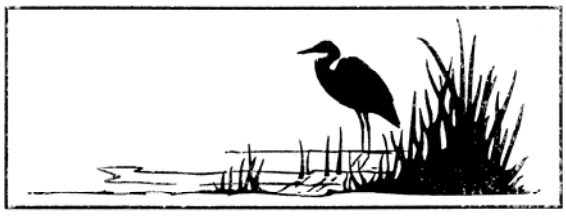
River Skerne Restoration Project Reach
Site Management Plan

March 1996



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Glossary

Alien species	Species not native to this country such as Himalayan balsam, Japanese knotweed.
Amenity grass	Short sward of fast growing species such as Rye grass, usually cut every fortnight through the growing season.
Bed	The lower surface of the river, usually under water.
Berm	A shelf at the base of the river bank at the level of normal flow. It may be covered with vegetation.
Channel	The area confined within the river banks.
Deflector	A structure in the river that forces the river flow in a different direction.
Revetment	Facing built to support river banks.
Top of bank	The area at the top of the river channel. There will usually be a change in slope.
Wetland	An area that is seasonally wet. Standing water will be present through the winter and early spring. Plant species tolerant of waterlogging will flourish.

PREAMBLE

The River Restoration Project partners are seeking to improve the environmental interest of the river corridor. The strategic objective of the scheme is to improve the River Skerne corridor for recreation and conservation purposes. This objective will be realised by implementing rehabilitation measures that will require a series of defined management policies. This management plan identifies these management policies and their rationale and describes the prescriptions to achieve them in the next ten years to 2006.

MANAGEMENT PLAN SUMMARY

The River Skerne and the associated site lie in the Borough of Darlington. The site is an important public open space and green corridor radiating from the centre of town. Generally it is of local recreational and amenity value with the Rockwell Nature Reserve being of particular conservation value. To date, the site has been managed in accordance with Darlington Borough Council's Parks and Open Spaces Policy, with Durham Wildlife Trust assisting with the nature reserve. The Environment Agency is responsible for maintenance of the river channel and banks.

The management objectives for this area are; to develop and maintain the site as a wildlife corridor, to improve biological diversity and to promote visual, recreational, educational and amenity value for the community.

PURPOSE AND SCOPE OF THE PLAN

Following the restoration work carried out on the River Skerne through the River Restoration Project (RRP), a change in the management of the surrounding open land is required. The management plan needs to integrate the old and new features of the area and conform to the standards and strategies laid down by Darlington Borough Council and the Environment Agency.

The purpose of the plan is

i. to clearly define management objectives and maintenance practices for the site in both the short and longer term,

ii. to ensure that these are environmentally sustainable and integrated,

iii. to enable all involved to have an understanding of the management of the site,

iv. to form an example for RRP of an integrated management approach and a written record for the project,

v. to have a management document that can be updated to incorporate new work.

1. SITE INFORMATION (Pre-construction)

1.1 General information

The site runs along 2.1 kilometres of the River Skerne, Darlington stretching from the Skerne Bridge (NZ29151555) to Haughton Road Bridge (NZ30701575). The geographical location and boundary of the site, along with access routes are shown in Figure 1 (Location Plan). In addition to the parkland alongside the river, two other areas, the Keepsafe and Rockwell Pastures are also parts of the site. Whenever 'the site' is referred to it includes all the land within the boundary.

The parkland is managed and mainly owned by Darlington Borough Council (DBC). The River Skerne and its banks are the management responsibility of the Environment Agency (EA) for the purposes of water quality and flood defence. The riparian owners (DBC) are responsible for litter collection and for the maintenance of adjacent land from the top of both banks. Three small parcels of land are not owned by DBC. These are; the area under Five Arches bridge belonging to Railtrack, the right hand bank downstream of Albert Road belonging to Durham County Council and the left hand bank downstream of Albert Road belonging to British Gas.

1.2 Site characteristics and use

Much of the relevant environmental information can be found in the Environmental Report (1995) undertaken for the River Restoration Project (RRP). A Landscape Assessment and a River Corridor Survey dating from 1994 are also available.

1.2.1 Physical:

Much of the land surrounding the River Skerne has been subject to past industrial tipping. A soil survey, carried out on the site prior to works, highlighted contamination 'hot' spots and the extent of 'Made Ground'. Areas beyond the river corridor such as the Keepsafe and Rockwell Pastures may also contain contaminated ground that is capped and covered with topsoil.

All the main services are present on land adjacent to the river. These include the main sewer and main gas pipe underground on the north side of the river opposite Riverside Way. In addition there are other gas pipes, high voltage electricity cables, and water mains parallel and perpendicular to the river. It is essential that all statutory undertakers and their respective service plans are consulted before any significant work commences.

1.2.2 Landscape:

The **preconstruction** landscape can be divided into six sections. Section 1 is Skerne Bridge to Albert Bridge. Skerne Bridge is the historic railway bridge featured on the £5 note. The area is of degraded industrial urban character. Section 2 is from Albert Road to the western edge of the allotments. Here the channel is fairly straight but it flows by a semi-natural wooded tip face and open parkland. Section 3 is from the allotments to Five Arches Bridge. The semi-natural wooded tip face continues on the south bank with allotments facing. Just west of the bridge is a retaining wall. Between this and the allotments are Skerne ponds.

Section 4 is between Five Arches Bridge and the Rockwell. The northern bank has the ecologically rich Rockwell Nature Reserve that contains pools and semi-natural wetland vegetation. The southern bank has the semi-natural Dropwell area but is backed by an industrial plateau. Section 5 is from the Rockwell to the old hedgerow on the southern bank. Here the channel is canalised and almost straight with nearly vertical banks. The floodplain is mainly mown grass with some groups of trees. An industrial plateau on the left bank dominates the skyline. The right bank is edged by housing with well-established belts of trees. The Rockwell is a rocky outcrop of glacial conglomerate. Below this is a spring that is culverted. Section 6 runs from the old hedgerow to Haughton Road. The channel is canalised and fairly straight. On the south side, the banks are steep with a pronounced terrace. The river is crossed by a concrete footbridge that although structurally sound is unsightly.

Rockwell Pastures mound and the Keepsafe are open grassed amenity areas adjacent to the river corridor.

1.2.3 Biological:

Species lists can be found in the RRP monitoring report and environmental report. The

flora of the River Skerne corridor was recorded in a river corridor survey (Aug 1994) using standard NRA methodology. Details can be found in the resulting report. With the exception of the Rockwell Nature Reserve, the corridor was very poor in species diversity.

A survey of macro invertebrates in the reach showed a very low species richness.

The main fish species present in the reach are stone loach and three spine stickleback. Individual brown trout have also been seen.

Great crested newts (*Triturus cristatus*) breed in Skerne ponds and ponds of the Rockwell Nature Reserve. These amphibians are nationally rare and both they and their habitat are protected by law.

Water voles (*Arvicola terrestris*) live in the river banks from Hutton Avenue footbridge to the eastern edge of Rockwell Nature Reserve. Increasingly rare, these mammals have been cited as needing protection in the UK Biodiversity Action Plan.

1.2.4 Cultural:

Currently the site is mainly used by local residents for recreation and access. There is a public footpath running part way along the north bank of the site. The river forms a focus of the open space but the water's edge has been generally inaccessible and remote from those using the area. Educational use is made of the Rockwell Nature Reserve. Also, a group of pupils from Haughton school has tried to develop a wild flower meadow northeast of the reserve.

Historically much of the site was farm land with meanders and wetlands associated with the river. In the late 1950s much of the reach was straightened for flood defence reasons. Around the Five Arches bridge sheet piling was utilised as well as stone gabions. In the recent past the area east of Five Arches bridge was used for grazing cattle. The wetlands were still present until they were filled in the late 60s early 70s when housing was built on the northern side.

Down stream of Five Arches the land was allotment gardens on the north side and industrial land on the south. The main changes here have been the reduction in the area of allotments and the increase in residential development.

There are no known sites of archaeological interest within the site. The site survey carried out in February 1995 revealed peat deposits of interest at depths of 2.4 - 3.6 m. Within this, an elk jaw bone was found. Pollen analysis of peat samples and radio carbon dating suggests the jawbone is 7 000 - 10 000 years old. This makes it the youngest elk bone to be found in this country.

The Skerne Bridge (£5 note bridge) which carries the Darlington to Bishop Auckland railway line is listed as an Ancient Monument. It is one of the oldest passenger railway

bridges in the world.

At the eastern end of the site lies St. Andrews Church that is Grade 1 listed.

2. EVALUATION AND OBJECTIVES

2.1 Conservation evaluation (Pre-construction)

The criteria used to evaluate the nature conservation of the site follow those used by Ratcliffe (1977). The **size** of the site at 2.1km can be considered a 'viable unit' for a riverine habitat, especially in an urban area. Proximity to a large population and several local schools adds to the current and potential value for public use and education.

The River Skerne corridor has a limited **diversity** of habitats. These include amenity grassland, trees and shrubs, wetland and the riverine habitat. Floral species diversity is generally poor except within Rockwell Nature Reserve. Faunal diversity is low but as further habitats develop this should increase.

