

# **Integrated Approaches to Sustainability Assessment: An Alignment of Ends and Means**

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## **Abstract**

This paper outlines research on a model for Integrated Sustainability Assessment (ISA). The model combines 20 key elements of sustainability assessment into a workable sustainability framework. The model was applied in the assessment, generation and modification of 12 sustainability projects with findings indicating wider applications. The paper describes the 20 components used in the ISA process, provides a definition of ISA and each component of the ISA model used, explains the reason for the necessary inclusion of each component, the effect if omitted from an ISA process, and the descriptive labels for 20 conceptual types of sustainability assessment identified.

[Keywords: Sustainability, Integrated, Impact Assessment, ISA, ISA Framework, ISA Model, Thinking Tool, SIA, EIA, SEA]

## **Introduction**

The development of increasing expertise in the conceptualisation, design, execution and integration of impact assessments, particularly in the separate fields of environmental and social impact assessment, creates in practice an intriguing question. As our proficiency increases in dealing with the many parts of assessment systems that were never designed to be integrated, so does our frustration at working with only parts of the greater whole.

With a recognition that ‘established things are not working’ (Gibson 2001) and hearing the calls for practical ‘holistic impact assessment’ (Kwiatkowski and Ooi 2003), we do not have to look too far into the future to see the emerging need for frameworks to think about the form and content of integrated sustainability assessments to facilitate the application of sustainability principles. As traditional decision making frameworks also transform, this emergent trend, diverging from the extension of established environmental or social considerations of impacts, may mark a distinct shift in the role and importance of impact assessments.

While we may be a few years away from this emergent shift, an opportunity to glimpse into the future was presented through the case studies in this paper, revealing a window into some of the possibilities, idiosyncrasies, difficulties and benefits that may arise in the practical application of the various levels of integration of, and the scope of different approaches to, integrated sustainability assessment in the future.

## **Overview**

The case studies the subject of this research involved the impact assessment of development proposals by managers acting on behalf of a local government authority. The managers were provided with training in an integrated thinking methodology for sustainability assessment and given the necessary tools for that assessment. In assessing the projects, they were asked to consider all 20 elements in an integrated model designed specifically for that purpose.

The findings include that a multi-component framework for ISA is workable. A secondary observation was that when confronted with the choice between changing their existing thinking or changing the integrated assessment framework, some of the participants undertaking the assessments consciously or unconsciously altered the assessment framework, and therefore altered the outcome of the assessment processes. This highlighted one of the future difficulties with ISA.

Also, omission of one or more elements from the integrated model created distinctly different outcomes from the assessment process. From the project proposals assessed, 20 distinctly different forms of sustainability assessment were identified as being theoretically possible, one resulting from the omission of each single component of the integrated model.

The paper describes the 20 components used in the ISA process, provides a definition of each component, explains the reason for the necessary inclusion of each, the effect if omitted from an ISA process, and the descriptive labels for the 20 conceptual types of sustainability assessment identified.

The aim of this research is to make conscious the unconscious decisions made in structuring sustainability assessment processes to include or exclude different elements, thereby making transparent the different ways of approaching sustainability assessment. The model presented, in describing an ISA framework, provides a new form of categorisation as a way of assessing the appropriateness of different forms of sustainability assessments from an integrated perspective.

## **Integrated Sustainability Assessment (ISA)**

In the emergent theory and practice of impact assessment evolving acronyms abound. With the creation of any new acronym there should also be an accompanying apology. Any integration of assessment methodologies into an assessment based on sustainability principles may include the processes and expertise of any, or all, of the disciplines of environmental impact assessment (EIA), strategic environmental assessment (SEA), policy assessment (PA), privacy impact assessment (PIA), economic and fiscal impact assessment (EFIA), technological impact assessment (TIA), demographic impact assessment (DIA), health impact assessment (HIA), social impact assessment (SIA), triple bottom line assessment (TBL), integrated impact assessment (IIA) and

sustainability assessment (SA). With increasing plurality comes the need to harmonize complexity.

However, for the purposes of this paper “Integrated Sustainability Assessment” (ISA) does not mean an integration of various assessment methodologies as parts of a whole process, but an integral assessment based firmly in sustainability principles which also forms an integrated component of the policy and decision making processes. A distinction is therefore made between the process of the assessment, consideration and mitigation of multiple impacts - and the iterative assessment and development of proposals towards sustainability using sustainability principles. For the purposes of this paper, rather than a focus on balancing increasing tradeoffs, ISA may be considered as being directed towards finding synergistic and complementary benefits in a proposal that is, by definition, intended to be sustainable.

To do this effectively, of course, requires us to draw on the completeness of the integral parts within the conceptual whole in the already developed IA forms. ISA is distinguished here by the purpose and basis for assessment (the assessment ‘ends’) in being towards sustainability (in whatever way that term is defined), rather than by the composition of the methodologies used (the assessment ‘means’). The scope of inquiry is therefore widened to include many forms of assessment, rather than being presented as an alternative, with the only exclusion being a shift to a different premise.

While this paper is directed towards identifying different graduations in the widest possible range of approaches towards ISA, for clarity in the limitation of the applicability of this paper, a definition of ISA is also attempted, using three principles of definition of ISA, being: 1. a basis in sustainability principles, 2. the integration of the assessment into governance structures and 3. the determination of assessed impacts on a identifiable sustainability test.

### **Sustainability Principles as a Defining Element of ISA**

Gibson (2001) has made an examination of sustainability-based environmental assessment and notes that once we adopt sustainability as a key objective and test in environmental assessment, it is clearly implied that the minimization of negative effects is not enough. Gibson (2001) makes the distinction that sustainability assessment must encourage positive steps – ‘towards greater community and ecological sustainability, towards a future that is more viable, pleasant and secure’.

By definition, the dimensions of sustainability assessment are more pluralistic, and also relativistic, than impact assessment alone, incorporating those matters of enduring value in the consideration of a balancing of present and future needs (Ravetz 2000). Sustainability assessment may be considered for this purpose, a values based test supported by empirical testing, rather than an empirical test supported by values.

