

HPE's Walkability Index – Quantifying the Pedestrian Experience

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ABSTRACT

The pedestrian environment is key to walking comfort, safety and activity. This paper outlines the application of ten criteria to determine street segment walkability on a 100 point scale. The walkability index draws from the best thinking and experience about walking/biking and the influence of the physical realm. Walkability Index application experience is summarized for several cities including Savannah, Georgia, and Towson, Maryland.

INTRODUCTION

There are numerous approaches for determining pedestrian level of service. Several in use today focus on the importance of urban design in shaping the pedestrian experience. Some of these are broadly focused, concentrating on district, community or neighborhood scoring. Some utilize complex scoring procedures. HPE's Walkability Index on the other hand achieves a pedestrian level of service score for a street segment. It is easy to understand, and easy to apply. The index has been successfully applied in several cities throughout the U.S. and is constantly refined based on experience.

INDEX APPROACH – TEN WALKABILITY CRITERIA

For its index, HPE carefully selected ten walkability criteria to determine quality of the walkable environment:

1. *Non-peak hour free flow speed (measured with a speed gun; at least 10 samples recommended)*
2. *Pavement width at each pedestrian crossing (measured curb face to curb face)*
3. *Presence of on-street parking (percent of a block face where on-street parking is provided and in use)*
4. *Sidewalk width (transect sensitive)*
5. *Pedestrian connectivity (distance between street intersections or mid-block crossings)*
6. *Presence and quality of pedestrian features (high quality versus low quality)*
7. *Street enclosure (ratio of building height to street width)*

8. *Land use mix (presence of different---pedestrian attractive---land use types; also transect sensitive)*
9. *Façade design (number of doors and façade character per block face)*
10. *Transit and/or bicycle features (presence of bus shelters, stops, bicycle lockers and bicycle racks)*

In the index form, walkability criteria are arranged in check-list style. After scoring in the field, results are tallied in a spreadsheet for comparison. Maximum score is 100 points. Total scores per street segment are graded:

90 - 100	High Walkability (A)
70 - 89	Very Walkable (B)
50 - 69	Moderately Walkable (C)
30 - 49	Basic Walkability (D)
20 - 29	Minimal Walkability (E)
19 points or less	Uncomfortable/hazardous to walking (F)

Why These Walkability Measures?

HPE considers of high importance to walkability (also see **Attachment A**):

STREET DESIGN (MAXIMUM SCORE 30 POINTS)

Non-peak hour free flow speed (measured with a speed gun; at least 10 samples recommended)---Up to 10 points

Traffic speed of 25 mph or less is safe and comfortable for pedestrians and cyclists. Studies have shown a pedestrian struck by a vehicle travelling 20 mph has a 95% chance of survival; but hit at 40 mph, only a 10% chance of survival.¹ Studies also show drivers of vehicles travelling 20 mph or less will likely stop for a pedestrian, but probably will not stop if travelling over 35 mph².

For Walkability Index purposes, “non-peak hour free flow speed” is actual speed, measured with a speed gun during a period of moderate to high pedestrian activity---taken during a period other than the AM, noon, or PM peak hours.

The measure of non-peak hour free flow speed is:

Walkability Measure	Possible Points
≤ 15 mph	10
16-20 mph	8
21-25 mph	6
26-30 mph	4
>30 mph	0

Pavement width at each pedestrian crossing (measured curb face to curb face)---Up to 10 points

According to pedestrian studies, most pedestrians walk in the neighborhood of 4.0 feet/second (about 3 mph), and elderly persons walk tend to walk more slowly at 3.0 feet/second (roughly 2 mph)³. The narrower the street, the less time a pedestrian is exposed to vehicular traffic and hot asphalt. While walkers can easily negotiate a two-lane, low speed roadway, crossing a wide multi-lane roadway increases exposure to danger and discomfort (**Note for this measure: Subtract 10' of width for angled parking**)

The measure for pedestrian crossing width—**measured from curb face to curb face**—is:

Walkability Measure	Possible Points
≤ 30'	10
31' - 36'	8
37' - 40'	6
41' - 60'	4
>60'	0

Presence of on-street parking (percent of a block face where on-street parking is provided and utilized)---Up to 10 Points (total both sides of the street)

On-street parking (either parallel or angle parking) is important, not only to help distribute the parking load, but also to control traffic speed. Parked cars also provide a safety buffer for pedestrians. The measure here is not only the presence of striped parking spaces, but of **occupied** parking spaces.

