

October 19 2006



Public Transport and the Sustainable City

Hank Dittmar

The Prince's Foundation

UITP, Bilbao, Spain

The Prince's Foundation for the Built Environment is an educational charity founded by HRH The Prince of Wales to improve the quality of people's lives by teaching and practising timeless ways of building. We are one of 16 charities for which the Prince of Wales is President, together we comprise the largest multi-cause charitable enterprise in the United Kingdom.



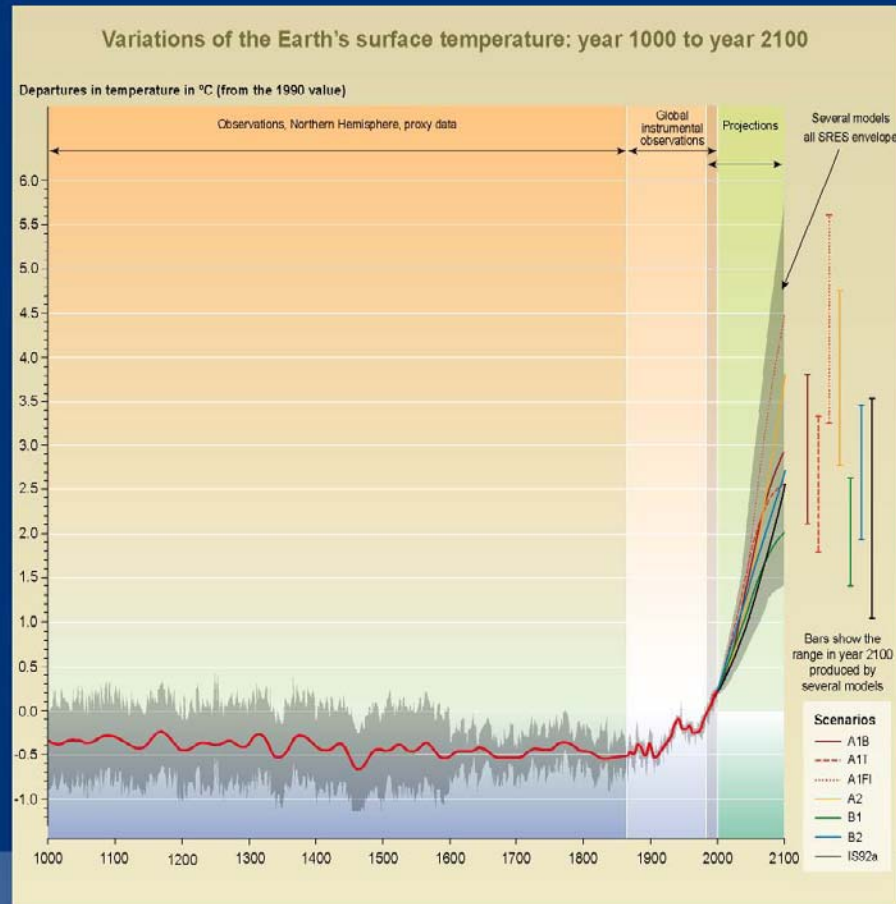
Strategy

- Work with others to create six exemplar projects by 2010, at different scales and in different settings;
- From practical work, develop tools and techniques to adapt traditional urbanism in response to today's environmental, social and economic issues;
- Teach these tools and techniques through an education programme in urbanism, building crafts and design;
- Develop a network of trained practitioners to tackle today's community building challenges; and
- Work with key strategic partners in industry, government and academia, including English Partnerships on master planning, the Building Research Establishment on sustainable building and the British Home Builder's Federation on improving the quality of community design.
- Build a network of International Centres of Excellence.

What is Sustainability?

- ***Brundtland Commission (Our Common Future)***
- Sustainable development is defined as "meeting the needs of the present without compromising the ability of future generations to meet their own needs."





SYR - FIGURE 9-1b

IPCC

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

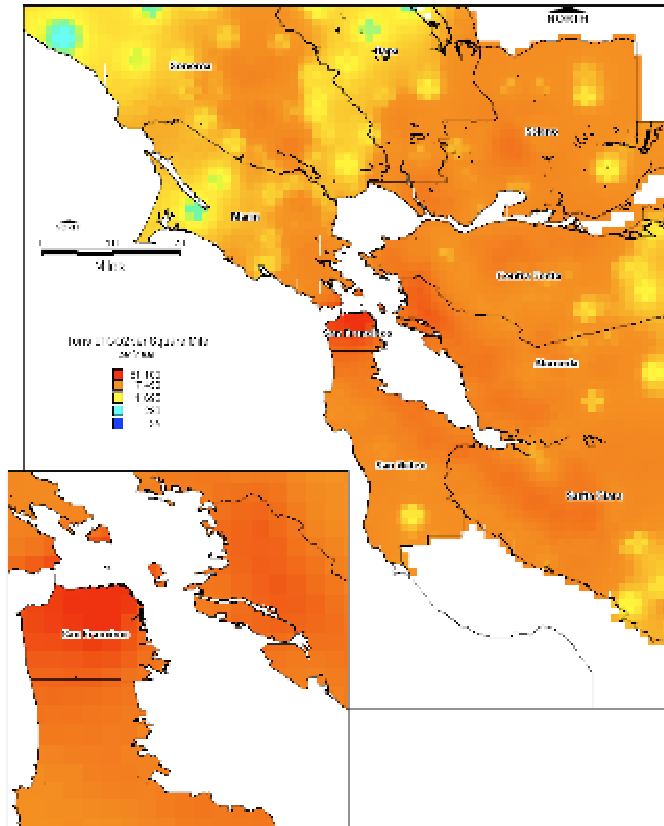


Two Views of Cities and CO₂

CO₂ Generated by Automobiles in the San Francisco Region per Year

Traditional View

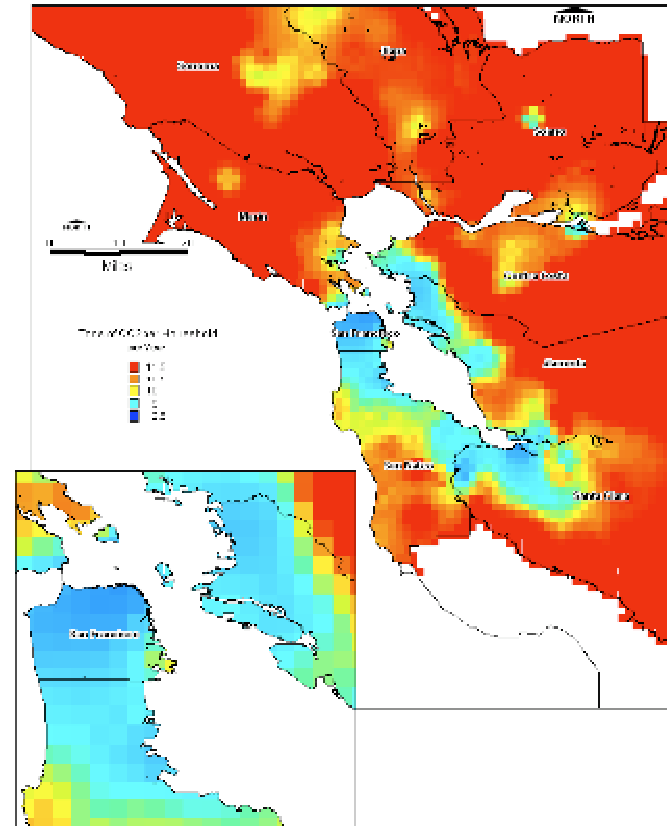
Cities produce large amounts of GHGs.



Data Source: 2002 Census, California Dept. of Transportation, and Federal Highway Administration.

