

RIPARIAN LANDS

Introduction

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- 17.2 Category 1 Environmental Corridor
- 17.3 Category 2 Terrestrial and Aquatic Habitat
- 17.4 Category 3 Bank Stability and Water Quality
- 17.5 Category 3A Watercourse Restoration

INTRODUCTION

Creeks, aquatic habitats and the associated riparian environments are important systems which support water quality; maintain habitat, connectivity and biodiversity; and contribute to the character, amenity and aesthetics of the local area.

The impact of urban stormwater management systems has led to accelerated erosion, increased localised flooding, significant sediment deposition, increased pollution and weed proliferation as well as loss of habitat and biodiversity. This in turn has altered the way the community uses and values the waterways. For example, many creeks are now unfit for swimming or other forms of recreation.

Within Ku-ring-gai these changes are apparent within the streams and riparian systems that still exist within the local government area (LGA). Outside the LGA the impacts can be seen in the receiving water bodies such as Sydney Harbour, the Hawkesbury River and local coastal beaches.

This Part guides development on land identified within the Natural Resource – Riparian Lands Map in the KLEP (see clause 6.4) and supports the achievement of the aims and objectives within the LEP.

Further background on the riparian lands mapping is contained within the *Ku-ring-gai Biodiversity and Riparian Lands Study Version 5*.

Practical measures are provided to ensure multiple objectives are achieved without compromising planning, development, conservation and restoration needs.

This Part is set out as follows:

- i) 17.1 of this Part provides general controls for development within all riparian land.
- ii) 17.2 - 17.5 of this Part provide additional provisions for development within specific categories of riparian land as identified on the Natural Resource– Riparian Lands Map in the KLEP.

Both sections are to be addressed when preparing development applications.

The following specific riparian categories are applicable:

- i) Category 1 Riparian Land includes a 40m setback from the top of each bank which, together with the waterway, forms the core riparian zone (CRZ); and a buffer zone of a further 10m from the core riparian zone. Refer Figure 17.2-1.
- ii) Category 2 Riparian Land includes a 20m setback from the top of each bank which, together with the waterway, forms the CRZ; and a buffer zone of a further 10m from the core riparian zone. Refer Figure 17.3-1.
- iii) Category 3 Riparian Land includes a 10m setback from the top of each bank which, together with the waterway, forms the CRZ. Refer to Figure 17.4-1.
- iv) Category 3a Riparian Land includes the area 10m on each side of a discontinuous or piped watercourse. Refer to Figure 17.5-1.

Note: Development within 'waterfront land' may be Integrated Development. Integrated Development requires consent from at least one public body other than Council. See www.water.nsw.gov.au for links to guidelines for controlled activities on waterfront land from NSW DPI Office of Water.

17.1 GENERAL

Further controls that may apply	
	SECTION C PART 21.2 - Landscape Design PART 24D.5 - Tennis Courts and other Sporting Surfaces PART 24D.6 - Fences

Objectives

- 1 To maintain natural waterways and floodplain processes.
- 2 To protect natural features, functions and biodiversity within riparian land (including the waterway).
- 3 To manage edge effects appropriately at the riparian land/urban interface.
- 4 To maintain and enhance the viability of riparian vegetation and habitats.
- 5 To protect and enhance water quality and aquatic habitat within the waterway and downstream.
- 6 To improve the connectivity and continuity of riparian vegetation and habitat.
- 7 To re-instate where feasible the natural functions and characteristics of the core riparian zone including reconstruction of existing piped or channelised waterways and natural waterways.
- 8 To prevent further piping and channelisation of watercourses.
- 9 To integrate human access to waterways without compromising the protection of riparian processes.

Controls

Note: Where a site is subject to both a riparian category in *Part 17 Riparian lands*, and a Greenweb category in *Part 18 Biodiversity*, the higher planting percentage for locally indigenous trees and understory species are to be used.

