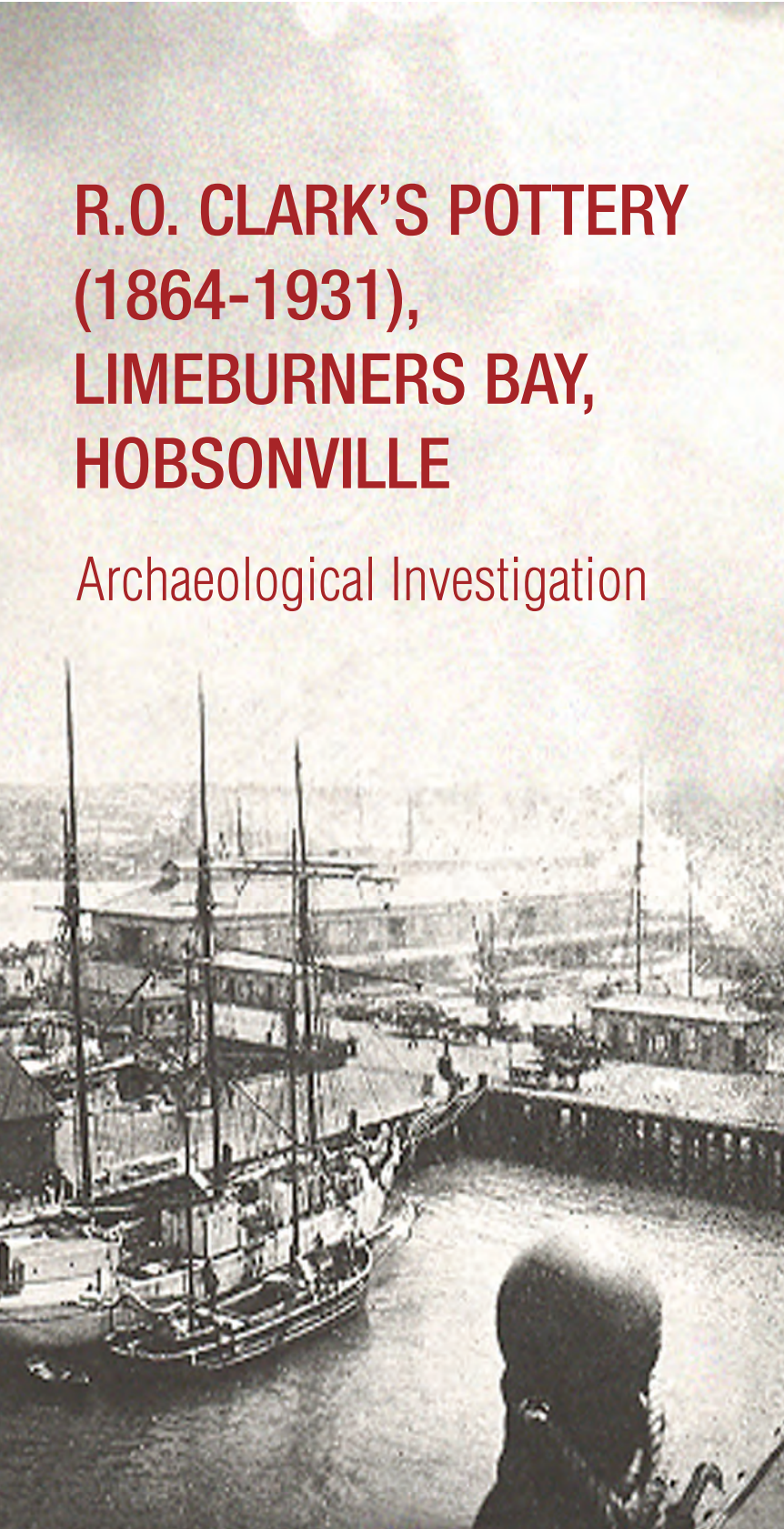


R.O. CLARK'S POTTERY (1864-1931), LIMEBURNERS BAY, HOBSONVILLE

Archaeological Investigation

Report on S18 investigation of
site R11/1508 in fulfilment of
NZHPT Authority No. 2005/355
prepared for
Hobsonville Residential Developments Ltd,
January 2008



