

The Walkability Indicator

A Case Study of Boulder City, Colorado, USA



Photo of Boulder City (Source: Visit and Verse)

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 - January 23, 2013
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Our purpose

- (1) Create an indicator of walkability.
- (2) Measure walkability environment around a study area in downtown Boulder.
- (3) Use GIS to analyze the distribution of pedestrian traffic.
- (4) Understand the relationship between walkable design and pedestrian demand.

Connection to sustainability

- (1) Boulder Valley Comprehensive Plan has five components of sustainability which are; Compact, Connected, Complete, Inclusive, and Distinct.
- (2) The city of Boulder planning department and the University of Colorado cooperated to create a list of metrics to measure the sustainable performance of city policy.
- (3) The walkability metric was developed to support the BVCP and its components of sustainability.



Walkability

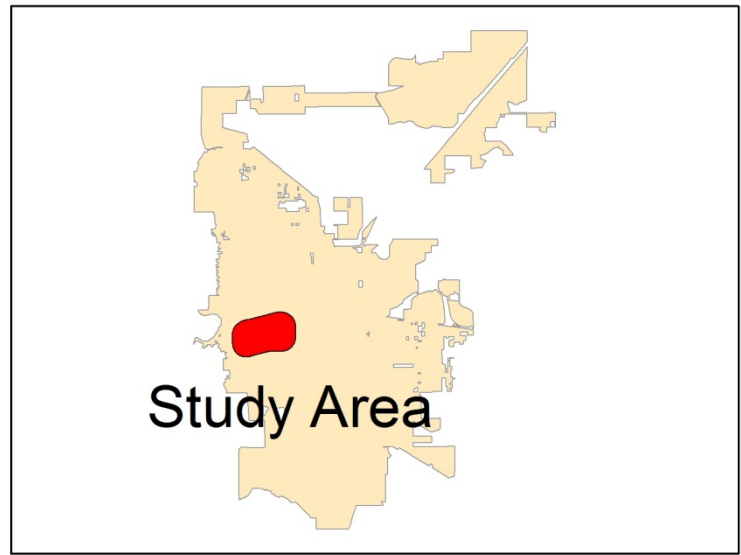
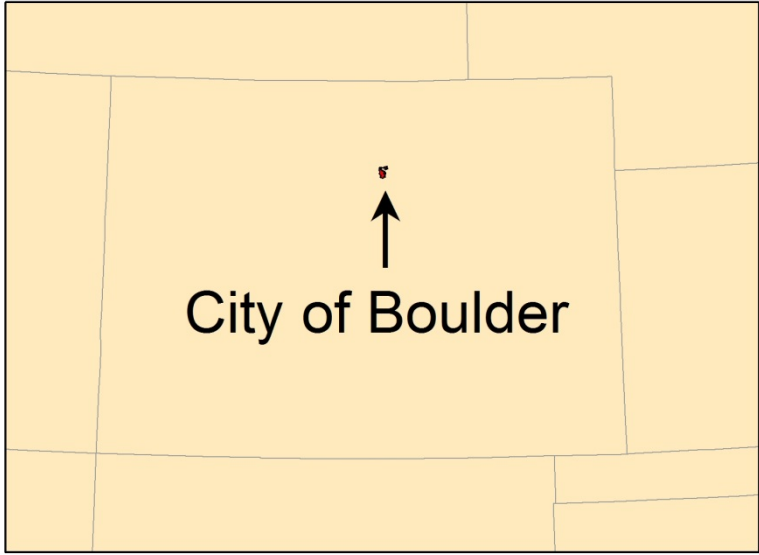
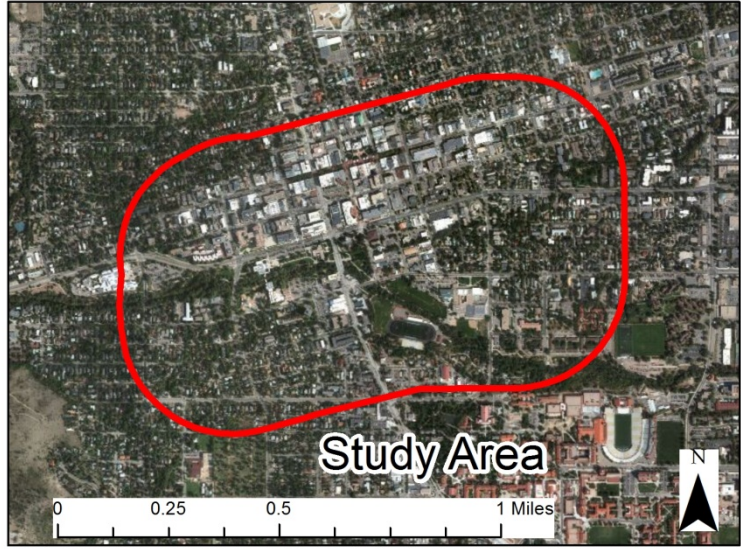
- (1) Walkability is a measurement of the quality of pedestrian space and encourage active transportation (Leslie et al. 2007)
- (2) A survey was created to measure the quality of pedestrian space.



