Holistic Open-space Assessment:

An evaluation of community supported public open-space, at the neighbourhood scale.

Marcus Wolfe
Landscape Architecture Department
Faculty of Architecture

This document is submitted as partial fullfulment for the completion of a Master's Degree of Landscape Architecture.

THE UNIVERSITY OF MANITOBA

FACULTY OF GRADUATE STUDIES

*****

COPYRIGHT PERMISSION PAGE

Holistic Open-Space Assessment:

An Evaluation of Community Supported Public Open-Space, at the Neighbourhood Scale.

BY

Marcus Wolfe

A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University of Manitoba in partial fulfillment of the requirements of the degree

of

Master of Landscape Architecture

Abstract

There is no holistic means to consistently measure and compare the relationship between humans and the built environment from an architectural perspective. Consequently, it is difficult to simultaneously evaluate the physical and social state of our communities, or the impact of changes we make to them.

One approach to making this type of comprehensive evaluation is the development of a more holistic evaluation tool. This involves several steps. The first step is an investigation of the methods currently used to assess settlement form. This includes a discussion of the approaches architects and planners use to interpret the landscape. Decision theory, functional theory, and a normative theory are reviewed for their effectiveness at interpreting settlement form and change process. The second step reviews the use of indicator models for the holistic assessment of regional and urban landscapes. The Barometer of Sustainability indicator framework is chosen from a series of four applied indicator tests to be used as a template for a holistic architectural evaluation model. The resulting instrument, The Barometer of Open-space measures predetermined indicators of human and environmental well-being. It is designed to evaluate urban and suburban community supported public open-spaces.

A series of eight community supported open-space projects are assessed using the Barometer of Open-space. The projects are introduced individually as a series of monographs. Results are plotted on a comprehensive graph for comparison purposes.

The research supports that there is merit in a holistic approach to open-space assessment and that community-supported design is capable of creating functional and meaningful places. Additional research, which defines alternative indicator tests, adapts other presentation methods, and applies statistical evaluation techniques, are all areas for future consideration.

Table of Contents

Appendices

Tables

Figures

Glossary

Sustainable Development "Sustainable development is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" (WCED, 1987, 8).

Holistic An eclectic grouping of characteristics or phenomena that represent the vital aspects of a complete system.

Indicators Indicators are signs or signals of complex events and systems. They are bits of information pointing to characteristics of systems or highlighting what is happening. Indicators are used to simplify information about complex phenomena, such as sustainable development ... in order to make communication easier and quantification possible (City of Winnipeg, 1998, 4).

Indicator Index or Suite Specific type of indicator presenting highly condensed information obtained by aggregating data. Generally used in high-level decision-making processes which require easy to understand and conceptualize information. (Hardi, 1997, 10)

Framework A structure or tool to provide support or order to a group of ideas. When applied to issues a framework can assist in providing a comprehensive evaluation and in clarifying many issues. A good framework helps to provide unique insights into issues. A framework can be very simple or complex. (City of Winnipeg, 1998, 4)

Governed Landscape	Landscapes that are strictly controlled by humans to the extent that they would revert to entirely different forms if it were not for continued human intervention (Bertollo, 1998, 5).
Open-space	Public and semi-pubic urban or suburban land, which is intended to function primary as a recreational and/ or agricultural space.
Settlement Form	A general term used to describe the physical fabric of a city. It brings together the spatial distribution between the permanent site features such as buildings, rivers, streets, parks, streets and perhaps protected natural areas and a general understanding each features purpose, value or ownership (Lynch, 1981, 47).
Performance Dimension	Certain identifiable characteristics of the performance of cities which are due primarily to their spatial qualities and which are measurable scales, along which different groups will prefer to achieve different positions (Lynch, 1981, 110).

1. Holistic Assessment of Local Public Open-space

In the past several decades, there has been a quiet revolution occurring in the urban and suburban communities around us. It is the design, development, or reinvention of open-spaces by local community members. These projects include community gardens, urban naturalization, and pocket parks. They focus on perceived community needs, as well as aesthetic concern and global responsibility. The results fill a variety of roles and functions.

This hybrid nature makes it difficult to evaluate the success of these projects. The traditional criteria used to assess settlement form do not provide an effective means to interpret these projects. This is because traditional assessment criteria are not adequately designed to measure overall systems environments. In the Landscape Architecture profession, for example, the design of many semi-public spaces focuses on the immediate site characteristics and the needs of the builder. In most cases, the broader implications and impact on the surrounding community is marginally consider.

This client-centric approach often produces exceptional site interventions. However when the project requires a strong social component, as well as design considerations, traditional methods may not be effective. Currently, there are no effective means to evaluate the

site-specific implications of these shortcomings. An alternative assessment technique is required; if the quality of community supported open-space is important.

Objective

The objective of this research is to develop and test a practical measuring instrument, which allows for a consistent and repeatable assessment of open-space projects, built at the neighbourhood scale. The results of the assessment provide a more holistic evaluation of project characteristics and a means to compare open-space projects. The assessment process is not intended to replace traditional design methods or to prognosticate.

Assumptions

There are three assumptions relied on in the following method.

1. The urban or suburban neighbourhood unit is a complex systems environment. It is the result of the interactions between human, physical, and natural systems. Any change to one system will affect the others.

2. Assessing projects will inform stakeholders about possible design decisions and existing conditions. The instrument is not a design alternative.

3. Methods used to measure a complex system environment for one set of goals can be modified to measure the same or similar system environment for a different set of goals. That is to say, experts from a variety of

disciplines have spent significant time and effort refining the principles and practice of system assessments. The basic mechanisms these approaches use are transferable for related applications.

Method

The study is divided into three sections. A research phase, an evaluation tool development section, and an applied testing phase.

The research phase examines existing approaches for landscape assessment from the perspective of several different disciplines. Holistic approaches for interpreting landscape conditions used by sustainable development researchers, are examined for possible application in the assessment of urban open-space.

Findings from the review of approaches provide the basis to develop a more holistic landscape assessment tool. This tool is used to evaluate urban open-space settlement form in a way, which formalize the assessment of an urban landscape from a human and an environmental point of view.

The assessment tool will be applied to a series of eight open-space projects. Results are plotted and compared. A concluding discussion considers the merits of using a holistic open-space assessment evaluation in an urban open-space environment.

Limitations

Several limitations may exist which will affect the quality of assessment produced by this research. These

limitations are divided into methodological and design measurement limitations. The methodological limitations include:

1. The number of projects assessed may prove too small to allow for a meaningful analysis of the assessment results.

2. Concentration of the data through aggregation may over or under emphasize the impact of certain site characteristics.

3. Only overtly successful projects may wish to participate in a study that is interested in measuring the success of community supported open-space projects.

Design measurement limitations include:

1. The choice of indicators assessed may not sufficiently capture vital information.

2. The assessment instrument may not be robust enough to measure a variety of projects.

3. Qualitative research may be interpreted differently depending on researcher experience and bias.

4. Essential site characteristics and cyclical activities, such as migratory visits or annual community events, may not occur within the allotted observation period and be ignored by the researcher.

Strategies to manage or limit the impact of these shortcomings will be discussed during the conclusion along with recommendations for future research.

2. Measurement Approaches

"We measure what we value, and we value what we measure."
(Meadows, 1998, 2).

The success of any public open-space has an environmental design and social acceptance element. Failure of either of these two elements to meet public expectation or design requirements, will result in a site which lacks a 'sense of place' or functions so poorly it becomes under-used. In either case, the result is the same; public amenities become wasted space.

Since wasted space can be attributed to design oversights and/or social planning issues, it is important to assess projects on both merits. This requires a holistic assessment approach. A holistic assessment is one where an integrated appraisal of the individual study components is conducted, providing insight into processes and interactions that are not recognizable when examining the isolated parts. Not only does the holistic approach provide feedback on system behaviour; it improves the likelihood of future project wide improvements, ensures long-term accountability, and formalizes learning opportunities. Little practical work has been done to holistically evaluate sites for their ability to achieve these goals.

There are a number of very good reasons why a holistic approach to project assessments is not used. Primarily, most analysis is done by professionals trained in specific disciplines. Techniques to holistically interpret pluralistic feature and value assessments have not been

within the scope of most professional training. Professional schools and practices stress the need for ad hoc analysis based on their specific training and experience. Ad hoc analysis is built to meet the requirements of the specific situation. It becomes the responsibility of the researcher to seek information, which in their opinion, best describes the needs of the situation. Naturally, they will choose to examine areas related to their own background and expertise.

Ad hoc analysis is far more straightforward, easier to execute and requires less preparation. However, ad hoc analysis does not provide an overall integrated appraisal of the individual study components. For an integrated appraisal, a holistic assessment and analysis approach is required.

Ad Hoc Analysis of Same Site by Three Professionals

Fig. 1: Schematic of Stream - A

Stream when interpreted by a biologist is seen as a series of habitats (Hough, 1990, 70).

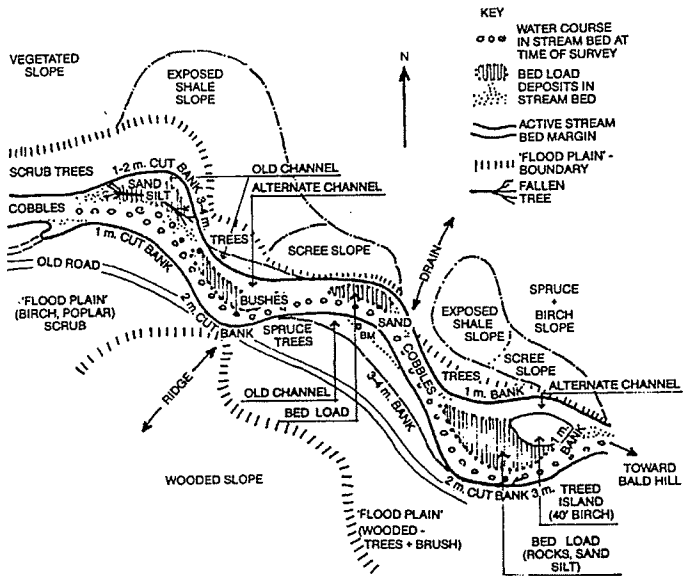


Fig. 2: Schematic of Stream - B

Stream when interpreted by an engineer is seen as a series of conditions to modify and control (Hough, 1990, 71).

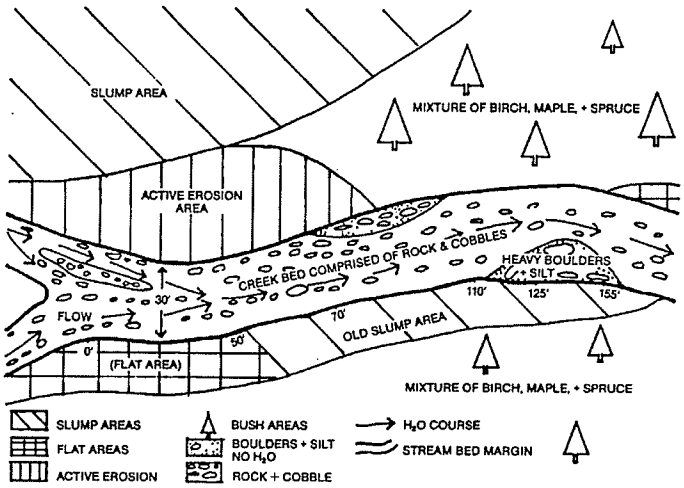


Fig. 3: Schematic of Stream - C

Stream when interpreted by a landscape architect is seen as a series of visual characteristics (Hough, 1990, 71).

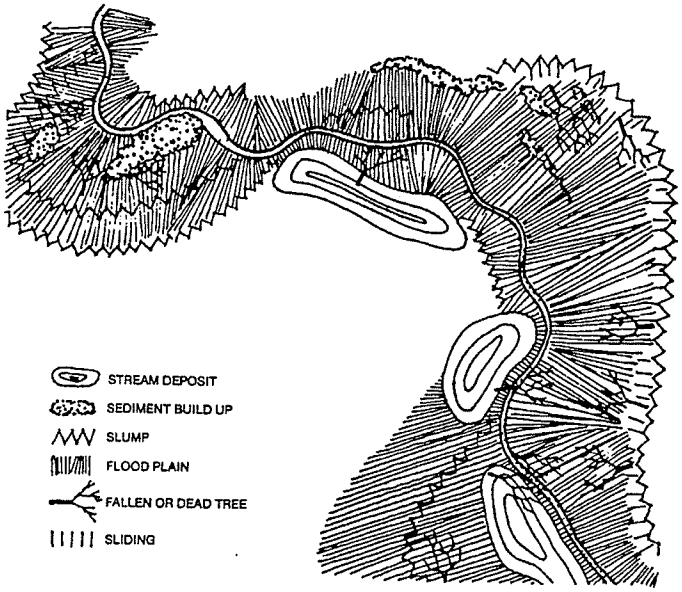


Fig. 4: Photo of Stream

Photo of the actual stream represented in the previous schematics. These images are part of a direct observation and interpretation experiment. They illustrate how training in one discipline can effect direct observation and the understanding of place (Hough, 1990, 73).

Planners, designers, landscape and building architects involved in creating settlement and built form are not immune to the limitations of specialized analysis. The use of constraint mapping provides these professionals with an understanding of the limitations of site. As a reductive process, this activity is limited to breaking system relationships down to discrete components and then comparing the pieces. The resulting interpretation of place is limited to the ways in which a fragmented landscape can be juxtaposed. Essential ques-

tions about what makes good built form, the success of design decisions and predictions for future site requirements often go unanswered.

Evaluating Open-space

Settlement Form*
Sometimes referred to as physical environment. Is generally referred to as the large, inter-related, permanent physical objects of the city: buildings, streets, utilities, rails, rivers, perhaps the trees. To these objects are attached a miscellany of modifying terms, referring to their typical use, or their quality, or who owns them... the spatial distribution of these things is shown on two-dimensional maps. (Lynch, 1981, 47).

There are several theories of settlement form* which could be the basis of a holistic site evaluation. Kevin Lynch uses the limitations of the planning and functional theories as a background to his own, normative theory of good city form.

Planning and Functional Theories

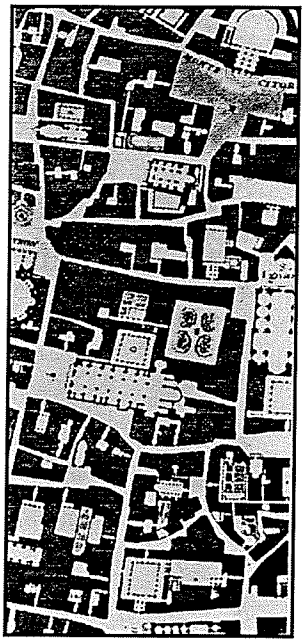
Planning and functional theories are practiced and studied extensively; they will be familiar to planners and architects. Both are primarily concerned with urban history and development prediction. Planning or decision theory considers the processes and approaches used to make decisions about city development. Functional theories consider the resulting settlement pattern and how these spatial patterns affect settlement function.

Lynch recognizes the value of these tools in the creation and understanding of built form. However, he is critical of both theories on several points. Primarily he is concerned that neither can adequately answer nor respond to a holistic a question such as "what makes a good city?" (Lynch, 1981, 36).

He explains that municipal planning practice lacks a strong central agency to guide the comprehensive de-

velopment of the settlement form. Parks, engineering and transportation departments, etc. are all controlled by parties with individual purposes and intentions. When development occurs, compromise not cooperation results, along with unwanted and partially effective decisions. The planning process becomes so entrenched in competing intentions and purposes the resulting city spatial form is lost in the agreement (Lynch, 1981, 40).

Fig. 5: A Functional Interpretation of the City



1768 drawing of Rome by the Architect Nolli. Spaces are interpreted according to function--public spaces (in white) vs. private spaces (in black). This functional division requires generalizations about the nature of public and private. It does not consider the influence class, gender, religion affiliation or time of day have on the concept of public and private (Rogers, 1997, 69).

In contrast, functional theories begin with a predetermined understanding of good city form. This preconceived understanding requires numerous untested value assumptions. Consequently, space is abstracted into convenient containers. When human relationships are included, they are grossly simplified. More specifically, the decision processes around what to value are exclusionary. Decision processes need to reflect that cities are made by families, industrial firms, developers, investors, and utility companies, in addition to, city bureaus, regulators, elected officials, designers, and subsidizing agencies. Finally, most functional theories interpret built form in very static ways; they can not effectively account for continual and progressive development such as the process of learning. The essential non-spatial processes, which provide spatial meaning, are not properly represented by most functional theories (Lynch, 1981, 39).

Normative theory

Lynch feels that there is no adequate contemporary theory to explain or evaluate city form, no systematic

effort to state the general relationships between the form of place and its overall worth. As an attempt to account for the non-spatial values we imbue in place, and the subtle changes to built form which continually result, he sketches an alternative theory from a normative perspective. A normative theory is, by nature, a prescriptive one that is concerned with the rules for correct usage.

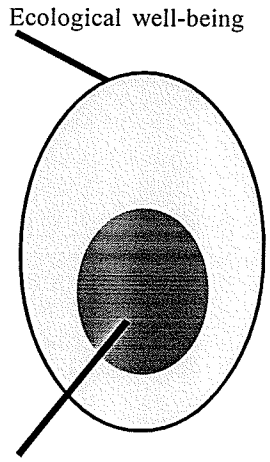
Lynch does not directly presents a testable method or even titles his theory. Instead, he suggests evaluation tactics and guidelines for the holistic assessment of settlement forms. These suggestions are intended to ensure the practical use of his theory will avoid cultural biases, generalizations, and preclusions.

Guidelines are presented as a series of performance dimensions to ensure consistent evaluation design. A performance dimension is a measurable site characteristic, which has a spatial and value component. Five performance guidelines and two points of consideration are presented (see Appendix D). When used collectively, the performance dimensions touch on all the likely interactions between spatial form and human processes. Performance guidelines act as a central agency to coordinate the evaluation of the settlement form. Unfortunately, Lynch provides no testable method to evaluate his normative theory, which may reflect the complexity of holistic measurement.

Measuring Progress Towards Sustainability

A generation ago, there were no effective means to evaluate progress towards sustainability or even define what sustainable development means. Today, there is still no comprehensive agreement on what sustainability means or the best way to achieve it. (Farrell and Hart, 1998, 6). There is however, a general interpretation based on a commonly accepted definition of sustainability. Sustainable development is "development that meets the needs of the present generations without compromising the ability of future generations to meet their own needs" (WCED, 1987, 8).