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Developments Ltd

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January 2008

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INTRODUCTION

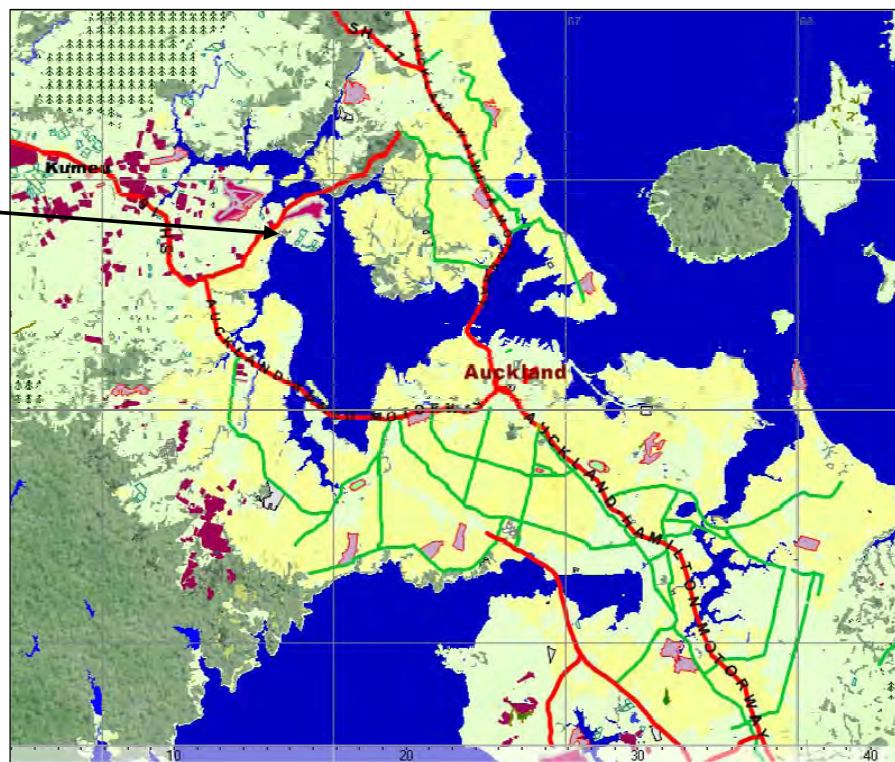
Limeburners Bay

Limeburners Bay in Hobsonville played a significant role in West Auckland's pottery and brickmaking industry in the 19th and early 20th centuries. It was the location of three brickworks and potteries, the most extensive of which was R.O. Clark's (1864-1931), the forerunner of Ceramco Ltd and the subject of this report. The whole of Limeburners Bay, which still has extensive industrial remains along and beside the foreshore, has been recorded as a single archaeological site (R11/1508). The Clark brickworks site is scheduled on the Waitakere City Council's District Plan (ref. no. 181) and on the Auckland Regional Council's Regional Plan Coastal (Schedule 1).

The other pottery works in the bay were Joshua Carder's (established c.1863) to the west of Clark's pottery, and the later Holland works (c.1904-9) between Clark's and Carder's. Also in the Hobsonville area were the Carder Brothers Point Pottery on Scott Point to the east (est. 1872) and Ockleston's (est. 1903) to the north (see Figure 2).

This report presents the results of an investigation of the Clark brickworks and pottery carried out under a Section 18 Authority (no. 2005/355) from the NZ Historic Places Trust.

Figure 1.
General location
map,
Limeburners Bay
arrowed



Continued on next page

INTRODUCTION, CONTINUED



Figure 2. Map showing the locations of Clark's, Carder's and other potteries in the Hobsonville area

1. R.O. Clark (1864-1931)
2. Joshua Carder (c.1863-76); C.F. Vazey (1874-88); Carder Bros. (1888-1929, but perhaps not operational until 1903)
3. Robert Holland (1904-09); R.O. Clark (1909-c.1931)
4. Carder Bros. Point Pottery (1872-76); Dowden Point Pottery (1878-81); Cater (1881-83); Auckland Brick & Tile Co. (1883-87)
5. J. & W. Ockleston (1903-09); Ockleston branch of R.O. Clark (1909-c.1914)

(Based on information from Eaves 1990: chapter 6)

Continued on next page

INTRODUCTION, CONTINUED

Background to the Investigation

Options for the preservation of the industrial remains in Limeburners Bay were first considered by the New Zealand Historic Places Trust (HPT) in 1987 because the landowner at the time, Mr Reg Banning, intended to subdivide and develop the area. The bay was inspected by Drs Rod Clough and Simon Best (advisers to the HPT) and Dave Reynolds of the HPT (Department of Conservation file CHI 047). It was agreed that preservation efforts should be focussed on the remains of Carder's brickworks, which were still partially intact. The Clark pottery remains had been largely levelled and were considered to have little potential for preservation and presentation to the public.

The Clark brickworks site had been partially bulldozed prior to 1966, when Jack Diamond recorded the visible remains (see Figure 27 to Figure 29 below). It had 'again been bulldozed successfully' by 1978 when Diamond made a return visit (JTDC 2003: 1298). Further extensive bulldozing was carried out by Mr Banning between 1987 and 1989 (R. Clough, pers. obs.), when a second visit was made by Rod Clough. This visit was undertaken at the request of the Department of Conservation (DOC) acting on behalf of the HPT, and the brief was to determine which areas merited preservation and which could be developed by Mr Banning. Mr Banning was subsequently advised that provided the Carder site was preserved the remainder of the property, including the site of the Clark pottery, could be developed (DOC file CHI 047, letter 19 May 1989).

All of this occurred before the property was sold to its present owners, Hobsonville Residential Developments, in 2006. Hobsonville Residential intend to subdivide the area around the Clark brickworks. At the time they acquired the property it was covered in weeds, brick rubble from the bulldozed kilns, and a great deal of dumped material including old car bodies and other recent rubbish. Hobsonville Residential carried out weed removal and rubble clearance on the site in October 2006, in the course of which they exposed and partly damaged the intact base of a kiln. Work was therefore halted by Hobsonville Residential, who asked Clough & Associates to prepare an archaeological assessment (Clough 2006). The assessment concluded that the majority of visible remains on the site would be of 20th century date, but that it was possible that some pre-1900 foundations were present. It was recommended that the subdivision avoid the site of the Clark works, and that the proposed development should incorporate links with and access to the Carder brickworks as part of a heritage trail through the area, a suggestion which Hobsonville Residential were happy to consider.

Continued on next page

INTRODUCTION, CONTINUED

Background to the Investigation, *continued*

Following the exposure of the kiln both Waitakere City Council and the HPT commissioned independent damage reports (Geometria 2007; Felgate 2006). Both reports appeared to conclude that the remains, and in particular those damaged, related to the pre-1900 period (contrary to Clough 2006), and there were some disparities between the two damage reports regarding the location of 19th century features.

The date of any archaeological remains impacted on by Hobsonville Residential was a significant issue as damage to pre-1900 archaeological remains is an offence under the Historic Places Act 1993.