Although the habitats have no **rarity** value, there are two species of note, the great crested newt (*Triturus cristatus*) and the water vole (*Arvicola terrestris*). Great crested newts are found in both Rockwell Nature Reserve and the Skerne ponds area. These newts and their habitat are protected under the Wildlife and Countryside Act 1981 and the European Union's Habitat and Species Directive. The water vole lives along the river bank between Haughton Road and Rockwell Nature Reserve. It has declined in recent years.

The site has been engineered and managed for many years and so would rate poorly for **typicalness, naturalness** and **fragility**. As the rehabilitation works develop, then there should be good examples of more typical and natural marginal and instream habitats.

Of the habitats within the site, the only one with a **recorded history** is Rockwell Nature Reserve. The reserve was established over 25 years ago by the Durham Wildlife Trust. This area, along with the restoration reach, has **potential value** for monitoring and research. Monitoring already carried out for the River Restoration Project will continue to evaluate the success of the scheme.

Under the criterion of **position in an ecological unit** the site is of value as it is part of a wildlife corridor. The rehabilitation works are improving a degraded reach that will improve links between good habitats upstream and the River Tees downstream.

2.2 Recreation Evaluation

Currently the site is mainly used for recreation and access. Amenity grassland is used as a kick around area, for walking, horse riding and dog walking. Some users are interested in wildlife that is mainly provided by Rockwell Nature Reserve. The potential use of the site will increase on completion of the enhancement works and the second footbridge.

The conservation value of the site will improve in time although there may be some areas affected by this increased pressure. Safety has been considered in the planning of the improvements with easy get away in times of flood and safer access to the water's edge.

In Darlington's Green Strategy and Local Plan the site has been highlighted as one to develop as a wildlife and recreational corridor.

Educational use is made of the Rockwell Nature Reserve and adjacent areas.

2.3 Summary evaluation

Important site features (Pre-construction) are:

a. Vegetation/habitat: The River Skerne provides freshwater and marginal habitats that are of local interest in the urban situation. Rockwell Nature Reserve is of local importance as a wetland/scrub.

b. Species: Rockwell Nature Reserve and Skerne ponds provide habitat for the protected great crested newt. The Reserve provides cover for a variety of wildlife interest. Water voles are also present along the river bank upstream of Five Arches bridge.

c. Access and recreation: There is a locally important east-west route along the river. A north-south route crosses the river via the footbridge. Both are used as footpaths and cycle routes. The east-west route is a designated footpath between Littlebeck Drive and Albert Road via Five Arches bridge.

d. Education: St. Williams pond and Rockwell Nature Reserve are used by local schools.

Important site features (post construction) are likely to be:

a. Vegetation/habitat: The variety and extent of habitats will be increased giving the site greater wildlife potential. Improved water quality will result from the extensive work on surface water outfalls and connections. Areas of wild flowers and rough grassland will be developed as will wetlands, tree and shrub planting areas and marginal habitats.

b. Species: As habitat diversity increases so will species diversity. An increase in wetland will attract a wider variety of birds and invertebrates.

c. Access and recreation: Once the second footbridge is in place access across the river will be easier. It is envisaged that more recreational use will be made of the south side. The areas of amenity grass will continue to be used as kickabout

areas.

d. Education: As the site develops and access improves, the educational potential will increase for local schools and residents.

2.4 Ideal management objectives

The overall objective of the River Restoration Project is to promote the restoration of the River Skerne for conservation, recreation and amenity. This is compatible with the Local Authorities objectives for public open space as stated in the Local Plan and 'People and Nature in Darlington'.

The objectives will apply to both the Environment Agency and the Local Authority.

The ideal management objectives are:

1. To maintain and enhance conservation interest and landscape value,
2. To improve and maintain the habitats for wildlife,
3. To promote recreation and amenity without compromising conservation value,
4. To improve the river for habitat diversity,
5. To continue to improve water quality,
6. Maintain public access,
7. To maintain and improve footpath links,
8. To provide a circular riverside walk,
9. Eradicate invasive alien species,
10. To maintain and extend woodland cover,
11. To encourage community involvement and ownership,
12. To improve the site for the public,
13. To encourage educational use and value of the site,
14. To provide access for disabled persons,
15. To maintain flood protection standards.
16. Ensure a cost effective approach.

3. FACTORS INFLUENCING MANAGEMENT

3.1 Natural trends

Management operations will control the establishment and dominance of pernicious weeds and other coarse herbs in areas of floral value. Spread of the highly invasive Himalayan balsam, Rape and Japanese knotweed will be of particular concern. Natural regeneration of scrub and trees within the river corridor will be controlled as will the encroachment of marginal species into the open channel, both for flood defence objectives. They must be maintained within the constraints of the original plan.

Successful establishment of marginal, bank and other planting will depend on control of invasive species.

3.2 Human induced trends

Due to the proximity of a large residential area, the site may be subject to negative factors such as erosion of footpaths, damaged by vandalism, litter, motor cycles, horse riding and dog fouling.

3.3 External factors

As with any watercourse, the River Skerne will continue to be influenced by events in its catchment. These may impact on water quality and flood defence.

Changing trends in recreational use may bring more people into the site. This increase may put pressure on some areas.

Management of the site will have to conform to Darlington's Local Plan, People and Nature in Darlington and Environment Agency guidelines.

3.4 Legal obligations

Great crested newts are protected under Schedule 5 of the Wildlife and Countryside Act 1981. Their presence in the Rockwell Nature Reserve and around Skerne ponds will influence works in these areas.

3.5 Management constraints

There are only limited resources available in terms of finance and manpower. Consequently, a cost effective approach is needed.

Health and Safety Regulations and internal guidelines for safe practice must be implemented and adhered to during the management of the site. Vehicle access for management operations will be limited to defined routes. Desilting machinery should be the lightest possible and should be used during the winter months to minimise impact to flora and fauna.

3.6 Impact assessment

An environmental report written for the River Restoration Project may apply in part to this management plan.

4. OPERATIONAL OBJECTIVES

4.1 Long term operational objectives

For each of the long-term objectives a brief rationale is given below, together with a list of operational objectives:

Objective 1: To ensure construction and operational activities associated with the scheme do not endanger the health and safety of those using or living nearby the site with particular reference to flood defence.

Due to its urban situation and flood frequency in this reach, it is necessary to manage the River Skerne for flood defence. This management of the banks and watercourse is currently undertaken by the Environment Agency. Operational objectives are as follows:

* To adjust as necessary the current management regime to ensure continuing flood defence without unduly compromising the enhanced conservation value of the site. Environment Agency Flood Defence Section will also have to manage new features such as berms, meanders and backwaters. Monitoring will be carried out by the appropriate Environment Agency department.

* To ensure access to both banks for maintenance purposes. Bankside vegetation should not prevent access.

* To monitor the watercourse to establish erosion and deposition characteristics.

* To monitor water quality and discharges via the appropriate Environment Agency department.

* To service and maintain as necessary all the various discharge pipes and associated inspection chambers belonging to Northumbrian Water Ltd.

* To monitor overall flow characteristics in response to river restoration works; particularly flood conveyance.

Objective 2: To improve and thereafter maintain the habitats for wildlife within the site so that its value as a wildlife corridor is enhanced. To improve the site by habitat creation and promoting biological diversity.

Some reaches of the site have limited wildlife interest while others need careful management. Rehabilitation works will diversify and enhance marginal and bank habitats as well as wetland and backwater areas. New areas of wild flowers and trees will further increase the diversity of species and habitats. Operational objectives are as follows:

* To monitor aquatic and riparian vegetation and rotational management

initiated, in keeping with both conservation and flood defence.

* To monitor the biological and chemical quality of the watercourse. During the post construction appraisal stage this will be carried out by Environment Agency staff.

* To monitor the establishment of introduced floral species.

* To encourage the Local Wildlife Trust to monitor macro-invertebrates and other fauna and flora diversity. To present opportunities for project work for students, schools and other local groups.

* To establish and maintain new wetland habitats for plants, invertebrates and amphibians, particularly by preventing the domination of invasive wetland species.

Objective 3: To enhance and maintain the landscape value of the site.

Between the Haughton Road bridge and Rockwell Nature Reserve the river flows though a wide expanse of amenity grassland. In the main this is bordered by housing and industrial areas which intrude on the wider vistas. Operational objectives are as follows:

* To enhance the setting of the River Skerne and develop its integration in the landscape.

* To develop tree and shrub areas to screen industrial land.

* To establish and maintain a variety of grassed and wild flower areas that will be used by local people.

* To maintain and enhance the 'naturalness'/ landscape value of the site through its management.

Objective 4: To promote the amenity value and recreational opportunities of the site without compromising the conservation interest.

Due to its location the site is important for recreation and access. Operational objectives are as follows:

* To continue to provide information in the notice board on site.

* To maintain and extend footpaths and links with the new footbridge without damage to the environment.

* To provide access for the disabled.

* To monitor human impact such as trampling and desire lines to establish any need for further paths.

* To manage the planted areas at Rockwell Pastures and Keepsafe.

