

# Update on Mapping of Regional Bus Service

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## The need for a new measure

- Simply mapping routes gives no indication of where the stops are.
- Where stop density is high, showing individual stops results in unreadable maps.
- Overlapping stops and routes are difficult to portray on traditional maps.



## Bus Transit Availability

- Unitless measure of transit presence
- Used for
  - Validation of inputs to regional travel demand model
    - Availability and routes show bus transit coverage
    - Allows agencies to compare coded bus network to expectations
  - Long-range transit planning
    - Availability illustrates future bus network coverage
    - Can be compared to growth forecasts to highlight underserved areas

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## Bus Transit Availability

- Transit Availability is a measure of the amount of transit service that is available within a certain radius.
- It is a function of the headways of bus routes which have stops within the radius.
- Uses GIS density calculations to “sum” headways.
- Resulting values represent relative availability of transit.
- Does not factor in directionality.

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## Transit Availability Calculation

- An effective headway is calculated by summing the inverse of the headways:

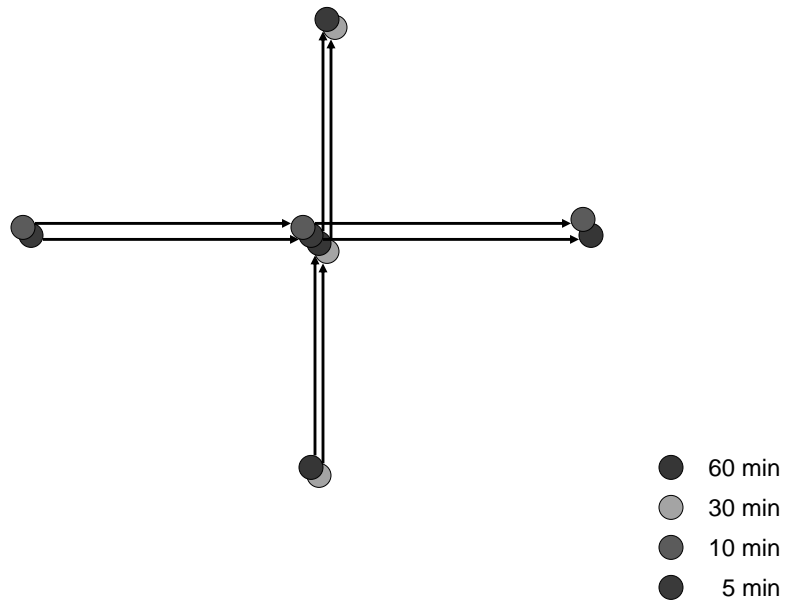
$$H_E = \frac{1}{\sum \frac{1}{H_i}}$$

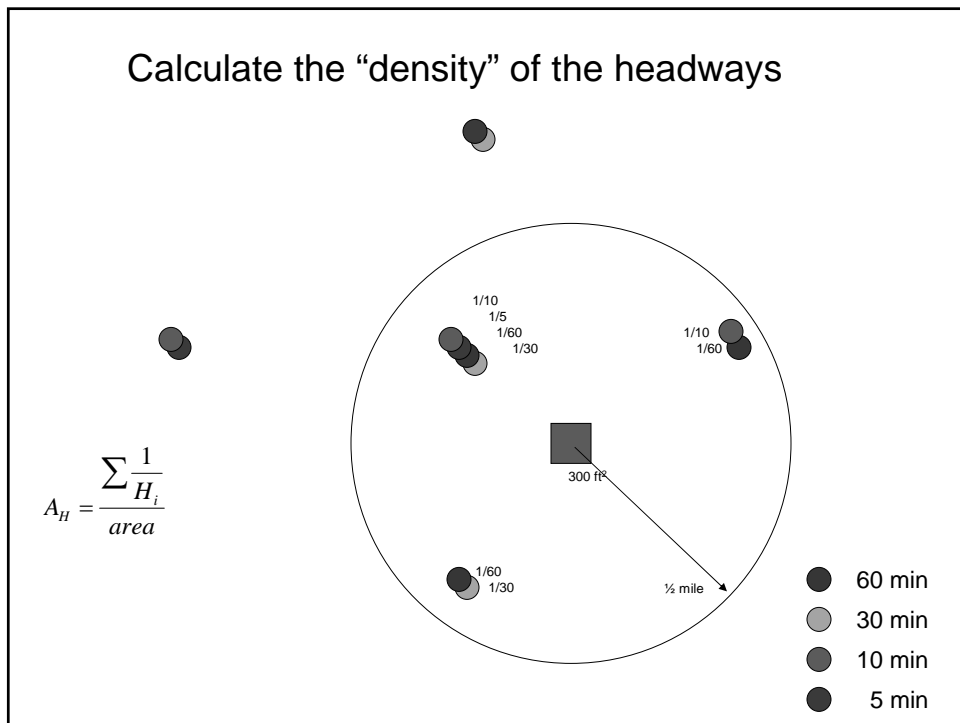
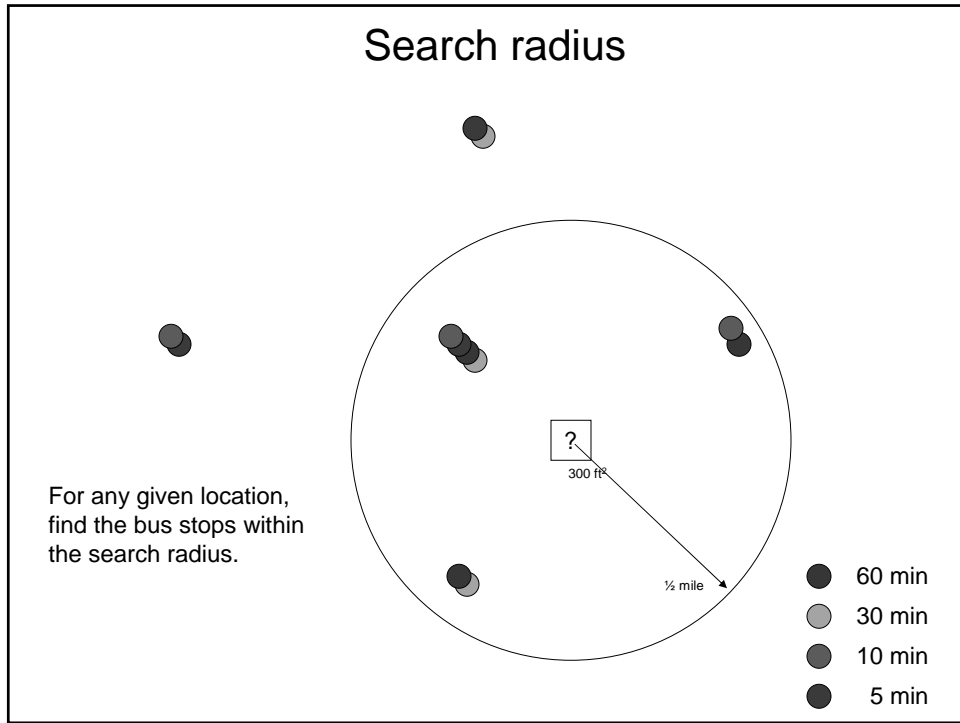
- Transit Availability is calculated in a similar fashion:

