

Application of Walking Security Index Research to Standard of Care Situations and Analysis

Dr. Barry Wellar
Policy and Research Advisor
Federation of Urban Neighbourhoods
Distinguished Research Fellow
Transport 2000 Canada
Professor Emeritus, University of Ottawa
Principal, Wellar Consulting Inc.
wellarb@uottawa.ca
<http://www.wellar.ca/wellarconsulting/>

Research Paper

Prepared for the
Federation of Urban Neighbourhoods-Ontario

<http://www.urbanneighbourhoods.org>

August 19, 2009

Application of Walking Security Index Research to Standard of Care Situations and Analysis

Barry Wellar

wellarb@uottawa.ca

<http://www.wellar.ca/wellarconsulting/>

1. Introduction

Community organizations are frequently asked by the people living in the neighbourhood to try to convince a municipality to correct infrastructure, maintenance, and traffic movement problems that affect the safety of pedestrians, cyclists, and transit users, as well as motor vehicle operators and their passengers. It is my experience that achieving remedial actions of that nature can be very difficult. I am therefore pleased to respond to a request from the Federation of Urban Neighbourhoods to prepare a report based on some of my research that may provide assistance to these public interest groups.

It may be useful to begin by noting that community support was instrumental in the decision that I made in 1994 to participate in the Transportation Environment Action Plan (TEAP), sponsored by the Region of Ottawa-Carleton. At the time I was engaged in activities with groups such as the Federation of Citizens Associations, Ottawalk, and the Carlingwood Action Committee, and I also made frequent presentations at community association meetings throughout the National Capital Region. When I submitted my proposal to TEAP, community associations not only supported the proposal, they committed to help on field work, index design, a pedestrian safety conference, and other tasks.

One of the elements of TEAP which persuaded many community and advocacy groups to participate in the TEAP effort was the goal of encouraging more trips by walking. In support of that goal, and in recognition of the fact that limited research had been done to quantify the traffic situations of pedestrians, the primary mission of the Walking Security Index (WSI) project was to design indexes which measure the levels of safety, comfort, and convenience expected and experienced by pedestrians at signalized intersections.

The thesis of the WSI research was that indexes could be designed to provide scores on the performance of intersections from the perspective of safety, comfort, and convenience of pedestrians, and the scores could be arranged in rank order. Then, for public safety, quality of life, engineering, traffic, enforcement, maintenance, modification, health, or other purposes, the scores could be used to identify needed corrective actions at intersections rated from best to worst, or at problematic intersection quadrants. And, as a final step, elected officials and region/city staff could use the information from the rankings to prioritize remedial actions.

As the reader may appreciate, the thesis underlying the research was a bold enterprise, since it appeared that no previous work of a similar nature had ever been done by the engineering, planning, urban design, or other professions.

During the design phase (1995-1998) ten indexes were developed, and in the pilot study phase (1999-2002) three macro indexes were tested for operationality. More than 40 publications describe the research design and findings of the WSI methodology. A bibliography of WSI project publications is provided at the end of the Research Paper for community association researchers who may wish to examine the design phase and/or the pilot study phase activities in detail.

In this Research Paper, I provide community associations with some suggestions for using the WSI research and reports to address safety issues affecting pedestrians on the streets, lanes, and sidewalks of their communities. The context for the suggestions is two-fold:

1. The duty of care responsibility of municipal governments for the transportation infrastructure and traffic of all kinds within their boundaries;
2. The standard of care responsibility that is imbedded in the policies, programs, plans, procedures, and practices which are implemented by municipal governments to meet the duty of care responsibility.

I note in closing the Introduction that community groups participated in the design phase and the pilot study phase of the WSI project, and I have worked on WSI-related initiatives with a number of community associations and advocacy groups in Ottawa and elsewhere since the completion of the WSI project in 2002. I rely on that interaction for my approach to the Research Paper, and include a selection of references to papers and websites containing materials developed in conjunction with or on behalf of community-based organizations for which I have presented workshops, given seminars, or provided consulting advice.