During subsequent discussions over the future of the Clark pottery site, involving Hobsonville Residential, Rod Clough of Clough & Associates, Alina Wimmer of Waitakere City Council and Bev Parslow of the HPT, it was agreed that an investigation of the site under Section 18 of the Historic Places Act would be appropriate. The purpose of the investigation was:

- a) to define the extent of the site and its surviving features as the basis for its future protection and the development of a landscape plan;
- b) to carry out further research to establish the date of different site elements; and
- c) to resolve any inconsistencies between the reports produced to date (Clough 2006; Geometria 2007; Felgate 2006).

Methodology

Previous literature relating to the Limeburners Bay potteries and brickworks was reviewed. This included earlier historic research carried out for Clough & Associates by Tania Mace during the development of the Waitakere City Council Conservation Plan for the Joshua Carder pottery. Additional archival research was also carried out. The J.T. Diamond Collection (JTDC 2003) in the Waitakere City Central Library in Henderson was a particularly useful source of information as Jack Diamond spent over 50 years researching and recording the history of West Auckland, and in particular its industrial sites. His collection was deposited in the library in 2003. Early plans and photographs of the Clark works were studied in detail.

A geophysical survey of the site was carried out by Matt Watson of Scantec Ltd between May and August 2007, using Ground Penetrating Radar (GPR), Conductivity and Gradiometer GSM equipment.

Continued on next page

INTRODUCTION, CONTINUED

Methodology, *continued*

The archaeological investigation was carried out subsequently (October 2007). Heavy machinery was required to shift the large quantities of brick and concrete rubble resulting from previous bulldozing of the site, some but not all of which had been shifted and stockpiled by Hobsonville Residential. When features were exposed they were cleaned down and excavated out manually. Not all areas were exposed, and substantial piles of rubble are still present on the site. However enough of the archaeological remains were exposed to confirm the layout of the site and inform the landscape plan.

Two trenches were dug at right angles to the foreshore in areas where there were no substantial remains, in order to establish the extent of the reclamation that has occurred, and to provide information on the reclamation process and materials used.

Archaeological features were mapped using a total station EDM and a detailed photographic record was made. Samples of bricks and other artefacts were retained for analysis.

Investigation Team

The investigation was directed by Rod Clough and Mica Plowman (field directors). Barry Baquié, Ben Thorne and Colin Sutherland comprised the rest of the excavation team, and Ben and Colin undertook total station mapping of the exposed archaeological features. Hobsonville Residential provided a machine operator and a team of labourers (Allied Workforce) to clear the overlying rubble so that archaeological features could be investigated.

HISTORY

The Ceramics Industry in Auckland

[The history presented below is partly drawn from material compiled by Clough & Associates (Tania Mace and Rod Clough) for the Waitakere City Council's Conservation Plan for the Carder pottery].

The clay industries played an important role in the early settlement of Auckland and in establishing its industrial basis. Limeburners Bay was the scene of one of Auckland's largest and longest lived heavy clay industries, spanning the period 1863-1929 (Eaves 1990; Scott 1979). The Bay is associated with a number of industrialists and entrepreneurs of the 19th century. Clark's and Carder's brickworks were the major works, but Holland and Vazey (part of the Carder Works) also operated in the Bay for shorter periods. Most of Auckland's c.80 brickworks have vanished without a trace and only the Pollen Brickworks and Burke brickworks on the Whau have been investigated in any detail (Best and Clough 1988; 1998).

In the early 1860s, the local ceramics industry was still in its infancy. Although bricks had been produced in Auckland from as early as 1841, production had not benefited from advances in technology (Eaves 1990:63). This was the era of the hand-made brick. Brickmaking was a relatively simple process which could be carried out anywhere with a supply of clay. During the early years of Auckland's history, bricks for some construction projects, for example Partington's Mill, were made directly on the site of the new building from local clay (Eaves 1990: 48).

In 1865 the *Auckland Weekly News* offered encouragement to anyone considering going into brick and tile production:

'There is still a vast field of enterprise lying waste, and if the right men could be found to enter into our requirements we believe the colony might soon be rendered independent of many of the importations which are necessary in our present condition.' (AWN 7.1.1865: supp. p.3)

While bricks were being produced locally, other domestic and more ornamental wares were almost unknown. Julius Vogel recorded of Auckland in 1875 that:

'good clay for bricks exists in many parts of the Province, and brickmaking is carried out extensively. Pottery clays have so far been applied only to the coarser kinds of ware such as drain pipes, &c.' (Vogel 1875: 247)

Vogel was clearly unaware of the domestic ware produced by James Wright, a Staffordshire potter. By 1865 the first New Zealand made commercial crockery had emerged from Wright's kiln (Diamond 1992: 45). It is unlikely that there were many potters who had the skills and inclination to produce such wares at this time.

Continued on next page

HISTORY, CONTINUED

Hobsonville Brickworks and Potteries

By 1867 there were at least 12 brick and tile manufacturers in Auckland including two at Hobsonville (Eaves 1990: 20). Hobsonville was a good location for the ceramics industry. Though clays suitable for pottery were well distributed in the Auckland area, the wide band of clay stretching from New Lynn to Hobsonville had the advantage of being easily accessible. It was also substantial enough to support a long term industry, so it was worth while investing in labour saving equipment (Eaves 1990: 38). Steam power was first harnessed by Walter and George Carder at their Waitemata Pottery at Scott's Point, Hobsonville (Eaves 1990: 79; Madden 1966: 62). Others, including Clark, followed the Carders' lead and over the coming years the industry was to develop and grow extensively.

Rice Owen Clark had bought land at Hobsonville in 1854 and became the first European settler in the district. Finding his land too wet to farm efficiently, Clark began digging the clay on the land and forming crude drainage pipes as early as the 1850s. Local demand for the drain pipes arrived with new settlers (Ceramco 1979: 3; Eaves 1990: 87). The Clark pottery focused on the production of bricks, tiles and pipes.