* To improve and maintain the old footbridge and build and maintain the new footbridge.

* To improve the site for the community.

Objective 5: To promote the educational use and value of the site.

Due to the proximity of several primary schools to the site there is a great deal of potential in utilising the area for educational use.

* To provide an educational amenity for schools and other sections of the local community.

* To promote responsible use of the River Skerne and the associated wetlands.

4.2 Short term objectives

Objective 1: To control the growth and spread of invasive ruderal species along the river bank to ensure the establishment of suitable riverside species.

The operational objective is as follows:

* To ensure the establishment of marginal and river bank species, the invasive species must be controlled. The primary concern is Rape and Himalayan balsam. But, Japanese knotweed is present on the left bank just upstream of both Five Arches bridge and Albert Road bridge.

Objective 2: To manage the grass cover on the new Rockwell and Keepsafe landforms.

The operational objectives are as follows:

* To ensure that a sward is maintained in accordance with the suppliers recommendations so that it is suitable for both tree and shrub planting in some areas and the introduction of wild flowers in others.

5. ACTION PLAN

5.1 Works programme

A works programme of management operations for the River Skerne site is presented in Table 1. The management prescriptions for a 10 year programme have been included.

Responsibility for each operation is also identified, namely the Environment Agency (EA), Local Authority (LA) Darlington Borough Council and Northumbrian Water Limited (NW). This is shown in Table 2 - Operations within each compartment and responsible agency.

The timing of each operation within the year and the estimated number of man hours has been included (to be completed by the EA/LA or advice from RRP). Where operations are undertaken on a biennial or less frequent basis, the man hours required are divided up and also presented annually.

5.2 Description and objectives of operations

The operations listed in Table 1 are further described below. In addition, the objective of each management operation is given.

****Newly seeded areas with wild flower mix need to be cut to 50-70 mm when the sward reaches 150mm to ensure success of wildflowers.**

Areas where oilseed rape predominates will need to be cut twice a year initially to allow the grassy sward to establish. The first cut of the year must be in June just before the rape sets seed.

Operation No 1: Annual cut of herbaceous vegetation, cuttings to be removed off-site.

Objective - To manage and maintain the watercourse channel for flood defence by reducing roughness factor.

Specification - Cut vegetation to approximately 50mm height using a combination of tractor mounted side arm flail and strimmers. Operation to be undertaken in September.

In areas where wild flowers have established which the Environment Agency ecologist considers seed dispersal is desirable, then cut vegetation to be allowed to lay on banks for a period of two weeks for seed to shed.

All cut vegetation to be removed out of the watercourse to prevent blockage downstream.

Rake up cut vegetation using grass rakes and remove off site.

Operation No 2: Biennial cut of herbaceous vegetation, cuttings removed off site.

Objective - To manage and maintain the watercourse channel for flood defence by reducing roughness factor.

Specification - Cut vegetation to approximately 50mm height using a combination of

tractor mounted side arm flail and strimmers. Operation to be undertaken in September of alternate years.

In areas where wild flowers have established which the Environment Agency ecologist considers seed dispersal is desirable, then cut vegetation to be allowed to lay on banks for a period of two weeks for seed to shed.

All cut vegetation to be removed out of the watercourse to prevent blockage downstream.

Rake up cut vegetation using grass rakes and remove off site.

Operation No 3: 14 cuts per year by rotary or cylinder mower. Cuttings dispersed on site.

Objective - To maintain low sward for amenity access/visibility for public.

Specification - To cut grass to approximately 25mm height using rotary or forage harvester.

Operation to be undertaken 14 cuts per year as follows:

March	once
April-Sept	twice per month
Oct	once

Cuttings can remain in situ.

Operation 4: Annual cut by rotary cylinder or hayterette type mower.

Objective - To encourage tall, diverse vegetation which will enhance nature conservation value of the site.

Specification - Cut vegetation to approximately 50mm height using small easily manoeuvrable machines. Operation to be undertaken in September.

Rake up arisings using grass rakes and remove off site.

Operation 5: Biannual cut by rotary cylinder or hayterette type mower.

Objective - To encourage further diversity of habitats on the site particularly summer flowers.

Specification - Cut vegetation to approximately 50mm height. Operation to be undertaken in April and late September.

Rake up arisings using grass rakes and remove off site.

Operation 6: Annual cut by flail, cuttings removed off site.

Objective - To encourage tall, diverse vegetation to enhance nature conservation value of the site.

Specification - Cut vegetation to approximately 50 mm height. Operation to be undertaken in September.

In areas where wild flowers have established which the local authority ecologist (or appropriate staff) feels seed dispersal is desirable, then cut vegetation to be allowed to lay on the ground for 2 weeks for seeds to shed.

Rake up vegetation using grass rakes and remove off site.

Operation 7: Biannual cut by flail.

Objective - To encourage areas of spring wild flower diversity.

Specification - Cut vegetation to 50mm height. Operation to be undertaken in mid July and September. (Operation to be undertaken in June and September if oilseed rape is a problem and arisings removed off site).

In areas where wild flowers have established which the Environment Agency ecologist feels seed dispersal is desirable, then the cut vegetation to be allowed to lay on the ground for two weeks for seeds to shed.

Rake up vegetation using grass rakes and remove off site.

Operation 8: Biannual cut with strimmer.

Objective - To remove course, tall ruderals.

Specification - Cut vegetation to ground level. Operation to be undertaken in May and September. (Operation to be undertaken in June and September if oilseed rape is a problem). Rake up arisings and remove off site.

Operation 9: Remove debris and low overhanging branches and collecting debris within flood capacity channel. Vegetation and debris removed off site.

Objective - To manage and maintain river corridor for flood defence access.

Specification - Debris is defined as material washed downstream (usually after a flood event). Debris to be removed off site.

Overhanging branches which either impede flow or collect debris are to be cut back.

Only low overhanging branches to be cut, but identified or likely fish habitat or kingfisher perches retained where possible. Cut vegetation to be removed off site.

Debris collection to be undertaken in winter months usually after a flood event. Cutting of branches ideally to be undertaken during the dormant season, November to March.

Operation 10: Remove branches overhanging and causing excessive shading of marginal vegetation.

Objective - To protect marginal habitats.

Specification - Branches causing excessive shading should be identified and marked using paint by an Environment Agency ecologist during the previous summer. Removal of branches should be undertaken during the dormant season, November to March.

Operation 11: Inspection and clearance of outfalls. (Locations shown in Fig 3, p34.)

Objective - To inspect and clear outfall pipes to manage for flood defence.

Specification - Outfalls to be checked for blockages. Any silt to be cleared using a high pressure hose which will flush the outfall pipe.

Initially this will be done annually in the summer but the frequency may need to be increased.

This will be undertaken by the agents of Northumbrian Water Ltd.

Operation 12: Inspection and clearance of inspection chambers.

Objective - To maintain clear inspection chambers to avoid pollution of the river.

Specification - Inspection chambers will be checked annually in the summer to remove any debris by suction. (Locations shown in Fig 3, p34.)

This will be undertaken by the agents of Northumbrian Water Ltd.

Operation 13: Reactive management to flood events etc.

Objective - Manage and maintain channel for flood defence.

Specification - Entire length of site should be checked for debris, overhanging branches, bank collapse, flooding of surrounding area, blockage of outfalls and culverts, damage to revetments, damage to structures any necessary reactive actions undertaken for flood defence purposes.

Operation 14: Desilting where required avoiding berms. Dredgings to be removed off

site. Operation to be undertaken in winter.

Objective - Maintain channel capacity for flood defence with minimum impact on nature conservation value.

Specification - A return period of 5 years is proposed but this will need to be reviewed. The levels of siltation will be monitored by Environment Agency staff. If in their opinion desilting is required it should be undertaken during the period when macro invertebrates are dormant, ie winter. All dredgings to be removed to a licenced tip. All damage by machinery to be reinstated and the appropriate seed mix sown in spring.

Note should be made of the general information given in 3.3.20 Dredging in Flood Defence Dales Area Maintenance Contract Document.

Operation 15: Control of scrub areas.

Objective - To limit the extent of scrub vegetation.

Specification - Cut back vegetation in surrounding rough area to prevent encroachment of scrub. This will be done every three years in winter using a strimmer.

Operation 16: Weed control in tree and shrub area.

Objective - To reduce competition for water for newly established trees.

Specification - To spray an area of 750mm diameter at the base of each tree and shrub with a Glyphosate type weed killer such as Roundup. This will be undertaken in May, July and September. Continue for the first three years after planting.

Spray strictly in accordance with manufacturers instructions and organisations health and safety guidelines. Avoid windy conditions when spraying.

Operation 17: Annual trim back of trees and shrubs.

Objective - To maintain the width of the footpath/cycleway.

Specification - Trim growth which encroaches into the footpath from ground level to above head height. Work to be completed in winter. Remove trimmings off site.

Operation 18: Check and /or remove tree stakes (and rabbit guards if appropriate).

Objective - To support young trees as they develop and protect from rabbit damage.

