Impacts of Climate Change on Urban Infrastructure & the Built Environment

A Toolbox

Tool 1.5: Policy and Plan Audit Tool

Authors

S. Allan[1]

S. Oldfield[2]

Affiliations

[1] Allan Planning and Research Ltd, 26 Patrick St, Petone, Lower Hutt

[2] MWH NZ Ltd., PO Box 9624, Te Aro, Wellington

Contents

1. Introduction

1.1 Background

This document gives details of one of a number of tools developed to assist Councils, and others, in taking account of long-term climate change effects in their on-going management of the urban environment, with the broad aim of making the built environment more resilient to climate change effects.

The tool described here (Tool 1.5) is included within a Toolbox Framework of various reference and guidance documents and software tools. These are designed to assist in assessing options and risks, support urban development responses that will reduce risks, and lead to more resilient urban areas in the face of climate changes (which include increasingly extreme weather events).

The Policy and Plan Audit Tool provides a structured way of considering current policy and methods of management of climate change effects in the urban environment. This includes the role of public interventions through rules and consent requirements in regional and district plans. Where shortcomings are identified – owing to, for example, inadequacy of past consideration of climate change issues and responses; to changes in the environment itself, or from improved understanding of climate-related risks – the tool seeks to prompt consideration of possible additional means of managing climate change effects.

The use of the tool is illustrated here using a review of management and control of land disturbance and earthworks for a city – in this case Wellington. In this context, climate change effects of increased frequency and intensity of rainfall events are relevant to topographic modification and vegetation clearance. The objective of the illustrative review is to identify weaknesses or gaps in the current provisions for management and control, the need for further provisions, and the development of alternative courses of action.

1.2 Purpose of Tool

The tool enables and encourages an integrated consideration of the adequacy of the current local authority framework for management of changes in the urban environment. This is with particular reference to preparing for the future impact of specific climate change effects (e.g. greater instances of landslides, more severe flooding, etc).

The tool helps identify and highlight the need for any changes in a local authority's specific management framework, and can be used to prioritise the necessary changes so identified.

2. Overview of the Policy and Plan Audit Tool

The Policy and Plan Audit Tool is implemented in a simple spreadsheet used to capture and analyse all relevant elements of the existing Council management framework.

2.1 Basis of the Audit Tool

It is now widely accepted that communities should consider potential climate change implications on the basis of a 100-year horizon where significant changes are expected (for example, from sea level rise, increased rainfall and/or coastal erosion)[1]. No specific targets for the level of protection from landslides are set[2], but it is likely that communities would expect similar, or greater, levels of protection[3].

Given these time-frames, it is anticipated that regular review of the appropriateness of policy and the management of such effects will be needed. Review may also be required because of:

- continuing improvements in the science and consequent understanding of the range of potential climate change effects in any area;
- growing community recognition of the need for present and future resilience against climate change-induced environmental change.

Such reviews should be preceded by an audit of the current scope, appropriateness and effectiveness of the management framework. A structured audit using the methods provided in the Policy and Plan Audit Tool will help identify inadequacies in the existing framework, and opportunities for improvement. The audit will also allow new information to be considered in context. Such an audit can be the first step in making changes to policies, rules and methods for managing effects. Furthermore, it provides a preliminary analysis of, and rationale for, subsequent council work programmes and expenditure in effecting changes to statutory instruments such as rules in regional or district plans, in bylaws and codes of practice, or in other areas such as community education.

[1] There is a range of relevant case law and climate change adaptation guidance material available. For example, Bay of Plenty vs Western Bay of Plenty District Council (8ELRNZ 157 and Skinner vs Tauranga District Council A163/02); both determined that 100 years was the appropriate horizon in specific circumstances. Communities have also chosen levels of flood protection well in excess of 100 years with the expectation that climate change may reduce the enhanced level of protection (for example the Hutt River Flood Protection Scheme).

[2] While landslide is not specifically mentioned, the Building Act states that a building consent must be refused if the land is subject to one or more natural hazards. In the case of an earthquake, a building must be able to sustain a moderate earthquake event such that people can escape.

[3] While a landslide event may be more localised than some of the above events, it may be very difficult to recover from. As with rapid coastal erosion, a site may need to be abandoned.