Emerging View

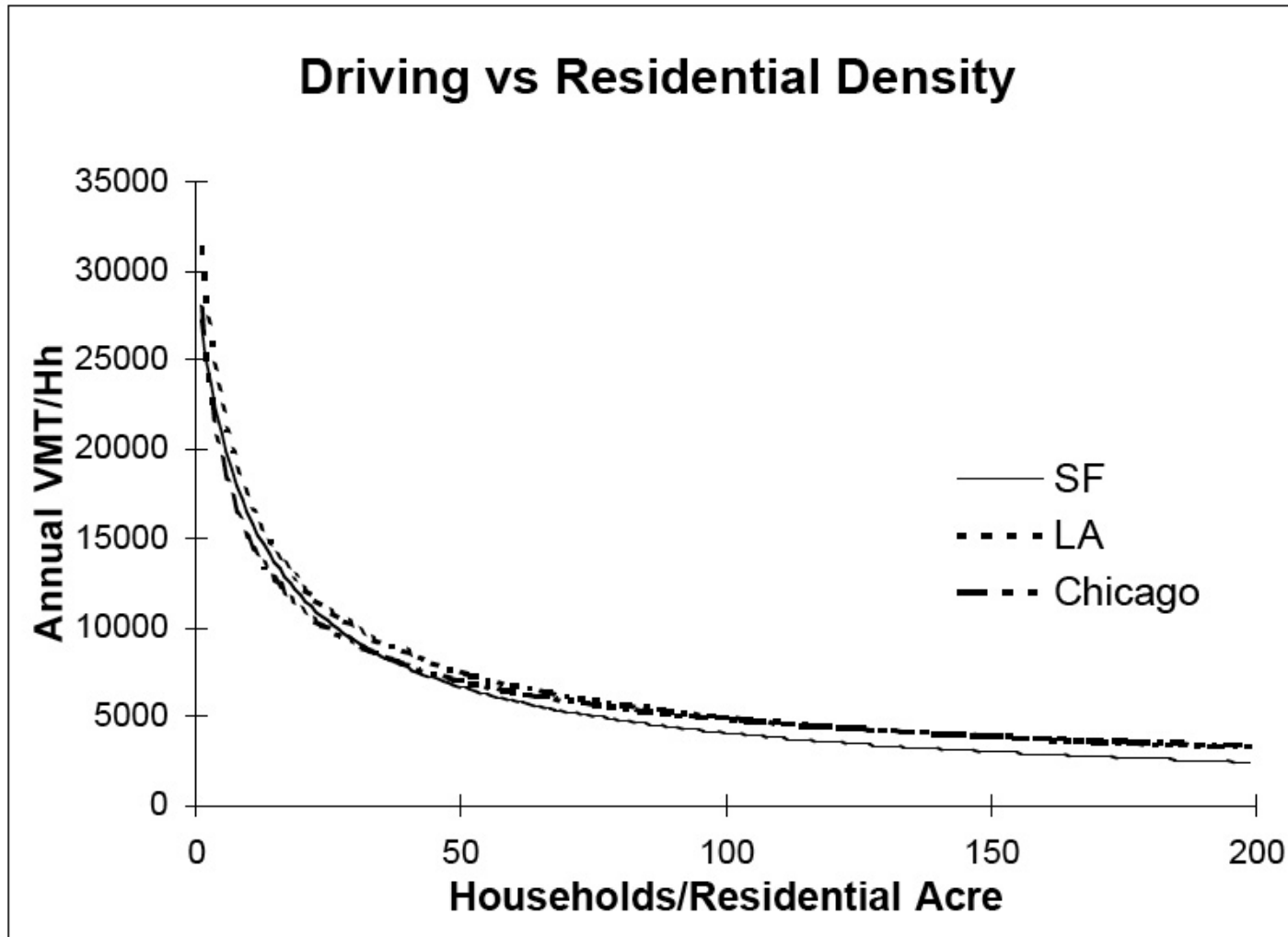
City dwellers produce relatively low amounts of GHGs.



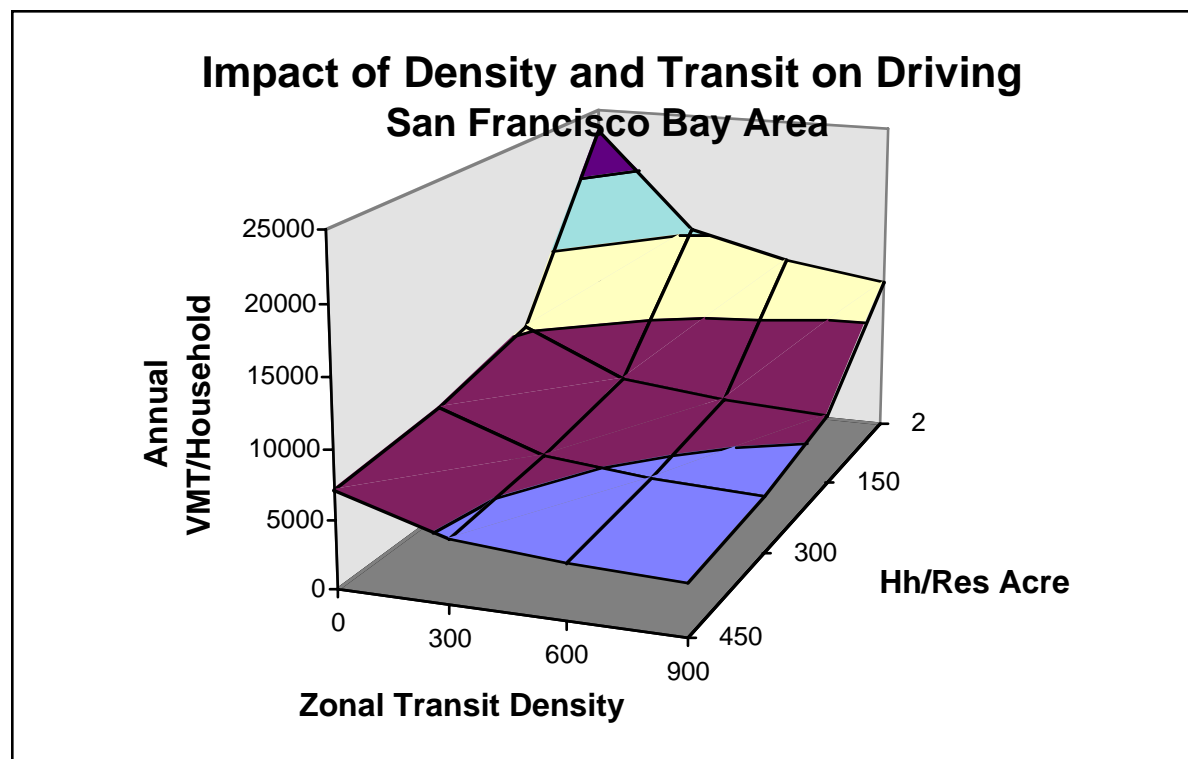
Data Source: 2002 Census, California Dept. of Transportation, and Federal Highway Administration.

Each aster represents one fifth of the land area on each map.

