regulations	Land Use Type[1]	Permit Required	Specific Use Regulations
Recreation, Education & Public Assembly			**Retail**		
Commercial recreation facility: Indoor	MUP		Bar, tavern, night club	UP	
Health/fitness facility	MUP		General retail, except with any of the following features:	P	
Library, museum	P		Alcoholic beverage sales	MUP	
Meeting facility, public or private	UP		Floor area over 10,000 sf	UP	
Park, playground	P		On-site production of items sold	MUP	
School, public or private	UP[2]		Operating between 9pm and 7am	UP	
Studio: Art, dance, martial arts, music, etc.	P		Neighborhood market	MUP	
Residential			Restaurant, café, coffee shop	MUP	
Home Occupation	P[2]	17.44.100	**Services: Business, Financial, Professional**		
Mixed use project residential component	P[2]	17.44.140	ATM	P	
			Bank, financial services	P	
Residential accessory use or structure	P[2]	17.44.020	Business support service	P	
Residential care, 7 or more clients	UP		Medical services: Clinic, urgent care	MUP	
Second unit or carriage house	P	17.44.190	Medical services: Doctor office	P	
			Medical services: Extended care	UP	
			Office: Business, service	P	
			Office: Professional, administrative	P	
			Services: General		
			Day care center: Child or adult	MUP	17.44.060 17.44.110
			Day care center: Large family	P	17.44.060
			Day care center: Small family	P	
			Lodging: Bed & breakfast inn (B&B)	MUP	
Key			Public safety facility	UP	
P	Permitted Use		Personal services	P	
MUP	Minor Use Permit Required		**Transportation, Communications, Infrastructure**		
UP	Use Permit Required		Parking facility, public or commercial	UP	
NA	Use Not Allowed		Wireless telecommunications facility	UP	17.46

End Notes

[1] A definition of each listed use type is in Article 10 (Glossary).

[2] Allowed only on second or upper floors, or behind ground floor use.
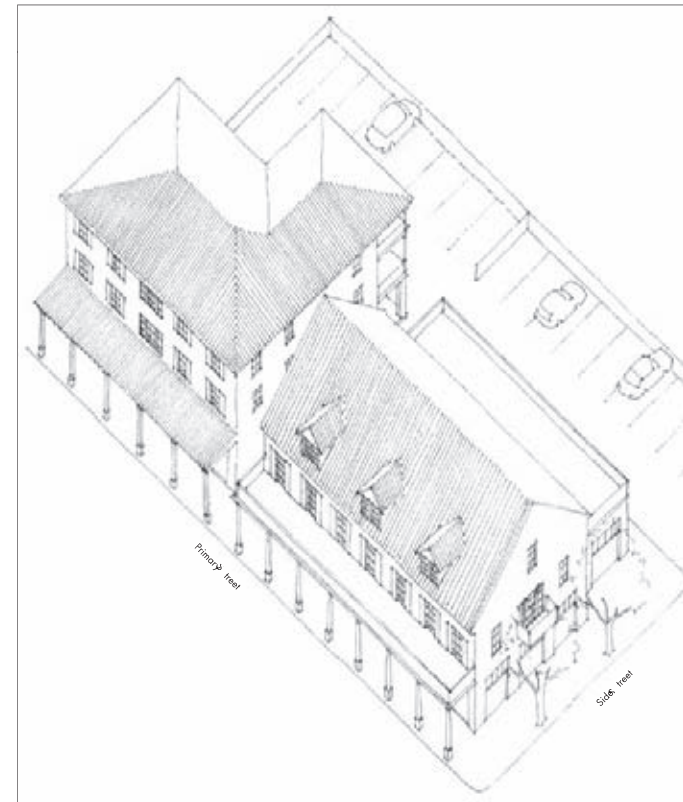
Examples of buildings in a Neighborhood Center area.

Form-Based Codes | Building Form Standards

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Prescriptive & easy to use
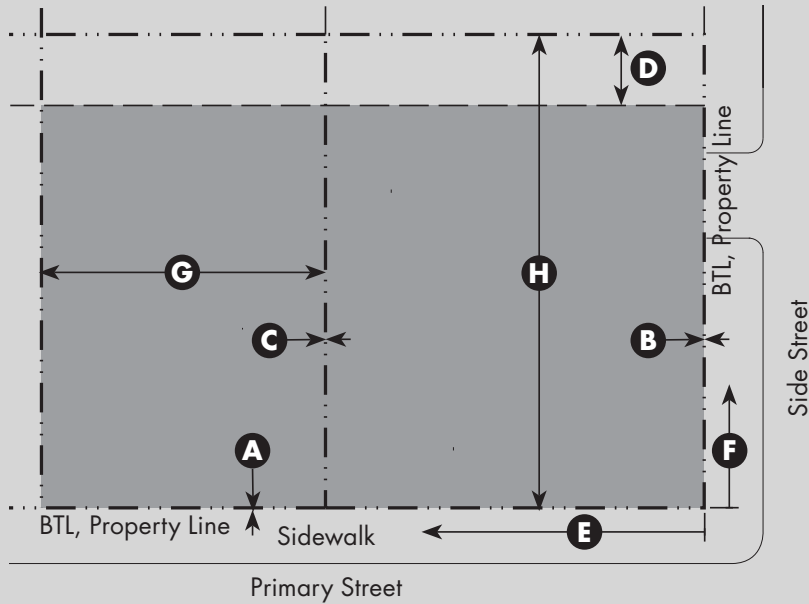
Key

- ----- Property Line
- ----- Build-to Line (BTL)
- ----- Setback Line
- ▓ Building Area

Building Placement		
Build-to Line (Distance from Property Line)		
Front	0′	**A**
Side Street	0′	**B**
Setback (Distance from Property Line)		
Side	0′	**C**
Rear		
Adjacent to NG Zone	8′	**D**
Adjacent to any other Zone	5′	**D**
Building Form		
Primary Street Façade built to BTL	80% min.*	**E**
Side Street Façade built to BTL	30% min.*	**F**
Lot Width	125′ max.	**G**
Lot Depth	100′ max.	**H**
*Street façades must be built to BTL along first 30′ from every corner.		