2. Duty of Care

Before discussing the details of the Walking Security Index research, it is necessary to outline the responsibilities of municipal governments in regard to pedestrians' safety. The initial step in the process is to establish that a duty of care exists, because if there is no duty of care then any further discussion is academic rather than practical, and not likely to motivate municipal governments to the point of taking corrective actions.

It is my reading of the literature that duty of care has many facets, so I hasten to note and emphasize that I am not writing and not attempting to write a legal document. Rather, the intent of the Research Report is to offer suggestions that community associations can raise with their own legal counsel, or their municipal councillors and mayor as appropriate.

Insofar as pedestrians' safety is concerned, there appear to be two aspects of duty of care that are pertinent to this paper. First, by building sidewalks, painting crosswalks, installing intersection signals that have a pedestrian component, clearing sidewalks of ice and snow, etc., municipal governments by their own actions demonstrate that they recognize and accept a duty of care responsibility towards pedestrians. In my experience, and as discussed below, duty of care domains within municipal governments that involve pedestrians can usefully be grouped in terms of responsibility for infrastructure, maintenance, and movement of traffic.

Official plans, transportation master plans, pedestrian plans, walking plans, and other official documents describe the ways that municipal governments acknowledge the duty of care responsibility for pedestrians.

The second aspect of duty of care involves a responsibility to ensure that standards of care are achieved. That is, standards of care (which are discussed in Section 3) are essentially statements of intent or principle, and they serve no practical purpose unless and until they are implemented appropriately. It is a duty of care responsibility on the part of a municipality, therefore, to ensure that the standards of care which have been adopted by a municipality on behalf of pedestrians are properly implemented.

3. Standard of Care

In brief, and without getting wrapped up in legalese, standard of care refers to the practices, procedures, actions, or other initiatives that it is reasonable for a municipality to undertake in order to achieve its duty of care responsibilities.

In the case of pedestrians' safety, three areas in which standard of care issues arise involve the transport infrastructure, maintenance of the transport infrastructure, and use of the transport infrastructure. The following questions illustrate standard of care issues in the above regards:

- Was the absence of a sidewalk a factor in the incident?
- Was the design of the sidewalk a factor in the incident?
- Was the design of the intersection a factor in the incident?
- Were proper maintenance procedures used?
- Were maintenance procedures applied properly?
- Was on-street parking a factor in the incident?
- Was the use of this street for transit buses appropriate?

- Was it appropriate to allow tractor trailers on this roadway?
- Were enforcement practices sufficient for traffic conditions?

The Walking Security Index project was obviously consistent with the Region of Ottawa-Carleton's duty of care responsibilities involving pedestrians, since both the design and the pilot study phases were funded as sole source contracts by the Region.

And, based on feedback received from officials and citizens in other communities, it is my impression that duty of care responsibilities of the Region of Ottawa-Carleton/City of Ottawa in regard to pedestrians is shared to a considerable degree by other municipal governments in Ontario, and across Canada for that matter.

As a result, it appears reasonable to present the Walking Security Index research as having general applicability to the duty of care situation in municipal governments.

Further, based on the results of four civil actions (three trials, and one case settled out of court to date), it appears fair to say that the Walking Security Index research is a credible source upon which to base an opinion involving standard of care issues that can be directly connected to that research.

In the next section I discuss how the variables in the indexes can be applied to standard of care situations and analyses involving pedestrians' safety.

Then, in the subsequent section, I make several suggestions about how the research on indexes can be used by community groups to "persuade" their municipal governments to take what may be a long overdue step. That is, to increase the amount of effort that goes into developing and using a more methodological approach to establishing and achieving quantitatively-based, standard of care measures of pedestrians' safety at intersections (signalized and non-signalized), as well as on streets, lanes, and sidewalks.

It is also pertinent to note that some of the motivation for this approach came from Ontario Municipal Board (OMB) hearings in which both planning and zoning applications involved expanding the road network and increasing the volumes of vehicular traffic on nearby streets. Concerns raised about pedestrians' safety that were not supported by quantitative measures were frequently dismissed in favour of the arguably lightweight notion of "level of service" that was used to justify enlarging intersections to move vehicular traffic. The Walking Security Index research not only addresses that particular OMB bias, it adds a standard of care aspect that in my opinion could be used in litigation involving municipalities and the Board itself if its rulings can be shown to negatively affect pedestrians' safety.