Fig. 6: The Egg of Sustainability



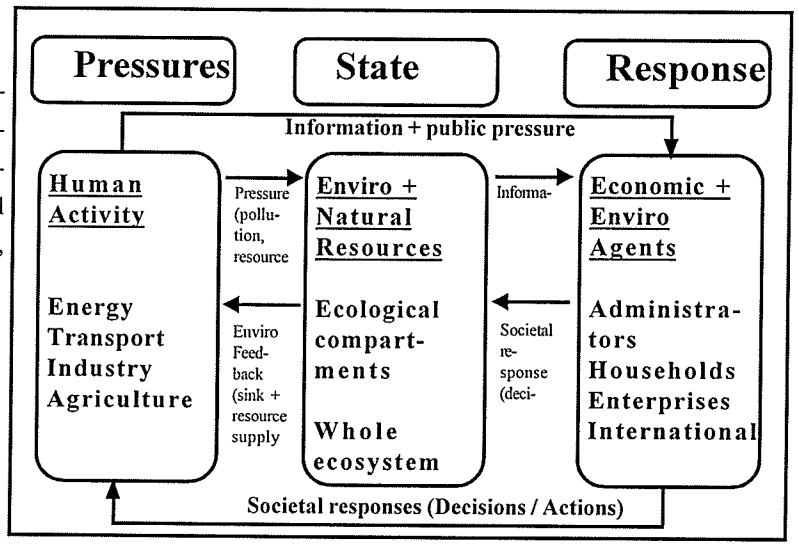
(Chimbuya, Sam, Robert Prescott-Allen, and Diana Lee-Smith, 2000)

Despite various interpretations and on-going debates about equity and resource management, it is commonly held that sustainability must consider the interrelation between human and ecological well-being. This interdependent relationship has been illustrated with the egg of sustainability metaphor. The yolk represents humans, while the white represents the ecosystem. The success of one is dependent on the success of the other. The system improves only when both the condition of the ecosystem and the human condition improve (International Development Research Centre, 1999).

Accepting ecological and human interaction as the basis for sustainability requires a holistic approach to evaluating sustainability because these systems can be so dissimilar. Traditional evaluation techniques employed by researches and policy makers like the pressures-state-response, which could track the impact of one event across many systems, was not sufficient.

Pluralistic assessment models that could adequately address the increased need for broader-based assessment and reporting was required. These new approaches would need to systematically take into account the links among ecological, socioeconomic and policy issues (Meadows, 1998, 3).

Fig. 7: Pressures-State-Response
An example demonstrating a general framework for a Pressure-State-Response model (Hardi and Pinter, 1997, 64).



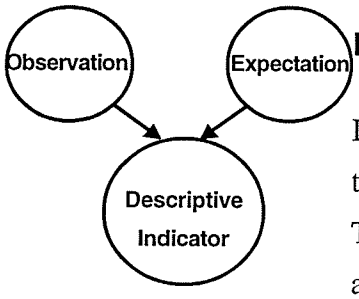
Many contemporary evaluation techniques are based on an integrated environmental assessment strategy. An integrated environmental assessment strives to produce and communicate relevant information on vital interactions between the natural environment and human society (Pintér, Cressman, and Zahedi, 1999, ix). To simplify this complex task, researchers have relied on social and ecological indicators to describe the state of the various systems. Selected indicators are then evaluated. Results are organized into models that describe systems interactions and provide insight into the overall systems well-being. It should be noted,

that there are as many variations for indicator selection and modeling techniques, as there are interpretations of sustainability. Some of the general trends in indicator use will be discussed in the next section.

Fig. 8: Relationship Between Spatial and Ecological Urban Issues
The European Commission's 'Green Paper on the Urban Environment' sustainable urban design model is an example of a holistic approach to understanding local and regional sustainability concerns. This model does not address many issues of human well-being (Carmona,1996).

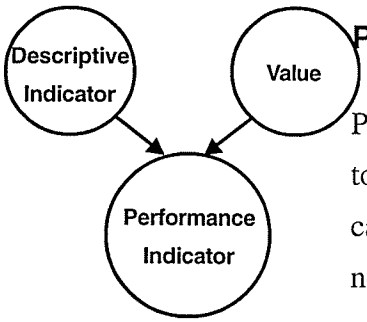
Indicator Types

Indicators are pieces of information that describe the state of a system. We use them intuitively and deliberately to monitor and interpret the complex systems we care about. They can be called signs, tips, grades, ranking, instruments, or measurements. They can be measured quantitative or qualitative; directly or indirectly; and span periods of time. Above all else, they are part of the necessary stream of information we use to understand the world, make decisions and plan actions (Meadows, 1998, 1). In order to understand how holistic models work, it is essential to understand the base unit of measurement 'the indicator'. Two basic types of indicators are used in holistic evaluations, descriptive and performance indicators.



Descriptive Indicators

Descriptive indicators define the qualities and characteristics of a system component we consider important. They do not need to have a controllable performance aspect; they do not need to be valued as good or bad; they do need to be observable. (Prescott-Allen, 1997, 6). The number of shade trees in a neighbourhood is an example of a descriptive indicator.



Performance Indicators

Performance indicators are quite different. They are tools for comparison, incorporating a descriptive indicator and a reference value or policy target. They are not limited by spatial scale or decision-making proc-

The Bellagio Principles
An international consensus of 'best practices' for performance measurement processes. No similar body of work has been developed for use in landscape design (see Appendix C).

esses (Hardi, 1997, 10). For a performance indicator to be effective, the performance aspect must be a controllable, measurable component. The sun rising in the east each morning is not a performance indicator because nothing can affect it. The orientation of windows designed to capture the morning sunlight can be evaluated as effective or ineffective, good or bad. It is a performance indicator.

Another important aspect to consider when understanding performance indicators is the concept of using performance as a common unit of comparison. Evaluating all pertinent indicators using a common performance scale allows a traditional unit for comparison, like money, to be compared with biotic levels in soil, if a performance value can be assigned to both indicators. The performance value can be boolean, or have a thousand degrees of variance. It is essential that the assessed characteristics be rated on a fixed measurement scale to ensure comparisons are consistent (Prescott-Allen, 1997, 5). This approach, using performance indicators to evaluate otherwise dissimilar items is similar to Lynch's concept of the performance dimension, however Lynch's concept is not nearly as well developed as the performance indicator.

Indicators in Practice

How something is said is as important as what is said: this is also true of indicators. Indicators need to be chosen carefully if a relevant description is to be cre-

ated. The following checklist provides a guideline for the selection of responsible indicators (The Community Indicators Handbook, 1996, 25).

Relevant - Is the indicator describing something meaningful to the research or community members?

Valid - Can the indicator be justified in logical or scientific terms?

Credibility - Does the data source reinforce or detract from the indicator's credibility?

Measurable - Is there available data relevant to your geographic area? If this is not readily available, a practical method of data collection or measurement must at least be possible.

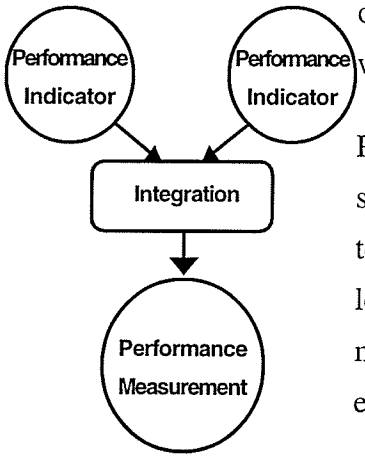
Consistent and reliable - What is the likelihood that this indicator will produce quality data over an extended period of time?

Comparable - Is the indicator used in other analysis? Could specific indicator findings be used for comparison with other communities and other studies?

Understandable - Will the indicators be easily interpreted by residents of the community? Choose indicators, which are clear and obvious.

Performance Measurement

An individual performance indicator can be powerful, but is not informative. The number of trees infected with Dutch Elm disease is important, but can not be



used exclusively to describe the overall ecological state of the mixed forest these trees are found in. To do so would be alarmist.

Performance indicators need to be combined into a suite to provide an educated understanding of the systems' interrelations and an estimate of its status. This level of indicator integration is called a performance measurement. The performance measurement is a powerful tool for critically summarizing findings.

As an example, Table 1 shows six performance indicators for the Madagascar ecosystem. This diverse set of performance indicators could be reviewed as an independent set of items or combined into a performance measurement. It becomes immediately apparent that unless this information is amalgamated into some type of coherent structure, broad-based questions about the overall systems status are very difficult to answer. This limitation becomes far more significant as the amount of gathered information increases. An overarching structure to combine performance indicators becomes the only way to manage, interpret, and analyze the data (Prescott-Allen, 1997, 3).

Table 1

Madagascar's Ecosystem (non-integrated indicators)

Issue	Indicator	Result
Ecosystem		
pressure on water supply	water withdrawals as a percentage of supply	4.8%
greenhouse gases	carbon dioxide emissions per person	0.02 tonne
pressure on forests	annual change in forest area	- 0.8%
People		
health	life expectancy at birth	56.5 years
literacy	children reaching grade 5	28%
gender equity and education	male/female difference in male enrolment combined primary/secondary school enrolment rations	3% higher than female enrolment

Modified from (Prescott-Allen, 1997, 3)

A note, the resulting performance measurement is not intended to replace traditional design or decision making processes. The performance measurement is an additional test of diligence when reviewing previous decision-making or confirming the validity and pertinence of goals and objectives (Hardi, 1997, 10).

Applying Performance Measurements

Rather than develop similar models, from scratch, for use in the assessment of public open-space, it is sensible to build upon this existing body of holistic performance measurement research and experience. Sustainable development researchers have had more than ten years to apply performance measurement to their progress towards sustainability practices.

How applicable is an indicator method used for assessing urban sustainability, in the assessment of urban open-space? First, it is important to keep in mind that descriptive indicators, or landscape characteristics, are independent of the values we attach to these landscape features.

Both sustainable researchers and open-space designers work with the same landscapes and look at many of the same features. It then becomes a question of determining if the values each group is interested in understanding are transferable. If not, the tests and performance measurement techniques used by sustainability researches will be of much less direct value.

At a basic level, the values and ideas, which motivate sustainable development models, are believed to insure the mutual human and environmental well-being without compromising the future well-being of the ecosystem. These include social, economic, environmental and cultural concerns.

Quality of public open-space is motivated by those ideas and values which use design to provide human well-being, while balancing the physical characteristics for specific landscapes. This does not mean that broad sustainability issues are not important to the landscape designer.

Many of the underlying values that motivate sustainable development also define public open-spaces design.

- Both perspectives recognize that our well-being is connected to the status and well-being of our surroundings.

- Highlight the need for a long-term perspective.

- Recognize that the ultimate success of a project is governed by all sectors of the community or, in the case of sustainable development, by society.

The strategic choice of sustainability researchers has been to evaluate space on an ecological and humanist basis. The landscape designer's quest to evaluate and design a site's 'sense of place', also strives to understand the site in ecological and cultural terms. Both groups are interested in interpreting landscapes in very similar ways, yet towards different ends.

Since these disciplines share common subjects of interest, it is conceivable that much of the practical efforts to interpret our progress towards sustainability may be applicable to the landscape designer's efforts to interpret a site's 'sense of place'.

Performance Modeling

A variety of approaches have been developed to assess the pluralism of values and characteristics which describe an ecosystem. In systems, which have multiple values and multiple assessment criteria, the type linkage that is analyzed by functional theorist is not enough. A framework is often required to manage the collected information. A framework is a structure or tool that is used to provide supports or order to a group of ideas. When applied to a set of systems characteristics or values, a framework can assist in providing a comprehensive evaluation and in clarifying many issues (City of Winnipeg, 1998, 4).

How well the framework organizes and presents data plays a significant role in a researcher's ability to interpret and analyze information. An effective framework will clarify the scope of analysis and can provide unique insight, not available through a segregated examination of component parts.

Once established, the framework should remain constant. One of the advantages of using a framework is that when research data is processed, it is converted into a predetermined scale and format. This gives the opportunity to easily and consistently overlay multiple evaluations and analyze for trends, patterns, or inconsistencies. Selecting a framework, which is robust enough to interpret and manage data sets from a variety of projects is essential if longitudinal or survey studies are required.

Assessment Frameworks

No single framework has been adopted as the benchmark standard for evaluating sustainable development. A variety of methods and techniques compete for general usage (Farrell and Hart, 1998, 8). As discussed earlier, most techniques combine a series of predetermined indicators, and then organize the findings within some sort of presentation framework.

The method used to combine and present data is guided by two decisions: what one wishes to know and how one wishes to use the information (Farrell and Hart, 1998, 7). In cases where progress towards sustainability is evaluated, what one wishes to know often relies upon the classic definition of sustainable development, "development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" (WCED, 1987, 8). Consequently, there is interest in interpreting the relationship between human and ecological well-being, over a period of time. These themes of human and ecological well-being are present to all the models reviewed.

The other factor determining how indicators are evaluated and interpreted is the needs of the intended viewer. Policymakers, the public, and researchers represent three basic viewer audiences, each with there own information requirements.

The policymaker might be thought of as a reader who wants clear summary information for validating policy

objectives, evaluation criteria, and targets. They are seldom interested in personally analyzing data. Nevertheless, they may wish to understanding the techniques involved in modeling the data. The public has the most basic needs and generally requires findings be presented as simple, clear, unambiguous messages. Finally, researchers are interested in seeing the raw supporting data and analyzing it for themselves (Farrell and Hart, 1998, 7).

The frameworks reviewed and evaluated for this study will be intended for use by a policymaker audience interested in assessing the quality of public-open space. They will be evaluated on the following criteria (The Community Indicators Handbook, 1996, 25):

Relevance (to open-space): Is the framework designed to include values or examples about human well-being, ecological concerns, and design considerations?

Consistency (of assessment): Is the process consistently repeatable over a period of time or across a series of landscapes?

Readability: Does the presentation of performance indicators allow for a quick and intuitive interpretation by the public and policymakers?

Transparency: Will the reader be able to make a clear connection between the results and the measured system components? This is effected by the processes used to integrate descriptive indicators and values.

Framework Selection

Four different frameworks used to evaluate progress towards sustainability are reviewed and evaluated as potential templates for modeling landscape quality inquiries.

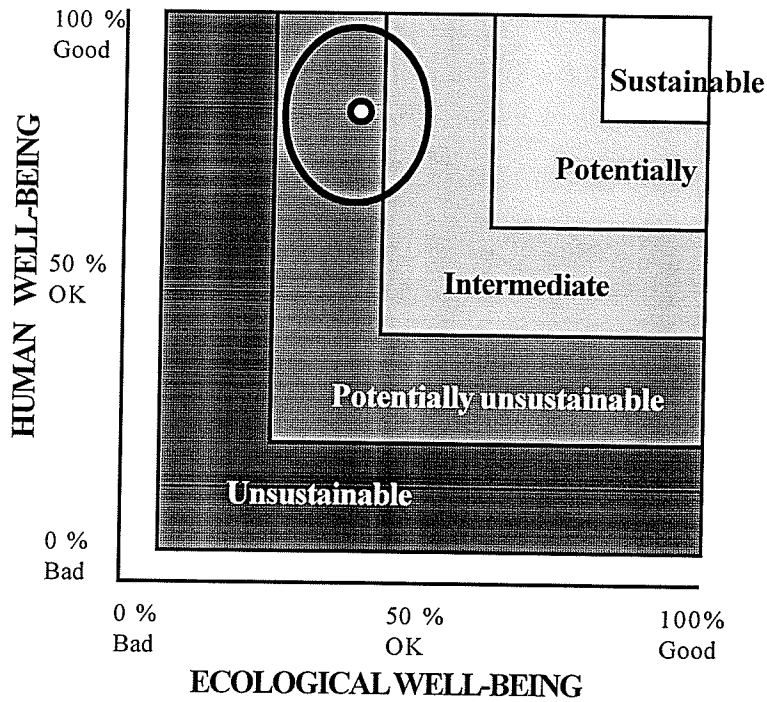
A. Barometer of Sustainability
B. ABC Model
C. Systems Orientation Method
D. Dashboard of Sustainability

The models have been chosen because they represent significantly different approaches to assessing and presenting performance evaluations. They have also been tested in practical applications. A description and the merits of these different approaches are discussed on a case-by-case basis in the following section.

Note: the Dashboard of Sustainability has been used in many applications, but not formally tested for sustainability evaluations.

A. Barometer of Sustainability

Fig. 9: Barometer of Sustainability
An example of a Barometer of Sustainability designed to assess the Manitoba Prairie Ecozone (Prescott-Allen, 1997, 7).



The barometer of sustainability organizes and combines indicators to draw conclusions about the interactions between people and the ecosystems. It is an engaging and visually appealing tool, providing an immediate picture of human and ecosystem well-being together.

The barometer is a performance scale with two axes, one for human well-being, which includes economic, community and human life indicators and the other for ecosystem well-being, which includes indicators for the natural environment. Both axes range from zero, the worst possible performance for any given indicator, to 100, the best possible. Indicators are expressed between 0 and 100 as points on their respective axes. Human and ecosystem well-being are calculated sepa-

rately to provide performance indicators which provide x and y graph coordinates. This means that an improvement in one index does not mask a decline in the other. The axes approach ensures the worst condition is graphically represented.

Where these two points intersect determines the performance measurement, which is the level of sustainability. A buffer area around the measurement point is intended to provide a graphic representation of the potential error factor. Finally, the presentation graph includes a series of performance thresholds, i.e. poor, good, excellent. This helps give the tool an external reference for comparison with accepted norms. Performance measures can then be grouped in desirable, acceptable and unacceptable categories (Manitoba Environment, 1997, 77).

Advantages

The barometer is a common and ancient tool to monitor and accurately predict climatic change. As an environmental messenger, the metaphor of the barometer is seen as impartial reporter. It responds to changes in a systems state and is not capable of holding partisan views.

In practice, the Barometer of Sustainability displays information in a clear and understandable manner. The graph is a widely accepted presentation format in academic and business settings, making the results familiar and easy to interpret. Relating the x and y axis to human and ecosystem well-being is easy to understand.

Overlaying multiple evaluations displays clearly discernable patterns of change and trends. This reinforces the understanding that human activities and the ecosystem processes are interdependent.

Limitations

To insure successful aggregation of information the researcher performs considerable interpretation that may not provide repeatable criteria. The interpretation process is far from transparent, making it difficult for the reader to understand the value judgments used to describe target data. Finally, the ellipsis, which is graphically used as an interpretive buffer around the performance measure, may not be equal in other test environments.

Practical Application

A documented use of the Barometer of Sustainability is the evaluation of Manitoba's Prairie ecozone. The purpose of the study was to evaluate real issues that concern people and organizations in the ecozone (Government of Manitoba, 2000).

A series of meetings between government experts and stakeholders produced 51 human and 54 ecological indicators. Indicator tests for these 105 indicators were then created and field tests were made. The results were evaluated and aggregated to form a performance measurement which was graphed. Overall performance was then rated between sustainable and unsustainable (Government of Manitoba, 2000).

Implications for use in Open-space Assessments

Relevance – High

The Barometer of Sustainability is a highly flexible assessment tool. It is capable of incorporating a variety of performance indicator data including the contradictory values held by various stakeholders. Open-spaces serve a wide variety of functions and roles, to evaluate a series of open-spaces or a single open-space over a period of time requires an eclectic range of performance measurements.