Because of the relativistic nature of sustainability definitions (Pezzey 1997, Rigby et. al. 2000, Varey 2004) a generic definition of sustainability principles applicable to all forms

of sustainability assessment is possible, but implausible. While it can be created, not all will agree. The different conceptualisations of values to be preserved, relative span of responsibility and the differentiation of generational consideration mean that no principles of sustainability can be considered universal, other than within particular frames of reference (Graves 1970, Beck 2001, Varey 2004).

This does not preclude, and in fact requires, that a key component of ISA must be in the integration of accepted explicit (or implicit) sustainability principles into the assessment framework. The principles themselves do not define the validity of the assessment, only that their presence defines the element of a sustainability-base in that assessment (George 2001).

Therefore, the first element required of ISA (if it is to be defined as such), is that the assessment is directed towards, and based on, the application of sustainability principles, rather than primarily towards the consideration of one of the many other distinctly separate principles that contribute towards sustainability (e.g. environmental impacts, social impacts, economic impacts etc).

### **Integration as a Defining Element of ISA**

The recognised need for ecological considerations in social impact assessment and social and health considerations in environmental impact assessment is one form of emergent integration that is occurring (Marafa 2002, Kwiatowski and Ooi 2003). In considering an ecology of systems an initial impact will have other impacts (environmental, social, etc.) and the necessary move towards harmonizing multidisciplinary will become increasingly apparent as the integration of methodologies also occurs.

In this definition of ISA, the second element of integration refers not to the integration of different assessment methodologies (essential to the valid process of assessment), but of the integration of the sustainability assessment process into policy and decision making frameworks.

One of the difficulties that will arise in ISA is that often our governance structures have evolved without an integral foundation in environmental, social or other essential considerations. Sustainability, as an emergent proposition, comes into conflict with existing governance structures. It is argued that impact assessment will only be useful in furthering sustainable development when it is fully integrated into the decision making process (Devuyst 2000, Noble 2002).

Gibson (2001) observes that sustainability based assessments would be easier if attempted in the context of a more coherent and comprehensive overall framework for sustainability-based governance, and that applying sustainability-based criteria in environmental assessment would be greatly facilitated by the general presence of well-considered sustainability objectives, indicators, priority action areas, etc. at strategic levels. As this is not always the case for our attempts, a distinction is made between

assessment systems that have a fully integrated effective framework for sustainability-based governance and those without.

For example, an sustainability assessment framework that is integrated might have each of the following components: 1. a clear and workable definition of sustainability, 2. an enumerated list of principles to guide the desired sustainable outcomes, 3. a sustainability assessment process that integrates with strategic and operational decision making, 4. meaningful sustainability metrics to inform those decisions and 5. useful and practical assessment tools and processes to guide the process so as to make sustainability a fully integrated, rather than complementary or conflicting, governance process (Varey 2003).

While for many governance structures it is unlikely that a sustainability orientation will occur in the short-term, the emergence of ISA is likely to also parallel fundamental changes that will occur in many governance frameworks. ISA will probably only be made a fundamental component of governance once the benefits of integration become clear as workability becomes possible. We are at this stage looking into the future rather than at the present, recognising the need for what is about to come.

### **Assessment as a Defining Element of ISA**

The third defining component of ISA is simply that the assessment involves some form of evaluation and determination on sustainability criteria, not just evaluation alone. The basic challenge is to determine the specific decision criteria that can be applied to a sustainability based assessment that resolves the inherent difficulty of the competing dynamics within eco-socio-economic based considerations, noting the problems of technical indeterminacy and value multiplicity unique to sustainability (Ravetz 2000).

This is not to say that ISA must resolve these difficulties, only that it must transparently face up to them. Decision criteria and assessment parameters may be based on strong or weak sustainability – trading off natural capital equations in the present and future or refusing to do so. The determination of the decision criteria is open to the designer of the process with reference to the intended outcome.

What is required in ISA is that the assessment is made of the sustainability of the proposal and not simply the assessment of its component parts. An impact assessment on separate environmental and social grounds of an economic proposal provides additional information to inform a decision. It is the integration of that assessment criteria into a decision about sustainability, not the mitigating impacts or benefits of the economic proposition, that defines an ISA approach in this definition.

### **From Concept to Practical Application of ISA**

Recognising that ISA, in this context, is a different beast, how do we then train and tame it in all of its forms. Simply defining ISA in theory, while assisting development, does not lead to expertise in practice. So when an opportunity arose to look at the practicalities of ISA, and glimpse into the future, the chance was too fortuitous to be overlooked.

The study concerns an isolated local government council with responsibility for over 30,000 residents that was formed from the merger of two Town and Shire administrations, combining seven local wards within one City administration. Its boundaries, encompassing 4,315 square kilometres, define a close-knit community in the oldest European settlement in the jurisdiction, bringing together under one administration many historic, indigenous and environmentally unique considerations. The 2002-2003 annual administration expenditure was budgeted at approximately \$36 million, with over half being spent on capital works developments, forming only a part of the expanding residential (\$40 million pa) and non-residential (\$16 million pa) development within the area (Annual Report 2001, 2002).

The City administration had won a number of Local Government Management Association awards, competing against over 144 other local governments, through a commitment to excellence and best practice in strategic management, process management, performance measurement, planning and communication. The City administration had also been developing a path towards sustainability principles based on development of its strategic management and governance frameworks.

The City engaged an executive management training institution to build the management capacity of the City's directors, executive management and senior management in a two-year program and requested, as a concluding part of that program, a pilot project for the integration of sustainability assessments into their planning and development functions. Not having already fixed in place sustainability based development planning and review processes, and not already dealing with environmental and social impact assessments in a formalised structure, there was the opportunity to consider and trial an ISA approach, facilitating a shift directly to a sustainability-based governance structure.

### **ISA Framework Design**

The request for the design of an ISA framework highlighted the need for a specific instrument for sustainability assessment and its non-emergence from EIA and SEA approaches, particularly at the local level (Devuyst 2000). Recognising this need, the opportunity was used to create an ISA specifically for this purpose. As it was to be used expertly by non-experts, the ISA needed to provide a simple framework incorporating all of the necessary parts, while allowing complete flexibility of application across diverse technical problem areas. As each application of the ISA framework was also to be assessed for training purposes, that flexibility was also required to be limited within a consistent format and approach.