1" = 15'-0"

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Public Space Standards: Thoroughfares and Civic Spaces

Civic Spaces

Kentlands: Gaithersburg, MD

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All Spaces Must Be Calibrated Along the Transect

T4-T5

T2-T3

Form-Based Codes | Civic Spaces

This is a Non-Starting Point for Placemaking!

Thoroughfare Standards

Sidewalk 13' | Parking 7' | Travel Lane 10' | Travel Lane 10' | Parking 7' | Sidewalk 13'
Typical Right of Way: 60'
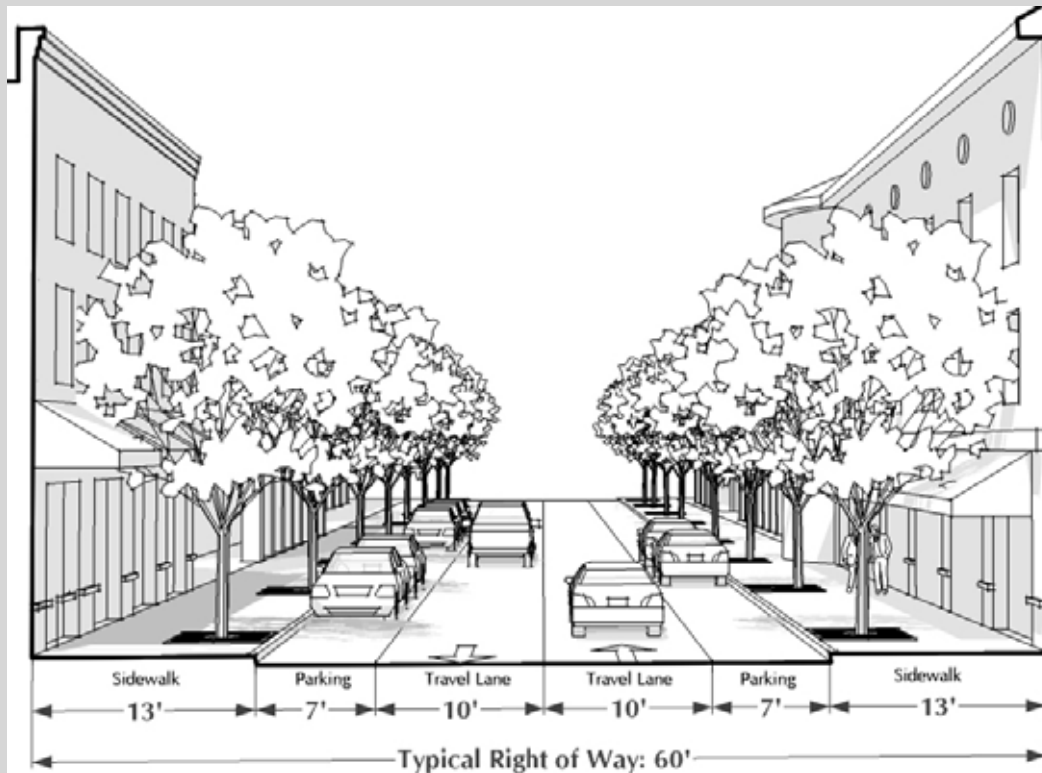
Design Standards

Design Speed:	20 mph
R.O.W. Width:	56'
Width of paving:	36'
On-Street Parking:	8'
Travel Lane Width:	10'
Bicycle Lane Width:	N/A
Drainage Type:	Open
Width of Sidewalk:	5' (typical)
Sidewalk Easement:	N/A
Width of Planter:	5' (typical)
Type of Trees:	Medium
Spacing of Trees:	40'

Sarasota County, Florida (Dover Kohl & Spikowski Planning Associates)

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Pedestrian Safety and Street Width

Chart 3

90.0	
67.5	
45.0	
22.5	
0	

20 mph   30 mph   40 mph

■ Perecentage Chance of Death in Pedestrian-Auto Accident
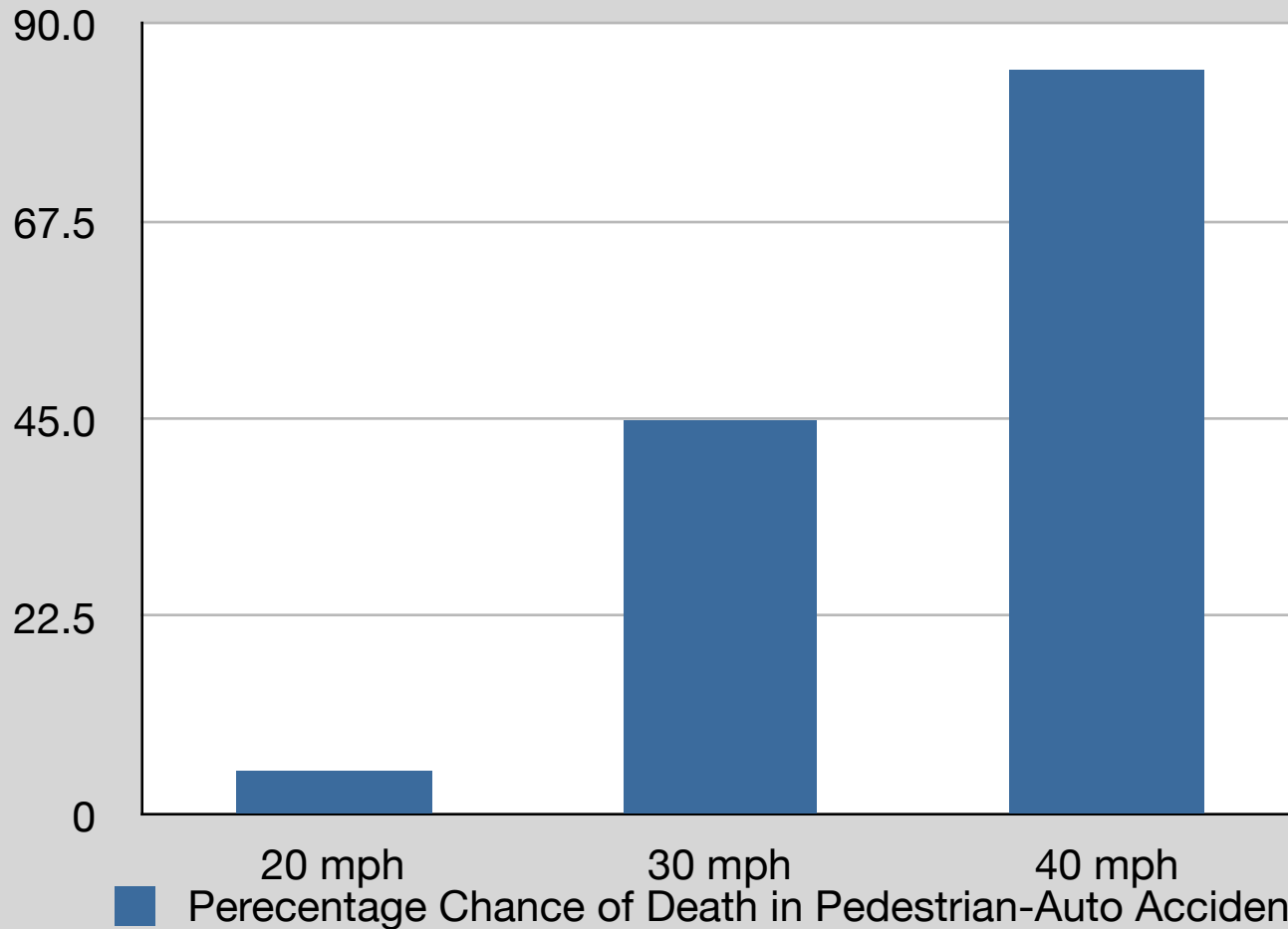
Source: National Highway Traffic Association and the Insurance Institute for Highway Safety.