Joshua Carder arrived in New Zealand in September 1863 and soon after he was producing pottery at Hobsonville, his wife and sons arriving to join him in 1865 (Smithies 1983; Madden 1966; Scott 1979). The skills he had gained in Staffordshire set him up well for production in his new country. He had plaster moulds for press moulding ornamental pieces including sporting scenes and sheaves of wheat (Luckens n.d.: 2). He no doubt made use of these moulds as well as producing more functional wares.

Joshua Carder's sons, Walter and George, set up their own pottery in 1872 (the Waitemata Pottery) at Scott's Point on the edge of Limeburners Bay. However in 1879 they sold to Walter Dowden and returned to Joshua Carder's pottery (Eaves 1990: 100). Two years later they set up a pottery at Ponsonby and George Vazey (Carder's apprentice and son-in-law) took over the operation of Joshua Carder's (AWN 10.5.1879: supp. p.2).

The two other brickwork/pottery sites in Hobsonville were J. & W. Ockleston on the Whenuapai side of the Waiarohia inlet, established in 1903, and Robert Holland, which set up between Carder's and Clark's works in 1904. Both had been taken over by Clark's within a few years. (Smithies 1983; Eaves 1990; Ockleston 1952). (See Figure 2).

A by-product of pottery manufacturing at Hobsonville was lime. This was produced by stacking sea shells onto the kilns during firing. The heat powdered the shells into lime which was used as mortar in brick construction. It is likely that both Carder and R.O. Clark produced the lime for which the bay was named (Goodall 1965).

Continued on next page

HISTORY, CONTINUED

Land Ownership at Hobsonville

Eaves (1990: 89-97) provides a history of land ownership relating to the Hobsonville brickworks and potteries. Figure 3 shows the original Crown Grant blocks (2, 12, 21, 22 and 24) and the later subdivision boundaries within blocks 2 and 24.

Rice Owen Clark was granted block 21 (139 acres) on 4 July 1854, and did not acquire the land on which the Clark Pottery was built (on block 12) until the 1870s. He acquired part of the land (lots 1, 2 and part of 3 on Figure 3) in August 1871, and the remainder of lot 3 with lot 4 in 1877. Clark's earliest attempts at pipe and brick production would have occurred to the west, on Clark's farm (block 21).

Joshua Carder did not own the site of his pottery initially either. The later Carder Bros. works were located on lots 7 and 8 of block 2 (a 1928 plan SO22195 shows the location of the pottery on these lots, and the remains are visible today). Joshua Carder acquired inland lots 17 and 46 in February 1866, lot 9 in January 1873 and lot 8 in August 1873. Carder's son-in-law C.F. Vazey, who owned the Carder works (or works immediately adjacent to them) from 1874 to 1888, acquired lots 6 and 7 in 1881. These passed to the Carder Bros. in 1888.

It appears that both Clark and Carder may initially have set up their potteries on land leased from the owner of block 2, Peter Robertson, acquiring the land some years later.

Lot 5, the site of the Holland works, later taken over by Clark, was acquired by Robert Holland in July 1902 and passed to Clark in 1909.

R.O. Clark's Pottery

Rice Owen Clark began to make handmade field tiles to drain his farmland in the 1850s, subsequently investing in a small tile making machine from England in the early 1860s (Ceramco 1979: 3; Scott 1979: 99). The official establishment date of the R.O. Clark's pottery was 1864 (Clark's 1906 Price List; Brett's Almanac 1907). Ockleston (1952) states that R.O. Clark's son Edwin, with a Mr Berry, took up the pottery business, producing bricks, tiles and pipes, but when they ran into financial difficulties R.O. Clark took over the business again. As Clark, who arrived in New Zealand in 1841, did not marry until 1849 (North 2000), this was presumably towards the end of the 1860s as his eldest son would have been no more than 14 or 15 in 1864, the official establishment date. Another son, R.O. Clark junior (1855-1905, see Figure 4) joined his father in 1876 at the age of 21 and had rather more success, gradually taking over management and greatly expanding the business. (Eaves 1990: 108-9; Smithies 1983; Ockleston 1952; Scott 1979: 102; Ceramco 1979: 3).

