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Australian Standard®

Climate change adaptation for settlements and infrastructure—A risk based approach

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The following are represented on Committee BD-103:

- Attorney General's Department (Cwlth)
- Australian Green Infrastructure Council
- Australian Institute of Architects
- Australian Institute of Landscape Architects
- Australian Local Government Association
- Australian Railway Association
- Australian Sustainability Built Environment Council
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- Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education
- Department of Planning and Community Development, Vic.
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- Energy Networks Australia
- Engineers Australia
- Housing Industry Association
- Independent Chair
- Insurance Council of Australia
- National Seachange Taskforce
- Planning Institute of Australia
- Property Council of Australia
- Water Services Association of Australia

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PREFACE

This Standard was prepared by Standards Australia Committee BD-103, Climate Change Adaptation.

This Standard provides a general and widely applicable approach and framework for decision-makers in all organizations that play a role in the commission, design, planning, approval, construction, maintenance, management, operation and decommission of settlements and infrastructure. The Standard provides guidance on managing climate change risks and includes implementation plans for suitable and effective adaptation (treatment).

The objectives of this Standard are to—

(a) provide principles and generic guidelines on the identification and management of risks that settlements and infrastructure face from climate change; and

(b) describe a systematic approach to planning the adaptation of settlements and infrastructure based on the risk management process.

The scope of this Standard is limited to settlements and infrastructure, and is not intended for use in other areas, such as public health.

The Standard follows the International Standard, ISO 31000:2009, *Risk management—Principles and guidelines* (adopted in Australia and New Zealand as AS/NZS ISO 31000:2009), which provides a set of internationally endorsed principles and guidance on how organizations can integrate decisions about risks and responses into their existing management and decision-making processes.

It is anticipated that a range of guides will be developed to assist users in applying this Standard. These guides will provide more specific information and guidance for particular infrastructure sectors or climate attributes.

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FOREWORD

Addressing climate change

How to deal with climate change in Australia is one of the most fundamental and far-reaching issues confronting our nation. Industry, commerce, agriculture and our way of life will be profoundly affected by rising temperatures, changing rainfall patterns, higher sea levels and the increasing frequency, severity and intensity of extreme events, such as heat waves, droughts and storms.

Sectors at risk from the effects of climate change include settlements and infrastructure (buildings, towns and cities), biological systems (threats to vulnerable species, changes to biodiversity), primary production (threats to food security, varieties and availability), health and welfare (increasing disease risks), and social stability.

As individuals and organizations grapple with the challenges of operating in a changing environment, it is clear that taking a pre-emptive approach to adapting to our changing circumstances is preferable to dealing with the increasingly severe consequences of our inaction in the future.

While this Standard has a wider relevance, it specifically deals with the impact of climate change on settlements and infrastructure, which sectors require the longest lead times to implement fundamental change.

Many of our settlements and much of our infrastructure are potentially vulnerable to the effects of climate change. Adaptation needs to commence now so that the consequences of climate change on existing and new structures can be managed. Climate change also offers some opportunities that will be advantageous and actions can be taken to ensure that these are realized.

This Standard is of relevance to all individuals and organizations who design, plan, approve, construct, maintain, operate and decommission settlements and infrastructure.

To maximize the effectiveness of adaptation measures, the Standard should be applied by those individuals and organizations in coordination and cooperation with one another and all levels of government. The impacts of climate change will both vary in their nature and level of risk from one part of the country to another. Recognizing this variation and the need for tailor-made adaptation solutions, this Standard avoids prescription and advocates a flexible approach. Adaptation planning should be based on risk management, where each case is considered in terms of the risks involved and the settlement or infrastructure item’s particular sensitivity.

The nature and extent of adaptation in each situation will depend on the costs and efforts involved compared with the benefits of adopting different adaptation strategies. Adaptation strategies include—

(a) policy and planning approaches to design or approvals;

(b) the modification, relocation or replacement of existing settlements or infrastructure; and

(c) the alteration of operations or maintenance regimes.

A major challenge for Australian individuals and organizations planning their management approach to dealing with the impacts of climate change is to build an understanding of how to adopt and develop strategies to build an appropriate level of resilience to the impacts they anticipate.