Consistency – High

Performance indicators and additional weighting control is determined before evaluations are conducted. They are not changed or adjusted to suit the character or conditions of the site. Pre-determined choice of indicators provides continuity and constancy for the evaluations. The prescribed weighting system based on evaluating upper and lower performance guidelines may not be useful because it requires an established baseline. This may limit the variety of projects that can be compared.

Readability – Medium

The visual nature of the graphic presentation is very straightforward. One point represents one project. This point can be used to reference human and ecological indices. However, analyzing a project for relevant pur-

poses, such as quality of design, is not possible without examining the individual performance ratings. In the case of a landscape assessment, which serves a variety of functions and is regularly interpreted through multiple perspectives, this is a limitation.

Transparence - Low

The computations, which provide the performance ratings, are intended to be simple and straightforward representations of the performance criterion. To be graphically represented, these values must then be aggregated before they are presented. This removes the opportunity to see how individual indicators effect the overall system. It also may be difficult for the viewer to separate a known performance measure of one indicator against a composite that demonstrates a very different overall performance rating.

B. ABC Model

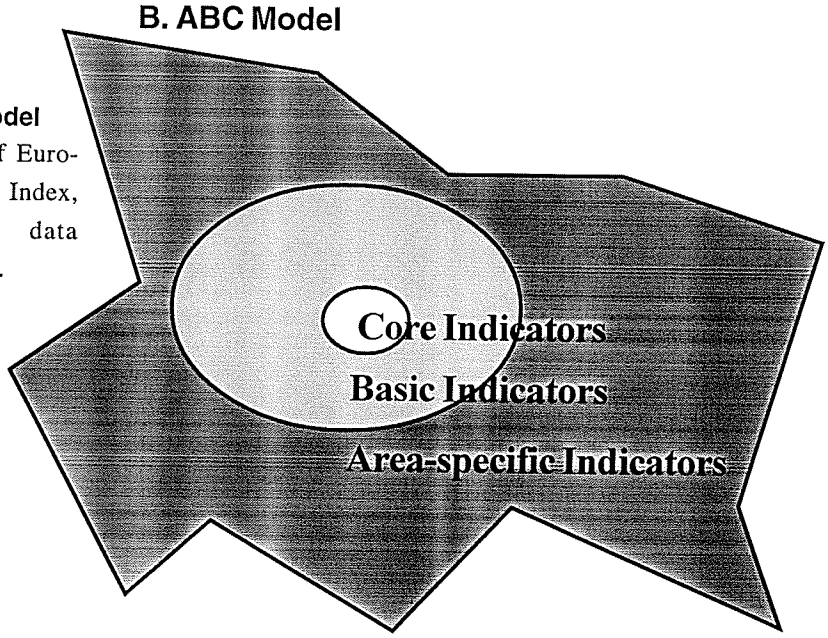


Fig. 10: ABC Model
Visual modeling of European Sustainability Index, 'ABC' indicator data (Deelstra, 1995, 3).

This approach was developed in Europe to reflect an evolving European Sustainability Index (ESI). The ESI uses six 'container issues' to describe an image of an environmentally sustainable city. The container issues are: healthy air, safe streets, good house keeping, greenery, environmentally compatible management, and sustainable use of resources (raw materials, water, and energy). All containers reflect aspects of sustainability, which are concrete and measurable. Note: See Appendix A for a more complete description of the ESI's indicators (Deelstra, 1995, 2).

Core and basic indicators are generic, pre-defined and applied universally. The Area-specific indicators reflect specific site issues. Area specific indicators are chosen to reflect unique local qualities. ABC is an acronym.

Area-specific Indicator Set- developed by local organizations and authorities to highlight and evaluate the specific problems, conditions, or features of the area.

Basis Indicator Set - a limited set of indicators, identical for every city; that can be used for comparison then allows for a balanced policy toward sustainable development.

Core Indicator Set - formed from a small group of indicators, these indicators are viewed as essential for policy development. The core indicators form the European Sustainability Index and provide minimal information to measure local sustainability (Deelstra, 1995, 9).

Advantages

The model is designed to be applicable to a variety of contexts. It provides a simple graphic presentation for interpretation. Choice of Area-specific Indicators are site dependent and compensate for site variance. This allows for a diverse set of indicators to be applied. The nesting relationship, which describes the interactions between different indicator suites, is clearly graphically implied.

Limitations

By nesting indicator suites, using a radar mapping technique (see Figure 10), each indicator is presented as a discrete evaluation. This presentation approach references the egg of sustainability model (see Figure 6). However, it is very difficult to interpret the interactions between indicator suites. In addition, the Area-specific indicators are defined on a site by site basis, and are not necessarily consistent through out the study. Therefore, it is difficult to be assured that comparable analyses are being made over time or across sites.

Like all aggregate approaches, it may be difficult to understand the relationship between the indicator and overall system performance.

Practical Application

The ABC model has been used for a variety of sustainability research studies (Local Sustainability Project, 1995). An important study conducted for the 'Global

Environmental Outlook' compared 12 European cities and produced "an interesting insight into the European situation in general" (Deelstra, 1995, 5).

The model was able to organize many descriptive and performance indicators, providing a clearer picture of the city's sustainability. However, the cities surveyed did not feel that the indictors sufficiently described the communities. Recommendations for revisions to the assessment criteria were made. This is important because one of the essential features of the model is the ability to allow the evaluated community to select up to a third of the measured indicators. This suggests that selecting site specific indicators will not ensure a representative study. The study concludes that cities feel a better use of this model would be to provide a framework that allows cities to compare urban sustainability experiences (Deelstra, 1995, 6).

Implications for use in Open-space Assessments

Relevance – Low

Cities tested with this model did not find the method as relevant as they had hoped. Perhaps allowing the host community to directly contribute to the indicator suite sets unrealistic results expectations. Regardless, this suggests the model is not overly relevant to the end user interested in site specific analysis. In addition, no distinction is made between how different types of indicators will be used. Descriptive indicators could be included that have no effect over the performance

measurement results. This may be misleading and irrelevant to communities interested in developing or evaluating policy and planning decisions.

Consistency – Medium

The A (Area-specific indicators) are determined by the host community and represent up to 1/3 of the indicators measured. They may be completely different from site to site, significantly compromising the overall consistency.

Readability – Low

No reference graph is presented and it is difficult to compare multiple assessment sessions. In addition, the relationship between the three indicator suites must be inferred by the viewer.

Transparency – Medium

It is difficult to separate the performance of one indicator from the overall systems rating. Segregating indicators into the ABC indicator groups is helpful, but still limited.

C. Systems Orientation Method

A systems orientation method is a holistic technique of performance measurement. It is the only method that attempts to intentionally find and include only the fundament interests of each essential system within the systems environment (Bossel, 1999,107).

Rather than selecting indicators based on the researcher's experience or education, and then using an aggregated technique to translate descriptive indicators into comparable terms, indicators are organized according to fundamental environmental properties and fundamental interests or orientors. These orientors, such as, existence, freedom, security, are not considered directly measurable (Bossel, 1999, 26).

Orientors provide a framework to organize potential indicators. They act as a reference guide to ensure essential indicators are included. According to Bossel, "In this structured approach, based on systems theory and empirical evidence, we can be reasonably certain to obtain a comprehensive set of indicators covering all important aspects of systems viability and sustainability" (Bossel, 1999, 62).

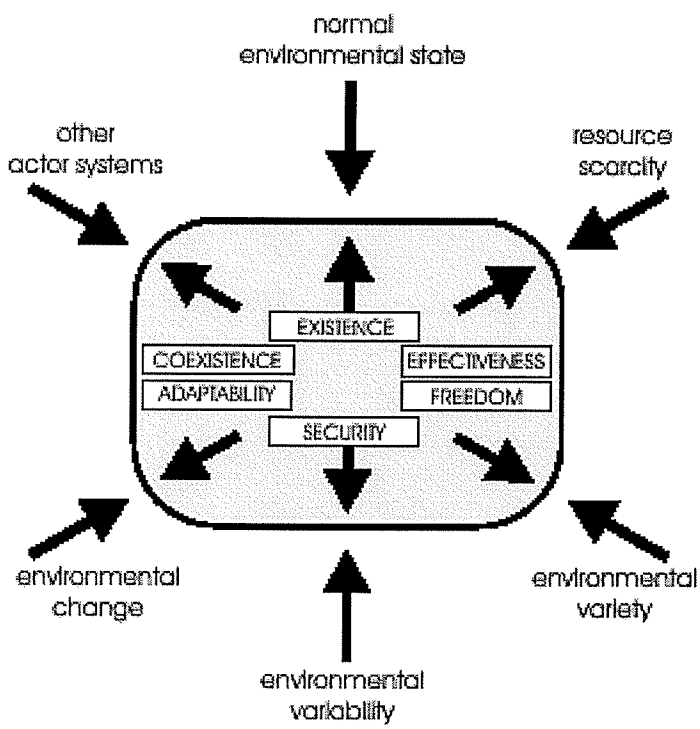


Fig. 11: Properties and Orientors
Fundamental environmental properties acting on system orientors (Bossel, 1999, 27).

The technique produces a variety of viable indicators for any single orientor. Candidate indicators are then evaluated through a series of averaging and concentration techniques to determine which indicators best represent the target orientor. This approach is used to ensure that all of the orientors are equally and adequately represented. "Potentially this may minimize the danger of overlooking essential areas or overemphasizing others" (Bossel, 1999, 109).

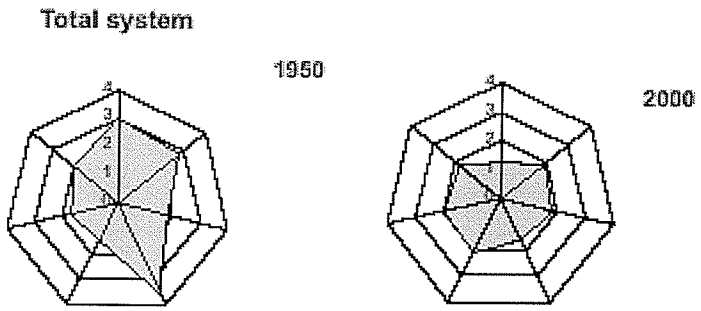


Fig. 12: Graphing Results
Star graph showing the overall condition of world in 1950 and 2000. The graph is a composite of orientors of human, support system, and natural needs satisfaction (Bossel, 1999, 83).

Once the indicators are selected, they need to be quantifiable, if they are to be measured. An indicator is measured by assessing how well it satisfies the requirements of the orientor it represents. This is done on a scale of 0-4. Four represents total satisfaction of the orientor. Zero represents total dissatisfaction e.g. national freedom: number of boarder crossings made in a year compared to the country's population. The results can be plotted individually or integrated and plotted through a variety of concentration techniques.

Advantages

This is the only performance measurement approach that provides an intentional framework to collect information on all of the essential systems of an environment. Consequently, the product may serve other research and evaluation purposes not initially intended by the designers.

The notion of central organizing principles that orient activities in an ecological system is appealing. If an underlying structure is inherent to human subsidized ecological systems, periodic use of this tool will provide additional quality assurances of more simplistic in-field performance measurement techniques. It may also provide insight into the success of new or existing projects by identifying gaps in the underlying project structure.

Limitations

The idea that there is a complex yet understandable prototype system upon which all human interactive systems are based is lofty and complex. The method is difficult for many to understand; this is compounded by the complex indicator selection and evaluation processes.

In practice, a variety of vital informations is essential for the analysis. Gathering this scope of information is a complex and resource intensive exercise. Adequate collection of such a diverse group of indicators requires significant expertise in all system components. A large research team may be required for an effective assess-

ment (Bossel, 1999, 57). Since a large group of specialists is required to setup and perform the evaluation, this instrument may be best suited as an academic or think-tank tool to provide quality assurance or cross-reference existing findings.

Practical Application

Bossel using a series of 42 indicators has tested the method. Data has been taken from the Worldwatch Institute database using information from 1950-2000. The presentations of the results are broken down in systems groups and presented as a complete integration.

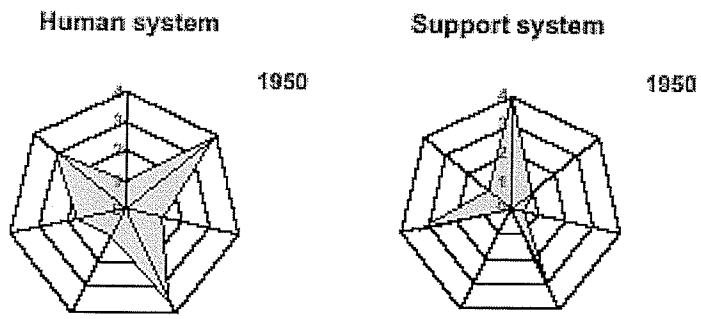


Fig. 13: Mapping Systems Orientors
Dividing the systems environment into human and systems orientors provides a clearer understanding of how systems interact (Bossel, 1999, 82).

Implications for use in Open-space Assessments

Relevance – High

The model is designed to use data from all aspects of the system. As long as the system orientors, fundamental environmental properties, and indicators are correctly selected, vital aspects of the system should be represented.

Consistency – High

The model is very complex, requiring a broad range of indicator data. As long as the indicator data is adequate, the findings should be consistent.

Readability – Medium

This radial graph presentation is generally readable. The inclusion of a measurement scale and integration of the data into a single mapping, presents the data holistically and greatly reduces the viewers need to interpret findings. However, the overall interpretation of the findings is still very subjective and dependent on the viewer interpretations of a single, yet complex shape formed by the plotting the indicators.

Transparency – Medium

An effort has been made to present indicator mappings according to themes or suites, as well as holistically. This demonstrates that a system orientor evaluation can be interpreted at various stages of data concentration, giving the viewer insight into system interactions, as well as, an evaluation of the overall systems performance.

Until the mapping technique for individual systems is further developed, functionality will be limited to general impressions by those who view the results, and as an appreciation of a systems architecture by these who review the underlying evaluation method.

D. Dashboards

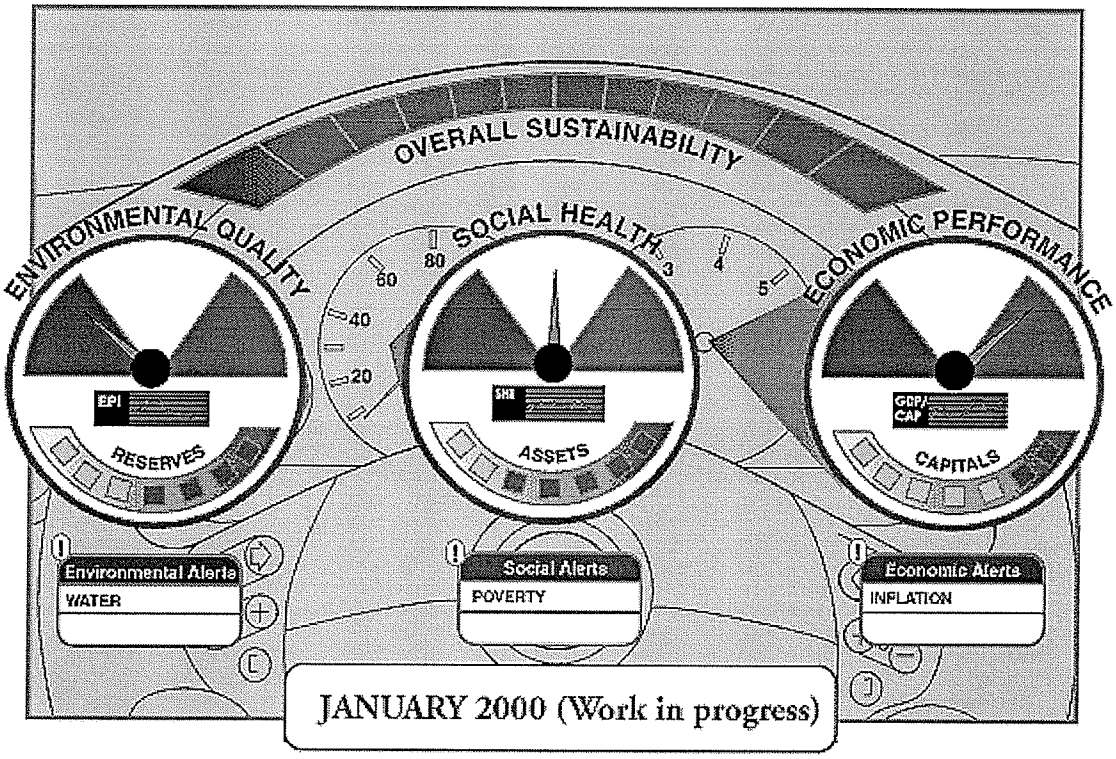


Fig. 14: Dashboard of Sustainability
An interpretation of a potential sustainability dashboard design (International Institute of Sustainability, 2000).

The dashboard is one of the most widely used means to monitor systems environments, yet only recently has the dashboard concept been applied to sustainability reporting (Hardi and Atkisson, 1999, 2). The key to the dashboard is the ability to present a series of different evaluation scales grouped into a visual cluster. Multiple overviews of the systems status and performance are presented without causing information overload. This allows the viewer to focus on issues, trends, and priorities (Microsoft, 2000).

The automobile dashboard is a useful example to explain how a dashboard can report on a systems environment. The typical automotive dashboard allows the driver to monitor and evaluate all major automotive systems, as well as, the overall systems status. There

is a variety of different gauges and warning signals used to accomplish this. Each one is designed to provide system status or performance feedback on a particular critical system(s), with an appropriately representative graphic interface, at a particular scale. For example, the emergency brake light indicates that the emergency brake is engaged and reminds the driver to release the brake when driving; otherwise, the braking system could be damaged. This information could easily be displayed on a speedometer type dial, however the amount of information presented would be extraneous and gauge would become irrelevant. A well thought out visual presentation gives the dashboard credibility and the evaluation clarity.

Advantages

The dashboard is a familiar and well-established performance measurement presentation style. It has been adopted for use with a variety of systems environments. The clustering of different status and performance indicators allows the viewer to focus attention on different aspects of the system, while gathering an awareness of overall systems performance. When gauges are well designed and reference appropriate source information, effective and timely feedback is assured, as well as, an intuitive understanding of system interactions.

Limitation

While systemic aggregation and holistic performance measurement can be built into the overall design, as in the Hardi proposal (see Figure 14), the dashboard is intended to group information by relationship, in concentrations the user can readily interpret. When only one systems environment is being monitored, this may be preferred. However, when a series of evaluations need to be compared, the number of aggregates the user is viewing increases by the number of performance measurements presented on each dashboard. The opportunity to see trends and patterns in larger scale comparisons is lost when too much data is presented.

Practical Application

To date, there is only an agreement about how a sustainability dashboard should be designed and function. The agreement has been structured as a series of seven objectives as follows (Hardi and Atkisson, 1999, 2-3):

> **Audience:** The dashboard must be intended for use by a general audience and by decision-makers.
>
> **Aggregation:** A limit has been placed on presenting no more then three aggregate clusters, and possibly an overarching single super-aggregate as well.