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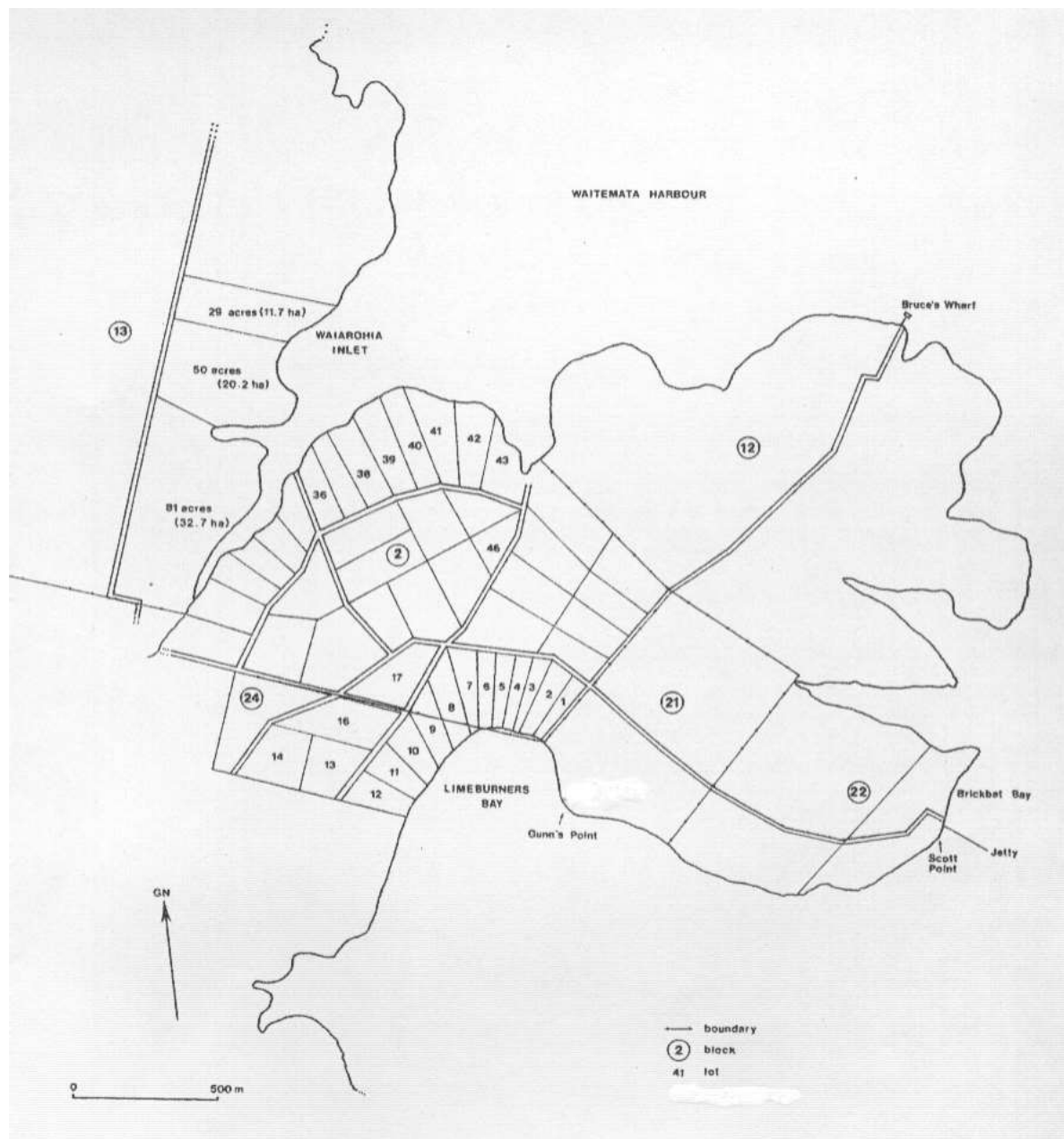


Figure 3. Plan showing the original Crown Grants in the Parish of Waipareira (circled numbers) and subsequent subdivision (after Eaves 1990: figure 6.2)

Continued on next page

HISTORY, *CONTINUED*

R.O. Clark's Pottery

The extent of Clark's and the other pottery works in Limeburners Bay in 1879 is described in the *Auckland Weekly News Supplement* (10 May, p.2):

'Of these establishments [Auckland pottery works], the five principal are: Boyd's, at Newton: Carder's, at Ponsonby, ... and Dowden's, Clark's and Vasey's, at Hobsonville. ...The pottery works at Hobsonville Point are owned by Mr Dowden ... there are nearly twenty employed...

In Mr Dowden's establishment the mills are driven by steam power...

Mr Clark's establishment is a few chains west of Mr Dowden's, on the banks of a tidal creek, where there is a large stock of pipes ready for burning, and every appliance for making and finishing for the trade. Mr Clark drives his machinery by horsepower and has one kiln the product of which has met with a ready sale in Auckland and the South.

Mr Vasey's [later Carder Bros.] works are in close proximity, and similar in character, the produce of his manufactory also finding a ready sale Mr Vasey has just completed a new kiln.

Mr Dowden's is the most extensive, Mr Vasey's the least, while Mr Clark's is the oldest establishment, but each, is well furnished with sheds and kilns on the most approved principles, built of the best brick made on the premises. The chimney stacks are from 70 to 80 feet high, forming quite a feature in the otherwise almost unproductive district, which, with but little exception, is uncultivated.' [transcribed in North 2000]

In 1879, then, Clark did not have steam power, and had only one kiln in operation. The Clark Pottery is shown in a plan of 1881, within two years of this description. It is fairly small compared with the later extent of the works and the size is consistent with an operation of the scale described in the newspaper. (Figure 5 and Figure 12).

It cannot have been long, however, before the Clark pottery also acquired steam power, as by 1885 R.O. Clark's works were able to manufacture 60,000 bricks per week (Thornton 1982: 115; Bretts Almanac 1886). Under R.O. Clark junior's management an office in Customs St West was opened in the 1880s (Scott 1979: 106), and the pottery acquired its own boat (the *Lady of the Lake*) to transport its wares to the city in 1883 (Smithies 1983; Scott 1979: 106).

Continued on next page

HISTORY, CONTINUED

R.O. Clark's Pottery, *continued*

However, while the product was available, the market was not. The New Zealand economy experienced what became known as the 'Long Depression' between 1878 and 1895, and in 1888 the building industry collapsed (Eaves 1990: 22-3; Scott 1979: 106). Few of the new firms that were established in west Auckland during the early 1880s survived more than a few years (Scott 1979: 103). Financial hardship meant that Vazey was no longer in business – in 1888 the pottery was purchased by Carder Bros. & Co. It seems that this site was left idle for some years while Carder Bros. & Co. continued working at their Ponsonby premises (Eaves 1990: 100). Dowden's works at Scott Point ceased production in 1881, and its two successors lasted only another 6 years between them, the pottery closing in 1887 (Eaves 1990).

Clark's pottery, however, under the management of R.O. Clark junior, weathered the depression by concentrating on pipe production and by 1898 was boasting that it was the largest pottery works in the country (Scott 1979: 108). Clark's was awarded *'the only First Prize and Gold Medal at the Auckland Exhibition, 1898 and 1899, for Glazed Socket Pipes, Bends, Junctions, Syphons, and Cesspits ... Awarded Special Gold Medals, Auckland Exhibition 1896 and 1897'* (AWN 21.7.1899: 47; JTDC 2003: 1298, advertisement).