- 1 Subdivisions and amalgamations are to provide for a development footprint outside the riparian land.
- 2 Subdivisions (via perimeter roads) are to front onto riparian land.
- 3 The provision of service infrastructure including stormwater and sewerage within the core riparian zone (CRZ) is to be minimised.
- 4 Despite the provisions of 17.2 to 17.5 of this Part, safety fences are permitted within the CRZ. Fences are to be set back an appropriate distance from the top of the bank, and be of an open design to minimise barriers to flora, fauna and water.
- 5 Encroachments onto riparian land may be permitted. In determining whether an encroachment is acceptable, the following is to be considered:
 - i) the location of existing hardstand structures to be retained within the riparian land;
 - ii) the scale of the development;
 - iii) the minimisation of any encroachment through the siting and design of the development;
 - iv) location above the 1% flood level;
 - v) enhancements proposed as part of the development such as offset areas;
 - vi) geomorphic and ecological values.

Note: Principal private open space should be provided for outside the CRZ.

Access

- 6 Opportunities for the community or residents to connect with and explore waterways are to be provided where appropriate.
- 7 Accessways are not to compromise the integrity of riparian land. Walkways, tracks, cycleways and general access points may be established in the riparian land, where:
 - i) they are designed and constructed to ensure minimum impact on the riparian land; and
 - ii) they contribute to the management of edge effects or ongoing riparian maintenance.

17.1 GENERAL (continued)

Controls

- 8 Any access to the waterway is to be located at strategic points where the ecological integrity of the existing riparian vegetation, stream bed and bank stability will not be compromised.
- 9 Crossings (ie. bridges) over natural waterbodies are to maintain riparian connectivity; retain natural stream bed and bank profile; prevent scour and erosion of the stream bed or banks during storm events; not restrict bankfull or floodplain flows and not inhibit natural sediment transport. This is to be achieved by:
 - i) minimising the number of crossings;
 - ii) minimising the width of the crossing to allow for pedestrian access. Vehicle crossings will only be considered where required;
 - iii) establishing crossings at right angles to the flow rather than at an oblique angle; and
 - iv) minimising disturbance to existing native riparian vegetation.

Note: Refer to the NSW DPI Office of Water - Guidelines for Watercourse Crossings on Waterfront Land www.water.nsw.gov.au

Design

- 10 Impervious surfaces within the CRZ are to be minimised. Where feasible, reduce the existing building footprint and impermeable surfaces within riparian lands.
- 11 The development is to be designed to ensure connectivity of vegetation, hydrological flows and fauna movement to, and within, the riparian land and waterway.
- 12 Riparian vegetation is to be retained and enhanced, where any works are proposed to be undertaken in the Core Riparian Zone a Vegetation Management Plan prepared by a suitably qualified person, is required

Note: Refer to the NSW DPI Office of Water - Guidelines for vegetation management plans on waterfront land www.water.nsw.gov.au
- 13 Planting of species listed in Council's Weed Management Policy will not be permitted within riparian lands.
- 14 Disturbance of soils within riparian land is to be minimised, except where required for rehabilitation or remediation of the waterway.

Watercourse and flood processes

- 15 Watercourse and riparian land management is to be integrated with flooding risk. Flood management studies are to consider the impacts of rehabilitation and remediation of riparian land in the assessment of risk and in any proposed mitigation strategies.
- 16 No works are to be undertaken on or near a natural waterway

17.1 GENERAL (continued)

Controls

or section of natural waterway that would cause straightening, significant relocation, widening, narrowing, piping or lining of the natural waterway.

- 17 No works are to be undertaken on or near an artificially modified waterway unless it involves maintenance of existing features or naturalisation or remediation to improve the condition of the waterway.

Note: Artificially modified waterways include those that have been modified by human activities such as relining with artificial materials and/or those that have been realigned (re-directed).

- 18 Stream bank stabilisation works should be by use of re-vegetation methods, or if necessary, be of a 'soft engineering' design.

- 19 All stormwater discharge is to be treated before it enters the waterway.

Note: Refer to Part 24 of this DCP for post- construction water quality standards.

- 20 Water quality and quantity treatments should not compromise the biodiversity objectives of this DCP or objectives of this Part.

Note: Council may require, as a condition of consent, that a restriction-on-use be placed over the riparian land. The terms of which do not permit any works or development including earthworks, construction, landscaping, removal of vegetation or changes to the waterway, without the written concurrence of Council.

- 21 Channel and bank stability within the CRZ is to be protected by avoiding the removal of natural stream structure, vegetation and woody debris, except where debris creates a flood hazard.

- 22 Development is to be designed to maintain or emulate a naturally functioning watercourse wherever possible.