The measure for on-street parking presence is **occupied** parking spaces on:

Walkability Measure	Possible Points
76% - 100% of the block face	5 each side = 10
51% - 75% of the block face	4 each side = 8
26% - 50% of the block face	3 each side = 6
10% - 25% of the block face	2 each side = 4
No on-street parking	0 each side = 0

SIDEWALK DESIGN (MAXIMUM SCORE 30 POINTS)

Sidewalk width (transect sensitive)---Up to 10 Points (total both sides of the street)

To function properly, sidewalks should be sized to accommodate the walking environment. For example, in an urban core, urban center or general urban transect zone, sidewalks should typically be at least 8 feet wide—and, often, greater width is desirable. In a low density residential environment, a 4 foot wide sidewalk might be sufficient. (see **Attachment B** for transect description)

The measures for sidewalk width are:

Walkability Measure				Possible Points
T3	T4	T5	T6	
Sub-urban	General Urban	Urban Center	Urban Core	
>5'	>6'	>12'	>20'	5 each side=10
>4' to 5'	>5' to 6'	>8' to 12'	>12' to 20'	3 each side=6
>3' to 4'	>4' to 5'	>5' to 8'	>8' to 12'	2 each side=4
≤3'	≤4'	≤5'	≤8'	0 each side=0

Pedestrian connectivity (distance between street intersections or mid-block crossings)---Up to 10 points (total both sides of the street)

A high-quality, connected, pedestrian network provides ease of walking and access through short (300' – 400') blocks and/or mid-block pedestrian alleys.

The measure for pedestrian connectivity is distance between intersections or cross-block passages:

Walkability Measure	Possible Points
≤300'	5 each side=10
301' to 400'	4 each side=8
401' to 500'	3 each side=6
501' to 600'	2 each side=4
>600'	0 each side=0

Presence and quality of pedestrian features (high quality versus low quality)---Up to 10 points (total both sides of the street)

This measure considers the presence---or lack of---high quality pedestrian features such as good sidewalk condition, lack of obstacles, ADA compliance, shade trees, and street furniture.

Walkability Measure	Possible Points
High quality (High presence of the qualitative measures)	5 each side=10
Moderate quality	3 each side=6

(Qualitative measures are present, but not to a large extent)

Low quality

2 each side=4

(Some, but not many, of the qualitative measures are present)

Poor quality, or no pedestrian features

0 each side=0

URBAN DESIGN (MAXIMUM SCORE 30 POINTS)

Street enclosure (ratio of building height to street width)---Up to 10 points

To provide a comfortable environment for pedestrians, the ratio of building height to street width (**measured from building face to building face**) should provide a feeling of “enclosure”. In walkability literature, ideal minimum enclosure ratios range from 1:1 to 1:6.

Building height to street width ratios are:

Walkability Measure	Possible Points
<1:1	10
1:1 to <1:3	8
1:3 to 1:6	6
>1:6	0

Land use mix (presence of different---pedestrian attractive---land use types; also transect sensitive)---Up to 10 points (both sides of the street)

Walking is most likely when there is a specific, inviting and easily accessible place to go. The land use mix criterion considers the mix of different kinds of land uses on a block face, such as shopping, eating and drinking, hotel, and residential land uses. Land use mix is scored for the appropriate transect:

The measure for land use mix is the number of different types of land uses per block face:

Walkability Measure			Possible Points
T4	T5	T6	
General Urban	Urban Center	Urban Core	
3+	4+	4+	5 each side=10
2	3	3	3 each side=6
1	2	2	2 each side=4
N/A	1	1	0 each side=0

Façade design (number of doors and façade character per block face)---Up to 10 points

Building facades that are varied, attractive and interesting are also attractive to pedestrians. Blank walls are daunting and tend to discourage walking.