To highlight the difficulty of the task, Gibson (2001) outlines the following key process design elements of a sustainability-focused environmental assessment process:

- explicit commitment to sustainability objectives and to application of sustainability-based criteria;

- broad definition of environment or other means of ensuring attention to social, economic, cultural and cumulative as well as individual biophysical effects, and all their systemic interrelations;
- mandatory justification of purpose;
- mandatory evaluation of reasonable alternatives;
- attention to positive as well as negative effects and enhancements as well as mitigations;
- provisions for adaptive design and adaptive implementation of approved undertakings;
- links with other sustainability-defining and applying processes; and
- provisions for transparency and effective public involvement throughout the process (Gibson 2001:50)

The identification of the descriptive domains and their relationship is the essence of integrated conceptual framework design. An integrated sustainability assessment would require the ‘simultaneous use of non-equivalent descriptive domains to represent and study in a coherent way the relevant dimensions of a system as a non-reducible model generating non-equivalent information spaces’ (Giampetro et al. 2001). An integrated model, by definition, must provide a general analytical framework to put in perspective the indications derived from the component descriptive tools available (Giampetro et al. 2001). In dealing with sustainability the framework should also take into account the themes of technical indeterminacy and values multiplicity as essential components of integrated assessment so as to create a transparent framework with both robustness and flexibility (Ravetz 2000). Essentially, the multiple components of an ISA needed to be identified and simplified without the risk of the assessment framework becoming simplistic.

As the ISA framework was to be used as a conscious and consistent application of sustainability, it also needed to incorporate an appropriate concept of sustainability at its base (Varey 2003). It would also, at a minimum, need to consider the proposal being assessed on economic, social, environmental and possibly ethical grounds (Ravetz 2000), preferably determined with reference to established sustainability principles that align with the sustainability definition (George 2001). The particular issue being resolved and outcome desired to be achieved (the unsustainable state to be avoided or remedied by the action) should also be expressly stated and the particular decision criteria (the basis for a determination of sustainability) made transparent and express (Dalkmann et al 2004). Considering fundamental sustainability principles of inter-generational and intra-generational equity (George 1999), a definitional base for the assessment of impacts on at least two levels of different proximity (in distance and time) is also needed (Verheem 2002). Assessment from a sustainability rather than a development base suggests the

implications of the no action alternative should also form part of the assessment (Diab et al 2001). Ideally the process should also allow for adaptive and iterative development of the proposal towards sustainable outcomes, without the problem of alteration of the proposal during the assessment process, to avoid making a shifting assessment illusory (Gibson 2001).

Each of these principles are reflected in the components used to create the ISA for the case study projects. Recognising the complexity of the task, the primary aim was for definitional simplicity – the model then being applied at the level of technical complexity applicable to the issue being assessed. The following are the simplistic definitions used for the purposes of distinction and to initially introduce the 20 components developed as the integrated descriptive domains of the ISA framework used:

1. **Sustainability Definition:** The definition of sustainability that is used by the organisation to frame its sustainability enquiry - What is to be sustained (e.g. economic, social and ecological values), for whom (e.g. the community) and for how long (e.g. future generations))
2. **Issue:** The matter that is causing the need for proposed action. It should not be phrased as a solution. (eg Issue: The number of introduced weeds in parklands)
3. **Outcome:** The desired result in wide terms. It should not be phrased as the absence of a problem. (eg That our natural parklands contain a healthy mix of biodiverse indigenous flora – not, for example, the elimination of a certain weed)
4. **Economic Principles:** The sustainability principles that reflect financial and non-financial economic considerations (eg cost estimates must aim to minimize both external and internal accounted for costs)
5. **Social Principles:** The sustainability principles that reflect social, community, heritage, cultural, gender and other humanitarian considerations (eg development must preserve amenity in the heritage of place in areas of cultural significance or uniqueness).
6. **Environmental Principles:** The sustainability principles that reflect ecological sustainability (eg application of the precautionary principle in the preservation of at risk non-renewable natural resources).
7. **Ethical Principles:** The sustainability principles that reflect good governance and moral considerations (eg compliance with both State law and issued, but not yet effective, policy)
8. **Required Outcome Criteria:** The specific financial, social, environmental and ethical criteria derived from the principles that are the ‘must haves’ for a proposal of that type to be acceptable (eg is within budget approvals, preserves heritage value, creates no pollution and complies with Building Code).



9. **Proposal:** The proposed action itself describing its essential elements (including a timeframe and location). This may be modified and adapted many times before becoming a Final Proposal but is stated with clarity for the purpose of assessment.
10. **Final Proposal:** The proposal once developed and assessed, incorporating any improvements required to satisfy the Required Outcome Criteria, to distinguish this from the initial Proposal, pre-assessment.
11. **No Action Alternative:** The description of what is most likely to occur in the future if the present position is maintained and no action is taken or proposal is decided on.
12. **Benefit:** For each of the sustainability categories, the benefits of the particular proposal, which include tangible and intangible benefits. A benefit is something that improves the existing position, now and in the future (ie not alleviates problems with a potential position).
13. **Impact:** For each of the sustainability categories means the adverse impacts of the proposal, which include tangible and intangible impacts. An impact is anything that adversely affects the status quo.
14. **Here:** The geographical or locational artificial boundary of the particular proposal for thinking purposes. A 'Here' may be geographically disaggregated (eg all community playgrounds within the region).
15. **There:** Everywhere else that is not defined within the category of 'Here' for a proposal.
16. **Now:** The temporal delineation of effects for the particular proposal for thinking purposes (eg effects that become obvious this day/month/in a 20 year period) determined as appropriate for the timeframe of the effects.
17. **Then:** Everything else in terms of time that is not defined within the category of 'Now' for a proposal. (ie past events are considered in the aggregate as part of the present comprised in 'Now'.)
18. **Assessment Criteria:** The scoring or metrics system used to assess each Benefit and Impact dimension (eg at its simplest, a ranking 0-5 where 0 is no benefit, 2 is some benefit, 3 is more beneficial than not, 4. is significant benefits and 5 is maximum potential benefits.)
19. **Decision Criteria:** The basis on which the scored assessment will determine if a proposal will be recommended for implementation. (eg the benefits outweigh impacts, net benefits and impacts must exceed 100 points in the assessment criteria, etc.). This may be influenced by whether the proposal is essential or

optional to ensure sustainability – with a higher threshold for optional projects. There may be only a decision criteria for the whole proposal overall, or specific threshold criteria for each of the multiple bottom lines (eg no environmentally adverse impacts of irreparable nature) depending on the nature of the proposal. Flexibility is provided subject to transparency.