Location Efficiency: Density and Auto Use



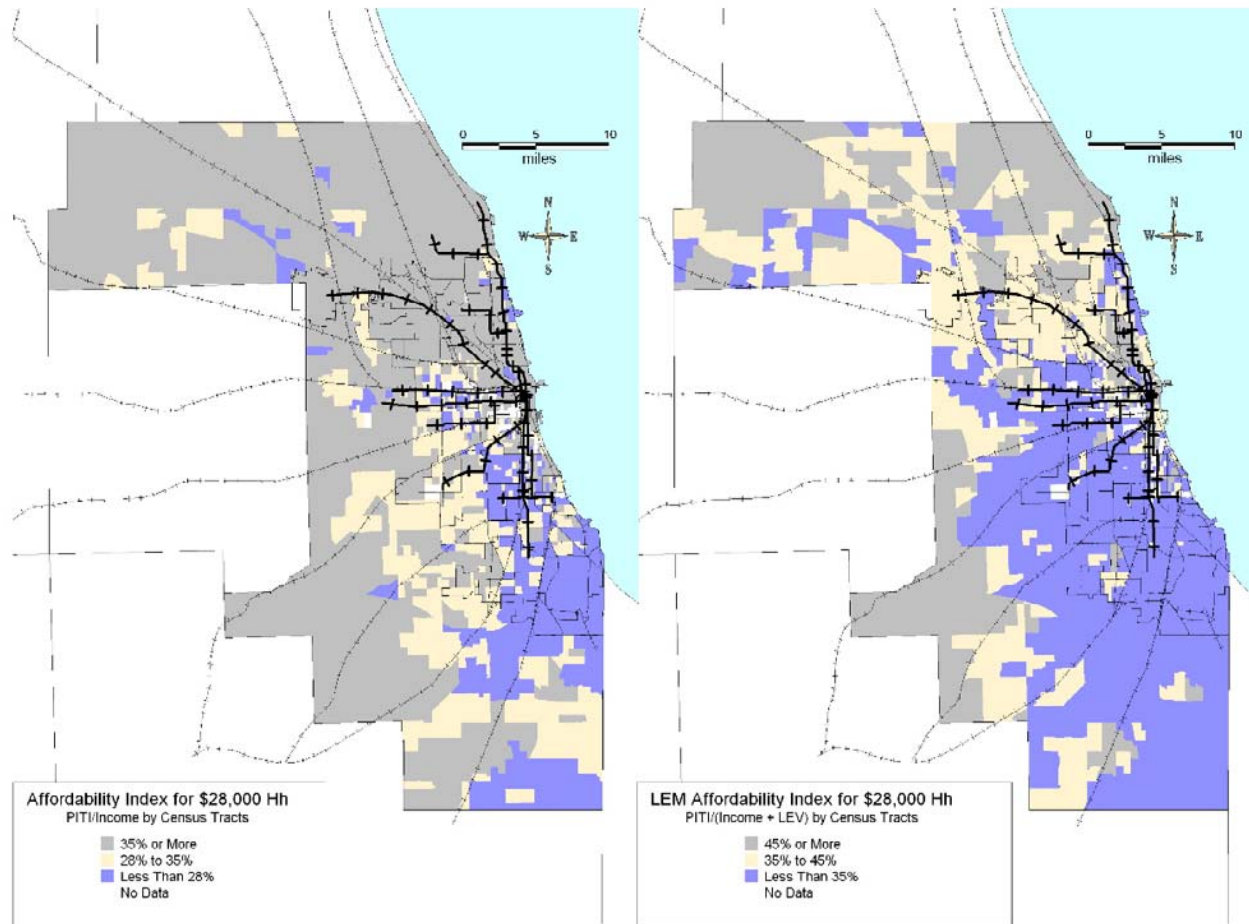
Location Efficiency



- Net residential density, transport access and pedestrian friendliness are positively correlated with reductions in driving, even after controlling for household size and income.

■ Holtzclaw, Clear, Dittmar, Transportation Planning and Technology, 2001.
(www.reconnectingamerica.org)

Location Efficiency and Affordability



Gregory Bateson, *Steps to An Ecology of Mind*

“The goal of our society should be a single system of environment combined with high human civilization, in which the flexibility of the civilization shall match that of the environment to create an ongoing complex system, open-ended for slow change of even basic characteristics.”

Characteristics of Healthy Systems

- Conservative: changing fundamental attributes slowly
- Adaptable & typological: composed of basic types that respond flexibly to changed conditions and feedback
- Holistic, integrated, environmentally aware
- Redundant, hence more reliable
- Focus on accessibility, not mobility

Hank Dittmar, "Thinking Like a System". 1995

Charter of the New Urbanism

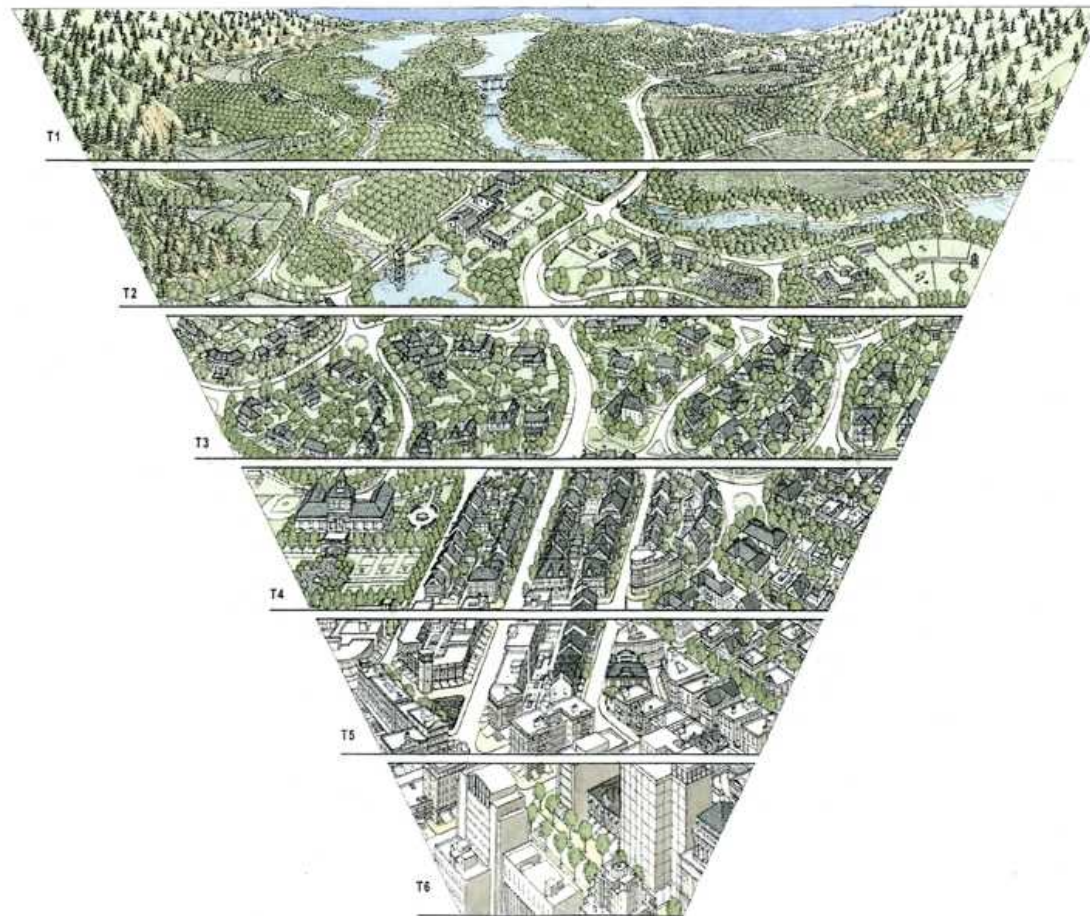
We advocate . . . the following principles: neighbourhoods should be diverse in use and population; communities should be designed for the pedestrian and transit as well as the car; cities and towns should be shaped by physically defined and universally accessible public spaces and community institutions; urban **places should be framed by architecture and landscape design that celebrate local history, climate, ecology, and building practice.**

Principles of Traditional Urbanism



- Walkable neighbourhoods are the core of the sustainable city; daily needs within a 5 minute walk;
- A legible network of connected streets accommodates vehicles and pedestrians;
- Neighbourhoods are both mixed use and mixed income;
- Cities and towns are shaped by physically defined and accessible public spaces; and
- Urban places are framed by architecture that celebrates local history, climate, ecology, and building tradition and materials.

