Development manual planning scheme policy (PSP)
SC6.4.15 Steep land development

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SC6.4.15 1 Introduction

Editor's Note - This section is to be read in conjunction with the following sections of the planning scheme policy:

Section SC6.4.2 Development application guidelines

Section SC6.4.6 Road works and traffic control

Section SC6.4.7 Clearing, grubbing and earthworks

Section SC6.4.8 Stormwater management

Section SC6.4.9 Stormwater quantity

Section SC6.4.10 Stormwater quality

Section SC6.4.11 Water and sewerage

Section SC6.4.16 Geotechnical investigations

Section SC6.4.17 Structures

Section SC6.4.18 Concrete works

Section SC6.4.23 Construction management, quality management, inspection and testing

Section SC6.4.24 Acceptance of completed works

(1) Background

(a) Development on steep land requires specific considerations for design, in particular geotechnical considerations, as well as safety, servicing, environmental and economic considerations.

(b) The stability of land which is steep, erosion prone, prone to slip and other geotechnical problems can be adversely affected by the following actions or development:

(i) earthworks (filling and excavation);

(ii) vegetation clearing;

(iii) construction of buildings and other structures (retaining walls);

(iv) construction of roads and driveways;

(v) on-site disposal of wastewater; and

(vi) changes to the existing flow of surface or groundwater.

Inappropriate development on land subject to landslide hazard can result in significant risk to people and property on the subject site, on surrounding land, and land down slope of the site. To ensure that these matters are appropriately considered when making decisions, geotechnical investigations are required, and appropriate design solutions implemented. In some circumstances development should be avoided.

(c) This section provides guidelines and advice for undertaking development on steep land and the application of suitable design practices and design considerations.

Editor's Note - This policy section should also be read in conjunction with the AGS (2007e), *The Australian GeoGuides for slope management and maintenance*, Australian Geomechanics Society, *Australian Geomechanics*, Vol 42, No 1 and the planning scheme policy section SC6.4.16 Geotechnical investigations.

(d) Wherever practical to do so, best practice techniques for construction and development techniques are expected to be demonstrated.

(e) In a broad sense, development should seek to achieve the following objectives:

(i) avoid unstable or hazardous sites and protect lives and property from hazardous conditions such as rock falls, excess stormwater run-off, erosion, etc;

(ii) be designed to minimise infrastructure maintenance requirements and costs to the

community and residents;

(iii) provide practical and safe access for residents, visitors, and service providers;

(iv) complement the scenic hillside character of the surrounding area by integrating unique or special natural features such as landforms, rock outcroppings, existing trees and vegetation, water features, hilltops and ridgelines and avoid further expansion onto scenic features, particularly ridgelines;

(v) minimise the footprint of development during and after construction;

(vi) protect wildlife habitat, corridors, and environmentally sensitive areas; and

(vii) be compatible with existing adjacent development.

The creation of good amenity, when viewing the development from streetscapes and surrounding areas,should be a key consideration in all designs to avoid development on steep slopes that is visually dominant.

(2) Development on steep slopes

As a general and overall consideration, the design of development on steep land should consider the following.

(a) Major considerations in relation to safety are:

(i) landslide risk; and

(ii) debris flow.

(b) The siting and design of development and infrastructure and any associated operational works should not increase the extent or severity of any landslide hazard or present any unacceptable risk to life, property, the community, or the environment. Risks may arise internally or externally to the site or affect the subject site or adjacent sites.

(c) Safety of the development should be addressed though appropriate investigations and design.

Editor's Note - The preparation of a site-specific geotechnical investigation is to be undertaken in accordance with Section SC6.4.16 Geotechnical investigations.

(d) The findings, recommendations and specific works of the geotechnical investigation report must be implemented and complied with to ensure that the risk level for the development will be no more than "low" in accordance with Section SC6.4.16 Geotechnical investigations. If required to achieve a risk level of "low', such works must certified by a suitably qualified person.

Editor's Note - Risk level "low" in accordance with *Landslide Risk Management*, Australian Geomechanics Volume 42 No 1 March 2007.

(e) Any recommendations contained in the geotechnical investigation report must be adopted in the final approved design.

(3) Servicing

(a) Development should provide for the safe and efficient servicing of the site by appropriate infrastructure and minimise ongoing costs to the final user and community. Specific designs for earthworks, roads, drainage, water and sewerage, water quality treatment, and site access may need to be demonstrated at an earlier stage than comparable developments on flatter land.

(b) Stormwater in particular should be controlled and conveyed in a manner that mitigates potential problems and emulates the area's natural water cycle, rather than shifting increased flows and issues downstream. Post development flows must not exceed pre-development flows. Particular attention should be paid to designing practical and robust inter-allotment

drainage systems. Groundwater flows should also be a key consideration in relation to drainage systems and the potential for landslide risk.

(c) Any public infrastructure developed should not result in unsustainable increases in infrastructure operation and maintenance costs relative to the number of rateable units created (e.g., high level water systems, high maintenance drainage systems). Retaining walls in road or drainage reserves are discouraged and will only be accepted in exceptional circumstances where there is a demonstrated benefit to the protection of public infrastructure. All retaining structures must be certified by an RPEQ and constructed of material that ensures public safety and minimised maintenance costs for the design life and should be designed for a design life of at least 60 years and achieve good streetscape amenity.