20. **Timeframe:** The timeframe for consideration to determine whether the consideration of the Issue must be decided based on information available up to a particular time, or that it can be decided in an open timeframe without invoking the No-Action Alternative.

The 20 components were then combined into a simple one-page ‘Thinking Tool’ as a template for the assessment projects. The Thinking Tool was designed to reflect the psycho-dynamics involved the complementary integration of conflicting components and the hierarchy of application needed to work through a holistic grouping of considerations. The framework design was trialled in a hypothetical exercise in isolation and then in an extensive group process to test for understanding, functionality, consistency and ambiguity, and modifications then made. The ISA framework was then tested in practice.

### **Practical Application of ISA Framework – 12 Case Study Projects**

Using the ISA framework developed, 24 executives and managers responsible for development proposals and public works within the municipality were trained in its use and the principles of impact assessment from a sustainability base. The managers then worked on 14 projects using the ISA approach which required them to incorporate the 20 distinct components of sustainability impact assessment into their considerations. Of the 14 projects, one was not commenced and one was not completed within the five month study period. Of the 12 that were completed, all were successfully assessed using the ISA approach, dealing with each of the components of the ISA model within the particular circumstances of the case-study projects and determining an outcome on a sustainability base.

The projects covered a diverse range of sustainability impacts, considering developments such as a major tourism and boating marina, a community cultural centre and performing arts venue, long term groundwater supply infrastructure, a multiple-use youth recreation facility, street trees management and streetscape amenity, industrial leachate discharge, enhancement to an underwater tourism development in the form of an artificial dive-site, stockyard bio-solids and wastewater handling, road-works gravel extraction and mining, historical landmark preservation, the removal and storage of a 175 year old archived records management facility and an urban development proposal. This wide diversity of considerations further added to the rigour of testing of the framework while acknowledging the limitation to projects of a manageable size for the study purposes.

The criteria for the form of the assessment produced using the ISA framework and tool was only that the stated definitional base must be used for each component, unless an express alteration could be justified and explained, and that all 20 components must be

considered, respecting that they would have more or less relevance in different applications and therefore require different levels of analysis, but initially should be given equal consideration.

The form of the completed assessments ranged from a single poster-sized page spreadsheet with multiple sub-components, to a detailed sustainability report with fully-integrated EIA field and technical evaluations. Others incorporated extensive community consultation data and processes, costed business plans and expert evaluation reports.

### **Findings and Observations from the Application of the ISA**

Rather than empirical analysis of the ISA case studies as to the accuracy or otherwise of the assessments conducted, this discussion of findings is by way of qualitative observations, the interest being not in the outcome of the assessments, but in the process.

The main focus of the use of the framework was not to improve the quality of assessment processes, but to make transparent the thinking used. As any reader of assessment reports where a format for the scope of consideration is not prescribed or defined, a framework that shows how a problem was approached, what was considered, what was omitted and the principles on which assessment (be it subjective or objective) was based, makes assessment of the recommendations much simpler. The proposition is that if we improve the quality and transparency of the analysis then we improve the quality of the assessment.

A surprise finding was that all of the assessment projects (with one exception) showed competency in thinking about and applying sustainability principles at an IAS level. The responses demonstrated that the underlying principles, the framework, its parts and its correct use were clearly understood. This perhaps only demonstrates the degree of existing management capability within the participants, even though most had not had a great deal of previous experience with impact assessment analysis or sustainability applications.

The study benefited significantly in its success from the fact that the assessments were done at a senior level with executive support, in an organisational environment conducive to learning, and without preconceptions about the form or content of impact assessments. Consequently, the barriers to ISA ordinarily present in existing structures familiar with impact assessment processes were not as rigid, the six change dependent criteria of cognitive development being able to be satisfied within the constraints of the project (Graves 1974).

What was uniquely interesting, however, was the apparent effects of the cognitive conflict that integrated sustainability thinking necessarily involves (Lubell 2000). With an alignment of ends and means, and a transparency of reconcilable reducible elements, the ISA provided the optimal process for decision-making. High goal conflict and low cognitive conflict reduces the quality of decisions made, whereas low goal conflict and high cognitive conflict creates the dynamics needed for high predictive quality, which

increases in performance with familiarity over time through experience (Cosier and Rose 1977, Rose, et al 1982). The ISA framework and the configuration of the thinking tool were specifically designed to achieve this low goal conflict, reflecting the alignment and shared understanding of sustainability values, and high cognitive conflict in the comparative analysis and non-reductive trades-offs of key principles based on distinct sustainability criteria.

Where the framework and the participants existing thinking about a proposal or their technical approach did not match, and given the choice of changing their thinking, or changing the thinking tool, some of the participants consciously or unconsciously changed the use of the tool to fit their thinking, and thereby altered the framework. They did this mostly without altering the form of the tool. Being an integrated model this created some very interesting effects, some general examples of which were:

1. Defining the Outcome and Proposal as the same – These components were separately defined and placed in the framework tool to create separate items and to clearly identify that the proposal presented for assessment was not to be assumed as being the same as the outcome desired. By framing them in identical terms this converted the ISA into a ‘TBL Impact Assessment’ tool and made extremely transparent the assumption that the only possible proposal was the one presented.
2. Omitting the Here/There Criteria – In defining the locational effects as the same (e.g. limited to the geographical boundaries of the participants political authority) this created the effect of ‘bounded sustainability’ – or a closed systems approach where options and effects outside of the undefined scope were ignored as part of the assessment. Effects that could have large impacts outside that area were not considered.
3. Merging Benefits and Impacts Scores – The framework used a simplified definition of ‘impacts’, reflecting the approach that benefits in improving an unsustainable state were an important consideration, and so adverse impacts needed to be separately assessed. By merging these processes in the framework, this unconsciously created a way of meeting a threshold net benefits test based on a total score using tradeoffs unintended by the framework (i.e. economic revenue off-sets environmental degradation, and social education programs mitigate ethical issues). An unsustainable proposal on an adverse impacts basis then became justifiable, but with the participant being able to demonstrate clearly why.
4. Omitting the Assessment Breakdown – For whatever reason, one participant ignored the multiple bottom line breakdown assessment by dimension, and instead completed a subjective composite list of benefits and detriments where the number of pros and cons were compared, which had the effect of making quantitative the qualitative component of the assessment, confusing subjectivity with objectivity.
5. Outcome but no Issue: - Some participants defined the sustainability outcome in line with the sustainability base, but did not identify an issue that the proposal resolved