Cities As Part Of Nature: The Transect



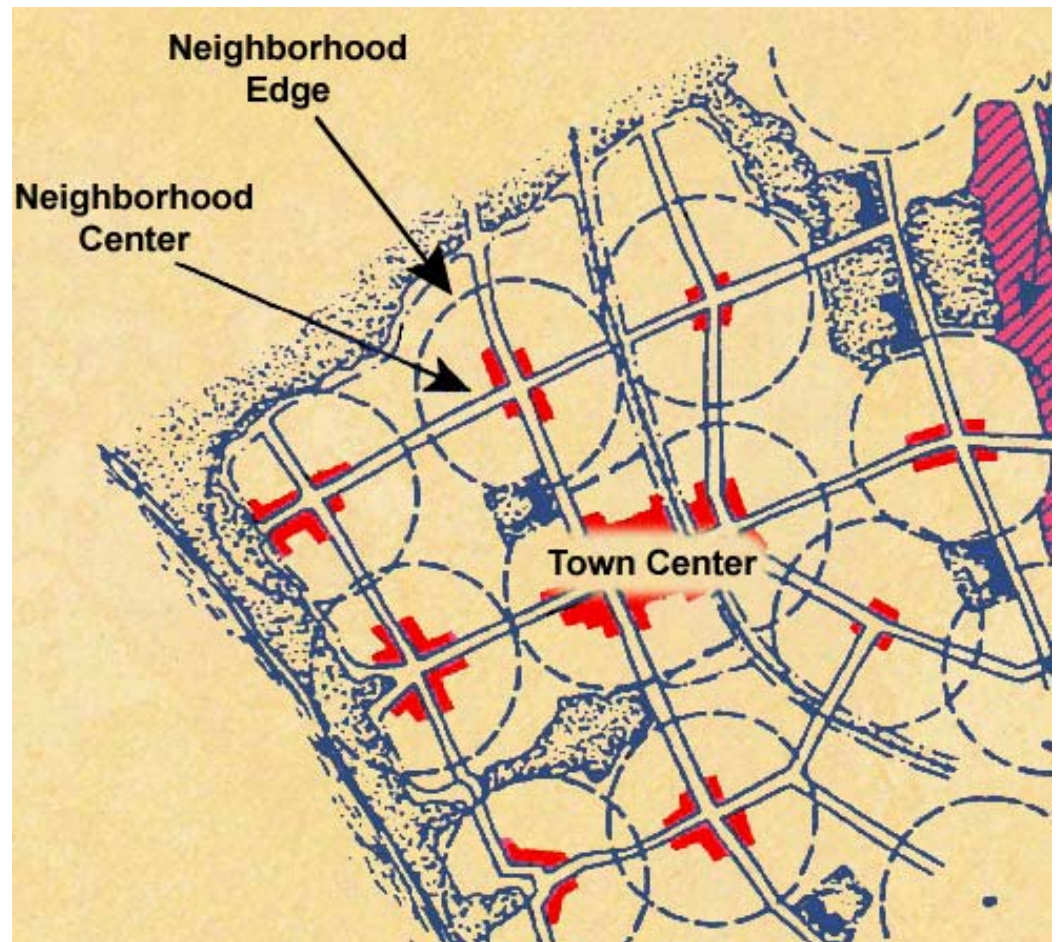


THE NEIGHBORHOOD PATTERN OF URBANISM



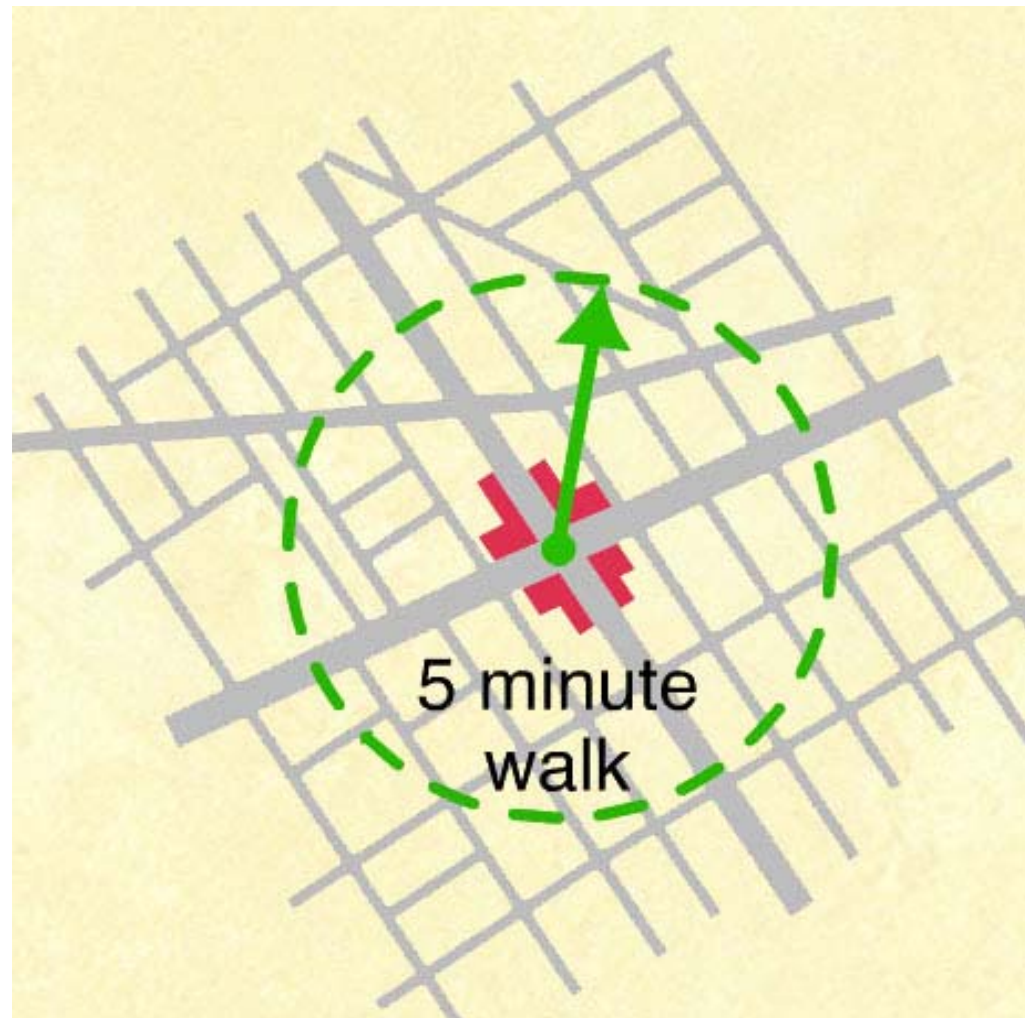
The Neighbourhood

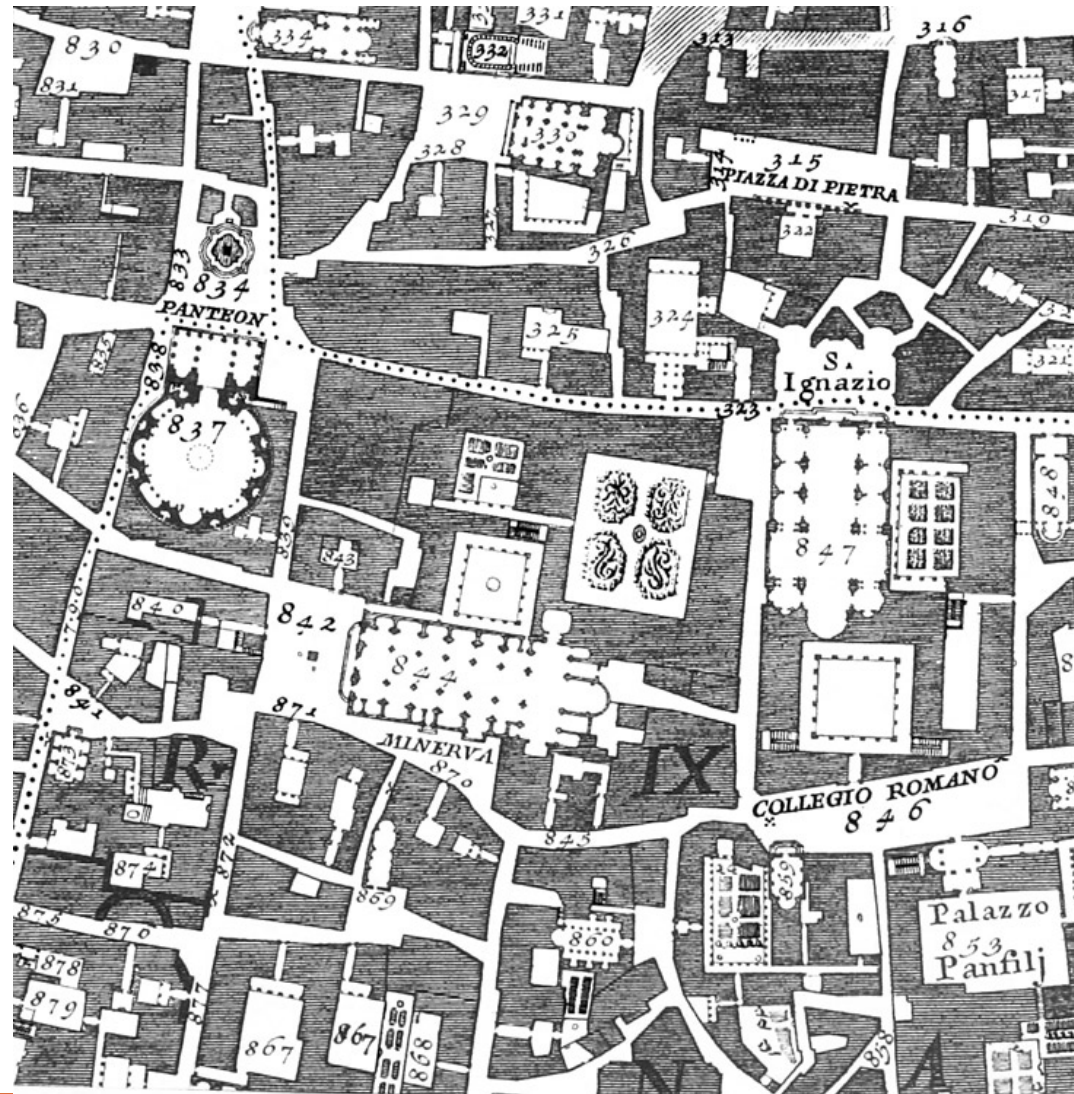
Walkable neighbourhoods are a core ingredient of villages, towns and cities. **Each neighbourhood has a center and an edge.