Form-Based Codes | Thoroughfare Standards

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Frontage Types

Frontages: How a Building Engages the Street

Form-Based Codes

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Form-Based Codes | Unique to Place

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Frontages: Unique to Ojai, CA

Form-Based Codes | Unique to Place

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Frontages Unique to a Flagstaff, AZ

© Keiji Iwai Photography

Form-Based Codes | Unique to Place

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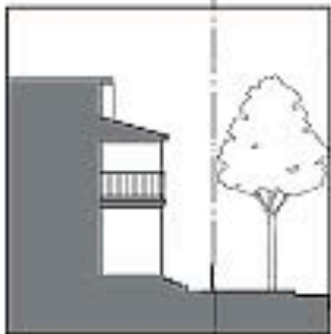**Coding to Prevent Bad Frontages Like These!**

Form-Based Codes | Frontage Types

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Form-Based Codes | Frontage Types

Porch: The main facade of the building has a small setback from the frontage line. The resulting front yard is typically very small and can be defined by a fence or hedge. The porch can encroach into the setback to the point that the porch extends to the frontage line. The porch can be one or two story. A minimum depth of 6' clear is required within the development standards to ensure usability.

On downslope lots the setback is typically minimized to improve the developability of the lot and on upslope lots it is maximized to reduce visual impact of the building on the streetscape.
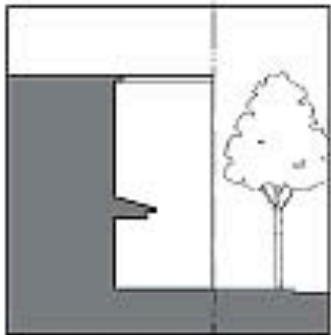
Forecourt: The main facade of the building is at or near the frontage line and a small percentage of it is set back, creating a small court space. The space could be used as an entry court or shared garden space for apartment buildings, or as an additional shopping or restaurant seating area within commercial zones. The proportions and orientation of these spaces should be carefully considered for solar orientation and user comfort. This frontage type should be used sparingly and should not be repeated within a block. A short wall, hedge, or fence should be placed along the undefined edge .

Form-Based Codes | Frontage Types

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Building Types

Commercial Block: Focal Point of Activity

Commercial Block

Live-Work

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Residential Types: "The Missing Middle"

Mansion Apartment: 6-8 units

Duplex

Bungalow Courts

Fourplex

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Block and Subdivision Standards
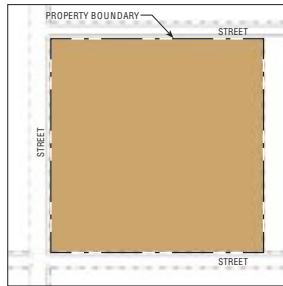
Maximizing Connectivity

4.7.7 Procedure for Subdividing Land

A. Site

Sites larger than 2 acres shall be subdivided further to create additional blocks.
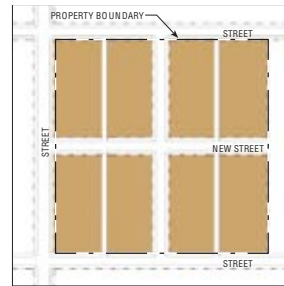
B. Introduce Streets

Sites being subdivided into additional blocks shall introduce streets from the list of existing and allowable street types and comply with the block-size requirements in section 4.6.3.

C. Introduce Alleys

Access to blocks and their individual parcels is allowed only by alley/lane, side street or, in the case of residential development, via small side drives accessing multiple dwellings. The intent is to maintain the integrity and continuity of the streetscape without interruptions such as driveway access. Therefore, although residential development allows minor interruptions along the primary frontage, the introduction of rear service thoroughfares such as alleys and lanes is required.

D. Introduce Lots

Based on the type(s) of blocks created and the thoroughfare(s) that they front, lots (parcels) are introduced on each block to correspond with the allowable building types in Section 4.4.

E. Introduce Projects

Each lot is designed to receive a building per the allowable building types identified in Section 4.4 and can be arranged to suit the particular organization of buildings desired for each particular block. The allowable building types then are combined with the allowable Frontage Types in Section 4.5 per the Zone in Section 4.3 in which the lot is located, in order to generate a particular urban form and character.

