

Waltham Abbey Royal Gunpowder Factory
(Former RARDE North Site)

Investigation of the Interfaces Between
Filled Canals and Open Waterways

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Introduction

This report represents an initial and purely visual investigation into the condition of the interfaces between the backfilled canals and leats on the North site and the open waterways of Horsemill Stream, The Old River Lea, Cornmill Stream, Millhead Stream and Middle Stream.

It was found that very few canals were adequately dammed at these intersections prior to backfilling and many have no retaining structures at all. This results in an osmotic process where material is entering the waterways via the ground water either in solution, suspension or by physical erosion. At the same time the "clean water" entering the site at these points could spread contaminants by the same agents. Also if the canals are to be cleared completely dams will be needed to stop the site being inundated.

Thirty two interfaces have been located, please refer to the location maps.



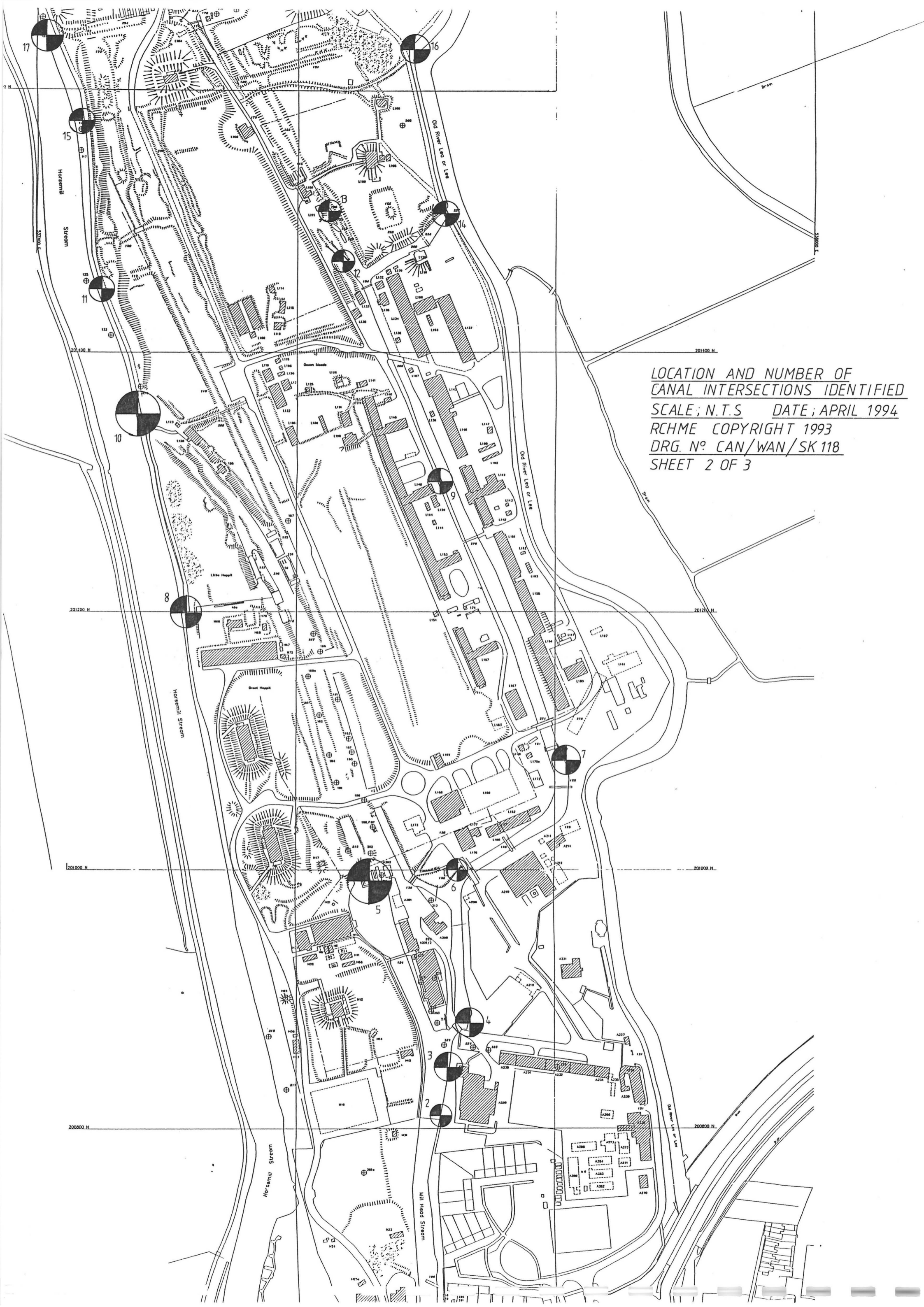
LOCATION AND NUMBER OF CANAL INTERSECTIONS IDENTIFIED