- 23 Piped services through the CRZ are to be avoided. Where necessary use non-destructive techniques such as direct drilling, where no part of the pipe is above ground or above the bed of the waterway. In exceptional circumstances pierced crossings may be considered.

17.2 CATEGORY 1 ENVIRONMENTAL CORRIDOR

Further controls that may apply

SECTION B
PART 16 - Bushfire Risk

SECTION C
PART 24D.3 - Development Over or Adjacent to a Natural Waterbody, Open Channel or Drainage Depression

Objectives

- 1 To provide a corridor for the movement of flora and fauna species between reserves and areas of remnant vegetation.
- 2 To preserve and enhance the viability, condition, connectivity and extent of native riparian vegetation and allow for adaption to climate change.
- 3 To protect and/or provide habitat for terrestrial and aquatic fauna.
- 4 To protect and/or provide bank and bed stability.
- 5 To contribute to improved water quality within the catchment.
- 6 To provide a riparian buffer to counter edge effects on the urban interface.
- 7 To provide for bushfire asset protection zones outside the core riparian zone.

Controls

- 1 The general controls and objectives under Part 17.1 General are relevant to this category.
- 2 All parts of the development are to be located outside the core riparian zone (CRZ) of category 1 lands being 40m from the top of each bank.
- 3 All parts of the development are to be located outside the category 1 buffer, being 10m from the CRZ.
Note: Any variation to the prescribed distances in 17.2 (1&2) are to be applied in line with the considerations in 18.1(5) of this Part.
- 4 Any Asset Protection Zone (APZ) proposed for bushfire management is to be located outside the CRZ.
Note: Encroachments of APZs into the CRZ may be considered where existing hardstand development limits the ability to establish a riparian buffer or does not allow sufficient space to establish an APZ outside of the CRZ. Any such proposal is to include submission of a vegetation management plan in line with section 17.1(12) of this Part.
- 5 An APZ is permitted in the buffer.