The Policy and Plan Audit Tool can be applied at any time. It may be triggered by a formal process such as:

- a requirement in a new or revised national policy statement under the Resource Management Act (RMA);
- a new provision in a regional policy statement and the need for district and regional plans to "give effect" to the change;
- a regular statutory plan review[4];
- the findings of monitoring;
- feedback from those applying the existing framework and tools;
- concerns raised in the public sector; or
- concerns from another entity, such as the insurance industry.

Figure 2.1 sets out a generic framework, indicating the steps in the application of the Policy and Plan Audit Tool. The associated notes set out the key considerations for each step in the audit process.

For clarity, it is best to apply the audit framework separately for each climate change effect of interest, e.g. assess the provision for landslide risk separately from the provisions for fluvial flooding.

2.2 Information Needs

The primary information needed to initiate an audit comprises all the relevant statutory documents likely to be relevant to the management of the climate change effect of interest. An understanding is required of how these documents are used and applied in practice. Information on past consent applications, involving consideration of the relevant climate change effects, is also helpful in gaining an understanding of which provisions have proved to be effective and which have not.

Once an audit is undertaken, it is possible to objectively assess the effectiveness of the current framework. Follow up audits, taking account of any new information about the environment and/or environmental change, become relatively straight forward allowing the audit tool to grow and improve as more information is obtained and insight is gained into the most expedient and effective controls or other management methods.

More specific discussion is given in sub-sections 2.2.1 to 2.2.3. In particular, audit requirements may be triggered by new policy at a national or regional level requiring data under the heading 2.2.3 below.

[4] The RMA requires that all regional and district plan provisions must be subject to a formal review process at least every 10 years. Plan changes can be made at any time.