R.O. Clark junior embarked on an innovative experiment, building himself an impressive two storey house called Ngaroma (Clark House) out of oblong ceramic blocks (Figure 6, Figure 7). The house took about 5 years to construct (c.1897-1902) and Clark hoped that this new construction material would catch on. However, although a few houses in Hobsonville and elsewhere used the blocks, the material did not become popular. (Scott 1979: 110-12; Smithies 1983).

**Figure 4. R.O.
Clark junior
(from R.O.
Clark's 1906
Price List)**



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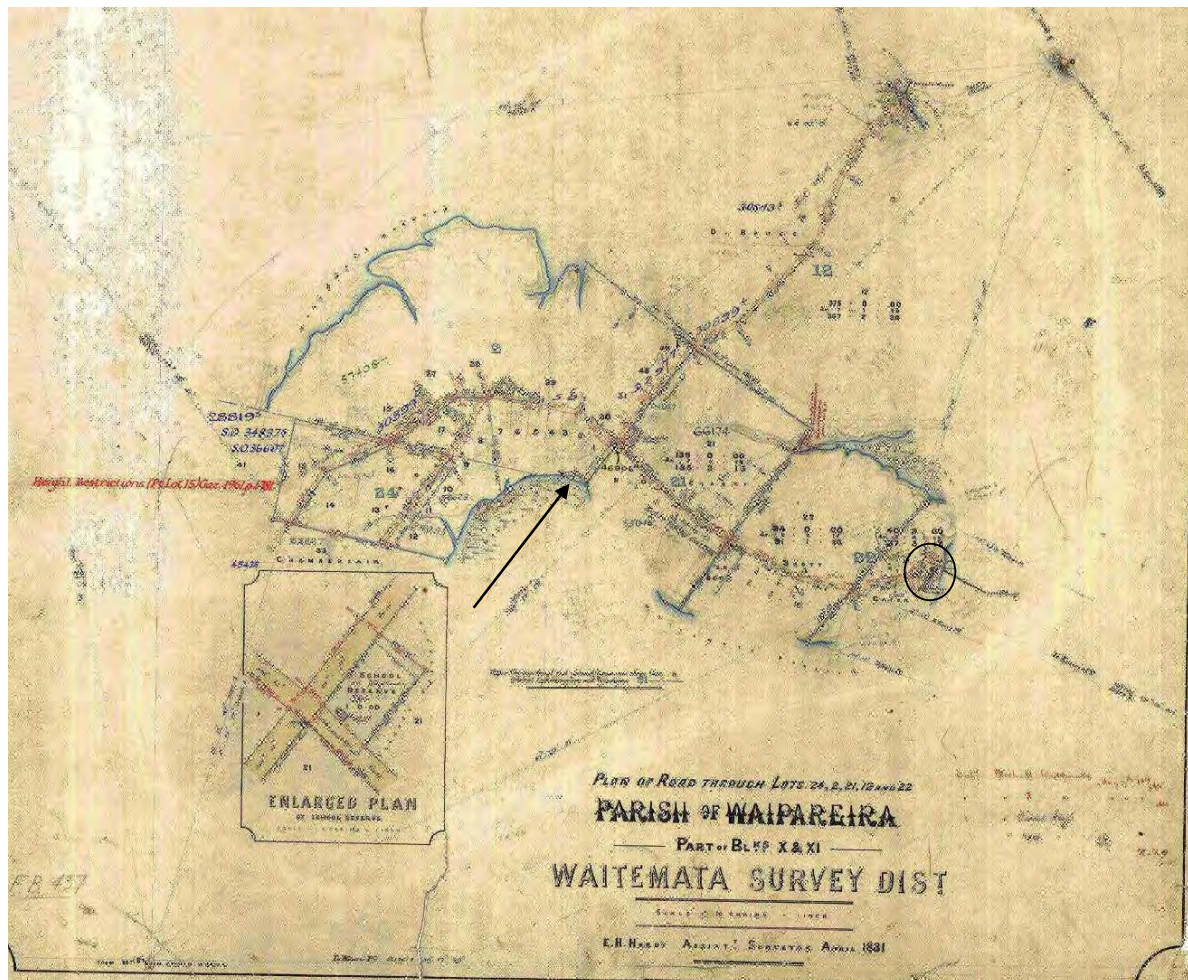


Figure 5. SO2598, ‘Plan of Road through Lots 24, 2, 21, 12 and 22 Parish of Waipareira’, dated April 1881, showing the location of the brickworks in 1881 (arrowed). A close-up of the area of Clark pottery works is shown below in Figure 12. The plan also shows the location of the Point Pottery (circled), but not that of the Carder works to the west

Continued on next page

HISTORY, CONTINUED

Figure 6.
Ngaroma – Clark
House (from
R.O. Clark's
1906 Price List)



R. O. Clark's Private Residence, Hobsonville.—Foundations, walls, and partitions built entirely of squares (No. 134)

Figure 7. Clark
House today



Continued on next page

HISTORY, CONTINUED

R.O. Clark's Pottery, continued

The Long Depression was over and the early 20th century saw considerable investment in and expansion of the Clark pottery works. The *Auckland Weekly News* (1903, Thurs. 5 March) reported that:

'Mr R.O. Clark has successfully erected a new pipe machine in his pottery. Messers Carder Bros Pottery is now in full work, the busy hum of machinery of the two potteries make Hobsonville quite lively.'

A few months later (3 September. p.35) the same paper reported that:

'Extensive improvements are being made in R.O. Clark's pottery. A new boiler and modern appliances to various parts of the machinery make this factory one of the most complete north of Auckland.'