(e.g. the need for amenity development). This created a self-fulfilling tautology, the proposal being considered good because any progress towards a good proposal is good. This resulted in the reverse of a TBL Impact Assessment (ie a TBL Benefit Assessment).

6. **Arbitrary or Post-Determination of Decision Criteria:** - Where the decision on the proposal was not integrated into the governance structures, and no decision criteria was specified, the assessment was not necessarily made on sustainability grounds. As the Decision Criteria was not determined independently and prior with transparency of rationale and policy, this set up the perception of a post-determined pass/fail test that was not be able to be justified objectively (even if the assessment was done effectively).
7. **Redefining Categories:** - Clear and mutually exclusive categories of social, environmental, economic and ethical considerations were required. While an environmental benefit (e.g. maintaining bio-diverse parklands) can also have social and economic benefits, rigour in sustainability assessment may require these to be separately considered. If economic benefits, or environmental benefits, or ethical benefits are misinterpreted as social benefits (and are given the same score in all categories) the framework creates double (or triple or quadruple) accounting. While the category areas are mutually exclusive, re-framing of the technical terms into common usage led to definition errors.
8. **Decision Making Process:** - The framework is intended to work within and as an integrated part of the decision making governance structure. This enables sustainability issues and political (or other) criteria to be separated with transparency. Where the assessed outcome was used without being formally integrated into the decision making process it potentially would operate to replace, or become merged, with that process. Lack of formal integration made the process a simple Sustainability Assessment which could be ignored (which in turn could influence the assessment).
9. **Absence of Sustainability Base:** - The ISA was to be used within a wider conceptualisation of sustainability principles and the assessment criteria ideally determined in alignment with a clear ‘sustainability definition’ and ‘sustainability principles’ – (e.g. what sustainability means in this context). Where this component was absent, incomplete or generic, personal principles were simply used. The effect is what is known as ‘unprincipled sustainability’ where the personal principles of the assessor are used as the basis, but these are not stated – making the assessment subjective and random in its outcome when tested using different assessors - causing problems in the consistency of assessments.

We can foresee in a review of practices and developmental theory in the area of impact assessments that sustainability thinking will develop in non-contiguous levels. The ISA framework approach was designed to enable thinking at a level that integrates multiple components, while allowing different standards of assessment as appropriate within that level. It is not prescriptive as to outcome, only approach, and within this prescriptive

approach, provides flexibility to consciously choose the appropriate components for consideration. A decision to select particular principles or choose certain criteria is entirely valid within the framework proposed, allowing for different levels of thinking, levels of detail and, by virtue of that discretion, different outcomes.

While the assessments were still made on an ISA base and generally consistent with the parameters given, those that resolved the cognitive stress with modification of the framework, potentially (but not necessarily) affected the assessment outcomes. While this modification is an ordinary human response, the difference was that by the use of a clear ISA framework in the form of the model, the outcome impacts of the alterations were clearly identifiable, allowing for objective evaluation and feedback to the participants. This enabled them to gain experience and become conscious of their unconscious process errors to enhance future familiarity and predictive performance. Higher order cognition requires this feedback in order to develop congruence of actions and intentions (Wolpert et al., 1995, Jeannerod, 1997). Unlike sensorimotor responses (e.g. you move your hand and you feel and see this), the systemic effects and impact of sustainability assessment are remote in time and distance. Finding a way of assessing the congruence of action and intent, and giving feedback on this, resolves a significant issue in the development of impact expertise.

The study also showed something unexpected about the framework when it was used to compare an ISA assessment to another assessment process in use. By identifying the presence or absence of each of the distinct components of the ISA model within the other existing assessment framework (whether they were in the same or a different form), the ISA framework could be used to identify components not used, and by their identification, the likely impact of omission on the assessment outcome. The results of this comparison were surprisingly revealing in a misalignment of ends and means.

This indicated a wider application of the ISA model created, as a means for the 'assessment of assessments', particularly for non-ISA assessments on their functionality on an ISA basis, and for proposed ISA frameworks for completeness with reference to the resulting impacts of omissions. As there is often great debate and variation in the approaches to sustainability and triple bottom line assessment processes, this may be something of significant practical use. The aim would not be to determine whether a model is more or less 'right', only to assess the alignment of ends and means against a set of objective options. The 20 component model with its particular definitions is, however, only one potential form of ISA, merely setting a beginning point for simpler, but not more simplistic, integrative structures that can be used for comparison. In a holistic evaluation of system effects, any definition of the parts is arbitrary and can be re-configured, provided only that the re-configuration also represents the whole.

### **Extrapolation of Observations**

A definition of ISA is provided (see above) using the three principles of; a sustainability basis (sustainability), integration of sustainability into the decision making considerations (integrated) and creation of a decision based on sustainability criteria (assessment). To be

an ‘integrated’ sustainability assessment on this defined base does not prescribe the type of assessment processes used or the form or content of the assessment, merely its scope of enquiry. This respects the many different definitional premises for interpretations of sustainability as a concept (Varey 2004).

All that is required for an effective ISA is a conscious alignment of ends and means. The impacts of a proposal on the sustainability end-state desired should be assessed using an assessment process that delivers determinations within that version of sustainability. Accordingly, not all elements of the 20 component framework need be present to create an ISA, and while desirable they are non-essential, provided we are conscious of the impacts of omission.