4. Applying Walking Security Index Variables to Standard of Care Situations and Analysis

As a first step, I think it is critically important for community association members to become familiar with the variables that were selected for inclusion in the indexes. As documented in perhaps 10-12 reports, a great deal of effort went into deriving these variables, and it seems to make a lot of sense for community association members to benefit from that work from the outset. Additional variables can always be added if those used in WSI research are insufficient, unsatisfactory, etc., but in the interests of time, and for reasons such as those given above, a proven place to start in terms of getting a handle on standard of care variables is with those that have already been tried and tested.

a. Intersection Volume and Design Index (IVDI) Variables

Variables selected for the Intersection Volume and Design Index (IVDI) are shown in Figure 1. The variables selected for the QICI were derived from the literature, consultations with community groups and regional government politicians and staff, and many hours of observing pedestrian and driver behaviour through courses in research methods and planning practices.

The eight variables are those which appeared to be most instructive in regard to arraying intersections along an axis which has “pedestrian-friendly intersections” at one end, and intersections that are labelled “intersection from hell”, and “intersection of fear and loathing” at the other.

**Figure 1.
List of Intersection Volume and
Design Index (IVDI) Variables**

- V1 = number of passenger car equivalents²/hour
- V2 = number of pedestrians/hour
- V3 = number of lanes rating
- V4 = number of turn lanes by type rating
- V5 = intersection geometry rating
- V6 = intersection slope rating
- V7 = direction(s) of traffic flow rating
- V8 = number of channels adjacent to intersection rating

WSI project reports discuss these variables in detail. The key point is that each of these variables can be used by a community association to ask questions,

questions, and more questions about how the standard of care practiced by a municipal government supports achieving the duty of care responsibility of the municipal government to provide a safe walking environment for pedestrians.

As for the use of the variables (or variations) by an expert witness, it is my belief that each of the variables can be used to great effect in establishing two key aspects of a standard of care opinion: first, whether the variables were taken into account before any intersection modifications or so-called “improvements” were approved and implemented; and second, whether those decisions properly took into account the likely or inevitable impacts of all the intersection changes on the safety of pedestrians.

b. Quality of Intersection Condition Index

Variables selected for the Quality of Intersection Condition Index (QICI) are listed in Figure 2. The QICI variables were derived from the literature, consultations with community groups and regional government politicians and staff, and many thousands of hours of interviewing pedestrians and observing pedestrians’ behaviour through class assignments in courses in research methods and planning practices.

The 18 variables represent a selection of design, construction, condition, and maintenance standards and practices that affect pedestrians’ use of sidewalks and intersections. The term ‘condition’ has general applicability to a number of the variables, and also contains maintenance implications, and hence its use in naming the index.

As was done for the IVDI variables, a number of WSI project reports discuss these variables in detail.

The key point, again, is that each of these variables (or variations) can be used by a community association to ask questions, questions, and more questions about how the standard of care practiced by a municipal government supports achieving the duty of care responsibility to provide a safe walking environment for pedestrians.

Further, and very importantly, the fact of the matter is that although the focus of the WSI project was on intersections, many of these variables are also applicable to the sidewalk area between intersections, and they can also be applied to streets where there are no sidewalks, as well as to lanes.

Consequently, these variables have general utility for asking questions, questions, and more questions about all parts of the transport infrastructure which involve walking as a mode of transport.

Figure 2.
**List of Quality of Intersection Condition
Index (QICI) Variables**

- V1= Sidewalk corner capacity
- V2= Height of curbing
- V3=Condition of curbing
- V4=Sidewalk width
- V5=Sidewalk curb condition
- V6=Roadway surface conditions
- V7=Median (refuge) capacity
- V8=Median (refuge) condition
- V9=Traffic calmers
- V10=Channel island capacity
- V11=Crosswalk capacity
- V12=Crosswalk signed and painted
- V13=Stop bar painted and signed
- V14=Pedestrian signage
- V15=No sight line obstruction
- V16=Street furniture near sidewalk corner
- V17=Ice/snow/slush removal
- V18=Water drainage

And, similarly to the case for the IVDI, it is my belief that each of the QICI variables (or variations) can be used by an expert witness in establishing whether some or all of the variables were properly taken into account in association with municipal government maintenance procedures and practices that affect the safety of pedestrians on sidewalks, lanes, streets, roads, parking lots, and all other parts of the transport infrastructure.

c. Driver Behaviour Index (DBI) Variables

Variables selected for the Driver Behaviour Index (DBI) are listed in Figure 3. The variables selected for the DBI were derived from the literature, consultations with community groups, regional government staff and police, and many of hours of observing driver behaviour through class assignments in courses in research methods and planning practices.