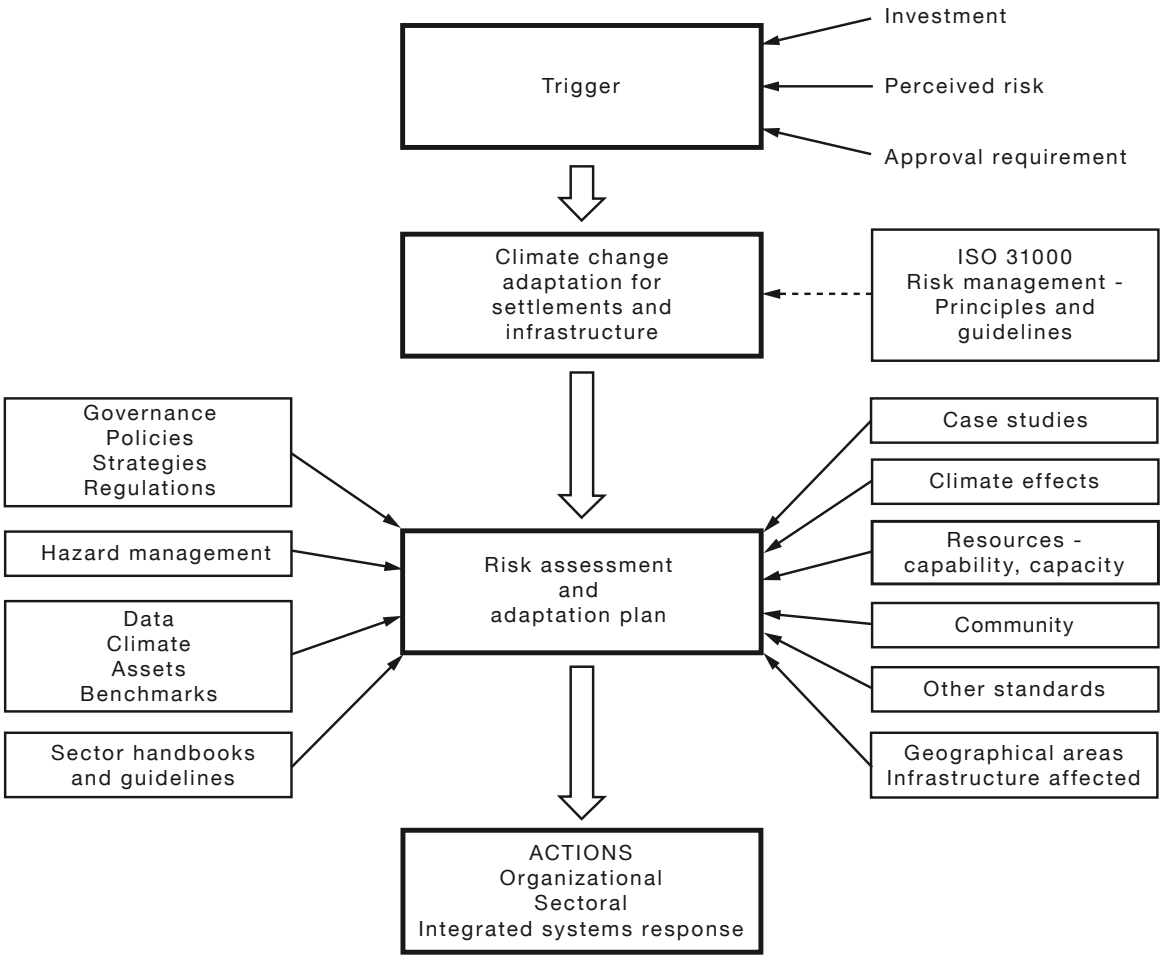
An effective way to do this is to ensure that climate change adaptation is considered as part of existing management and decision-making processes.

This Standard facilitates the integration of climate change considerations into these conventional business practices.

The Standard follows the International Standard, ISO 31000:2009, *Risk management—Principles and guidelines* (adopted in Australia and New Zealand as AS/NZS ISO 31000:2009), which provides a set of internationally endorsed principles and guidance on how organizations can integrate decisions about risks and responses into their existing management and decision-making processes.

Committee BD-103 is aware that climate change adaptation is a relatively new field and many alternative approaches to the risk management approach either exist or are in the process of being developed as suitable methodologies for adaptation of settlements and infrastructure.

The Committee has not undertaken a review of alternative methods to risk management for climate change adaptation of settlements and infrastructure. Therefore, such alternative adaptation methodologies should not be disregarded on account of this new Standard, as they may be appropriate, either on their own or in conjunction with this Standard, for a particular project or application. The following figure illustrates the approach outlined in this Standard.



APPROACH TO DEVELOPING A CLIMATE CHANGE ADAPTATION PLAN

Trigger for developing an adaptation plan

An event or occurrence that results in an organization commencing climate change risk management through adaptation is referred to as a 'trigger'. Examples of triggers are:

(a) *Investment* Where an organization is in the process of developing a significant settlement or infrastructure, as part of the project planning, it would be prudent to undertake an analysis of the risk (including any financial risk) of climate change affecting the infrastructure over its expected life. Similarly, when considering purchasing an already established settlement or infrastructure, an analysis of any potential risk to the investment should be made. This would also be advisable where a particular settlement or infrastructure is already owned by the organization. Over the life and subsequent decommissioning of settlements or infrastructure, climate change may necessitate additional expenditure or other measures.