Walkability Measure ⁴	Possible Points
Small units; many doors (15-20 doors/block face); lots of character	5 each side=10
Small units; many doors (10-14 doors/block face); many details	4 each side=8
Mix of large and small units (6-9 doors/block face); few details	3 each side=6
Large units; little variation (2-5 doors/block face); few or no details	1 each side=2
Large units; few or no doors (0-1 doors/block face); uniform facade	0 each side=0

TRANSIT/BICYCLE FEATURES (MAXIMUM SCORE 30 POINTS)

Transit and/or bicycle features (presence of bus stops and bicycle racks)---Up to 10 points

Transit and bicycle features assure other non-automotive components of mobility are satisfied. A high-quality transit/bicycle environment will provide for safe travel via slow traffic speed (20 mph or less) and will have appealing transit/bicycle features:

Walkability Measure	Possible Points
Presence of bus stops and bicycle racks	10 points
Presence of bus stops and bicycle racks	5 points
No bus stops or bicycle racks	0 points

APPLICATION EXPERIENCE TO DATE

HPE's Walkability Index has been applied successfully in several communities, and is in a constant state of refinement as lessons learned from each use are employed to make Index adjustments. Notable examples of Walkability Index experience to date include:

Towson, Maryland

The Walkability Index was used during Walkable Townson Plan preparation for Baltimore County, Maryland. Towson has a traditional downtown that once was thriving, but now is a "9 to 5" district dominated by office workers (sound familiar?). Walkable Towson is an effort to transform downtown into a vibrant, pedestrian friendly destination.

To gauge current walkability, Stu Sirota's TND Planning Group design team trained County staff to administer the index. Staff then scored street segments throughout the planning area. Total walkability scores ranged from 11 (uncomfortable/hazardous for walking) to 67 (moderately walkable).

During the Walkable Townson design charrette, the Index was used again to evaluate how recommended changes to land use and the transportation network would affect Walkability Index scores.

In both applications, after Index scores were tallied for each street segment the results were displayed on a map, with street segments colored coded from highest score (green) to lowest (red). (see also **Attachment C**)

Savannah

HPE applied the Walkability Index to Savannah, Georgia's, Broughton Street. In this old section of the city with its extensive grid of pedestrian-oriented streets and appealing destinations, index scores ranged from 72 (very walkable) to 96 (high walkability).

Sarasota

For the City's "Connecting Downtown to the Bayfront" study, TransAssociates applied the Walkability Index to US 41, a currently auto-dominant thoroughfare passing north-south through the heart of Sarasota. Scores ranged from 13 (uncomfortable/hazardous to walking) to 37 (basic walkability).

CONCLUSIONS

An easily applied walkability index can be a valuable assist to the urban design process. It demonstrates improvements that can be made to streets that are now unwalkable. It also aids by guiding the design of new streets to insure walkability.

APPLYING HPE'S WALKABILITY INDEX IN YOUR COMMUNITY

If you are interested in applying HPE's Walkability Index in your community, for an electronic Walkability Index copy in Excel and/or PDF, contact HPE at either (850) 222 – 2277 or by e-mail www.lmoore@hpe-inc.com. HPE asks only that you:

- Provide full contact information for the person who will be administering the Index
- Give Index credit to Hall Planning & Engineering, Inc.
- After administering the Walkability Index, send copies of worksheets and results (scanned or Excel copies) to HPE to assist in data collection and evaluation
- Finally, based on your experience, provide any recommendations you might have for Walkability Index improvement.

If desired, HPE can provide Walkability Index training.

ACKNOWLEDGMENTS

HPE would like to thank the Baltimore County, Maryland, planning staff for their assistance with walkability index application and refinement during the early days of development.

References

¹Durkin, M and T. Pheby. "York: Aiming to be the UK's First Traffic Calmed City." PTRC Education and Research Services, Ltd., London, England, 1992; pp.73-90)

^{2,3} Florida Pedestrian Planning and Design Guidelines. (University of North Carolina Highway Safety Research Center; for the Florida Department of Transportation, May, 1996; pp. 21-23)

⁴Jan Gehl, Lotte Johansen, Kaefer and Solvejg Reigstad. "Close Encounters with Buildings." *Urban Design International*, No. 11, 2006.