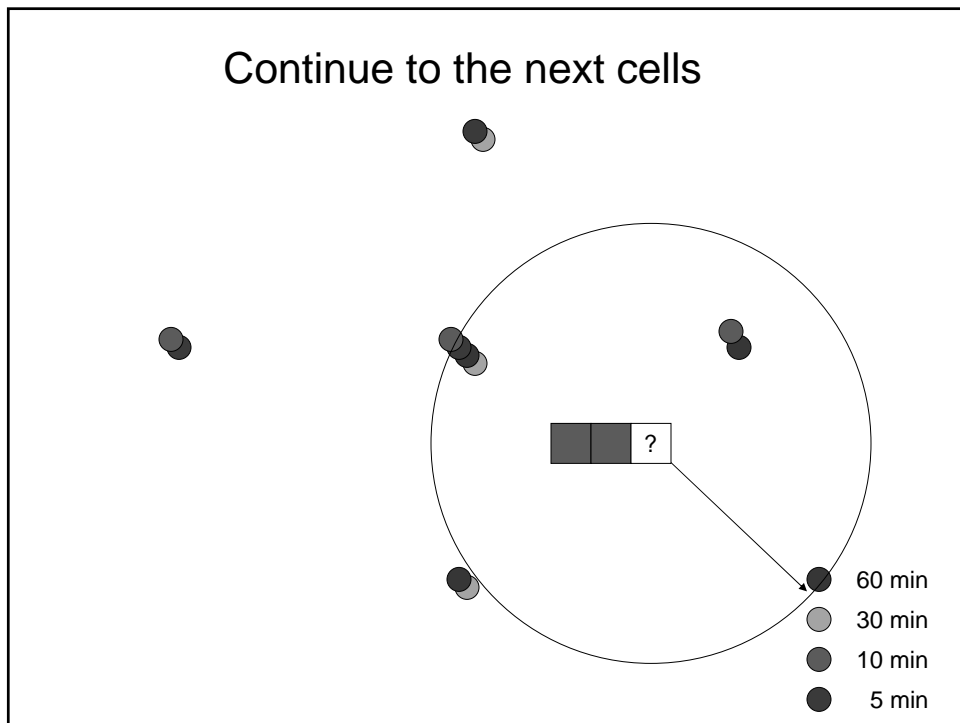
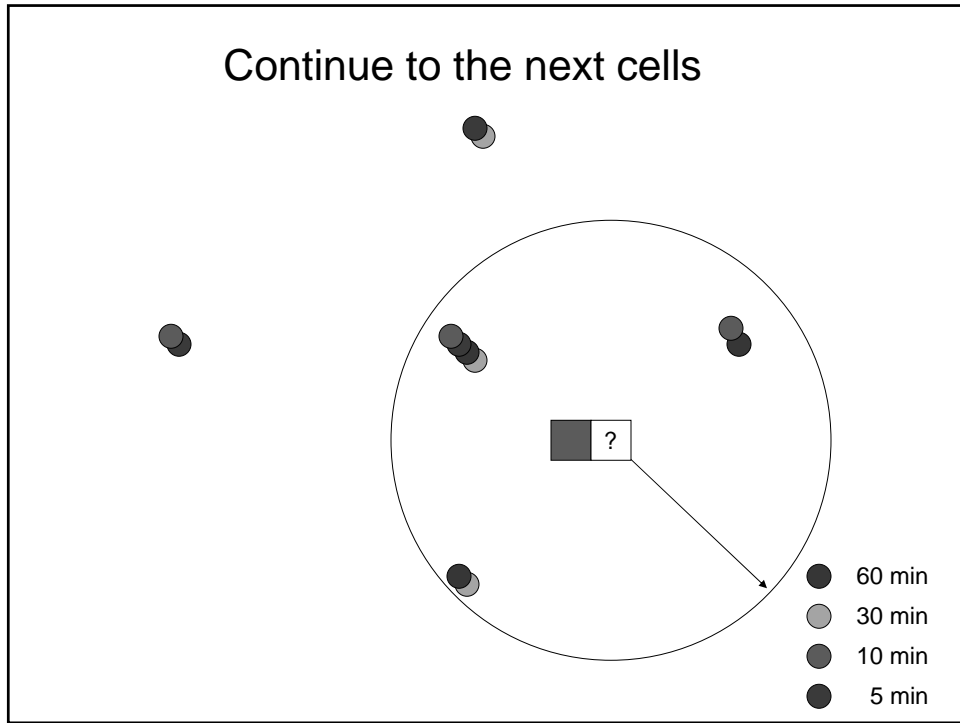
$$A_H = \frac{\sum \frac{1}{H_i}}{area}$$