Data Clusters: Only three data themes should be presented. The three themes can be broken down into seven sub-themes.

Graphic Presentation: The graphic presentation should be simple and high-impact, allowing for varying interpretations.

Stocks and Flows: Stock and flows (or performance) should both be graphically presented. To avoid confusion they should be illustrated with different types of meters such as fuel type gauges and speedometers.

Alerts and Warnings: The presentation must also provide warnings of critical thresholds or changes not visible due to information concentration techniques such as aggregation.

Multimedia: The dashboard should be presentable through a variety of media, too effectively and efficiently reach the widest audience possible.

Implications for use in Open-space Assessments

Relevance – Low

In cases where a single landscape is being monitored, the dashboard would be highly effective. Indicators could be clustered according to design considerations, ecological well-being, community interest, etc. Where this data is intended to provide a baseline or is being

compared with a series of sites over a period of time, the presentation offers too much information and becomes far less effective.

Consistency – Medium

If the indicator tests have been well constructed, consistency should remain high across all sites since all sites will be tested for the same group of indicators. However, because the viewer is given the opportunity to interpret the indicator clusters, there is no guarantee that projects will be interpreted consistently or subjectively.

Readability – Medium

On a case by case basis, the dashboard is very readable, as long as the viewer is skilled in how to interpret the data. As the number of dashboards or projects increase, it will make the indicator interactions less legible and less relevant.

Transparency – Medium

Using a performance measurement for multiple aggregations will give the viewer a broader understanding of the performance measurements overall effect. This is useful in a setting like a landscape, where system status is the result of complex and multiple indicator interactions. However, the dashboard does rely extensively on methods to concentrate information before presentation. It is unlikely that the viewer will be

able to infer the underlying individual performance measures although these measurements may be used multiple times during the presentation.

Presentation Model Selection

Each model has its strengths and weaknesses. Table 2 summarizes the evaluations of each model for distinct comparisons. Of the four performance models presented, the two which best meet the evaluation criteria are the System Orientors model and the Barometer of Sustainability.

Table 2

Assessments of Performance Measurement Frameworks

Method	Relevance	Consistency	Readability	Transparency
A. Barometer	H	H	M	L
B. ABC	L	M	L	M
C. Systems	H	H	M	L
D. Dashboard	L	M	M	M

H = high, M = medium, L = low

The Systems approach, by definition, provides the most complete and comprehensive type of evaluation because it "describes the state of satisfaction of the fundamental interests of each system (within the environment)" (Bossel, 1999, 121).

Defining an indicator set that represents a complete cross-section of all the systems in an environment is not an easy task. It requires detailed knowledge of all the systems within the environment and an understanding of how each system functions. Achieving this degree of refinement is a complex task, requiring considerable analysis, which may be beyond the scope of all but a multi-disciplinary research team. According to Bossel, "It is essential to bring in a wide spectrum of knowledge, experience, mental models, and social and environmental concerns to ensure that a comprehensive indicator set is found for a given application" (Bossel, 1999, 57).

The complexity of this method is not limited to indicator selection, once the systems, sub-systems, and essential indicators have been identified and selected. Sufficient resources must be allocated to collect and evaluate all of the information. Again, this process requires expertise, and knowledge on the part of the researchers.

Alternatively, the Barometer of Sustainability can function within a less rigidly defined indicator suite. Indicators are selected and measured because they meet the requirements of one of the barometer's two axes themes; not because they represent a fundamental aspect of a related system.

Simplifications of the indicator selection and assessment criterion are a benefit, especially when making initial or periodic evaluations or involving the public. With increased simplicity, there is however, the need

for additional diligence in assuring that the systems being evaluated are sufficiently represented by the selected indicators.

Since this study of public open-space, is intended as a 'trial balloon', to see if a holistic assessment of open-space is possible, and if so, how effective the chosen holistic approach is. It seems the best choice for an organizing and presenting framework is the Barometer. In subsequent studies, when a more complete understanding of open-space systems interactions are developed, the Systems Orientor approach may prove useful to validate the evaluation technique and resulting assessments.

Note about the Dashboard model: The dashboard is a presentation technique, combining systems data and then allowing the viewer to interpret the results and interactions. Consequently, a dashboard could be used to present any data combining approach or to display the results of other modeling techniques. Systems Orientors' method would particularly benefit from a dashboard presentation since so many systems are represented in a Systems Orientor evaluation. However, it is also possible that confusing or ambiguous messages would be interpreted by the viewer because they are not fully aware of how a particular system functions. For example, when evaluating the health of an urban ecosystem, increases in local wildlife population may validate the efforts of a conservation program that increases a certain type of habitat. The reintroduction of specific wildlife population may upset local residents and reduce the perceived quality of life. One gauge

will be warning of a potential problem, another may suggest significant improvement. A comprehensive gauge rating overall well-being may appear unchanged as the two issues cancel each other out.

Unless the viewer has an intimate knowledge of how the gauges were developed, evaluated, and presented, misleading conclusions may be formed. This suggests that effective use of a dashboard model requires a mature understanding of the environment of the system being evaluated.

3. Defining Public Open-space

A limitation placed on this study has been the decision to only study community built public open-spaces.

This section will look at ways public open-spaces can be defined, the essential characteristics of these open-spaces, and how to apply this understanding to holistic evaluations.

Contemporary Landscapes

The defining characteristic of many landscapes in the postwar era has been a striking homogeneity in the appearance and character of settlement form. This is the result of: a desire to surround ourselves within controlled, constructed environments and the standardization of design processes, material manufacturing, and construction techniques.

This condition is especially true in urban and suburban environments, which are constructed almost entirely of spaces created through human effort and purpose (Relph, 1976, 20). These artificial surroundings are examples of 'governed' landscapes because they are controlled by humans to the extent that they would revert to entirely different forms if it were not for continued human intervention (Bertollo, 1998, 33).

With this approach to urban place making, there is a tremendous focus on built structures and the open-spaces associated with these buildings. This occurs to such an extent that most public and semi-public spaces,

such as roadways, parks, and underused lots are left solely to the development and care of civic agencies or ignored when ownership cannot be clearly determined. Hough interprets the importance of certain buildings and private spaces as examples of the 'pedigree landscape'. Pedigree landscapes hold a high value in the public mind as an expression of power; hold significant aesthetic and civic value; and negate the environment, symbolizing the separation between town and country. (Hough, 1984, 7)

One exception to a pedigree interpretation of urban landscape or townscape is the development of community supported public open-spaces. These spaces are often highly prized by the local community, yet lack wider civic importance they are often seen as a way to restore or heal the linkage between the community and the environment. This speaks to the distinct relationship between people and the communities in which they live.

Community Supported Open-space

Community supported open-space requires the citizenry to take an active role in the stewardship of specific sites. This involvement is seldom spontaneous. Active participation in the creation and maintenance of open-space often occurs as a reaction towards the perceived state of the community and changes to the surrounding physical environment.

These reactions can be thought of as either positive or negative feedback within the neighbourhood system

(Meadows, 1998, 30-33). Negative feedback loops are attempts to reverse the change processes affecting a system or community. For example, the mature trees in a local park have reached the end of their expected life span and are now dying. The community chooses to plant new trees to replace the old ones as an attempt to maintain the visual character of a local park. A positive feedback loop is the opposite condition, where a progression of changes is encouraged and leads to a new state of balance. A new community garden project requires two small garden plots to provide sufficient space for growing plants. The season proves successful and more people want to participate. The next year, five plots are prepared. This continues until the entire site is used for gardening plots.

Regardless of the feedback mechanism, the resulting interventions are seldom well publicized or documented and therefore, as an outside observer, difficult to locate and identify. Directly tracking the activities of these grassroots groups when no public reporting stipulations exist is difficult.

It may be easier to track the administrative activities of the support agencies responsible for supporting project development. Since many grassroots activities are defined in response to specific concerns, these groups tend to lack the formal structure or regulations governing businesses and organizations.

Grassroots Development Requirements

Most development or redevelopment of open-space requires materials, services, and labour. Services and labour are often subsidized by the community and seldom supported or tracked by other agencies. Material requirements are often more difficult for the community to directly subsidize. Consequently, there are numerous community and/or environmental conscience agencies, which provide supplementary funding to allow grassroots organizations to purchase materials and develop projects. Corporate social and environmental funds, various tiers of government, and non-governmental organizations all provide material funding to these loosely structured local community initiatives.

Accessing the funding records of these support organizations provides an efficient way to identify and contact candidate projects. This method will be used to short-list candidate projects for possible inclusion in this study.

Project Selection

The term 'open-space' is very ambiguous. The term could refer to a street corner, a highway, a parking lot, a park, or a community garden. To simplify the scope of the work, only projects, which fulfil a primarily recreational and/or working function, will be considered for evaluation. The potential case study must also be supported by the local citizenry.

Local support will be determined by projects which are of a scale that allows the community to have an active voice in the design and management of the space, participate in site maintenance, and contain amenities that appear to be important to the local community members. For example, a predominately Italian community may provide a Bocce ball court as a park amenity or an urban high population density area may offer community gardens.

One important consideration is that these open-spaces be intended to serve the needs and requirements of the local community above all else. In practical terms, projects that serve the needs of those within a 15-minute walking radius of the site are to be included in the study. This is seen as a feasible travel distance for most urban dwellers. Exceptions to this 15-minute rule need to be considered. Virtual communities like business parks and schools may be mostly populated by temporary residence that only spends certain periods of the day, week, or year at the site. For the purposes of this study, these circumstances are also considered local communities. Alternatively in an automotive centric society, a 15-minute walk might be as great a barrier as at 40-minute drive. Considerations for these circumstances are not included in the selection criteria for this study.

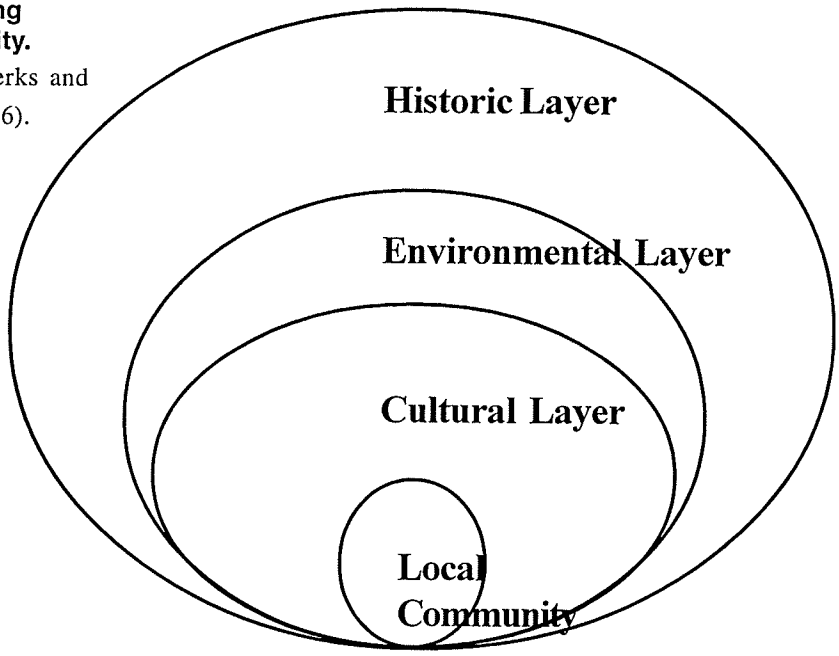
Defining Site Characteristics

One approach to defining the characteristics of a site is to study the relationship between built forms. This is a functional approach and its limitations have been dis-

cussed in section one. An adaptation of a functional technique involves using examples of built form to interpret the processes, which create and define a landscapes appearance, character, and relationship with its human hosts. The resulting landscape form has been termed 'vernacular' (Hough, 1990, 34)

This vernacular approach towards understanding the built environment offers several important features. It addresses the landscape as a continually evolving series of social, historical and environmental processes; it provides a framework to categorize events, and it acknowledges that these changes also shape how humans interpret and respond to the landscape. Hough

Fig. 15: Vernacular Factors Affecting Local Community.
Adopted from (Perks and van Vliet, 1993, 46).



identifies three primary catalysts effecting the vernacular -- historic, cultural and environmental factors (Hough, 1984, 7).

In the contemporary city, historic and environmental factors play marginal roles in the development of the vernacular. The abundance of cheap energy, the attitude that physical growth is equated with progress, and the universality of building materials, collectively mean that design interventions have become largely independent of setting. The use of recycled materials should be noted as an exception to this trend because there are few systems dictating the best way to combine and join these materials in consistent, systematic way. As well, these materials are often found or obtained locally.

This leaves the cultural factors, which do play a significant role in the development and character of the modern city. Social influences can affect the choice of material, although these materials are still selected from a narrow range of mass-produced choices. Public trends also affect the resulting form through an ever-changing stream of iconography, concerns for equity and safety, and shifting opinions about what appears natural or human-made. All of these cultural influences play a role in the short and long-term shaping and remodeling of the urban landscape and urban public open-space.

Robert Putnam (Putnam, 1995) also emphasizes the importance culture plays on the relationship between North American communities and their physical set-

tings. In a series of time budget studies, Putnam indirectly looked at changes to ones 'home place' and the resulting impact on social interactions. He discovered that despite a variety of cultural, social, and physical differences, participation in community life has continually declined in the post-war era regardless of economic, residential mobility and suburbanization factors (Putnam, 1995). It appears that while we have an influence on the shape of our neighbourhoods, they have a limited effect on how we interact with each other.

The vernacular approach to understanding landscape goes beyond a basic functional interpretation of built form, by adding the dimension of time to interpret change processes. In Hough's *Out of Place*, 1990, evaluating change over time is demonstrated as an important means to understand how human action, as well as, natural forces shape and define the landscape.

As an assessment tool, it may not be ideally suited for the short-term quantitative interpretation of sites within the contemporary urban landscape -- nor has been intended to do so. Nevertheless, it does confirm the underlying processes that shape the human landscape. Any evaluation of a landscape form, including public open-space, must provide a framework to reference these processes if an over all understanding of the landscape is to be gained.

The landscape interpretation framework used for this study is based on the Lynch normative model as outlined in Section One. It organizes landscape processes

according to five dimensions of settlement form (see Appendix E). Like Hough's vernacular approach, Lynch's dimensions provide a structure to organize and interpret the human and natural factors that contribute to settlement form.

Direct Phenomenal Evaluation

An alternative approach to defining landscape character, used extensively in the 1970's, is a direct phenomenal approach. In this approach, the actual events occurring in the community are studied and then used as evidence to quantify and interpret the impact an environment has on people, and people on the environment (Relph, 1976, 4). It has a basis in the applied social studies.

Phenomenological methods rely heavily on direct activity observation techniques. The use of cognitive mapping, user mobility studies and time budget studies are all examples of the phenomenological approach to landscape assessment.

Landscape evaluation tests are planned using basic scientific methodologies, which provide well documented, repeatable experiments. The results are often presented as individual studies, however information is compiled and aggregated where opportunity and common interest allow (Scanlan, 1984, 3). Combined results provide a broader understanding of the environment, but should not be seen as a true holistic interpretation of place.

Phenomenological methods are well suited to a neighbourhood or community scale because they rely on direct observation of the environment. According to Scanlan these methods can, "Increases your understanding of the processes at work in the neighbourhood, within the neighbourhood, and allows you to see relationships between various spatial patterns" (Scanlan, 1984, 2). Finally, they offer a means to evaluate the human and environmental landscape conditions simultaneously using elementary, low cost means available to anyone.

Basic phenomenological methods will be used to evaluate most performance indicators for this study. Findings will then be aggregated on human and ecological indices and plotted on a version of the Barometer of Sustainability called the Barometer of Open-space. This will allow direct observation of site characteristics to be evaluated holistically.

An intermediary step is introduced to organize indicators according to Lynch's dimensions of settlement form. Organizing indicators according to this framework is a quick way of confirming that all aspects of place are equally represented. If one dimension is represented by numerous indicator tests and another has none or few representative tests, it may be necessary to weigh some indicators more heavily, providing a handicap for the stronger dimension. Alternatively, weaker tests

can be removed from the over represented dimension, or additional tests added to the under represented dimension.

Indicator Selection

Any observation that can be tied to a value could potentially be considered a performance indicator. The researcher must discriminate between the observations they record and the ones they ignore. In an ad hoc approach, this would happen during the evaluation. In a prescriptive approach, this is done before the evaluations are conducted. This increases the consistency of testing and reduces the likelihood that superfluous tests are being conducted or vital tests are not included. A well-designed set of indicator tests is required to minimize this effect, as is the choice to combine indicator data.

For the purposes of this study, the intention is to develop a sufficiently detailed list of indicators, which will then be combined. The indicators should represent the most important dimensions of settlement form, yet be brief enough to allow for the efficient collection of data and management of results. The indicator tests developed here are a first step in defining a definitive list of performance indicators for community supported open-space development.

Indicator Sources

A collection of potential indicators has been gathered from a variety of landscape assessment projects (see

Table 3). The following samples reflect landscape assessments from a variety of different research perspectives. In theory, building on the research from a host of different disciplines will allow for a more holistic indicator suite than any one individual could create. The alternative is to organize a multi-disciplinary team to develop and administer indicator tests. This study will use the research sampling approach to defining indicators.

Selected assessment tests will be reviewed, modified and combined with other tests as required, forming a new composite suite of performance indicators. The resulting indicator suite (see Table 6) will be used specifically for the evaluation of community supported open-space. Broader evaluation applications for this performance measurement suite will not be considered for this study.

Table 3

Indicators of Settlement Form

(International Development Research Council, 1993)

- (On farms) the complexity of fences indicates the number of generations of development on the farm.

- The number of outside researchers working in a community is inversely related to the level of concern if it is measured by the amounts of money available to the community to carry out its own research.

- The evolution of institutions over time and space can be seen as a predictor, or indicator of social and environmental change.

• Early signs of increases in social violence are indicators of break down in traditional society and economy often linked to diminishing environmental health.

• Health indicators, such as an increase in infant mortality, can signal social and environmental change.

• The presence or absence of species of animals suggest environmental quality. For example, performed in the soil, the activity of the colonies, the presence of songbirds, the existence of life under rocks "Gives a sense of the state of life".

(International Downtown Association, 1994)

• Indicators of place (accessibility): transit mode split, ridesharing, single occupancy drivers, length of commute time, congestion, parking (off street - long term, short term, on street), turnover rate, bicycle if indicators of place (amenities/pedestrian friendly): cafe, vendors, farmers markets, street lighting, percent of two ways streets, benches, number of pedestrian/on key streets during daytime/weekends. Indicators of place (cleanliness): street/sidewalk cleaning personal, number of street suites, collection, weed collection, graffiti removal program, plant maintenance.

