3D - Boulder Valley Comprehensive Plan

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City of Boulder
Presentation

☑ Boulder’s use of 3D GIS and other tools in Comprehensive Planning (e.g., story maps, CityEngine, analysis)

☑ Lessons Learned and Next Steps
City of Boulder, CO
About Boulder (2016)

- **25.8 sq mi urban area**
- **71 sq. mi. city open space!**
- **~107k city residents**
- **~100k jobs**
About Boulder

• **Major employers:** University, federal labs, health care, technology, Ball Aerospace

• **55%** of people in jobs commute into Boulder

• **Half** renters/owners

• **$1M+** average detached home price (2016)   
  **$850** median

• **Little vacant land**
It takes a village to plan

- Many actions citizen-initiated
- First city in 1967 to approve tax to pay for open space

VOTE FOR SALES TAX
Vision and Core Values

- Stewardship, Climate Action
- Cooperation
- Compact, contiguous, infill
- All modes Transportation
- Welcome, Inclusive, vital
- Great Neighborhoods
Key Planning Issues

• **Compact growth**: floodplains, height limits (cottonwood), urban service limit
• **Housing** diversity and affordability
• **Balancing job growth** and community character
• **Climate action and resilience**
• **Highly engaged community** (hands on)
Redevelopment – Placemaking – 3D?

Planning “before” and “after”
ArcView 3.3 Application
Internal Staff Only
Employment... and Housing Potential
Custom JavaScript Application for Development Review

High Resolution LiDAR Data
Land Use, Area Maps Guide Future Growth
Story Maps:
Bouldervalleymcompplan.net
KEY RESOURCES AND MAPS FROM PHASE 1:

Foundations and Community Engagement Plan

The key resources below include the body of research and analysis that form the foundations work for the plan update:

- Jump to the Interactive Story Maps
- Jump to Analysis, Maps and Reports
- Jump to the Subcommunity Fact Sheet

You can also read the community engagement plan, learn about Phase 1 community input at the Get Involved page, or jump to key resources and maps from Phase 2 or Phase 3.
City of Boulder

Boulder has an international reputation as a great city with a high quality of life. Situated on the high plains and adjacent to the Rocky Mountain foothills, the city is surrounded by more than 45,000 acres of protected open space that offer trails and a wide variety of recreational opportunities. Boulder is known as an international leader in environmental sustainability and a forward-thinking community with lively culture. As a national hub for scientific and environmental research, the city is home to several federal research labs and a world-class university. Driven by a culture of innovation and a strong creative economy, Boulder is a regional employment center with ongoing economic success. The community places great importance on the local economy and actively supports an impressive assortment of dining, shopping, art and cultural activities within the city. Boulder is also well-recognized as a walkable city with a multimodal transportation system of multi-use paths, bike lanes, and transit that help make alternative options more accessible to residents. All of these factors contribute to making Boulder one of the most desirable places to live in the region.
3D Story Maps for BVCP Update
LIFESTYLE

Planning Areas

71 square miles of city open space
26 square miles of city service area

Area I is the area within the City of Boulder, which has adequate urban facilities and services and is expected to continue to accommodate urban development.

Area II is the area now under county jurisdiction, where annexation to the city can be considered consistent with the adopted policies in the Comprehensive Plan.

Area III is the remaining area in the Boulder Valley, generally under county jurisdiction. Area III is divided into the Area III-Rural Preservation Area, where the city and county intend to preserve existing rural land uses and character and the Area III-Planning Reserve Area, where the city and county intend to maintain the option of future Service Area expansion.

Supporting Narrative and Data
LIFESTYLE

PLANNING AREAS

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EXISTING LAND USE

Industrial
1,489 acres

Other
97 acres

Residential
63,750 acres

Commercial
1,299 acres

Mixed Use
37 acres

Industrial

Public/Quasi-

Vacant Land

Urban Parks, City

Open Space and Mountain Parks, City

Open Space, Boulder County

Open Space/Park, Other (Public or Private)

Agriculture

Commercial

Mixed Use

Industrial
LIFESTYLE

CURRENT LAND USE DESIGNATIONS

Residential
- Very Low Density Residential (VLR)
- Low Density Residential (LR)
- Manufactured Housing (MH)
- Medium Density Residential (MR)
- Mixed Density Residential (MXR)
- High Density Residential (HR)