Further, the Driver Behaviour Index research also benefitted in two ways in particular from more than 300 media interviews and stories. That is, the media coverage not only generated numerous comments about the value of the Driver Behaviour Index research and suggestions for index design, it also resulted in many hundreds of observations about aggressive driver behaviours at

intersections, and numerous requests for us to do surveys at intersections throughout the National Capital Region.

Figure 3.
List of Driver Behaviour Index (DBI) Variables

V1= Amber-light incidents per phase
V2 = Red-light incidents per phase
V3 = Fail-to-yield incidents per phase

Variables V1 and V2 are generally understood to refer to the driver behaviour of “running the yellow” or “running the red”, and as a rule this aspect of driver behaviour tends to involve collisions between vehicles rather than between vehicles and pedestrians.

However, pedestrians can be hit directly by the “light runners”, as well as by vehicles involved in collisions, and these variables in the DBI can be the basis of questions and expert opinions about the standard of care achieved by the police services unit when it comes to charges and convictions of aggressive drivers.

As for V3, a failure-to-yield incident is deemed to have occurred if any of the following events are observed:

1. Vehicle blocks crosswalk when pedestrian signal in walk mode.
2. Vehicle unable to clear intersection before start of pedestrian signal.
3. Vehicle enters crosswalk when pedestrian in or about to enter lane.
4. Vehicle accelerates to “beat” pedestrian to crosswalk.
5. Vehicle fails to slow to allow pedestrian to enter crosswalk.
6. Vehicle causes pedestrian to stop or change direction to avoid collision in crosswalk.
7. Vehicle causes pedestrian to delay entering crosswalk.
8. Vehicle changes lanes to cut in front of or behind pedestrian.
9. Vehicle fails to stop before reaching the stop bar.

Community association members are fully qualified to observe failure-to-yield incidents at intersections, and to compile a very substantive file as a basis for asking questions, questions, and more questions about the level of service provided by enforcement agencies in regard to charges and convictions for failure-to-yield incidents, particularly in the vicinity of schools, parks, seniors’ residences, shelters, and other locales where the pedestrian population may comprise a relatively large proportion of more vulnerable road users.

And, in a similar vein, questions, questions, and more questions can be put to municipal government officials about the practices they have implemented and/or have under consideration to physically modify the intersection, add surveillance cameras, add crossing guards, etc., so that the standard of care that is expected and experienced by pedestrians is not negated by the aggressive behaviour of motor vehicle operators.

It is my experience that these three variables can be used separately and in combination by an expert witness in analysing whether effective standard of care measures have been taken by municipal governments and police services to deal with aggressive driving behaviour that has affected or threatens the safety of pedestrians at signalized intersections. And, parts of V3 are also applicable in analysing aggressive driving behaviour at non-signalized intersections.

Further, the failure-to-yield component of the DBI could also be used as a model for analysing incidents involving motorized vehicles and cyclists. This suggestion is prompted by the seeming rash of collisions in Ottawa this summer, as well as in other cities, which has precipitated yet another large volume of media articles about the situation, as well as reports about where and when collisions occur.

One obstacle to getting beyond talk to action, however, is that there appears to be little thought going into the standard of care aspect. And, more particularly, there appears to be little emphasis put on examining the situation from the perspective of responsibility (liability) of municipalities and police services for the collisions.

Based on readings, consultations, and personal experience as a cyclist, it appears that there are standard of care shortcomings in transport infrastructure for cyclists, road maintenance for cyclists, and the enforcement aspect of use of the transport infrastructure by motorized vehicle operators. I believe that community groups, and cycling groups, could use the WSI research as a basis for “persuading” municipal governments and police services that the standard of care provided for cyclists is lacking, and is in urgent need of safety-related improvements in the three domains.