** The center should be a public space, whether a square, a green, or an important intersection.



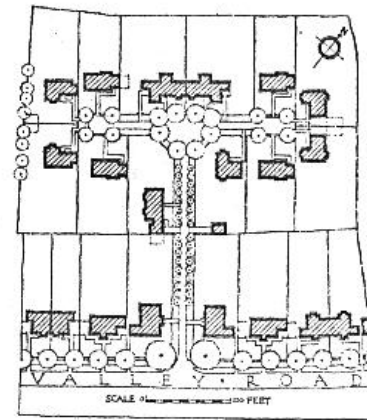
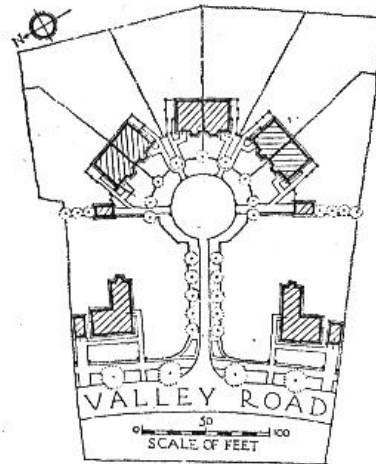
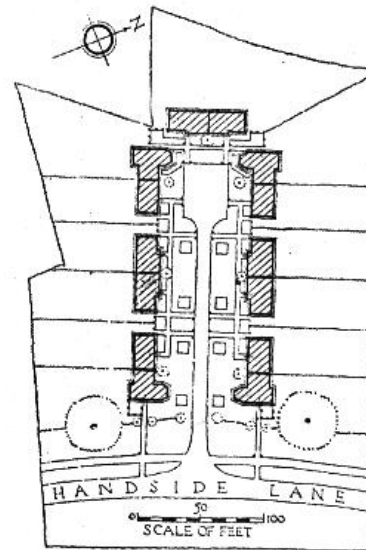
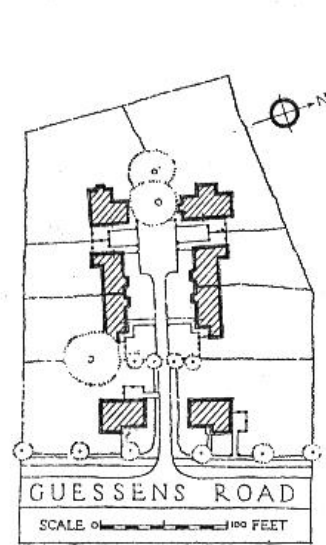
Neighbourhood

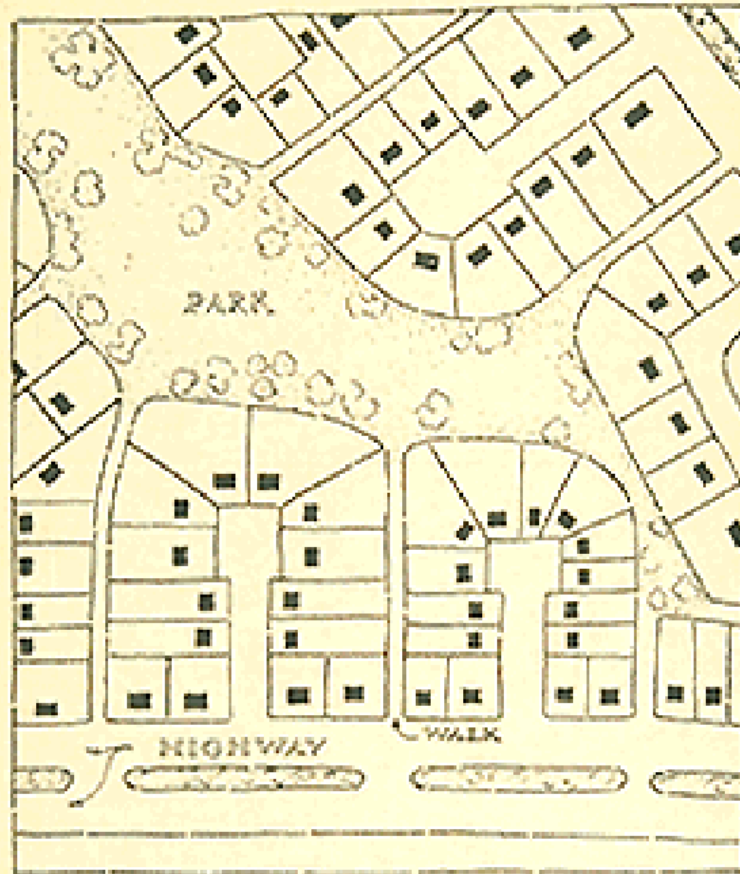
For a neighbourhood to feel walkable, many daily needs should be supplied within a five-minute walk.