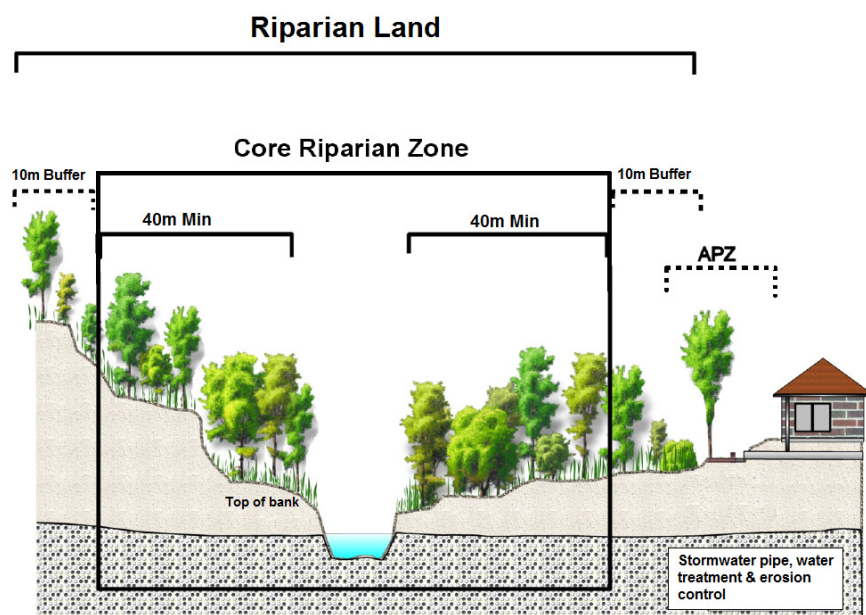


Figure 17.2-1:
Category 1 Riparian Land

17.2 CATEGORY 1 ENVIRONMENTAL CORRIDOR (continued)

Controls

Design

- 6 Where the riparian land within the CRZ or buffer has been disturbed or degraded, appropriate riparian vegetation is to be revegetated or rehabilitated. Local native vegetation assemblages, capable of supporting the long term ecological function of the riparian land, is to be used.
- 7 Where practicable, protection, regeneration and rehabilitation of vegetation in the CRZ is to retain or achieve a density that would occur naturally.
- Note:** Practicability will be considered on merit. For instance, within existing asset protection zones on bushfire prone lands, the density and design of vegetated areas will need to meet the requirements for Asset Protection Zones under Planning for Bushfire Protection 2019 rather than the above controls.
- 8 Particular emphasis is to be given to the retention, regeneration or revegetation of the CRZ in key locations. Including:
- i) where two or more watercourses join;
 - ii) sites with significant erosion;
 - iii) stormwater outlets.
- 9 Plantings within the CRZ are to consist of 100% locally native species.
- 10 Planting within sites that include land identified as Category 1 buffer is to consist of:
- i) not less than 70% locally native tree species and 30% locally native understorey species;
 - ii) species that reflect the relevant vegetation communities within the area;
 - iii) a mix of groundcover shrubs and trees and is to exclude monocultures.

Note: Council may support a variation to 8) or 9) above if suitable justification is provided.

17.3 CATEGORY 2 TERRESTRIAL AND AQUATIC HABITAT

Further controls that may apply

SECTION B
PART 16- Bushfire Risk

SECTION C
PART 24D.3 - Development Over or Adjacent to a Natural Waterbody, Open Channel or Drainage Depression

Objectives

- 1 To preserve and enhance the viability, condition, connectivity and extent of native riparian vegetation and allow for adaption to climate change.
- 2 To protect and/or provide habitat for terrestrial and aquatic fauna.
- 3 To protect and/or provide bank and bed stability.
- 4 To contribute to improved water quality within the catchment.
- 5 To provide a riparian buffer to counter edge effects on the urban interface.
- 6 To provide for bushfire asset protection zones.

Controls

- 1 The general controls and objectives under *Part 17.1 General* are relevant to this category.
- 2 All parts of the development are to be located outside the core riparian zone (CRZ) of category 2 lands being 20m from the top of each bank.
- 3 All parts of the development are to be located outside the Category 2 buffer, being 10m from the CRZ.
Note: Any variation of the prescribed distances in 18.3 (1&2) is to be applied in line with the considerations in 18.1(5) of this Part.
- 4 Any Asset Protection Zone (APZ) proposed for bushfire management is to be located outside the CRZ.
Note: Encroachments of APZs into the CRZ may be considered where existing hardstand development limits the ability to establish a riparian buffer or does not allow sufficient space to establish an APZ outside of the CRZ. Any such proposal is to include submission of a vegetation management plan in line with section 18.1(12) of this Part.
- 5 An APZ is permitted in the buffer.

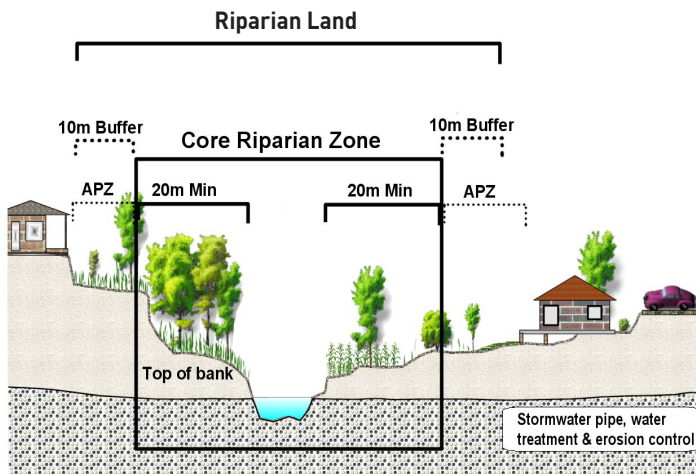


Figure: 17.3-1
Category 2 Riparian Land

17.3 CATEGORY 2 TERRESTRIAL AND AQUATIC HABITAT (continued)

Controls

Design

- 6 Where the riparian land within the CRZ or buffer has been disturbed or degraded, appropriate riparian vegetation is to be revegetated or rehabilitated. Local native vegetation assemblages, capable of supporting the long term ecological function of the riparian land, is to be used.
- 7 Where practicable, protection, revegetation and remediation of vegetation in the CRZ is to retain or achieve a density that would occur naturally.
Note: Practicability will be considered on merit. For instance, within existing asset protection zones on bushfire prone lands, the density and design of vegetated areas will need to meet the requirements for Asset Protection Zones under Planning for Bushfire Protection 2019 rather than the above controls.
- 8 Particular emphasis is to be given to the retention, regeneration or revegetation of the CRZ in key locations. Including:
 - i) where two or more watercourses join;
 - ii) sites with significant erosion;
 - iii) stormwater outlets.
- 9 Plantings within the CRZ are to consist of 100% locally native species.
- 10 Planting within sites that include land identified as Category 2 buffer is to consist of:
 - i) not less than 70% locally native tree species and 30% locally native understorey species;
 - ii) species that reflect the relevant vegetation communities within the area;
 - iii) a mix of groundcover shrubs and trees and is to exclude monocultures.