SCALE ; N.T.S DATE ; APRIL 1994

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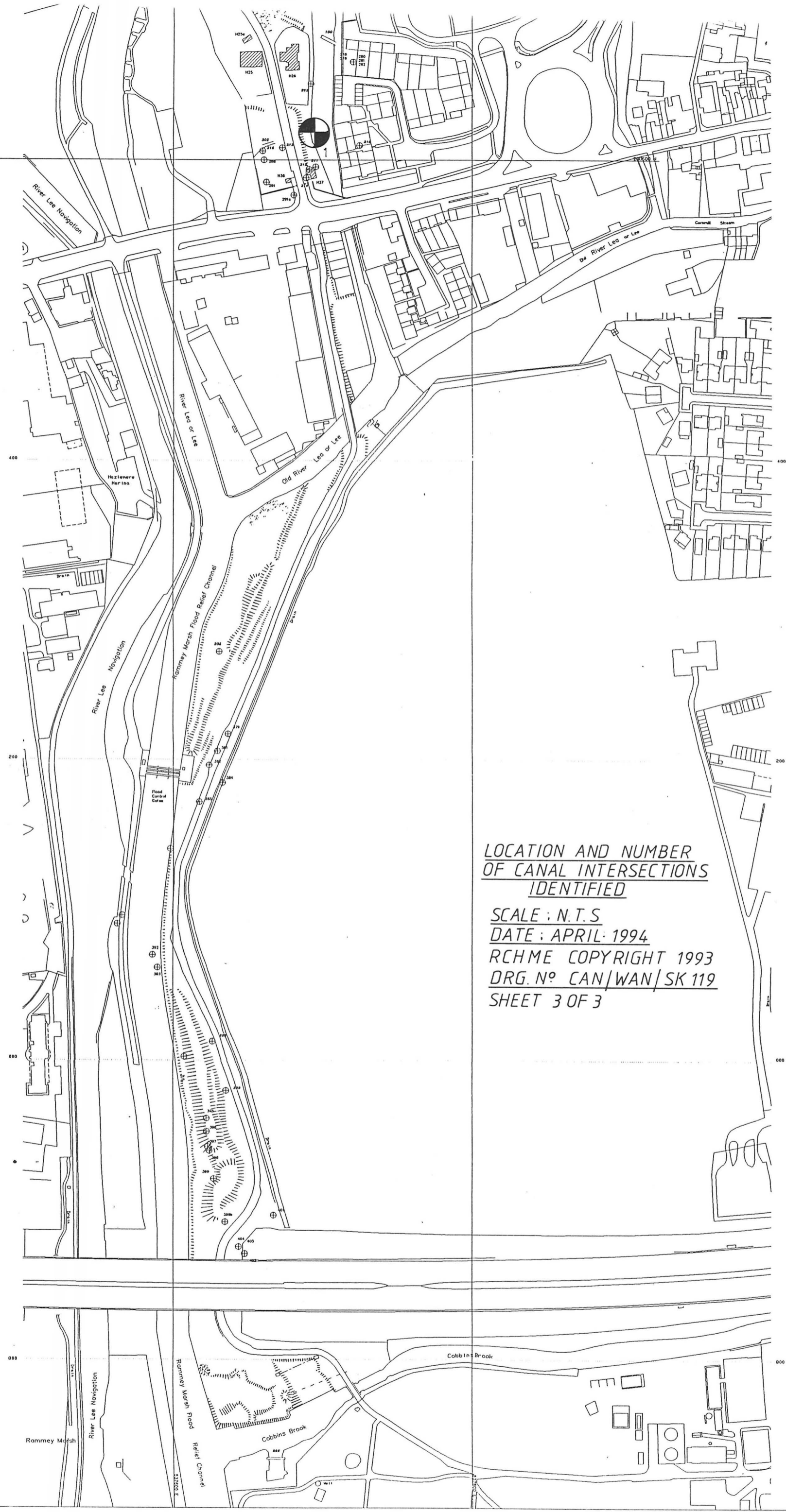
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SHEET 1 OF 3