Site to be subdivided: Illustrative Diagram

Introduce Streets: Illustrative Diagram

Introduce Alleys: Illustrative Diagram

Introduce Lots: Illustrative Diagram

Introduce Projects: Illustrative Photo

Moule & Polyzoides Architects and Urbanists **4:52**
For the City of Whittier, California

Uptown Whittier Specific Plan (Moule & Polyzoides)

Form-Based Codes | Block and Subdivision

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Administration

Administration: Predictable Process is Goal

CRC - Coordinated Review Committee
PZAB – Planning Zoning and Appeals Board

```
Applicant
   │
Zoning
Department
   │
```

By Right	Waiver	Warrant	Exception	Variance	Zoning Change
	Preapplication	Preapplication	Preapplication	Preapplication	Preapplication
	File with Planning *	File with Planning *	File with Hearing Board *	File with Hearing Board *	File with Hearing Board *
		CRC	CRC		
	Planning Director	Planning Director	Planning Director	Planning Director	Planning Director
			PZAB	PZAB	PZAB
					City Commission

Appeal PZAB (Waiver)
Appeal PZAB (Warrant)
Appeal City Comm. (Exception)
Appeal City Comm. (Variance)

Building Permit	Building Permit	Building Permit	Building Permit	Building Permit	Building Permit

* All applications shall include required notice

Miami 21 (DPZ)

Optional Components:

- Architectural Standards

- Green Building Standards

- Landscape Standards

- Affordable Housing Requirements

- Storm Water Management

- Alternative Energy

- Food Production

Form-Based Code defines this

This is the architecture

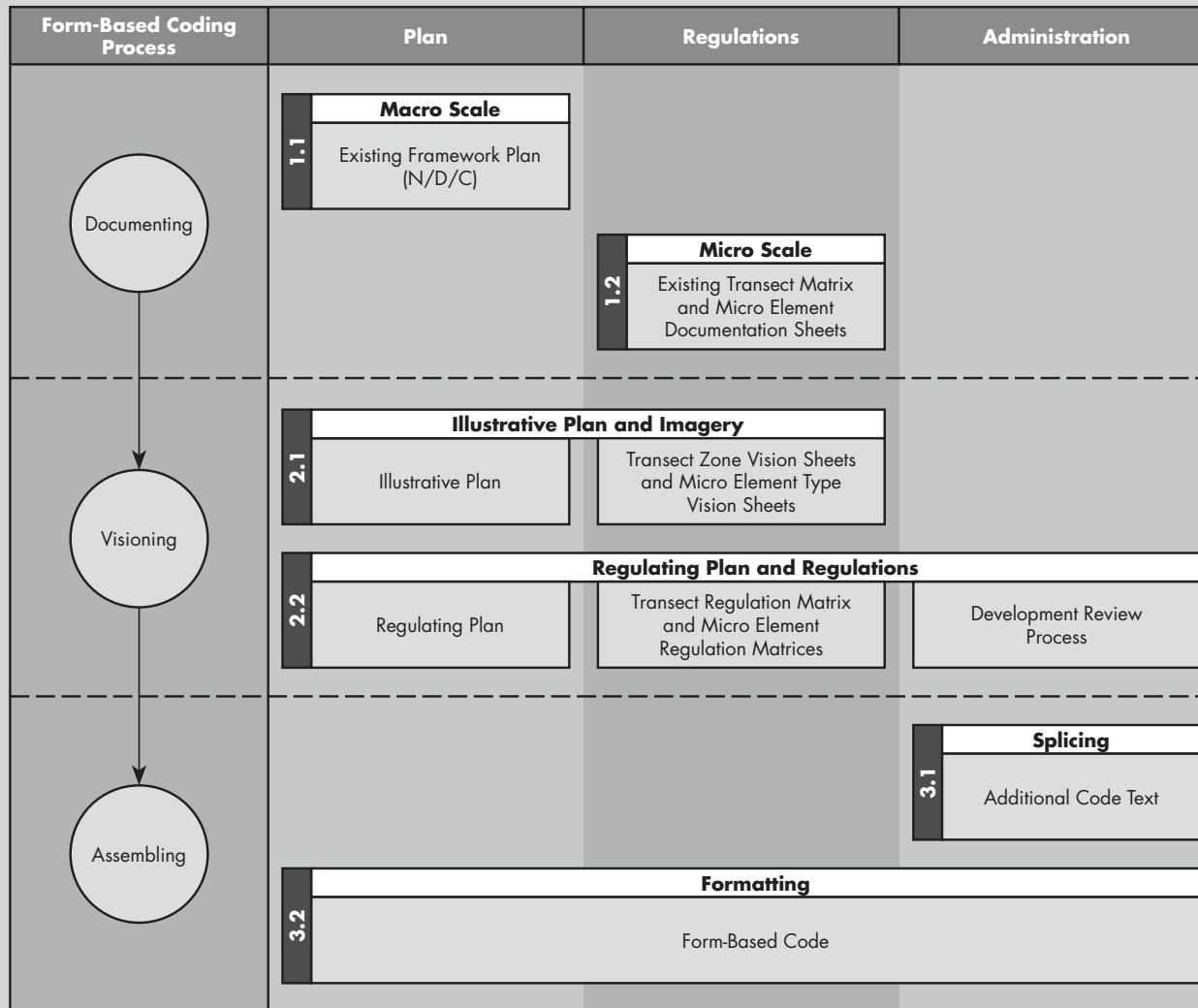Opticos Design

3
Form-Based Code Process

Three Important Steps

Process

| Form-Based Coding Process	Plan	Regulations	Administration
Documenting	**1.1 Macro Scale** — Existing Framework Plan (N/D/C)	**1.2 Micro Scale** — Existing Transect Matrix and Micro Element Documentation Sheets	
Visioning	**2.1 Illustrative Plan and Imagery** — Illustrative Plan	Transect Zone Vision Sheets and Micro Element Type Vision Sheets	
	2.2 Regulating Plan and Regulations — Regulating Plan	Transect Regulation Matrix and Micro Element Regulation Matrices	Development Review Process
Assembling			**3.1 Splicing** — Additional Code Text
	3.2 Formatting — Form-Based Code		