Note: Council may support a variation to 8) or 9) above if suitable justification is provided.

17.4 CATEGORY 3 BANK STABILITY AND WATER QUALITY

Further controls that may apply

SECTION B
PART 16- Bushfire Risk

SECTION C
PART 24D.3 - Development Over or Adjacent to a Natural Waterbody, Open Channel or Drainage Depression

Objectives

- 1 To protect and/or provide bank and bed stability.
- 2 To contribute to improved water quality within the catchment.

Controls

- 1 The general controls and objectives under *Part 17.1 General* are relevant to this category.
- 2 All parts of the development are to be located outside the core riparian zone (CRZ) of Category 3 Riparian Land being 10m from the top of each bank.
- 3 An Asset Protection Zone (APZ) proposed for bushfire management is permitted within the CRZ, only where no practical alternative exists.

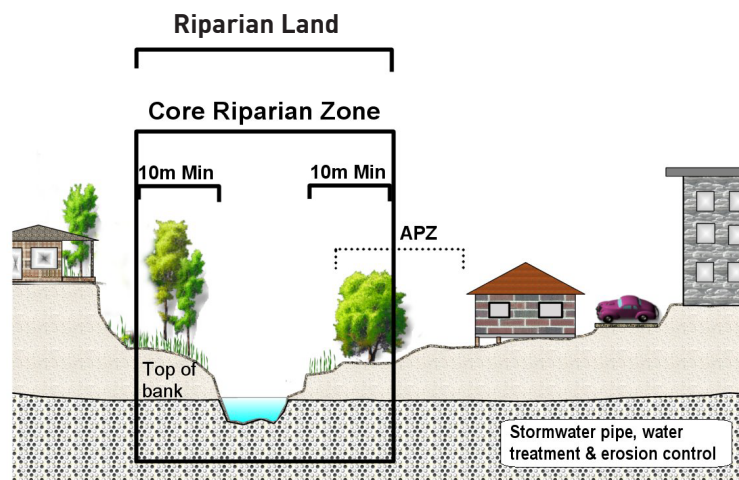


Figure: 17.4-1
Category 3 Riparian Land

17.4 CATEGORY 3 BANK STABILITY AND WATER QUALITY (continued)

Controls

Design

- 4 Where the CRZ has been disturbed or degraded, appropriate riparian vegetation is to be revegetated or rehabilitated. Locally native vegetation assemblages, capable of supporting the long term ecological function of the riparian land, are to be used.
- 5 Protection, revegetation and rehabilitation of vegetation in the CRZ to is achieve a density that would occur naturally, except where the zone is within bushfire prone land.
- 6 Particular emphasis is to be given to the retention, regeneration or revegetation of the CRZ in key locations. Including:
 - i) where 2 or more watercourses join;
 - ii) sites with significant erosion;
 - iii) stormwater outlets.
- 7 Planting within the channel and within 2 metres of the top of the bank is to consist of 100% locally native species. Species are to reflect the relevant vegetation communities within the area. A mix of groundcover, shrubs and trees is to be provided.
- 8 Planting within Category 3 lands more than 2 metres from the top of the bank is to consist of:
 - i) not less than 70% locally native tree species and 30% locally native understorey species;
 - ii) species that reflect the relevant vegetation communities within the area;
 - iii) a mix of groundcover shrubs and trees and is to exclude monocultures.

Note: Council may support a variation to 6) or 7) above if suitable justification is provided.