Elasticity

1. Elasticity is the “ratio of the percent change in one variable associated with the percent change in another variable.” (Ewing and Cervero, 2010)
2. Assume that pedestrian demand is elastic and design intervention will increase the number of pedestrians.
3. Planners use this Elasticity concept to predict behavioral changes resulting from design interventions.

Study Area



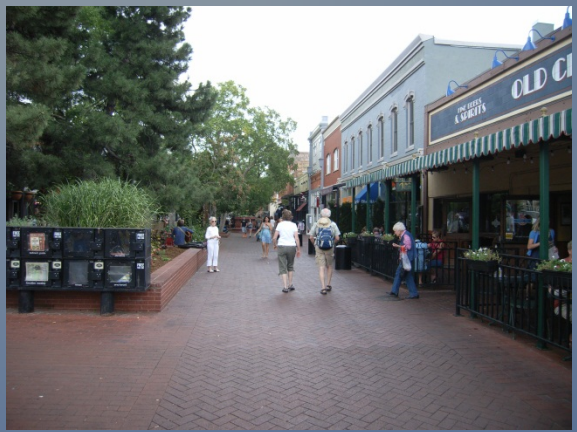
8) Walkability Indicators survey sheet

- The five indicators are;
1. Sidewalk physical qualities
 2. Safety
 3. Vegetation
 4. Urban design
 5. Social quality

Walkability Indicators

		Observer:	Poor	Average	Excellent	
		Segment:	(1pt)	(2pt)	(3pt)	
		Date:				
		Start time:				
		<input type="checkbox"/> Town Core	<input type="checkbox"/> Residential	<input type="checkbox"/> Commercial	<input type="checkbox"/> Mixed	<input type="checkbox"/> Other
Sidewalk physical qualities	1. Condition/Maintenance of path along this segment is well kept.					
	2. Path Material on this segment is attractive. (Brick or Stone path) 3pt, (Concrete path) 2pt, (No sidewalk or same path material as roadway) 1pt					
	3. Width of a walking path. Width over 8ft: 3pt, Width 5 - 8ft: 2pt, Under 5ft: 1pt					
	4. Vegetated detached buffer zone between Pedestrian and Roadway that provide separation 3pt, Detached sidewalks or attached planters: 2pt, Attached sidewalks with no buffer: 1pt					
	Subtotal					
Safety	5. There is a physical difference between pedestrian and bike lanes: 3pt, There is no pedestrian and bike difference but no conflict: 2pt, Pedestrian and bikers have to make an effort to avoid each other: 1pt					
	6. Noise; Quiet residential area or park: 3pt, Normal conversation at 3ft: 2pt, Busy traffic same as Phone ringtone: 1pt					
	7. Street light; Layout by Pedestrian scale:3pt, Layout by Traffic scale: 2pt, Lack of street lights: 1 pt					
	Subtotal					
Vegetation	8. Street trees are present along this segment. Layout continuously with tree span less than 30ft: 3pt, Relatively continuous layout with tree span 30-45ft: 2pt, Scattered layout with tree span more greater than 45ft: 1pt					
	9. Street trees on this segment providing shade. Continuous shade: 3pt, Patches of shade: 2pt, No shade: 1pt					
	10. There is Public Green Space present on this block including other side of this street. Large green space: 3pt, small green space: 2pt, no green space: 1pt					
	Subtotal					
Urban design	11. Building volumes and setbacks Pedestrian oriented scale: 3pt, Relatively Pedestrian oriented scale: 2pt, Car oriented scale and pedestrian feel isolated or pressured by the building volumes and setbacks: 1pt					
	12. Ground level of building Façade on this segment are attractive to pedestrians; High area of non-mirrored windows and doors exist: 3pt, There are some non-mirrored windows and doors exist: 2pt, feeling of isolation: 1pt					
	13. There are Historical Buildings or buildings that have an Aesthetic design quality.					
	Subtotal					
Social quality	14. General Attractiveness					
	15. Interactive Social Spaces (Ex. Café, park, restaurant); Variety of Social Spaces with several uses in this block including other side of the street: 3pt, At least one Social Space in this block including other side of the street: 2pt, No Social Space: 1pt					
	16. Necessities (Ex. Grocery, convenience store). Variety of Necessities in this block including other side of the street: 3pt, At least one Necessities in this block including other side of the street 2pt, No Necessities: 1pt					
	Subtotal					
Grand total						