• Indicators of people (residents): numbered of residents, daytime/nighttime census ratio, a diversity income of residents, diversity of ethnicity of residents, resident satisfaction of downtown living.

• Indicators of people (diversity): racial diversity, ethnic diversity of activities, generational diversity.

(Deelstra, 1995)

- Green space: the percentage of people that have access to green within a certain distance.

- Quality of built environment: the ratio of open-space related to the area used by cars.

- Accessibility: the number of kilometres traveled by mode of transport (car, bicycle, public transport, etc.) per year, per capita.

- Vitality: the number of social-cultural activities/facilities (add list).

(The Community Indicators Handbook, 1997)

- Environment: impervious surface, pedestrian- friendly streets, urban villages meeting open space requirements. Sources of water, years remaining in landfill space, tons per capita a solid waste, number of trees, percentage of population participation.

- Social environment: people reporting they volunteered last year, percentage of apartment versus Home ownership, waiting list assisted housing.

(Bertollo, 1998)

- Environmental legislation regarding environmental management, land tenure and development.

- Human health: aesthetic quality of cultural environment, generation of waste and hazardous substances, potential risk to human health as a result of environmental factors.

(Perks & van Vliet, 1993)

• Community: a high degree of user purpose and planning, design and management. The high degree of residents stewardship of the local environments (and high rate of participation of the residents).

• Land and communities space: space between buildings is by nightly, carefully designed. A variety of public, semi-public and private spaces that variously to ad hoc social activities and organized community events and activities.

• Waste management: recycling and reusing facilities or programs; composting, and nutrient recycling.

• Landscaping and urban greening: macro and microclimates conditions are accounted for as a normal part of the planning and urban design policies. Optimizing the retention/preservation of local landscape features.

• Community based food production: area provided for private garden allotments.

• Protection of soil, care and underground water: sensitivities to cut/fill operations and replacement of plant materials, preservation and improvement of agricultural soils, reforestation. Use of organic techniques and biological controls.

This compiled list of indicators can be thought of as a wish list, describing the characteristics of an ideal, imaginary place. It should be not been seen as a checklist or recipe for the design of open-space. Like any utopian vision, it sets expectations no real place can meet because real systems, like human settlements, are too complex to have every interaction fully understood and incorporated into a predeter-

mined design. Consequently, some of the values associated with the descriptive indicators are contradictory. This is the result of describing 'place' in generic rather then specific terms.

If a generic indicator suite is to be used it needs to either measure a variety of seemingly contradictory values or provide a series of performance tests that represent a continuum of systems interactions.

Performance tests selected for this study will attempt to evaluate the relationship between people and place using the first approach. This is intended to make the tool as general and universally applicable as possible.

In a case where the value of asphalt multipurpose areas versus a passive recreational area is the focus of the evaluation, testing would remain holistic, considering how the amenity, the asphalt area, effects the essential dimensions of place, rather then testing specifically for the presence asphalt courts. Questions that may pertain to a court site feature may include; percentage of surface types; physical site accessibility: percentage of permeable versus non-permeable surface; and vandalism. These questions also speak to a range of other landscape features, contributing to the holistic understanding of place.

Avoiding Indicators

Some indicators will be intentionally avoided because they require value judgements, which can not been confirmed. For example, attributing a high value to sites with high open-space to user ratios may be prob-

lematic. The commonly held belief that a low population density reduces crime has shaped much of the contemporary urban landscape, despite the fact that a universal relationship between density and crime has never been clearly established.

The following table provides some examples of indicators which have value components that can not be generally applied or require values that are unsubstantiated in general use. Avoiding these indicators is also an attempt to keep the measurement tool as universal applicable as possible.

Table 4

Examples of Excluded Indicators

Crime reported	• Crime has a relationship to community cohesion, but it difficult to relate the quality of an open-space to the absence of crime. Better indicators of safety may reflect lighting schemes, nighttime site usage, or impressions of safety.
External financial support	• Financial support from external agencies for start-up or maintenance is important may really be deferring program inadequacies which will reappear when supports have ended. This can make a project appear artificially successful and cripple the long-term success of a project.
Graffiti	• Graffiti is a complex expression, which has many meanings. Its presence or absences do not necessarily reflect the community's relationship with the open-space.
Population Density	• The question 'What is the ideal population' is as old as settlement itself. This tool is intended for use with a variety of land-uses. It is difficult to generalize a fixed value or desired population thresholds when the site usage could vary greatly. Population density on its own is of questionable value. It may be useful when integrated with other indicators as a ratio.

Evaluating Performance Indicators

Two methods will be used to evaluate the indicator suite. Direct observation and user interviews.

The direct observation approach will assess the physical condition and some functional aspects of the site. The interview portion is intended to provide an understanding of underlying processes and social dynamics which may not been observable through brief site visits.

Interviews will be conducted either on or off site, with a pre-selected project representative. The project representative will be chosen because this individual has a sound understanding of the development of the site. Interviews will follow a scripted format to ensure consistency and repeatability (see Appendix E).

Quantifying Measurements

For a condition to be evaluated it must be measured. All of the performance tests will be measured on a scale ranging from 5 to 0 or, 0 to -5 when an undesirable condition is being tested for.

Measurements can be either a threshold or absolute value. Threshold measurement is prescribed for most tests. However, when only the presence or absence of a condition is important an absolute or boolean measurement will be used. Absolute condition could be evaluated as either -5 or 0; or 0 or 5. The measurement method is pre-determined during the indicator suite design.

In cases where a measurement is reduced to a percentage or ratio, such as percentage of impermeable versus permeable surface, a conversion scale is used to translate the recorded value to the 0 to 5 scale rating scale.

Table 5
Evaluation Conversion Scale

Evaluation %	Rating value
0	0
1 - 20	1
21 - 40	2
44 - 60	3
61 - 80	4
81 - 100	5

To assist the researchers and to ensure consistent, reliable results are collected, an Indicator Test Table (see Table 6) is provided as an evaluation reference. This table provides outlines for applying the various indicator tests and sets limits for the resulting values. It references Lynch's five dimensions of settlement form, and is then organized according to the human and ecological indices.

Assessment Aggregation

When a project is evaluated a series of measurement tests are conducted to assess the overall well-being of the project. The results of these individual performance measurement tests are transferred to the computation form and input into a question's A or B reference cell (see Appendix E). The A and B columns represent

the human and ecological indices. An X in a cell is used as a placeholder, insuring that the value is added to the correct column. If a column has an X in both columns then no value is required for that question. In step two, the values for column A and B are totaled and then divided by the best possible score for that index. This reduces the performance ratings for both indices to a percentage score. The percentages are then used as x and y co-ordinates to plot the project's overall worth on the Barometer graph. Figure 9 presents the Barometer of Open-space, which will be used for plotting the evaluations. This graph is a variation on the Barometer of Sustainability model.

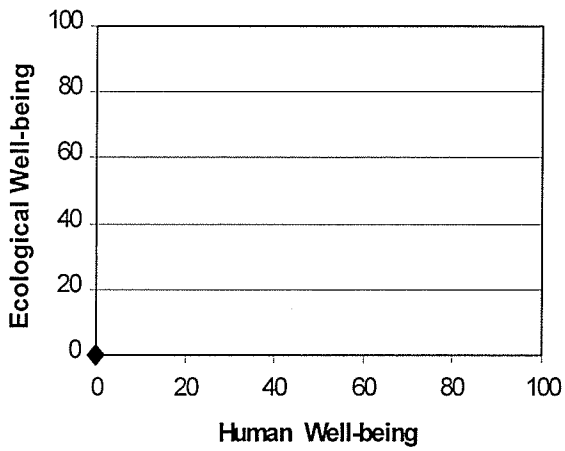


Fig. 16: Barometer of Open-space
The evaluation graph is adopted from a Barometer of Sustainability styled presentation framework. Rating thresholds i.e. good , fair, poor performance have not been defined at this point in the study. Thresholds will be determined as a refining mechanism once the all of the data is collected .

Multiple Measurements

The strength of the tool comes from its ability to present information in a clear and comparable manor. Multiple assessments can be overlaid on the same chart to indicate the progress of a single project over time, or series of projects can be rated simultaneously. For this study, a series of ten community supported open-space projects will be plotted and evaluated.

Plotting and comparing a series of projects will give an indication of the tool's ability to interpret a variety of different landscape conditions. This speaks to the universality of the test and indicator suite. If the tool proves robust and efficient, longitudinal studies on individual studies may be considered.

Summary

Human and ecological conditions combine to define and shape settlement form. Keeping this in mind, a holistic investigation into landscape condition must also consider the interaction of human and natural systems.

These interactions and the resulting patterns are often very subtle. Researchers have used functional and phenomenological approaches to interpret the landscape, especially settlement form. When assessing community supported open-space, a combined approach, which applies the direct observation within a predefined functional framework, seems to offer the most straightforward means for evaluation.

Indicators used to report on this framework come from a variety of sources. Careful examination of potential indicators is required before a set of performance tests and evaluation system can be developed.

Once the testing system is developed, projects that meet the study's scale and function criterion can be evaluated. Results are then plotted on a modification of the Barometer of Sustainability for presentation and comparison.

Table 6 a

INDICATOR TEST TABLE - INDICATORS OF HUMAN WELL-BEING

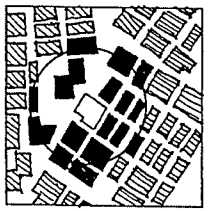
Ref.	Dimension	Performance Measure	Measuement test	Rating	Reference
H - a	n/a	n/a	Site survey - Population within a 15 minute radius.	Information for computations only.	
H- b	Fit	Project reflects an intentional and planned purpose or effort.	Interview - Before the site was developed, what organizational steps were taken to insure the development would run smoothly?	0 to 5	E.g. verbal plans = 1 pt. written plans = 1 pt. sketches = 1 pt. drawings = 1 pt. scaled plans = 1 pt. **TOTAL = 5 pt.**
H-c	Sense	Presence of a theme or purpose which guides site development.	Interview - Is there a guiding purpose or philosophy organizing the site layout?	0 or 5	E.g. The site uses only haritage plants popular in the 1930's = 5 pt. **TOTAL = 5 pt.**
H-d	Sense	Community member's involvement in the planning and management of the open-space.	Interview - Do any members of the local community hold office on boards responsible for planning and management decisions which effect this open-space?	0 to 5	E.g. City councillor = 1 pt. Local Foundation = 1 pt. **TOTAL = 5 pt.**

Table 6 a

INDICATOR TEST TABLE - INDICATORS OF HUMAN WELL-BEING

Ref.	Dimension	Performance Measure	Measuement test	Rating	Reference	
H-e	Sense	Number of people who have volunteered to work on the site within the last year.	Interview - Estimate how many people have volunteered their time or services to help build, maintain, or improve this open-space within the past year?	15 min radius population/estimate of volunteers per year. Converted to 0 to 5 scale.	E.g. 100 volunteers/ 1000 residents converted to scale	= 10% = 1 pt.
					TOTAL	**= 1 pt.**
H-f	Access	How many groups, within the last year, use of this site as part of a curriculum?	Interview - Have any groups used this site as a meeting or teaching centre within the past year? Be sure to include regurlar users like the gardeners at a community gardening site.	0 to 5	E.g. Interview indicates two garden groups meet at the site	= 2 pt.
					TOTAL	**= 1 pt.**
H-g	Sense	Do individuals/organizations plan and hold events or gatherings at this specific site?	Interview - How many events have been held on this site in the past year?	0 to 5	E.g. 8 events held at site in last year	= 5 pt. max
					TOTAL	**= 5 pt.**
H-h	Sense	Questions 10 people walking by site. Are they aware of this site and activities which occur on it?	Interview - Are you familiar with this local (open-space) site? Do you have a name for this place?	0 to 5	E.g. 3 of 10 familiar the site converted to scale	= 30% = 2 pt.
					TOTAL	**= 1 pt.**

Table 6 a

INDICATOR TEST TABLE - INDICATORS OF HUMAN WELL-BEING

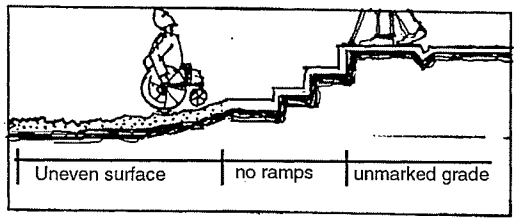
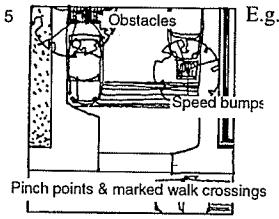
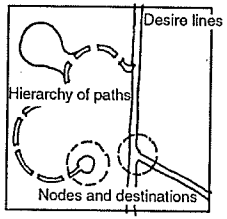
Ref.	Dimension	Performance Measure	Measuement test	Rating	Reference
H-i	Fit	Does this open-space provide the opportunity to participate in activities which can not be practiced elsewhere in the community?	Interview - Count the activities which occur on this site, and do not occur anywhere else in your local community.	0 to 5	E.g. Only allotment gardening site = 1 pt. Annual residents assoc. picnic = 1 pt. **TOTAL = 2 pt.**
H-j	Access	Absense of barriers impeding access to the site for the disabled: wheel chairs, the visually impaired, etc.	Site survey -- Are there site conditions like changes in grade, uneven surfaces, sever grade changes,etc. which will limit site access for specific groups such as the disabled?	0 to -5	
H-k	Fit	Presence of traffic calming measures on streets adjacent to the site that encourage safe and easy site access.	Site survey -- Count the amenities or strategies used to reduce traffic speed or flow on streets adjacent to the site?	0 to 5	 E.g. obstacles (2) = 2 pt. speed inhibitors (1) = 1 pt. marked crossings = 1 pt. vehicle pinch points = 1 pt. **TOTAL = 5 pt.**
H-l	Access	Are circulation routes within the site well laid out? Are they easy to navigate and help define the space?	Site survey - Are the pathways found on the site funtional? Do visitors find it simple and intuitive to navigate around the site? Do visitors have a sense of entering and leaving the site?	0 to 5	 E.g. demarcated entry = 1 pt. use desire lines = 1 pt. hierarchy of paths = 1 pt. node+destinations = 1 pt. **TOTAL = 4 pt.**

Table 6 a

INDICATOR TEST TABLE - INDICATORS OF HUMAN WELL-BEING

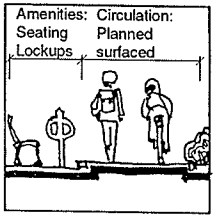
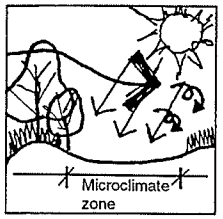
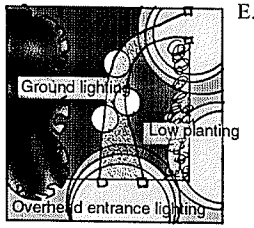
Ref.	Dimension	Performance Measure	Measuement test	Rating	Reference
H-m	Fit	Have amenities been provided to encourage social interactions on the site?	Site survey - Are there amenities, on the site, which are intended to improve the site experience of pedestrians and cycles?	0 to 5	 E.g. bench (1) = 1 pt. lockup (1) = 1 pt. multi-use = 1 pt. paving = 1 pt. **TOTAL = 4 pt.**
H-n	Control	Creation of spaces (microclimates) where climate is intentionally affected through the placement of materials, objects or amenities .	Site survey - Are there areas or objects, on the site, other then enclosed buildings, intentionally used to provide shelter from adverse climatic conditions like sun, snow, or rain?	0 to 5	 E.g. wind block (1) = 2pt. topography(1) = 1 pt. solar gain (1) = 1 pt. face prevailing wind (1) = 1 pt. **TOTAL = 4 pt.**
H-o	Control	Is the site designed to permit safe night use?	Interview and site survey - Is the site adequately designed and lit for safe night use by visitors?	0 to 5	 E.g. Flood lighting at entry points = 2pt. Low plantings at external view corridors = 1 pt. Spot lighting on path = 1 pt. **TOTAL = 4 pt.**
H-p	Vitality	Is the site is devoid of human health hazards?	Interview and site survey - Is the site clean with no obvious opportunities for bodily injury? Have steps been taken to ensure the site will provide a healthy envimoment for human and non-human visitors?	0 to -5	E.g. Rotten smell from compostor = -1 pt. Broken bottle on site = -1 pt. Pressure treated wood used for food growing planters = -1 pt. **TOTAL = -3 pt.**

Table 6 b

INDICATOR TEST TABLE - INDICATORS OF ECOLOGICAL WELL-BEING

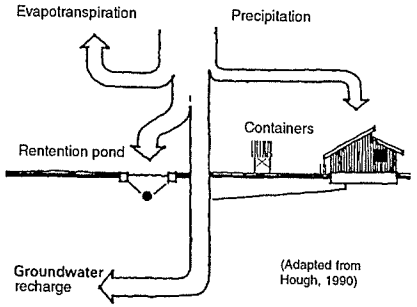
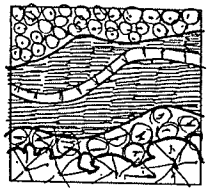
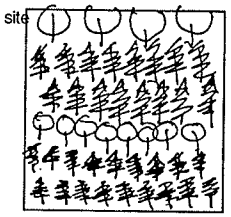
Ref.	Dimension	Performance Measure	Measuement test	Rating	Reference
E-a	n/a	n/a	Apx. area of site in meters.	For computations only.	
E-b	Vitality	How many techniques are used to capture or collect water on the site?	Site survey -- Count methods used to capture water on site.	0 to 5	
E-c	Vitality	How much of the site surface will allow water to percolate through for ground water recharge?	Site survey -- Estimate of amount of permeable site surface area.	% of permeable surface area. Converted to 0 to 5 scale.	 **/ SITE AREA** site = 700 m2 veg = 680m2 E-c = (680/700) *100 =97% or 5 pt. **TOTAL =5 pt.**
E-d	Vitality	Count of trees/shrubs growing on the site.	Site survey -- Count of trees and large shrubs growing on or encroaching on the immediate site.	Number of trees & shrubs / site area in meters. Converted to 0 to 5 scale.	 **/ SITE AREAx5** site = 700 m2 trees = 48 E-d = (48/700) *100x5 =34% or 2 pt. **TOTAL =2 pt.**