LOCATION AND NUMBER OF
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SHEET 2 OF 3

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LOCATION AND NUMBER
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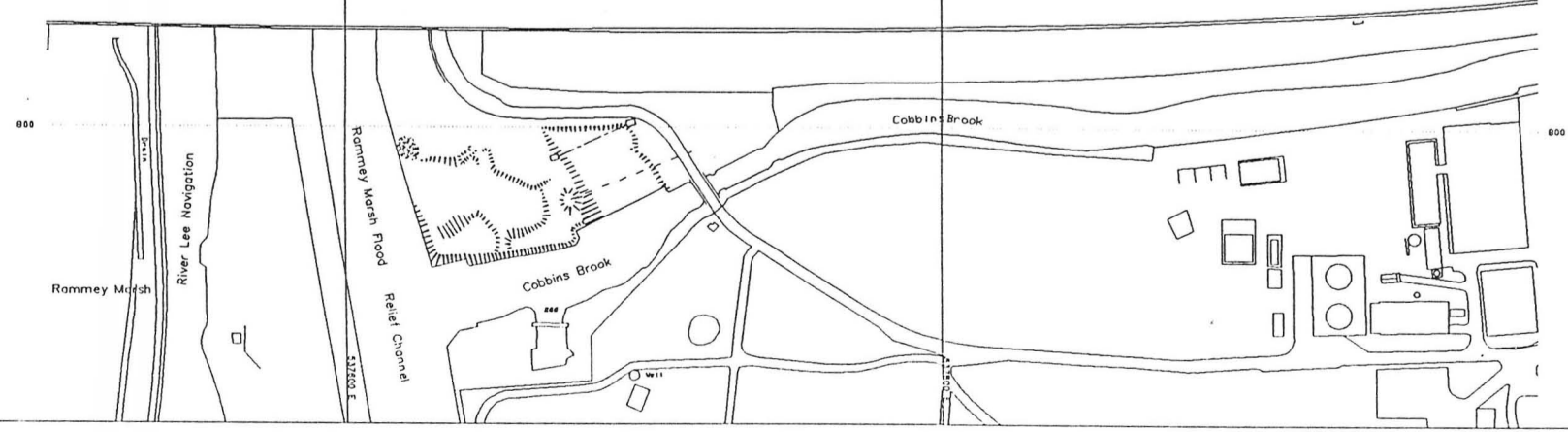
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SHEET 3 OF 3



1 Canal RCHM 302**NGR TL 37640 00614**

The canal was constructed before 1783 and linked Horsemill and Millhead Streams. The eastern end has been dammed with steel sheet piles and the western end is approximately 85m from the new line of the Horsemill Stream. An area of reclaimed land lies in between. The canal was filled between 1974 and 1977. The canal has recently been excavated to remove the fill.

