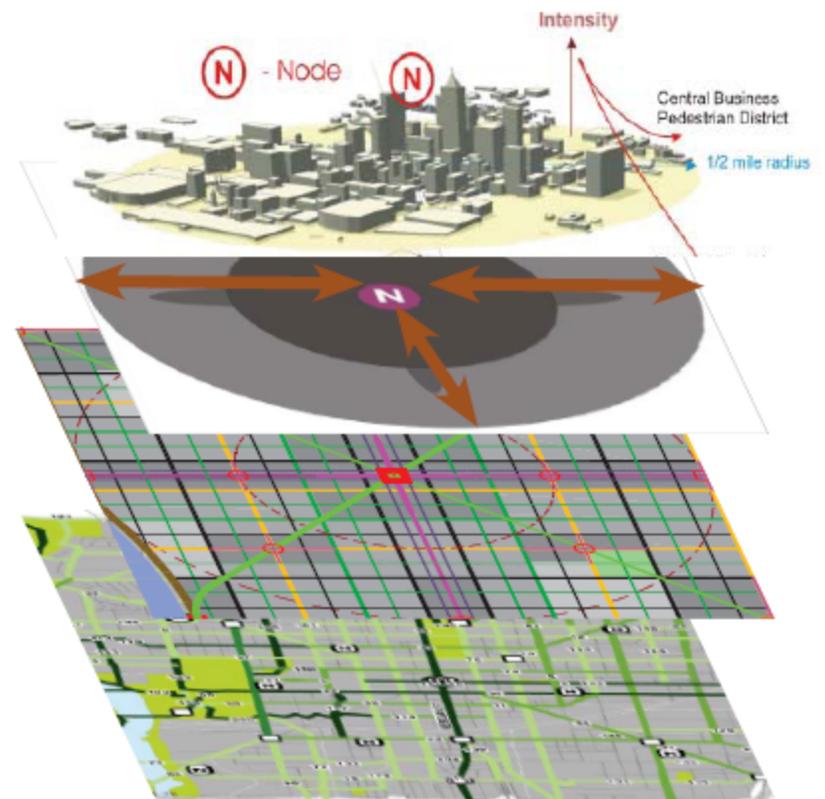
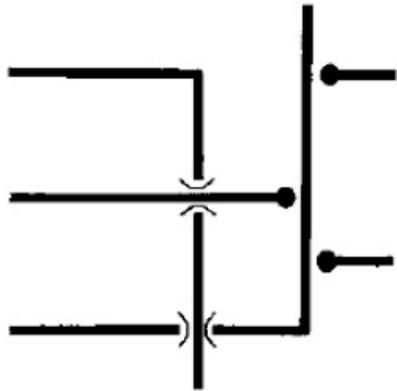


# Defining and Measuring the Sustainable Transportation Network

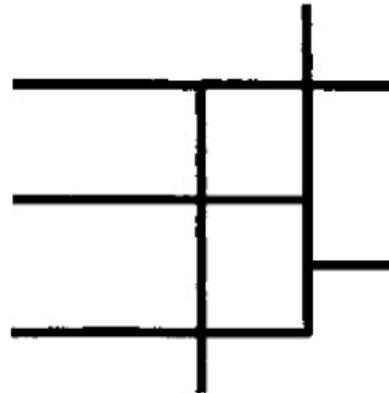
Andrew Gast-Bray  
Norm Marshall  
Kevin Tilbury  
Scott McCarey  
Fred Dock  
Norman Garrick  
Ellen Greenberg



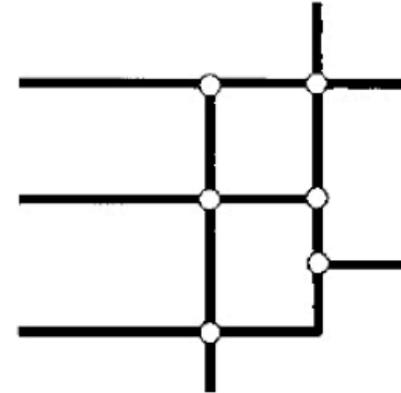
# What is a Network?



Disconnected - Non-Network

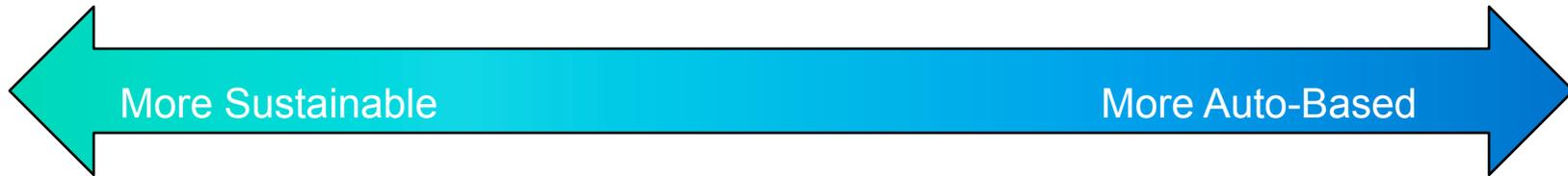


Possible Network - but what is it connecting?



Network - Connects Nodes

A structure that serves and connects multiple nodes, people, flows and/or functions to achieve a goal



SUSTAINABLE TRANSPORTION NETWORK\*

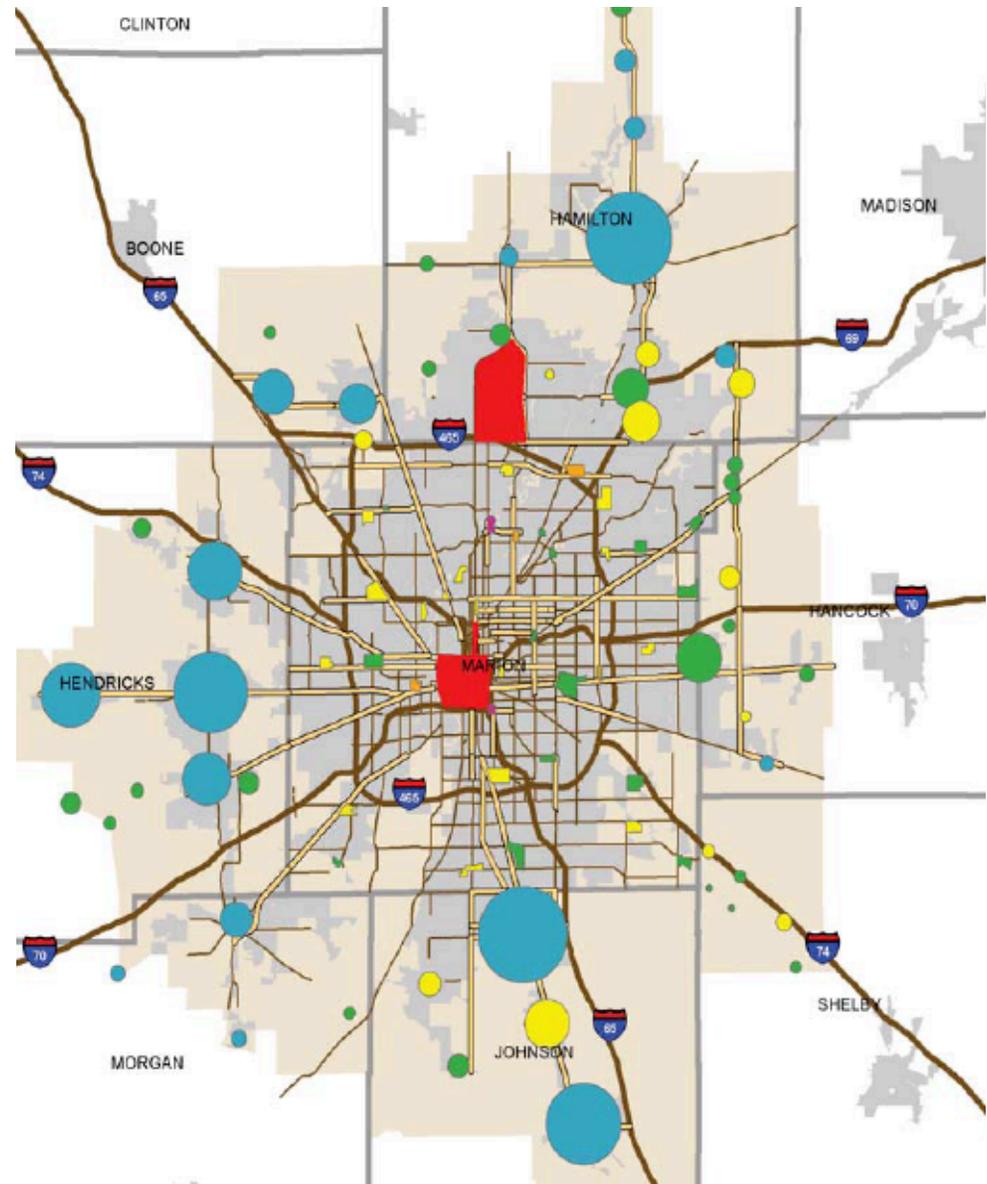
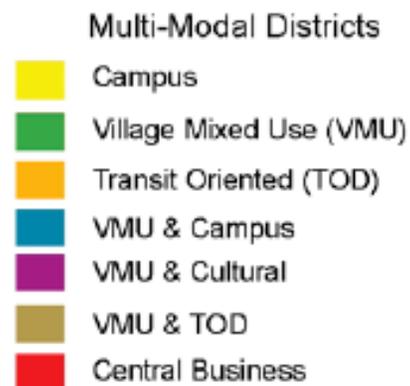
About places and getting to them  
 Connected  
 Multimodal  
 Accessible destination  
 More public streets  
 Detailed streetscape  
 Welcoming for pedestrians  
 More route choices / redundant  
 Smaller (narrower ?) streets  
 Finer grained  
 Lower speeds but faster trips  
 Focus on quality of place  
 Less delay at intersections  
 Simpler turns  
 Supports activity on sidewalks / adj to streets

CONVENTIONAL NETWORK

About moving cars at speed  
 Not  
 Auto-dependent  
 Indirect routes  
 Fewer public streets  
 Few streetscape elements  
 Dangerous and unpleasant for pedestrians  
 Fewer route choices / prone to breakdown  
 Wider streets  
 Coarser grained  
 Higher speeds but slower trips  
 Focus on speed of vehicles  
 More delay at intersections  
 More complicated turns  
 More arterials that are not comfortable to be next to