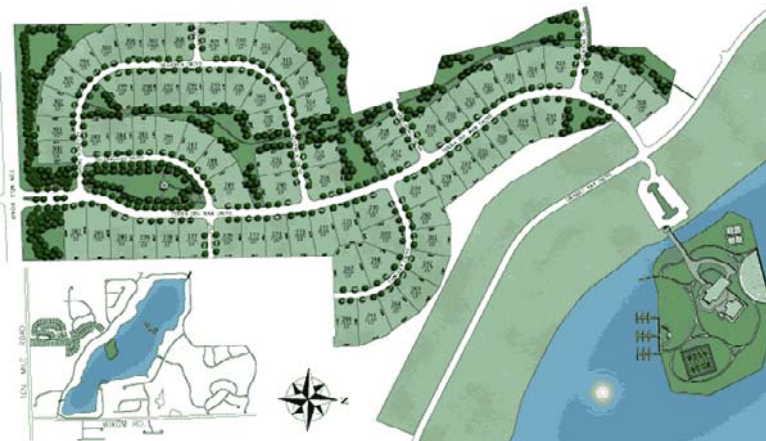






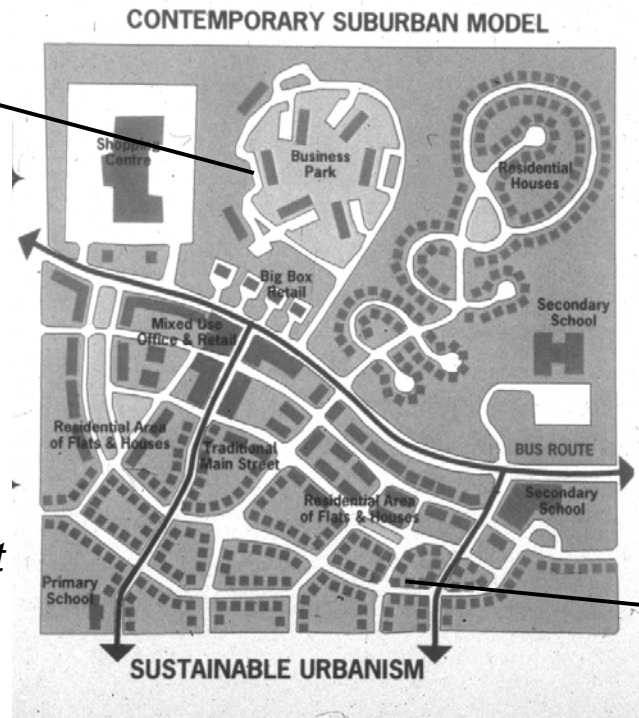


The Radburn type plan showing a series of cul-de-sacs grouped in a super block around a central park. The traffic highways border the superblock. The houses face the front yards and parks rather than the streets. The cul-de-sac roadways are service drives and give access to the rear of the houses. Traffic passes by rather than among the houses.





Original "Standard" Concept



Plan After Local Collaboration

Cities Are Composed of Basic Types

- “I would define the concept of type as something that is permanent and complex, a logical principle that is prior to form and that constitutes it. . . . Ultimately, we can say that type is the very idea of architecture, that which is closest to its essence.”

Aldo Rossi, *Architecture and the City*.

- “Typology also brings discipline and hierarchy to creativity. Typology is the vocabulary for the language of urban form.”

Doug Kelbaugh, *Repairing the American Metropolis*.

THE AVENUE (NORTHERN END)



Fig 2.3 The Avenue: Section

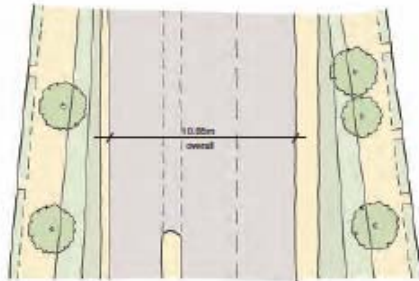


Fig 2.4 The Avenue: Plan
Showing entrances from A30

Materials	
Carriageway surface	Black top
Parking bays	None
Kerb	300 x 200 square edged textured precast concrete kerb
Footway at street	Natural grey precast conc. paving flags 63mm thick, var. sizes (600 x 450/450 x 450 - 10%/300 x 450)
Footway at upper level	Natural grey tumbled precast paviers
Railings	black metal railings 900 - 1100mm high
Privacy Strip	Planting

Specifications	
Road type	Street
Speed limit	30mph
Control Speed	20mph
Footway	As noted section
Cycleway	None - parallel routes provided
Min. Carriageway	11.1m o/s
On Street parking	At Square: refer previous pages

LANES

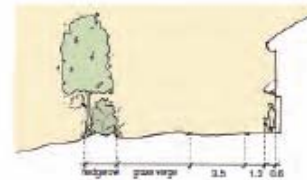


Fig 2.9 One-sided Lane: Section

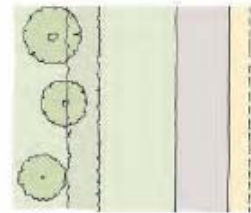


Fig 2.10 One-sided Lane: Plan
Note: the two-sided lane located in blocks to the west of Main Square to match the carriageway, footway and privacy strip dimensions noted above.



Informal Lane within development



Informal Lane edge of development



Formal Lane edge of development

Lanes will change in architectural and urban character according to their location within the development. Three examples from Poundbury show this variety.

Materials	
Carriageway surface	Natural grey or coloured precast tumbled paviers/ 2 rows granite setts at perimeter/property line.
Parking bays	Shared surface parking to match carriageway surface Stone setts to mark parking bays
Drainage channel	300mm wide diaped pre-cast conc. drainage channel
Pavement at street	Shared surface to match carriageway surface
Front boundary	None within the urban lanes. Edge lanes - hedges, typical. 300mm wood posts to protect trees
Privacy Strip	Soft landscaping

Specifications	
Road type	Lane
Speed limit	20mph
Control Speed	10mph
Footway	shared surface
Cycleway	None
Carriageway	3.5m, firm opposite garages/parking
On Street parking	Alternate sides
Privacy Strip	0.6m

TOWN HIGH STREET Urban Type Defining Characteristics

Runs through the centre of the town. There is considerable diversity in elevational treatment although a loose bay rhythm is discernable.



Relationships to contours

The Town High Street generally follows the contour and as a result is flatter than perpendicular streets.

Street frontages

Generally from 5m to 15m wide. The majority of the buildings are 2 storeys (some with dormers) or three storeys. Compared with residential urban typologies the degree of variation (especially in height) is much greater.

Length range

Road junctions spaced at between approximately 80m and 130m, often with continuous terraces for the whole block.

Connections to other urban types

Surrounded by Town Residential areas (7B) and may become Village High Street (4B) as the road continues away from the commercial centre.

Vistas and views

The street curves gently, allowing changing views. The varying road width gives feeling of enclosure at some points, and provides places for people to gather at others. As the High Street approaches Central Square (2B) the length of vista becomes shorter, increasing a sense of enclosure and anticipation.

Position

Passes through the centre of the town, surrounded by relatively high building densities.

Circulation routes

Generally the primary pedestrian route through the area, but a secondary vehicular one.

Edge buildings

Predominantly Mixed Use (3C & 4C) and Commercial Purpose Built (2C).

Corner buildings

Prominent corners at significant junctions are generally articulated through greater scale, embellishment or simply chamfering the corner to present an extra surface.

Minor junction positions

Access to minor parallel streets and backs of shops. These corners are generally not articulated.

Surface materials

Tarmac with granite edges to the pavement, and where pedestrianised, paved.

Street furniture

Decorative street lamps, hanging baskets, bins and benches are commonplace.

Parking

Long-term parking discouraged. Deliveries and short-term parking necessary.



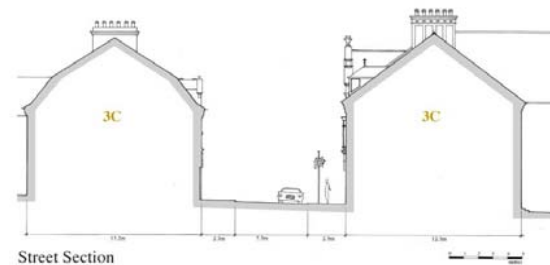
Mid Town High Street: approx view length 130 metres.



The Town High Street as it approaches Central Square: approx view length 75 metres.



Architectural articulation of prominent corners.



