The development conditions may be thought of as recommendations. Recommendations are usually considered to be optional for the client to accept or reject if other factors weigh more heavily. However, the development conditions may not be an option for the owner if they form an essential component of the risk management strategy.

The practitioner should be mindful of the need to sign documentation upon completion of construction of the approved works, such as by submission to the regulator of a completion form (such as the Practice Note, Appendix D, Form G).The experienced practitioner will be aware of the implied liability associated with such forms. Therefore, as a matter of good practice for liability risk management, the practitioner needs to specify appropriate inspection and testing throughout the detailed design and construction phases so that he can sign-off on completion without unnecessary liability exposure.

AS2870 (Standards Australia, 1996) requires sites where the “foundation condition on a sloping site where downhill foundation movement or failure is a design consideration” (clause 1.7.29, AS2870) to be classified as Class P (clauses 2.1.2 and 2.4.4, AS2870). Such sites require design of footings from engineering principles. The design and construction aspects of such footings may form an integral part of the risk mitigation measures. Some general guidance is given in Appendix G of the Practice Note.

C9.3 DESIGN LIFE

The premise behind adoption of a design life may be the community expectation that a residential dwelling frequently, with appropriate maintenance, will have a functional life well in excess of 50 to 60 years. The community can reasonably expect this performance for a well designed and constructed building. Such a design life is consistent with that nominated by relevant Australian Standards and other design guides as summarised in Table C11.

Table C11: Summary of Design Life Requirements.

<table>
<tr><th>Standard or Design Guide</th><th>Title</th><th>Clause/Section</th><th colspan="3">Design Life</th></tr>
<tr><td>AS 2870–1996</td><td>Residential Slabs and Footings - Construction</td><td>1.4.2</td><td colspan="3">50 years</td></tr>
<tr><td>AS 3600–2001</td><td>Concrete Structures</td><td>4.1</td><td colspan="3">40 – 60 years</td></tr>
<tr><td>AS 3700–2001</td><td>Masonry Structures</td><td rowspan="3">Refer to
AS 1170.0 and
AS 1170.4-</td><td colspan="3" rowspan="3">[AS 1170.4 – Appendix F, Table 3.3]

<6 months ranging to >= 100 years for varying Importance Levels and varying Annual Probability of Exceedance</td></tr>
<tr><td>AS 4100–1998</td><td>Steel Structures</td></tr>
<tr><td>AS 1720.1–1997</td><td>Timber Structures</td></tr>
<tr><td>AS/NZ 4676–2000</td><td>Structural Design Requirements for Utility Services Poles</td><td>Appendix D, Table D2</td><td colspan="3">Varying according to pole construction material and exposure.
<u>Galvanised Steel</u>: up to 60 – 100 years and >100 years, down to 3 – 12 years
<u>Concrete</u>: 50 – 100 years and >100 years</td></tr>
<tr><td rowspan="6">AS 4678–2002</td><td rowspan="6">Earth Retaining Structures</td><td rowspan="6">3.4.1 and Table 3.1</td><td>Short</td><td>5 years</td><td>Temporary site works</td></tr>
<tr><td rowspan="2">Medium</td><td>10 years</td><td>Mine structures</td></tr>
<tr><td>30 years</td><td>Industrial structures</td></tr>
<tr><td rowspan="3">Long</td><td>60 years</td><td>River and marine structures, residential dwellings</td></tr>
<tr><td>90 years</td><td>Minor public works</td></tr>
<tr><td>120 years</td><td>Major public works</td></tr>
<tr><td>Concrete Masonry Association of Australia 2003/04</td><td>Design and Construction Guides:
▪ Reinforced Concrete Masonry Cantilever retaining Walls
▪ Segmental Concrete Reinforced Soil Retaining Walls
▪ Segmental Concrete Gravity Retaining Walls</td><td>Appendix C</td><td colspan="3">As above for AS 4678</td></tr>
<tr><td>Building Code of Australia</td><td>Importance Level</td><td>Table B1.2a</td><td colspan="3">Read in conjunction with AS 1170.0 and AS 1170.4</td></tr>
</table>

Usually the time-frame for the life of the structure or development, and hence the period over which the landslide risk assessment is relevant, will be based on that specified by relevant design codes or the regulator. For example, Sydney’s

Pittwater Council requires a baseline period of 100 years as the context within which the geotechnical risk assessment should be made, broadly reflecting the expectations of the community for the anticipated life of a residential structure.

The practitioner should identify the maintenance required to achieve the required design life in relation to the landslide hazards. The design life should also be nominated, particularly if it is not in accordance with a specific requirement.

On-going maintenance is essential for the effectiveness of the risk control measures. Without such maintenance, the risk may change from acceptable to unacceptable with time.

C9.4 MAINTENANCE REQUIREMENTS

It is essential that the owner (and occupier) be made aware of the necessity of maintenance to provide effective and sufficient risk control over the design life. The Practitioner should advise on appropriate inspection and maintenance to control the risk. Some guidance is given in the GeoGuides (AGS 2007e)

Future owners need to be made aware of the same requirements. One method available to inform future owners is to have annotation on the Land Title so that the details referred to in the annotation become readily known to new owners. Such details should include the reference details of the risk management report and relevant design and construction records, as well as maintenance records.

C10 REPORTING STANDARDS

The report has the overriding function to document the data, assumptions and thought process used for the assessment. Such documentation facilitates subsequent review and revision. The report should be technically rigorous but must also be understood by non-technical people who are required to make decisions based on it.

The report should fully document sources of data, extent of investigations completed, assumptions made and associated limitations. The report is to be clear, unambiguous, stating outcomes from the investigations and assessment, and to make clear recommendations. If there is uncertainty, then such doubt needs to be stated in the report together with what can be done to clear up the doubt. A good principle to adopt for such documentation is to assume that the report may be tendered as an expert report to a subsequent court case. Such documentation is necessary to justify the expert's conclusions if it is not to be rejected on the basis of the "Makita Principle" which, broadly speaking, requires reasons based on facts or calculations or precedents, not simply an unsubstantiated opinion.

The report should document the best estimate results for the risk analysis, based on data available at that stage.

Table C12 presents an example checklist of issues to be addressed / considered by LRM reports. The checklist should also assist the practitioner when preparing reports to confirm that all relevant aspects have been addressed, and the regulator when evaluating reports for compliance with policy requirements.

C11 SPECIAL CHALLENGES

C11.1 MINOR WORKS

No further comment.

C11.2 PART OF THE SITE NOT ACCEPTABLE

The requirement to address other parts of the site is derived from the community expectation that unacceptable risks will be identified and addressed as part of a broad duty of care.

C11.3 ADJOINING AREAS NOT UNDER THE RESPONSIBILITY OF THE SITE OWNER

Again the broad duty of care requires these other such areas to be addressed. Adjoining areas may be under the regulator's control and require direct input.

C11.4 COASTAL CLIFFS

Stability of coastal cliffs (and bluffs) is often not associated with a rainfall trigger (as is usually the case with soil and colluvial slopes). Cliff stability is often triggered by sea conditions, such as undercutting in storms, wetting by run up and spray leading to frequent wetting and drying cycles and possibly temperature.

Access to coastal cliffs is often difficult due to the physical constraints. Nonetheless, where there are elements at risk (being either property or people, above or below the cliff) then the situation needs to be examined from both above and below to confirm the appropriate site details / features since the likelihood and consequences will be highly dependent on those features.