5. Applying Walking Security Indexes to Standard of Care Situations and Analysis

The indexes developed for the WSI project were designed so that their use did not require expertise in research methodology. Indeed, during the research process, community association members participated in mini Delphi exercises, as well as in field tests of index modifications. However, due to the legal nature of the standard of care issue, and its connection to the duty of care responsibility of municipal governments, the focus of this paper is on creating an environment whereby it is elected and appointed officials in municipal governments who are required to do the heavy lifting, not community association members.

Long story short. It is not the responsibility of citizens to do the thinking or the work of municipal politicians and employees. Rather, in my experience, the proper role for citizens is to ask questions, questions, and more questions, and to make known their concerns, problems, etc., and to do so in writing (emails count) whenever possible. Paper trails form the basis of establishing competency, diligence, accountability, responsibility, liability, negligence, gross negligence, etc., and are especially useful if litigation is involved.

What follows, therefore, are several suggestions about how the Walking Security Indexes can be applied to standard of care situations and analysis by community associations which have “issues” with their municipal governments about pedestrians’ safety. And, to repeat a point made earlier, all inquiries are best made in writing, and preferably via email for ease of dissemination.

A1. Establish whether the indexes developed by the Walking Security Index project have been adopted in whole or in part, and if that is the case obtain the titles and urls of the reports which contain this information.

A2. Establish whether the indexes developed by the Walking Security Index project have been implemented in whole or in part, and if that is the case obtain the titles and urls of the reports which document the use of the WSI materials.

A3. Establish whether the indexes have been used by the municipal government, including police services, in association with standard of care issues involving pedestrians’ safety, and if that is the case obtain the titles and urls of the reports which document the use of the WSI materials.

A4. Establish whether other indexes or other kinds of measures are used by the municipal government, including police services, in association with standard of care issues involving pedestrians’ safety, and if that is the case obtain the titles and urls of the reports which document the use of these materials.

There are additional episodes to the story of the “A” file, but they can wait until more is learned about the A1, A2, A3, and A4 municipalities and police services in Ontario, and in other provinces for that matter.

The “B” file deals with municipalities and police services that have not applied Walking Security Indexes to standard of care situations and analysis.

B1. If the indexes developed by the Walking Security Index project have not been adopted in whole or in part, obtain the titles and urls of the reports which document why that is the case.

B2. If there are no reports which document why the indexes developed by the Walking Security Index project have not been adopted in whole or in part, obtain the titles and urls of the reports which explain why that is the case.

B3. Establish whether other indexes or other kinds of measures are used by the municipal government, including police services, in association with standard of care issues involving pedestrians' safety, and if that is the case obtain the titles and urls of the reports which describe the use of these materials.

B4. If inquiries establish that no other indexes or other kinds of measures are used by the municipal government, including police services, in association with standard of care issues involving pedestrians' safety, ask for an explanation as to why that is the case.

There are additional episodes to the story of the "B" file, but they can wait until more is learned about the B1, B2, B3, and B4 municipalities and police services in Ontario, and in other provinces for that matter.

6. Walking Security Index Publications and Presentations

There are basically three kinds of Walking Security Index project documentation.

a. WSI project reports published as a joint effort by the Region of Ottawa-Carleton and the University of Ottawa between 1996 and 2002. A number of public libraries, university libraries, and municipal government libraries in cities across Canada purchased some or all Walking Security Index project reports.

b. WSI project articles published in journals, as well as in conference and workshop proceedings. Most of these materials are accessible through the journals or the proceedings, although some of the articles are posted on websites. In the latter cases, an url is included in the reference.

c. WSI project presentations at conferences and workshops. These are sometimes done in the form of PowerPoint Slides, and may be posted on one or more websites. When this is the case, an url is included in the reference.

I note before listing the publications and presentations that it is now nine years after amalgamation, and about 14 years after the start of the WSI project. However, despite the passage of time, and numerous advances in website posting techniques, it appears that the City of Ottawa is still unable to assist those wanting electronic access to WSI design or pilot study reports.