ATTACHMENT A

Walkability Index Data Sheet

WALKABILITY INDEX DATA SHEET:

[Order of evaluation: West to East; or South to North]

Date: / /2010

Begin Time: A.M. P.M. (Circle One)

Completed by:

Representing:

Posted Speed of Street/Road:

Transect Zone (Circle One):

T3Sub-Urban

T4General Urban

T5Urban Center

T6Urban Core

Name of Cross Street

Side A

Name of Cross Street

Name of Street Segment

Side B

WALKABILITY MEASURE

Criterion	Value	Score Side A	Total Score	Score Side B
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STREET DESIGN (MAXIMUM SCORE 30 POINTS)

- 1 Non-peak hour Free Flow Speed (Vehicles not hindered by stop signal or other slowing/stopping vehicles)
- [Note for this measure: If possible, take a minimum of 10 samples---some in each direction; if not possible, take at least 3 samples in 10 minutes]

≤15 mph	10	10
16-25mph	8	
26-30 mph	4	
>30 mph	0	

Segment Total 10

- 2 Pavement Width---curb face to curb face---exclusive of curb extensions

≤30'	10	10
31' - 36'	8	
37' - 40'	6	
41' - 60'	4	
>60'	0	

Segment Total 10

- 3 Presence of (Occupied) On-Street Parking (Parallel or Angle Parking)

76% - 100% of Block Face	5	5	5
51% - 75% of Block Face	4		
26% - 50% of Block Face	3		
10% - 25% of Block Face	2		
No on-street parking	0		

Segment Total 10

SIDEWALK DESIGN (MAXIMUM SCORE 30 POINTS)

- 4 Sidewalk Width: Sidewalk width should be appropriate to the built environment (Score for appropriate transect)

T3	T4	T5	T6			
>5'	>6'	>12'	>20'	5	5	5
>4' to 5'	>5' to 6'	>8' to 12'	>12' to 20'	3		
>3' to 4'	>4' to 5'	>5' to 8'	>8' to 12'	2		
≤3'	≤4'	≤5'	≤8'	0		

Segment Total 10

- 5 Pedestrian Connectivity: Distance between street intersections or mid-block crossings with pedestrian linkage

300' or less	5	5	5
301' to 400'	4		
401' to 500'	3		
501' to 600'	2		
Over 600'	0		

Segment Total 10

- 6 Presence and quality of pedestrian features (good sidewalk condition; lack of obstacles; ADA compliance; shade trees; lighting; street furniture)

High quality (4-5)	5	5	5
Moderate quality (2-3)	3		
Low quality (1)	2		
Poor quality or no features (0)	0		

Segment Total 10

60

Value	Score Side A	Total Score	Score Side B
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URBAN DESIGN (MAXIMUM SCORE 30 POINTS)**7 Street Enclosure: Ratio of building height to street width [building face to building face]**

<1:1	10
1:1 to <1:3	8
1:3 to 1:6	6
>1:6	0

10

Segment Total

10

8 Land Use Mix: Presence of different land use types, e.g. retail, eating and drinking establishments, offices, hotels and residential units (Score for appropriate transect)

T4	T5	T6	
3+	4+	4+	5
2	3	3	3
1	2	2	2
N/A	1	1	0

5

5

Segment Total

10

9 Façade Design: Presence of façade arrangements and designs that are attractive to pedestrians*

Small building fronts; 15-20 doors/block face; lots of character	5
Small building fronts; 10-14 doors/block face; many details	4
Mix of large & small building fronts; 6-9 doors/block face; few details	3
Large building fronts; little variation; 2-5 doors/block face; few or no details	1
Large building fronts; 0-1 doors/block face; uniform façade	0

5

5

Segment Total

10

*Drawn from *Close Encounters With Buildings* ; Jan Gehl, Lotte Johansen Kaefer and Solvejg Reigstad**TRANSIT/BICYCLE FEATURES (MAXIMUM SCORE 10 POINTS)****10 Transit and/or Bicycle Features**

Presence of special bus/bicycle features (e.g. bus shelters & bike lockers)	10
Presence of bus stops and bicycle racks	8
Presence of bus stops or bicycle racks only	6
No bus stops or bicycle racks	0

10

Segment Total

10

Walkability Scoring

90 - 100 points	High Walkability (A)
70 - 89 points	Very Walkable (B)
50 - 69 points	Moderately Walkable (C)
30 - 49 points	Basic Walkability (D)
20 - 29 points	Minimal Walkability (E)
19 points or less	Uncomfortable/hazardous for Walking (F)