Street Section



Part Typical Street Elevation

Central Square





Rates of Change

From Stewart Brand

Public Transport Oriented Development



Defining Transit Oriented Development

Transit and transit-oriented development work in a context of:

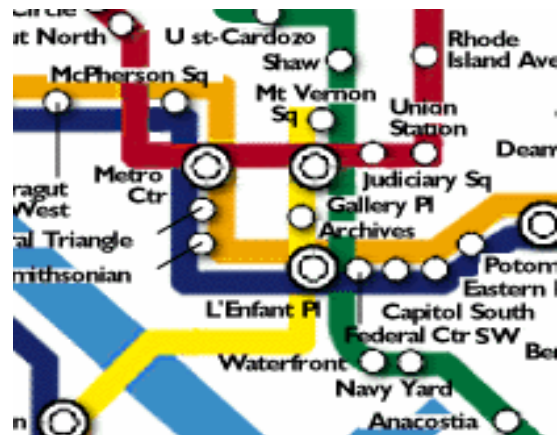
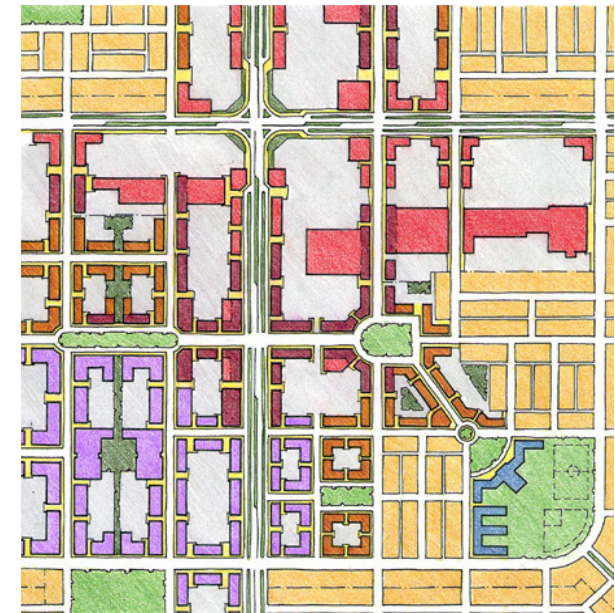
- Location Efficiency.
- Expanded Mobility, Shopping and Housing Choices.
- Financial Return and Value Recapture.
- Balance Between Place and Node

Rich Mix of Choices

- Appropriate Land Use Mix for the Area
- Mix of Housing Types and Price Ranges
- Supporting Amenities: car sharing, bike stations, rider serving retail and services, day care, public space.
- Urban design that celebrates the pedestrian.



Place and Node



Value Capture:

Linking Land Use and Public Transport

- Pursue transit-oriented development in concert with rail expansion:
 - public private transit finance partnerships,
 - land assembly funding,
 - balance park and ride with development at station
- Condition transit investment on adoption of appropriate densities and land uses, utilise design codes to ensure pedestrian orientation and mixed use
- Permitted development funds public transport as in Portland Streetcar, generates revenue for needed services

Arlington County, Virginia

- Used Metrorail as catalyst for redevelopment of commercial spine of Arlington
- Concentrated density and promote mixed use at five stations; scaled development down to neighborhoods
- Reinvested in adjacent residential neighborhoods



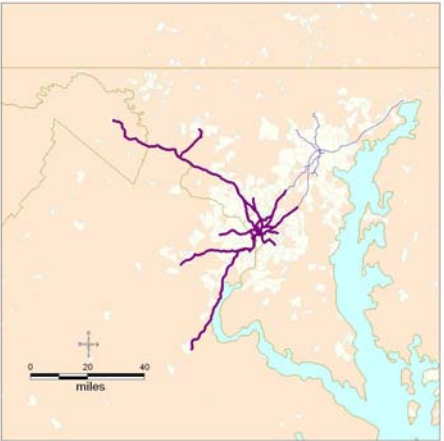
Arlington County: Impacts

- Corridor produces 32.8% of the County's real estate tax revenue from 7.6% of its land area
- Arlington County has the lowest real estate property tax of any major jurisdiction in Northern Virginia
- Increasing weekday trips at the five Metrorail Stations from 57,100 in 1980 to 79,500 in 2002*
- 73.3% of patron travel to and from Metro stations on foot or over 58,000 trips daily*

Network Coverage is Key



New York - Extended (962 Stations)



Washington DC - Large (163 Stations)

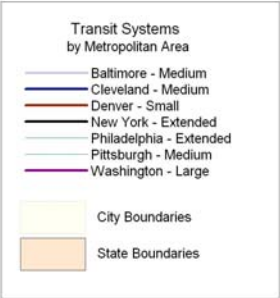


Cleveland - Medium (50 Stations)



Denver - Small (30 Stations)

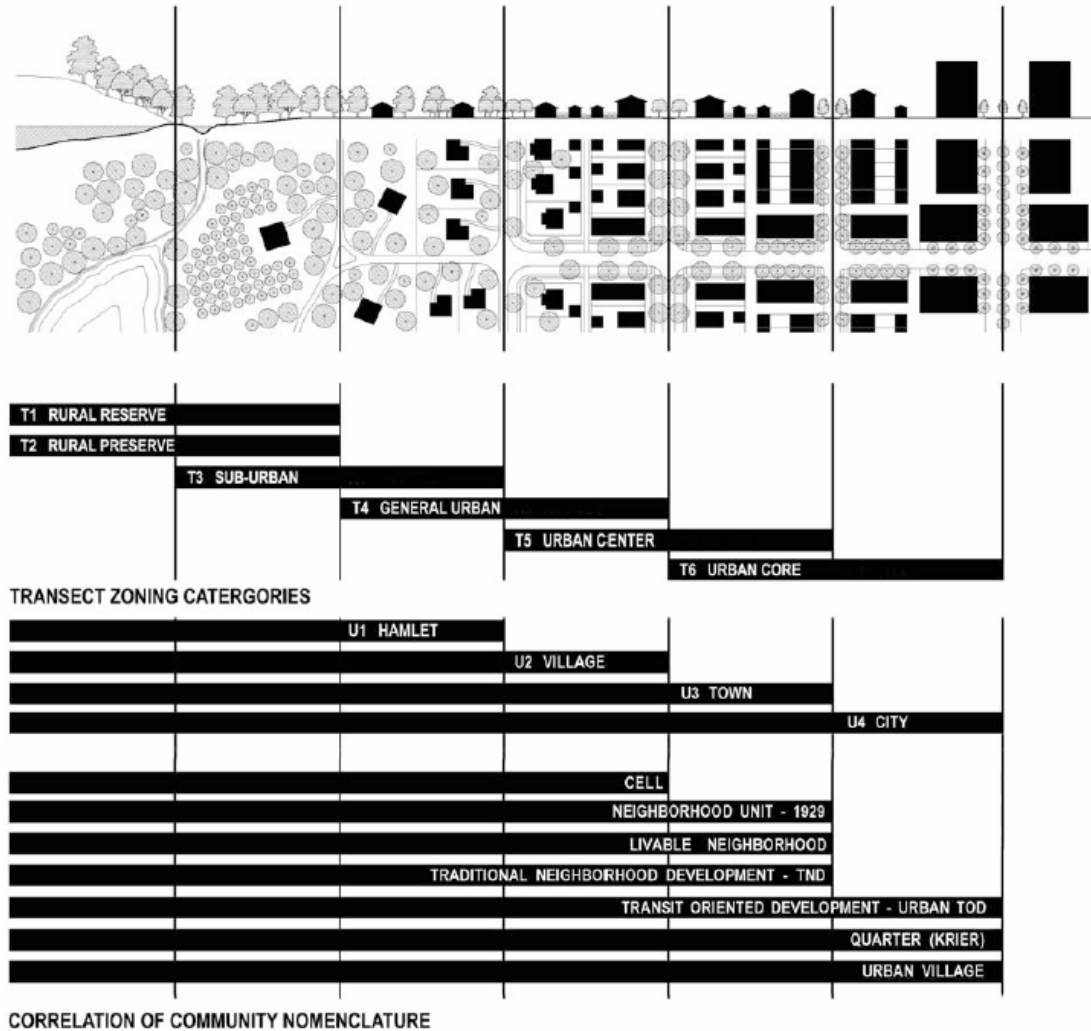
Four Transit Systems Shown at the Same Geographical Scale