Specification - Tree stakes to be checked to ensure firm and upright. Tree ties adjusted to ensure tree is held securely without restricting growth. Undertake stake and tie check on an annual basis during Spring months years 1-3 and as necessary until removal. At

the same time rabbit guards replaced or removed as appropriate.
Removed stakes to be taken off site and reused if possible.

Operation 19: Thin weak trees and shrubs.

Objective - To allow the stronger plants to develop.

Specification - Remove weak tree and shrub specimens as directed by local authority ecologist (or appropriate staff member). Dispose of removed material off site or chip and use for mulch if appropriate. Work to preceed nesting season.

Operation 20: Replace specimens.

Objective - To maintain planting density.

Specification - Replace weak plants with specimens of the same species as directed by local authority ecologist (or apppropriate staff member). To be undertaken in winter months of the first three years.

Operation 21: Bush and shrub clearance.

Objective - To manage and maintain the river corridor for flood defence purposes.

Specification - To thin and remove sections of shrub when they are restricting flood flows eg between the arches of Five Arches bridge. This should be done in the winter months to avoid the bird nesting period.

Operation 22: Litter clearance

Objective - To keep all areas clear of litter for public amenity, to reduce risk to flora and fauna and to prevent impedance of flow in the river.

Specification: Remove all litter from the watercourse banks and surrounding areas. Undertake on a fortnightly basis throughout the year. Remove all litter to an offsite tip.

Operation 23: Inspection of signage/reactive maintenance.

Objective: To provide information to the public on the river rehabilitation measures undertaken. To increase public awareness of the nature conservation value of the river corridor.

Specification: Inspect signage for damage and graffiti using a proprietary cleaner. Undertake repairs as necessary and replace if damage severe.
Renew information as necessary.

Operation 24: Inspection of footbridges and reactive maintenance.

Objective: To ensure health and safety of the public.

Specification: Inspect footbridges on an annual basis for structural and other defects. Undertake repairs as necessary.

Operation 25: Nature reserve maintenance

Objective: To maintain the habitats within the Rockwell Nature Reserve with particular reference to the Great crested newt which is protected under the Wildlife and Countryside Act.

Specification: To work in liaison with Durham Wildlife Trust(DWT) to undertake reactive maintenance of the reserve. Liaise with DWT via Low Barnes. Work must be timed so that the great crested newts are unaffected during their breeding season. English Nature must be informed when work is proposed.

Operation 26: Pond maintenance.

Objective: To maintain viable pond habitats and protected species habitat.

Specification: To work in liaison with Durham Wildlife Trust to undertake reactive maintenance of Skerne ponds, St Williams pond and the new pond above the nature reserve. Any dredging should be sympathetically carried out. Durham Wildlife Trust will give advice on specific works and may be available to be on site at the time.

Operation 27: Check land drains.

Objective: To allow drainage of the Rockwell Landform.

Specification: To check the area served by the land drains and if not free draining to check the drains for blockages. Remove blockages and take the material off site.

Operation 28: Footpath maintenance.

Objective: To ensure that the surface remains intact and that vegetation along side does not encroach on the path. To maintain free passage, in particular, for people with disabilities.

Specification: To check the footpath on an annual basis and resurface as necessary with a suitable material. Encroaching vegetation should be cut back as required.

Operation 29: Annual cut of vegetation on deflectors on a 33% rotational basis.

Objective: To maintain habitat diversity in channel to increase wildlife potential whilst maintaining conveyance.

Specification: Deflectors to be monitored. If in the opinion of the Environment Agency ecologist management is needed then cut vegetation to 150mm between November and February.

Operation 30: Maintain 2/3 channel free.

Objective: To maintain a free flow channel and retain in channel habitats.

Specification: A review to be undertaken (by Environment Agency staff) after the first year to decide if this is necessary. Work to be carried out in the autumn.

Operation 31: Annual cut of reeds on a 33% rotational basis, cuttings removed off site. If required cut reeds between November and February.

Objective - To maintain a filtering reed bed in the backwater. Winter cutting to ensure that seeds have sown and to avoid disturbance to nesting birds.

Specification - **Reeds to be monitored after planting until, in the opinion of the Environment Agency ecologist, the reed bed is sufficiently established to start the cutting regime**. Stands of reeds are to be divided intro 3 equal areas (33%) following the line of the watercourse. The central section to be cut in the first year of the cutting regime, followed by the downstream section the second year and the upstream section in the third year. The rotation follows this pattern. Reeds shall be cut to approximately 150mm height using scythes.

Operation 32: Rotational pruning of willows.

Objective: To maintain a cover of willow on the revetment, which will support the bank, act as a haven for wildlife and as a physical barrier.

Specification: Once the willows have established they will be divided into three equal sections. The central section to be cut in the first instance, followed by the upstream section and then the downstream section. The cutting rotation will follow this pattern. **Selected trees could be allowed to grow to maturity.**
Visual amenity and landscape should be considered during this work as well as flood defence. The pruning should be sympathetically executed.
Pruning will be undertaken in the winter months to encourage bushy growth from the base of the stems.

Operation 33: Spot weedkill

Objective: To control the spread of invasive aliens.

Specification: Spray Japanese knotweed using Glyphosate. Aim to cover 50% of vegetation.

Following a minimum period of three weeks for the glyphosate to become fully effective, cut back the vegetation to ground level and immediately remove vegetation off site.

Operation 34: Cutting back of aliens.

Objective: To remove invasive weeds such as Himalayan balsam and oilseed rape and maintain species diversity along the banks.

Specification: Cut back Himalayan balsam and oilseed rape using a scythe or strimmer. Remove all arisings off site.

Where Himalayan balsam predominates this should be cut in July before it sets seed. Areas of mainly oilseed rape should be cut in June.

Operation 35: Reactive maintenance of wetland areas.

Objective: To allow the new wetland areas to establish .

Specification : The two new wetland areas will be allowed to establish and a review of maintenance will be done after the first two years. Work to be carried out between November and the end of February.

Operation 36: Fence maintenance.

Objective: To maintain the structure of the riverside fence for the safety of users.

Specification: The fence will be inspected on an annual basis as well as after any flood events and reactive mantenance will follow if necessary.

5.3 Management compartments

Areas within the site that will be subject to a similar management regime have been allocated a compartment type and are illustrated on the Management Compartment sheets, (Figure 2.1 to 2.7). Operations that will be carried out in each compartment are listed below (see Tables 1 and 2 and Section 5.2 for full descriptions of operations). Colour codes used on the management compartment sheets are also illustrated in the text adjacent to the corresponding compartment type, (page 21).

Compartment Type 1 (Watercourse)
Operations 9, 10, 11, 12, 13, 14, 30

Compartment Type 2 (Berms)
Operations 1, 2, 29, 33

Compartment Type 3 (Backwaters)
Operations 22, 31, 33

Compartment Type 4 (Deflectors)
Operations 29, 33, 34

Compartment Type 5 (Steep banks)
Operations 1, 2, 6, 7, 21, 33, 34

Compartment Type 6 (Shallow banks)
Operations 5, 6, 8, 33, 34

Compartment Type 7 (Revetments)
Operations 31, 32, 33

Compartment Type 8 (Wetlands)
Operations 35

Compartment Type 9 (Grass area - amenity)
Operations 3

Compartment Type 10 (Grass area - wild flower mix)
Operations 4, 5, 7, 8

Compartment Type 11 (Grass area - course/tall vegetation)
Operations 4, 6, 8

Compartment Type 12 (New tree and shrub planting areas)
Operations 16, 18, 19, 20, 22

Compartment Type 13 (Established tree and shrub areas)
Operations 15, 19, 22

Compartment Type 14 (Ponds/Nature reserve)
Operations 25, 26

Compartment Type 15 (Throughout)
Operations 17, 22, 23, 24, 27, 28, 33, 34, 36

Amended maintenance regime. (see figure 2.3)

Our ref: skerne.rrp.cons.kmd
Your ref:

Date: 14 June 2001

Rob George
Countryside and Rights of Way Officer
Darlington Borough Council
Development and Environment Department
Town Hall
DARLINGTON
DL1 5QT

Dear Rob

MAINTENANCE OF RIVER SKERNE RESTORATION SITE

I refer to the site meeting between Darlington Borough Council staff and Environment Agency staff on 3rd May 2001. I apologise for the delay in providing written confirmation of our discussions. Flood Defence priorities followed by a period of sickness have prevented me from writing to you until now.

1. Management Plan Operations

There were queries over two aspects of management: removal of cuttings and cutting of areas containing wild flowers.

During 2000 it was apparent that grass cuttings were not being removed from relevant areas. At our meeting I explained the importance of removing cuttings in order to assist wildflower establishment. Reference to the Plan shows that Operations 4, 5, 6 and 7 require the removal of grass cuttings and that Operations 8 and 34 require the removal of cut plant material after cutting. **In summary - No change, just confirmation of the need to remove cut vegetation.**

The timing of cutting wildflower areas is identified in the Plan according to the flowering period of the flower species which were sown. On site we queried the timing of cutting an area on the south side of the river opposite the downstream backwater. Cowslips were visible, suggesting a springtime flower species mix, yet that area is identified in the Plan for a springtime cut. I have been unable to find the specification for the seed mix used. However, the Plan identifies this area for an April and September cut in order to encourage summer flowers. I recommend that we should stick to this. I intend to visit the whole site at intervals to see the species composition of the various spring and summer flower areas. **In summary - No change, just confirmation of the need to cut areas at the specified times.**

Cont/d..