Form-Based Codes | 3-Step Process

Step I: Documentation and Analysis

Phase I: Documenting the Place
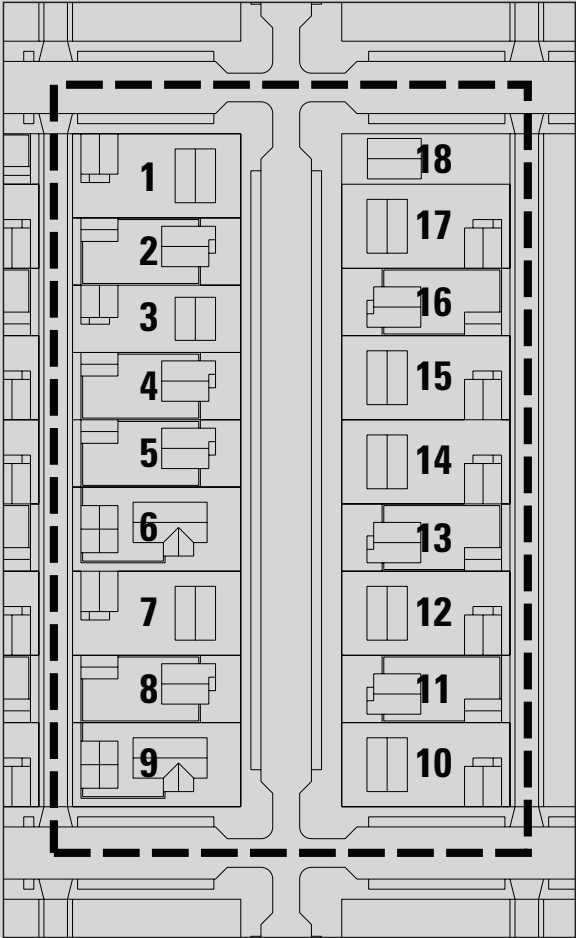
Micro-Scale Analysis

Macro-Scale Analysis

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Phase 1: Documenting

Plan	Regulations	Administration
Macro Scale **1.1** Existing Framework Plan (N/D/C)		
	Micro Scale **1.2** Existing Transect Matrix and Micro Element Documentation Sheets	

Location: #4: Oak St. bet. Elm and Maple
Thoroughfare Type: Street

45'　　　　　　　　　　　　　　40'

5' sidewalk | 5' planter | 8' parking | 10' travel | 10' travel | 8' parking | 5' planter | 5' sidewalk
G H I　　　　　　　C D E F　　　　　　　G H I

36'

56'
A

Application		
Movement Type	Yield (Slow) Free	
Speed Limit	**20** mph	
Pedestrian Crossing Time	**10.9** seconds	
Transect Level	**T4**	
Overall Widths		
Right-of-Way (ROW) Width	*(note on section)*	Ⓐ
Curb Face to Curb Face Width	*(note on section)*	Ⓑ
Lanes		
Traffic Lanes	(Single) Yield	Ⓒ
Bicycle Lanes	*(note on section)*	Ⓓ
Parking Lanes	(Parallel) Diagonal	Ⓔ
	Reverse Diagonal	
Medians	*(note on section)*	Ⓕ

Edges		
Curbs	(Square) Rolled	Swale	
Planters	(Continuous Planter)	Ⓖ
	Continuous Swale	
	Tree Well	
Landscaping		
Type	**Medium trees**	
Spacing Type	(Evenly-spaced) Clustered	
Spacing	**40'** o.c. avg.	
Walkways	(Sidewalk)	Path	Ⓗ
Lighting	**None**	Ⓘ
Type	—	
Spacing	— o.c. avg.	
Intersection		
Curb Radius	**15'**	
Distance Between Intersections	**400'**	

		T3		T4		T5	
		Typical Mid-block	Typical Corner	Typical Mid-block	Typical Corner	Typical Mid-block	Typical Corner
FPO Images Only -->							
City							
Width of Largest Historic Building				120' Apartment Bldg			
Block							
Perimeter Length		1530'		1600'		1600'	
Length (Primary Street)		525'		400'		400'	
Depth (Secondary Street)		240'		400'		400'	
Shape		R		R		R	
On-street parking spaces within 1/4-mile radius		250		200		200	
Length of Building at Front BTL from Corner							
Left End of Block					80'		100'
Right End of Block					100'		100'
Building Placement							
Lot Size							
Width		45' – 50'	50' – 60'	25'	30'	75' – 125'	75' – 125'
Depth		110'	110'	100'	100'	100' – 150'	100' – 150'
Square Footage		5,500	6,600	2,500	3,000	12,500	12,500 sf
Distance From		P	P	P	P	P	P
Location of lot		M	C	M	C	M	C
If it is a corner lot, where does the building face?		—	P	—	P	—	P
Front (Main Body of Building)		15' – 20'	15' – 20'	5'	5'	0'	0'
Side Street (Main Body of Building)		—	15' – 20'	—	5'	—	0'
Left Side, Main Building		8'	8' – 10'	0'	0'	0'	0'
Right Side, Main Building							
Left Side, Ancillary Building		0' – 60'	0'	0'	0'	—	—
Right Side, Ancillary Building							
Rear, Main Building		40'	40'	40'	40'	—	—
Adjacent Use/Transect Level		T4	T4	T4 & T5	T4 & T5	—	—
Rear, Ancillary Building		6' – 8'	6' – 8'	6'	6'	—	—
Length of Building at Façade Line (BTL)							
Front		60% – 100%	50% – 80%	100%	100%	90% – 100%	90% – 100%
Side Street, Main Building		—	30% – 35%	—	70%	—	90% – 100%
Side Street, Ancillary Building		—	100%	—	70%	—	—
Width of Building/Lot Width (%)							
Front		35% – 55%	35% – 50%	100%	80% – 100%	80% – 100%	80% – 100%
Side Street		60%	60%	—	70%	—	80% – 100%
Miscellaneous							
Number of Buildings on Lot		2	2	2	2	1	1
Number of Main Buildings		1	1	1	1	1	1
Number of Ancillary Buildings		1	1	1	1	0	0
Distance between Main and Ancillary Buildings		25' – 30'	25' – 30'	20' – 30'	20' – 30'	—	—
Sidewalk Edge Treatment where there is not a Building		3' fence	3' fence	3' fence	3' fence	6' street wall	6' street wall
Treatment between Building and Sidewalk (if any)		lawn	lawn	hardscape	hardscape	—	—