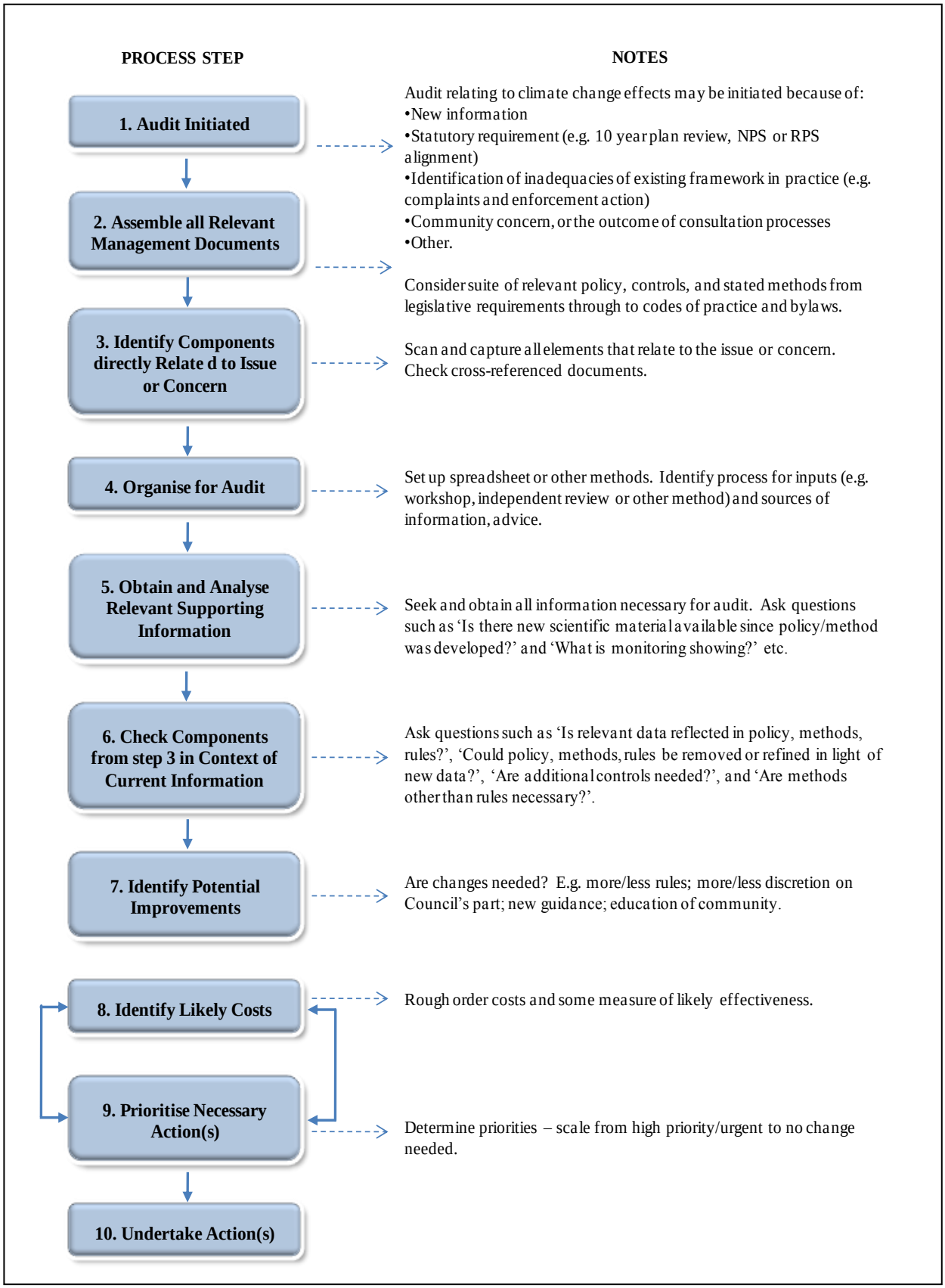

Figure 2.1: The Policy and Plan Audit Tool

2.2.1 Effectiveness of Current Framework

Councils are required to undertake regular state-of-the-environment monitoring, and to monitor the effectiveness of their policies and plans[5]. This monitoring should highlight any areas or problems. For example, increased incidences of landslips or flooding events in a particular area may indicate that there is inadequate control of earthworks or development on sites up-slope or upstream, or that on-site controls are inadequate. They may also be an indication of cumulative effects, from intensive or extensive development taking place over a wide area, or of a changing environment, such as local manifestations of global climate change.

In addition, councils and council staff tend to informally identify issues and inadequacies in the environmental management framework they are administering. While there may be informal practical responses available, sometimes these are either inadequate or unlawful, and a problem escalates to the point where an action is essential. An example could be inadequate rules or lack of discretion to address cumulative effects of vegetation removal on subdivided hillsides.

2.2.2 New Information about the Environment

There is an increasing availability of information about the environment at a highly-resolved level, including for individual sites. For example, RiskScape [Tool 3.2 and 3.3] can be used to gain insights into the level of natural hazard risk for selected climate change effects on a national, regional or local scale.

New information may provide a suitable basis for more refined rules, or may need to be specifically addressed in information provided to a council when a development is promulgated. For example, information about ground conditions and/or the behaviour of foundation materials in a range of ground conditions may raise an issue about conditions for permitted activities in a plan, or may lead to refinements in hazard zoning and associated rules.

2.2.3 New Information about Environmental Change

Climate science is increasingly providing predictive information, based on a range of scenarios and models, which may lead to changes in the assumptions that a council uses for its longer term planning. In particular, for future planning, both existing and potential new greenfield development areas may become subject to enhanced risk of flood, landslide and drought, resulting in the need for a changed approach to their management or more onerous standards of design.

Councils may seek such information specific to the area or issue, or may rely on information available from more general sources. Other tools and information in this

[5] Section 35, RMA.

Toolbox, and the associated examples, provide an idea of the range of information and approaches available to local authorities and other agencies.

2.3 Outputs

The output of the Policy and Plan Audit Tool is a structured compilation and assessment of all existing relevant management components available to the council, including policy, statutory plans and associated instruments, and bylaws, codes of practice, NZ Standards and other relevant provisions. It may include recommendations for additional controls by other agencies[6].

2.4 Assumptions and Limitations

The assumptions and limitations in the Policy and Plan Audit Tool are largely internal. That is, the use of the tool requires that relevant issues are identified, the associated objectives and policies, methods and rules are captured and possible gaps identified.

The effectiveness of the audit is largely dependent on the honesty and diligence with which issues and potential gaps are identified, and the willingness to accept that changes may be necessary. There is a compromise to be struck in the level of detail at which information is captured. Too little may not accurately represent the full scope of the methods and rules, and when and where they apply. Too much, and the audit will lack clarity, making it difficult to identify gaps. An example of the proposed level of detail that should be used is also available in this Toolbox tray [Tool 1.5 supplemental – Policy and Plan Audit Tool Example: Landslide hazards and climate change for Wellington City].