Environment Agency
Teesdale House, Lingfield Way, Yarm Road Industrial Estate, Darlington, DL1 4GQ
Tel: 01325 480849 Fax: 01325 382633

2. Changes to Operations

The upstream wetland on the north side of the river has not developed as originally envisaged. We agreed that managing this area in a different way to the surrounding area is no longer appropriate. **Change : Cut the North side upstream "wetland" area hatched blue in the existing Plan in the same way as the surrounding area (Operation 8). See Figure 2.3 in the amended Plan.**

We identified that one metre (or a mower width) of grass should be cut along the riverward edge of the new path along the north side of the river. This will keep growth back from the path and should also let people see that there is intentionally different management of the amenity zone to the north of the path and the riverside management zone between the path and the river. **Change : Cut one metre (or a mower width) of grass along the riverward edge of the new path along the North side of the river.** In the absence of Figures marked up with the new path I hope this is self-explanatory.

3. Other site issues

On site you suggested that grass could be left uncut under some of the groups of trees on the amenity area between Riverside Way and the river corridor. Rebecca agreed to look into this.

The Hutton Avenue Footbridge continues to be somewhat of an eyesore. Also, interpretation boards have been removed from their stone bases. Ideas to remedy these issues included: looking for funding for bridge improvements and converting the stone bases into seats.

4. Amended Plan

I enclose two **amended** copies of the Plan for you and Rebecca Williams. These contain one new page of text highlighting the main points discussed on site. The Plans also contain an updated Figure 2.3. Any Plans which you already hold should not be used in their current form. Please use the enclosed Plans instead and copy the page of text and amended Fig 2.3 for putting into your old Plans.

I have not marked new paths onto the Figures in the Plans. I may be able to do this in due course. To assist me I wonder if Darlington BC hold any drawings of the new paths? If so I would appreciate a copy.

If you are not clear about any of the above please let me know. I would be grateful if you could pass the enclosed copies of my letter and the enclosed Plan to George and Rebecca.

Yours sincerely

KATY DICKSON
Conservation Officer

Cont/d..

cc Liz Chalk, Environment Agency (with new page and amended Fig 2.3 only)
Rebecca Williams, Darlington BC (with whole amended Plan)
George Brook, Darlington BC
Martin Janes, River Restoration Centre (with new page and amended Fig 2.3 only)

Additional page added June 2001

Points arising from a site meeting between EA and DBC on 03.05.01

Confirmation of Operations:

Remove cuttings during Operations 4, 5, 6, 7, 8 and 34

Cut wildflower areas at the times specified in the Plan

Changes to Operations:

Refer to revised Figure 2.3. The upstream wetland on the North side of the river will no longer be managed separately. Cut this area the same as the surrounding area ie Operation 8.

New path along North side of river – Cut one metre (or a mower width) of grass along the riverward edge of this new path.

For consideration:

Darlington Borough Council to consider leaving grass uncut underneath groups of trees between Riverside Way and the river corridor.

Darlington Borough Council to consider ways of rectifying damage to signboard bases and improving Hutton Avenue Footbridge

Review

The plan will be reviewed annually in order to adjust the requirements in response to site developments and local community feedback. As much of the site will be evolving from new landform and planting it is essential that the plan is flexible.

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National Rivers Authority - Flood Defence Maintenance Contract Handbook.

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Ratcliffe, D(1977) - A Nature Conservation Review, Cambridge University Press.

River Restoration Project (February 1995) - River Restoration: Benefits for integrated catchment management. UK monitoring programme Year 1 (1994) Interim Report.

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TABLE 1

Management Operations and Timetable for 10 year River Skerne Management Plan (Haughton Road Bridge to Skerne Bridge)

DWT- In liaison with Durham Wildlife Trust
* Cuttings removed off site
** Leave for 18 -48 hours before removal

Op no.	Operation	Time of year	Estimated man hours per year	Management period																			
				Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		Year 8		Year 9		Year 10	
				LA	EA	LA	EA	LA	EA	LA	EA	LA	EA	LA	EA	LA	EA	LA	EA	LA	EA	LA	EA
	Watercourse																						
9	Remove debris and low overhanging branches	winter			x		x		x		x		x		x		x		x		x		x
10	Remove branches causing heavy shading	winter			x								x										
11	Inspection/clearance of outfalls	summer		o		o		o		o		o		o		o		o		o		o	
12	Inspection / clearance of inspection chambers	summer		o		o		o		o		o		o		o		o		o		o	
13	Reactive management to flood events etc	throughout			x		x		x		x		x		x		x		x		x		x
14	Desilt	winter											x										
30	Maintain 2/3 channel free**	nov-feb			x																		
	Berms																						
1	Annual cut of herbaceous vegetation*	sept			x		x		x		x		x		x		x		x		x		x
2	Biennial cut of herbaceous vegetation*	sept					x				x				x								x
29	Annual cut of vegetation 33% rotation	nov-feb			x		x		x		x		x		x		x		x		x		x
33	Spot weedkill	may			x		x		x		x		x		x		x		x		x		x
	Backwaters																						
22	Litter clearance	throughout		o		o		o		o		o		o		o		o		o		o	
31	Annual cut of reeds 33%**	nov-feb			x		x		x		x		x		x		x		x		x		x
33	Spot weedkill	may			x		x		x		x		x		x		x		x		x		x
	Deflectors																						
29	Annual cut of vegetation 33% rotation**	nov-feb			x		x		x		x		x		x		x		x		x		x
34	Cutting back of aliens	june -july			x		x		x		x		x		x		x		x		x		x
33	Spot weedkill	may			x		x		x		x		x		x		x		x		x		x
	Steep river banks																						
1	Annual cut of herbaceous vegetation*	sept			x		x		x		x		x		x		x		x		x		x
2	Biennial cut of herbaceous vegetation*	sept					x				x				x								x
6	Annual cut by flail*	sept									x				x								x
7	Biannual cut by flail*	june/july-sept			x		x		x		x		x		x		x		x		x		x
21	Bush and tree clearance	winter			x		x		x		x		x		x		x		x		x		x
33	Spot weedkill	may					x				x				x								x
34	Cutting back of aliens	june-july			x		x		x		x		x		x		x		x		x		x
	Shallow banks																						
5	Biannual cut by rotary cylinder *	april and sept			x		x		x		x		x		x		x		x		x		x
6	Annual cut by flail*	sept			x		x		x		x		x		x		x		x		x		x
8	Biannual cut with strimmer*	may and sept			x		x		x		x		x		x		x		x		x		x
33	Spot weedkill	may			x		x		x		x		x		x		x		x		x		x
34	Cutting back of aliens	june-july			x		x		x		x		x		x		x		x		x		x

cont /....

TABLE 1 continued

Op no.	Operation	Time of year	Estimated man hours per year	Post Construction period																	
				Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		Year 8		Year 9		Year 10	
				LA	EA	LA	EA	LA	EA	LA	EA	LA	EA	LA	EA	LA	EA	LA	EA	LA	EA
	Revetments																				
31	Annual cut of reeds 33%**	nov-feb			x		x		x		x		x		x		x		x		x
32	Rotation pruning of willows	winter					x		x		x		x		x		x		x		x
33	Spot weedkill	may			x		x		x		x		x		x		x		x		x
	Wetlands																				
35	Reactive maintenance of wetland DWT	nov - end feb		o		o		o		o		o		o		o		o		o	
	Ponds/Reserve																				
25	Nature reserve maintenance DWT	nov - end feb		o		o		o		o		o		o		o		o		o	
26	Pond maintenance DWT	nov - end feb		o		o		o		o		o		o		o		o		o	
	Grass areas																				
3	14 cuts per year	end march-oct		o		o		o		o		o		o		o		o		o	
4	Annual cut by rotary cylinder*	sept		o		o		o		o		o		o		o		o		o	
5	Biannual cut by rotary cylinder *	april and sept		o		o		o		o		o		o		o		o		o	
6	Annual cut by flail*	sept		o		o		o		o		o		o		o		o		o	
7	Biannual cut by flail*	july & sept		o		o		o		o		o		o		o		o		o	
8	Biannual cut with strimmer*	may and sept		o		o		o		o		o		o		o		o		o	
	Trees and shrubs																				
16	Weed control in tree and shrub area	spring/summer		o		o		o													
18	Check and/or remove stakes and guards	spring		o		o		o													
19	Thin weak plants	winter		o		o		o													
20	Replace specimens	winter		o		o		o													
22	Litter clearance	throughout		o		o		o		o		o		o		o		o		o	
	Wooded area																				
15	Control of scrub	winter					o					o						o			
19	Thin weak plants	winter					o					o						o			
22	Litter clearance	throughout		o		o		o		o		o		o		o		o		o	
	Other areas																				
17	Annual trim back of trees and shrubs	winter		o		o		o		o		o		o		o		o		o	
22	Litter clearance	throughout		o		o		o		o		o		o		o		o		o	
23	Inspection of signage/reactive maintenance			o		o		o		o		o		o		o		o		o	
24	Inspection of footbridges /reactive maintenance			o		o		o		o		o		o		o		o		o	
27	Check land drains			o		o		o		o		o		o		o		o		o	
28	Footpath maintenance			o		o		o		o		o		o		o		o		o	
33	Spot weedkill	may		o		o		o		o		o		o		o		o		o	
34	Cutting back of aliens	june/july		o		o		o		o		o		o		o		o		o	
36	Fence inspection and reactive maintenance			o		o		o		o		o		o		o		o		o	