7) Example of streets Score of Walkability indicator



High



Medium



Low



High

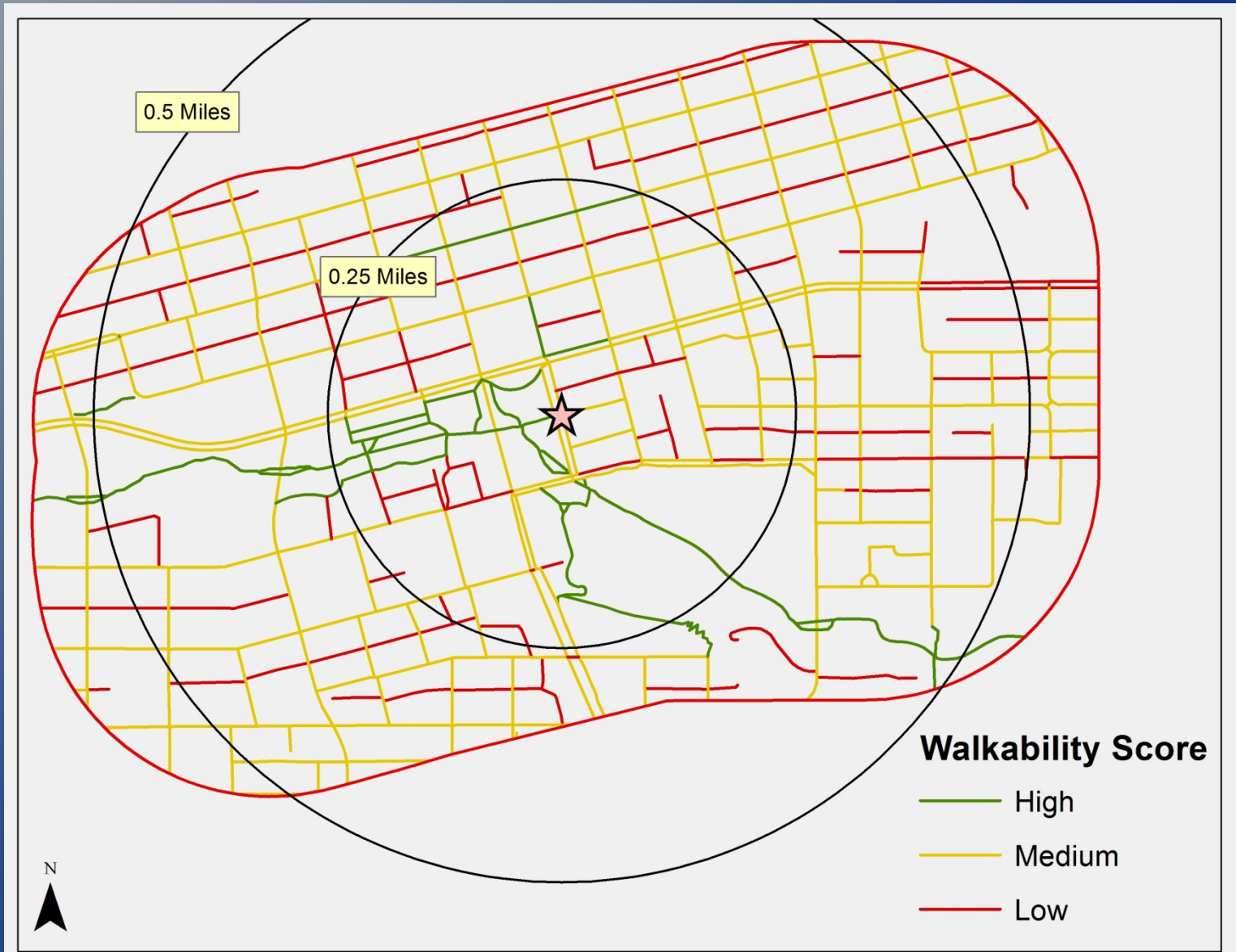


Medium

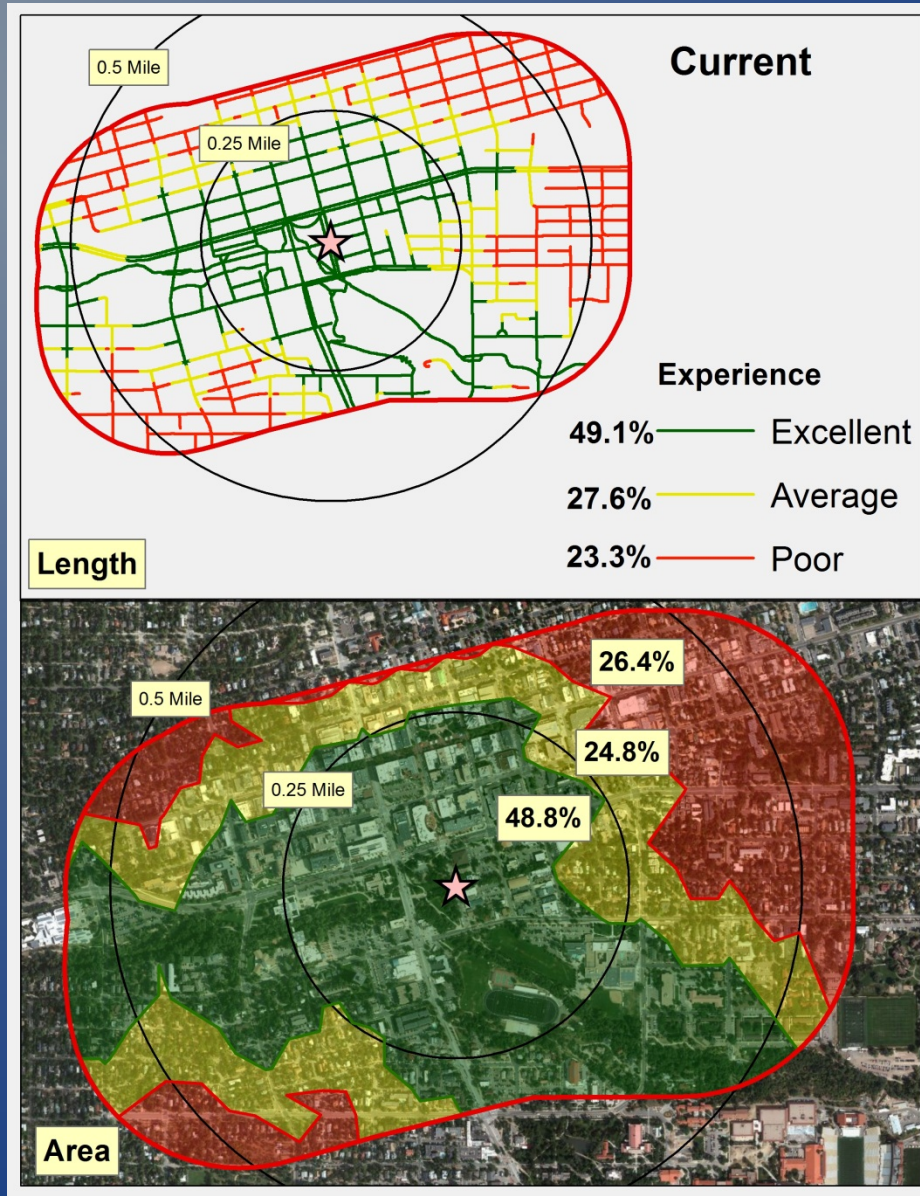