In the absence of identification of climate change as an issue for a region, it is unlikely that there will be a basis for policy development and intervention at regional or district level[7]. Similarly, if issues are loosely scoped, and objectives and policies vague or overly generalised, the ability for a council to provide effective management at a local or site-specific level may also be weak.

[6] In this case, a council should take the matter up with the relevant agency or agencies, based on the findings of the audit.

[7] Unless there is national policy, formally expressed through a National Policy Statement; at present, the Government policy approach is expressed through guidelines and advisory material; however, section 30 of the RMA makes "*the control of the use of land for the purpose of avoidance or mitigation of natural hazards*" a function of regional councils, and section 31 makes district councils responsible for "*the control of any actual or potential effects of the use, development, or protection of land for the purpose of avoidance or mitigation of natural hazards*". In addition, all persons exercising functions and powers under the RMA must have regard to the effects of climate change, and must act in accordance with the purposes of the RMA, including avoiding, remedying and mitigating adverse effects of activities on the environment.

There is an assumption in the use of this tool that information, policy and practice are closely and effectively inter-related. The tool provides a mechanism which can drive improvements in overall environmental management in relation to climate change.

3. How to Apply the Policy and Plan Audit Tool

The Policy and Plan Audit Tool is best applied by a small group of analysts, or a single analyst seeking advice from other departments and/or independent experts, within a local authority. It is important that those who use the tool, those who are familiar with current information and techniques and those responsible for policy development, are all involved in the audit process.

Application of the Tool involves a simple spreadsheet to which information is progressively added. The worked example in the following section, and the spreadsheet included [Tool 1.5 supplemental], show the information output of the audit process.

Figure 2.1 sets out the steps in applying the Policy and Plan Audit Tool, and the types of information involved and questions that should be asked at each stage.

In following the process given in Figure 2.1 there is a need to adopt an open-minded questioning approach, rather than simply to collect confirming evidence to fit preconceived expectations or needs.

A willingness to accept that improvements may be necessary is essential. Preferences amongst alternative options should be considered, weighing up the benefits and effectiveness of each against the implementation and ongoing operating costs.

It should be noted that in some instances rules (i.e. district or regional plan rules) may be most appropriate in ensuring that minimum requirements are achieved on a site-by-site basis i.e., the use of discretionary activity categories which allow each circumstance to be considered and specific conditions to be applied. Discretionary activity classes can set minimum requirements for information, such as requirement for a developer to engage specialist input into hazard controls, and can provide the opportunity for ongoing monitoring of risk on a site.

In other circumstances it will be more appropriate to consider encouraging stakeholders or other agencies to take their part in managing climate change effects such as through stream-care or coast-care groups involved in weed removal and stream bed stabilisation or dune restoration.

Having completed an audit, the spreadsheet becomes an aide memoire for future decision makers to reference in any future consent application.

4. Example – Audit of Policy and Plans Relating to Landslide Hazard – Wellington City Area

4.1 Application of the Policy and Plan Audit Tool

The intended use of the Policy and Plan Audit Tool is illustrated through an audit of the policy and planning documents that apply within the area of Wellington City Council (WCC), relevant to the management of landslide hazards in the city. In this instance the tool has been applied by the authors without the direct involvement of WCC. Ideally, such an audit is likely to have revealed greater insights into the practical workings of the policies and plans if WCC staff had been involved, but the results are considered sufficiently relevant for the purposes of illustration.

4.1.1 Spreadsheet

[Tool 1.5 supplemental] is a spreadsheet completed in relation to landslide hazards and climate change for the Wellington City area.

The Audit Tool spreadsheet captures the relevant policy framework and key tools in managing landslide risk, as relevant to this example. Landslide risk is considered to have the potential to increase in the region due to predicted increased frequency and intensity of extreme localised rainfall (and wind[8]) events, associated with climate change.