2 Ditch/Leat RCHM 500**NGR TL 37712 00807**

This narrow drainage ditch first appears on maps in 1827 but was probably excavated before that. It is unknown when it was filled, possibly the first half of this century. The western end has a concrete retaining wall which forms part of the bank of Millhead Stream. To the east the leat joins another recently excavated leat in area P. The vertical extent of the concrete is unknown but its condition appears poor.

3 Canal/Basin RCHM 501**NGR TL 37725 00860**

The canal was constructed between 1801 and 1827 and possibly linked Millhead Stream and the Old River Lea. By 1865 most of the canal had been filled leaving a short stretch at the Millhead end serving the store buildings to the west of the Administration Block A230 - 234. By 1886 it was shortened again and the mouth was widened to form a basin serving the store buildings and now a shipwrights shop on the south bank.

This basin survived up to the end of the Second World War. A concrete revetment wall was built over the mouth but this does not extend more than a metre down where it is founded on brick rubble. The position of the eastern opening, if it existed has not been located.

4 Canal RCHM 356**NGR TL 37735 00882**

The canal was constructed between 1801 and 1806. It originally formed a link between Middle Stream and the narrow perimeter ditch which ran along the eastern side of the site. By 1827 it extended eastward to link Middle Stream at Flagstaff Bridge with the Old River Lea opposite the Powdermill Lane Gate. The Last 20m was culverted to allow road access to the Lodge A221.

The canal was filled between 1927 and the beginning of the Second World War with demolition debris and ash/clinker possibly from the near by Power House A210.

At the western end there is a timber retaining wall made from railway sleepers set vertically. Although they appear to be in a fair condition the vertical extent is unknown. To the east a small culvert pipe was uncovered during recent excavations and the possible remains of the grill over the outflow was discovered on the banks of the Old River Lea.

5 Sluices RCHM 135**NGR TL 37650 00994**

The sluices were constructed in the late 18th early 19th Centuries, although the existing features may date to a rebuild in the mid 19th Century. They were constructed to control the water level of the elevated Millhead Stream and to provide foundations for the two Stamp

Mills. The Millhead Stream or canal was filled sometime after 1956 probably with the remains of the gunpowder mills which sat on each bank.

The fill can be seen tumbling out of the sluices into Hoppit Pool. There are no retaining structures.

6 Drain/Leat RCHM 299

NGR TL 37420 01961, 37714 00978

This narrow leat was constructed between 1806 and 1827 and ran parallel with Long Walk up to L105. The northern third remains as a dry ditch. In the lower section a slight scarp is the only indication of its position. This lower section may have been filled by the end of the First World War. No damming structure was found where the leat joins Middle Stream.

7 Canal RCHM 278

NGR TL 37810 01084

This branch canal was constructed between 1820 and 1830 and served the Charcoal Cylinder House and wood stacking yard and later the Gas Works and boat repair shop. The canal was filled in the late 1940s, it was re-excavated in 1993 and the end was dammed with rock filled gabbions.

8 Tail Race/Canal RCHM 301

NGR TL 37507 01200, 27588 01212, 37544 00988

This tail race, at a lower level to Millhead, served to take the water away from the mill races to Hoppit pool. The waterway was constructed before 1783, probably in the late 17th Century and was filled in the late 1940s early 1950s. there are no retaining features either at the sluices already described or at the intersection with Horsemill Stream.

9 Leat RCHM 355

NGR TL 37720 01283

This buried waterway runs roughly east west under Queens Mead connecting leat RCHM 299 and Middle Stream, passing under L148. It was constructed in the 1850s and was filled prior to the construction of L148 in 1888 - 9. The Middle stream is sheet piled for most of this stretch although it is difficult to exactly pinpoint the intersection.