Low

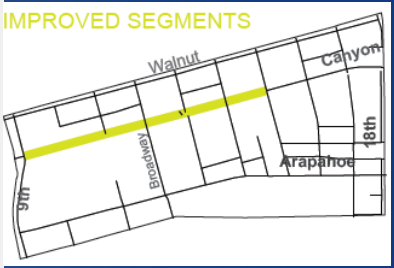
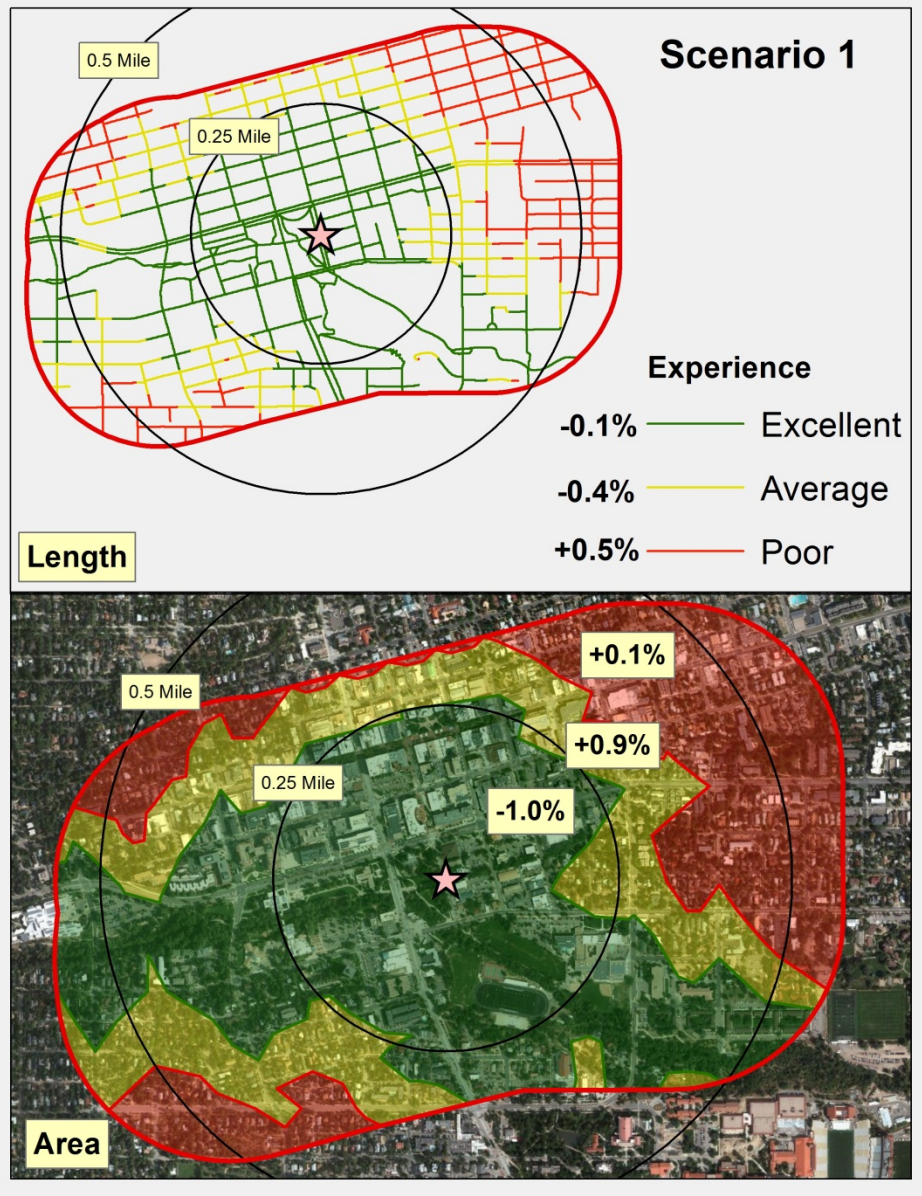
7) GIS (Geographic Information System) Walkability Indicator Scored Map(Current)