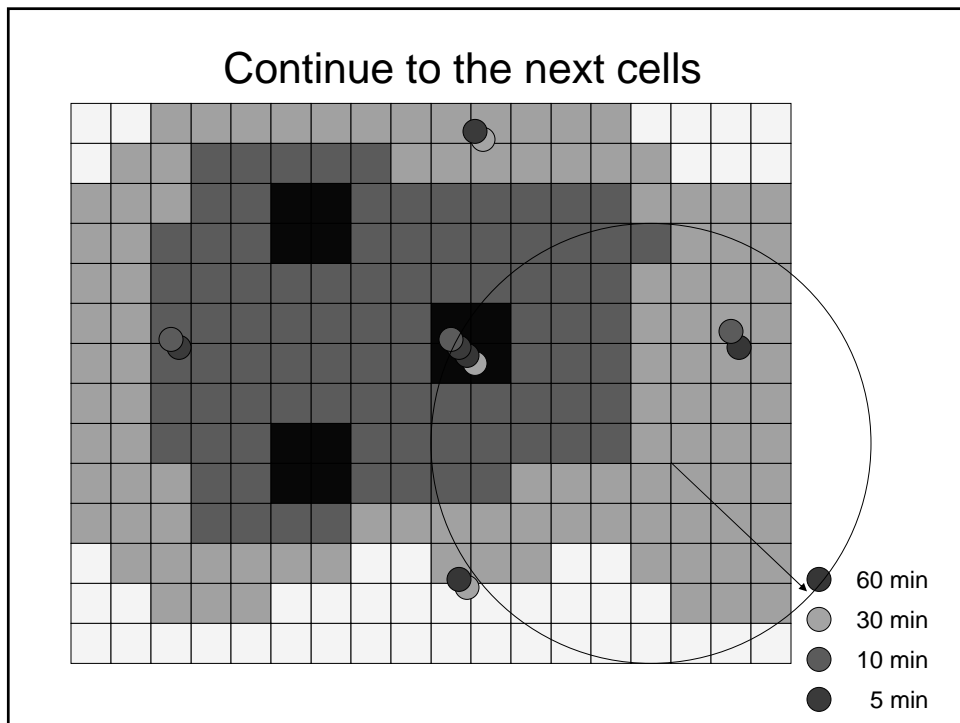
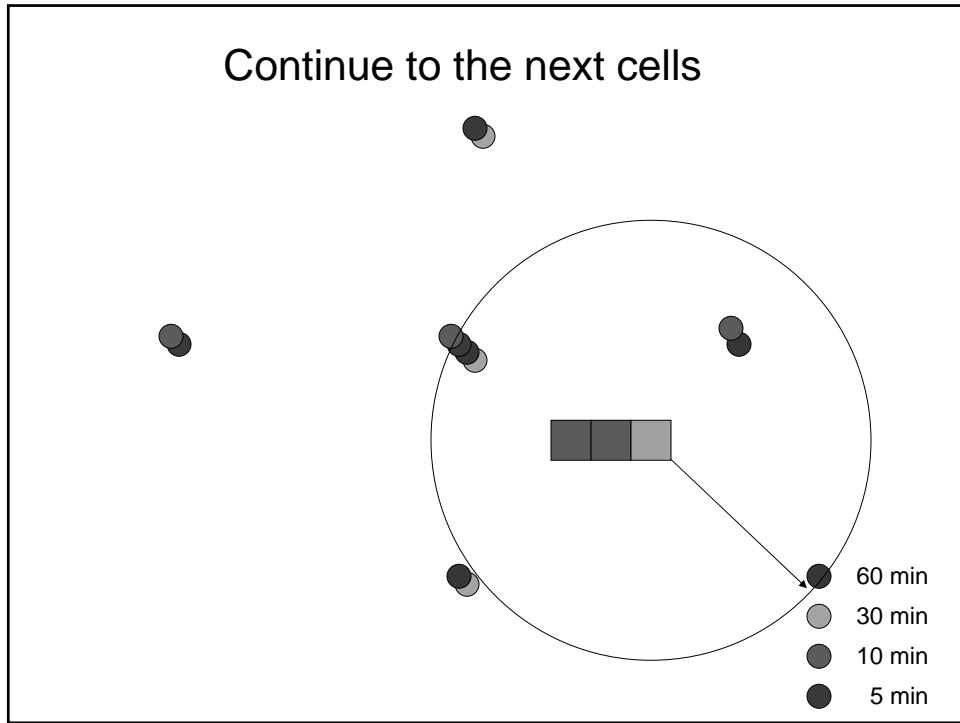
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### Example: Bus transit routes



