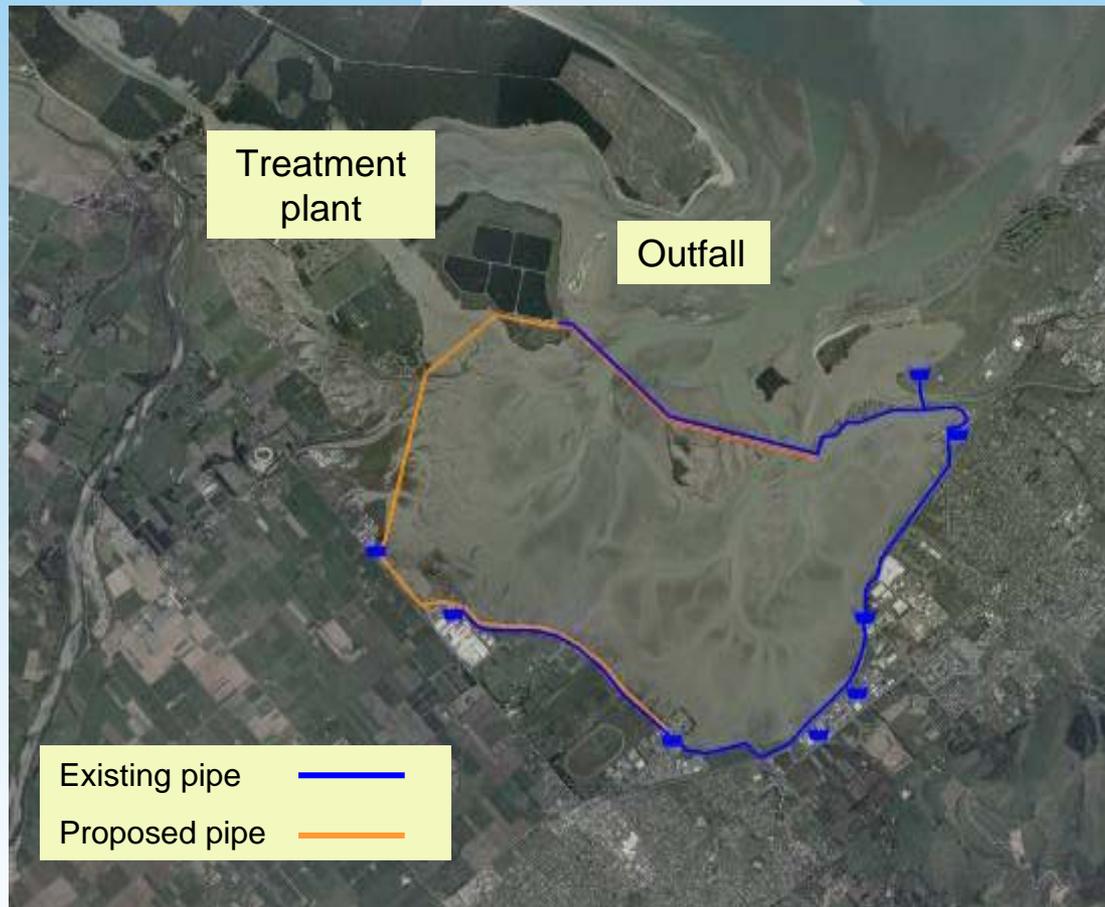


**NZSSES Conference – Auckland
10-12 December 2008**

Nelson Regional Sewerage Scheme A Sustainable Solution?