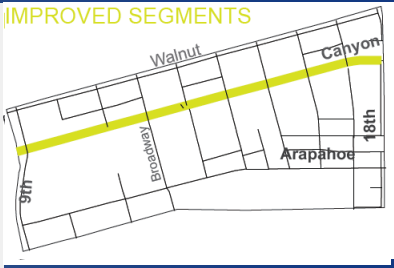
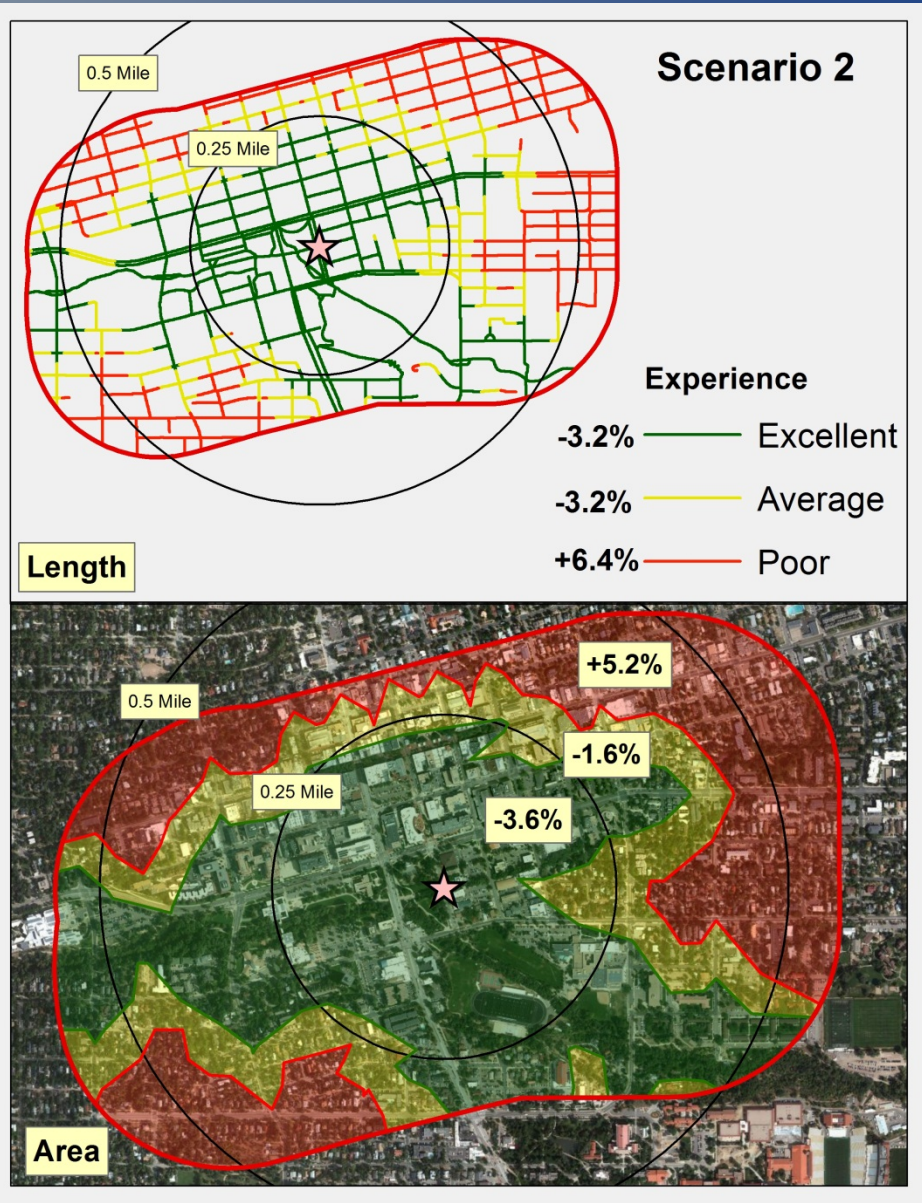
7) GIS (Geographic Information System) Walkability Indicator Result Map(Current)