17.5 CATEGORY 3A WATERCOURSE RESTORATION

Further controls that may apply

SECTION B PART 16- Bushfire Risk	SECTION C PART 24D.3 - Development Over or Adjacent to a Natural Waterbody, Open Channel or Drainage Depression PART 24D.2 - Flood studies and the Flood Design Standard
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Objectives

- 1 To re-create the core riparian zone.
- 2 To emulate a naturally functioning watercourse, with associated riparian vegetation where possible.
- 3 To prevent development from compromising the ability to re-create the core riparian zone (including the watercourse) in the future.
- 4 To contribute to improved water quality within the catchment.

Controls

- 1 The general controls and objectives under *Part 17.1 General* are relevant to this category.
- 2 All parts of the development are to be located outside the CRZ on Category 3a Riparian Land.
- 3 The CRZ is up to 10 metres from the centreline of the watercourse.

In determining an appropriate width for the CRZ in category 3a the following is to be considered:

- i) drainage characteristics including flooding;

Note: the core riparian zone for category 3a should at a minimum cover the extent of any overland flow path. Determining this may require a flood study to be undertaken. See Part 24D.2

- ii) the location of the riparian land within the catchment;

Note: Land at the very top of the catchment may require a CRZ less than 10m wide.

- iii) the presence of existing open watercourses up and down stream within the site or adjacent land;
- iv) the type, condition and connectivity of existing vegetation;
- v) the scale of the proposed development; and
- vi) the location of existing development to be retained.

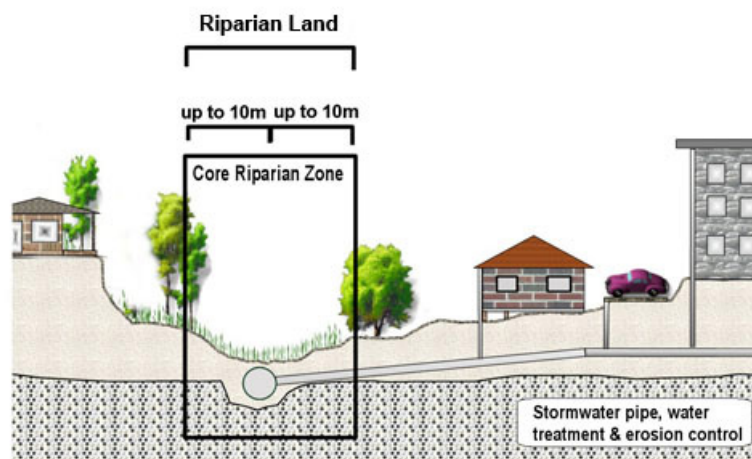


Figure 17.5-1:
Category 3a Riparian Land.

17.5 CATEGORY 3A WATERCOURSE RESTORATION (continued)

Controls

Access

- 4 Vehicular and pedestrian crossings over piped waterways are to comply with the easement provisions in Part 24D.4.

Note: Where a watercourse is re-created the general access controls apply

Design

- 5 Piped or channelised re-instatement of the watercourse to a more natural form is only a mandatory consideration for land zoned R3 Medium Density Residential, R4 High Density Residential, or subdivisions into 3 or more lots, and is to be undertaken where feasible. Feasibility of channel restoration is to be determined taking into consideration the factors outlined in the Controls in clause 17.5(2) of this Part.

Note: watercourse re-instatement is most likely to be feasible on larger developments where landscaping and drainage works are already significant and re-instatement of the watercourse can help achieve beneficial social and environmental outcomes

- 6 Where a watercourse is re-created the design controls for Category 3 apply.

Watercourse and flood processes

- 7 Piped waterways are to comply with the flooding and easement provisions in Part 24D.4.

Note: Where a watercourse is re-created the Watercourse and Flood Process Controls from Part 16.1 apply.



Figure 17.5-2:
Partially restored watercourse in new residential development.

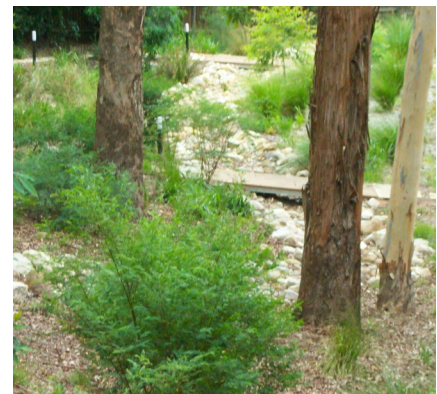


Figure 17.5-3:
Same partially restored watercourse a few months later.

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