The scheme



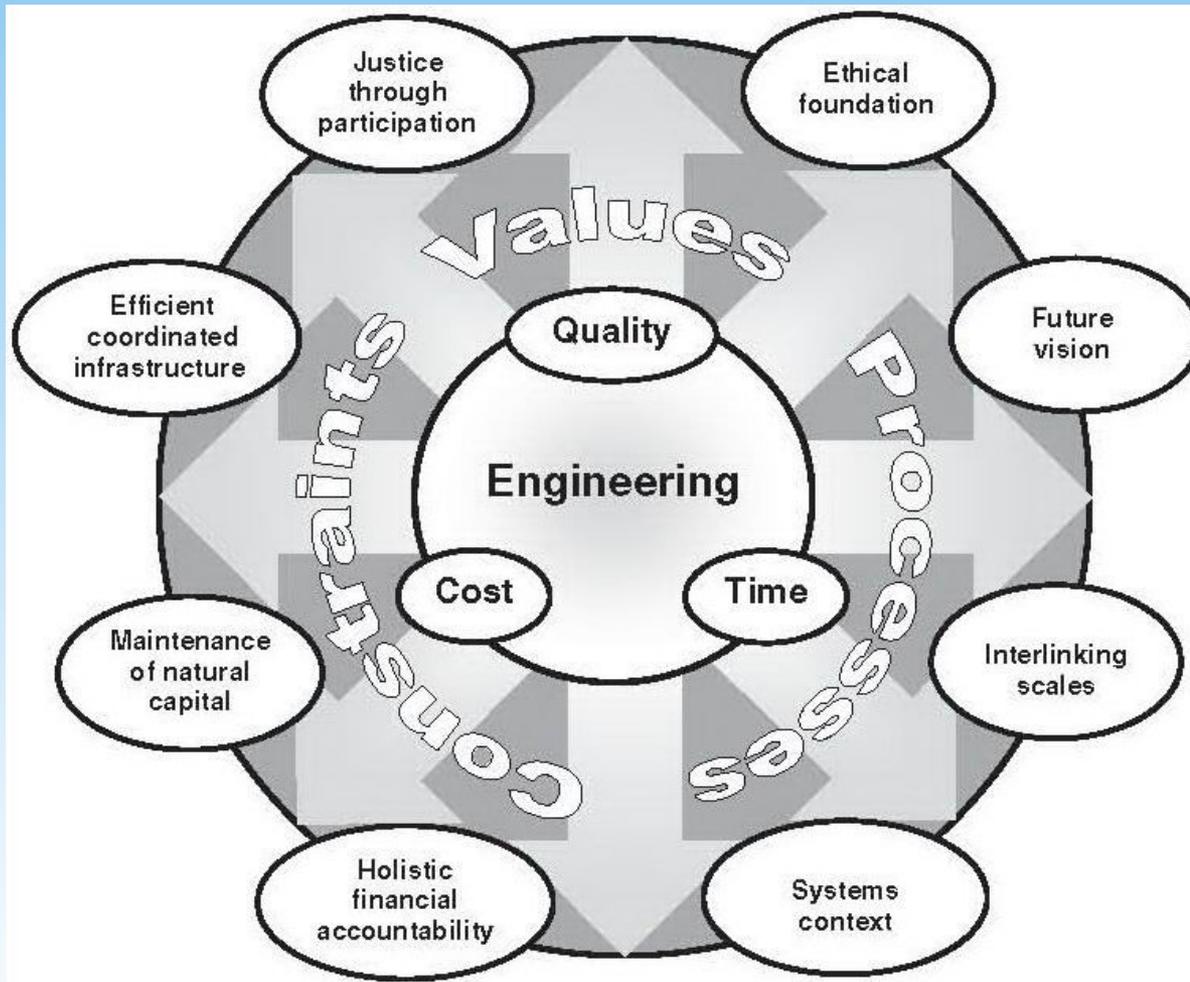


Fig 1. A sustainable framework for civil engineers (Fenner et al 2006)

