4

Revetting and Supporting River Banks

4.7 Bank revetment using low steel sheet piling and coir rolls

RIVER THAMES

LOCATION - CLIFTON LOCK CUT, OXFORDSHIRE SU 544944

DATE OF CONSTRUCTION - SEPTEMBER 1996

LENGTH – 140m

COST – £45,000

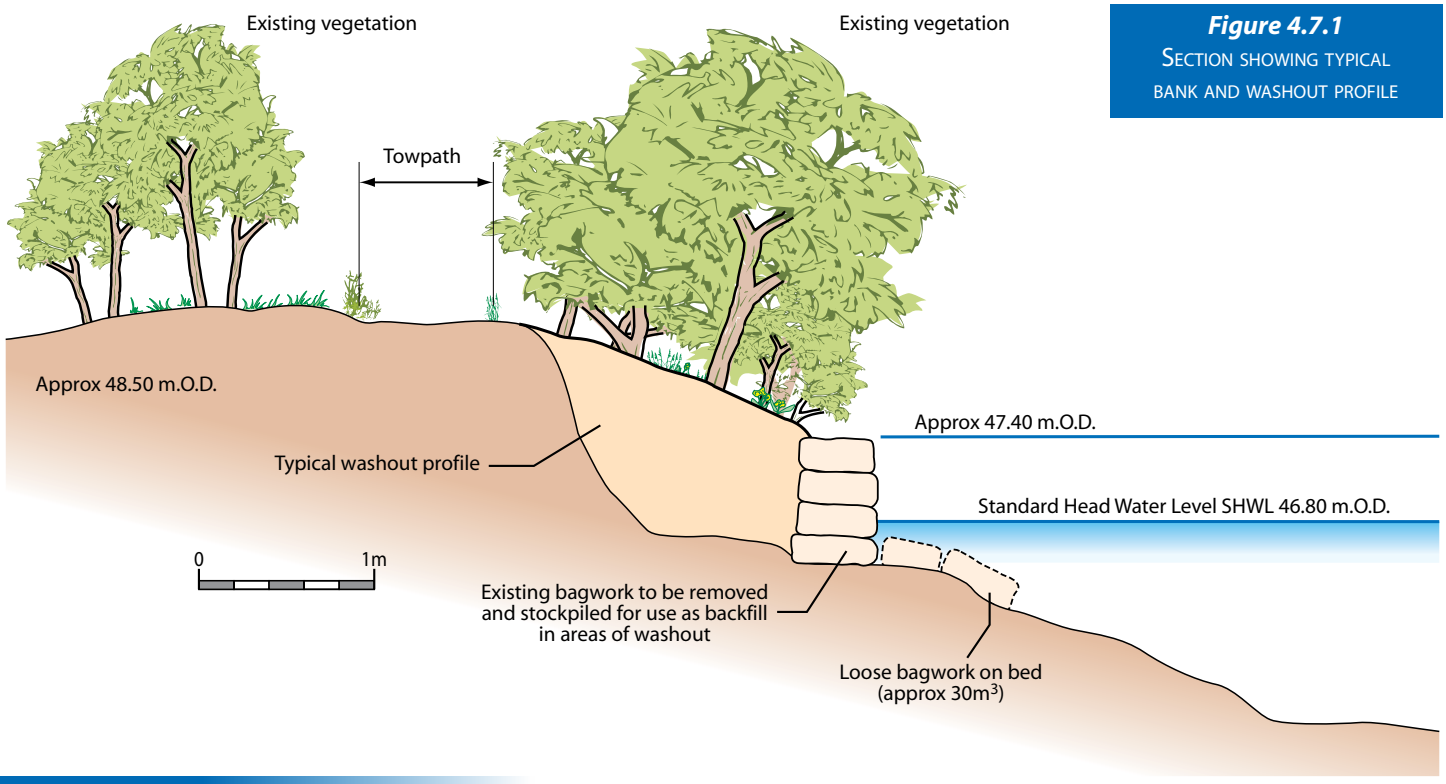

Figure 4.7.1
SECTION SHOWING TYPICAL BANK AND WASHOUT PROFILE

Description

For centuries the River Thames has been heavily managed for the purposes of flood defence and navigation. In its lower reaches the river is restricted and controlled by weirs and locks. Various techniques of bank revetment are used along its banks including steel sheet piling and/or concrete bagwork. Boatwash is a major concern where more natural softer engineered banks exist. In addition, sections surrounding locks and 'artificial' lock cuts experience a degree of rapid drawdown and changes in velocity in association with lock usage.