Refer to Section SC6.4.17 Structures for more details

(d) Road geometry should be designed in accordance with Section SC6.4.6 Road works and traffic control, Clause SC6.4.6.1 Geometric road design, and Austroads with particular attention to grades, property accesses, design speeds and sight distances to ensure the safety of all road users. Where variations are sought to Council's standards strong justification must be given to support the application. Long distances of steep roads or sharp curves without adequate sight distances or turning paths will not be approved. Road aesthetics are valued as a significant contributor to the character and quality of development and should be a key consideration.

(e) Access to all properties must be safe and functional. The design of the accesses must be shown in the overall development design to ensure the safety, practicality and impact on the public and private domains. Lot levels should reflect the requirement of accesses to meet minimum grade requirements and allow for additional near level on-site parking for visitors, service vehicles and other parking needs. Access designs should be in accordance with the Section SC6.4.5 Road network infrastructure, Clause SC6.4.5.4 Driveways. Where lot accesses may be problematic to construct later, they should be constructed with the roads.

(f) Pedestrian, cyclist, and public transport infrastructure design should also be considered at the overall development design as these means of movement are often restricted on steep lands. Alternate facilities to standard road routes and footpaths (e.g., pedestrian connection stairs) may require special design considerations due to grade and safety needs. Residential streets should be designed to create low speed environments and to facilitate and encourage pedestrian and cyclist use. Refer to Section SC6.4.4 Active transport infrastructure for further details.

(4) Sustainability

(a) Hillside development can add its own positive character to a particular locality, however, it can also have negative impacts on the natural and built environment. Development should seek to maintain or enhance positive site characteristics and should maintain or enhance the natural qualities of hillsides (e.g., skylines, vistas, landscape form, vegetation, rock outcrops and other topographic features), whilst negative impacts (e.g., scarring and a lack of respect for natural terrain and aesthetics) should be avoided, or where complete avoidance is not practically feasible, minimised . Scenic natural features should be incorporated into the subdivision design as natural open space or through the use of larger allotments that can contain the features.

(b) The layout of a development should be sympathetic to the area's natural terrain and hazardous conditions. It should aim to maintain sensitive natural areas and protect and preserve the scenic characteristics of hillsides. Where possible development should be clustered to restrict its impact on the natural state, improve the financial efficiency of the development and assist in creating a variety of the housing forms.

(c) The effect of slope on built form should be identified in the initial stages of the development's

design and appropriate building designs should be encouraged through suitable lot sizes, site, and access works, building envelopes and covenants. This will help ensure the development can be built as proposed and reduce the likelihood of conflict or compromise at a later date.

(d) The extent of earthworks (filling and excavation)is a major consideration in the design of developments on steepslopes, not just for reasons of site stability but also in terms of cost, the efficient use of land and visual impact. Constructed slopes should be stable and capable of re-vegetation and effective maintenance. They should also not be so high as to be visually obtrusive to the streetscape or the scenic quality of the development. Heights between the streets and site levels should not be so great as to provide a disconnect between housing and the street or prove impractical for regular movement. Long stretches of high cuts or fill adjacent to road edges will not be supported . Site grading and retaining walls should be designed to respect the existing terrain; that is, steep land is not to be extensively excavated or filled to create “build-able lots” or flat yards. Final lot grades should, wherever practical, mimic the natural slope.

(e) Where disturbance from future site development is likely to be problematic earthworks to individual sites should occur at the subdivision stage. For subdivision, this may include providing level building pads to accommodate future dwellings, associated filling, and the construction of private retaining walls.This may occur where there are unavoidable large cuts and fills, repeated or close accesses, or where future blasting may be required.

(f) Retaining wall heights should be minimised where possible and should not be of such height that they detract from the amenity and human scale of the development. Generally, walls adjacent to roadways on property boundaries should not exceed a height of one metre . Unavoidably high walls should be articulated, be constructed with visually appealing materials or finishes (i.e,. complementing natural materials where possible), be embellished with sufficient appropriate soft landscaping to screen the wall and be set back from the road boundary to permit landscape treatment. Where possible, a series of smaller stepped walls should be utilised and designed to permit landscaping of the terraces. Retaining walls can be used to reduce slope disturbance, rather than modify natural terrain. Lot sizes should increase as the natural slope increases. Constructed slopes can be placed behind buildings if needed, however, consideration should be given to the principle of minimising the need for any earthworks in the first instance.

(5) Economic

(a) The volume of cut and fill over the development should be minimised and a cut and fill balance over the site as a whole should be achieved where possible.

(b) It is expected that with any new public infrastructure the cost of ongoing maintenance should generally be no more for steep sites than for flat sites on a per lot basis. Where there may be a special requirement for non-standard or higher maintenance infrastructure, it is expected that a full life cycle cost comparison would be provided (e.g., high level pumps or reservoirs, drainage structures, access to landscaped areas, etc.).

(6) Development applications advice

Particular steep land issues that must be addressed at various application stages are indicated below.

(a) Council encourages applicants to discuss development proposals with Council at the initial concept design phase.

(b) It is important that the design reflects all the recommendations of the geotechnical report and that sufficient design detail is provided to demonstrate that the proposed road and lot layouts will

work in practice and result in infrastructure and built form outcomes that comply with these guidelines. In particular, sufficient detail should be provided to assure Council that the layout will not require significant changes due to technical design constraints, i.e., it should not be left to the operational works stage to prove the development will work. Sufficient drawings and design data (including multiple site and building cross-sections) should be provided to demonstrate this.

(c) Where an initial geotechnical report (submitted to support a Material Change of Use or Reconfiguring a Lot development application) identified a requirement to undertake further detailed investigation prior to design, then this must be carried out. The operational works design should be certified by a geotechnical engineer as complying with the recommendations of the geotechnical report.