Table 2

Operations within each compartment and responsible agency

Op no	Operation	Compartment														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Watercourse	Berms	Backwaters	Deflectors	Steep bank	Shallow bank	Revetments	Wetlands	Amenity grass	Wild flower area	Course veg	New trees/shrub	Wooded area	Ponds/Reserve	Throughout
1	Annual cut of herbaceous vegetation*		EA			EA										
2	Biennial cut of herbaceous vegetation*		EA			EA										
3	14 cuts per year									LA						
4	Annual cut by rotary cylinder*										LA	LA				
5	Biannual cut by rotary cylinder *						EA				LA					
6	Annual cut by flail*					EA	EA					LA				
7	Biannual cut by flail*					EA					LA					
8	Biannual cut with strimmer*						EA				LA	LA				
9	Remove debris and low overhanging branches	EA														
10	Remove branches causing heavy shading	EA														
11	Inspection/clearance of outfalls	NW														
12	Inspection / clearance of inspection chambers	NW														
13	Reactive management to flood events etc	EA														
14	Desilt	EA														
15	Control of scrub															
16	Weed control in tree and shrub area													LA		
17	Annual trim back of trees and shrubs												LA			
18	Check and/or remove stakes															LA
19	Thin weak plants												LA			
20	Replace specimens												LA	LA		
21	Bush and tree clearance					EA							LA			
22	Litter clearance															LA
23	Inspection of signage/reactive maintenance															LA
24	Inspection of footbridges /reactive maintenance															LA
25	Nature reserve maintenance DWT															LA
26	Pond maintenance DWT														LA	
27	Check land drains														LA	
28	Footpath maintenance															LA
29	Annual cut of vegetation 33% rotation**		EA		EA											LA
30	Maintain 2/3 channel free**	EA														
31	Annual cut of reeds 33%**			EA				EA								
32	Rotation pruning of willows							EA								
33	Spot weedkill		EA	EA	EA	EA	EA									
34	Cutting back of aliens				EA	EA	EA									LA
35	Reactive maintenance of wetland DWT								LA							LA
36	Fence inspection and reactive maintenance															LA

* Remove arisings off site

** Leave for 18-24 hours before removal

DWT - In liaison with Durham Wildlife Trust

Fig 2.1 Management Compartments

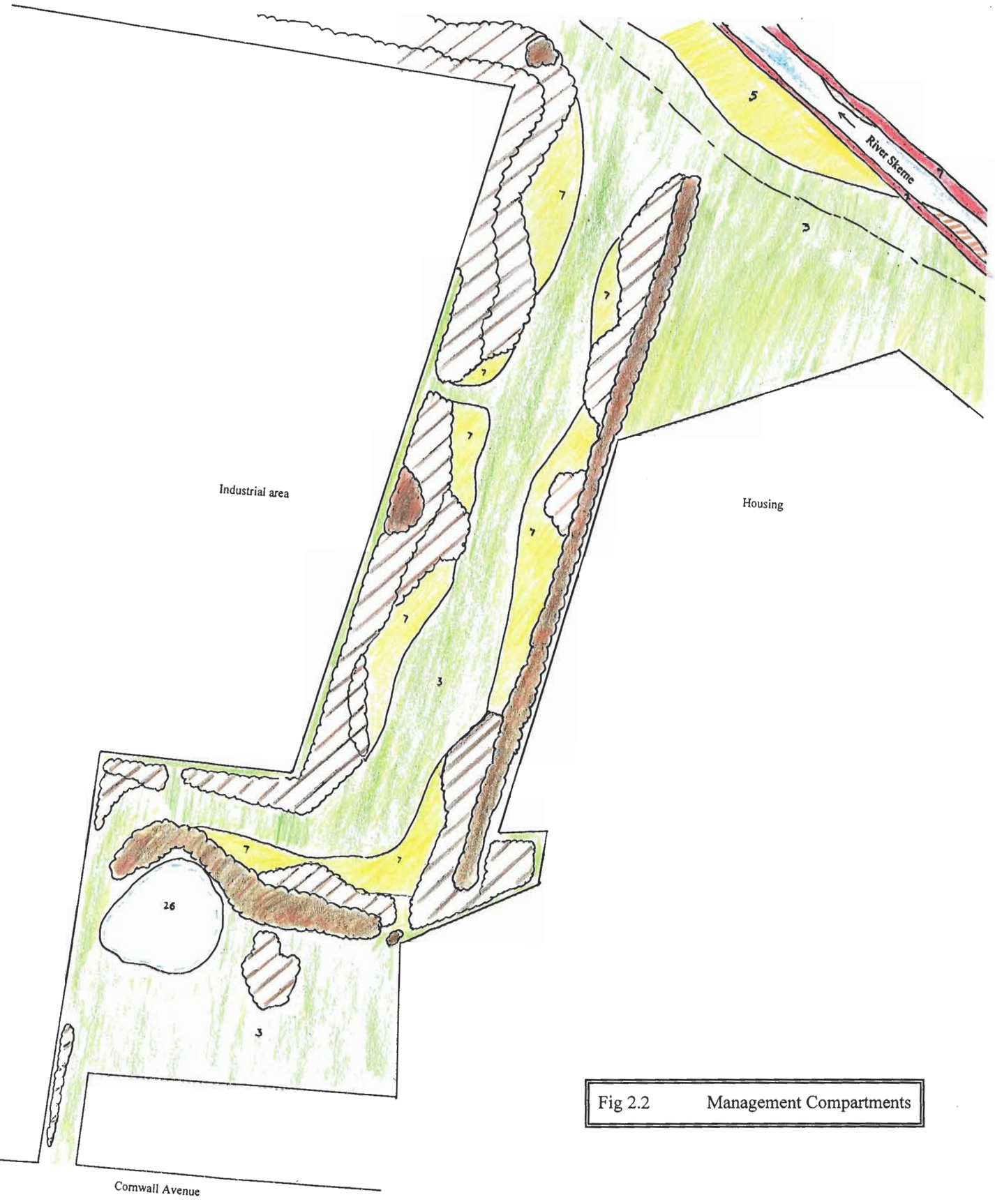


Fig 2.2 Management Compartments

Amended maintenance regime 14/06/01 (see appended letter.)