Business
- Community Business (CB)
- General Business (GB)
- Service Commercial (SC)
- Transitional Business (TB)
- Regional Business (RB)

Industrial
- Community Industrial (CI)
- General Industrial (GI)
- Light Industrial (LI)
NATURE

WATER FEATURES

Wetlands 1.96% of area 316.37 acres
Wonderland Creek
Goose Creek
Boulder Creek
100 Year Floodplains 14.64% of area 2,436.58 acres

GETTING AROUND

BIKE LAKES & TRAILS

204 miles in the city
130 miles within 15

Layers

- Blue line (approximate)
- Blue line (approximate)

Wetlands
- Wetlands - Stream Category
  - High Functioning
  - Low Functioning

Hydrology
- Creeks, Ditches
  - Creek
  - Intermittent Creek
  - Ditch
- Lakes, Reservoirs
- 100 Year Floodplain
NATURE

WATER FEATURES

- Goose Creek
- Wetlands 4.5% of area 12.46 acres
- 100 Year Floodplains 13.57% of area 366.03 acres
- Boulder Creek
- Gregory Creek
- Skunk Creek

GETTING AROUND

BIKE LAKES & TRAILS

- 13.67 miles
- 101.81 miles in Boulder Valley
- 28% of subcommunity within 1/4 mile of a trailhead

TRANSIT

- 84% of subcommunity within 1/4 mile of transit
GETTING AROUND

77% of the city within 1/4 mile of transit

This map displays the bus routes that make up the City of Boulder's Community Transit Network (CTN). CTN provides a high-frequency transit system that helps address the most common barriers to transit use, such as infrequent service, and indirect routes.

GETTING AROUND

NEIGHBORHOOD ACCESS

Weighted Access Score %
Accessible:
- 6-14
- 15-25
- 26-35
- 36-45
- 46-56
- 57-67
- 70+6

26% of the Boulder residents currently live in a neighborhood where they can access a full range of goods and services within a 10-minute walk.

The weighted access score is determined by a combination of the accessibility of transportation facilities and the number of destinations that can be reached within a 10-minute walk. A high number of destinations will result in a higher access score. Destinations that were factored into the analysis include grocery stores, parks,
PEOPLE & HOUSING

- **Total Dwelling Units**: 13,770 (2015), 14,100 (projected capacity)
- **Housing Unit Mix**: 43% Single-Family Detached, 12% Attached, 45% Multi-Family
- **Density (Dwelling Units/Residential Acre)**: 8.87 units/acre (city average)
- **Range of Single-Family Lot Size**: 16.4% < 5,999 sq ft, 59.0% 6,000-10,000 sq ft, 24.6% > 10,000 sq ft
Central Boulder

Located in the heart of the city, Central Boulder is a dynamic and diverse place. The area is rich with iconic Boulder locations, including Downtown and the Pearl Street Mall, University Hill, Boulder Creek, and Chautauqua. As such, Central Boulder offers some of the best shopping, restaurants, services, entertainment and recreation opportunities in the state. It is a hub of civic activity and a central gathering place for the community and the region, and a variety of iconic events such as the Farmers' Market, Boulder Creek Festival, and many others, are hosted here. Central Boulder is also one of the oldest and most historic parts of the city. Nearly all of Boulder's designated historic districts are located in this area, and many more neighborhoods and districts are potentially eligible for designation. Well-connected to the rest of the city and with a diverse collection of places to explore and things to do, Central Boulder stands out as the civic and cultural core of the community.
FACT SHEETS FOR 10 AREAS

AREA III

CENTRAL BOULDER

CROSSROADS

EAST BOULDER

GUNBARREL

NORTH BOULDER

PALO PARK

SOUTH BOULDER

SOUTHEAST BOULDER

UNIVERSITY OF COLORADO SUBCOMMUNITY

The University of Colorado at Boulder consists of two distinct areas: the main campus and the downtown. The main campus is located in the heart of downtown Boulder and is home to a vibrant academic and cultural community. The downtown area is known for its mix of historic and modern architecture, as well as its diverse array of restaurants, cafes, and bars. The University of Colorado downtown campus is home to several distinguished programs, including the School of Business and the College of Natural Resources. The downtown area is also home to many businesses and organizations, including the University of Colorado Foundation and the Boulder Daily Camera. The downtown area is a hub of activity for the Boulder community, with numerous events and festivals taking place throughout the year. The University of Colorado downtown campus is a vibrant and dynamic community that attracts students and visitors from around the world.
to address issues not adequately addressed by comprehensive plan
LIFESTYLE