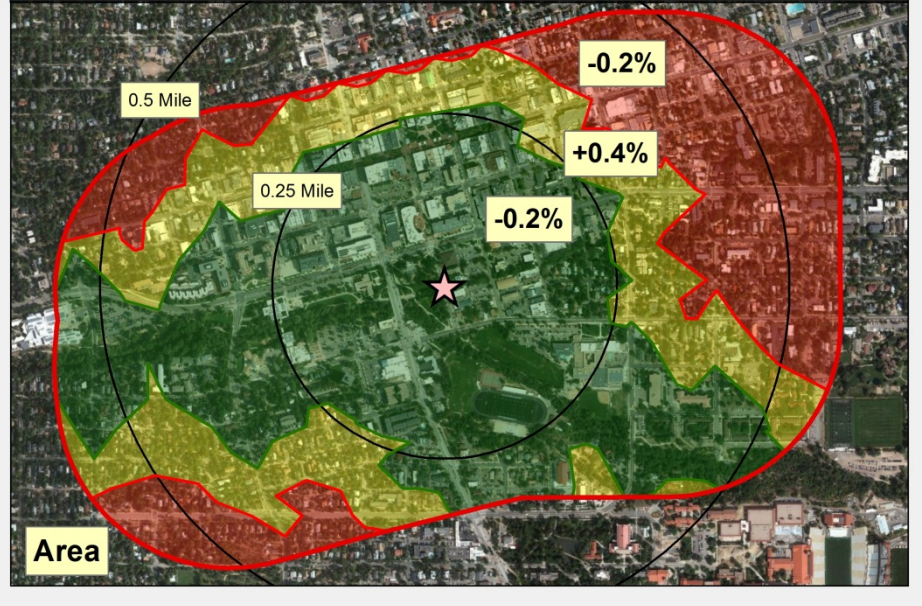
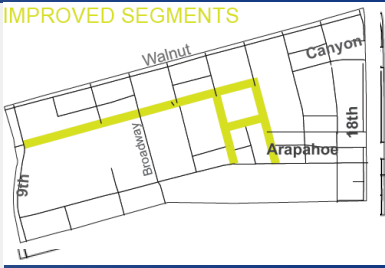
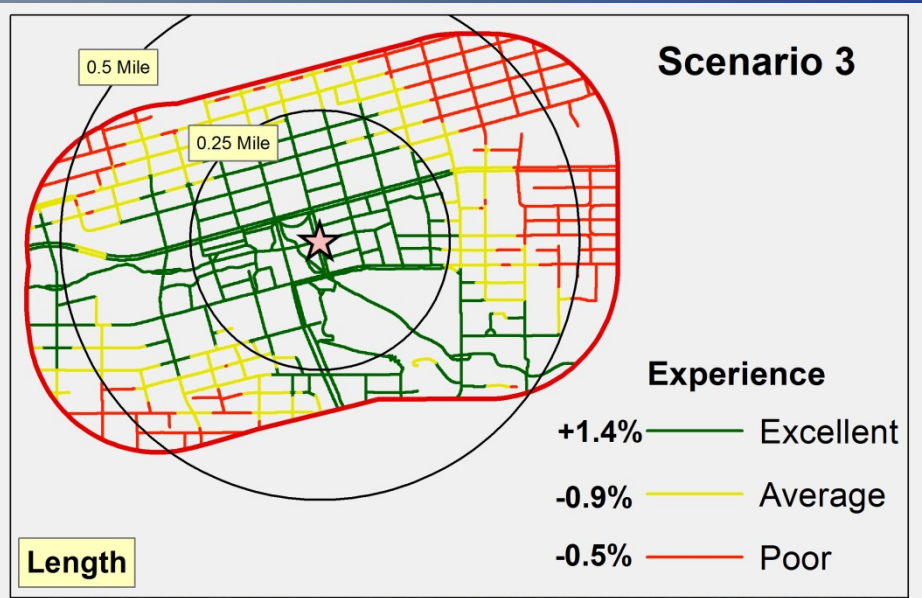
7) GIS (Geographic Information System) Walkability Indicator Result Map(Scenario 1)