Ethical foundation

Defining the problem (scope)	How does the engineering project meet clearly defined needs of all project proponents and end users?	Needs not yet clearly defined for “new” project. Overall could be defined as “collect and treat waste with no adverse effects” (meaning social, cultural, economic, environmental effects). Active management of Environmental , Economic, and local community social effects, but not to the level we would like to be at yet	3
	When was the justification for the scheme or project explored? Has the way in which it fits within the prevailing government policy array been established?	When first set up, and re-explored in 1998. When considered separate treatment or combined plant. Yes, new Board owned by Nelson and Tasman. We have also re examined a number of times in context of the justification for contributor inputs, ie industrial, and septage	5
	Where and with whom do the benefits of the scheme lie? Who wins and who loses?	With community. Win/loss? Working to make a win/win, but at present there is possibly a loss associated with local residents, We have a focus on reducing this loss through access for recreation to the island shore, etc.	4
	What clear responsibilities to both the client and to society/environment have been identified?	Responsibility to minimise, risks of adverse effects, maintain public health. Also fiscal, aesthetic, odour, etc	4

Justice through participation

Defining the problem (scope) Implementation	How has a fair foundation for this scheme been developed with the stakeholders?	Charging mechanism contracts with users, interaction with TLA owners.	4
	Which cultural, religious, ethnic or gender issues may be relevant?	Iwi.	3
	Have genuine concerns been considered with an openness and willingness to adapt and modify designs?	Consultation underway, cultural concern.	3
	How have the interests of those not well represented or not represented at all been recognised and embraced?	Consultation.	2
	What channels have been established for good communication with the public, employees and other professional groups? Is the basis of decision making established and known to all likely stakeholders at the outset?	Iwi committees, consultation, Board/stakeholders.	4
	With whom has the extent to which participation can and will affect decisions been determined and agreed? Who carries responsibility for explaining what cannot be altered, and why?	Ratepayers, iwi liaison group, contributors. Board.	2
	What are the steps in the process for managing disagreement, and with whom are these discussed?	Board.	2
	Who is involved in establishing a base of agreed positions (facts as well as aspirations)?	Board, contributors.	3

Efficient healthy infrastructure

Choosing a solution Participation	What opportunities for environmental enhancement (as well as mitigation) have been sought?	Biosolids application, anaerobic digestion/cogeneration, sewer mining, irrigation.	4
	Are adverse impacts only accepted reluctantly?	Yes.	3
	At what stage is an appropriate balance between form and function of engineered systems explored and defined?	Concept stage? We look at colour, but not architecture	2
	What flexible and adaptable designs have been developed to allow for extended useful life?	Re-engineering of STP, demand management, new changing mechanism replacement of pipe.	4
	How much flexibility of operation can be permitted to allow for future change?	Designed in to pipe conveyance, flexible STP.	4
	To what extent do designs contribute to social cohesion and inclusion, and human wellbeing and welfare?	?	
	Does the engineering product provide value and satisfaction to meet the needs of end users and the general community?	Yes, reduced costs, low environmental effects, reduced risk, minimise odours.	3

Maintaining natural capital

Choosing a solution implementation	How is resource and energy efficiency optimised over the whole life of the project?	Design and evaluation in traditional least NPV, new proposals for reduced energy, new charging mechanism.	3
	What steps are actively taken to minimise pollution arising and negative visual impact?	Designs to reduce risk of pollution, little visual?	4
	How is careful and informed material selection ensured and over-specification avoided?	Optimum design?	3
	What opportunities are sought for re-use (eg of land, materials and building stock)?	Pipe - rehabilitation of part, STP, re-engineered. Sale and re use of old equipment, tanks , e.g DAF, Aerators	5
	Is a formal environmental management system adopted?	No.	1
	To what extent is any natural capital lost as an integral part of the scheme sought to be replaced and replenished?	? Planting natives, monitoring estuarine considerations, etc	3