EXISTING LAND USE

- Public
- Commercial + Mixed-Use
- Parks/OSMP
- Residential

Existing Land Uses (DRAFT)
- Residential
- Public, Vacant
- Natural, Agricultural, Recreational
LIFESTYLE

EXISTING LAND USE

- Public: 100 acres (5%)
- Commercial + Mixed-Use: 161 acres (8%)
- Parks/OSMP: 285 acres (14%)
- Other: 13 acres (1%)
- Residential: 1,472 acres (72%)

Existing Land Uses (DRAFT)

- Residential
- Public, Vacant
  - Public/Quasi-public (e.g. Church)
  - Vacant Land
- Natural, Agricultural, Recreational
CityEngine 3D maps...Scenarios
Downtown

Crossroads
CITYWIDE SCENARIOS

Designed to: Test land uses and tradeoffs about housing and non-residential uses

A. Current Policy

B. Current Policy + Focus on Centers and Corridors

C. Current Policy + Focus on Light Industrial Areas

D. Nonresidential Growth Management
SCENARIO A: CURRENT POLICY

Baseline Scenario – If we change no policies or land use

51,450 dwelling units
101,430 jobs

Housing
+ 6,750 new residential units = 58,200
Jobs
+ 56,000 jobs = 156,000
SCENARIO B:
CURRENT + CENTERS AND CORRIDORS
SCENARIO C:
CURRENT + LIGHT INDUSTRIAL AREAS
PROJECTION MODELING – CITYENGINE

- Commercial
- Office
- Parking
- Openspace
MODELING AT SITE LEVEL

- Office
- Retail
- Flats
- Livework
- Rowhouse
- Existing

Scale: 1/8th mile
FOR EACH SCENARIO AND AREA

• Generalized depiction in CityEngine for citywide context and analysis
• Annotated diagram(s) to convey characteristics by area:
  • Housing prototypes
  • Housing units by type
  • Square feet of non-residential
  • Unique considerations (e.g. transitions, neighborhood protections)
• Street-level sketch(es)
Street level visualizations and some aerial views to depict concepts.
HOUSING PROTOTYPES

- **24,950 SF LOT**
  - 10.5 DUAC
  - Internal units: 700 SF residential + 1,000 SF D.U.
  - Corner units: 900 SF commercial + 1,400 SF D.U.

- **16,000 SF LOT**
  - 14.5 DUAC
  - 1,600 SF units + Detached Garages

- **12,285 SF LOT**
  - 28.5 DUAC
  - 1,700 SF units + Attached Garage
OPTION 1 - REAR YARD ACCESSORY DWELLING UNIT

OPTION 7 - DOUBLE LOT COTTAGE COURT
INDICATORS/ANALYSIS

1. Different modeling tools (i.e., transportation)
2. Values based – community goals
3. Not too “black box”
4. Implementation critical

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Base (现状)</td>
<td>[Housing in Centers (社区住房)]</td>
<td>[Housing in Current Centers (现有社区住房)]</td>
<td>[Housing in Consolidated Areas (整合区域住房)]</td>
<td>[Housing Consolidation and Low- (整合与低住房)]</td>
<td>[Housing Consolidation and Low- (整合与低住房)]</td>
</tr>
<tr>
<td>Commercial Growth (商业增长)</td>
<td>2.4/6</td>
<td>2.4/6</td>
<td>2.4/6</td>
<td>2.4/6</td>
<td>2.4/6</td>
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**NOTES:**

- Evaluation of Transportation and implementation critical
- Values based on community goals
- Not too “black box”

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**Indicators:**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Scenario A</th>
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<th>Scenario C</th>
<th>Scenario D</th>
<th>Scenario E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing and Livability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance jobs/housing (Ratio – jobs: dwelling units) (Source: City of Boulder (City), Nelson Nygaard)</td>
<td>2.36</td>
<td>2.44</td>
<td>1.46</td>
<td>1.46</td>
<td>2.36</td>
</tr>
<tr>
<td>Possible new housing units (City)</td>
<td>6,790</td>
<td>11,490</td>
<td>10,900</td>
<td>10,900</td>
<td>10,900</td>
</tr>
<tr>
<td>Range of types and affordability of dwelling units (assuming 20% affordable for current policy and 40% for new scenarios) (City)</td>
<td>1,150</td>
<td>1,803</td>
<td>1,850</td>
<td>1,850</td>
<td>1,935</td>
</tr>
</tbody>
</table>