10 Canal RCHM 296

NGR TL 37440 01770, 37517 01796

This is the location where the historic Millhead Stream swung into the site to power the gunpowder mills to the south. Now this spot represents the interface between the widened Horsemill Stream/Flood Relief Channel and Millhead Stream. Horsemill Stream was widened in 1971 -2, Millhead Stream was filled in the Late 1950s early 1960s. Again no damming structures were observed.

11 Mill Leat RCHM 502

NGR TL 37460 01455

This small race or leat served a glazing and dusting house (the remains destroyed during the widening of Horsemill Stream) which pre dates 1783 and was probably a mid to late 17th Century process building. We can assume that the leat is of the same date. There is no retaining structure at the Horsemill Stream end.

12 Lock RCHM 225**NGR TL 37630 01475**

Both the lock and the canal above it were constructed in 1878, part of a large expansion program carried out at this time. The lock joined canal RCHM 179 with Middle Stream. The lock survives empty and intact, the canal was filled soon after the Second World War. There are no revetment structures and the lock gates are too decayed to be used for this purpose.

13 Canal RCHM 156**NGR TL 37683 01600, 37645 01473**

This canal, part of the low level system links Middle Stream with the perimeter ditch and Long Walk Leat. It was most likely constructed in the 1880s/1890s. At the northern end it survives as a partially filled, dry ditch. To the south it is half filled with water and vegetation. It also contains the waterlogged remains of four gunpowder barges. This southern end is open to the Middle Stream.

**14 Ditch/Canal RCHM 181
37835 00980****NGR TL 37456 01586, 37670 011623,**

The exact location where the perimeter canal joined canal RCHM 300 (Middle Stream) is unknown. A close inspection of the banks under and adjacent to the road bridge showed no obvious damming features unless the concrete bridge abutments serve a dual purpose.

15 Ditch/Canal RCHM 181**(see above for Grid Ref.)**

This intersection was where the perimeter leat and the Long Walk leat linked up with Horsemill Stream, it also served as a race for a corning/granulating house dating to 1827. The leat survives as an earthwork for the most part but next to Horsemill Stream it has been buried by the arisings from the channel widening. Again there are no retaining structures visible.

16 Tail Leat (part of RCHM 294)**NGR TL 37420 01640, 37679 01693**

The canal RCHM 294 was constructed in 1806 to supply water to the Gunpowder Press House, the tail leat drained the water into the Old River Lea. The canal and the leat may have been filled in the late 1940s. Examination of the river bank where the leat entered the waterway did not show any damming structures.

17 Press House Canal RCHM 294**NGR TL 37420 01640, 37679 01693**

The western mouth of the 1806 canal again is banked over by the arisings of the dredging operation in the early 1970s. Examination of Horsemill Stream bank shows rubble tumbling out of the canal mouth unhindered.

18 Canal/Leat RCHM 297**NGR TL 37406 01750, 37438 01744**

This point, to the south of Edmonsey Sluice is the position of a mill leat powering a granulating house which was built before 1821. As with the previous two examples the mouth of this leat has been covered with river gravels but in this case the bank has steel pilings along it forming part of the sluice.

19 Leat RCHM 296**NGR TL 37440 01770, 37517 01796**

This leat was constructed between 1806 and 1827 and is now partially filled. It joined the main north south ditch RCHM 299 with the Old River Lea. This intersection has been bridged but there is no revetment.

20 Leat RCHM 295**NGR TL 37490 01952, 37513 01909**

This narrow leat probably linked canal RCHM 288 with the Old River Lea, perhaps acting as an overflow. It was built between 1850 and 1886 and now exists as an earthwork. There is no revetment.

21 Canal RCHM 288**NGR TL 37386 01972, 37530 01956**

Constructed between 1850 and 1886 this canal originally served the gunpowder drying stove 76. It was later incorporated into the high level system. It was filled completely by 1960 with the demolition arisings from the acid factory to the north. The interface with Horsemill Stream has no barrier or damming feature.