R.O. Clark junior died in 1905, and the works were taken over by his sons Thomas Edwin Clark (1887-1964) and Rice Own Clark III (Eaves 1990: 111; Scott 1979: 112) (see Figure 8). The works continued to expand under their management, with photographs showing the construction of two new chimneys between 1905 and 1908 (see next section). Company advertisements at around this time are shown in Figure 9 and Figure 10.

A registered company (R.O. Clark Ltd) was formed in 1908 (Eaves 1990: 111). R.O. Clark III left the company to T.E. Clark's management in 1909, and despite competition from other potteries established in the early 20th century, the company continued to expand. Clark's had taken over both Holland's and Ockleston's potteries by 1909 (Eaves 1990: 111), and Clark's Patent Block Ltd was established at Holland's in that year to produce the ceramic blocks used in the construction of Clark House (Scott 1979: 129). A complete remodelling of the central part of the works had been completed by the start of World War I (see next section).

Competition and Cooperation

In the early 20th century, a number of new potteries were established producing similar wares to Clark's. J.J. Craig set up his works in west Auckland with ambitions to reach production of 200,000 bricks per day (Scott 1979: 117). The Gardner brothers, descendants of R.O. Clark, joined W.J. Parker in New Lynn in 1902 (JTDC 2003: 1292 & 1293 BNE). Albert Crum, who had run a successful brickworks at Ashburton, set up a large pottery in New Lynn in 1905 (Scott 1979: 118-19). These were just some of the 26 brick, tile and pottery works operating in the Auckland province in the early 20th century (NZ Official Yearbook 1907: 268). Competition was hot in the trade. A fierce price war ensued with prices plummeting. Recognising that consumers were the only victors from this price war, R.O. Clark negotiated a trade agreement in 1906 with Carder Bros & Co. and seven other rivals. This agreement set the price for the various goods produced (Scott 1979: 125).

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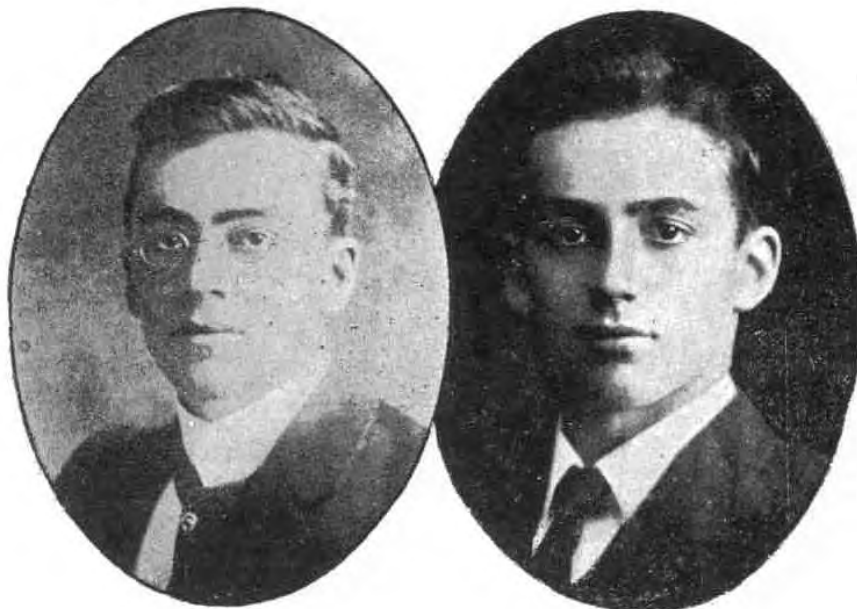
HISTORY, CONTINUED

Competition and Cooperation, *continued*

Further co-operative agreements followed. Four of the larger firms agreed not to compete with each other in tendering for local body contracts. R.O. Clark along with Carder Bros & Co. was awarded a 3/8 share of these tenders. In 1907 R.O. Clark, Carder Bros & Co., J. & W. Ockleston and the Avondale Brick and Pottery Company, set up a central office for orders in the Auckland province. The office was called the Auckland Sanitary Drain Pipe Company and R.O. Clark gained 8/16 of the trade which it brought in, with Carder's allocated 5/16, J. & W. Ockleston 2/16 and J.J. Craig 1/16 (Scott 1979: 126).

Figure 8. R.O. Clark junior's sons Rice Owen and Thomas Edwin Clark (from R.O. Clark's 1906 Price List)

Two sons of the late Mr. R. O. Clark, who are, and for several years past have been, managing the business.



MR. R. O. CLARK
Business Manager

MR. T. E. CLARK
Factory Manager

Continued on next page

HISTORY, CONTINUED

R. O. CLARK

Drain Pipe Manufacturer.

ALWAYS ON HAND—A Large Stock of MEDIUM QUALITY PIPES, which can be supplied on short notice at Low Rates.

THE QUALITY OF CLAY FROM WHICH THESE PIPES, ETC., ARE MADE IS UNIVERSALLY RECOGNIZED AS THE BEST IN NEW ZEALAND FOR POTTERY PURPOSES.

Special Quotations to Road Boards, County Councils Etc.

TOWN YARDS AND OFFICE:—

Customs St. West, Auckland

Orders forwarded to above Address will be punctually attended to.

WORKS: HOBSONVILLE.—The Works being alongside water, special quotations can be given for Exportation. Vessels loaded with despatch.

DESCRIPTIVE CATALOGUES ON APPLICATION.



Telephone 559.

Manufacturer of SOCKET PIPES (in all sizes), BENDS, JUNCTIONS, SYPHONS, CESSPIES, Etc., generally acknowledged to be

The Best Pipes in New Zealand


R. O. CLARK was awarded The Only First Prize and Gold Medal at the Auckland Exhibition, 1896 and 1897, for Glazed Socket Pipes, Bends, Junctions, Syphons, and Cesspits.