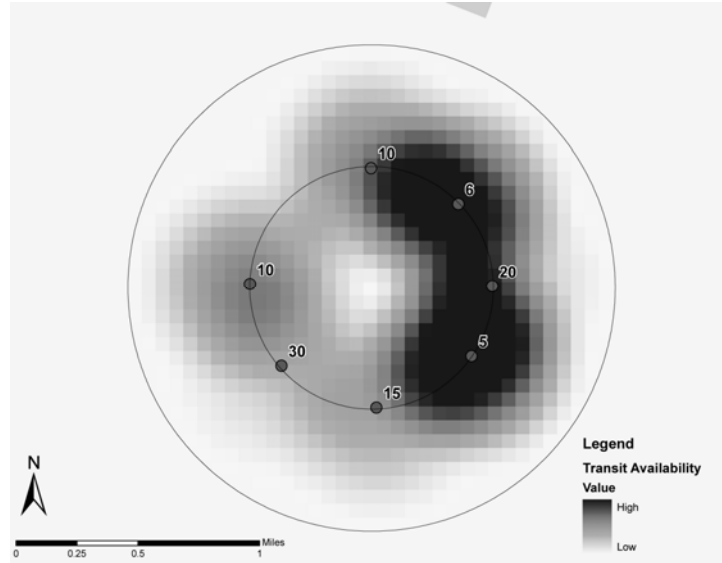






### Actual density calculation uses a smarter algorithm

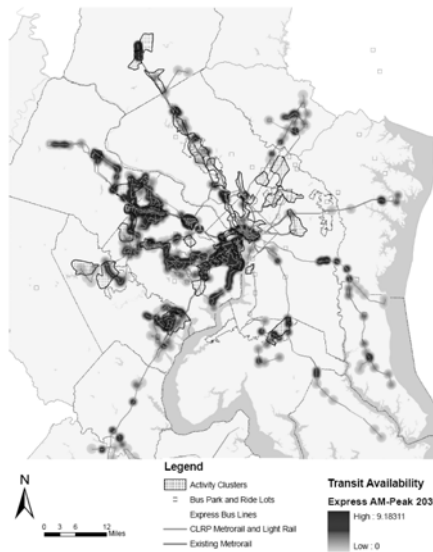
--Factors in distance from bus stop as well as headway.



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### Example: Bus Transit Availability

- Maps show areas of dense bus service.
- Illustrate relationships between transit service and land use:
  - Activity Centers/Clusters
  - Land Use Projections



## Many factors can be mapped

- 2010 vs. 2030 vs. Difference
- Peak vs. Off Peak
- Local vs. Express
- Activity Clusters vs. Household Density vs. Change in Households

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## Level-of-Service Standards?

- Collect and assemble regional LOS goals for household and employment density ranges?

Density Level	Service or Benefit	
4-6 units / acre	Minimal bus service (subsidized)	1 hour headway
6 units /acre	Neighborhood Convenience Store (2400 households w/in 1/4 mile radius)	In walking distance
6-7 units / acre	Vehicular Use Walking Transit use <small>(For a comparison of how these uses change at higher densities see 50 units/acre below)</small>	5.0 daily trips/household 0.6 daily trips/household 0.2 - 0.3 daily trips/household
7-8 units / acre	Intermediate bus service	30 minute headway
9-10 units / acre	Light Rail	5 min peak headway 25 - 100 sq. mile corridor
12 units / acre	Rapid Transit	5 min. peak headway 100 - 150 sq. mile corridor
	Shopping Center w/Supermarket (4800 households w/in 1/4 mile radius)	In walking distance
15 units/ acre	Frequent bus service High multi-modal potential	120 buses / day
50 units / acre	Vehicular Use Walking Transit use	1.2 daily trips/household 1.5 daily trips/household 1.3 daily trips / household

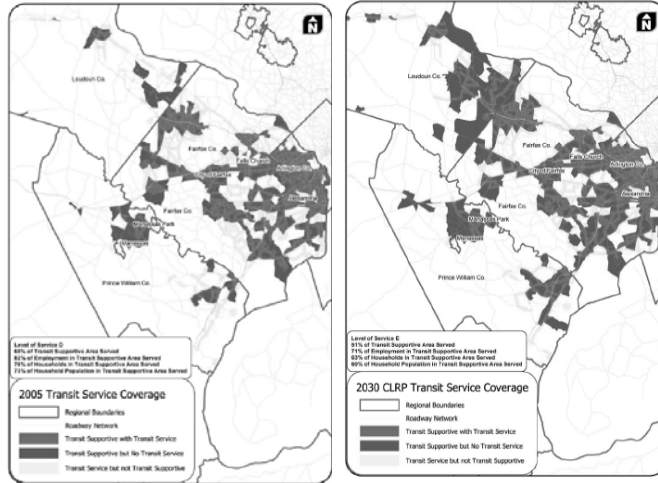
- Compare to transit supply for regional route planning?

Source: Lincoln Land Institute:  
<http://www.lincolninst.edu/subcenters/VD/goodthings/thresholds.pdf>



## Example: Assessing LOS Goals

- Example maps from TransAction 2030 use simple LOS D threshold
- Could provide richer regional LOS standards based on land-use...



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## Mapping Tools for the CLRP

How can bus transit maps help inform the CLRP planning process?

- Produce visual representations of regional bus service for:
  - Verification of inputs
  - Long-range planning
  - Assessing LOS goals
- Collection of maps published on a regular basis:
  - Schedule proposed for incorporating bus transit mapping into the CLRP cycle

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