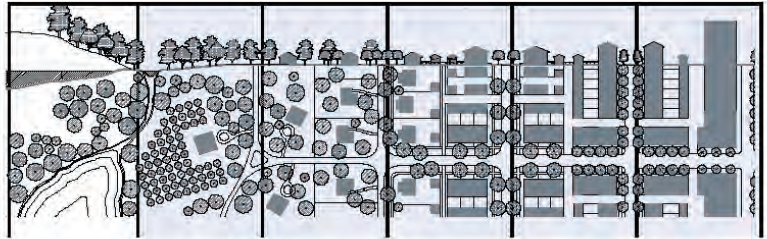
TOTAL WALKABILITY SCORE

100

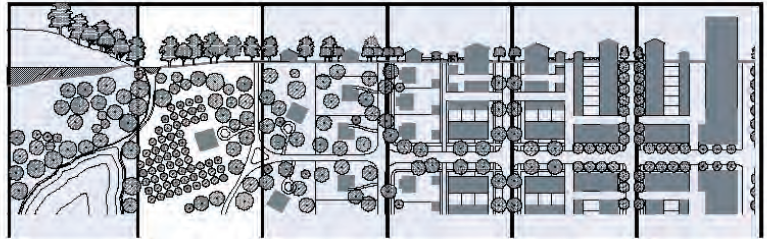
ATTACHMENT B

Transect Description

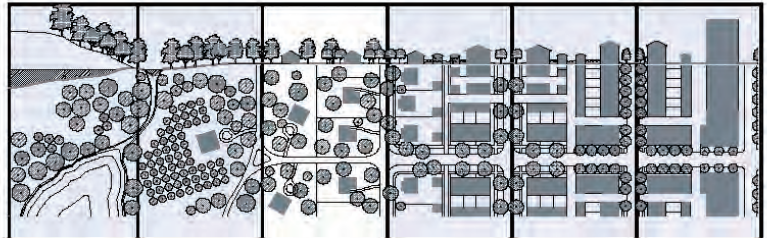
- T1** THE NATURAL ZONE consists of lands approximating or reverting to a wilderness condition, including lands unsuitable for settlement due to topography, hydrology or vegetation.



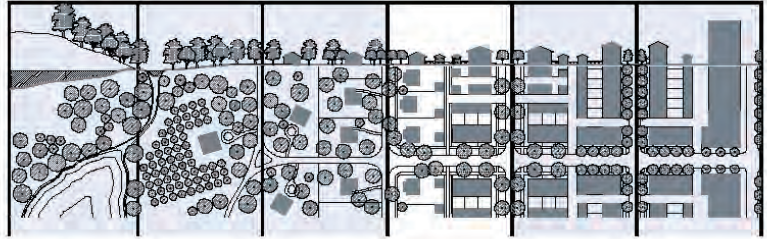
- T2** THE RURAL ZONE consists of lands in open or cultivated state or sparsely settled. These include woodland, agricultural lands, grasslands and irrigable deserts.



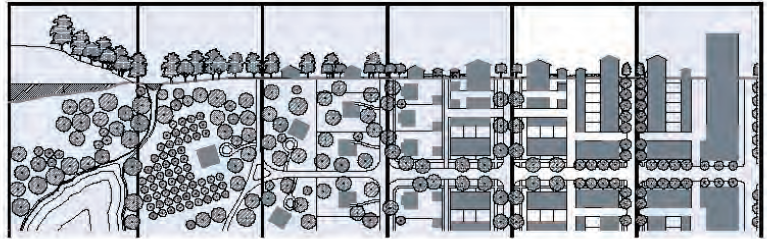
- T3** THE SUB-URBAN ZONE consists of low density suburban residential areas, differing by allowing home occupations. Planting is naturalistic with setbacks relatively deep. Blocks may be large and the roads irregular to accommodate natural conditions.



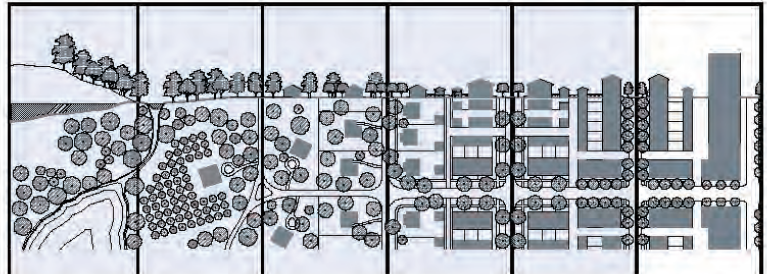
- T4** THE GENERAL URBAN ZONE consists of a mixed-use but primarily residential urban fabric. It has a wide range of building types: single, sideyard, and rowhouses. Setbacks and landscaping are variable. Streets typically define medium-sized blocks.