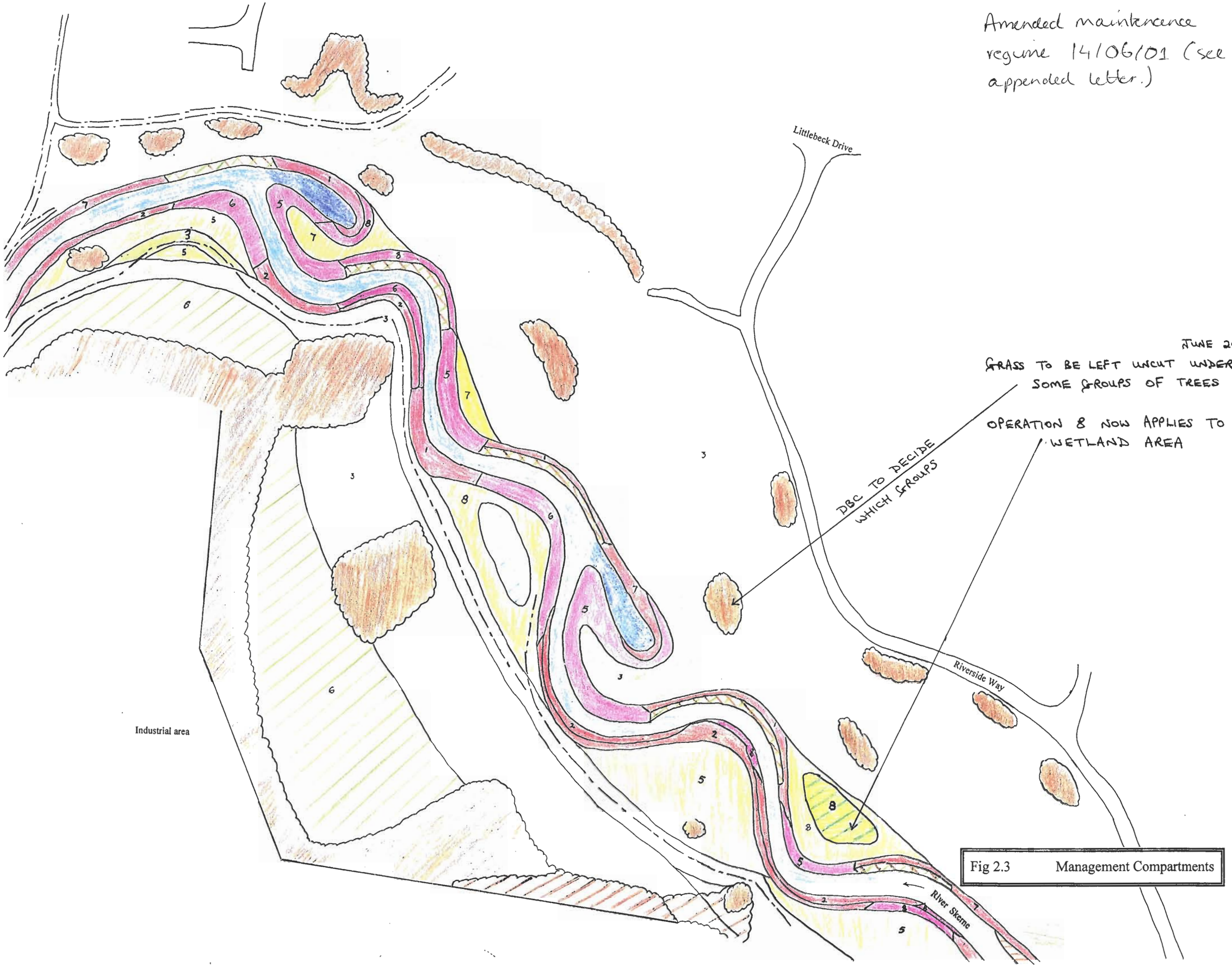


Fig 2.3 Management Compartments

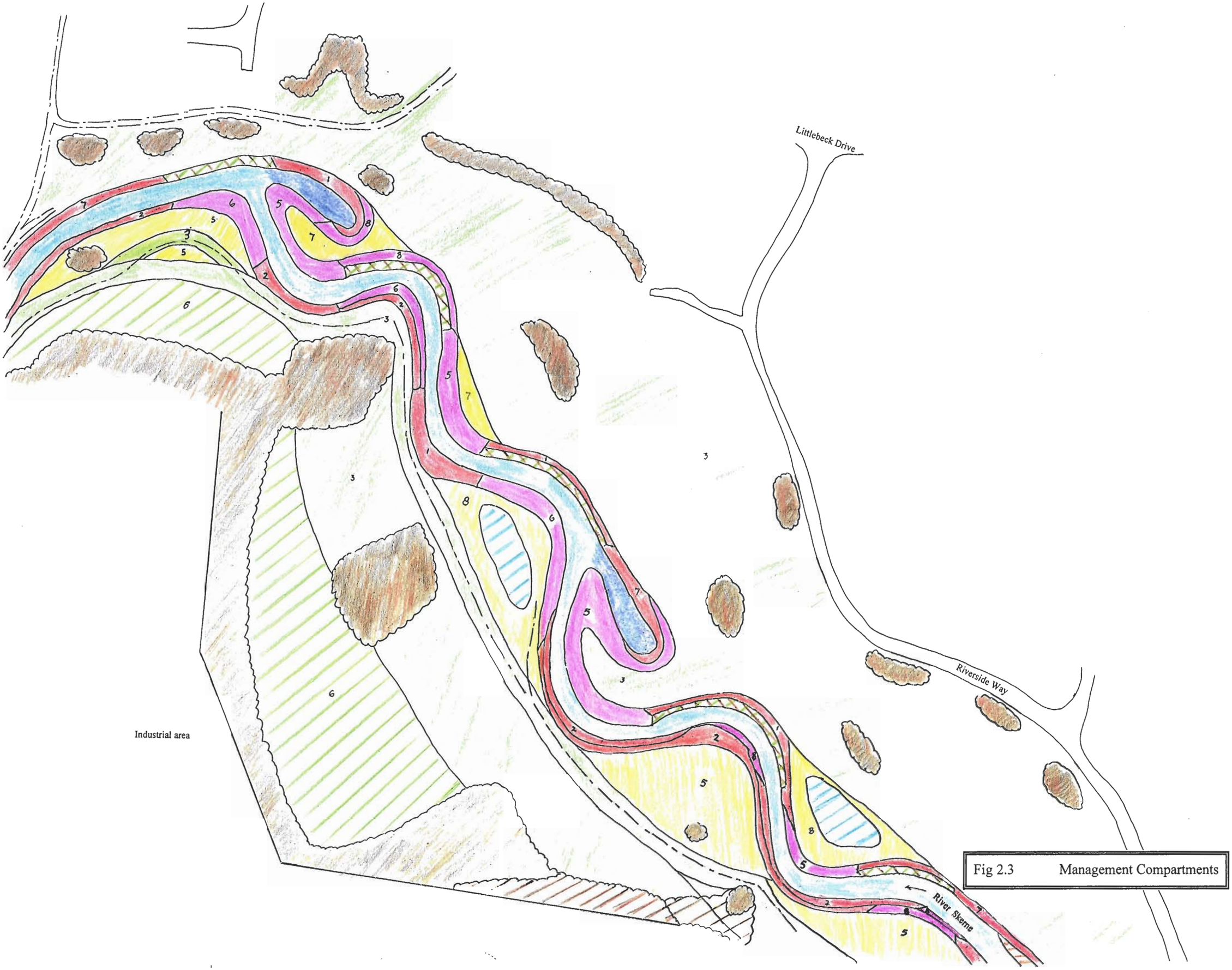


Fig 2.3 Management Compartments

Fig 2.4 Management Compartments

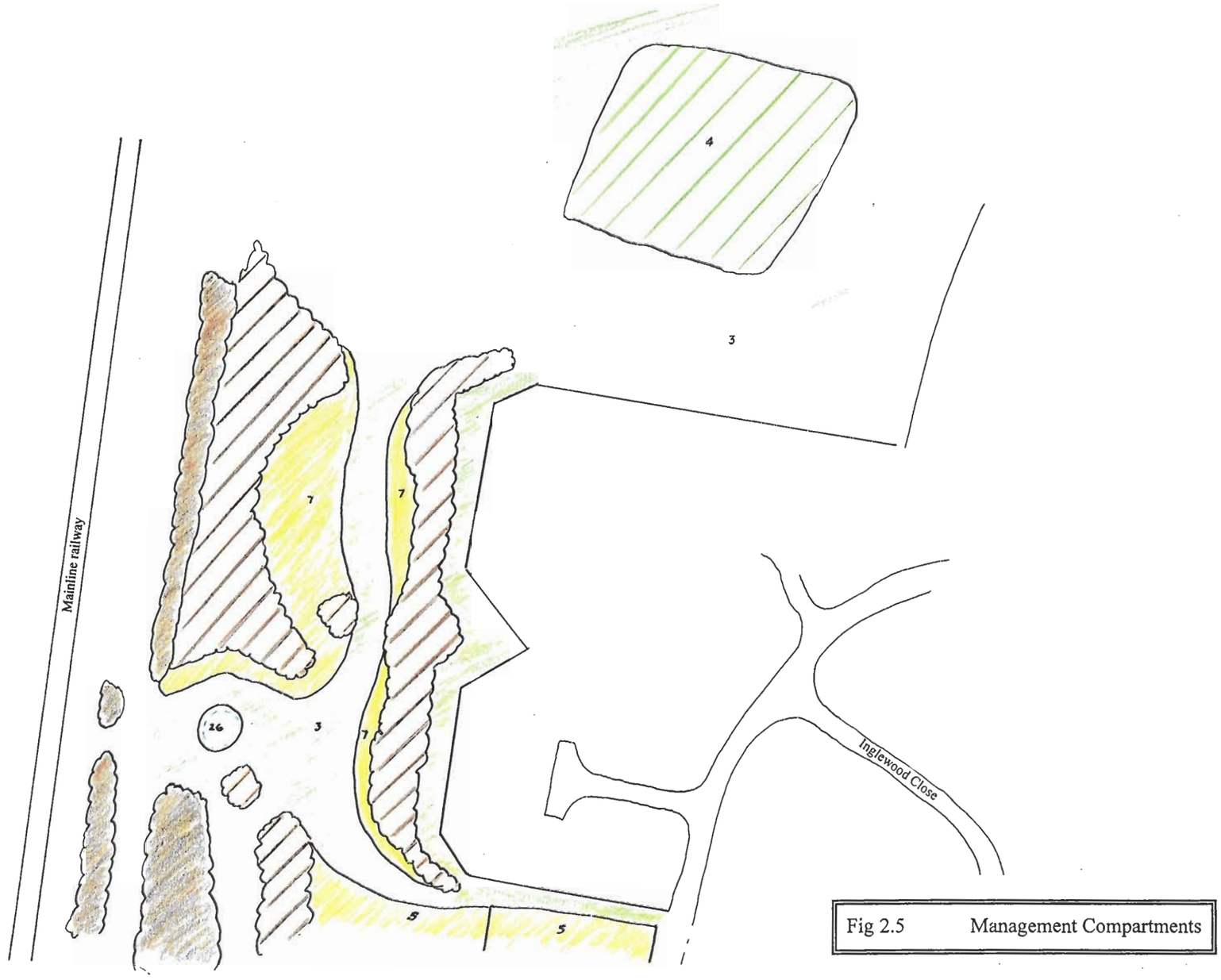


Fig 2.5 Management Compartments

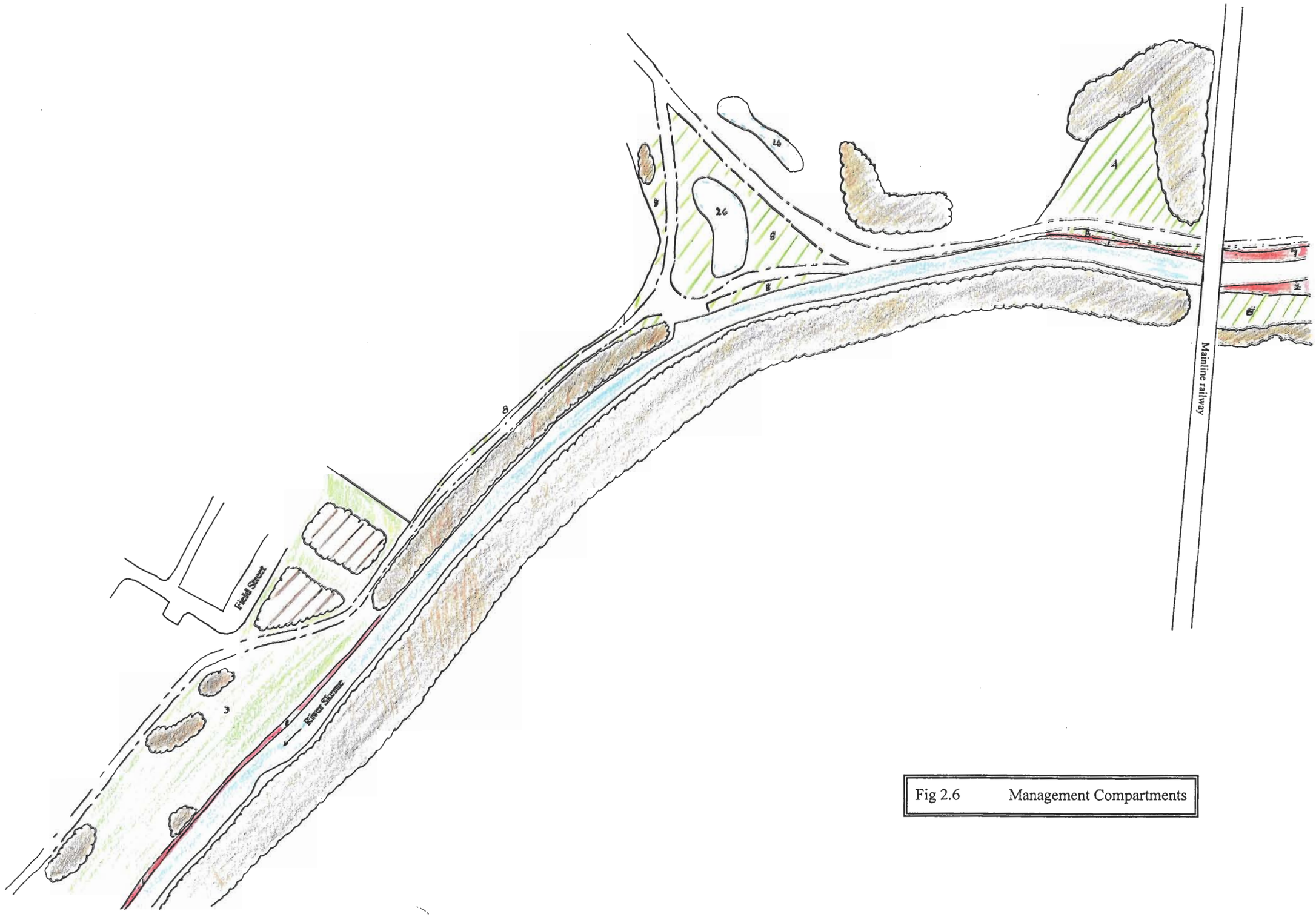
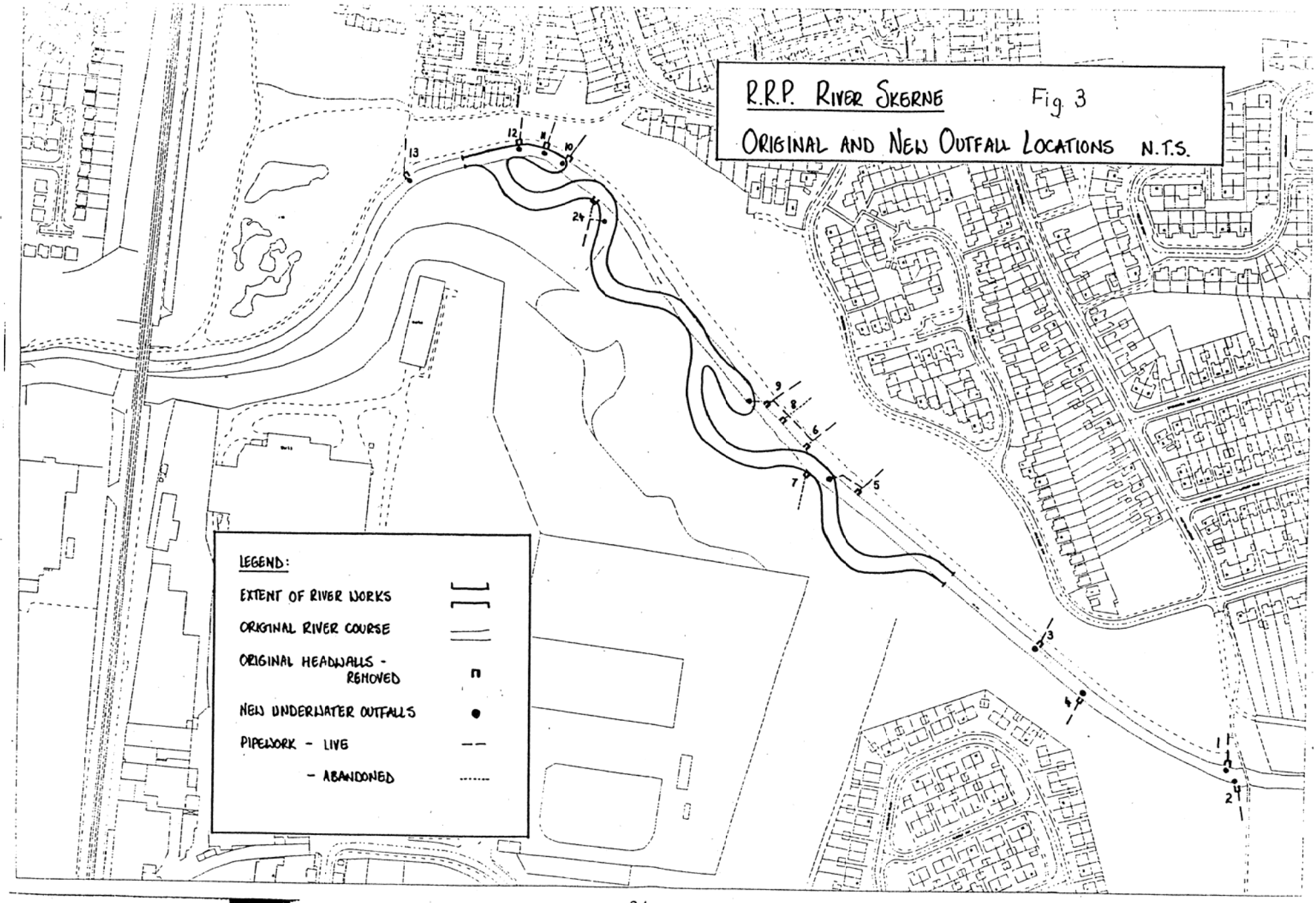


Fig 2.6 Management Compartments

Fig 2.7 Management Compartments


R.R.P. River Skerne
Fig. 3
Original and New Outfall Locations N.T.S.
LEGEND:
EXTENT OF RIVER WORKS
ORIGINAL RIVER COURSE
ORIGINAL HEADWALLS - REMOVED
NEW UNDERWATER OUTFALLS
PIPEWORK - LIVE
- ABANDONED
13
12
11
10
24
9
8
6
7
5
3
4
2

Appendix 1 Grass mix used in the newly seeded areas

Low Maintenance Grass Mix

15%	*Agrostis capillaris*	Common bent
10%	*Cynosurus cristatus*	Crested dogstail
35%	*Festuca ovina*	Sheeps fescue
5%	*Lolium multiflorum ssp. Westerwoldicum*	Westerwolds annual ryegrass
20%	*Festuca rubra*	Red fescue
15%	*Poa pratensis*	Smooth meadowgrass

Sowing rate: 6-15grms per metre square.