Form-Based Codes

Step II: Visioning

Phase 2: Visioning

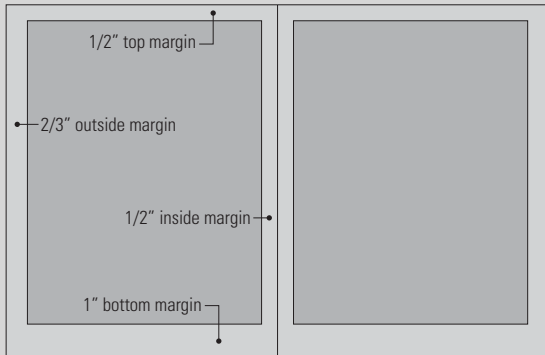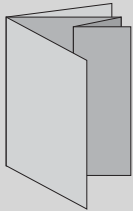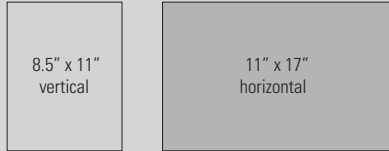|	Plan	Regulations	Administration
2.1	**Illustrative Plan and Imagery**		
	Illustrative Plan	Transect Zone Vision Sheets and Micro Element Type Vision Sheets	
2.2	**Regulating Plan and Regulations**		
	Regulating Plan	Transect Regulation Matrix and Micro Element Regulation Matrices	Development Review Process

Opticos Design with Moule & Polyzoides: Paso Robles, CA Downtown Specific Plan

Form-Based Codes | 3-Step Process

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Step III: Assembly

Phase 3: Assembling

8.5" x 11"
vertical

11" x 17"
horizontal

1/2" top margin

2/3" outside margin

1/2" inside margin

1" bottom margin

Left Justified

For lots 70' wide or wider, the courtyard must be enclosed by the building on at least three sides. Otherwise, the building courtyard must be enclosed by the building on at least two sides.

Center Justified

For lots 70' wide or wider, the courtyard must be enclosed by the building on at least three sides. Otherwise, the building courtyard must be enclosed by the building on at least two sides.

Fully Justified

For lots 70' wide or wider, the courtyard must be enclosed by the building on at least three sides. Otherwise, the building courtyard must be enclosed by the building on at least two sides.

Plan	Regulations	Administration

3.1   **Splicing** / Additional Code Text

3.2   **Formatting** / Form-Based Code

Street

Property Line

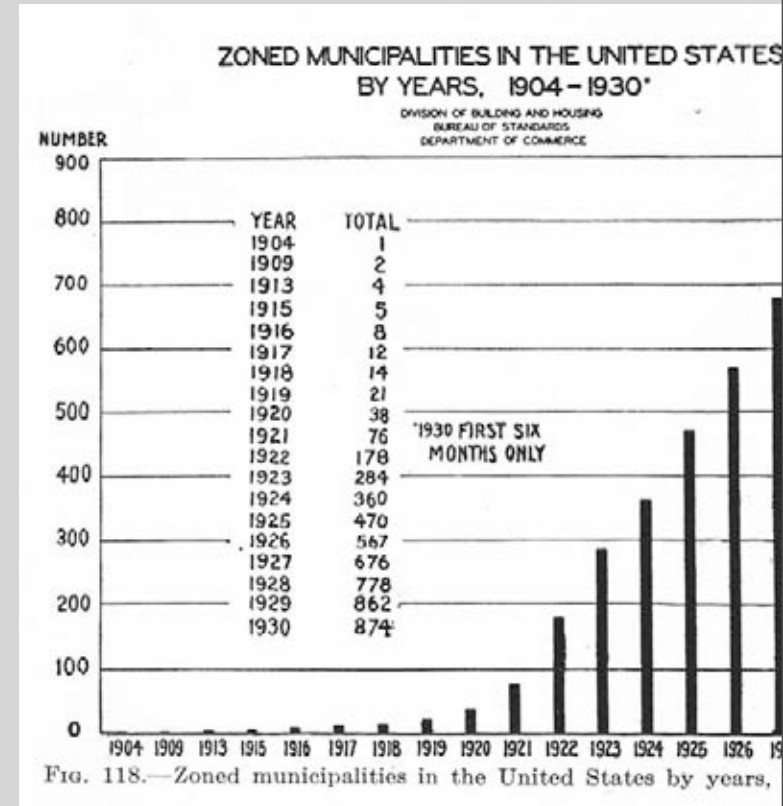| Building Form		
Height		
Main Building	22' min.;	**H**
	3 Stories max.	**H**
Ancillary Building	2 Stories max.	
Ground Floor Finish Level	6" max. above sidewalk	**I**
Ground Floor Ceiling	12' min. clear	**J**
Upper Floor(s) Ceiling	8' min. clear	**K**

4
Diverse Applications of Form-Based Codes

From a Site-Specific Scae to The Region

Applications: A Growing List!