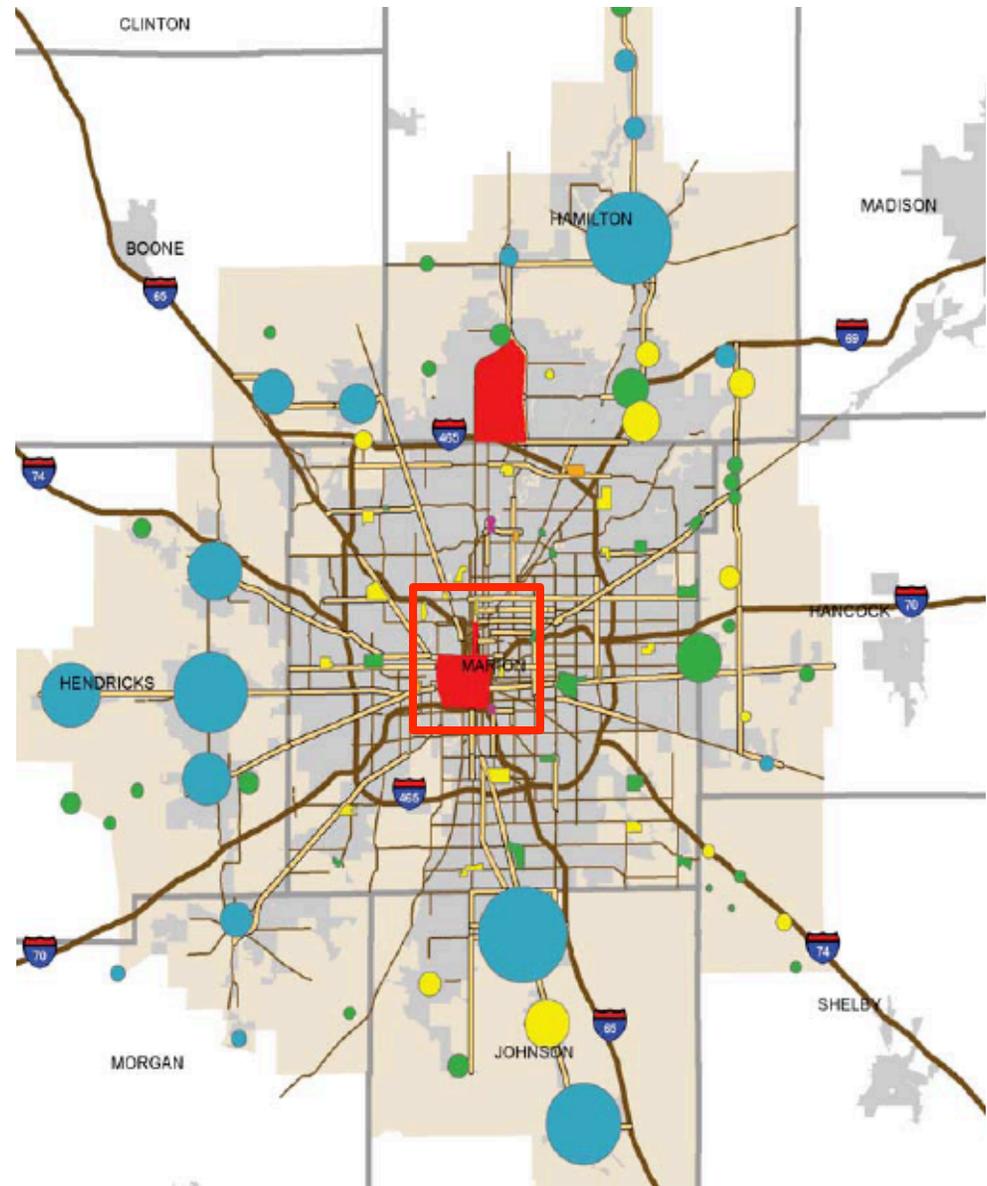
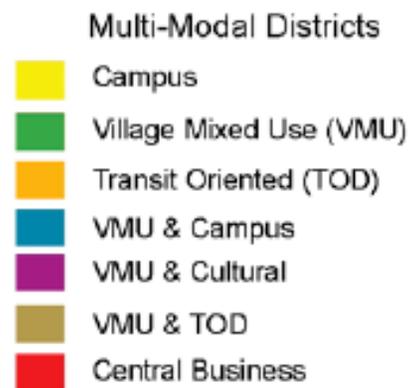
People understand connecting places, even if transportation engineers and planners do not. Different modes must connect places regionally.

- Indianapolis Case Study - Places for Indianapolis regional transportation to serve – determined by a public process.



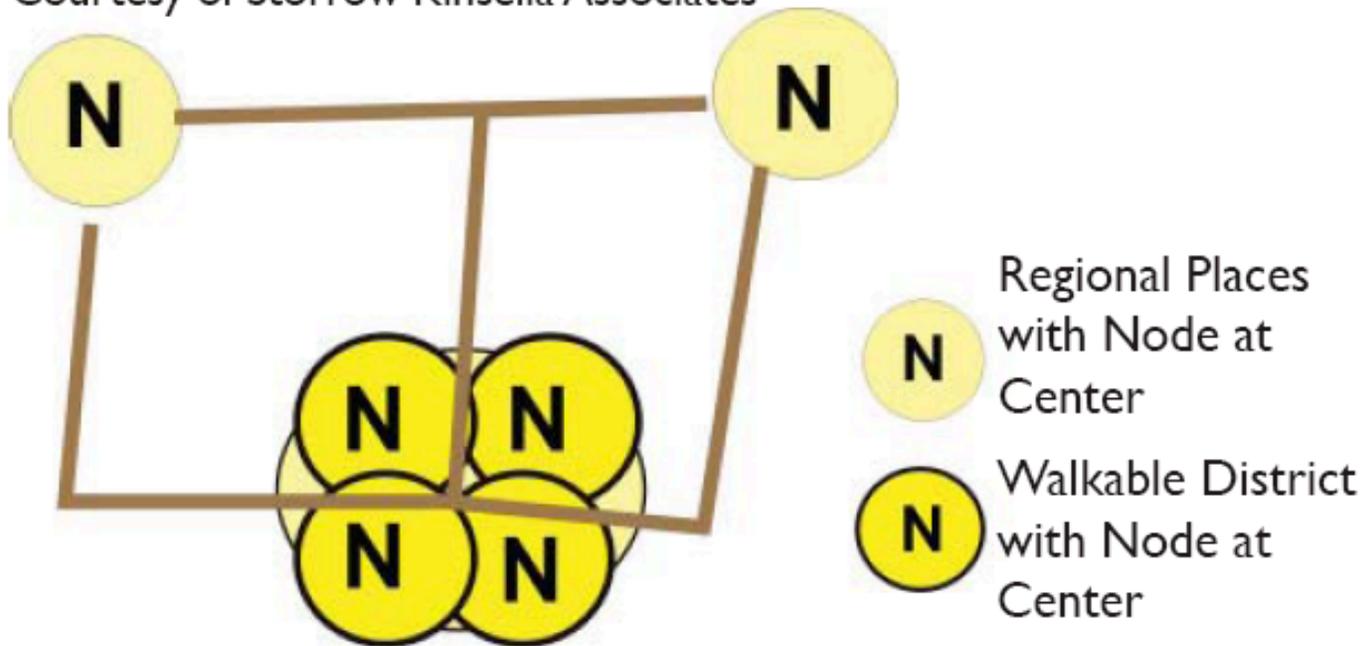
People understand connecting places, even if transportation engineers and planners do not. Different modes must connect places regionally.

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## Regional Places Diagram

Courtesy of Storrow Kinsella Associates



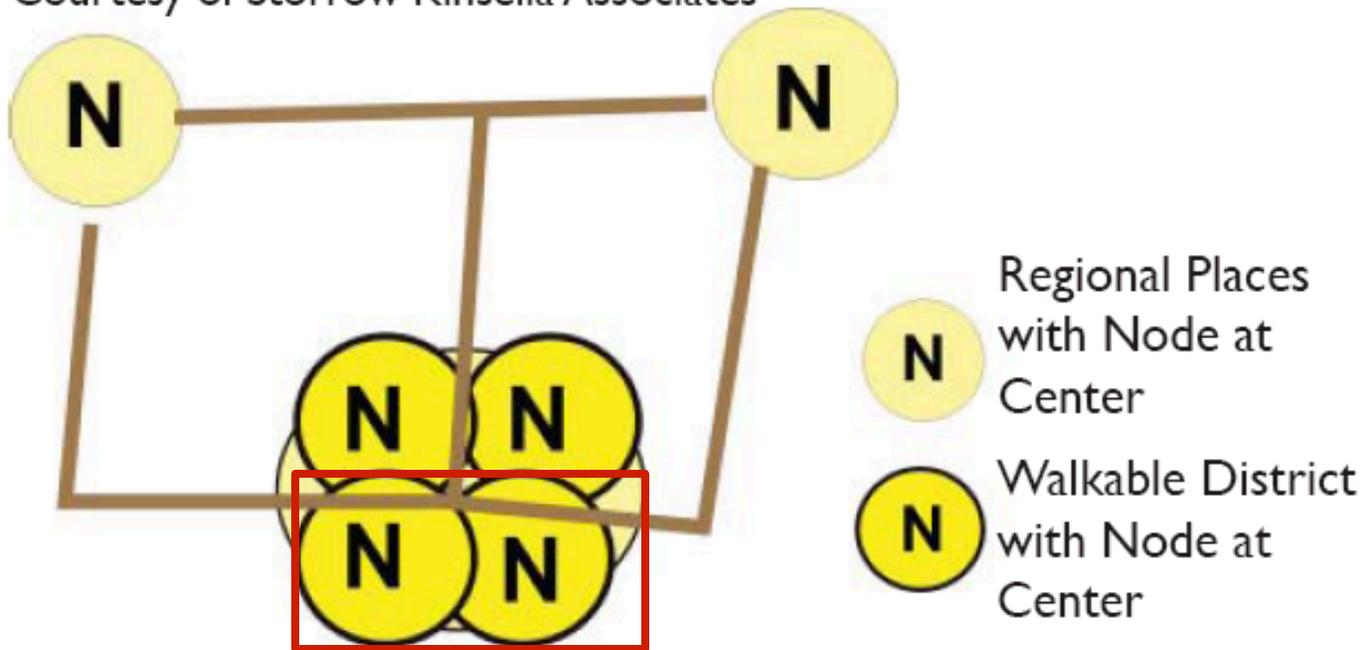
## Walkable District Diagram

Courtesy of Storrow Kinsella Associates and the Indianapolis MPO

Each multimodal district must be connected. If a district is too big to be walkable, it must be subdivided into walkable neighborhoods.