(b) *Perceived risk* Where an organization or individual perceives that a risk could occur as a result of climate change. This perception may not relate to the more concrete need associated with financial investment, but is likely to be more intangible. An example is where local government may be concerned about projected sea level rises. Would the council be liable if it approved development in an area not yet impacted by climate change, but with potential impacts over time? Would costs for maintaining amenities and local infrastructure be impacted? The federal and state governments may also act on a perceived risk to the health and wellbeing of its citizens. Perceived risks often prompt planning policies and other instruments that provide direction to organizations and individuals.

(c) *Approval requirement* Approval for a project may be subject to a requirement to undertake a risk assessment and develop suitable treatment through an adaptation plan (and subsequent necessary actions).

It is important to be aware that early adaptation planning within a project or program tends to yield better adaptation outcomes. Options and choices are usually greater the earlier adaptation planning is carried out.

Assessment methodology

AS/NZS ISO 31000 is a well-established and universally accepted process for risk management. It is used in this Standard to guide organizations in developing effective climate change adaptation plans. It advocates that these risks should be managed in an integrated way, supported by a framework that—

(a) sets policy;

(b) demonstrates commitment;

(c) provides resources;

(d) allocates responsibility; and

(e) pursues continuous improvement.

The alignment with the well-recognized risk management Standard allows organizations that are already familiar with, or using, AS/NZS ISO 31000 to easily integrate this climate change adaptation Standard into their management processes.

Climate change risks should also be considered within the context of other risks that may affect the organization within a similar timeframe, as multiple risks may combine and result in a more severe risk. For example, organizations responsible for water supply are affected both by population growth, which increases water demand, and declining rainfall, which decreases water availability. The two factors together multiply the risk.

It is important for organizations that have gone through the risk assessment process and developed adaptation plans to ensure that these plans are implemented in a reasonable time frame. Plans must lead to quantifiable actions. Senior management should allocate responsibility within the organization, establish appropriate reporting lines, and provide adequate resources.

Information and data use and availability

Within this Standard there are a number of clearly defined steps to be taken. Many of these steps require the user to consult, integrate, or otherwise be aware of external policies, information, plans, data and guides. It is the responsibility of those undertaking the assessment to make sure they have consulted the appropriate documents.

One of the key concerns of users of this Standard is the availability of information about likely future climate. While climate models continue to improve, some uncertainty about future climate is inevitable and decisions must be made on the basis of the best available information.

Uncertainty is part of the intrinsic nature of complex systems. As the quality, quantity and communication of climate change information improves over time, the knowledge gap is expected to reduce. However, filling the knowledge gap will not remove all uncertainties when dealing with climate change information and data. It is likely that significant levels of uncertainty with regards to climate change projections will remain and adaptation planning processes will have to be flexible enough to cope with these. The lack of incontrovertible data should not be considered as a reason not to implement climate change adaptation measures.

Adaptation plans should be reviewed on a regular basis to take new data into account. Adaptation plans should be seen as ‘living documents’ that are updated and modified to take changing circumstances into account.

There are as yet no recognized central sources of climate change data, and this Standard cannot specify data sources. It will be up to individuals and organizations to locate and use the best available data. Research results published in refereed scientific journals can be a source of reliable data; however, these can often be application-specific and not necessarily suitable for general use. Care should be taken when using results from refereed journals for other applications and studies since the specificity of location, time and resolution as well as models that are calibrated differently in such reports may be very different from the application under consideration.

Information, and specific data, used in climate change adaptation studies should be current, authoritative and credible. Sources should be cited.

Summaries, critical reviews of available data, and compilations of data such as maps and charts are extremely important, particularly if they come from a credible and reliable source. These sources can be government agencies, research institutions, universities, and private institutions.

STANDARDS AUSTRALIA

Australian Standard

Climate change adaptation for settlements and infrastructure—A risk based approach

1 SCOPE

This Standard provides principles and generic guidelines on the management of the risks that settlements and infrastructure face from the consequences of climate change. In particular, it describes a systematic approach to planning the adaptation of settlements and infrastructure based on the risk management process given in AS/NZS ISO 31000:2009.

This Standard is relevant to individuals and organizations concerned with all phases in the lifecycle of settlements or infrastructure that will be affected by climate change. These phases may involve—

(a) policy and planning;

(b) creation or acquisition;

(c) utilization and maintenance; and

(d) renewal and disposal.

Both beneficial and detrimental consequences can arise from climate change.

2 APPLICATION

This Standard is not intended for the purpose of certification.

This Standard should be applied throughout the life of settlements and infrastructure.

This Standard applies to settlement planning processes as highlighted in Figure 1 and to infrastructure sectors as given in Table 1 and the climate change variables in Table 2.

This Standard is intended for use, as appropriate, by organizations to inform all decisions concerning the commissioning, design, planning, approval, construction, maintenance, operation and decommissioning of settlements and infrastructure.