1. Transit Oriented Development
2. Downtown Master Plans
3. Corridor Revitalization Plans
4. Neighborhood Revitalization Plans
5. Specific Plan Development Standards
6. General Plan Implementation
7. Historic Resource Preservation Planning
8. Greyfield Redevelopment
9. University/Community Interface Plans
10. Subdivision Ordinances
11. Complete Development Code Updates
12. Model Codes
13. Regional Plan Implementation

ZONED MUNICIPALITIES IN THE UNITED STATES BY YEARS, 1904–1930*

DIVISION OF BUILDING AND HOUSING
BUREAU OF STANDARDS
DEPARTMENT OF COMMERCE

NUMBER

YEAR	TOTAL
1904	1
1909	2
1913	4
1915	5
1916	8
1917	12
1918	14
1919	21
1920	38
1921	76
1922	178
1923	284
1924	360
1925	470
1926	567
1927	676
1928	778
1929	862
1930	874

*1930 FIRST SIX MONTHS ONLY

Fig. 118.—Zoned municipalities in the United States by years,

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Code Resources
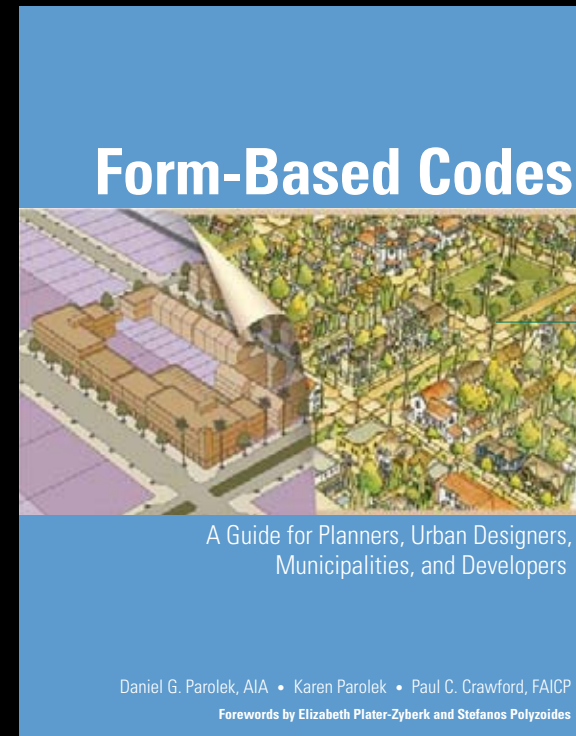

"Form-Based Codes." Available at
opticosdesign.com

Form-Based Code Institute
www.formbasedcodes.org

ABCs of Form-Based Codes
January 27, 2010, St. Petersburg, Florida
March 24, 2010, Kansas City, Missouri

201
February 18-19th, Ventura, CA

Opticos' FBCs
www.opticosdesign.com
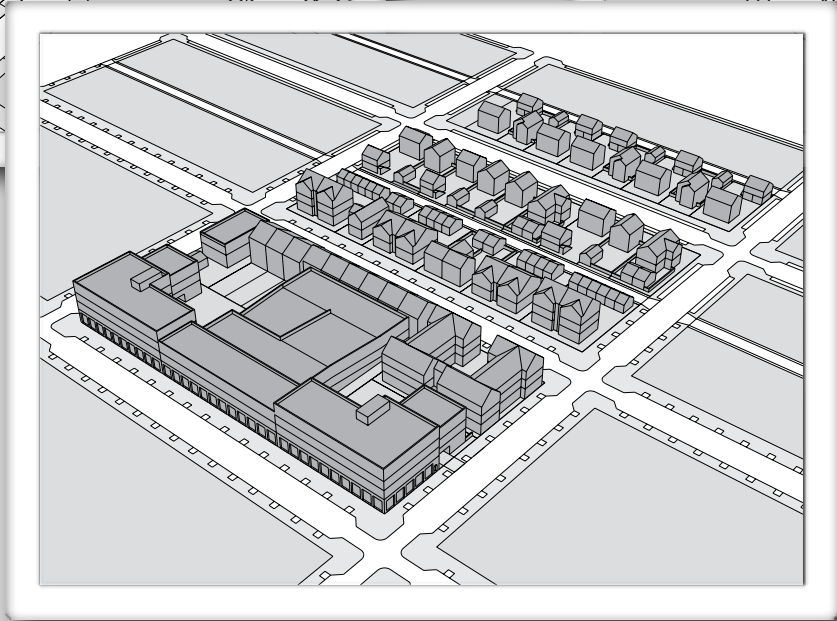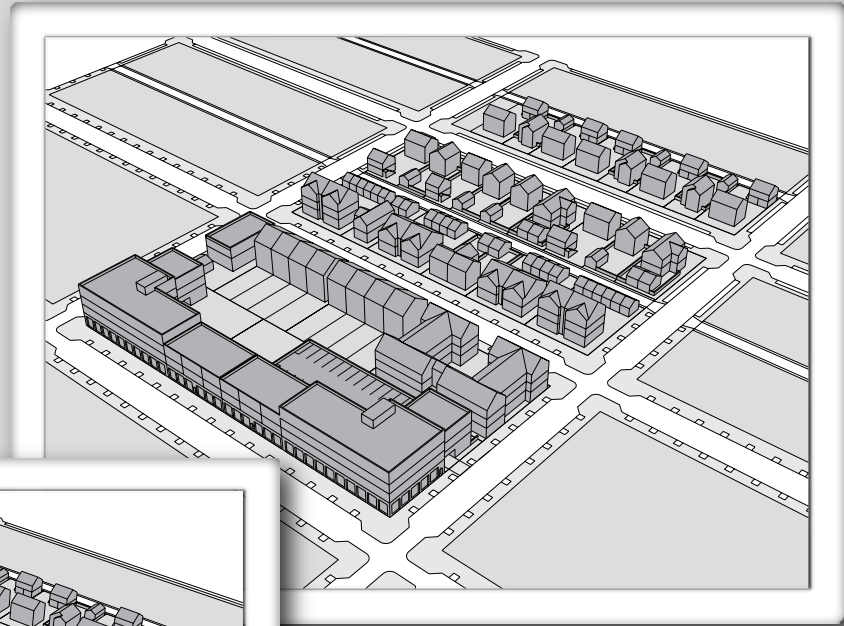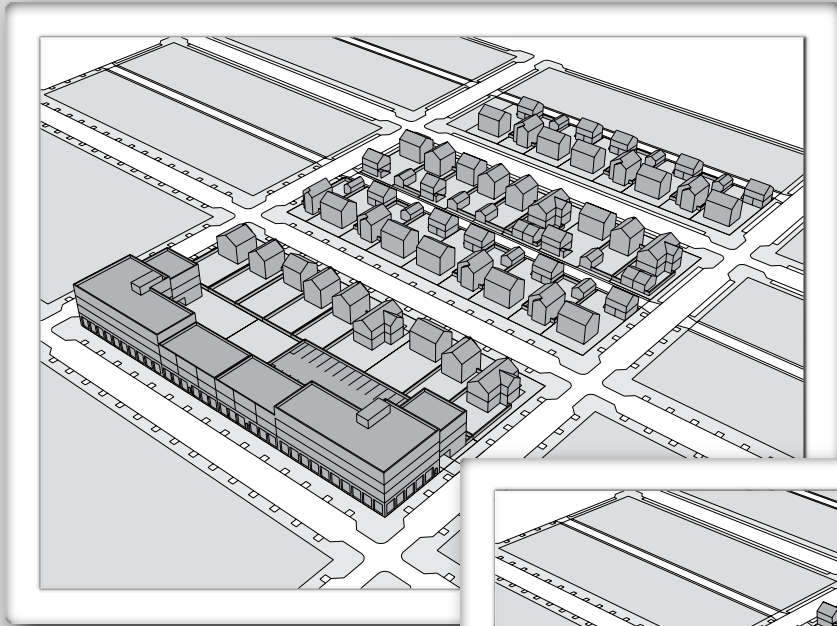
Smart Code and Transect
www.smartcodecentral.com