Table 6 b

INDICATOR TEST TABLE - INDICATORS OF ECOLOGICAL WELL-BEING

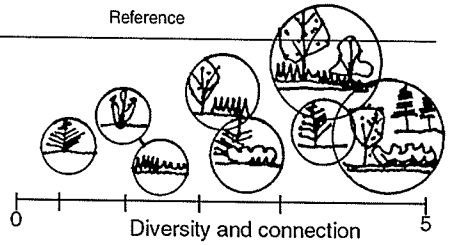
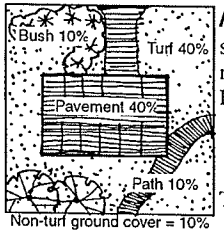
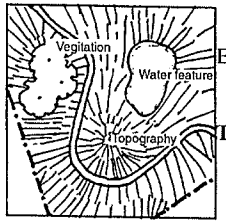
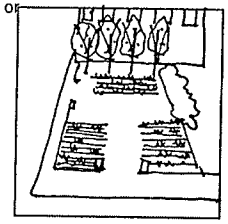
Ref.	Dimension	Performance Measure	Measuement test	Rating	Reference
E-e	Vitality	Are native species growing on the site?	Site survey -- Are there examples of native plant or tree species on the immediate siteor encroaching on the site?	0 to 5	
E-f	Vitality	Area of ground covered in vegetation (excluding maintained turf).	Site survey -- Estimate of area with non-turf ground cover.	% of non-turf area. Converted to 0 to 5 scale.	 **/ SITE AREA** site = 700 m2 nt = 70m2 E-f = (70/700) *100 =10% or 1 pt. **TOTAL =1 pt.**
E-g	Fit	Have unique site features been conserved and/or integrated into the site design?	Site Survey - Have pre-existing site features or established plant material been intentionally conserved or integrated in to the site design?	0 or 5	 E.g. pond =1 pt. maple =1 pt. **TOTAL = 5pt.**
E-h	Vitality	Evidence that the site used as a habitat for birds or animals.	Site survey - Is there any evidence that the site is used by wildlife? Can you see any nests, dens, tracks, sightings, etc. ?	0 or 5	I.e Robin's nest = 5 pt. bees hive fox sited on site **TOTAL = 5pt.**

Table 6 b

INDICATOR TEST TABLE - INDICATORS OF ECOLOGICAL WELL-BEING

Ref.	Dimension	Performance Measure	Measuement test	Rating	Reference
E-i	Vitality	Consolidation, collection, or managment of solid waste occurs on the site.	Site survey -- Count of on-site waste receptacles, including composting and recycling containers.	0 to 5	E.g. 3 recycling bins, 3 trash bins = 5 (maximum value recordable) **TOTAL** **= 5 pt.**
E-j	Vitality	Reclaimed/recycled materials have been used to construct or maintain any part of the site?	Interview and site survey -- Estimate the percentage of recycled material intentionally used in site construction and maintenance or removed for use on other sites.	% of reclaimed/recycled materials used on site. Converted to 0 to 5 scale.	E.g. 30% recycled material / 20 = 1.5 (rounded up to 2) **TOTAL** **= 5 pt.**
E-k	Control	Presence of farming activities (food, supplies, animals) grown on site.	Interview and site survey.-- Percentage of site area dedicated to growing food or product?	Estimate % of site used for food or animal production. Converted to 0 to 5 scale.	 **/ SITE AREA** site = 700 m2 plots = 100m2 E-k = (100/700)*100 =14% or 1 pt. **TOTAL** **=1 pt.**

4. Findings and Discussion

A series of eight projects have been examined in the course of this study. All of these projects are located in the communities of Hamilton and Burlington, Ontario. Both communities have expanding subdivisions, which are very different in layout and character than their older core neighbourhoods. Neighbourhood and population sizes are roughly the same in both cities.

Identifying Projects

Potential projects were identified by contacting a variety of support agencies operating in the area. Such organizations include The United Way, Friends of the Environment Foundation, and local community development agencies. Representatives from these organizations have provided contact information on projects their organizations have sponsored or have assessed. Review of community funding reports by these organizations has played an important roll in locating potential projects and in contacting project representatives.

Type of Project Reviews

All eight projects reviewed have been initiated by local community members with additional support from a combination of public and private agencies. Supporting agencies have played a crucial, yet indirect, role in the planning and development of projects by providing monies and services when required. In several cases, support agencies were involved in site modi-

fication and construction. All of the projects included were designed to serve the needs of the local community, yet they are still accessible to the general public.

Scope of Analysis

All projects have completed some phase of development and have an understanding of how additional development would be integrated into the existing site design. Evaluations have been limited to the work as it stands at the time of evaluation. The analysis of each project is then, a snapshot of the status of each project. This single evaluation can not be used as an absolute marker of a project's success or failure. Rather the rating should be seen as a marker along the project's evolution.

Each project has been evaluated in the same manner using a series of predetermined interview questions and site evaluation techniques (see Appendix E).

All participants were made aware of the studies purpose and investigation process before they participated.

In all cases, project representatives provided some form of site tour. Although this was not a required component of the study, it did help validate and clarify the information provided.

Evaluation Presentation

Each project evaluated is presented as a monograph. The monograph attempts to allow the reader to become moderately more familiar with each project. As

part of the monograph, a holistic evaluation is presented for each project using the Barometer model. The holistic rating is also presented as part of a composite chart in the discussion of the findings (see Figure 25).

Project 1: Riverdale Community or Warden Park

Fig. 17: Warden Park: North Entry.

The decision by community members to create a park space from this derelict site came as a reaction to the murder of an area resident whose body was discovered on site. The body was not found for several weeks because it was hidden in a field of uncut grass.

Context:

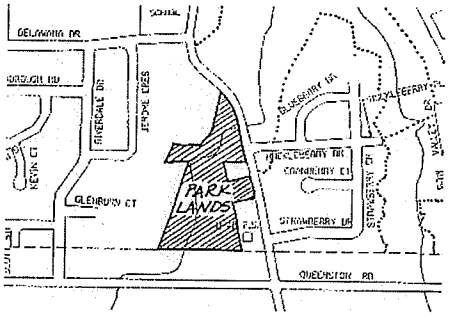


Fig. 18: Warden Park: Park Context.

The Riverdale community has approximately 7000 residents. Many of these residents live in the 14 local high-rises. Occupancy tends to be transient due to a significant number of apartment dwellers and recent immigrants to Canada. The remainder of the community members live in small older homes. The park is one of the few local sites with a playground structure.

Site:

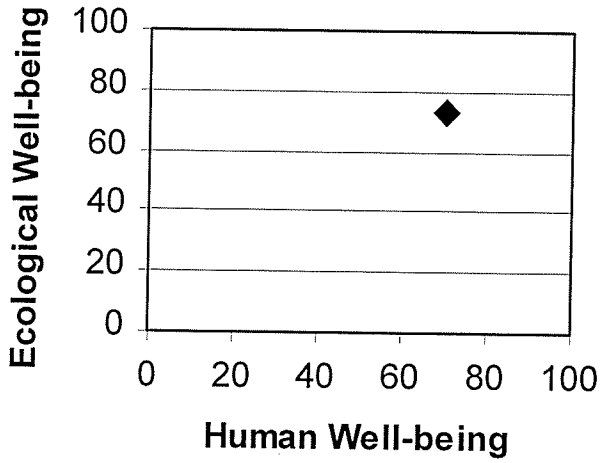
This recreational park is owned and formally maintained by the local municipal authority. It is set in a naturally occurring ravine and features a stream that runs the length of the site. Originally, only a small portion of the 2700 sq. m site was maintained. This section included a small playground area. A new play structure and two multipurpose courts have recently been added. The courts have been designed through the coordinated effort of community youth, city plan-

ning officials, and design professionals. Gravel pathways and the multipurpose courts are lit for safety and night use.

Evaluation:

The Riverdale Community Park scores high on the human and ecological well-being indices. The project has enjoyed a long development history and consistent representation by the community members. Site development plans are regularly adjusted to the cultural needs of a continually changing stream of local residents. This is reflected in the design decisions and organized social activities. The site is well laid out and serves a variety of uses, however physical problems like stream bank erosion exist.

Fig. 19: Holistic Assessment: Riverdale Community



Project 2: Holy Rosary Community Gardens

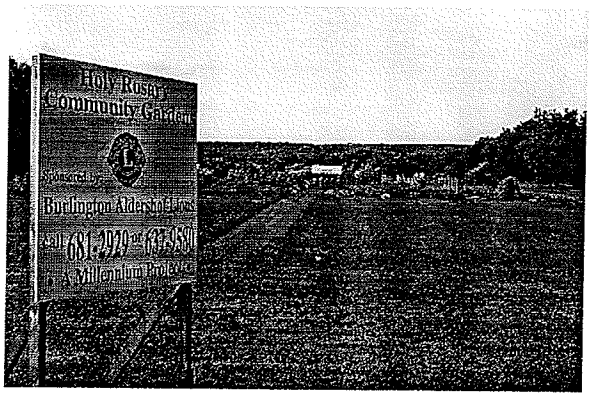


Fig. 20: Holy Rosery Site.

This allotment garden is in the first season of operation. The project was made possible because a local religious organization offered access to an underused plot of land. A local service group is responsible for the project's administration. They are interested in providing local residence interested in food security with an opportunity to participate in allotment gardening.

Context:

The garden site is on an empty lot along a primary access road, which links the North Aldershot community to the rest of Burlington. The Aldershot community is comprised mainly of detached suburban homes, however there are several enclaves of high-density house within walking distance of this site.

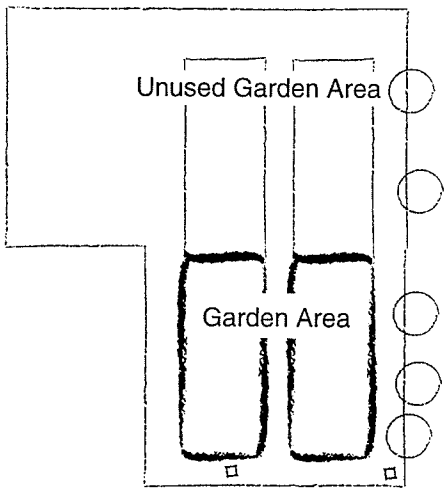


Fig. 21: Holy Rosery: Site Layout.

Site:

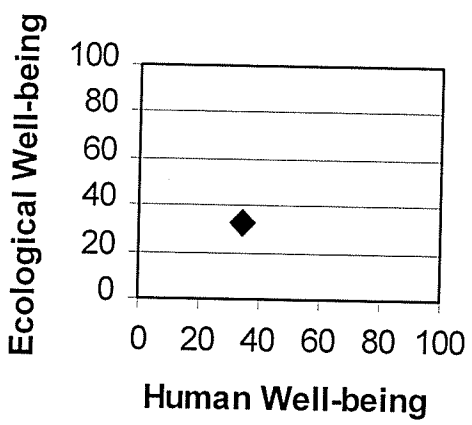
The 5700 sq. m site has been developed strictly as a utilitarian food growing site, although only 2000 sq. m are cultivated and 1000 sq. m are used for food production. All site ameni-

ties are specifically for the use of gardeners, although the site is fully accessible to the general public.

Evaluation:

The project is intended to fulfil a food security need. Little effort has been placed on the quality of spaces created or the environmental impact design or food production activities have on the site. The project fails to rate highly on the ecological indices because of lack of interest or knowledge in ecological processes. The project fails to rate highly on the human well-being scale mainly because this evaluation is only a snapshot of the first year of development. It appears this project will require several years to develop and mature. A latitudinal study might better indicate the real success or failure of this project.

Fig. 22: Holistic Assessment: Holy Rosary Community Garden.



Project 3: Our Lady of Mt. Carmel School (OLMC) Naturalization Project

Fig. 23: OLMC: Site Layout.

This project is in the first season of development. It was made possible though the volunteer efforts of staff and students, environmental development grants, and gifts-in-kind from numerous supporters within the community. The project is the first step in re-establishing a wood lot, for educational use and as a nature sanctuary.

Context:

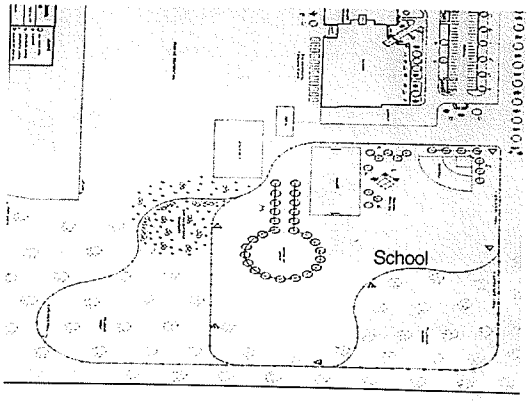


Fig. 24: OLMC: Site Layout.

OLMC school supports kindergarten through grade eight classes and a daycare facility. The school is situated in a rural setting. The main planting area is physically set back from the school in what were once cattle grazing fields. A series of smaller planting areas are developed close to the school building.

Site:

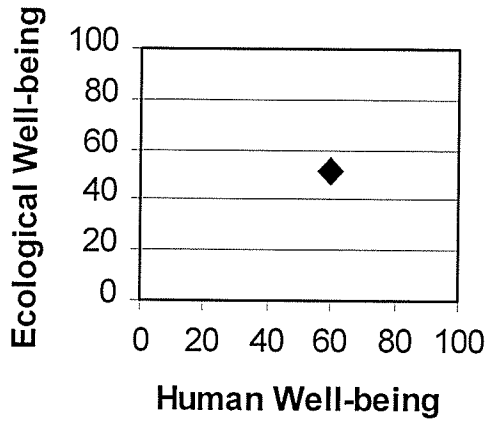
The design intervention was conceived by a staff member and detailed by a professional landscape designer. Most plantings are container stock trees. Some

plantings are placed randomly, some are used to form a series of outdoor spaces, and other plantings improve the appearance of a supervised play area and the school building. The planting plan for the supervised play area and around the school is intended to make an immediate visual difference to the school and has a much more refined appearance then the larger planting areas. A small garden area for the youngest children has also been built.

Evaluation:

The project fulfils social, as well as, ecological needs. The smaller planting areas next to the school building reflect careful selection and placement of plant material for ecological compatibility and user safety. However, the majority of the plantings are not as visually effective, due to the limited size and maturity of the planting material used. The site should improve aesthetically as the plant material matures.

Fig. 25: Holistic Assessment: Our Lady of Mt. Carmel School.



Project 4: Lester B. Person High School (LBP) Naturalization Project

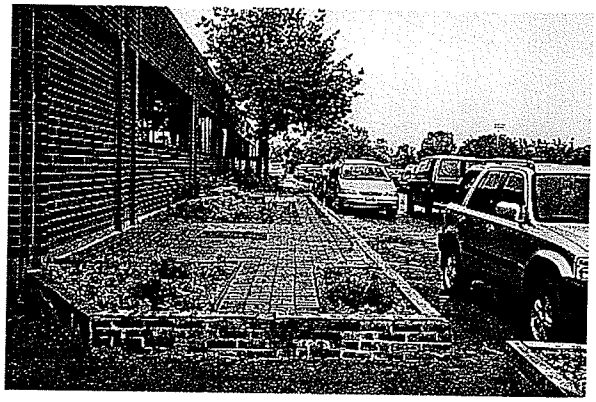


Fig. 27: LBP: Site.

This naturalization and beautification project is in its first season of operation. The project was made possible through the volunteer efforts of staff and students, corporate grants and gifts-in-kind from numerous support agencies. Circulation areas of the site had been hard surfaced as a means of minimizing maintenance; the remaining property had been largely ignored by grounds keepers. The project's design is a reaction to these site conditions and is intended as a display of local pride and civic responsibility.

Context:

LBP has approximately 800 academic users. They represent the primary community and are on site from September to July. The school itself is also used through out the year by the broader community, for educational and recreation purposes. The surrounding community is suburban and low density. The greater community has had little involvement in the project.

Site:

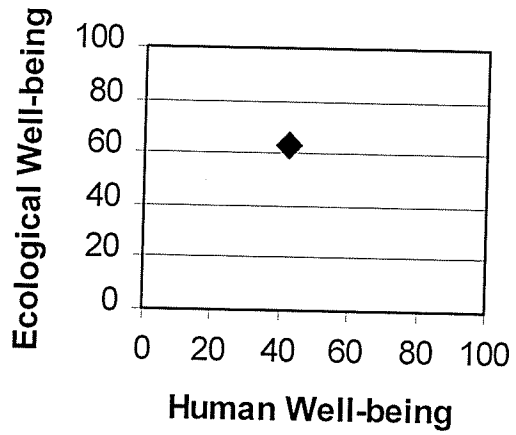
The naturalization and beautification design was conceived by a staff member and detailed by a professional landscape designer. Path edges, and traffic is-

lands have been converted into raised planters and beds, which 'naturalizes' the main entry area and provide a pleasant outdoor waiting and reception area. Additional planting has been added to the edges of the property where erosion and public presentation are a concern.

Evaluation:

The project fulfils social and ecological needs. The choice of design intervention sends a very clear message about how members of the school community feel about their environment. The project has involved most of the students of the school. Visual and social success is apparent. The design is practical and the choice of plant material meets a minimum of ecological considerations.

Fig. 28: Holistic Assessment: Lester B. Pearson High School.



Project 5: Holy Cross Church Community Garden

Fig. 29: Holy Cross: Site.

This well-established project was created as a means for local residents to improve their personal food security. The site is intended for use by the impoverished members of the community. However, anyone is welcome to participate. The allotment garden is managed and subsidized by the congregation of the adjacent church. There are no religious affiliations between the church and the gardeners.

Context:

The project is in an affluent, low density, suburban community. The site has limited transit access. No similar gardening programs exist in the surrounding area. The local community seems to have little to do with the project.

Site:

The gardens are tucked away in the back of the church property. Approximately 60% of the sites 2000 sq. m area is dedicated to food production. No signs, fences, or barriers demarcate the site. This is strictly a utilitarian food production space with only basic gardening amenities provided. The site is however, ideal for gardening.

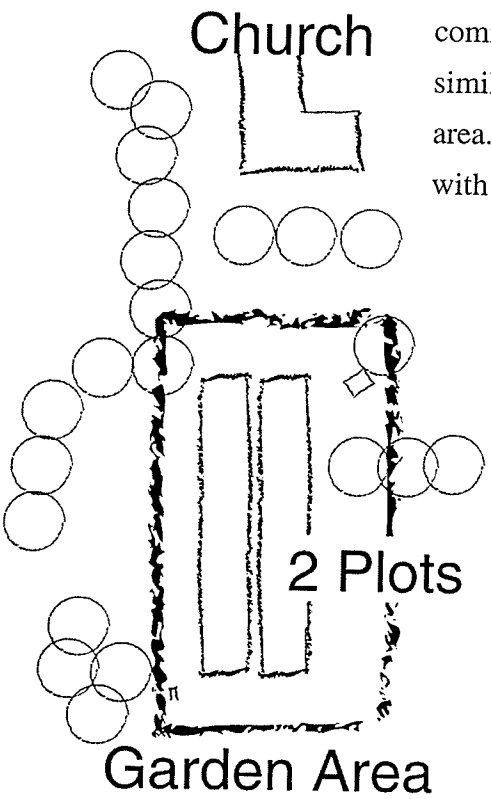
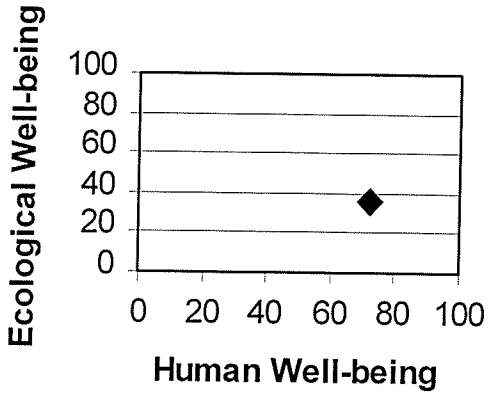


Fig. 30: Holy Cross: Site Layout.