The audit spreadsheet works from the highest to lowest level in policy terms: the Regional Policy Statement, through provisions in Regional Plans (in this case, the relevant Plan is the Regional Soil Plan), the Wellington City District Plan (which has a separate chapter for Earthworks), the Subdivision Design Guide which is part of the District Plan, and the Code of Practice for Land Development (which has replaced a former Earthworks Bylaw).

Two "backstop" provisions – in the RMA for subdivision, and in the BA for structures – are also noted at the end of the spreadsheet. These are not able to be amended as part of an audit, but they provide an overall part of the management framework and a "backstop" (or power of last resort) if other methods, rules or tools contain gaps[9]. They should, however, not be considered as substitutes for other provisions.

It is also important to recognise that any changes in the regulatory instruments directly influenced by a council are only likely to be effective if these changes are compatible with other instruments of a wider or over-riding application. If a policy or plan audit

[8] High winds are known to be an initiator of landslips on wooded slopes already weakened by weathering and rainfall; as far as is known, there are no provisions within policies and plans that are associated with the management of wind hazard.

[9] Or where past decisions have allowed for development and activities in areas that have subsequently been identified as at high risk.

identifies issues or groups with these provisions, they should be taken up at the appropriate level[10].

While the left-hand columns set out the issues, objectives, policies, methods, rules and tools that are in place, the right hand columns under "Analysis" are very much the working end of the Audit Tool. Headings for these elements of the audit process are "Dependencies", "Outstanding Issues", "Potential Improvements", "Cost and Effectiveness" and "Planning for Action". These items are intended to provide a structured means of identifying gaps through to development of appropriate considerations and action. This analysis aspect of the Audit is discussed later in Section 4.4.

4.2 Issues, Objectives and Policies

As can be seen from the spreadsheet example in [Tool 1.5 supplemental], the implication of climate change is recognised as an issue in Wellington's Regional Policy Statement in the Natural Hazards Chapter, along with recognition of the generic effects of natural hazards on people and communities, and the potentially exacerbating effects of human activities on natural hazard risk and consequences.

This high-level recognition is translated into objectives and policies. The policies are expressed as being either a District Plan responsibility for the territorial local authorities in the region (i.e. District Plans are required to include measures to avoid subdivision and development in areas at high-risk from natural hazards), or a "consideration" when new plan provisions or resource consent applications are being considered (i.e. the risks and consequences of natural hazards, and of adverse effects of hazard mitigation measures must be minimised).

There are two relevant plans with issues, objectives and policies that relate to potential effects associated with landslides and land stability – the Regional Soil Plan and the District Plan.

While the Regional Soil Plan identifies slope stability as an issue, it is clearly directed at the less physically dangerous processes of erosion, and also at the maintenance of rural soil productivity. A cross-reference in this Plan states that when subdivision consent is required as part of a proposed development, earthworks are addressed under District Plan rules and a regional resource consent under the Regional Soil Plan is not needed. This is in line with the Regional Policy Statement, and avoids duplication of effort and responsibility. However, on a wider basis, despite the Regional Soil Plan's

[10] An example is some provisions in the Building Act, where councils have expressed concern about lack of ability to apply standards that are higher than Code requirements in some cases. Further concerns have been expressed about the ability to limit development in areas subject to recent and/or known hazards.

recognition of the issue, it does not explicitly address slope stability hazard. Nor does it explicitly refer to or address climate change effects which might exacerbate soil erosion in the future.

The Wellington City District Plan includes a separate chapter on Earthworks, with a comprehensive introductory discussion on the issue, including discussion about climate change and other risk and consequence effects, as well as explaining the type of controls and the reason for the controls. There is a single "balancing" general objective, and a range of specific policies which explain that some earthworks are allowed as of right, but larger earthworks on steeper slopes and in more vulnerable areas are required to obtain a resource consent. Parallel policies relate to the visual, amenity and natural character implications of earthworks.

The Audit Tool has also identified the Subdivision Design Guide, which is part of the District Plan, as a relevant document along with the Wellington City Council Code of Practice for Land Development. Of these, the former is more directed at amenity, although the retention of existing vegetation, important for stability of steeper slopes, is also sought through the Design Guide. The latter is more directly related to hazard management and site and construction stability.

4.3 Methods, Rules and Tools

Using the policies as the basic audit building-block, the methods, rules and tools are then examined, as discussed below.