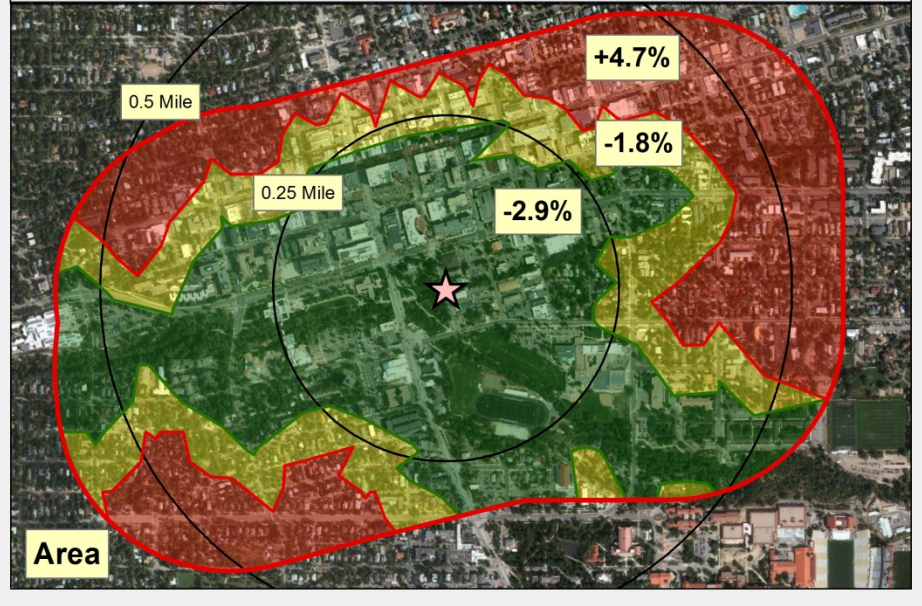
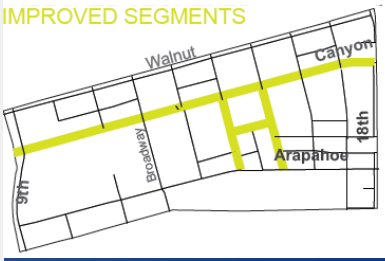
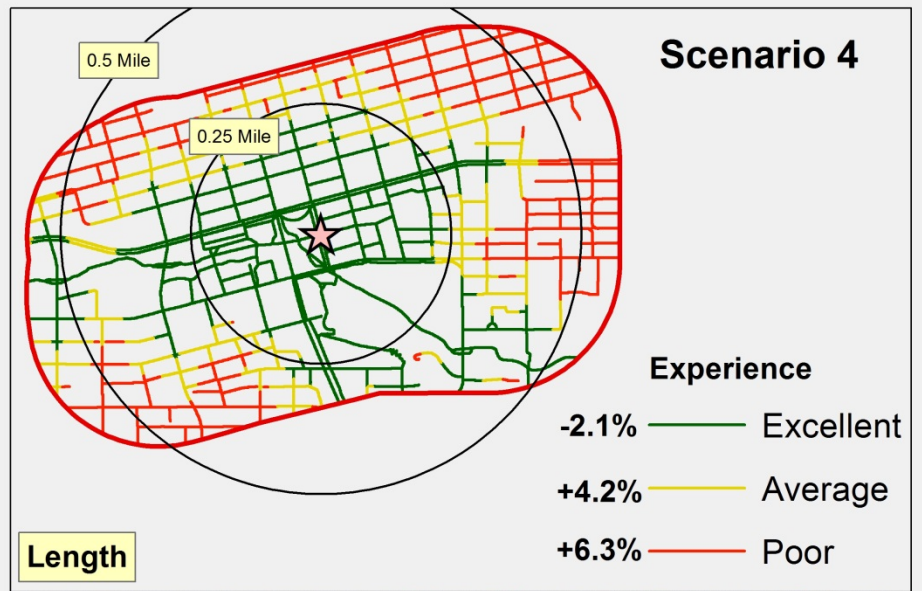
7) GIS (Geographic Information System) Walkability Indicator Result Map(Scenario 2)



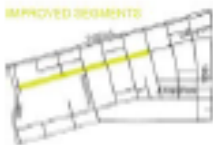



7) GIS (Geographic Information System) Walkability Indicator Result Map(Scenario 3)