Holistic financial accountability

Choosing a solution	To what extent are transparent business practices audited externally and how is risk managed?	Audit NZ, contributors look at decisions, review of both Councils, financial risk - charging mechanism, technical risk - consultants formal risk analysis in AMP	4
	How do costs reflect environmental and social externalities and at what intervals are these embraced and reported?	How do we rate compared to others?	?
	What methods are used to assign other than monetary value to natural assets and social gain (by scoring qualitative components where feasible)?	To be considered in consultation phase - so far, unsure.	2
	How are costs external to the scheme included in consideration of alternatives?	To be considered, say alternative STP sites. Septage, as a external need that we consider and manage	3
	What steps are taken to seek long-term relationships with clients and suppliers?	Charging mechanism with contributors, alliance with consultants and operators.	4
	How is it recognised that best value is not always lowest cost?	Part of evaluation procedures, weighted attribute. Risk management and tailored decision frameworks.	3

Systems context

Defining the problem (scope) Choosing a solution	What agencies and other organisations are involved in adopting a coordinated approach to infrastructure problem (scope) provision?	Councils, iwi, regional authorities, contributors, DoC, Fish & Game, Forest & Bird, local and national interest groups, ratepayers through consultation. DWG	4
	How is the relationship with other professional and special interest groups managed (eg planners, politicians, civil society, global corporations, individual stakeholders, etc.)?	Reporting to planners, TLA's and owners, consent process, AMP process.	3
	Who has responsibility for seeking integrative solutions (eg between hard (build) and soft (non-build) measures)?	Board and consultants, operators, Council, through demand management initiatives.	4
	How are impacts that go beyond the site boundary identified and what measurements are made?	Environmental monitoring, consent process, consultation, annual reporting.	4
	How is cradle-to-grave lifecycle thinking adopted and a systems engineering approach followed?	Eighty year strategic planning process. Aerators, Copper, etc	4
	How is complexity recognised and uncertainty managed? Are the inter-relationships between system components understood?	Through AMP process and Business Plan, also this planning, strategic planning process. Becoming more understood with complex models, biokinetics, flows and these interactions	4

Interlinking scales

Defining the problem (scope)	Are global challenges appreciated and how do these influence the conception of local solutions (i.e. by acting as if local actions WILL have a wider influence)?	Climate change recognised, and scheme is designed to be energy efficient, reduce waste byproduct and provide co-generation. Increased recycling at reasonable cost.	3
	Over what operational timescales are schemes considered, and how is their influence on future generations provided for?	Considered over 80 year timeframe. Flexibility built in to provide opportunity to vary solution in future.	4
	How is the exploitation of distant resources and people minimised (eg by adopting fair trade practices)? How are the interests of communities beyond the immediate scope of the scheme considered?	Maximise local involvement, and local money “recycling” Waste/pollutants minimised to environment, water re-use considered for wider community.	3
	At what stage are secondary (remote) impacts recognised in both space and time?	Environmental assessments of affects in consent applications.	3

Future vision

Defining the problem (scope)	How commonplace is it to take action BEFORE legislation and regulation requires change?	Common, planned in AMP which identifies issues and risks, and programmes for consideration.	4
	What assumptions are made regarding increasing levels of regulatory control over emissions, waste, natural resources, and increased costs and declining availability of energy?	Strategic planning, 80 year horizon, water re-use, sewer mining, reduction in waste values, co-generation.	5
	How are methods such as scenario planning used to explore a range of futures and to ensure real needs are served through careful problem formulation?	Strategic planning.	4
	What ambitious goals and targets are set that stimulate creativity and allow innovation? How regularly are they revised?	In AMP, revised three yearly.	4
	Which long-term aims are considered as important drivers as responding to today's immediate problems?	energy, reuse of water and other materials	3
	How is performance benchmarked as a precursor to seeking continual improvement?	Performance criteria reviewed annually for compliance. Hansen , comparison with other plants	3

