Alternative Land Use Patterns: Can They Minimize Congestion?

Research findings
92nd Purdue Road School
28 March 2006

Topics to be covered

- Alternative land use patterns
- 1. Travel impacts
- 2. Economic aspects
- 3. What residents think
- Lessons learned
New Urbanist Land Use

- Neighborhoods compact, pedestrian-friendly, and mixed-use.
- Many activities of daily living should occur within walking distance.
- A village center
- Street networks to encourage walking, reduce the number and length of automobile trips.

Source: Congress for the New Urbanism, www.cnu.org

1. Does mixed land use reduce trip lengths?

In travel demand model,

- Subdivide standard TAZs into block-size minizones.
- Move non-residential "attractions" into neighborhoods. (NPTS + ITE T/G)
- Let trip productions choose attraction ends for full study area.
1. Mixed land use reduces trip lengths

- % change in trip length (mi) w/rt “EUCLID”
- Minor change to study area VMT
- Noticeable change to neighborhood VMT

<table>
<thead>
<tr>
<th></th>
<th>UTOWN</th>
<th>REN</th>
</tr>
</thead>
<tbody>
<tr>
<td>HBW</td>
<td>-2.4</td>
<td>-4.8</td>
</tr>
<tr>
<td>HBNW</td>
<td>-9.3</td>
<td>-10.2</td>
</tr>
<tr>
<td>NHB</td>
<td>-4.0</td>
<td>-40.3</td>
</tr>
</tbody>
</table>

2. Can neighborhoods support enough businesses?

- Walkable neighborhood of 1 square mile
- Economic census data: households needed to support each business type
- Lure of businesses outside the neighborhood

TABLE 5 Number of Establishments Supported by Catchment Area from Market Analysis

<table>
<thead>
<tr>
<th>Retail Trade Sector</th>
<th>5 HH/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grocery Stores/ Supermarkets</td>
<td>0.8</td>
</tr>
<tr>
<td>Foodservice and drinks</td>
<td>5.9</td>
</tr>
<tr>
<td>Beer wine and liquor</td>
<td>0.8</td>
</tr>
<tr>
<td>Furniture and home furnishing</td>
<td>0.9</td>
</tr>
<tr>
<td>Health and Personal Care</td>
<td>0.9</td>
</tr>
<tr>
<td>Amusement and recreation</td>
<td>1.2</td>
</tr>
<tr>
<td>Bookstore</td>
<td>0.2</td>
</tr>
<tr>
<td>Building Material &amp; Equipment</td>
<td>1.62</td>
</tr>
<tr>
<td>Clothing and accessories</td>
<td>1.89</td>
</tr>
<tr>
<td>Commercial Banking</td>
<td>1.31</td>
</tr>
<tr>
<td>Electronics and Appliances Store</td>
<td>0.62</td>
</tr>
<tr>
<td>Movie Theatre</td>
<td>0.10</td>
</tr>
<tr>
<td>Personal and Laundry Services</td>
<td>2.50</td>
</tr>
<tr>
<td>Pharmacy/ Drugstore</td>
<td>1.10</td>
</tr>
<tr>
<td>Public Library</td>
<td>0.01</td>
</tr>
<tr>
<td>Sporting Goods and Hobbies</td>
<td>0.98</td>
</tr>
</tbody>
</table>
Consumer expenditure market analysis

Units = (HH Expenditure * Total HH) / Average Sales

Example: No. of Grocery Stores

= ($3000 per HH * 100 HH) / ($600,000 per unit) = 0.5 units

→ 100 HHs can support 0.5 grocery stores

2. Neighborhoods cannot support most businesses

- Meridian-Kessler Neighborhood
- Mailback survey: many “basic” trips go outside neighborhood
- Sidewalk survey: 38% < 1 mi, 46% > 2mi
3. Is New Urbanist Design popular?

- St. Lawrence-McAllister neighborhood (Lafayette)
- Surveys: Best attributes and land uses in neighborhood
- Hypothetical changes

Community input and preferences

- Thriving neighborhood center means vehicle traffic from outside
- Acceptable: Businesses on edge on neighborhood
- Repeat economic support analysis
4. Do new “New Urbanist” designs reflect New Urbanism?

- Village of West Clay
- Variety of architecture
- Long walk distances to “center”
- Center lacks businesses that meet frequent household needs.

5. Some mixed use neighborhoods work

- Oakwood OH
- Old development preserved and/or updated
- Businesses along busy streets at neighborhood edges
5. Some mixed use neighborhoods work (2)

Supermarket street side  Parking lot behind store

Lessons learned

- LU changes can reduce VMT.
- Mixed land use must be economically viable.
- Adapt land use designs to specific conditions (tp. network, citizen attitudes)
- Preserve and enhance existing mixed land use.
- Provide choices!