Sheet piling has the benefit of good structural integrity with a proven lifespan and can retain vertical banks. Concrete bagwork, similarly, has a proven lifespan and can be used in conjunction with near vertical bank faces. However, both these offer little benefit to wildlife in terms of habitat value and do not address landscape or aesthetic issues.

At Clifton lock cut the old concrete bagwork revetment was beginning to disintegrate and allow wash-out of the unprotected bank back towards the towpath. The reinstatement was initially to be sheet piling which would be visible above water level, continuing the existing run of high sheet piling and bagwork that protects the lock.

As an alternative, a more visually acceptable solution was proposed which would add habitat value to the reach. This design incorporated the structural integrity of sheet piling (to

Failed section of bagwork at Clifton Lock Cut

Revetting and Supporting River Banks

4

Initial sheet piling after bagwork removal, over existing trees

allow continued maintenance dredging) with an above-water 'soft' approach promoting vegetation growth. The sheet piling was carried out using a land based crane with floating pontoon to support the piling frame, thus reducing the degree of trimming and removal of existing bankside vegetation.

Design

The three vertical zones referred to in previous revetment techniques are considered below:

Below water
The old bagwork was removed to be used as backfill. To ensure stability at the toe of the bank, short sections of sheet piling were driven to below water level. The piling was capped with an inverted steel channel section with mesh welded to the top to prevent movement of the above two courses of new bagwork, ending just below 'standard head' water level (*see Figure 4.7.3*).

Water's edge
The sheet piling and bagwork was backfilled with the old bagwork and dredgings from the channel, then capped with a pre-planted (pond sedge, reed canary-grass and iris) coir fibre roll. The dredgings were stockpiled and allowed to de-water before being used as backfill.

2 layer capping bagwork and tie-in to existing sheet piling

4 Revetting and Supporting River Banks

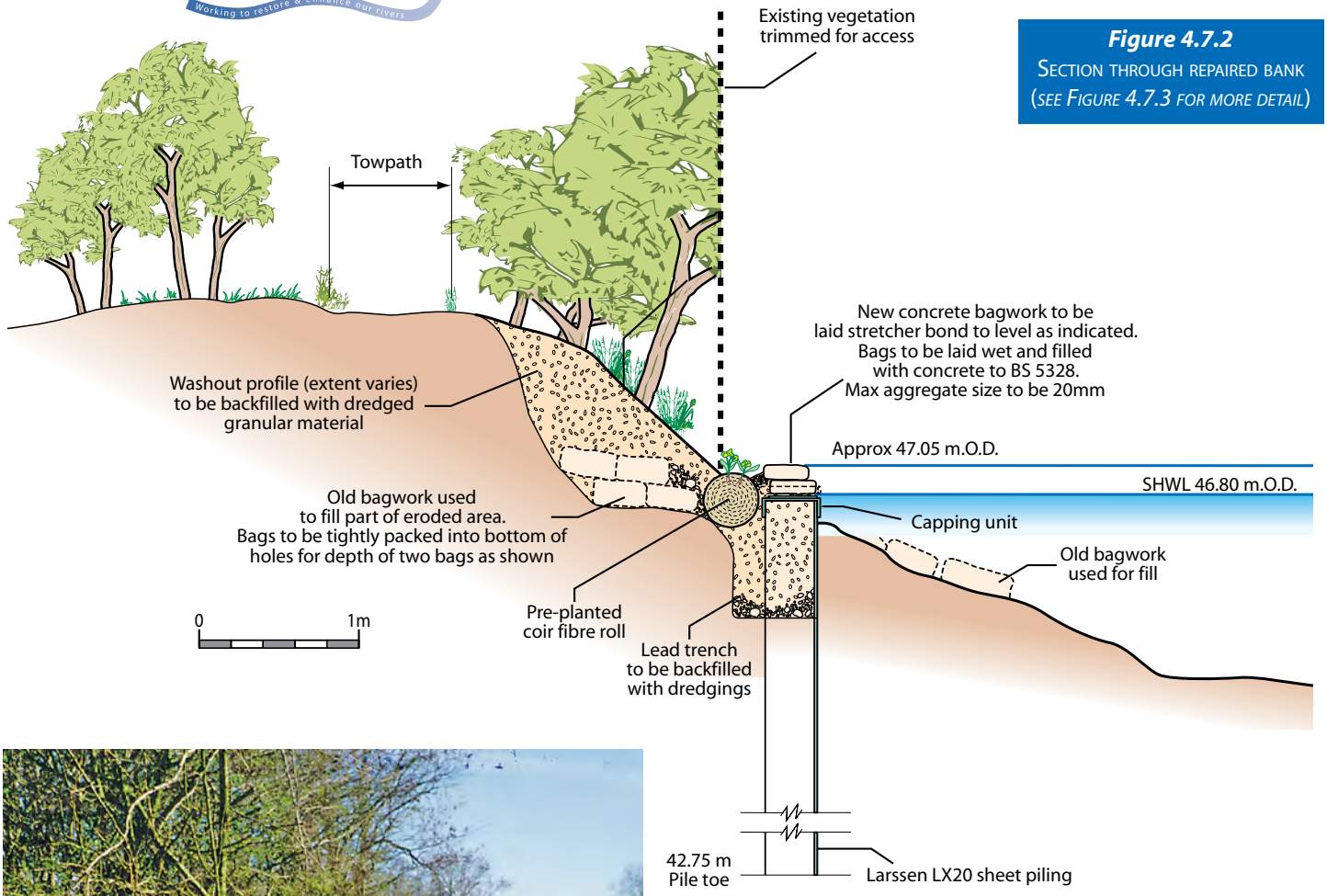

Figure 4.7.2
SECTION THROUGH REPAIRED BANK
(*SEE FIGURE 4.7.3 FOR MORE DETAIL*)

Flax mat secured, planted coir rolls installed and voids backfilled

The roll provides both retention of the backfill, preventing wash-out, and a medium for reedy marginal vegetation establishment. The vegetation, when established, provides an effective natural defence against boatwash, habitat for bankside wildlife and is visually more pleasing.

In addition, 0.05m diameter UPVC 'mammal' pipes were incorporated between the lower level bagwork at 1.5m intervals.

Upper bank
The upper slope was formed from imported topsoil and covered with a biodegradable fibre mat to protect and retain the sloping surface. The mat was used along most of the reach, a necessity due to the timing of the works with little opportunity of vegetation establishment before high winter flows. The matting was pinned to the slope using wooden pegs, rising to the retained shrubline. The bank was not seeded to allow natural re-vegetation.

Transition from the existing high sheet piling and bagwork wall is achieved by stepping down the bagwork to tie into the new 2 layer system. At the upstream end the return piling runs 1.2m into the bank.

Revetting and Supporting River Banks

4

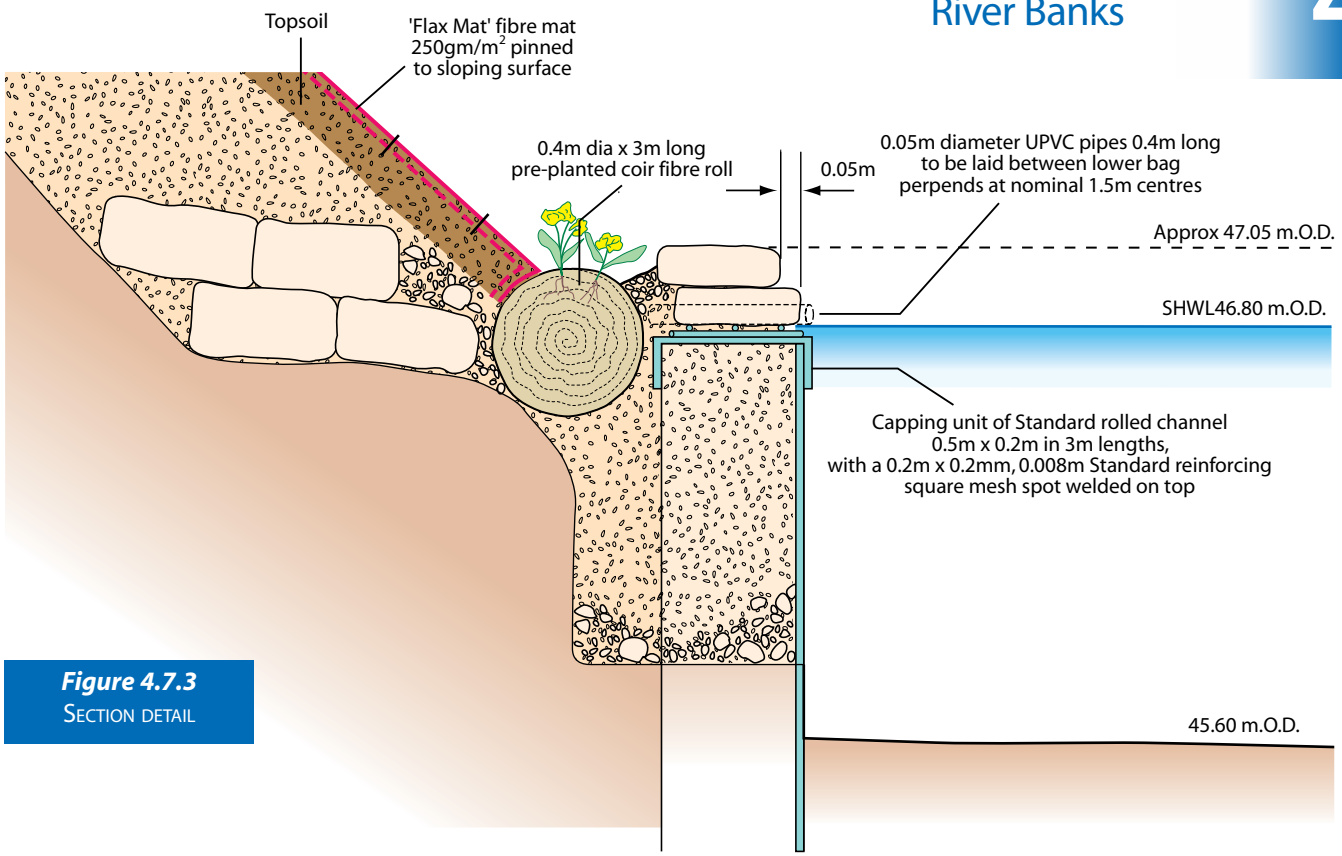

Figure 4.7.3
SECTION DETAIL

Vegetation establishment after 18 months

Subsequent performance 1995 – 2001

The revetted bank showed no signs of erosion and appears quite 'natural'. The emergent species planted in the reed rolls have established well, forming a dense marginal fringe.

The fibre matting protected the slope well and has since almost completely degraded allowing re-vegetation of the upper slope. In areas this has taken a number of years, possibly due to the steepness of some sections and a dry summer after completion. The growing root system of the retained shrubby vegetation helped to bind the backfilled bank and provide extra stability.

Some minor tree maintenance has been carried out along the towpath where it has begun to restrict access to, and views of, the river. In-channel dredging work (removal of displaced material) has also been undertaken since completion, with no adverse impact to the bank.

Original Information Providers:
Lesley Sproat,
Martin Luker.

4

Revetting and Supporting River Banks

4.7 River Thames 2013 Update

The introduced bagwork has settled (soil and silt has solidified) and is standing up well to wash caused by passing boats. Where there is sufficient light there is good vegetation growth and numerous plant species have successfully established. However, in some areas lack of maintenance means riparian vegetation has overgrown, restricting some views of the river from the towpath. The minor tree work carried out along the towpath has since ceased and it is suggested that the scheme may have benefited from a tailored tree maintenance schedule.

This technique has been recommended by the Environment Agency for use along the River Thames and similar managed navigation systems.

River Thames	Medium energy, clay
WFD Mitigation measure	**Click Here** to view details
Waterbody ID	GB106039030334
Designation	None
Project specific monitoring	None

Vegetation growth has established and the bagwork has remained intact – August 2013

Contacts

Lesley Sproat, Environment Agency
lesley.sproat@environment-agency.gov.uk, 08708 506506