As a result, for most of the project reports it is necessary to obtain a hardcopy version. In the event that copies of reports are not available from area libraries, it is possible that they can be obtained via inter-library loan.

And, if that is not possible, then it may be that some of the reports are still available for purchase. To discuss this option, send an email to me at wellarb@uottawa.ca listing the reports of interest, and I will examine the archives to see which documents remain available for distribution.

Walking Security Index Project: A Selection of Publications and Presentations

1. Wellar, B. ed. 1995. ***Perspectives on Pedestrians' Safety***. Ottawa: Pedestrian Safety Conference Committee, Region of Ottawa-Carleton.
2. Wellar, B. 1995. ***Design and Pre-Testing of a Survey Instrument to Measure Pedestrian Levels of Safety and Comfort: A Case-Study of the Channelized Cut-off from Laurier Avenue East to Nicholas Street South***. Ottawa: Regional Municipality of Ottawa-Carleton, Mobility Services Division.
3. Wellar, B. 1996. ***Walking Security Index. (WSI) Project: Literature Search, Outreach and Research Design Activities***. Interim Report 1. Ottawa: Mobility Services Division, Regional Municipality of Ottawa-Carleton, and Department of Geography, University of Ottawa.
4. Wellar, B. 1996. Background and introduction to *Perspectives on Pedestrian Safety*. In ***Perspectives on Pedestrian Safety***. B. Wellar, ed. Ottawa-Carleton: Pedestrian Safety Conference Committee. 2-13.
5. Wellar, B. 1996. Pedestrian perspectives on intersection performance: A case study report on channelization. In ***URISA Proceedings***. 187-201.
6. Wellar, B. 1996. Measuring pedestrian safety: A progress report on the Walking Security Index (WSI) project. In ***Perspectives on Pedestrian Safety***. B. Wellar, ed., Ottawa-Carleton: Pedestrian Safety Conference Committee, 36-44.
7. Wellar, B. 1996. ***Regional Plan Review: Comments on the Proposed Regional Development Strategy***. Ottawa: Planning Committee and Environment and Transportation Committee, Regional Municipality of Ottawa-Carleton.
8. Wellar, B. 1996. The Walking Security Index: Demonstration of roadway, traffic and human factors affecting index design, testing and use. In ***Perspectives on Pedestrian Safety***. B. Wellar, ed. Ottawa-Carleton: Pedestrian Safety Conference Committee, 69-75.
9. Wellar, B. and I. Froelich. 1996. ***Findings from a Field Re-Survey of the Laurier and Nicholas Cut-Off Channel (E-S), and Implications for the Walking Security Index***. Interim Report 2. Ottawa: Mobility Services Division,

Regional Municipality of Ottawa-Carleton, and Department of Geography, University of Ottawa,

10. Wellar, B. 1997. ***Capability of IS/GIS-Based Intersection Applications to Implement the Walking Security Index (WSI): A Preliminary Status and Prospects Assessment***. Interim Report 4. Ottawa: Mobility Services Division, Regional Municipality of Ottawa-Carleton, and Department of Geography, University of Ottawa.

11. Wellar, B. 1997. ***Safety, Comfort and Convenience as Principal Components of the Walking Security Index: Initial Specification***. Interim Report 3. Ottawa: Mobility Services Division, Regional Municipality of Ottawa-Carleton, and Department of Geography, University of Ottawa.

12. Wellar B. 1997. ***Using the Walking Security Index (WSI) to Evaluate Traffic Calming Needs, Initiatives and Outcomes: A Progress Report***. Annual Meeting of the Transportation Research Board, Washington, D.C.

13. Wellar, B. 1997. ***Walking Security Index Variables: Initial Specification***. Interim Report 5. Ottawa: Mobility Services Division, Regional Municipality of Ottawa-Carleton, and Department of Geography, University of Ottawa.

14. Wellar, B. 1997. Integrating intersection feature and performance data using the Walking Security Index (WSI) model. In ***URISA Annual Conference Proceedings***. Chicago: Urban and Regional Information Systems Association, CD-ROM publication, 1997.