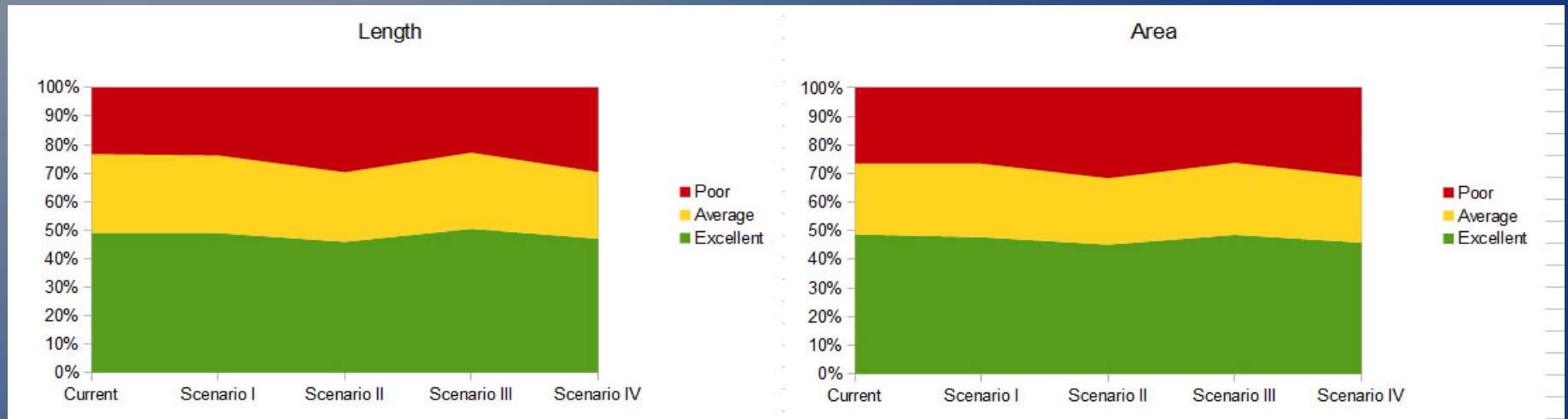
7) GIS (Geographic Information System) Walkability Indicator Result Map(Scenario 4)



9) Findings (Scenario results)

		Percentage of Total length of Excellent	Percentage of Total length of Average	Percentage of Total length of Poor	Percentage of Total area of Excellent	Percentage of Total area of Average	Percentage of Total area of Poor
Current Condition		49.1%	27.6%	23.3%	48.8%	24.8%	26.4%
Scenario 1		49.0% (-0.1%)	27.2% (-0.4%)	23.8% (+0.5%)	47.8% (-1.0%)	25.7% (+0.9%)	26.5% (+0.1%)
Scenario 2		45.9% (-3.2%)	24.4% (-3.2%)	29.7% (+6.4%)	45.2% (-3.6%)	23.2% (-1.6%)	31.6% (+5.2%)
Scenario 3		50.5% (+1.4%)	26.7% (-0.9%)	22.8% (+0.5%)	48.6% (-0.2%)	25.2% (+0.4%)	26.2% (-0.2%)
Scenario 4		47.0% (-2.1%)	23.4% (-4.2%)	29.6% (+6.3%)	45.9% (-2.9%)	23.0% (-1.8%)	31.1% (+4.7%)

9) Findings (comparison of length & areas)



Length percentage

Area percentage

7) Design scenario



Birds Eye View: Looking NE



User's Point of View: SW Corner of 13th and Canyon



WALKABILITY

Scenario 4: SECTION AND RENDERINGS



Drawing by Maslonka, M & Horan, B

12) Conclusion

(1) Pedestrian demand is not necessarily elastic.

(2) The walkability improvement alters the distribution of pedestrian rather than increase the total number.

(3) Specific design interventions will pull pedestrians from other areas rather than increase pedestrian traffic overall.



11) Implication

- (1) Constructing walkable areas is resource intensive and will concentrate pedestrian activity, however, it does not necessarily convert drivers to pedestrians.
- (2) Planners and decision makers can more effectively increase pedestrian activity by focusing on strategies that regulate automobiles.
- (3) Income generated by regulating automobiles can then be circulated and reinvested in creating safe, pleasant and walkable public spaces for pedestrians to enjoy.

Questions?



Source

Cook, J.A.(2010) EXAMING THE RELATIONSHIP BETWEEN DESIGN QUALITY(DQIs) OF THE BUILT ENVIRONMENT AND HEALTH STAT US OF YOUTH IN RURAL PENNSYLVANIS. Published Master's Thesis, The Pennsylvania State University.

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Frank, L.D. et al. (2011) AN ASSESSMENT OF URBAN FORM AND PEDESTRIAN AND TRANSIT IMPROVEMENTSAS AN INTEGRATED GHG REDUCTION STRATEGY. Washington State Department of Transportation. State of Washington, U.S.A.

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(Source: Foto pedia)