Form-Based Codes

A Guide for Planners, Urban Designers,
Municipalities, and Developers

Daniel G. Parolek, AIA • Karen Parolek • Paul C. Crawford, FAICP

Forewords by Elizabeth Plater-Zyberk and Stefanos Polyzoides

FBCI
Form-Based Codes Institute

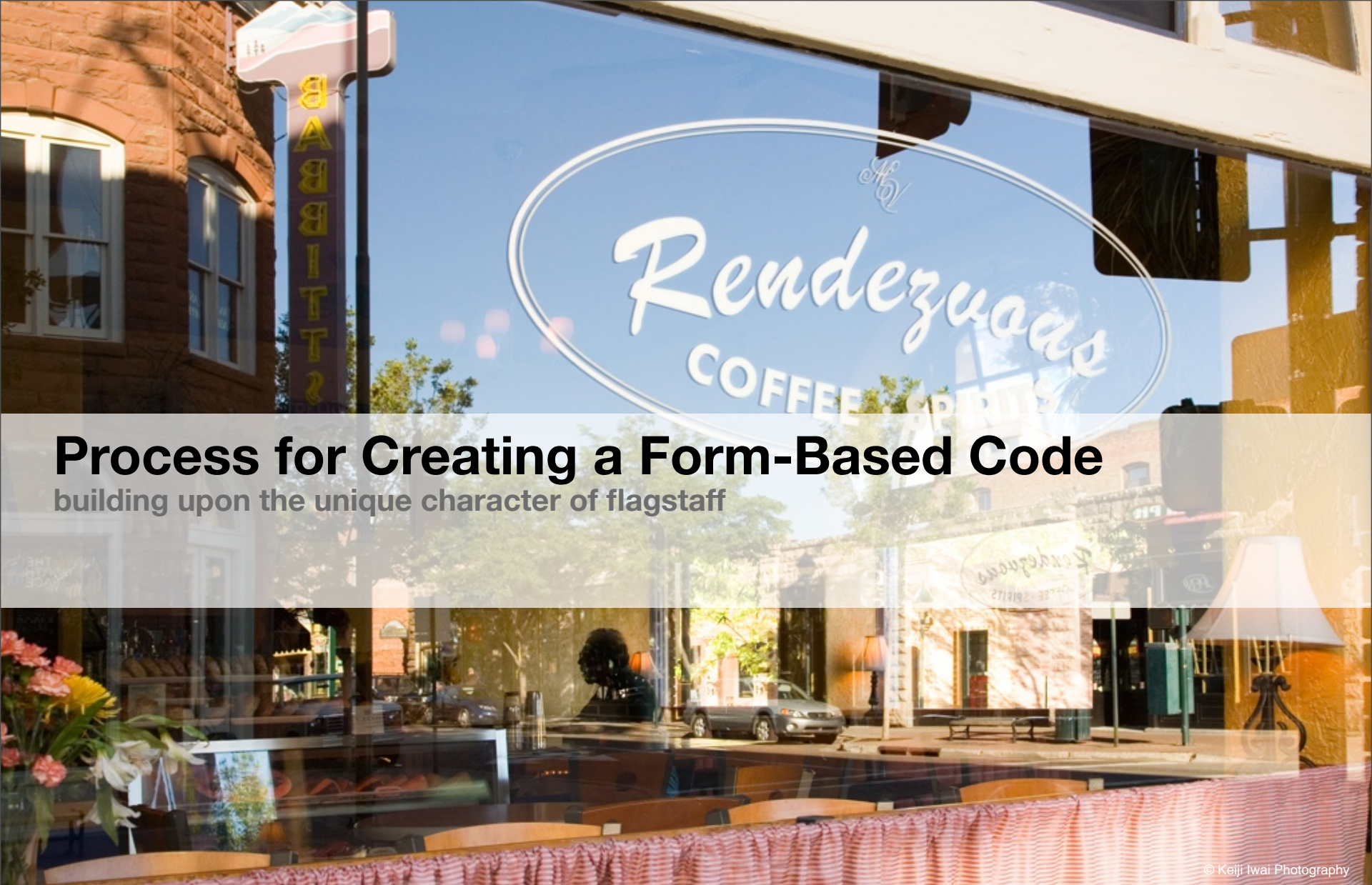Form-Based Codes | Addresses Transitions

Components of a Form-Based Code

for the successful implementation of a community's vision

Form-Based Codes | Components

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Process for Creating a Form-Based Code
building upon the unique character of flagstaff

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Form-Based Codes | Kick-Off Workshop

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