**Transportation:**

<table>
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<th>Scenario E</th>
</tr>
</thead>
<tbody>
<tr>
<td>New housing units near services, destinations, transit (Nelson Nygaard)</td>
<td>21%</td>
<td>21%</td>
<td>21%</td>
<td>64%</td>
<td>64%</td>
</tr>
<tr>
<td>New housing dwelling units in areas with high street connectivity (Nelson Nygaard)</td>
<td>72%</td>
<td>72%</td>
<td>72%</td>
<td>72%</td>
<td>64%</td>
</tr>
<tr>
<td>New housing units within 1/4 mile of transit - Community Transit Network (CTN) (Nelson Nygaard)</td>
<td>65%</td>
<td>79%</td>
<td>65%</td>
<td>65%</td>
<td>71%</td>
</tr>
<tr>
<td>Vehicle Miles Traveled (VMT) —relative comparison (Nelson Nygaard qualitative)</td>
<td>OK</td>
<td>Better</td>
<td>Better</td>
<td>Better</td>
<td>best</td>
</tr>
<tr>
<td>New dwelling units within access districts (ability for Transportation Demand Management and managed parking) (Nelson Nygaard)</td>
<td>16%</td>
<td>48%</td>
<td>35%</td>
<td>16%</td>
<td>56%</td>
</tr>
</tbody>
</table>

**Environment and Energy:**

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<tbody>
<tr>
<td>Acres of city-open space land maintained (no loss all scenarios) (City)</td>
<td>[Yes]</td>
<td>[Yes]</td>
<td>[Yes]</td>
<td>[Yes]</td>
<td>[Yes]</td>
</tr>
<tr>
<td>Greenhouse gas emissions from transportation (related to VMT) (Nelson Nygaard, Intergroup)</td>
<td>[Low]</td>
<td>[Low]</td>
<td>[Low]</td>
<td>[Low]</td>
<td>[Low]</td>
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</table>

**Economic:**

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<th>Scenario E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of future new jobs based on changes to nonresidential lands (City)</td>
<td>65,000</td>
<td>52,000</td>
<td>57,000</td>
<td>19,000 (20%)</td>
<td>65,000</td>
</tr>
<tr>
<td>Fiscal impact to general fund (Ratio of revenues to expenditures) (City, Keyser Perez based on qualitative research)</td>
<td>[Moderate]</td>
<td>[Moderate]</td>
<td>[Moderate]</td>
<td>[Moderate]</td>
<td>[Moderate]</td>
</tr>
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**Safety and Infrastructure:**

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<tr>
<td>Water and wastewater level of service (City utilities in initial exploration)</td>
<td>[Good]</td>
<td>[Good]</td>
<td>[Good]</td>
<td>[Good]</td>
<td>[Good]</td>
</tr>
</tbody>
</table>

**Key:**

- Least favorable
- Moderately favorable
- More favorable

Other topics for further evaluation or policy development:

- Location of dwelling units within 1/4 mile space and trails (GIS analysis)
- Location of dwelling units within 1/4 mile of schools and other community facilities (health, government) (GIS analysis)
- Location of new units in or within 1/4 mile of neighborhoods (GIS analysis)
- Location of new units related to fire station and ability to serve
- Renewable energy generation (policy development)
- Building energy use (Building Code)
MOVING FORWARD

1. Land use and zoning changes in industrial areas and Regional Center to allow more housing

2. Area plans for neighborhood centers

3. Residential infill pilots
LEARNINGS... SO FAR

1. **Expanding Storymaps** – Training staff. Integrating other projects and other departments (e.g., CIP, parks)

2. **Assessing CityEngine - Model for planning decisions.** Ideal for area plan or site level

3. **Still Using Variety of 3D (and 2D) Tools -** Infill focus, analytical and design important
WHAT’S NEXT?

1. Storymaps Expanded
2. Interactive Comp Plan Maps
3. 3D Area Planning (crowdsourcing apps)
4. Development Review functions
Thank you!

ellisl@bouldercolorado.gov
Bouldervalleymppplan.net

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