Extrapolating on the reflections from the analysis of the omissions or re-interpretations of components of the ISA model used in the case studies, we can identify 20 other distinct alternative forms of ISA – one arising from the omission of each component of the integrated model. Recognising the impact of the omission makes conscious the choice of ISA type used and the impact on the outcome of the sustainability impact assessment chosen.

Appended to this paper as **Table 1**, is a representation of this extrapolation, examining each of the 20 component elements forming the ISA, its reason for inclusion reflecting ISA principles and the effects of omission. A label is also attached to each component examined, phrased to identify the effect of the component if omitted, not as a judgment, but only to make conscious the effect of omission of that particular element, highlighting that which is otherwise often only implicit.

In theory, if the 20 components can be considered a valid set for this particular type of ISA, combinations of omissions of more than one element, would each yield a different type of integrated sustainability impact assessment. If it can be assumed that conceptually an assessment with one element only is still a valid form of assessment on an ISA base (for example an assessment of the ‘no-action alternative’ component alone still constitutes some form of assessment) – the combinations of omissions from the 20 component framework has the potential to generate 1,048,555 distinct and identifiable types of sustainability impact assessment (ie A, AB, ABC, ABD, ABE, ACE, ADE etc up to 19 components, but excluding repetition). Arguably, to then create the ‘one right’ combination of the 20 elements into a workable thinking framework would be to find 1 combination in 2,432,902,008,176,640,000, demonstrating that flexibility of application is essential.

This simply highlights the difficulties of generating sustainability impact assessment frameworks using only fragmented parts of the whole without conscious application and the potential for a miss-alignment of ends and means, even when within solely the ISA discipline, and the reason for this ISA framework, to at the very least, not provide the answer, but to frame the question.

## Observations on the Scope and Limitations of the ISA Model

From the application of the ISA framework used comes some observations about the ISA 20 component model, and ISA frameworks generally:

**Meta-Model:** The ISA model used was developed as a conceptual tool to assist in the development of sustainability assessments which are integrated into wider decision-making and governance structures. It is distinguished from other forms of assessment that are designed to enable decisions on impacts, but draws from these other forms as essential parts for its completeness. The ISA model is in effect, and application, only useful as a meta-model, identifying components, but not the assessment processes within components.

**Integrated Model:** The ISA model has been designed to represent an integrated model. Each part of the model is part of a whole. Each part of the model is also mutually exclusive in definition and category from all other parts. All parts of the model are therefore inter-dependent. This means that the components of the ISA are also to be interpreted as ‘inclusive’ – meaning all parts of all sub-sets are to be, and can be, included in the relevant part of the model. For example, the model does not omit ecological diversity assessment because it is not mentioned – it is included within the relevant category of environmental considerations. Similarly, privacy and health impacts are assessed within the social dimension (Clarke 1998). Rather than added on, additional components are to be added in. This means omission or re-interpretation of any of the parts will defeat the valid use of the whole as an ‘integrative’ model.

**Span of Model:** The ISA model was designed for a specific purpose. It has a specific span to address the assessment component of an integrated sustainability assessment process. All matters within that span are included within the model. It includes those areas of a smaller span in complexity (ie assessment of social impacts) which are complete in themselves. Matters of higher order in the holarchy of which it is part, are not included. For example, the ISA model is intended to be used as part of a wider integrated framework. This requires a choice of the definition for sustainability that frames the ISA. It also prescribes the selection of a decision making process that frames the use of the ISA model and specifies the timing of assessment in that process. It also links into the metric and reporting processes that feed quantitative criteria into the assessment. The ISA model also should interface with the necessary consultation processes. The ISA model as a collection of parts, is at the same time only one part of this larger framework. The ISA model is not, in of itself, a ‘sustainability framework’, but is a key part of one (and should not be used independently).

**Scope of Model:** The ISA Model is to be used principally in the iterative structuring and analysis of a proposal as to its sustainability. Assessment of a proposal is built into the design process, sustainability proposal generation being an adaptive process. The model is also designed to provide a ‘first pass assessment’ of a completed proposal, to identify areas of weakness as a focus for review, but is not intended as a substitute for a full



assessment process. The level of detail at which the model can be used is that appropriate to the level of importance and significance of the issue being considered. It will not make a proposal sustainable. It will however make the thinking behind the assessment of the proposal as being sustainable or not, transparent – at both a conscious and unconscious level, allowing for both iterative development and more detailed impact assessment.

## Summary and Conclusion

In summary:

1. A distinction is made between sustainability assessments and other forms of impact assessment, sustainability assessments possibly being directed towards the iterative development of synergistic benefits from a sustainability base, rather than the identification, assessment and mitigation of specific adverse impacts. The distinction is, however, indistinct; the second being an inseparable part of the first.
2. Integrated sustainability assessment is one form of sustainability assessment and is defined with reference to three principles relating to; the basis of inquiry, the degree of integration into governance frameworks and the basis of the decision criteria.
3. Recognising this restriction on the definition of an ISA, one configuration of the minimum number of possible components to comprise a conceptually sound ISA framework is presented comprising 20 distinct elements.
4. Within the limitations of the study, the particular ISA model developed was workable in practice in a range of situations.
5. It is possible for ISA novice managers to successfully complete an ISA using the 20 component model, given a sufficiently simple framework, thinking tools and directed training based on the particular case studies and their circumstances.
6. The model did not wholly prevent the effects of the cognitive conflict inherent in sustainability assessments and as a result errors of application occurred.
7. Those errors in application and interpretation of the ISA were however easily identified using the framework, as were their impacts on the assessment outcome, leading to transparency in the assessment process.
8. The identification of application and interpretation errors provided a valuable base for feedback, to enhance the future predictive performance of the ISA model.
9. An ISA approach may include some or all of the 20 components noted. Not all are required, only the combination that is appropriate to meet the desired IAS scope.
10. The selective application of components from the 20 component model potentially allows for the identification of multiple forms of ISA (which can be identified by the corresponding limitations to the assessment scope and outcome).
11. An alignment of ends and means is possible when we ensure the desired outcome and assessment scope correspond with the necessary components to achieve that scope and outcome.
12. This conscious structuring of ISA frameworks by their component parts has the potential to reduce goal conflict and enhance the focus of cognitive conflicts in a positive way.