15. Wellar, B., ed. 1997. ***Municipal Problem-Solving with GIS: Introduction and Demonstration - A Guide for High School Teachers***. Ottawa: University of Ottawa, Department of Geography, High School Teachers Professional Development Program.

16. Wellar, B. and J. Soroko. 1997. Integrating intersection and performance data using the Walking Security Index (WSI) model. In ***URISA Annual Conference Proceedings***, CD-ROM publication.

17. Wellar, B. 1998. Strategies behind using client-driven research on the Walking Security Index (WSI) to connect ontology, epistemology and praxis in undergraduate courses. In ***Papers of the Applied Geography Conferences***. A Schoolmaster ed. 21: 161-169.

18. Wellar, B. 1998. ***Walking Security Index***. Ottawa: University of Ottawa and Region of Ottawa-Carleton.

19. Wellar, B. and G. Malinsky. 1998. The Walking Security Index (WSI) as a means of harmonizing transportation and community goals. In ***Proceedings of***

the Annual Conference of the Transportation Association of Canada. Ottawa: Transportation Association of Canada. CD-ROM publication.

20. Wellar, B. 1999. Moving research from concepts to operation: Comments on contract negotiations for the Walking Security Index (WSI) pilot study. ***Papers and Proceedings, Applied Geography Conferences.*** A Schoolmaster, ed. 22: 11-19.

21. Wellar, B. 2000. ***Newspapers as a Source of Fact and Opinion on Pedestrians' Safety, Comfort, Convenience: A Keyword-Based Literature Search and Review.*** Ottawa: University of Ottawa and City of Ottawa.

22. Wellar, B. 2000. ***Walking Security Index Pilot Study: Basic Walking Security Index Component.*** Ottawa: City of Ottawa and University of Ottawa.

23. Wellar, B. 2000. ***Walking Security Index Pilot Study: Basic Walking Security Index Component-Technical Supplement.*** Ottawa: City of Ottawa and University of Ottawa.

24. Wellar, B. 2000. ***Walking Security Index Pilot Study: Quality of Intersection Condition Index Component.*** Ottawa: City of Ottawa and University of Ottawa.

25. Wellar, B. 2000. ***Walking Security Index Pilot Study: Quality of Intersection Condition Index Component-Technical Supplement.*** Ottawa: City of Ottawa and University of Ottawa.

26. Wellar, B. 2000. ***Walking Security Index Pilot Study: Driver Behaviour Index Component.*** Ottawa: City of Ottawa and University of Ottawa.

27. Wellar, B. 2000. ***Walking Security Index Pilot Study: Driver Behaviour Index Component-Technical Supplement.*** Ottawa: City of Ottawa and University of Ottawa.

28. Wellar, B. and C. Vandermeulen. 2000. Field tests of the Driver Behaviour Index (DBI) survey forms: Initial findings from an applied geography project involving selected regional intersections in Ottawa-Carleton. In ***Papers and Proceedings of the Applied Geography Conference.*** 23: 206-214.

29. Wellar, B. 2001. The pilot study as a step in the process of implementing transportation innovations: Findings from the Walking Security Index (WSI) project. In ***Papers and Proceedings, Applied Geography Conferences.*** 24: 244-252.