Public Transport Modes and Settings

Mode	Application & Setting	Station Spacing	Technology
Rail Rapid Transit : Up to 80 mph	High density corridors	1/2 mile- 1 mile	Electric
Ferry 25-40 knots	Crossing river, Bay	Usually two stations	Diesel, wave jet
Commuter Rail Up to 100 mph	Suburb to center city	Limited stations, Downtown serving	Diesel, Electric, Dual Mode
Light Rail 25-55 mph.	Wide variety of applications: urban to suburban	Short to Long: 1 mile to 1/4 mile	Electric, DMU
Streetcar/Tram	Downtown, urban circulators	Block to block	Electric
Bus Rapid Transit Rubber-tired vehicles with exclusive lane or separated roadway (busway)	Less dense environments, urban to suburban, may be a building block to rail	Limited stations, short to long	Diesel, Natural Gas
Bus Transit Rubber tired vehicles in mixed traffic	All settings; connection to rail or BRT, local transportation	Frequent	Diesel, Natural Gas Buses
Paratransit Small vans	Suburban or rural, or for specialized transportation	On-demand	Vans

The Transect: Duany Plater Zyberk



TOD

A Typology of TOD Places



Typology of TOD Places

TOD Type	Land Use Mix	Density	Connectivity
Urban Downtown	Primary Office Hub Entertainment/Retail Multifamily Housing	> 60 DUA	High: Hub of radial system
Urban Neighborhood	Multifamily Housing Terrace & Detached Local Retail	>24 DUA	Medium: Downtown access, sub regional circulation
Town Center	Office Center Entertainment/Retail Multifamily Housing	>50 DUA	Medium: Downtown access, sub regional hub
Suburban Neighborhood	Limited Commercial Multifamily and single family housing	>12 DUA	Low: access downtown or suburban center
Commuter Town Center	Retail Center Housing	>12 DUA	Low: peak, local
Neighborhood Transit Zone	Limited Retail Housing	>7 DUA	Low: access to station



Urban Downtown (T6)



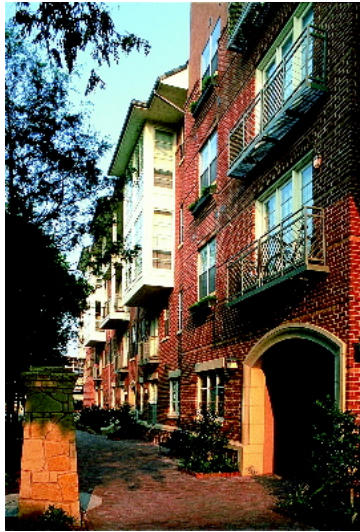
- Primary Office Center; residential densities in excess of 60 d.u./acre
- Transit service frequency 5 minute headways in peak; hub of radial transit system; high regional connectivity

Urban Neighborhood (T5)



- Residential Density: Average >20 units per acre; denser at station. Also retail Class B Commercial
- Supports rapid transit, light rail or rapid bus in radial service to downtown. Medium regional connectivity.
- Local bus service at 1/2 mile spacing or less with 10-15 minute headways

Suburban Town Center: T5



- Characteristic: substantial activity center, with an office & retail concentration, and densities approaching downtown densities >60 units per acre (Arlington County FAR up to 10)
- Can be key sub-regional node on bus network, with rail or rapid bus service as spine, 10 minute peak headways. Access to downtown.

Sub-urban Neighborhood: T4 General Urban

- Characteristic: a commuter rail, rapid bus or light rail stop, with walkable retail commercial cluster around station, typically substantial auto access to station.
- > 12 units per acre, more close in to station
- Medium connectivity: access to suburban center with 20 minute peak headways



Commuter Town Center T4 General

- Residential and Retail center; >12 units/acre
- Low regional connectivity, access to downtown. Served by commuter rail or express bus
- Peak transit service, demand responsive local circulation



Neighborhood Transit Zone: T 3



- At least 7 units to the acre, bus, rapid bus at 20-30 intervals
- Neighborhood circulation, access to town center
- Retail concentrated at stops, stops located at intersections of arterials

Public Transport and the Public Realm

Technology and alignment options & implications for urbanism

- Urban subway
- Segregated guideway:
 - at grade, freeway alignment or elevated
- Street running: Center, edge or one side
- Alignment choice should balance performance and access, while responding to the setting in the city.

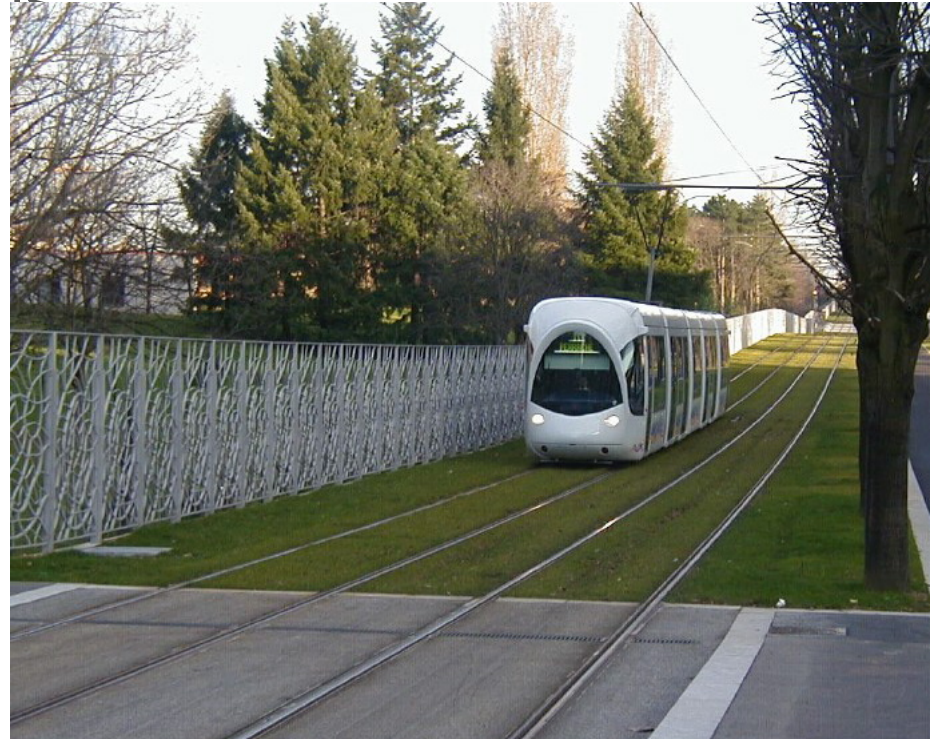


Accommodating Transit throughout the Region

	Urban Downtown	Urban Neighborhood	Suburban Town Center	Suburban Neighborhood	Commuter Town Center	Neighborhood Transit Zone
Subway	XXX	XXX	XXX			
Segregated Guideway: At Grade	XXX	XXX	XXX	XXX	XXX	
Segregated Guideway: Elevated	XXX	XXX			XXX	
Segregated Guideway: Freeway			XXX		XXX	
Street Running: Center	XXX	XXX	XXX	XXX		XXX
Street Running: Either side alignment	XXX		XXX			
Street Running: One side		XXX	XXX	XXX		XXX

Public Transport & Sustainable Urbanism

- Public Transport Provides the Framework for Sustainable Growth
- Public Transport and Location Efficiency:
 - Reduced Carbon Emissions
 - More Affordable Cities
 - Accessibility to Amenities



<http://www.princes-foundation.org>