- T5** THE URBAN CENTER ZONE consists of higher density mixed-use building types that accommodate retail, offices, rowhouses and apartments. It has a tight network of streets, with wide sidewalks, steady street tree planting and buildings set close to the frontages.

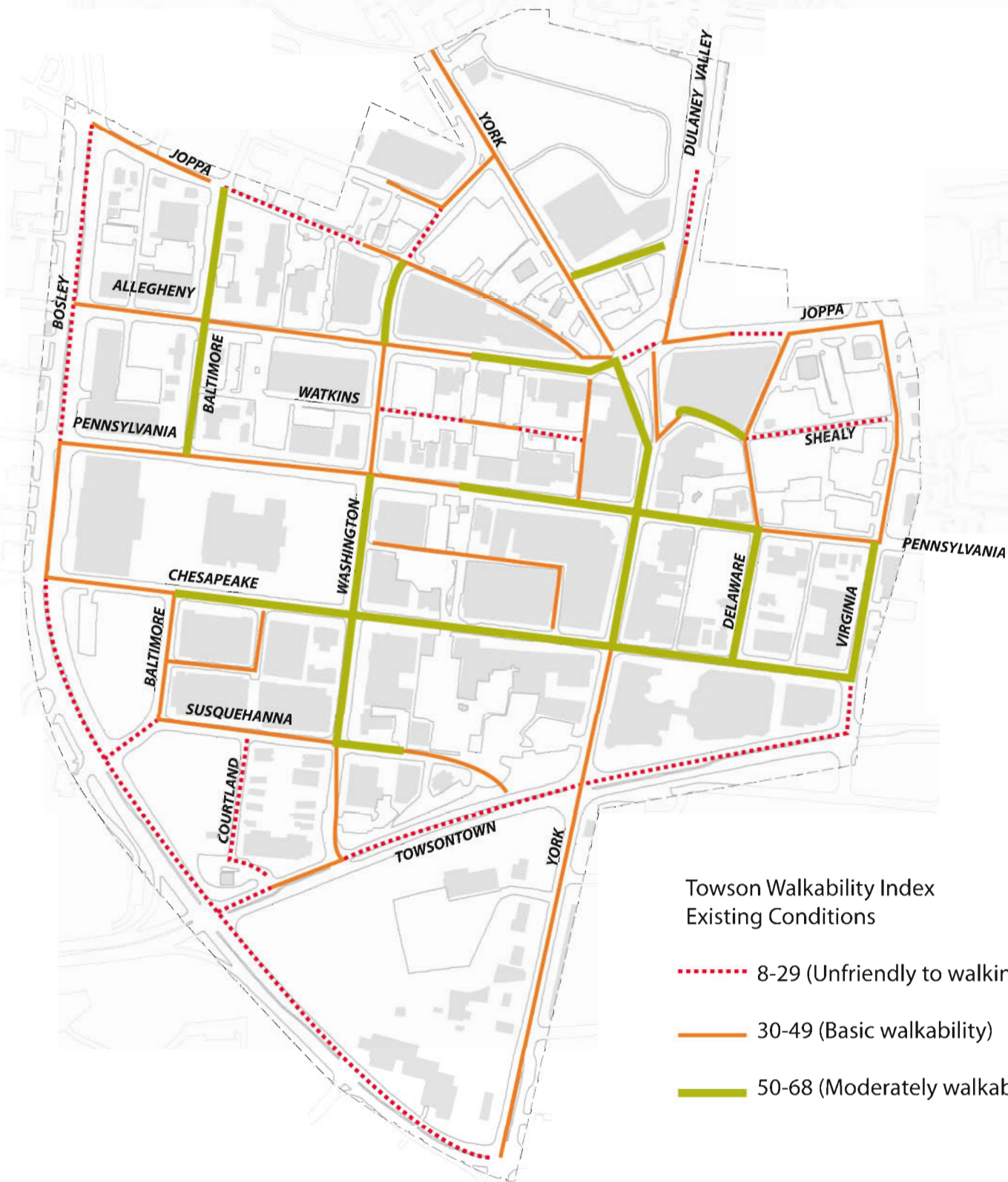


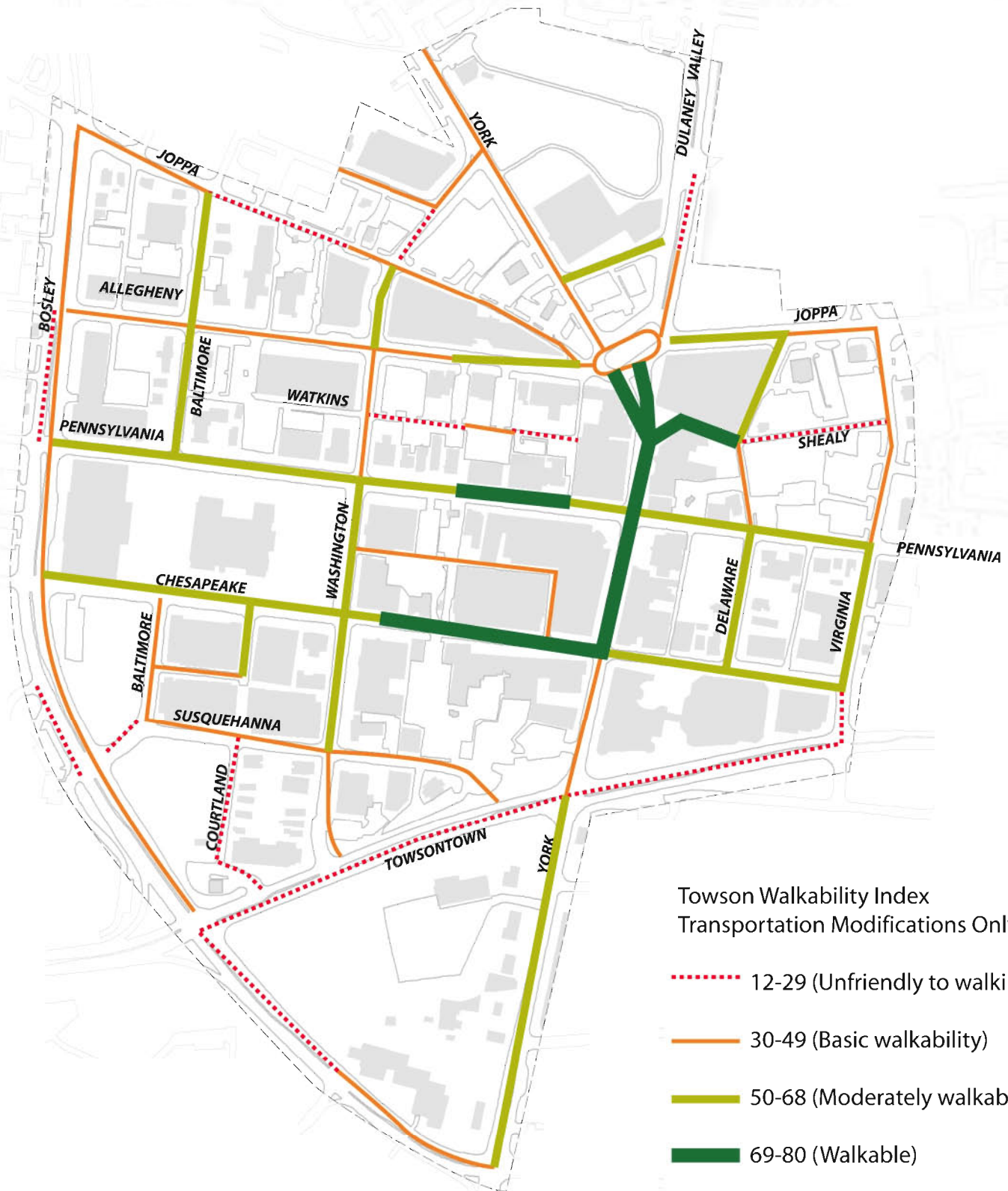
- T6** THE URBAN CORE ZONE consists of the highest density, with the greatest variety of uses, and civic buildings of regional importance. It may have larger blocks; streets have steady street tree planting and buildings set close to the frontages.



ATTACHMENT C

Walkability Mapping Example







Towson Walkability Index
Transportation plus Land Use
Modifications

- 12-29 (Unfriendly to walking)
- 30-49 (Basic walkability)
- 50-68 (Moderately walkable)
- 69-80 (Walkable)