In conclusion, the research opportunity outlined in this paper has led to a starting point meta-level framework, that is likely to have significance in the future, but also meets a presently identified need. As governance structures shift towards resolving the complexity of sustainability ends, impact assessment frameworks must deliver greater certainty of the means of achieving them.

In the outline of the sustainability stream of the International Association for Impact Assessment 2004 Conference the future challenge to impact assessment is described as:

“In order to be a meaningful and worthwhile endeavour, impact assessment should contribute significantly to worldwide efforts to secure a sustainable future for the human race. This will likely be one of the most important criteria upon which the historical relevance of impact assessment is judged by future generations.” (IAIA 2004)

The response to this challenge is within the ingenuity of the disciplines working towards sound approaches to both impact assessment, and integrated sustainability assessment. Only by bringing these approaches together will success be possible, and at the point of this occurring (now or in the future), it will be our conscious thinking about our choice of approaches to integrated sustainability assessment, that will ultimately determine if what we are presently doing is, in fact, sustainable.

William Varey  
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### **Footnotes:**

1. This paper was presented by William Varey at the International Association for Impact Assessment Conference, Vancouver, Canada, 27 April 2004 within the Sustainability Theme.
2. In the pedigree dog show, an entrant with four legs and a tail that barks, may or may not be a canine. Once that threshold question of ‘What animal is it?’ has been passed, distinctions of champions within the breeds is then a different and easier question. If a form of assessment is not a within the ISA category, we should not unfairly judge it on the basis of being so.
3. The author gratefully acknowledges the assistance and expertise of his colleague Jenny Pope in working through and assisting in the testing of the framework and thinking tool, both in the conceptual design and post-analysis phase, and for the co-operation and support of the City administration and training institution referred to in the case study.
4. Table 1 as an Annexure is intended to be read with reference to the discussion of its use within the paper, and not as a stand alone description of the framework, lest the same definitional errors and selective re-interpretations described in the case study are repeated unconsciously.

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### **Bio**

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Table 1: - Descriptive Summary of Component Approaches to Integrated Sustainability Assessment

Component	Description	Reason for Requirement	Effect if Omitted	Assessment Type (if Omitted)
<b>Definition</b>	The definition of sustainability that guides the principles of assessment clarifying what it is that is to be sustained, for who and for how long.	To give some definitional meaning to the exercise and to align the assessment with the 'ends' desired to be achieved.	Without a sustainability definition the assessment may address criteria other than that intended. If politically or socially out of alignment the process for assessment will not be integrated. The definitional base should not be left implicit unless the assessment is to be merely a personal one	<b>Meaningless</b>
<b>Issue</b>	The matter that is causing the need for proposed action. It should not be phrased as a solution.	To give some point to the exercise. The proposal should change the status quo for a reason.	Without a defined issue the focus may fall on the assessment process, not on the purpose and appropriateness of the Proposal itself.	<b>Aimless</b>
<b>Outcome</b>	The desired result in terms of the ultimate sustainability state desired.	To ensure 'sustainability' is the outcome sought – not the approval or rejection of a proposal on grounds of its sustainability features.	The Proposal can only be 'more or less sustainable, more or less' – as there is no description of what level of sustainability is actually sought, or if in fact it is sought at all. The effect is that the Proposal itself will be the Outcome.	<b>Limited</b>
<b>Principles</b> (All Economic, Social and Environmental Principles combined as a group)	The sustainability principles that comprise the sustainability definition. These principles are the component 'lines' that are added together to achieve the 'quadruple bottom lines'.	To guide and inform how to interpret the sustainability definition adopted into multiple considerations at a workable level of specificity.	With no principles, all there is to guide the formulation of criteria is a subjective interpretation of the sustainability definition – which creates uncertainty as to the basis for considering other proposals.	<b>Unprincipled</b>
<b>Economic</b>	Those sustainability principles that reflect financial and non-financial economic considerations	To ensure economic viability or at least consideration of the economic realities and the accounting basis and assumptions.	The proposal may be economically unviable – making the Proposal ultimately unsustainable depending on the process for evaluation of economic evaluation (ie ROI, net profit return etc).	<b>Impoverished</b>
<b>Social</b>	Those sustainability principles that reflect social, community, heritage, cultural, gender and other humanitarian considerations.	To ensure in a sustainability approach based in inter-species equity that human values and existence needs are a distinct category (which may or may not be given predominance over other values and needs in the Decision Criteria)	If social principles are ignored (say in favour of a purist biological integrity approach) human values may not given any special weight - and this should be acknowledged and the assessment process may as a result be anti-human/human benefit.	<b>Dehumanising</b>
<b>Environmental</b>	Those sustainability principles that reflect ecological sustainability from a biosphere or biological perspective focussed on environmental concerns.	To ensure ecological considerations are included – at whatever level (ie they may be based in conservation, ecological integrity, biodiversity, intrinsic value or purely as recognition of natural capital value to human sustainability).	With no ecological principles an unconscious assumption is that natural capital is an unlimited and infinite resource (ie the oceans can not be polluted because they are bottomless, diversity is guaranteed etc). It assumes we have multiple Earths to use or that non-renewable natural resources are substitutable.	<b>Multiple Earths</b>
<b>Ethical</b>	The sustainability principles that reflect good governance and moral considerations	To cover the moral and legal issues that may apply over and above the other categories.	A proposal may be sustainable even though immoral or illegal (ie causing death/injury of a person to preserve a cultural tradition) where definable principles of moral integrity are acknowledged as part of the sustainability of a society.	<b>Ungoverned</b>