Evaluation:

The project fulfils the most basic requirements for a food producing open-space: cleared plots, tool shed, and compost bin. There is no impression that the site carries much social significance beyond the gardener's community and a small group of supporting congregation members. The design of the project seems to intentional isolate the garden from the surrounding community.

Fig. 31: Holistic Assessment: Holy Cross Church Gardens.



Project 6: North Hamilton Community Health Centre (NHCHC) Adult Gardens

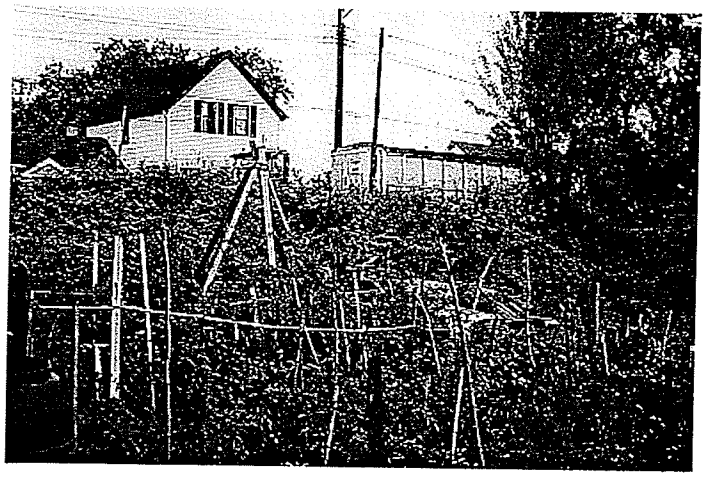


Fig. 32: NHCHC Adult Garden: Site.

This project exists in a traditionally industrial neighbourhood. The site was conceived as a stance against urban poverty. It provides local residences with additional personal food security and a sense of communal pride.

Context:

The site is set in an older mixed industrial neighbourhood. All of the garden plots appear to be in use by the thirty resident gardeners. For some participants, with non-Canadian backgrounds, this site is the only opportunity to cultivate foods found in their native homelands.

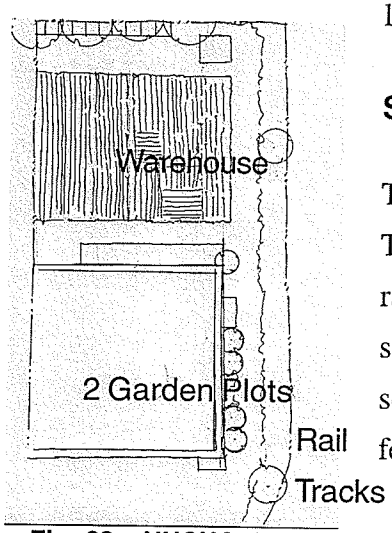


Fig. 33: NHCHC Adult Garden: Site Layout.

Site:

This community garden site is nested in a small ravine. The two open sides face an existing warehouse, and railway tracks. Approximately 65% of the 1800 sq. m site is cultivated for food production. The tracks and section of the ravine walls are separated with snow fencing. All available land is used for gardening or for

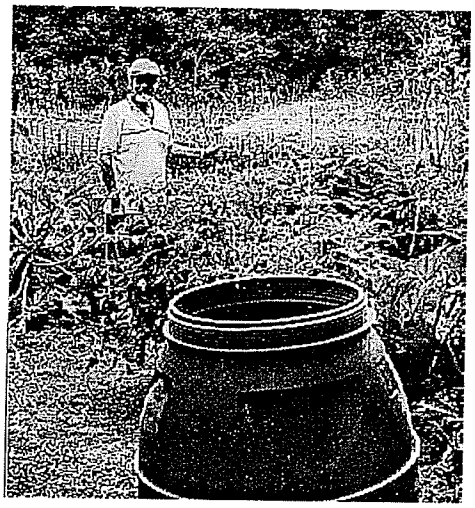


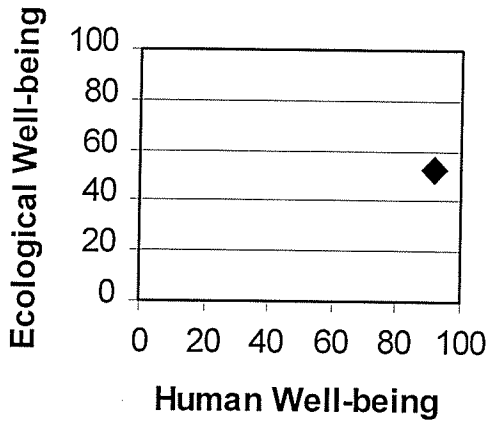
Fig. 34: NHCHC Adult Garden: Participant.

amenities to support the gardening activities.

Evaluation:

The site is well adapted to its' purpose, but lacks the infrastructure that would fully link it to the community. The researcher had to ask a local resident to show him where the garden was located because no signage is posted and the site can not be seen from the road. Nevertheless, for those who know where the garden is, it offers a well thought out urban oasis.

Fig. 35: Holistic Assessment: NHCHC Adult Garden.



Project 7: North Hamilton Community Health Centre (NHCHC) Children's Gardens

Fig. 36: NHCHC Children's Garden: Entry Area.

The Children's Garden is the only place in the community where small children can collectively participate in outdoor gardening activities. The creation of this site was the outcome of a community consultation process.

Context:

The site is situated in an open park on a quiet corner in a mixed-use neighbourhood. The neighbourhood includes industrial warehouses and private residences. Several years ago this neighbourhood was the location of a sever industrial fire. The industrial site, now abandoned, is directly across from the park and has been partially cleaned up.

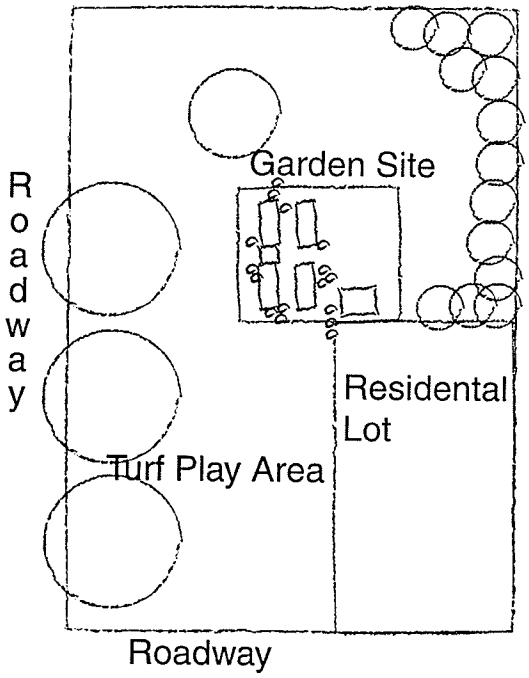


Fig. 37: NHCHC Children's Garden: Site Layout.

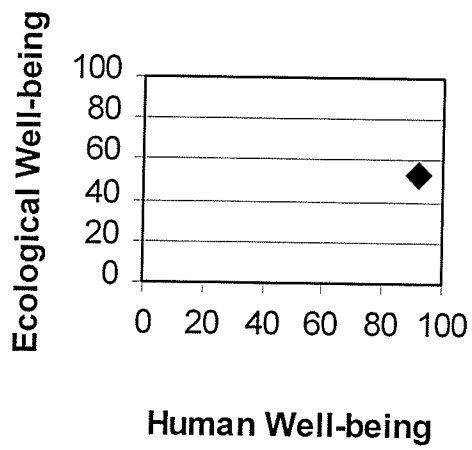
Site:

The children's allotment garden uses about 20% of the 5000 sq. m park. The only structures in the garden are raised planters made from recycled wood and plastic barrels. Planters are organized in a symmetrical arrangement and entry area is demarcated by a trellis.

Evaluation:

The garden represents a symbol of change, as well as, safe access to gardening. The project reflects a significant amount of community involvement and participation, which is evident in the treatment of the site. The garden is well laid out but clearly only in it's initial stages of development.

Fig. 38: Holistic Assessment: NHCHC Children's Garden.



Project 8: Mt. Gardens Public School Naturalization Project

This schoolyard, like most schoolyards in the area was originally cleared and planted with turf grass as a means to provide a safe play area, while reducing grounds maintenance and site upkeep costs. Local residence concerned with the poor visual appearance and questionable environmental message this landscape condition conveyed, planned a project to create a wood lot out of an under used portion of the schoolyard.

Context:

Support for a naturalization project was not available through the local Board of Education. Funding was secured through grants from an external environmental agency. Planning and labour services were provided on a volunteer basis by community members. The project has involved many of the families of the children whom attend the school.

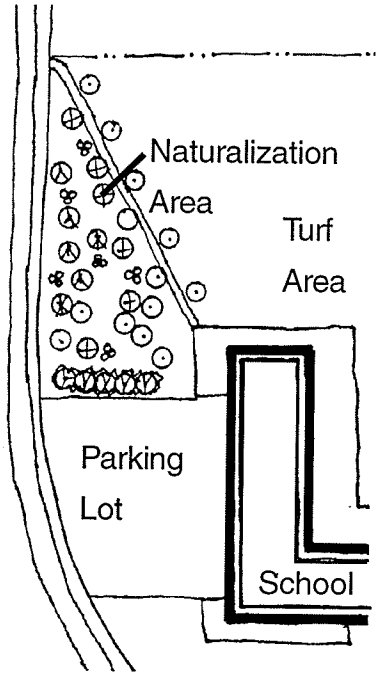


Fig. 39: Mt. Gardens: Site Layout.

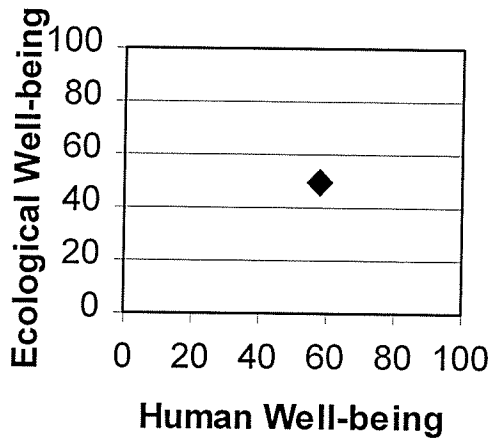
Site:

The school building is surrounded by turf play fields and asphalt play areas. Much of turf area on the site is used for recreational activities. A 1500 sq. m portion of the turf area has never been effectively put to use because it is difficult to monitor from the main play ground area and is prone to flooding in the spring and autumn. This project planted this underused portion with native trees and shrubs, as the first step in re-establishing a wood lot.

Evaluation:

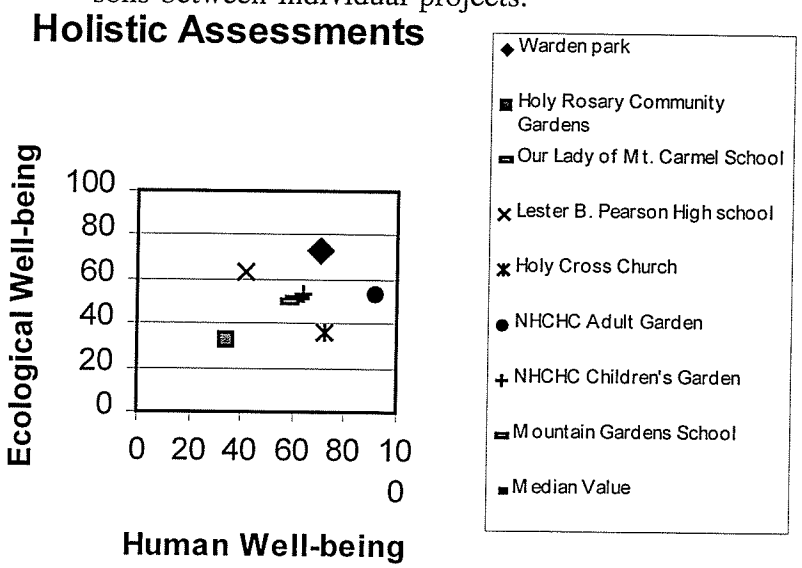
The naturalization project is in the initial stages of development. Some 150 trees and shrubs have been planted, however the groundcover remains mown turf grass. Limited community support is provided for on going maintenance, while support for significant development phases, like planting and inauguration days, are well supported by the community. The project offers a dramatically improved open-space but seems slow to develop into a meaningful and useable community place.

Fig. 40: Holistic Assessment: Mt. Gardens School.



Discussion of the results will be based on a compiled presentation graph, rather then on the individual monographs (see Figure 25). Presenting the finding in this format should make patterns and trends evident that are not observable when reviewing assessments individually. This is intended to allow for easy comparisons between individual projects.

Fig. 41: Barometer of Open-space Assessment.
A chart plotting the holistic assessments from all of the projects evaluated. A median value is also plotted as a reference point.



Without a compiled presentation, it would be very difficult to compare a project like the OLMCS' school naturalization project with an urban community garden, such as the NHCHC Children's Garden. It would impossible to produce repeatable, longitudinal studies on these same projects. At the most basic level, the opportunity to review and compare open-space projects in a new way marks this study as a success.

Interpreting Results

The results reveal the Warden Park site attained the best overall rating, while the Holy Rosary Gardens re-

ceived the poorest rating. The other projects are distributed between these two values. This does not necessarily mean that the Warden Park site is superior to all other projects.

Each evaluation is a snapshot of the project's status at one particular instant in time, rather then an absolute rating of worth. Since the evaluation sessions were held between May and July 2000, it is possible that projects with strong seasonal development patterns, like gardening sites, would be at a disadvantage, if surveyed before the season had begun or after it had ended. This could be the case for the Holy Rosary site. Seasonal considerations should be considered in future evaluations.

Patterns and Trends

Viewing the cluster of results reveals no definitive patterns. The findings appear to be independent of variables such as: project maturity, site function, or location. This suggests the indicator test effectively measures a range of different type of open-space projects, or possibly, the sample size is too small to define any patterns. A larger sample size and statistical evaluation would be needed to confirm if any latent patterns exist within the data set.

Indicator Indices

One of the reasons the barometer method has been chosen is because it offers some degree of data transparency. This allowance the reader to compare evalua-

tions of projects based on the performance of an individual index. This provides a greater understanding of site without resorting to minutiae of detail.

Results from the human index were not unexpected. Urban agricultural projects show a modestly higher degree of well-being than sites with other primary functions. Holy Rosary Community gardens is the exception and rates very poorly on both scales. Urban agricultural projects may rate higher on this index because successful gardening requires a more consistent on-site presence then any other type of open-space function and greater opportunity to foster relationships with others.

Comparison of the ecological index provided somewhat surprising and incongruent results. This suggests problems with the ecological index. Figure 25 shows the OLMC's Naturalization project and the Children's garden receive very similar ecological ratings. Large naturalization projects like the OLMC site, which added substantial amounts of plant material, that increase habitat size and biotic diversity, should receive much higher ecological ratings than a small garden project, such as the children's garden. A project intentionally designed to have a minimal impact on the existing site. If these two projects rate almost equally on the ecological index, clearly there is a problem with the validity of the index or the indicator tests report on something other than ecological well-being.

Reviewing the specific ecological indicator tests suggests the second condition is true. Indicator tests for

this index report on things other than the ecological aspects of site. The ecological index has acted as a catch all for all physical aspects site, including includes design issues, site functionality, and ecology. Further, none of the indicators are designed to directly report on how the site influences the wider community. Indicators are specifically intended to examine how the physical surroundings and human community interact with the specific site. A real evaluation of the ecological impact would require a substantially different indicator test suite. The intention of the instrument was to evaluate the condition of the specific site. With this in mind renaming the ecological well-being index to the physical site or built design index would be more appropriate then redesigning the indicator suite.

Rating Results

The original Barometer of Sustainability uses the same x and y axis values to determine success thresholds (See Figure 9). The same rating scale has been applied here. The evaluation range is capable of representing a variety of different site conditions. All of the project evaluations fell well within the scale limits, with a median value of approximately 60.

Individual Indicator Test

Most of the indicator tests were relatively straightforward to gather and appear to have produced accurate

results. Although all tests were less empirical than expected and required, greater estimation on the part of the researcher then was hoped.

The decision to base several indicators on ratios that involved population sizes for local community proved difficult to validate and the results were of question-

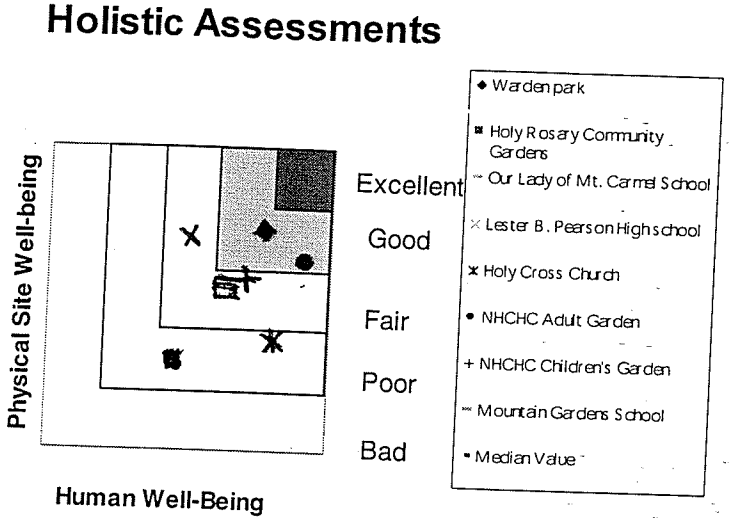


Fig. 42: Barometer of Open-space Assessment - Revised. A refined Barometer of Open-space assessment. Features a series of rating thresholds and the removal of an evaluation scale.

able value. For example, relating the number of volunteers to the population size (see Table 6a reference H-e) proved meaningless. Volunteer participation seems, in the projects evaluated seemed to be independent of community size.

Summary

Overall, the Barometer of Open-space assessment provides a viable means to evaluate a series of projects by offering an interpretation of data which cannot be compared though traditional methods of site evaluation.

Once the findings have been reviewed in more detail, problems are discovered in the transparency of the results and with the ecological index. Changes or refinements to the actual presentation method can be made to account for these problems. The renaming of the ecological index to the index of structural well-being' and the addition of performance thresholds are two of these changes.

5. Conclusions and Recommendations

The initial question sparking much of this inquiry into holistic assessment, asked if there is an effective means to evaluate the quality of open-space by comprehensively assessing the social and design components of a community supported open-space project.