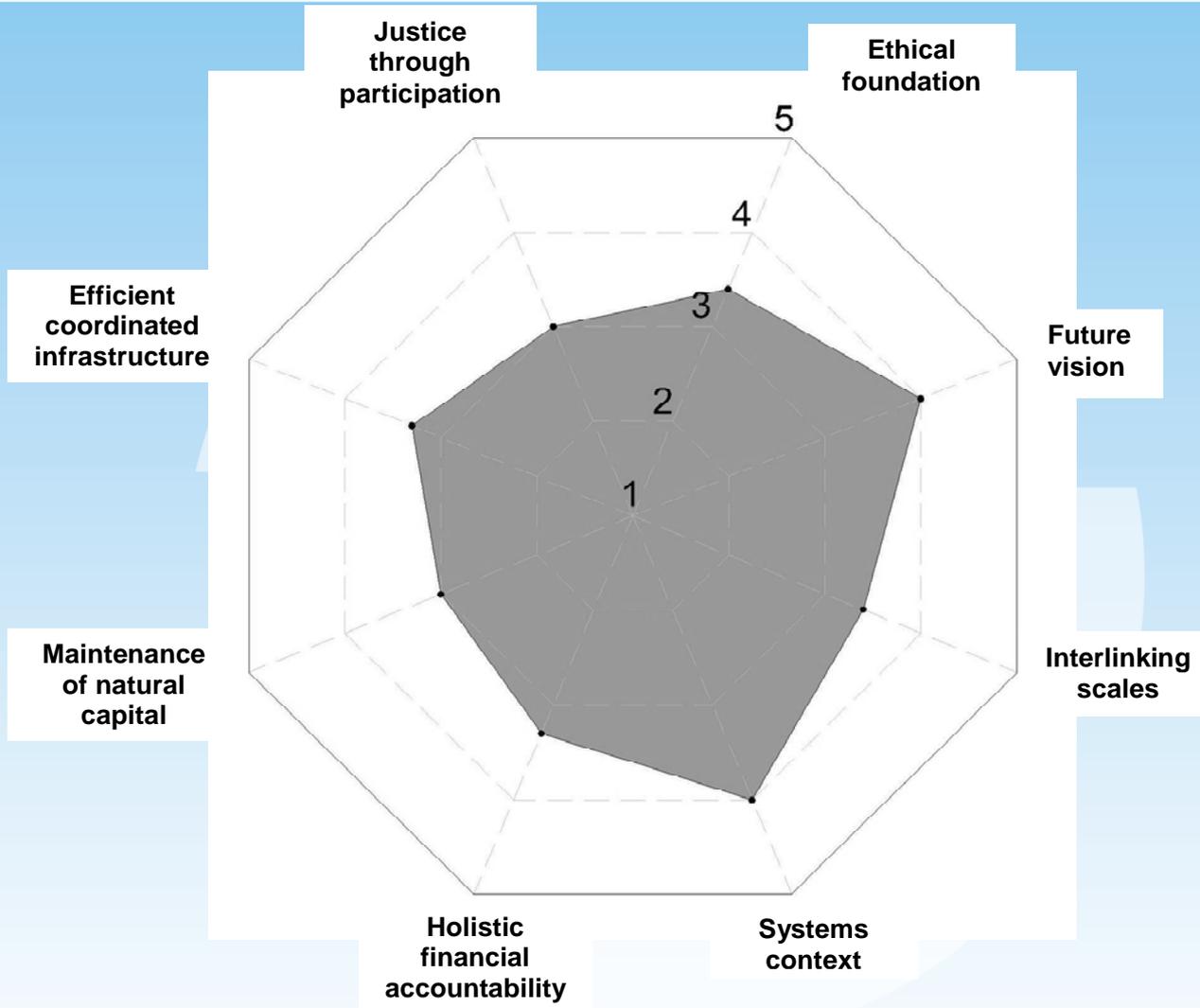


Fig 2. Results of assessment using eight-point framework

Lessons from 8-point process

- Numerical results not so important
- Grappling with answers provided value
- Useful planning tool at start-up
- More appropriate for owners & large projects
- Scorecard:
OK, but could do better!

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