30. Wellar, B. 2001. Strategies for designing IS/GIS strategies to implement Walking Security Indexes. In **URISA Annual Conference Proceedings** Chicago: Urban and Regional Information Systems Association. CD-ROM publication.
31. Wellar, B. 2001. The Walking Security Index is Being Developed at the City of Ottawa. In **Perils of Pedestrians**, Episode 55.
<http://www.pedestrians.org/episodes/number51to60.htm>
32. Wellar, B. 2002. Lessons learned from the Walking Security Index (WSI) on how to achieve street-smart urban transportation improvements. In **Proceedings, 2002 Annual Conference, Canadian Institute of Planners**. Ottawa: Canadian Institute of Planners, CD-Rom publication. Also posted at www.slideshare.com.
33. Wellar, B. 2002. *Walking Security Index Pilot Study*. Ottawa: University of Ottawa and City of Ottawa. http://aix1.uottawa.ca/~wellarb/toc_pilot.htm
34. Wellar, B. 2004. Application of the Walking Security Index (WSI) to achieve urban transportation improvements that actively serve and promote pedestrians' safety. In **Proceedings, Canadian Multidisciplinary Road Safety Conference XIV**. <http://www.cmrrsc.ca>
35. Wellar, B. 2004. The Walking Security Index and pedestrians' security in urban areas. In **WorldMinds: Geographical Perspectives on 100 Problems**, ed. D. Jannelle, B. Warf, K. Hansen, 183-189. Boston: Kluwer Academic Publishers, 183-189.
36. Wellar, B. 2006. Linkages Between Children's Mobility and Health. **Ecoliving Guide II**. Regina: Regina Ecoliving, 154-155.
37. Wellar, B. 2006. Practical Steps Key to Achieving Sustainable Transport. **Ecoliving Guide II**. Regina: Regina Ecoliving, 252-253.
38. Wellar, B. 2006. Turning the Corner on Pedestrians' Safety: Getting Action on a No-Brainer. **TransportAction**. Special Issue: Transportation Safety and Security. Ottawa: Transport 2000 Canada. Volume 28, No.6. 5.
39. Wellar, B. 2007. **Adapting Walking Security Index Concepts and Procedures to Serve and Promote the Mobility of Children**. Presented at AAG 2007. http://www.geotrans.hofstra.edu/geotrans/tgsg_transport2000.ca , and www.slideshare.com
40. Wellar, B. 2007. **Driver Behaviour Index: Research Design and Field Test Overview**. Materials for the Human Factors Workshop, Aggressive Drivers and Pedestrians, 2007 Annual Meeting, Transportation Research Board. Washington, DC; Pedestrian Committee, Transportation Research Board.

41. Wellar, Barry. 2007. ***Sustainable Transport by Design or by Default? Either Way the Wasteful Ride is Over.*** Plenary Presentation, National TravelWise Association Annual Conference. Belfast, Northern Ireland. transport2000.ca.
42. Wellar, Barry. 2007. ***Sustainable Transport: Does Anybody Here Know How to Win This Game?*** Luncheon address, Kiwanis Club of Ottawa. transport2000.ca
43. Wellar, Barry. 2007. ***Sustainable Transport: Is there Anybody Here Who Can Win This Game?*** Resource Paper, National TravelWise Association Annual Conference, Belfast, Northern Ireland. transport2000.ca
44. Wellar, B. 2007. The Walking Security Index. In ***Perils of Pedestrians***, Episode 132, shown October 16, 2007 by DISH Network Channel 9411 -- The Universityhouse Channel. <http://www.pedestrians.org/tv.htm> and <http://video.google.com/videoplay?docid=3505120316460165595>
45. Wellar, B. 2008. ***Best Practices for Walkability.*** (Waterloo: Workshop presentation prepared for Pedestrian Charter Steering Committee, Region of Waterloo and Ontario Healthy Communities Coalition). http://www.together4health.ca/public_docs/Waterloo%20Presentation_Best%20Practices.pdf; and slideshare.com
46. Wellar, B. 2008. ***How Citizens Can Make a Difference in Defining and Achieving Walkability*** (Waterloo: Workshop presentation prepared for Pedestrian Charter Steering Committee, Region of Waterloo and Ontario Healthy Communities Coalition). wellar.ca/wellarconsulting/, slideshare.com, and http://www.together4health.ca/public_docs/Waterloo%20Workshop%20Final.pdf.

Note. It is likely that additional publications and presentations will be added to the Walking Security Index file over the next several years. And, it is likely that it would be worthwhile to update this report after community associations and other groups have had time to find out where their municipal governments and police services are located on the **A** and **B** standard of care achievement files presented in Part 5, and where these organizations are heading. I therefore look forward to receiving feedback that can be incorporated in the design of a follow-on report, which will include an updated list of publications and presentations.

In the interim, information about Walking Security Index-related materials, including those with duty of care and standard of care aspects, will be distributed via listserves, listshares, and various newsletters. In addition, and circumstances permitting, documents and presentations will be posted on websites such as: wellar.ca/wellarconsulting/; urbanneighbourhoods.org; transport2000.ca/; and, slideshare.com.