## Regional Places Diagram

Courtesy of Storrow Kinsella Associates

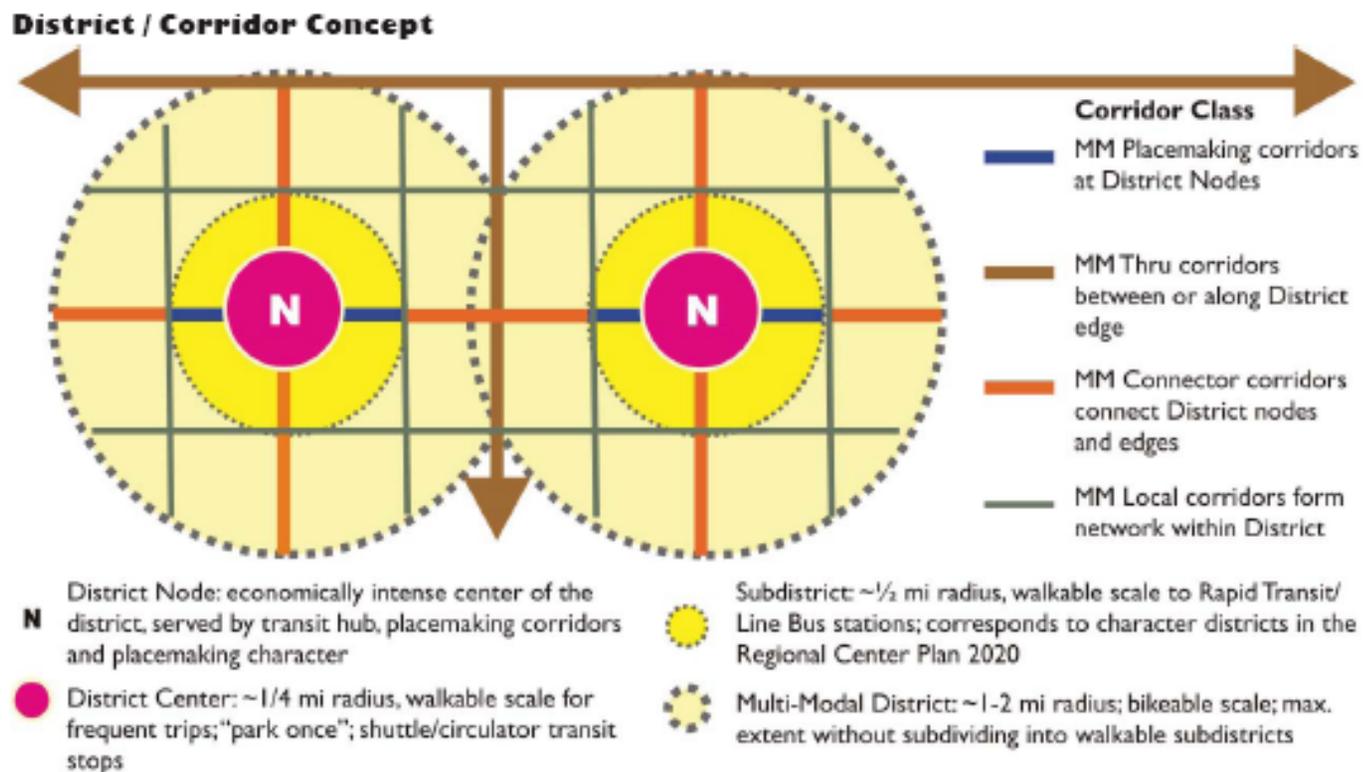


## Walkable District Diagram

Courtesy of Storrow Kinsella Associates and the Indianapolis MPO

Each multimodal district must be connected. If a district is too big to be walkable, it must be subdivided into walkable neighborhoods.

Using a place-based functional classification reorganizes street layout within a walkable district or neighborhood

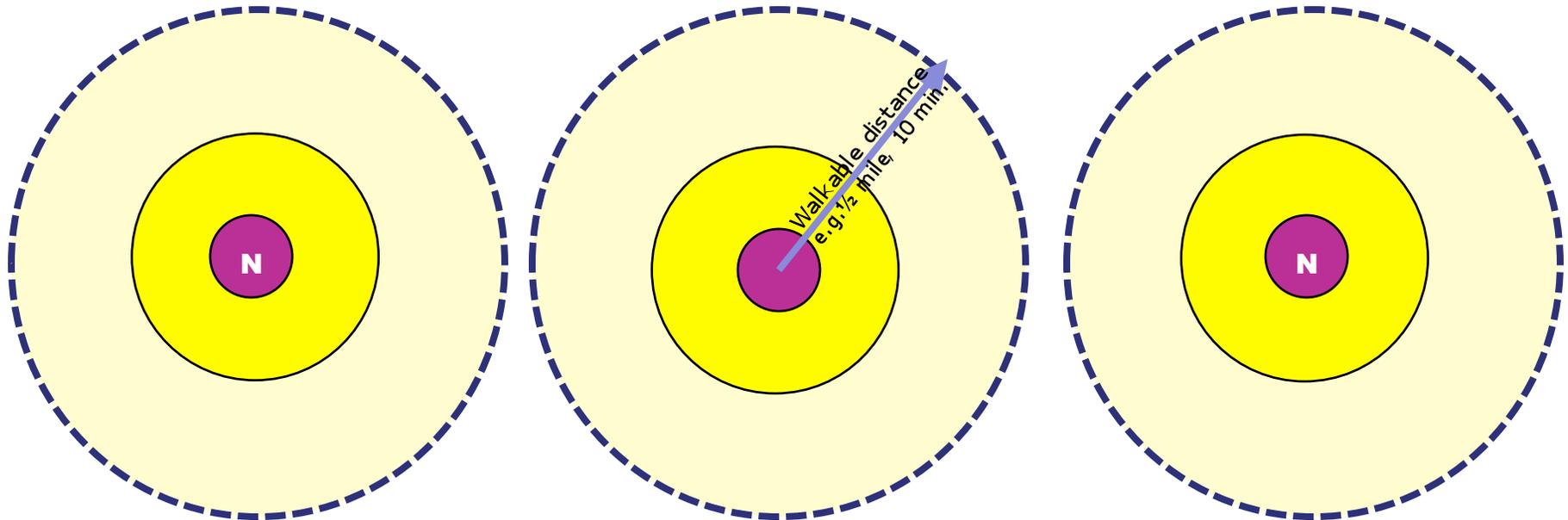


## Districts are multimodal places with “nodes” ( ) at their center

- “Node” or center which is the heart of the district
- Cluster many destinations, goods and services
- Hubs –walkable, bikeable, transit, “park once”
- Unique places based on heritage and culture

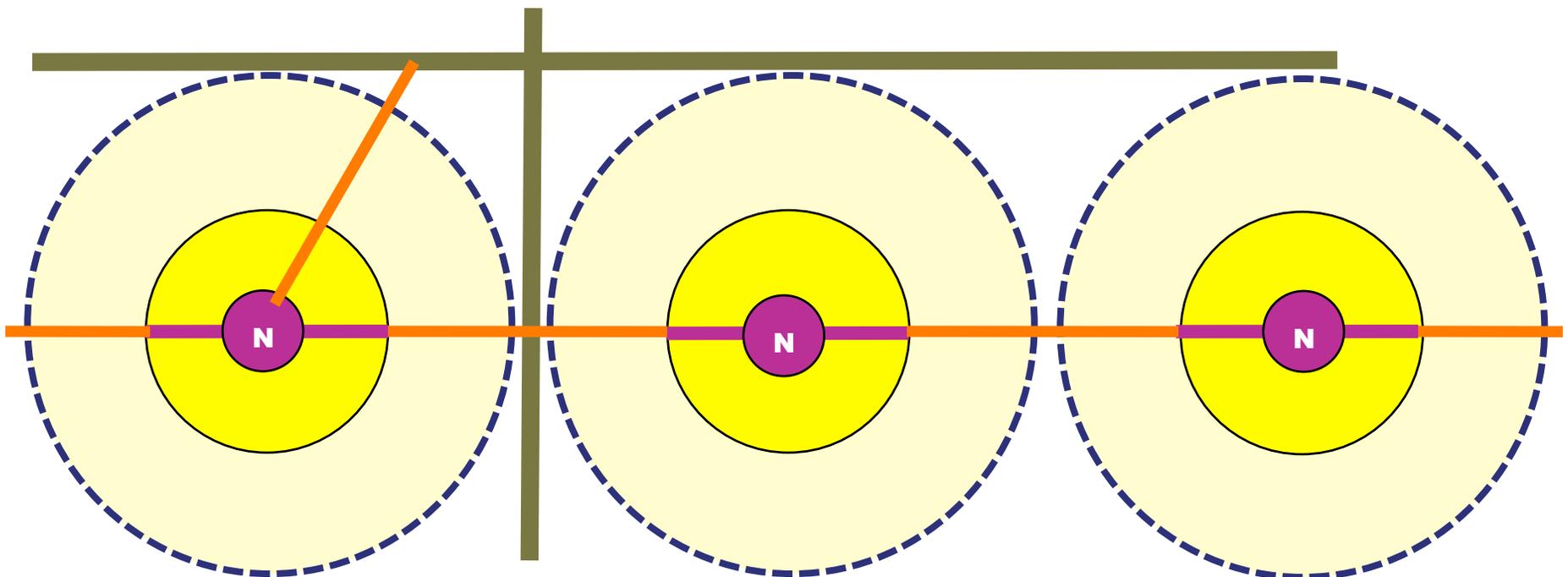


*Davlan Park is a “node” within the Mass Ave “Mixed –Use Village Subdistrict”*



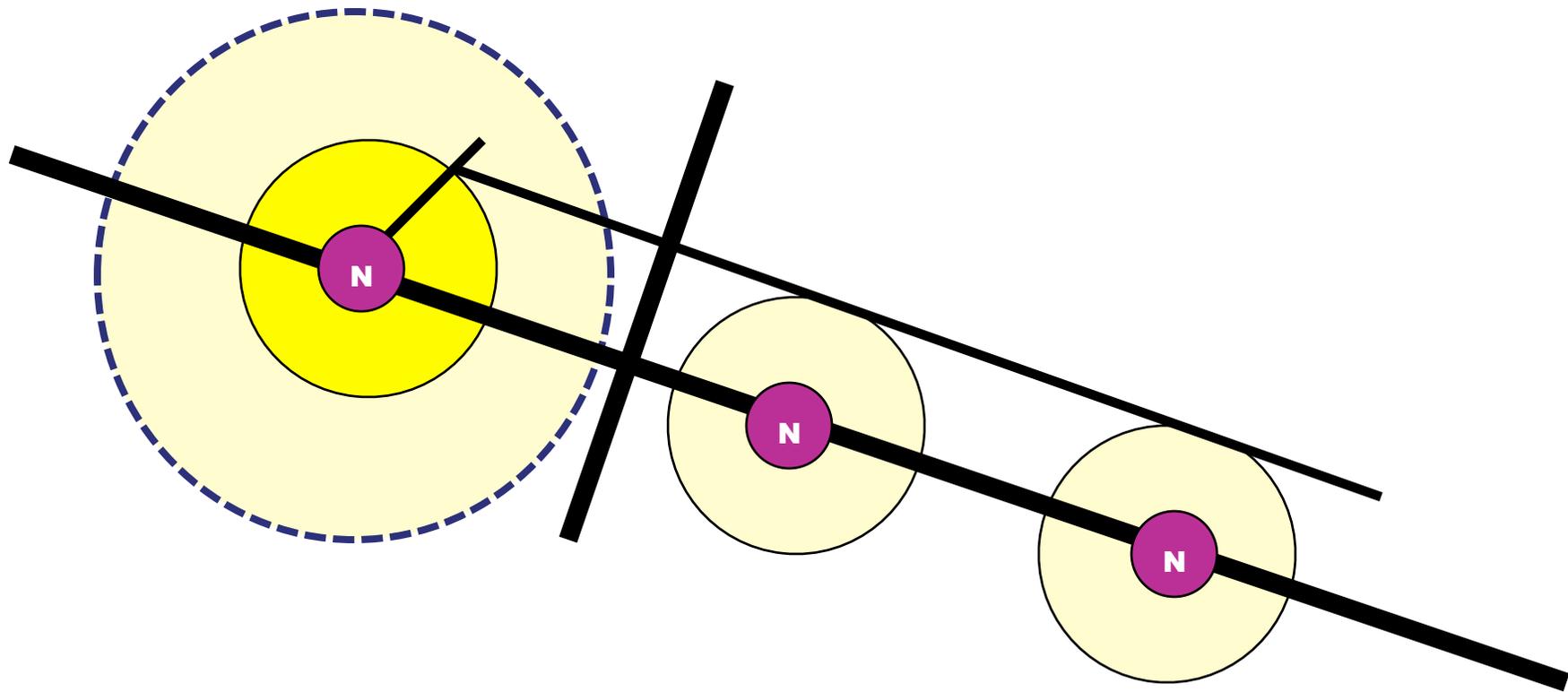
# Multi-Modal Corridors link Multi-Modal Districts

- MM Placemaking Corridors at district nodes
- MM Thru Corridors between or along edges
- MM Connector Corridors connect nodes and edges

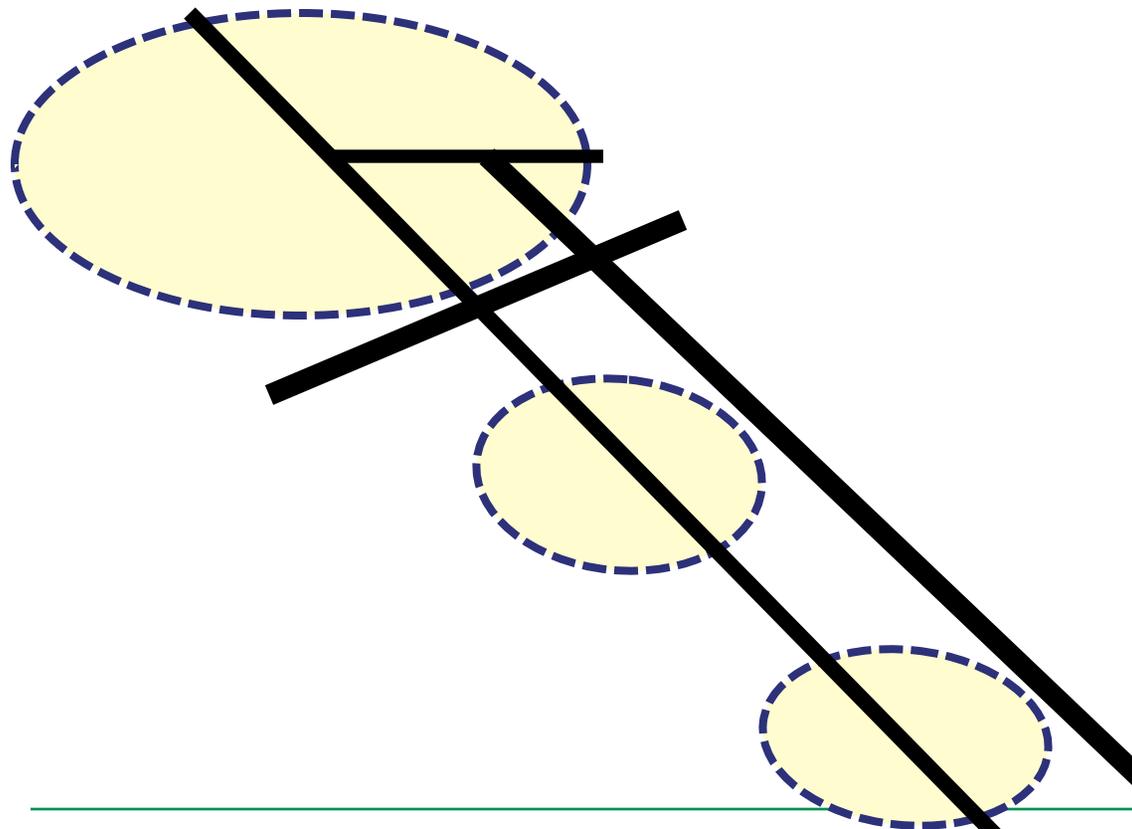


## Multi-Modal Corridors

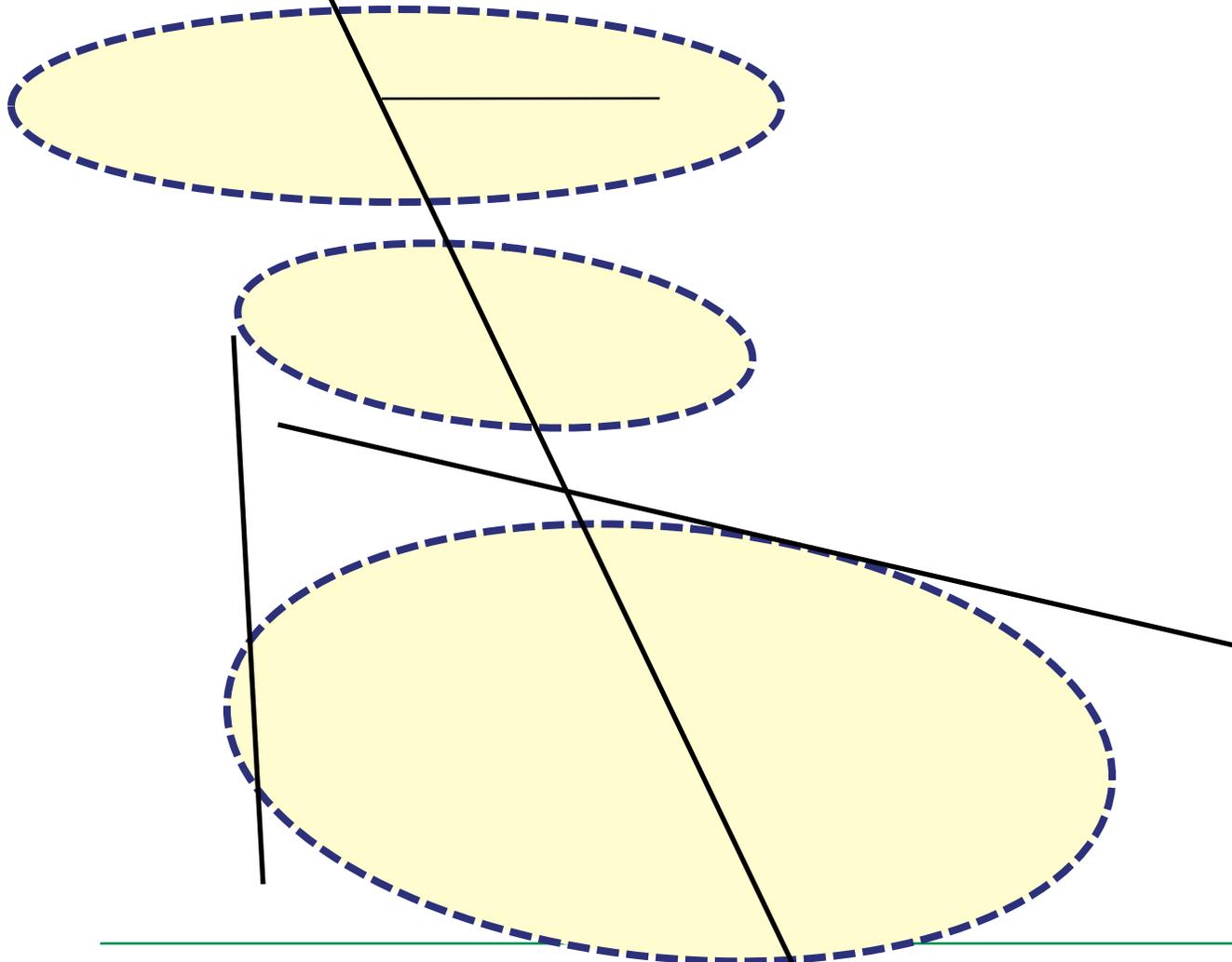
## Link Multi-Modal Districts

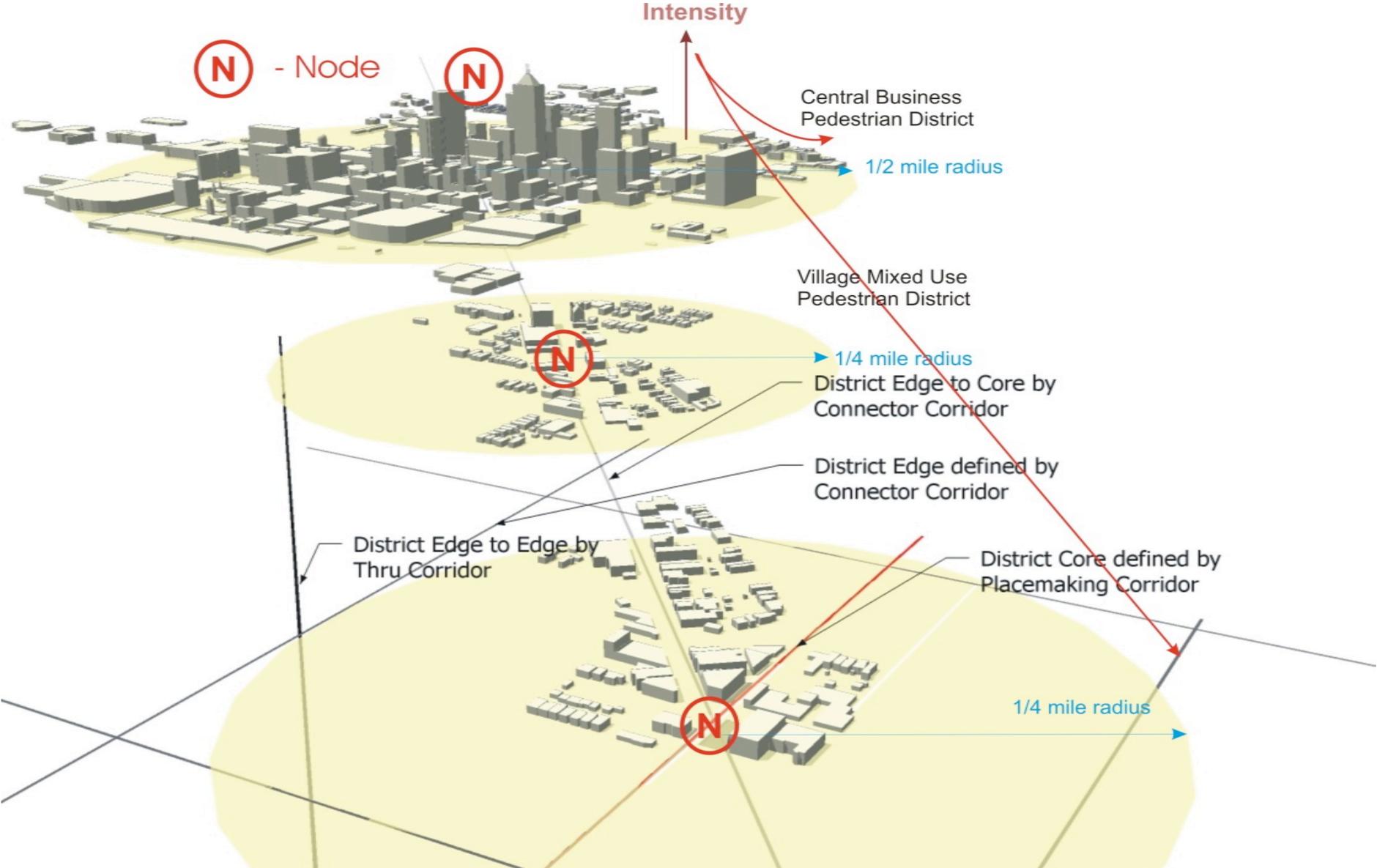


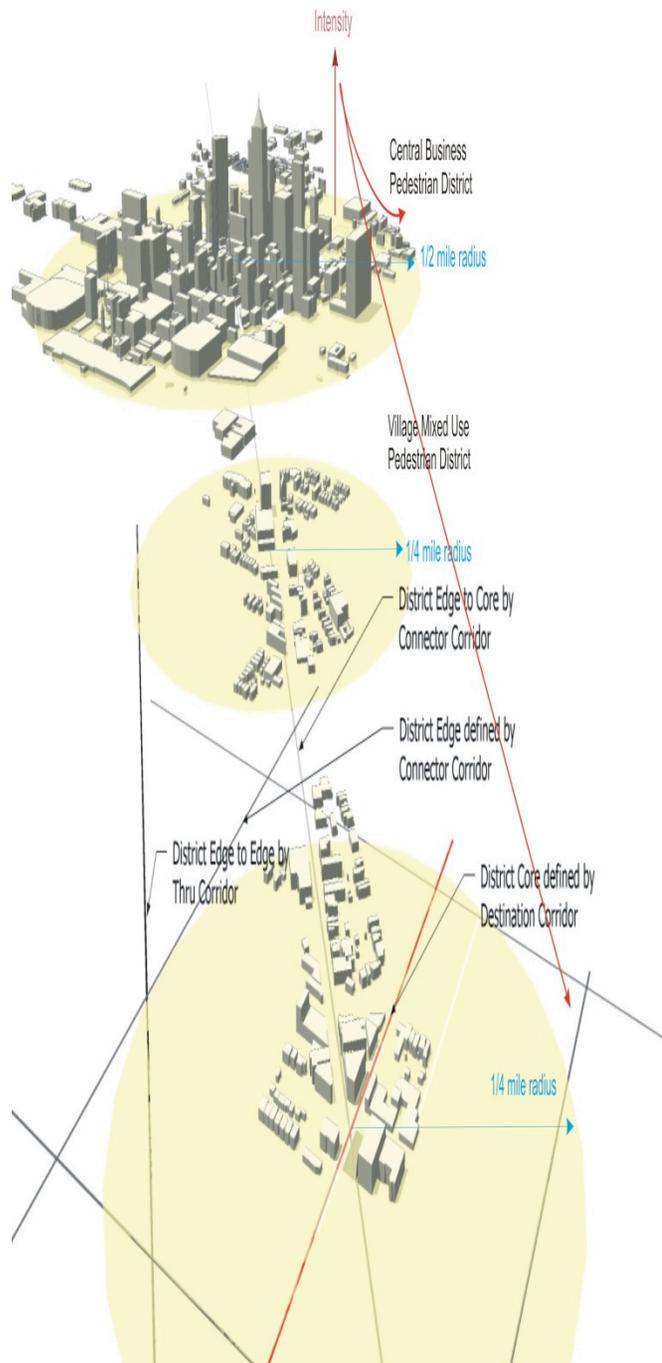
# Multi-Modal Corridors Link Districts

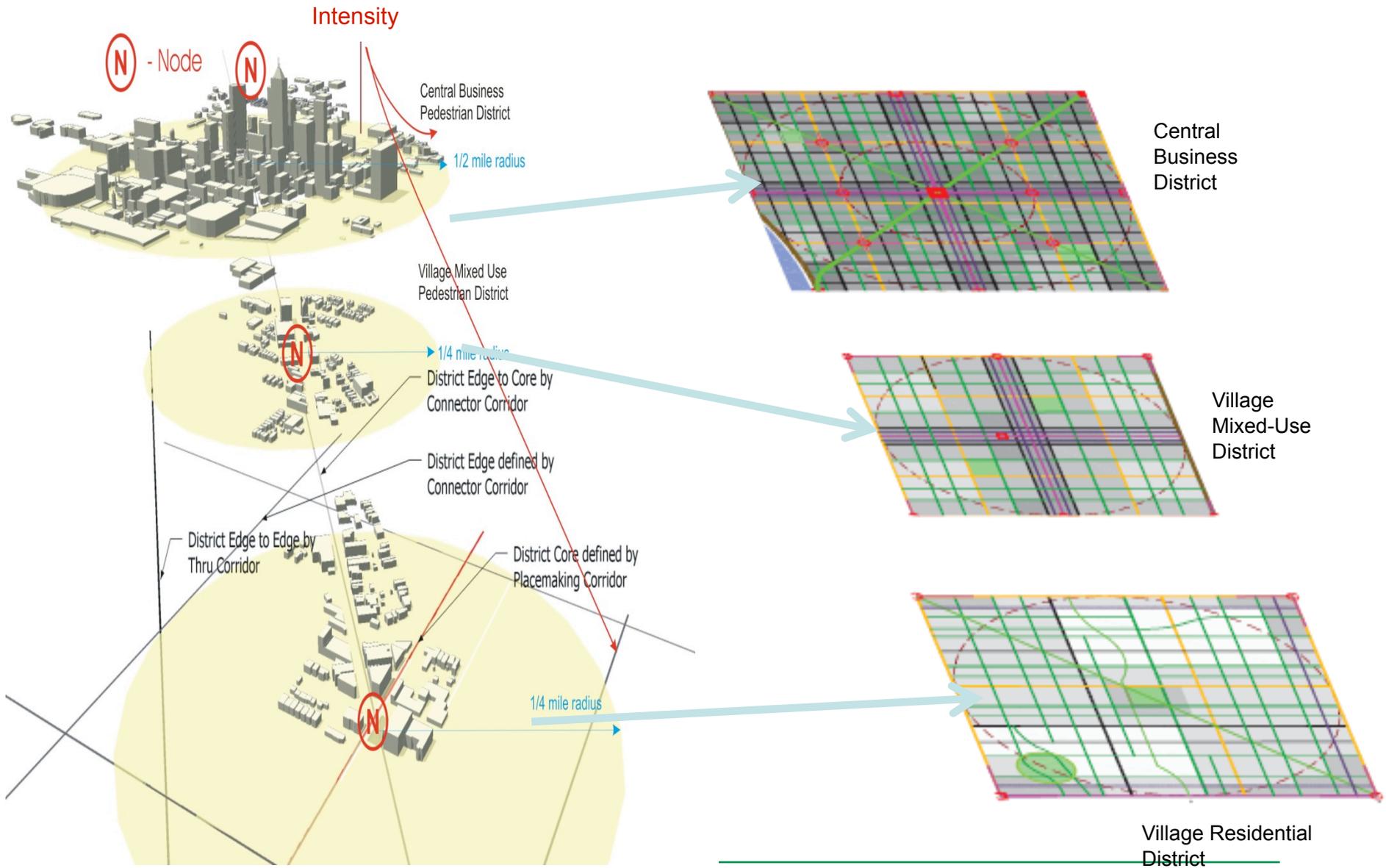


# Multi-Modal Corridors Link Districts



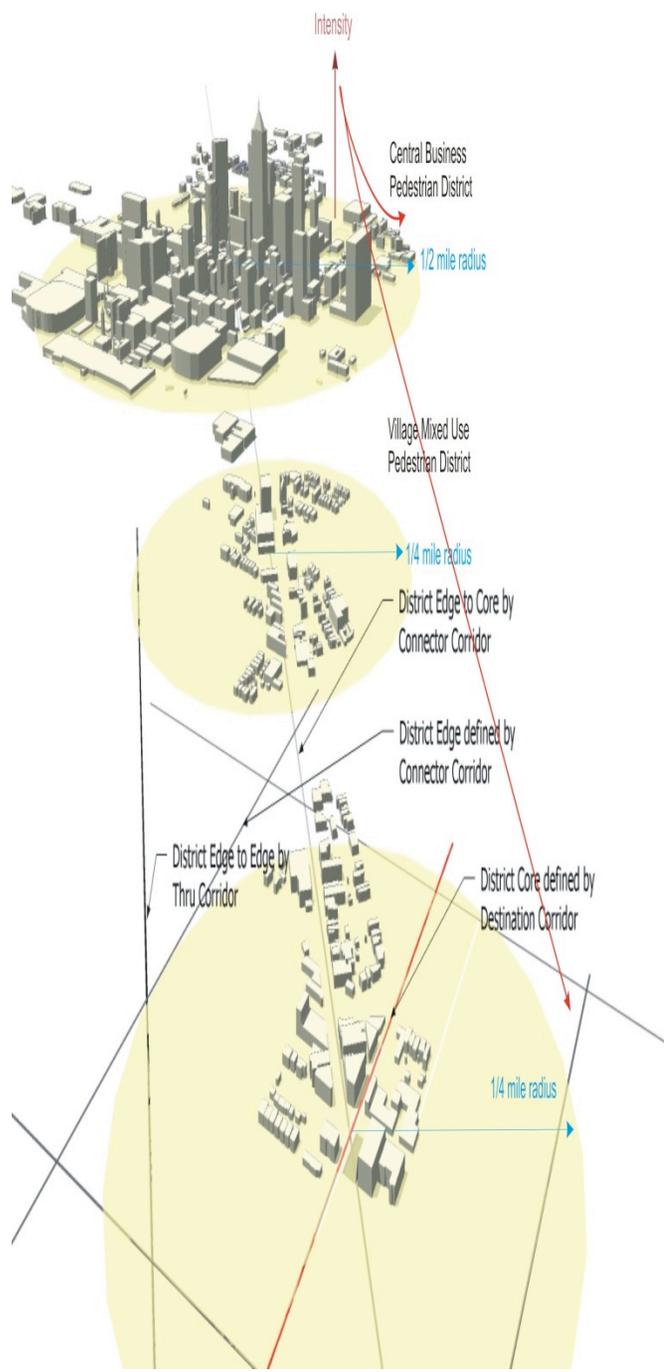




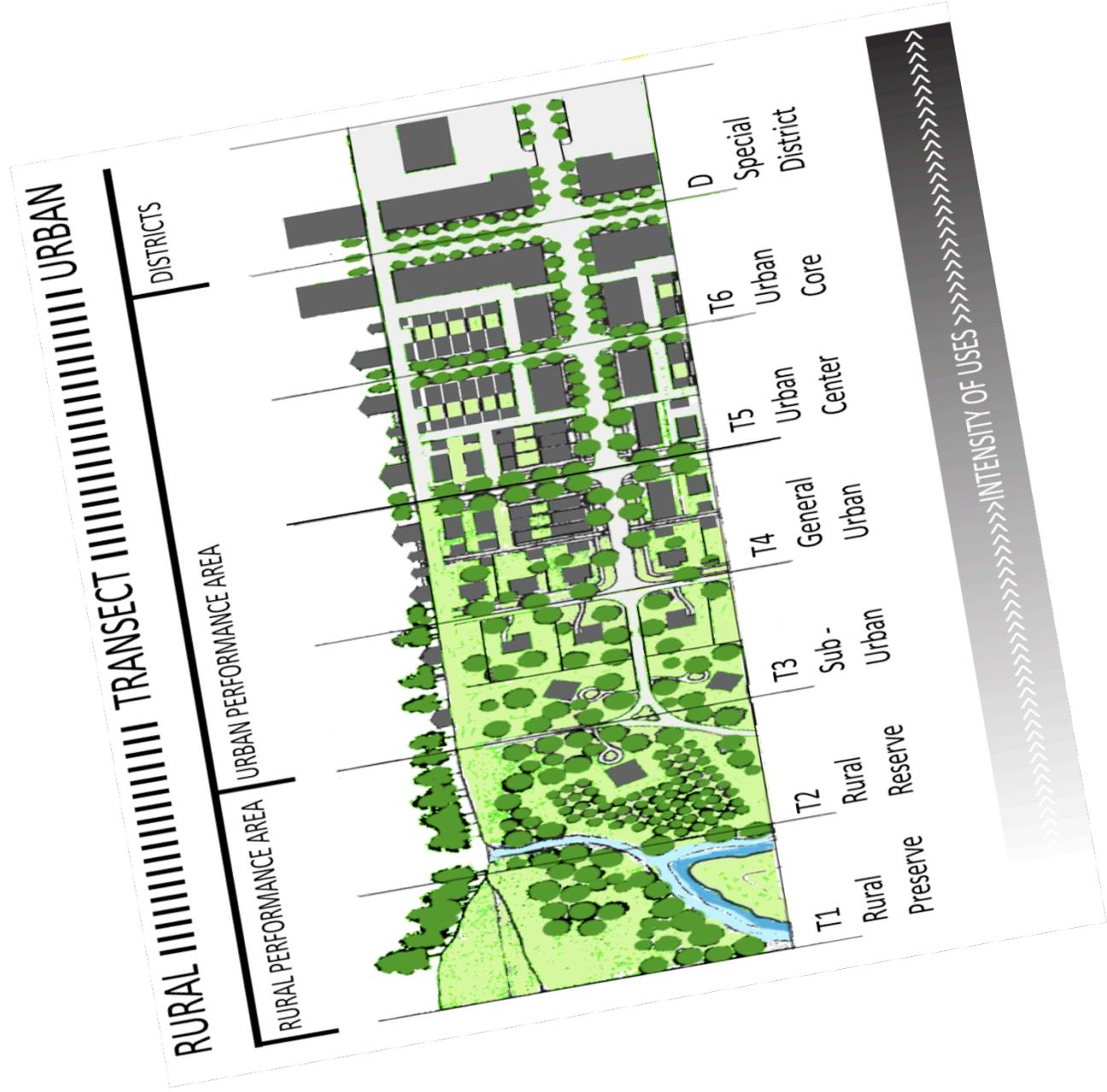


CONGRESS FOR THE NEW URBANISM

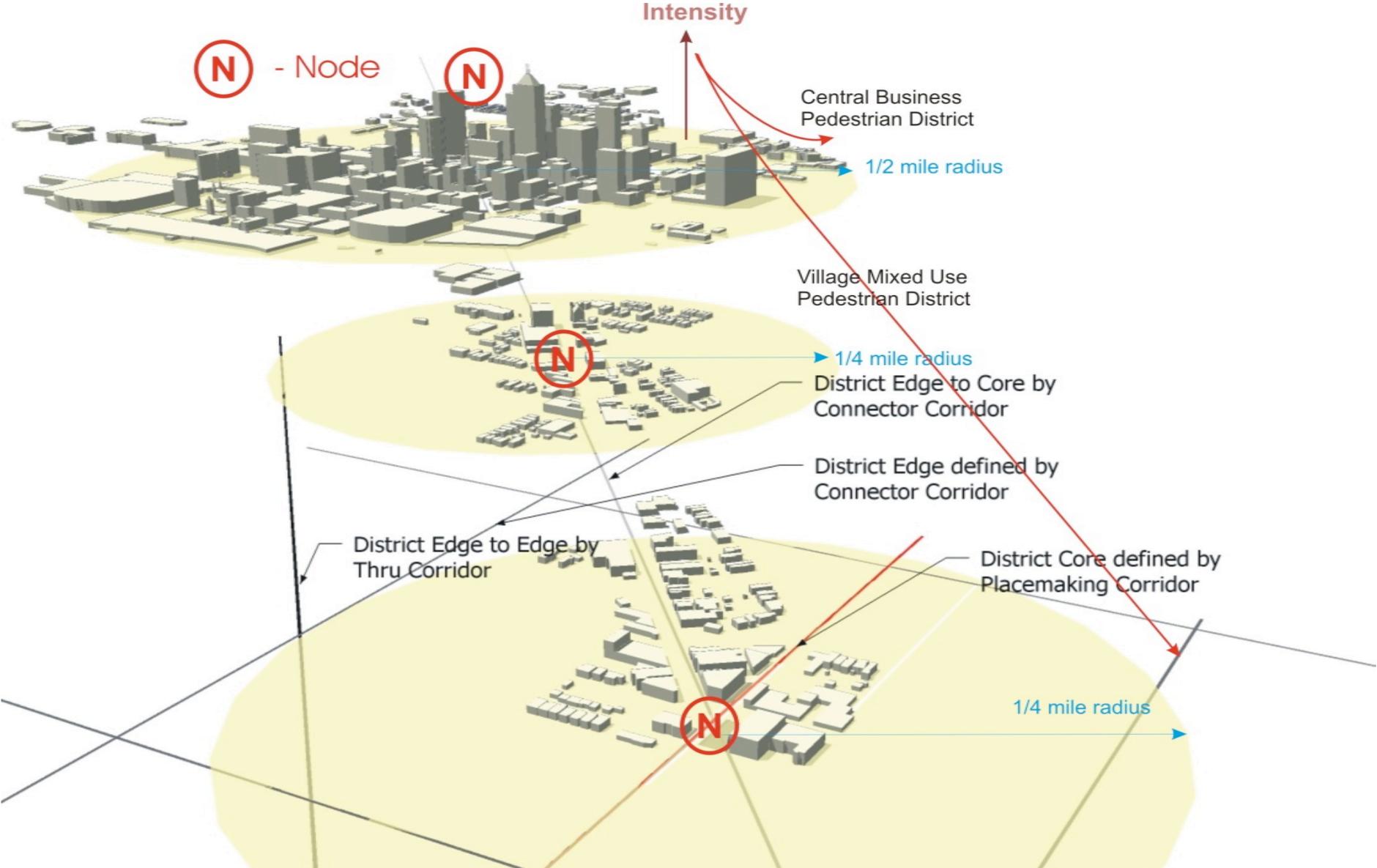
# SUSTAINABLE TRANSPORTATION NETWORKS



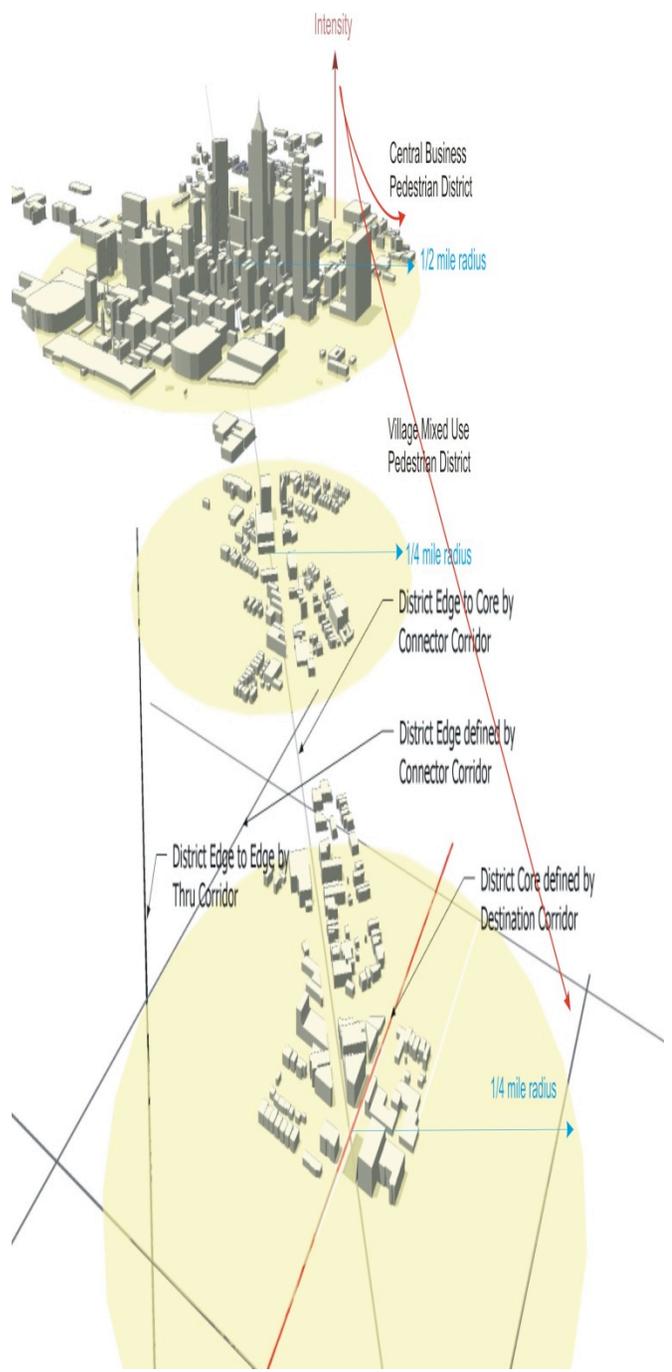


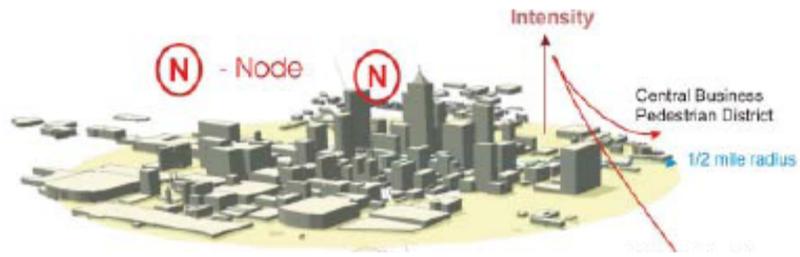






CONGRESS FOR THE NEW URBANISM  
**SUSTAINABLE TRANSPORTATION NETWORKS**





## More Performance out of Place-Based Networks:

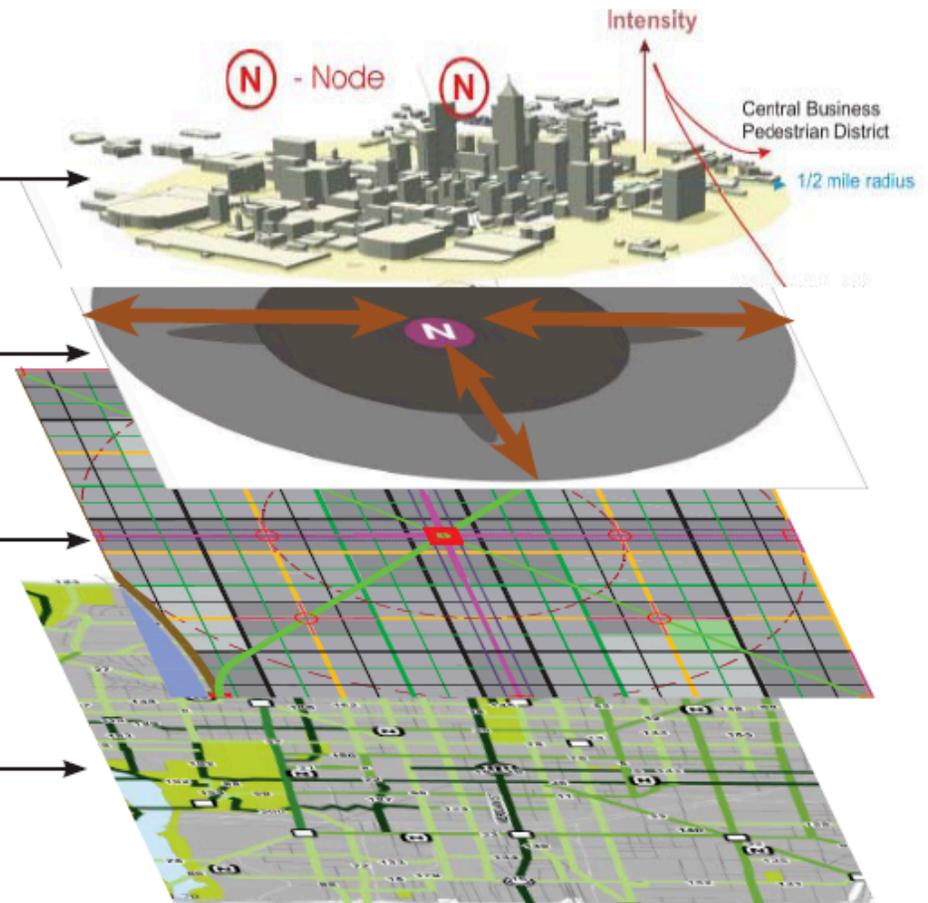
Place-based networks are better for so much more – For a given district, there are natural overlays

*Vertical Structure Level - Built Space, architectural guidelines, function of success of place - the more desirable for gsp to be there, more space for activities crams into the area driving prices/buildings up - houses wireless/cell/radio stations, windpower/solar - this level allows the district to evolve over time.*

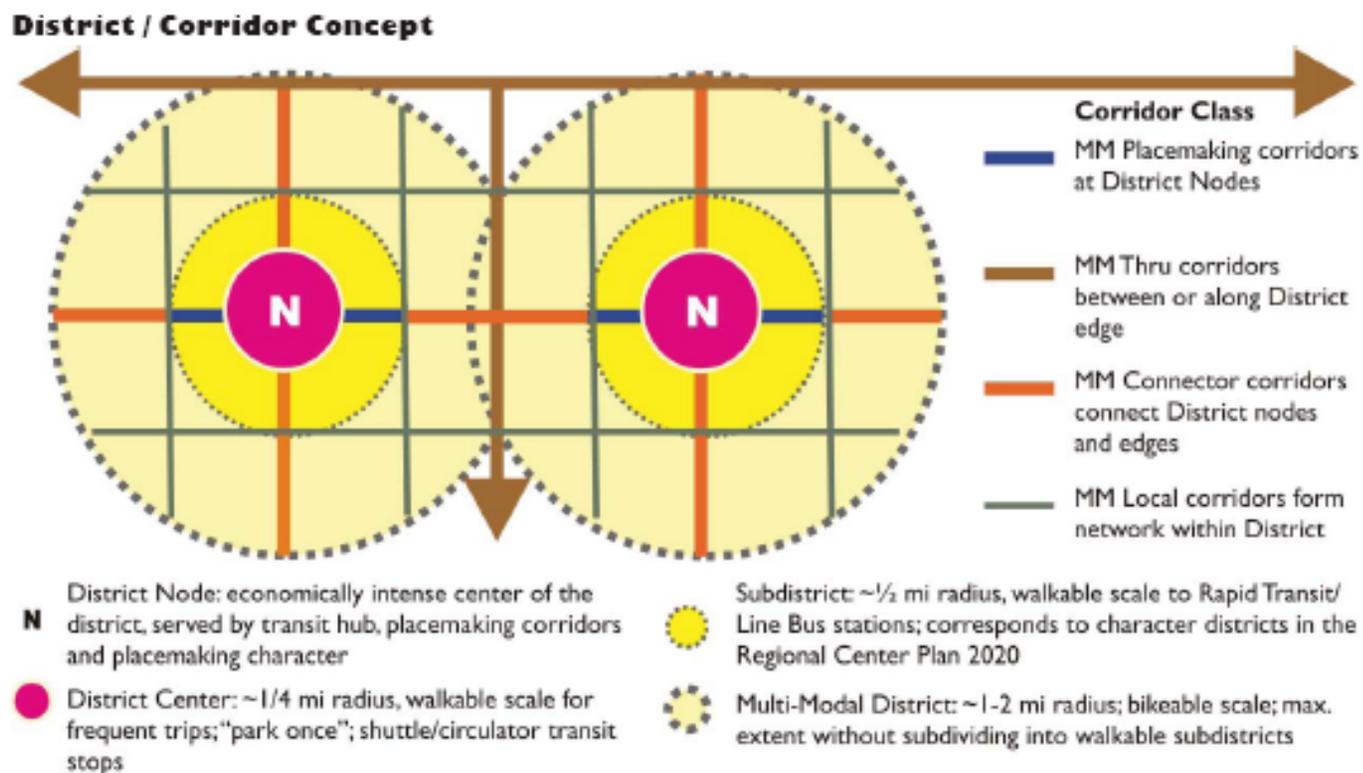
*Economic/Land-Use Structure Level - economic infrastructure, freight, service-provision organization, information structure level, education infrastructure, CHP/district power must be accessible to all for least cost - this level allows all in the district to access the modes and functions, but does not provide them directly to all.*

*Road Structure Level - co-location of principal utilities with roads, transportation mode network, emergency response network - must serve all residences, this level providing modes and functions to all extents of the district*

*Green Infrastructure Level - Natural resources, water, air, topography - some imposed variation with landscaping and planting - this is the base level upon which all else is built, ignoring this increases cost of service dramatically.*



# Sustainable transportation networks' (STN) new functional classification



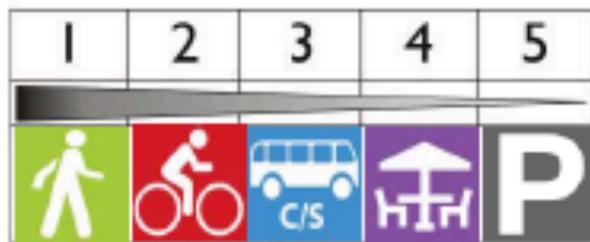
## STN's new functional classification characteristics

<b>STN Functional Class</b>	<b>Street Types</b>	<b>Speed Regime</b>	<b>Landuse Intensity &amp; Cross-Traffic</b>
Thru	Highway, Parkway	35-65 mph	Low & low
Connector	Commuter, Boulevards	25-35 mph	Med & high
Placemaking	Avenues, Mainstreets	15-25 mph	High & high
Local	Local, Links, Quiet	Bike, ped, transit determine speed, not autos	High & low-med

## Placemaking Class

- Multi-Modal Urban Pedestrian Corridor Concept

- Other typology examples: MM Boulevard, MM Social Street



URBAN PEDESTRIAN CORRIDOR MODAL HIERARCHY

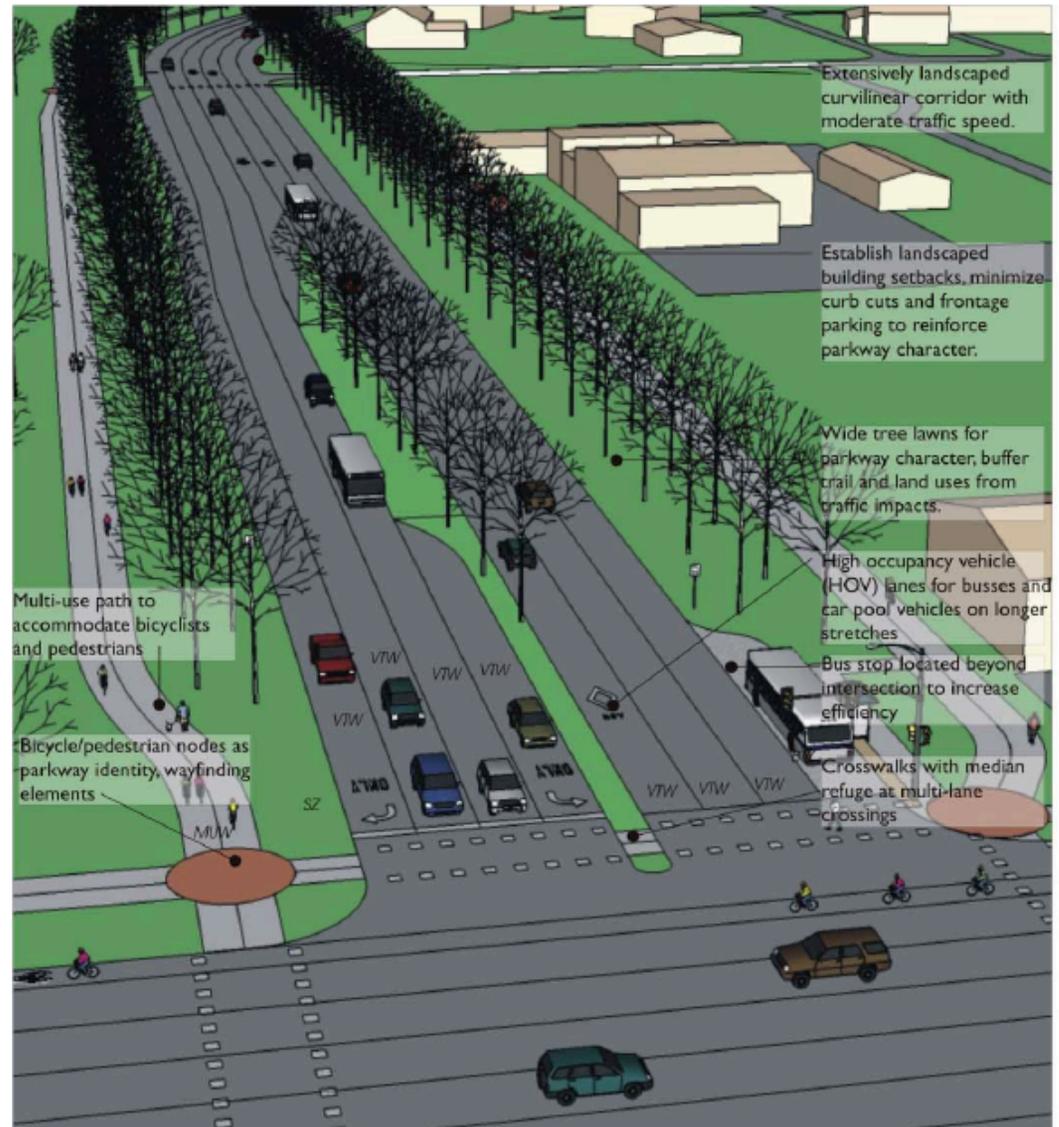


## Thru Class

- Multi-Modal Parkway Concept



MODERN PARKWAY CORRIDOR  
 MODAL HIERARCHY

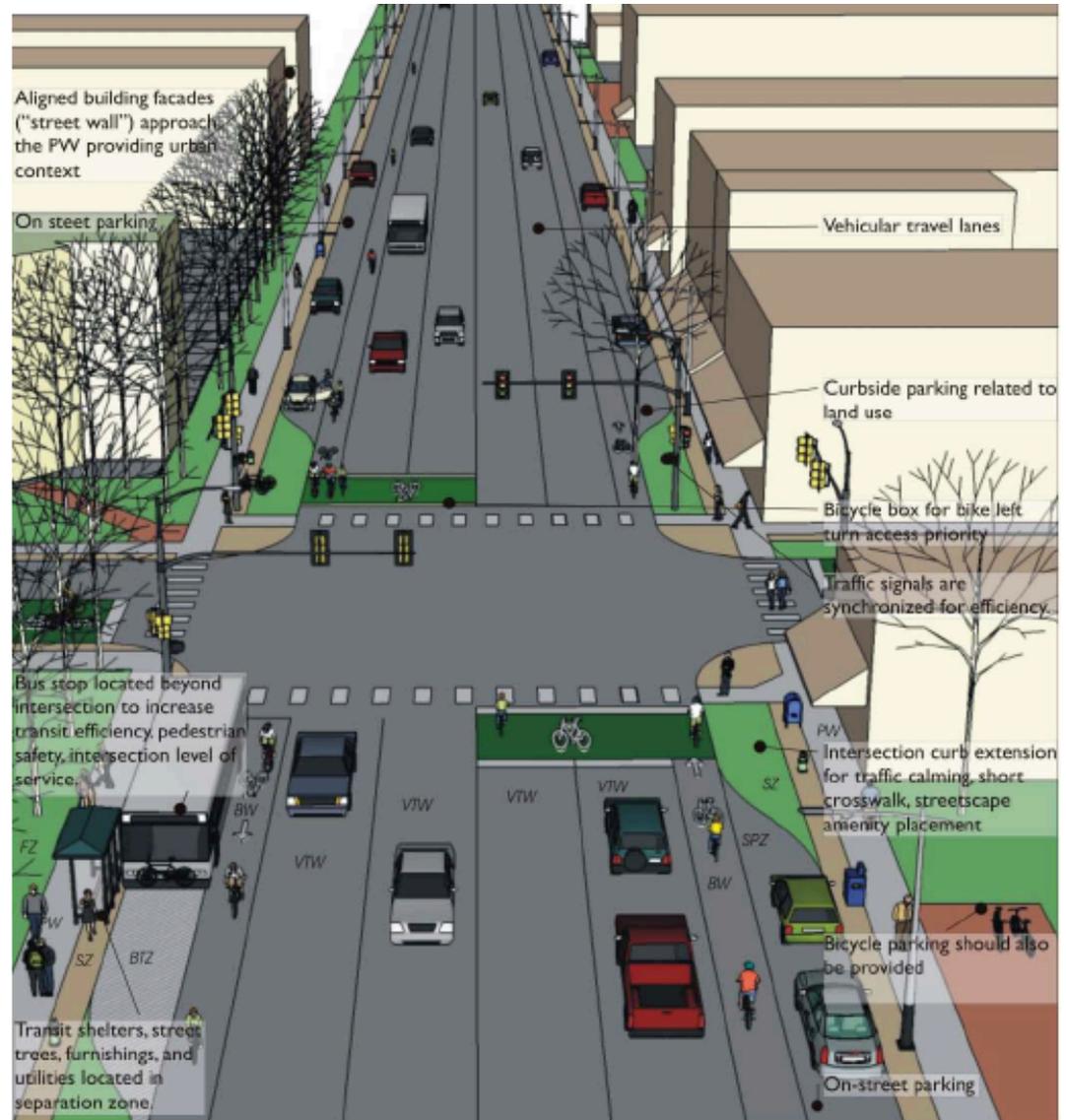


# Connector Corridor Class

## Multi-Modal Urban Commuter Concept

Other typology examples:

MM Urban Connector, MM Suburban Commuter and Connector



## Local Class

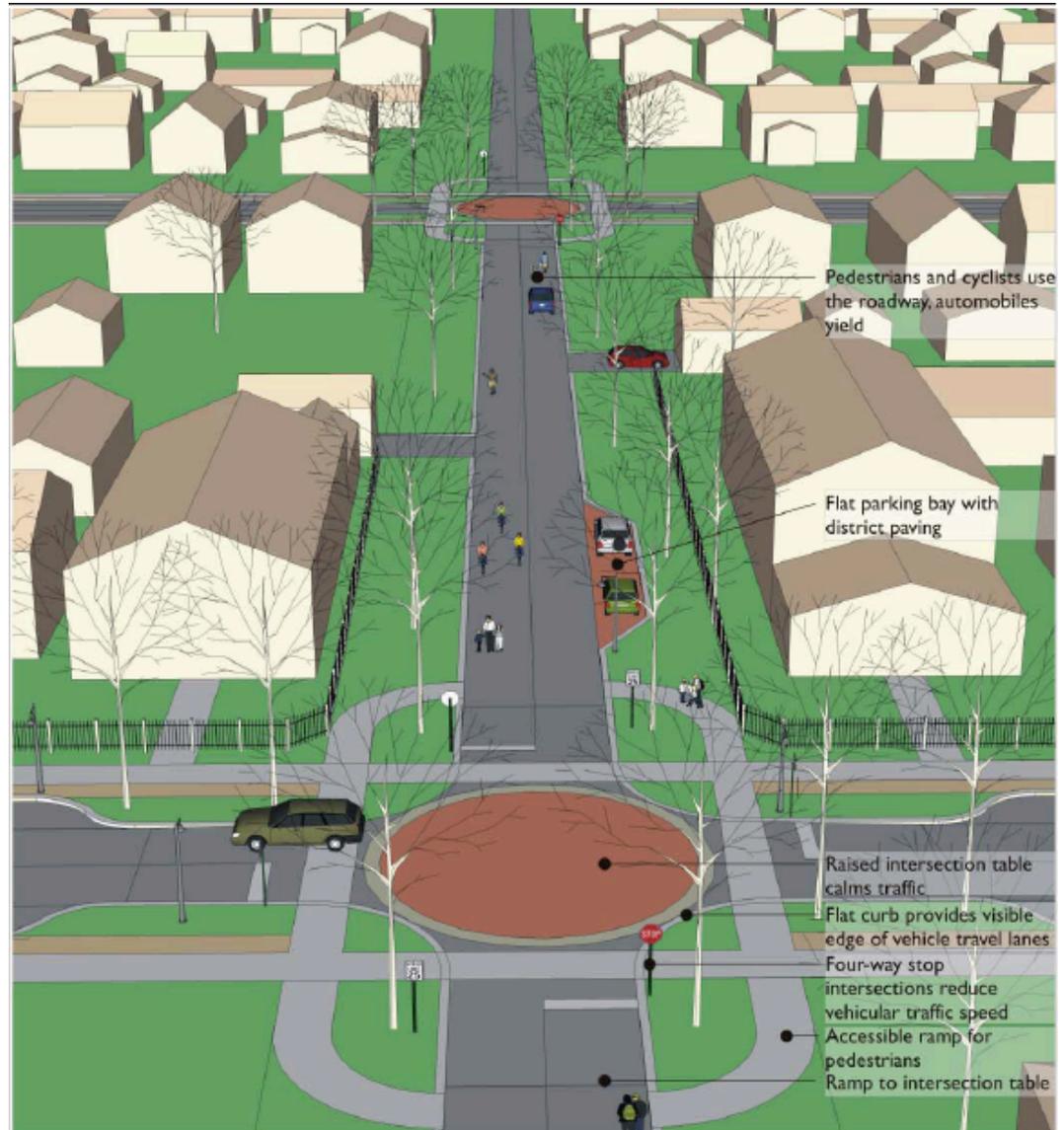
### Multi-Modal Quiet Street Corridor Concept

Other typology examples:

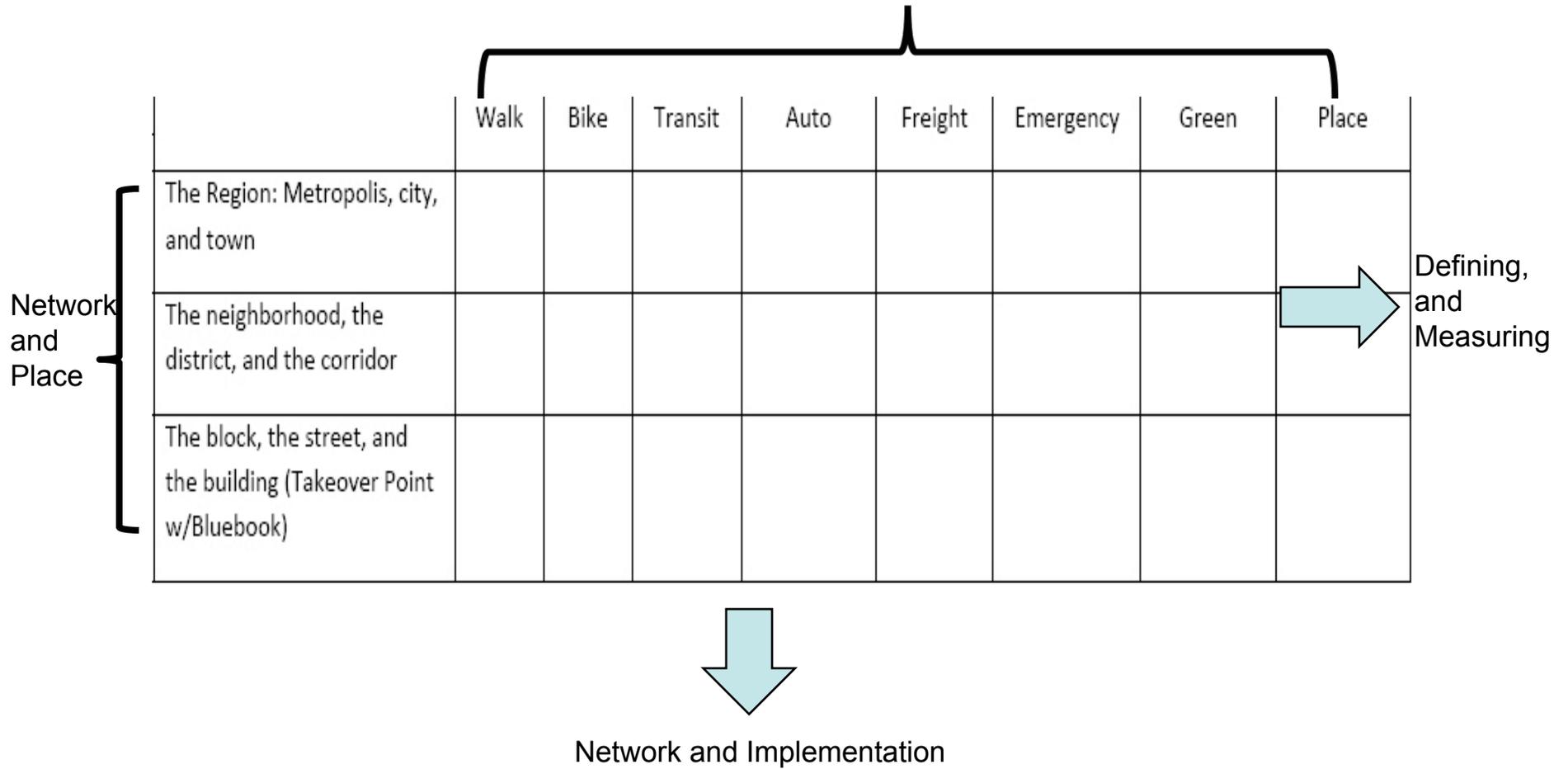
MM Urban, Suburban and Rural Links, MM Off Street and Off Street with Transit



QUIET STREET CORRIDOR  
 MODAL HIERARCHY



Network and Modes



# Measuring a Network?

## □ Optimizing

- Time to Destination, Directness and Circulation Patterns
- Connectivity and Spacing
- Continuity and Convergence
- Street Hierarchy and Types
- Street Intensity and Mode Accessibility
- Cost and Efficiency

## □ Assessing

- Network Grain
- Pedestrian Route Directness
- Pedestrian Environmental Quality
- Width of Thoroughfares
- Accessibility
- Modal LOS

## □ Verifying and Sustaining

- Triple Bottom Line
- Generative Capacity