



Appendix D Livable Communities Pilot Study GIS Protocol

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Objective: Use Geographical Information Systems (GIS) to evaluate communities for livability. Specifically, use GIS to identify areas that can be safely traveled by walking or biking to connect people from their first places to second and third places.

Please note that this protocol measures only the accessibility and safety attributes of communities by walking or biking. It does not measure accessibility or safety of other forms of transportation or other attributes of livable communities, such as 1) Aesthetics (measured by architectural or landscape form, texture, scale, color), 2) Sense of Place (measured by the cultural and biological attachments to place), 3) Amenities (measured by the existence or absence of certain cultural or natural goods/services that attract people, 4) other attributes that influence livability???

Livable Communities Analyses (safety and accessibility by walking and biking)

1) Map First Places

Definition

Places people call home.

Data Requirements

Geographic Data: Residential land uses (polygons).

Attribute Data: Only location, no additional livability assessment.

Analyses (data creation only)

Using land use polygon data, extract residential land uses into a separate, distinctive geographic data set.

2) Map Second Places

Definition

Places people work or go to school.

Data Requirements

Geographic Data: Commercial, industrial, and institutional land uses, and school locations (polygons).



Attribute Data: Only location, no livability assessment.

Analyses (data creation only)

Extract commercial, industrial, and institutional land uses and schools into a distinctive geographic data set.

If it is desirable to have schools as a separate geographic data set, extract school locations from parcel data.

3) Map Third Places

Definition

Places people visit, socialize, or congregate, other than their homes or places of work or school.

Data Requirements

Geographic Data: Polygons from parcels or point files from addresses or other field work that show the location of third places.

Attribute Data: Only location, no livability assessment.

Analyses (data creation only)

Identify third places from research and digitally transcribe their locations into a geographic data set of points or parcel polygons.

4) Map Walking Routes

The criteria for walking are adapted from the American Association of State Highway and Transportation Officials (AASHTO) standards for safe biking and the federal Safe Routes to School program. Communities may need to identify unique local conditions that might make roads safe or unsafe to walk or cross.

Definition

- Roads with sidewalks are SAFE to walk.
- Roads without sidewalks are NOT SAFE to walk.
- Intersections of local (residential) roads with ≤ 25 mph speed limit and two lanes of traffic are SAFE to cross.
- Intersections of collector roads, arterials and other roads with higher speeds, greater daily traffic counts or more than 2-lanes of traffic with signaled or 4-way stop signed intersections are SAFE to cross.
- Uncontrolled intersections on collector roads, arterials and other roads with higher speeds, greater daily traffic counts or more than 2-lanes of traffic are NOT SAFE to cross.



Data Requirements

Geographic Data: Road center lines, sidewalk lines, intersections.

Attribute Data: Road centerlines can act as a database container for sidewalks [0,1,2 sides]

Intersection point files can act as a database container for crosswalks [y/n], traffic lights [y/n], 4-way stop [y/n], pedestrian medians, others.

If data isn't available it must be collected through field inspections of roads and intersections.

Analyses

Select roads and intersections labeled SAFE and extract to a separate geographic dataset.

5) Map Biking Routes

The American Association of State Highway and Transportation Officials (AASHTO) recommendations for safe biking routes take into account speed limits, daily traffic counts, road width and nature of the curb apron. The curb apron is the flat area immediately adjacent to the curb that is poured at the same time as the curb. The apron is assessed for existing condition, width, nature of the seam between it and the road proper as well as the type of storm water grate within the apron. Our protocol takes into account data on the first three items which are readily available but not the nature of the curb apron which usually requires field inspection in order to collect the needed information. Communities may need to identify unique local conditions that might make roads safe or unsafe to bike.

Definition (criteria from Linda Stoll)

- Local (residential) roads are SAFE to bike.
- Roads with speed ≤ 25 mph and two lanes of traffic are SAFE to bike.
- All roads with designated bike lanes are SAFE to bike.
- Bike trails are SAFE to bike.
- Collector roads, arterials and other roads with higher speeds, greater daily traffic counts or more than 2-lanes of traffic are NOT SAFE to bike.
- Intersections of local (residential) roads or roads with ≤ 25 mph speed limit and two lanes of traffic are SAFE to cross.
- Intersections of collector roads, arterials and other roads with higher speeds, greater daily traffic counts or more than 2-lanes of traffic with signals or 4-way stop signs are SAFE to cross



- Uncontrolled intersections of collector roads, arterials and other roads with higher speeds, greater daily traffic counts or more than 2-lanes of traffic are NOT SAFE to cross.

Data Requirements

Geographic Data: Road center lines, bike trails, intersections.

Attribute Data: Road centerlines can act as a database container for bike lanes [y, n]

Intersection point files can act as a database container for traffic lights [y/n], 4-way stop [y/n], other traffic calming devices.

If data isn't available it must be collected through field inspections of roads and intersections.

Analyses

Select trails and roads and intersections labeled SAFE and extract to a separate geographic dataset.

Map Livable Community Service Areas between first places and second and third places.

Definition

Service areas are geographic locations that can be safely traveled by walking or biking measured in distance traveled.

Data Requirements

Geographic Data: First places, second places, third places, safe walking routes, safe biking routes (mapped earlier).

Attribute Data: Location attributes only.

Analyses

A) Identify the centroid location or several point locations for each First Place.

B) Conduct a walking service area analysis for each First Place. The result is the geographic area that can be safely walked from each first place. Measure distance traveled in 1/8 mile increments.

C) Conduct a biking service area analysis for each First Place. The result is the geographic area that can be biked from each first place. Measure distance traveled in 1/4 mile increments.



D) Overlay the results of the First Place service area analyses with Second and Third places. The result will identify and highlight Second and Third places that can be accessed safely by walking or biking from First Places. It will also highlight places that represent livable communities using safety and accessibility as criteria.