<b>Outcome Criteria</b>	The financial, social, environmental and ethical criteria that are 'must haves' for a Proposal to be acceptable (in line with each of the Principles) – these are both a minimum requirement and a threshold test which form the basis for scoring the assessment.	To provide guidance to the key threshold levels required as a numeric or specific indicia upon which the proposal can be assessed at the next level of detail. (It ensures that the things that matter most are not at the mercy of the things that matter least).	If left undefined the Criteria may be derived post-fact and a decision made based on the <i>number</i> of considerations, not their relative importance (eg number of species preserved – not that 'no species are threatened') allowing for undue flexibility in what is considered important to the sustainability Outcome.	<b>Rubbery</b>
<b>Proposal</b>	The proposed action itself describing its essential elements (including a timeframe and location). This may be modified and adapted many times before becoming a Final Proposal.	To frame one solution as a starting point for iterative development of the best possible and truly sustainable solution to the presenting issue, which ideally will go as close as possible to achieving the Outcome.	If assessment proceeds in the abstract, the assessors are working blind as to the detail. A conceptual solution (which can be generated around the 'type of proposal') may in its detailed form have implications not otherwise considered.	<b>Black-Box</b>
<b>Final Proposal</b>	The proposal once developed and assessed incorporating any improvements required to satisfy the Required Outcome Criteria.	To conclude the process of development of the Proposal such that the sustainability assessment can also be conclusively concluded.	There is no certainty as to what is assessed, and if assessed as sustainable, what was approved. As a change to one part of a proposal may affect all other parts – and the assessment result – the Final Proposal (without variations) should be the only one that is conclusively assessed.	<b>Perpetual</b>
<b>Benefit</b>	For each of the sustainability categories, means the benefits of the particular Proposal, which include tangible and intangible benefits. A benefit is something that improves the existing position (ie not alleviates problems with a potential position).	To distinguish positive from negative impacts allowing them to be separately assessed.	The potential for the situation to be improved (eg via conservation and education) may be overlooked when trying merely to minimize and protect an unsustainable status quo from impacts.	<b>Least Worse</b>
<b>Impact</b>	For each of the sustainability categories, means the adverse impacts of the Proposal, which include tangible and intangible adverse impacts. An impact for this purpose is anything that adversely affects the status quo.	To distinguish negative from positive impacts allowing them to be separately assessed.	The potential for the situation to deteriorate (eg via unforeseen impacts) may be overlooked when trying merely to enable more of an apparently well intended and beneficial initiative.	<b>More the Better</b>
<b>Here</b>	The geographical or locational artificial boundary of the particular proposal for thinking purposes. A 'Here' may be geographically disaggregated.	To provide a focus for the consideration of the locational effects of the proposal.	The proposal may consider effects only in an extremely wide geographical boundary, diluting the consideration of local issues, which may be unique and significant (irreplaceable) and become so wide as to negate an effective local solution.	<b>Unbounded</b>
<b>There</b>	Everywhere else that is not defined within the category of 'Here' for a proposal.	To provide a focus for the consideration of the related effects of the proposal on other locations.	The proposal may consider effects only within a narrow geographical (political) boundary, ignoring global perspectives and effects on adjacent systems.	<b>Bounded</b>

<b>Now</b>	The temporal delineation for the particular proposal for thinking purposes (eg effects that become obvious this day/month/in a 20 year period) determined as appropriate for the overall timeframe of effects.	To define the immediate timeframe by which a remedy to the Issue needs to occur based on present needs. By exclusion it creates a notional boundary between present and future needs to allow consideration of these parts independently, and together.	Without a focus on the immediate the 'sustainable' solution may have short term and serious implications that are overlooked in the assessment process and not managed – causing new Issues and other remedial proposals.	<b>Longsighted</b>
<b>Then</b>	Everything else in terms of time that is not defined within the category of 'Now' for a proposal. (ie past events are considered in the aggregate as part of the present comprised in 'Now')	To provide a future perspective separate and distinct to the assessment of present needs so as to mitigate the apparent importance of immediate needs within the urgent.	Without a focus on the future the 'sustainable' solution may meet only present and short -term needs and could unknowingly prejudice distant needs (ie future generations).	<b>Shortsighted</b>
<b>Assessment Scale</b>  <b>Decision Criteria</b>	The scoring or metrics system used to assess each Benefit and Impact dimension (eg A simple ranking 0-5 where 0 is no benefit, 2 is some benefit, 3 is more beneficial than not, 4 is significant benefits and 5 is maximum potential benefits). The basis on which the scored assessment will determine if a proposal will be recommended for implementation. (ie 50:100). There may be only a decision criteria for the whole Proposal overall, or criteria for each of the multiple bottom lines (ie no net impact), or each of the Outcome Criteria (ie no species risk). It depends on the nature of the Proposal.	To provide a scale of either quantitative or qualitative assessment measures to provide both rigor to the assessment process and promote collective and transparent decisions on competing sub-criteria. To ensure the decision is made on a rational and explainable basis that is linked with the assessment. The Decision Criteria should be determined prior to the assessment being done, in line with the Principles and Outcome Criteria.	Without a scale the assessment may be purely subjective and based solely in the opinion of the assessor. Bias will not be transparent. Having to fix a score, even if only done subjectively, provides the opportunity for transparency, discussion and review. If there is no criteria for the decision, the basis of the decision cannot be reviewed or audited. The make up of the bottom line assessments will not be transparent. If the Decision Criteria is developed <i>after</i> the assessment, the outcome can be manipulated post -assessment by fitting criteria to the threshold reached – rather than iteratively developed subject to and within the framework.	<b>Subjective</b>  <b>Hidden</b>
<b>No Decision Alternative</b>  <b>Timeframe</b>	The description of what is most likely to occur in the future if the present position is maintained and no action is taken or no proposal is decided on.  The timeframe within which the decision based on the assessment has to be made, guiding the timeframe within which the assessment must be completed.	To create a focus on whether the Proposal is merely optional or is instead essential from a sustainability perspective – framing the imperative with which it should be assessed. As an integrated assessment process, the outcome must mesh with existing decision making and governance structures. The assessment that is not directed towards these processes risks delaying due-governance with the effect of causing adverse impacts by delaying decision and action, rather than assessing and alleviating them.	Without this the drastic impending effects of the Issue may be overlooked or action taken which adversely impacts a sustainable state unnecessarily such that it is predetermined that something will occur. If omitted, the assessment is done in separation from the political and governance realities. Timeliness of response is where impact assessment earns its entitlement to enhance governance structures, rather than to cause them to breakdown. If omitted, the relevance of the assessment, if completed too late to avoid the impact, or to obtain the benefit, may be lost, ultimately self-defeat the process itself.	<b>Fated</b>  <b>Tardy</b>