The Land Use Conflict Identification Strategy as a Basis for Regional GeoDesign Modeling

Visioning Orange County Florida in 2060

School of Landscape Architecture and Planning
Department of Urban and Regional Planning
College of Design, Construction and Planning
University of Florida
Paul D. Zwick, Ph.D., Professor and Director
Abdulnaser Arafat, Ph.D., Researcher

School of Landscape Architecture and Planning
Planning Department
College of Architecture and L
University of Arizona
Iris Patten, Ph.D., Assistant Professor
Base LUCIS Process

Develop Goals and Objectives
Create Suitability (Objectives – Goals) Using Experts
Create Preferences Using Community Values
Combine Preferences for Conflict/MU Opportunity

Base LUCIS Land Use Allocation Process

First, Allocate Using Gross Urban Density
Second, Allocate Using Alternative Scenarios – In General:
   Allocate Redevelopment Employment and Residential Population *
   Commercial, Service and Retail, Multifamily Residential
Allocate Infill Employment *
   Industrial, Service and Retail, Commercial
Allocate Infill Residential Population *
Allocate Greenfields Residential Population *
Orange County Gross Residential/Employment Densities

<table>
<thead>
<tr>
<th>Density Category</th>
<th>Base Population or Employment</th>
<th>Base Acres With Vacant</th>
<th>Base Acres Without Vacant</th>
<th>Base Density With Vacant (People/Acre)</th>
<th>Base Density Without Vacant (People/Acre)</th>
<th>Base Percent Vacant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Urban</td>
<td>1,114,979</td>
<td>271,832</td>
<td>218,992</td>
<td>4.102</td>
<td>5.091</td>
<td>19.44%</td>
</tr>
<tr>
<td>Gross Residential</td>
<td>1,114,979</td>
<td>138,508</td>
<td>99,564</td>
<td>8.05</td>
<td>11.20</td>
<td>28.12%</td>
</tr>
<tr>
<td>Gross Commercial</td>
<td>168,417</td>
<td>13,771</td>
<td>4,127</td>
<td>12.23</td>
<td>40.81</td>
<td>70.03%</td>
</tr>
<tr>
<td>Gross Industrial</td>
<td>94,210</td>
<td>9,377</td>
<td>5,660</td>
<td>10.05</td>
<td>16.65</td>
<td>39.64%</td>
</tr>
<tr>
<td>Gross Service</td>
<td>544,730</td>
<td>48,400</td>
<td>38,412</td>
<td>11.25</td>
<td>14.18</td>
<td>20.64%</td>
</tr>
<tr>
<td>Gross Institutional</td>
<td>115,701</td>
<td>8,257</td>
<td>7,815</td>
<td>14.01</td>
<td>14.81</td>
<td>5.35%</td>
</tr>
<tr>
<td>Gross Retail</td>
<td>181,667</td>
<td>15,455</td>
<td>12,811</td>
<td>11.75</td>
<td>14.18</td>
<td>17.11%</td>
</tr>
</tbody>
</table>
Aggregate Preferences for Greenfields

Agriculture
Conservation
Urban

Commercial
Multifamily
Retail
Greenfields Criteria Evaluation Matrix

GCEM Table
Urban Weighted Suitability
County Gross Density
Conflict
Greenfields Conflict Matrix

- Agriculture Preference
- Conservation Preference
- Major Conflict High Preference
- Major Conflict Low Preference
- Major Conflict Moderate Preference
- Minor Conflict Ag-Con High Preference
- Minor Conflict Ag-Con Moderate Preference
- Minor Conflict Ag-Urban High Preference
- Minor Conflict Ag-Urban Moderate Preference
- Minor Conflict Con-Urban High Preference
- Minor Conflict Con-Urban Moderate Preference
- Urban Preference
Greenfields Criteria Evaluation Matrix (CEM)

Using ArcGIS Spatial Analyst, Local Toolset, “Combine Tool”

The ArcGIS Combine Tool is used to "combine multiple rasters so that a unique output values assigned to each unique combination of input values" (Esri ArcGIS 10.0 Desktop Help, 2011).
Redevelopment All Showing Mixed Use

Commercial

Service & Retail

Multifamily
Greenfield All

Sprawl (Trend)

Increased Density With Moderate Redevelopment and Infill
Example Using a CEM for Mixed Use – TOD Alternative
Redevelopment Mixed Use TOD
CEM Location Criteria ★★★★★

Location criteria assist in relates and allocation summaries.
Redevelopment Mixed Use TOD CEM Conflict Criteria

Conflict criteria assist in allocation decisions.
Redevelopment Mixed Use TOD CEM Preference Criteria

Preference criteria assist in allocation decisions.
Redevelopment Mixed Use TOD
CEM Policy Criteria ★★★★★

Policy criteria assist in allocation decisions.
Additional Related Data (Examples)

- Average Household Size (From Census)
- Single Family Units (From Census or TAZ)
- Multifamily Units (From Census or TAZ)
- Property Acres (From Property Tax Records)
- Existing Density (Residential and Employment) (Census and Property Tax Records)
- Land Use Classification (Property Type, Year Built, and Market Value) (Property Tax Records)
- Allocation Year (Additem)
- Allocation Population (Additem)
- Alternative Density (Additem)
- Cell Acres (Additem)
- Class Category (Additem)
Redevelopment Population 2060 = 262,104 people

Redevelopment Commercial 2060 = 39,591 employees
Total Population = 169,635
Total Commercial = 12,023
So what does this mean?

Regional urban form can be the result of informed decisions that are generated from GIS models.

Regional Geodesign models can produce results that are summarized to local areas, making regional planning proactive, flexible, and community based.

Regional geodesign/planning will be less unpredictable and ultimately produce fewer unintended consequences.

Existing land use plans can be compared to multiple geodesign alternatives producing plans that are based upon truly informed policy decisions.

Policy alternatives can be tested and refined to produce a more sustainable urban form without interfering with design creativity.

Planners and urban designers can function within an environment based upon identified parameters and still allow designers freedom within site design.

Design impacts can be tested within local or regional areas and more easily explained to the general public.

Regional geodesign criteria can guide site design by specifying parameters that support regional policy with minimal design interference.