The Regional Soil Plan has a specific construction around its rules, which as already noted, is not particularly directed at natural hazards. The Plan has a separate Chapter of Methods, other than rules. These other methods are primarily related to land care rather than hazard management and include the use of guidelines, publicity and education programmes, and support for local land care groups.

The Wellington City District Plan identifies a range of methods that sit alongside its rules. These include advocacy and extensive reference to design guides, codes of practice and sediment control guidelines promulgated at regional level.

The audit at this stage shows a multi-pronged approach to earthworks management, involving information, advice, and methods that encourage good environmental management and sustainable development. Methods and tools are closely aligned, with rules providing a layer of statutory control where permitted activity conditions cannot be achieved, supported by design and runoff water quality management

4.4 Analysis

The Audit Tool looks first at dependencies, then at outstanding issues, and subsequently at possible improvements. Finally, an estimate of the costs of the improvements and an assessment of their potential effectiveness is made. The balance of costs versus the effectiveness of alternatives gives a basis for establishing preferences and priorities for action.

In summary, the dependencies identified in the example are:

a) The Wellington Regional Policy Statement recognises the implications of climate change and the generic effects of natural hazards.

b) The Soil Plan has limited focus on erosion of soils but references the District Plan for sub-divisions involving earthworks when a resource consent is required.

c) The District Plan makes general introductory comments about building on earthworks, slope stability and climate change issues, and requires a resource consent application for larger earthworks on steep slopes.

Possible gaps identified from the audit are:

- The Regional Soil Plan does not specifically require a consideration of increasing rainfall and storminess from climate change. This, together with increasing areas of hard surface, will impact surface run-off and the damage to soils.

- While the Regional Soil Plan references the District Plan for earthworks stability it does not recognise increased hazard from landslips resulting from vegetation removal. Developments may be preceded by removal of all site vegetation, increasing the chance of landslips on steeper slopes.

- The District Plan requires a resource consent only for major earthworks. If the extent of earthworks is under-estimated it is possible that additional unplanned earthworks will result in unstable cuts and fill.

- There is a heavy reliance on the Building Code for control of building design and construction. However the Building Code is focussed on the building itself and not the impact of the building on the surrounding land. This responsibility remains with the District Plan in the first instance and the RMA if there are low probability / high consequence risks to be considered.

Past instances, such as the example given above, provide strong evidence of a need to provide additional guidance and rules. The Top-down Decision Tool [Tool 4.6]

outlines an example where slope stability issues escalated to become a real difficulty for completion of a development. The example illustrates short-comings in the current provisions to manage landslide risk and therefore identifies strong evidence for improvements.

Given the limited nature of this demonstration of the auditing tool, no attempt to suggest possible improvements is given here. However, some further general comments are given below.

4.5 General Comments

A District Plan is the first barrier to prevent future problems with a development. It has a wider remit than the Building Act and Building Code in that the District Plan, through the consenting requirements, dictates if the sustainable management approach of the effects-based RMA comes into play. If there are wider concerns that a development will impact the stability of the surrounding land, the Building Code will not address these.

For example, soil penetration tests are generally taken for the design of a building's foundations; they are generally not taken beyond the building envelope. Thus if earthworks are carried out, the possibility of destabilising banks above the cut slope may not be picked up. RMA resource consent processes have a wider mandate and the information obtained at the time of resource consents, along with appropriate conditions, can substantially reduce risk.

However, to be really effective, there needs to be an integrated flow of consistent policy from regional (Regional Policy Statement) level, through to Regional and/or District Plans, supported by appropriate rules and other methods (such as guidelines and bylaws in the example given). The information required at resource consent stages, and the opportunity to consider the environmental context (both of climate change and the wider neighbourhood beyond the site) for any application, can be crucial.

Complementary methods, such as land care groups are effective in terms of soil erosion, but in more intensively developed urban areas, consenting processes are likely to be most effective. The results of monitoring the effectiveness of plans and specific provisions within them will assist an audit. Once auditing is established as a useful mechanism for updating policy and plans relating to climate change, councils will have increasing confidence in using this tool.

The Audit Tool is consistent with section 32 of the RMA, but provides a more comprehensive framework on which to approach and identify gaps and needs in the planning framework for managing the effects of climate change.