There appeared no such means readily available to make this type of inquiry. If a comprehensive project appraisal was to be conducted, an instrument was required that could evaluate a range of project conditions and integrate the findings into a more complete and comparable appraisal. This tool needed to consider the formal design characteristics of site and the subtle communal relationships that allow these sites to be treated as places.

Consequently, an assessment method was designed, based on an existing holistic assessment tool, which assesses indicators of human and site specific well-being. The resulting community supported assessment tool, The Barometer of Open-space, was field-tested on a series of eight community supported open-space projects.

Assessment results did not offer any specific insights into the benefits of a particular design form, site function, or site component in creating quality open-spaces. On the contrary, the analysis suggests a passive recreational, naturalized, or agrarian landscape can work equally well in a variety of different neighbourhood

settings; if there is strong community leadership behind the development and management of the project. This assertion is supported by the evaluation results, which show that most projects provide consistently higher degrees of human well-being then physical site well-being.

The relationship between a strong community network and project's success is supported by the practices of successful community supported open-space programs like Montreal's Community Gardening Association. The City of Montreal requires a core of local support be established before the City is willing to provide their expertise or funding support. This has proved to be a very successful way of introducing community supported urban agriculture in a range of neighbourhood settings.

A strong community focus does come at a cost. The design choices and site organization of most projects reviewed are very pragmatic and do not take full advantage of site specific design opportunities. It appears that the interviewed project representatives, for the most part, have limited knowledge about the physical aspects of their sites and tend to limit the complexity of site design to reflect their understanding. When tasks require advanced design and building skills, like the selection of exclusively native plant material or the construction of a play structure, community activists are very good at obtaining necessary design and building services on a voluntary or gift-in-kind basis. The Lester B. Person project for example, used municipal excavation equipment and received planting plans

from a professional garden designer. Without these supports, the project would have been considerably less ambitious.

To improve the quality of physical site well-being, project developers need to find ways to increase their awareness of physical site characteristics. A self-administered form of the holistic evaluation instrument, based on the assessment research conducted here, is one approach to increasing site awareness because the project developer must first become aware of physical site indicators, if they are going to evaluate these indicators. An alternative approach to improving awareness of site characteristics is a community service that educates project developers about physical site issues. This consultation role would provide an outreach opportunity for the environmental design professional interested in community supported open-space.

Overall, the instrument performs as expected, allowing information from a variety of different projects to be gathered and compared. Including these results in the development and policy decision process offers project designers a means to predict the success of proposed development choices and validate design decisions. The assessment technique offers the environmental designer a basis for developing a quality assurance program, which will give insight into the designer's strengths and weaknesses. In either case, it is vital to ensure that the assessment process becomes a consistent and long-term effort, to avoid skewed results.

Recommendations

As addressed in Section 4, the instrument and method presented have several weaknesses, any of which could be addressed and improved. Consequently, there are several directions that additional research could follow to improve the holistic assessment of community supported open-space and the development of local open-space.

1. Refinement and testing of alternative presentation methods:

Four ways of aggregating and presenting performance measurements were considered during the course of this study (see Section 3). Applying the findings from this study, for use with these other presentation methods would be one way of determining which presentation method is best suited for which audience.

2. Creation of a definitive, generic suite of community open-space indicators:

In order to further develop a generic suite of indicators for community open-space assessments, the next natural step, is to invite experts who hold a variety of landscape and community perspectives to review, refine, and expand the existing indicator suite. A working group of experts will provide additional indicators and alternative approaches to testing and evaluation. Recognition that the tests directly reflect the interest and

concerns of a range of disciplines will also increase instrument credibility as a more holistic tool for landscape assessment.

3. Create a design and development support network:

There are a variety of organizations offering the services and supports required by local community developers. However, many of these developers find it difficult to initially access these organizations. Consequently, many projects are abandoned due to a lack of initial support.

The creation of a design and development support network gives an opportunity to improve access to support agencies by giving local community developers a forum to share effective development strategies and design experiences. This simplifies the process of accessing support agencies and permits developers to direct more attention towards often-overlooked project issues like site design.

4. Additional research into settlement form and the relationship between site, citizen, and community:

This research only scratched the surface of understanding the mechanisms that link community and place. The research was primarily intended to see if a holistic indicator test suite offered a suitable approach for a more holistic assessment of community supported open-space. Additional review of research into the areas of human geography, architecture, and ecology may re-

veal vital systems relationships not initially considered in the indicator selection process. These relationships could be the basis for additional indicator tests.

5. Integration of remote and statistical information:

A conscious effort was made during the instrument's design process to examine the phenomenological aspects of place and processes of community development. Very little remote or statistical information was evaluated because these information sources could not accurately describe the specific site or community condition at the time of the evaluation.

However, statistical data about site and community characteristics are used as part of many other holistic evaluations to improve the scope and accuracy of an assessment. When the recommended longitudinal studies are undertaken, an assessment method, which would include statistical or remotely gathered indicators, should be evaluated.

6. Use the indicator suite as preparation for community open-space development:

The presented indicator suite (see Appendix E) exemplifies many of the important aspects of local open-space. When the designer or community developer is aware of all of these factors, they can better understand how their decisions will affect the quality of the open-space. They can then make better informed design and

development decisions, producing more meaningful and functional open-spaces. This use of the indicator suite is intended to increase the designer's awareness, not to be used directly as a design tool.

The purpose of this research is to design and test an instrument that provides a more holistic evaluation of community supported open-space projects. It is hoped that pursuing these six recommendations can further the development and refinement of the assessment instrument and improve the quality of the open-spaces the Barometer of Open-space is designed to assess.

Appendix A

The European Sustainability Index: Container issues and core indicators (Hardi and Zdan, 1997, 2- 4)

Healthy Environment	The number of days per year that the locally applied standards for the air quality are not exceeded.
Green Space	The percentage of people that have access to green within the certain distance.
Efficient Use of Resources	The total consumption of energy and water, and the production of waste for final disposal per capita per annum.
	The ratio of renewable related to non-renewable energy resources.
Quality of Built Environment	The Ratio of open-space related to the area used by cars.
Accessibility	The number of km traveled by mode of transport (car, bicycle, public transport, except for) per year, per capita.
Green Economics	The percentage of companies that have joined eco-management and audit schemes or similar schemes.
Vitality	The number of social cultural activities/facilities.
Community Involvement	The number of volunteer organizations/groups per 1000 inhabitants (and an educated guess about the number of members).
Social Justice	The percentage of people living below the poverty line.
Well-being	A survey of system satisfaction of the quality of life (contents of survey to be determined locally).

Appendix B

Friends of the Environment Foundation

FRIENDS
of the
Environment

Fig. 43: Friends of the Environment Logo.
Friends of the Environment Foundation (http://www.fef.ca/main.html) provides funding support for initiatives that make a positive impact on the Canadian environment.

"Since 1990, the Friends of the Environment Foundation has been encouraging Canadians to participate in the restoration of their local environment. They knew we needed leaders, people willing to take a chance. They knew that making things better renews and heals us at the same time. I urge you to join them in the quest to protect the natural world. By supporting the Friends of the Environment Foundation you are reserving the place you call home."

(Friends of the Environment, 2000)

Friends of the Environment Community Fund

The purpose of the Friends of the Environment Community Fund is to provide funding support for worthwhile community-based initiatives that make a positive difference to the Canadian environment. Local advisory boards, made up of Canada Trust customers and employees, review the applications and make recommendations for funding support according to the established guidelines. Grants will not generally exceed $10,000. Applications are reviewed throughout the year.

The Canada Fund considers projects that:

- Protects and preserves the Canadian environment.
- Involves and benefits the local community.
- Increases awareness about environmental issues and responsibilities.
- Makes a positive difference to the health of our environment.
- Takes place within the geographic scope of the Community Fund chapter.

Appendix C

Bellagio Principles — Guidelines for Holistic Assessment

(Hardi and Zdan, 1997, 2-4)

1. Guiding Goals & Vision

Assessment of progress toward sustainable development should:

- Be guided by a clear vision of sustainable development and goals that define that vision.

2. Holistic Perspective

Assessment of progress toward sustainable development should:

- Include review of the whole system as well as its parts.
- Consider the well-being of social, ecological and economic subsystems, their state as well as the direction and rate of change of the state, of their component parts, and the interaction between parts.
- Consider both positive and negative consequences of human activity in a way that reflects the costs and benefits for human and ecological systems, both in monetary and non-monetary terms.

3. Essential Elements

Assessment of progress toward sustainable development should:

- Consider equity and disparity within the current population and between present and future generations, dealing with such concerns as resource use, over-consumption and poverty, human rights, and access to services, as appropriate.
- Consider the ecological conditions on which life depends.
- Consider economic development and other non-market activities that contribute to human and social well-being.

4. Adequate Scope

Assessment of progress toward sustainable development should:

- Adopt a time horizon long enough to capture both human and ecosystem time scales, thus responding to current short-term decision-making needs as well as those of future generations.
- Define the space of study large enough to include not only local but also long distance impacts on people and ecosystems.
- Build on historic and current conditions to anticipate future conditions: where we want to go, where we could go.

5. Practical Focus

Assessment of progress toward sustainable development should be based on:

- An explicit set of categories or an organizing framework that links vision and goals to indicators and assessment criteria.
- A limited number of key issues for analysis.
- A limited number of indicators or indicator combinations to provide a clearer signal of progress.
- Standardizing measurement wherever possible to permit comparison.
- Comparing indicator values to targets, reference values, ranges, thresholds or direction of trends, as appropriate.

6. Openness

Assessment of progress toward sustainable development should:

- Make the methods and data that are used accessible to all.
- Make explicit all judgments, assumptions and uncertainties in data and interpretations.

7. Effective Communication

Assessment of progress toward sustainable development should:

- Be designed to address the needs of the audience and set of users.
- Draw from indicators and other tools that are stimulating and serve to engage decision-makers.

- aim, from the outset, for simplicity in structure and use of clear and plain language.

8. Broad Participation

Assessment of progress toward sustainable development should:

- Obtain broad representation of key grassroots, professional, technical and social groups, including youth, women and indigenous people to ensure recognition of diverse and changing values.
- Ensure the participation of decision-makers to secure a firm link to adopted policies and resulting action.

9. Ongoing Assessment

Assessment of progress toward sustainable development should:

- Develop a capacity for repeated measurement to determine trends.
- Be iterative, adaptive and responsive to change and uncertainty because systems are complex and change frequently.
- Adjust goals, frameworks and indicators as new insights are gained.
- Promote development of collective learning and feedback to decision-making.

10. Institutional Capacity

Continuity of assessing progress toward sustainable development should be assured by:

- Clearly assigning responsibility and providing ongoing support in the decision-making process.
- Providing institutional capacity for data collection, maintenance and documentation.
- Supporting development of local assessment capacity.

Appendix D

5 Performance Dimensions for Lynch's Normative Theory

(Lynch, 1984, 118)

1. Vitality

The degree to which the form of the settlement supports the vital functions, the biological requirements and capabilities of human being -- above all, how it protects the survival of the species.

2. Sense

The degree to which the settlement can be clearly perceived and mentally differentiated and structured in time and space by residents, and the degree to which that mental structure connects with their values and concepts -- a match between environment, are sensory and mental capabilities, and our cultural constructs.

3. Fit

The degree to which the form and capacity of spaces, channels, and equipment in the settlement match the patterns and quality of actions that people customarily engaging, or want to engage in -- that is, the adequacy of the behaviour settings, including their adaptability to future action.

4. Access

the ability to reach other persons, activities, resources, services, information, workplaces, including the quantity and diversity of the elements which can be reached.

5. Control

The degree to which the use and access to spaces and activities, and their creation, repair, modification, and management are controlled by those who use, work, or resided in.

Additional meta-criteria:

i. Efficiency

The cost, in terms of other value things, creating and maintaining the settlement, for any given level of attainment of the environmental dimensions listed above.

ii. Justice

The way in which environmental benefits and the costs are distributed among persons, according to some particular principal such as equity, he, intrinsic worth, ability to pay, effort expended, potential contribution, or power. Justices the criteria which balances the gains among persons, while efficiency balances the gains among different values.

Examples of Normative theory

To clarify the notion of a normative theory, Lynch cites three traditional normative approaches to creating and understanding city form. He does not feel any of these approaches are complete. To familiarize the reader with the normative notion, they are described here.

Cosmic theory

Cosmic theory basis settlement form on the mapping of sacred images, icons and forms onto the landscape. This provides the basic ordering principal for settlement layout. The mapping is also used to prescribes the function of places within the settlement form. This technique is intended to create harmony between human lives and the cosmos.

Machine theory

The machine theory, treats the city as an assemblage of discrete parts. The concept of linkage is the essential ordering principal of the machine metaphor. It is the quality of connection between these parts that allows the city to function, produce and grow. When linkage provides the only constraint, builders with sufficient technical know-how can expand the city in any direction, as long as adequate linkage is provided. This metaphor is useful in describing a relationship between the city centre and the surrounding suburbs (Lynch, 1984, 118).

Organism theory

Organism theory, in contrast to machine theory sees settlement form as a one complex entity, of definitive size with growth thresholds. Interrelated internal functions support the health and well-being of the organism. Popularized through many ecological models, organism theory is built upon an understanding that an effect on one aspect of a settlement, will affect the entire settlement.

Appendix E

Survey Site Questionnaire and Worksheet

Holistic Open-space Assessment Survey Sheet

Date: _____

Assessor: _____

Contact Information

Organization: _____

Contact: _____

Phone Number: _____

Address: _____

Funding Organization: _____

Site Information

Project Name: _____

City: _____

Community: _____

Description of Open-space:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Orientation Map

Survey Questionnaire

1. Estimate the amount of reclaimed/recycled materials used to construct or maintain the site as a percentage of total material used. (Also see Site survey No. 9) (*E-j)

Note see Site Survey question No. 9

2. Estimate the amount of site area where food or material is grown as a percentage of total area. (Also see Site survey No. 10) (*E-k)

Note for evaluation with Site survey Question No. 10

3. Count the developmental and organizational steps taken to insure the construction, development and maintenance of the site would run smoothly. (*H-b)

1 2 3 4 5

4. Was there an organizing principle or theme to aid the design and planning process? If so, please describe these principles. (*H-c)

1 2 3 4 5

5. Count of the local community members who hold positions on boards or committees that have an influence on this open-space. (*H-d)

1 2 3 4 5

* See Table 6 Ref. section for additional information

6. Estimate how many people have volunteered their time or services to help build, maintain, or improve this open-space. (*H-e)

1 2 3 4 5

7. Count of groups or organizations that use this open-space a meeting place or teaching centre. (*H-f)

0 1 2 3 4 5

8. Estimate the number of events held on this site within the past year. (*H-g)

1 2 3 4 5

9. Count of activities, which occur on this site and nowhere else in the community. (*H-i)

1 2 3 4 5

10. Do people feel safe visiting this site at nighttime. Do you feel it is adequately lit for safety? (Also see survey question No. 17) (*H-o)

0 1 2 3 4 5

11. While standing close to the site, ask ten people randomly if they know the name of this site? If no, ask what they. (*H-h)

1 2 3 4 5

* See Table 6 Ref. section for additional information

Site Survey

1. Count of methods used to capture water on site. (*E-b)

1 2 3 4 5

2. Estimate of the amount of permeable site surface area. (*E-c)

1 2 3 4 5

3. Estimate the number of trees and large shrubs growing on, or encroaching on the site. (*E-d)

0 1 2 3 4 5

4. Are there examples of indigenous hardy species on the immediate site? (*E-e)

0 1 2 3 4 5

5. Estimate of area with non-turf ground cover. (*E-f)

1 2 3 4 5

6. Count of the pre-existing site features or established plant material that have been intentionally conserved or integrated into the site design. (*E-g)

0 5

7. Evidence that the site is used by wildlife. (*E-h)

0 5

* See Table 6 Ref. section for additional information

8. Count of all on-site waste receptacles included composting containers. (E-i)

1 2 3 4 5

9. Percentage of pre-used or recycled materials used on the site and material removed form this site for use on other sites. (Also see Survey question No. 1) (E-j)

1 2 3 4 5

10. Estimate the physical site area dedicated to food or product production. (See Survey Questionnaire No. 2) (E-k)

0 1 2 3 4 5

11. Human population estimate within 15 minute radius. (H-a)

Number of people: _____

12. Count the conditions, which will impede access to a site for physically disabled individuals. (H-j)

0 -1 -2 -3 -4 -5

13. Count the amenities or strategies to reduce traffic speed or flow on streets adjacent to the site. (H-k)

0 1 2 3 4 5

* See Table 6 Ref. section for additional information

14. Evaluate pathways for functionality. Are entry and exits defined? *H-l)

1 2 3 4 5

15. Count the amenities provided to improve the site experience for pedestrian and cyclists. (*H-m)

0 1 2 3 4 5

16. Count of the areas within the site, which are used as microclimates--areas which are used because they are protected from adverse climatic conditions. (*H-n)

0 1 2 3 4 5

17. Is the site adequately lit for safe night use? (Also see related survey questions No. 10) (*H-o)

0 1 2 3 4 5

18. Count the conditions that may cause harm to humans or animals. (*H-p)

0 -1 -2 -3 -4 -5

19. Site area in square metres. (*E-a)

Site area in square metres:_____

* See Table 6 Ref. section for additional information

COMPUTATION FORM

INTERVIEW QUESTIONS			SURVEY QUESTIONS		
No.	A	B	No.	A	B
# 1	X	X	# 1	X	
# 2	X	X	# 2	X	
# 3		X	# 3	X	
# 4		X	# 4	X	
# 5		X	# 5	X	
# 6		X	# 6	X	
# 7		X	# 7	X	
# 8		X	# 8	X	
# 9		X	# 9	X	
# 10		X	# 10	X	
# 11		X	# 11	X	X
			# 12		X
Total			# 13		X
			# 14		X
			# 15		X
			# 16		X
			# 17		X
			# 18		X
			# 19	X	X
			Total		

Step Two

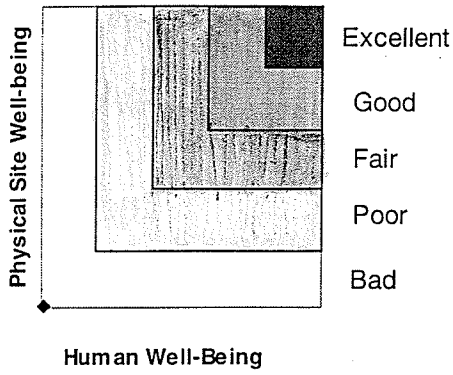
Added total for A columns _____ / 60 = Human well-being _____

Added total for B columns _____ / 50 = Ecological well-being _____

Complete this form by filling-in each box with the evaluation values from the interview and survey forms. Complete the computations outlined in Step Two. This will provide the ratings for human and ecological well-being that can be plotted on the Barometer of Open-space to give an overall wellness rating.

Holistic Evaluation Graph

Holistic Assessments



NOTES: