BRITISH WATERWAYS BOARD
SOUTH EASTERN DIVISION

Your Ref: N4927.PBL/VVF
Dated: 20th May, 1960.

Our Ref: CNH/KT.95
Date:- 26th May 1960.

TO:-DIVISIONAL ENGINEER,
WATFORD,

FROM:- DISTRICT INSPECTOR,
WARWICK DISTRICT,

REPRODUCTION OF ORIGINAL

The arm of the Canal to Buckingham commences at Cosgrove, above Lock No.21, and terminates 150-feet on the Buckingham side of Drawbridge No.28.

The Arm comprises two sections -

(a) The Stratford Arm, commencing at Cosgrove and terminating at Hayes Basin, adjacent to the main trunk road A.5.

This section, 1-mile – 533-yards long, was one of the collateral cuts included in the Grand junction Canal act of 1793.

(b) The Buckingham Arm proper, the subject of a later act of 1803, commences at a point 166 yards from the Hayes Basin end of the Stratford. Arm, leaving this Arm in a north-west direction.

The total length of both the Stratford and Buckingham Arms approximates 10.3/4 miles.

Originally it was intended that the Buckingham Arm should leave the end of Hayes Basin and join the River Ouse in the Passenham area, from which point onwards the river would be canalised to Buckingham.

As with the main line of the Canal from Stoke Bruerne to Willen, it was found before construction started that the Ouse valley was liable to floods of long duration, and it was decided to construct the Arm as a contour canal slightly higher up the north side of the valley, thus ensuring an uninterrupted navigation at all tines.

The general line of the Canal is north-east to south-west, and being constructed along the contour of the north side of the valley, generally speaking, the south-east or towpath side of the Canal is on slight embankment for nearly the whole distance.

Engineering details are as follows:-

BRIDGES

There is a total of 31 bridges on both Arms, 11 of which are masonry bridges, the remainder timber hinged lift bridges. These latter bridges comprise a cambered timber platform spanning the waterway on brick abutments of approximately 9'-0" span, and this platform is hinged on a timber heel at ground level on the off-side.

CONT'D……

Two timber baulks are erected vertically on the off-side of the Canal, on top of which are balanced two horizontal timber baulks similar to a Lock-gate balance beam.

The towpath or inner end of these horizontal balances are connected by chains to the towpath end of the cambered timber bridge platform, the outer ends form a counterbalance to which are attached light chains to enable the bridge to be lifted or lowered.

None of these drawbridges now exist as such. All horizontal and vertical baulks, almost without exception, have been dismantled and placed across the waterway, and afterwards planked over to form a fixed bridge.

Bridge No.3 has subsequently been removed and replaced with a fixed concrete bridge, and Bridge No.5 has recently been re-constructed by the Northamptonshire County Council, as a fixed bridge with a R.C. platform.

Bridge No 7 is still a fixed timber bridge taking full unclassified road traffic.

Bridge No.3 - Stratford Arm - is a timber swing bridge, now collapsed and removed.

Of the masonry bridges - Bridge No.1 - B.A. taking the A.508 road, has been re-constructed and taken over by the Northamptonshire County Council, at an agreed lowered headroom of 5'-6" above W.L.

Bridge No.2 – B.A., taking the A.5 main trunk road was in the form of a short tunnel with no towpath. Owing to bad sighting on the main road, it was agreed with the Ministry of War Transport, during the last War, that approximately two-thirds of the arch would be lowered, and the headroom is now 5'-6" above W.L.

Bridge No.12 - taking the main Stony Stratford - Buckingham road, was taken over and reconstructed by the Northants County Council, about 1934

Bridges Nos.8 and 9 take unclassified road traffic through Deanshanger village and are maintained by the Commission, as does Bridge No. 22 at Leckhampstead Wharf, also maintained by the Commission.

The Bridge taking the road at Thornton is not owned by the Commission, and this bridge was constructed alongside our No.18 many years ago. The arch only of our bridge is still in position and could be demolished.

All other masonry bridges are accommodation - Nos. 1 and 2 Stratford Arm, and 14 and 16 Buckingham Arm.

LOCKS:-

There are two locks on the Buckingham Arm rising to Buckingham, one at Hyde Lane, adjacent to Bridge No.23, and the other at Maids Moreton, adjacent to Bridge No.26. Both locks are almost completely derelict and very extensive repairs and replacement would be necessary to put the locks in working order.

CONT'D……

PROPERTY:-

Other than buildings let to an outside tenant at Hayes Basin at the end of the Stratford Arm, which are in a poor state of repair, the only other property owned by the Commission is cottage No.172 alongside Lock No.2 at Maids Moreton, let to an outside tenant.

Maids Moreton Mill, adjacent to Bridge No.25, was purchased in 1932 for water supply purposes, but this was demolished in 1953, the feed to the Canal being retained.

EMBANKMENTS:-

As previously stated, the south-east or towpath side of the Canal is generally on a slight embankment.

The Canal does, however, cross three shallow valleys by full embankment, the first being on the Stratford Arm between Bridge No.2 and Hayes Basin, the second between Bridges Nos.8 and 9 Deanshanger, the third between Bridges Nos.12 and 13, and the fourth a very shallow bank between Bridges Nos.22 and 23 at Hyde Lane.

On the off-side of the Canal, between Lock No.1 and Bridge No.24, gravel pit workings coming close to the Canal have now been taken over as Reservoirs by the Bucks Water Board, and this length would have to be considered as an embankment.

WATER SUPPLIES:-

The Stratford and Buckingham Arms can be combined and treated as one unit for water supplies. This combined length can be divided into three sections:-

(a) from Cosgrove to Lock No.1 Hyde Lane - a distance of 7.3/4-miles.

(b) from Hyde Lane Lock No.1 to Maids Moreton Lock No.2 - a distance of 2-miles.

(c) From Maids Moreton Lock No.2 to Buckingham - a distance of l-mile.

The water supply to section (a) is derived entirely from the main line of the Canal, this section being at the same level as the Stoke Bruerne - Cosgrove 6-mile pound. There is also a minor feeder which enters the Canal on the off-side immediately below Lock No.1.

The water supply to section (b), which is one lock higher than section (a), was originally supplied either from Buckingham or from the canalised river section of the Canal at Maids Moreton Mill on the Buckingham side of Bridge No.25.

Until 1932, when the Grand Union Canal purchased the Mill, we had No direct control of the canalised section, but since that date we have controlled the flow and have fed water from the Mill through Lock No.1 to the Stoke Pound main line as a feeder.

CONT'D……

The water supply to section (c), one lock higher than section (b), is derived entirely from a feed from the River Ouse controlled by a sluice, now non-existent, which entered the Arm 150-feet on the Buckingham side of Bridge No.23.

We were only allowed to take water from the Ouse to keep the pound at weir level and to make good the loss of water by the operation of Lock No.2, and there was a weir between Bridges Nos.26 and 27 discharging to the Ouse to control the level of the Pound

The last trading boat to negotiate the Arm was in l932, when a single motor boat discharged coal at Leckhampstead Wharf, just over 7-miles from Cosgrove.

For many years prior to that navigation was difficult,, and two items of floating plant comprising non-cabin flats, known as 'lighteners' were always stationed at Cosgrove, to lighten the draft of craft using the Arm.

Despite the lack of trade, the Arm was regularly weeded and cleared annually of growth as it formed a good supply feeder to the main line.

It was essential to keep section (a) completely clear if it was to act as a feeder, otherwise there was a tendency for the main line to feed back to this 7.3/4 mile level.

During the 1932-1935 Development Scheme, most maintenance men were transferred to this work, and as a result no weed cutting or clearance of the Arm was carried out.

By 1938, with no traffic and little maintenance, the Arm was becoming increasingly silted up and the water supplies from Maids Moreton were being used purely to keep water in the Canal, to define a boundary.

This weeding and silting continued over the years, and by 1944, became such that the water at the Cosgrove end of the Arm was being fed from the Stoke Pound of the main line. Owing to the lack of maintenance and the progressive deterioration of the towpath and embankment, resulting in excessive leakage and over-topping, a dam was driven across Bridge No.1 Stratford Arm, to stop the feed back from the Stoke Pound, and this dam is still in position.

Water supplies continued to be run from Maids Moreton, but by 1957, the silting and weed growth had become so bad that this water was lost entirely between the Mill and Lock No.1 in section (b) and during the summer months the Arm almost completely dried out.

Owing to general deterioration and excessive leakage, a further dam with a controlled rectangular weir was also driven across bridge No.22 in 1944, in order to hold the Canal at a slightly lower level between Bridges No.22 and 1.

Section (b) continued to be supplied through Maids Moreton Mill but as the years passed, the silting became progressively worse and it is now quite impossible to take a feed from this source.

Section (c) was bad in 1930, and during the Development programme this completely dried out in sections, and lengths of this dried out waterway are now let for grazing.

CONT'D……

No supply can now be taken from the River Ouse in Buckingham, and the sluice is non-existent and the feed channel completely grown over.

CULVERTS:-

There are 39-No. culverts, 5-No, on the Stratford Arm and 34-No. on the Buckingham Arm. These vary in construction from brick to C.I. pipes, glazed earthenware pipes, steel tubes and old timber trunks. No maintenance has been carried out on thEse for at least 40 years, and they have only been dealt with in recent years when they have failed and caused flooding.

WEIRS:-

There are 4-No. weirs on the Arm, one adjacent to Bridge No.7, at present serving little purpose and lowered to keep the general level down; one below Hyde Lane Lock, again lowered to overcome excessive leakage and over-topping; one large weir in the Canalised section above Maids Moreton Mill, approximately 175-feet long in a complete state of disrepair and likely to completely breach at any time, and a fourth between Bridges 26 and 27 on the dried out section.

FLOOD PADDLES:-

One between Bridges 2 and 3 Stratford Arm, now unusable due to silting; one near Bridge No.15 and one between Bridges Nos.22 and 23, both in a complete state of disrepair.

GENERAL CONDITION AND COMMENTS:-

Between Cosgrove and Bridge No.1 Stratford Arm, the waterway is completely silted up and can be traversed on foot, the remainder to Lock No.1 has shallow water in sections during the winter, but is now drying up in the summer. Weed, overhanging trees and reed growth excessive.

Between Lock Nos. 1 and 2 similar remarks apply, and between Lock No.2 and Buckingham the (*unreadable)*

If re-opening the Arm to a limited depth is contemplated, it is most important to appreciate that irrespective of whatever dredging depth may be approved the weir level of the first 7.3/4 miles from Cosgrove to Lock No.1. must be the weir level of the main line Stoke Pound.

As the level of this length has been low for so many years, the present state of the towpath and embankments is now such that this entire length of the 7.3/4 miles slight towpath embankment and both sides of the valley embankment on the Stratford Arm, Deanshanger, bridges 12 and 13 and bridges 22 and 23 lengths must either have the clay puddle and towpath and off-side banks raised and the fender wall made good, or alternatively 6'-0" concrete piles driven.

The above comments are briefly the history, engineering details and present condition of the Buckingham Arm.

CONT'D……

Dealing with the points raised in your memo of the 20th May; I would comment and estimate as follows:-

If consideration is given to re-opening the Arm to a limited depth for Pleasure Craft purposes, I am in no doubt personally that the whole of the towpath and off-side banks on embankments would have to be raised either by clay paddling and fender walling, or driving 6'-0" concrete piles.

I have been in charge of this section for many years and have had to deal personally with leakage, low banks, flooding and endless landowners complaints when the canal was at a higher water level, and with the further deterioration which must have taken place since 1944, when the dams were driven at Bridges 1 and 22, there is no doubt in my mind that this raising of banks must be carried out before the level can be returned to normal.

I doubt if anyone can be found now capable of clay puddling and fender walling, and I therefore recommend 6'-0" concrete piling.

If it should be considered that the 7.3/4 mile section could be operated at a lower level by the construction of a lock at Cosgrove, I doubt whether this would be feasible as the minimum 3'-0" dredging depth required at the lower level would inevitably result in trouble with the existing culverts which are generally shallow.

Without making a detailed survey, I consider that 75% of the towpath side of the Arms will need piling plus off-side piling on the 5 embankments previously mentioned. In view of the traffic envisaged, I suggest this piling would be 6'-0" long concrete not tied or waled and the cost to include making up behind.

Towpath side 43,345-ft. plus 5,300-ft. on off-side embankment, total 47,645-ft. @ £2. foot run - equals	£95,290. 0. 0d.	(1)

BRIDGES.

20 existing drawbridges would need replacing as such No.5 Buckingham Arm being replaced by the Northamptonshire County Council. *(calculation un-readable)*	£14,250.0.0d	(2)

I am unable to comment as to how the headroom at Bridges 1 and 2 Buckingham Arm can be increased.

The Commission owned masonry bridges 1 & 2 Stratford Arm, 8, 9, 14 and 16 and 22 Buckingham Arm need only normal maintenance, say,	£1,000. 0. 0d.	(3)

LOCKS.

Locks 1 and 2 need extensive repairs to brickwork, sills, paddles, hollow quoins and completely new gates - 2-No. lock reinstatements @ £5,000 each – equals	£10,000.0.0d	(4)

CONT'D……

WATER SUPPLIES.

Reconstruction of sluice from River Ouse in Buckingham and opening feeder channel to Canal, say £1,250.0.0d (5)

CULVERTS

Having had experience of these culverts in the past, I consider that immediately dredging commenced consideration would have to be given to rebuilding 50%.

20 culverts @, say, £600. each equals £12,000.0.0d (6).

WEIRS

3 short weirs to be rebuilt @, say, £150each and one long river weir above Maids Moreton Mill completely re-constructed and pitched @ £2,000 - total equals £2,450.0.0d (7)

DREDGING

Average width 35'-0". To dragline dredge to 3'-0" depth, say average of 4-cubic yards of material to be removed per yard to be deposited on site to make up banks and towpath @ 2/9d per cu.yd. over the whole length - £10,351. 0. 0d (8)

Before access can be obtained for dragline equipment, trees and bushes will have to be removed in places, for which £750. should be allowed. Compensation will (11)
also be payable to landowners for dredgings, for which, say, £600. should be allowed. (12)

FENCING

As I have previously reported, the towpath hedge on both Arms are either completely out of hand or non-existent. Assume that 25% could be reinstated and laid down as hedges - equals 10,600 yards or 482 chains @ £2.l0.0d par chain - equals £1,205.0.0d. (9)

Fencing 31,745 yards to standard recently agreed with N.F.U. @ 10/-d yard - equals - £15,872.0.0d. (10)

If the canal is reinstated, we are bound by our Acts to erect and maintain a stock-proof fence between the Canal and adjoining land on the towpath aide.

CONT'D……

SUMMARY:-

(1)	Piling	...	£95,290.
(2)	Bridges	...	£14,250.
(3)	Bridges.	...	£ 1,000.
(4)	Locks.	...	£10,000.
(5)	Water Supplies.	...	£ 1,250.
(6)	Culverts.	...	£12,000.
(7)	Weirs.	...	£ 2,450.
(8)	Dredging.	...	£10,351.
(9)	Hedging.	...	£ 1,205.
(10)	Fencing.	...	£15,812.
(11)	Trees & Bushes.	...	750.
(12)	Tipping compensation	...	600.
		TOTAL:-	£165,018

Regarding the second part of your memo I find it difficult to estimate the cost of closing the Arm entirely. I assume, however, that this is probably not your intention, but rather that the existing bridges, weirs, locks etc., should be left as they are and that a line of fence should be erected down the centre of the waterway, the land either side being used by the adjacent landowners.

I have not surveyed the entire Arm to ascertain the landowners either side, but in the length Bridge 9 to 22 the subject of the recent conference with the N.F.U., I would say that some 50% of the land either side is farmed by the same landowner. This could well apply to the remainder of the Arm, thus reducing the length of fencing required.

With regard to cattle water supplies; from Bridge 14 to 28 the Ouse runs roughly parallel to the canal on the towpath or south-east side, and there is no problem as regards watering.

On the off-side or north-east side where the ground rises generally as far as I know without making enquiries only one farmer, Watson, who runs from the Buckingham side of Bridge 12 to the Buckingham side of Bridge 15 is the only farmer who uses the Canal for watering purposes, and when I last saw him, he informed me that he was seeing his Landlord regarding a piped water supply.

The Estate Department could probably advise on any cattle watering agreements still being paid.

The only minor problem in this respect might be the length between Lock 2 and Maids Moreton Mill, where the waterway is canalised. This is close to Buckingham and it might be advisable to allow a sum for a piped water supply at this point.

If fencing down the centre of the Canal is considered, then it will be necessary to have the channel dried out completely, as soon as possible, and the easiest way to do this would be to remove existing weirs completely and open up certain culverts at strategic points where minor discharges to the Canal occur. A 1959 summer would then dry out the Arm completely.

An approximate estimate would therefore be:-

Assume 50% fencing and cross-fencing for 10.3/4 miles @ 10/-d per yard to N.F.U. standard - equals 9,400 yards equals £4,700. (1)

Remove 4-No weirs, say, £750. (2)

Open up, say, 10-No culverts at strategic points, @ £300 each - equals - £3,000. (3)

Allow for water supply at Maids Moreton, say, £200. (4)

Overhaul dam at Bridge 1 - Stratford Arm, say, £75. (5).

SUMMARY

(1)	Fencing.	...	£4,700.
(2)	Weirs.	…	750.
(3)	Culverts.	...	£3,000.
(4)	Water supply.	...	200.
(5)	Dam at Bridge 1.	…	75.
	TOTAL:-		£8,725.

My estimate for leaving the Canal as it is and double fencing to overcome the immediate N.F.U. complaints was £6,053. 0 .0d - see my report dated 20th April, 1960.

C.N.Hadlow.
DISTRICT INSPECTOR.