22 Culvert RCHM 183**NGR TL 37402 02066, 37426 02049**

This brick lined culvert or channel powered a granulating house to the north (now surviving as a slab) and fed water into a large pond to the south east. It was constructed between 1875 and 1895 and is now partially filled with rubble. Rubble and concrete blocks can be observed tumbling out of this feature, unchecked, into Horsemill Stream.

23 Leat RCHM 292**NGR TL 37586 02071, 37627 02088**

This leat powered the dusting house RCHM 275 which was built in 1879, it linked the main high level system with the Old River Lea. The foundations of the dusting house survive and the leat remains as an earthwork which opens out into the river.

24 Leat RCHM 293**NGR TL 37636 02094, 37680 021108**

Built in 1878 this leat served an undefined gunpowder process building and later, around 1920 a weighing house. To the west it survived as an earthwork, to the east it was filled with rubble and overlain with the present perimeter road. No revetment was observed at the interface with the Cornmill Stream.

25,26 Stove Canal RCHM 503**NGR TL 37410 02185, 37410 02240****27,29 Stove Canal RCHM 286****NGR TL 37400 02265, 37400 02317**

These positions represent the entrances of two semicircular canals which surrounded gunpowder drying stoves 27 and RCHM 274. They acted as a barrier and as a land drain, but also allowed barges to load and of load gunpowder to the two tray stove buildings on either side of the boiler houses. RCHM 274 dates from 1800 to 1820 and 27 dates to 1884. Prior to the construction of the stove RCHM 274 intersection 26 was the inlet for canal RCHM 291, built between 1801 - 1806 which linked Horsemill Stream with the press house

76. At the turn of the century a canal (RCHM 284) joined the same waterway, this time at the northern return opposite intersection 25. All of these canals were at least partially filled before the end of the First World War. None of them have adequate damming structures at the Horsemill Stream.

28 Canal/Leat RCHM 504

NGR TL 37620 02220, 37635 02270

This waterway powered the gunpowder granulating house 34 where the present S34 now stands. All that remains of this process building is a brick traverse. The leat was a short narrow channel running from the Cornmill Stream into Newtons Pool, nothing of it remains apart from a slight indentation in the bank of Cornmill Stream and some timber revetments. It was probably filled around the turn of the century when the building became a cordite mixing house.

30 Reclaimed Land

This area covers most of the land on the west of the site between the drying stove 27 to the Grand Magazine 1 at the tip of the site. As part of the canalization of Horsemill Stream in the early 1970s this part of the site boundary was straightened which involved reclamation. This resulted in two canals being sealed , RCHM 285 and 281. RCHM 28 is dammed with steel sheet piling the other has no visible retaining structure. The extent of sheet piling is shown on the maps as a thicker line along the boundary.

31 Canal RCHM 281

NGR TL 37558 02569, 37626 02523

This is the eastern end of the channel mentioned above. The waterway was originally a natural course which formed Paynes Island on which the Grand Magazine stands. It was later straightened and then filled between 1957 and 1960. As with the western end this opening has been dammed effectively this time with concrete piles.

32 Reclaimed Land

This is the very tip of the site and is now outside the boundary. Approximately 50% of the present area is reclaimed land where old waterways have been filled. All sides are steel sheet piled.



Canal Exit 1



Canal Exit 2



Canal Exit 3



Canal Exit 4



Canal Exit 5



Canal Exit 6



Canal Exit 7



Canal Exit 8



Canal Exit 9



Canal Exit 10



Canal Exit 11



Canal Exit 12



Canal Exit 13



Canal Exit 14



Canal Exit 15



Canal Exit 16



Canal Exit 17



Canal Exit 18



Canal Exit 19



Canal Exit 20



Canal Exit 21



Canal Exit 22



Canal Exit 23



Canal Exit 24



Canal Exit 25



Canal Exit 26



Canal Exit 27



Canal Exit 28



Canal Exit 29



Canal Exit 30



Canal Exit 31



Canal Exit 32