The Judges report: "We consider this a particularly good and excellent exhibit of its class."

Awarded Special Gold Medal, Auckland Exhibition 1896 and 1897.

Figure 9. R.O. Clark advertisement, early 20th century (source not stated, copy in JTDC 2003: 1298)

ABSOLUTELY UNRUSTABLE and EVERLASTING



R. O. CLARK, Ltd.

Capital, 100,000 Shares of £1 each.

THE LARGEST GLAZED SANITARY DRAIN PIPE MANUFACTURERS IN AUSTRALASIA

ENGINEERS—See full details of the latest thing in WATER and GAS PIPING for mains and distributing mains, as now being used by the New Zealand Government, and in Auckland, Wellington, Timaru, Dunedin, etc.

CLARK'S PATENT GLAZED STONEWARE HYDRAULIC PIPES and SOCKETS

STAND UP TO 400lb. PER SQUARE INCH INTERNAL PRESSURE.

All Enquiries and Orders address to Head Office: ENDEAN'S BUILDINGS, QUEEN STREET, AUCKLAND.

Chief Pipe Depot: CUSTOMS STREET WEST, AUCKLAND.

Have you seen our new Patent Stoneware Building Blocks? Absolutely the best building material on the market. Write for illustrated catalogue.



Motto: "PROGRESS."
Telegraphic Address: "SANITARY," AUCKLAND.
Phones: Office: 935
Pipe Depot: 559.

Established 1864.
Incorporated 1908.

The following table shows that the PATENT STONEWARE HYDRAULIC PIPES have the advantage of being about 45% CHEAPER than the thick cast iron pipes, which, in many soils, are completely carbonized, and useless within ten years. Case in point.—The low-lying parts of Dunedin, where iron pipes only last seven or eight years. In any case iron pipes have to rely solely on the asphalt covering to prevent corrosion, while the whole body of the stoneware pipes is unrustable and undecayable, being absolutely as good in fifty years as when they were put down.

Free samples of Hydraulic Pipes and Sockets on application, when same will be put L.O.B. steamer or train Auckland.

IRON PIPES.			PATENT STONEWARE HYDRAULIC PIPES.		
Size.	Thickness.	Cost per foot.	Cost per foot, including necessary Sockets.	Thickness.	Size.
3in.	1in.	1 1/4	1 1/4	1 1/2in.	3in.
4in.	1 1/4in.	1 3/4	1 3/4	1 3/4in.	4in.
5in.	1 3/4in.	2 1/4	2 1/4	1 3/4in.	5in.
6in.	2in.	3 1/4	3 1/4	2in.	6in.
7in.	2 1/4in.	4 1/4	4 1/4	2 1/4in.	7in.
8in.	2 1/2in.	5 1/4	5 1/4	2 1/2in.	8in.
9in.	2 3/4in.	6 1/4	6 1/4	2 3/4in.	9in.
10in.	3in.	7 1/4	7 1/4	3in.	10in.
11in.	3 1/4in.	8 1/4	8 1/4	3 1/4in.	11in.
12in.	3 1/2in.	9 1/4	9 1/4	3 1/2in.	12in.



MR. R. O. CLARK,
Managing Director.

MR. T. E. CLARK,
Director.

Figure 10. R.O. Clark advertisement (NZ Christmas Geographic 1908: p.39, copy in JTDC 2003: 1298)

Continued on next page

HISTORY, *CONTINUED*

The End of Production at Limeburners Bay

By the late 1920s the clay at Limeburners Bay had all but run out and the cost of transport from Hobsonville was becoming even more of a hindrance. But Tom Clark of R.O. Clark Ltd had masterminded his next move, and negotiated a merger of the west Auckland ceramics industries. Carder Bros & Co, along with Archibald Bros, were purchased and closed down while the Amalgamated Brick and Pipe Company was formed by merging R.O. Clark Ltd, the New Zealand Brick, Tile and Pottery Co. Ltd, Gardner Bros and Parker Ltd and the Glenburn Fireclay & Pottery Co Ltd (Scott 1979: 133). Production was centralised at New Lynn and R.O. Clark's works were subsequently dismantled, along with Carder's (Eaves 1990: 98, 114). The end for Carder's came in 1929 and for Clark's 1931 (Smithies 1983: Eaves 1990: 98, 108). Thus ended nearly seven decades of pottery making at Limeburners Bay.

THE POTTERY WORKS

Introduction

Successful and long established potteries such as R.O. Clark's are dynamic concerns which undergo considerable change over time as new technology and machinery are introduced, facilities expanded and existing kilns repaired and replaced.

The Clark's pottery at Limeburners Bay underwent considerable expansion during its almost 70 years of operation, some of which would have been unrecorded. A number of photographs and an early plan, however, are available and these, in conjunction with archival information, allow a broad reconstruction of the extent of and changes to the pottery works from the late 1870s until their closure in 1931.

Photographs

A detailed analysis of the available plans and photographs was carried out as part of the investigation. Some of these photographs have been reproduced or archived without a source or date being given, which has resulted in speculation regarding the extent of the pottery in the 19th and 20th centuries (Geometria 2007: 8-11; Felgate 2007: 5-12).

In fact the majority of the available photographs of the Clark works derive from 'R.O. Clark's Illustrated Price List' (Figure 11), a copy of which is held in the Waitakere City Central Library (JTDC 2003: 1298). Although the catalogue itself is undated, it includes testimonial letters dating to 1905 and makes reference to the 'Scale of Measurement of Pipes used by U.S.S.C. Co. and N.S.S. Co., 1905'. The date of the Price List is usually given as 1906 (Scott 1979). The catalogue includes some of the wares produced by the Carder Bros, and includes some identical photos to those found in a similar Carder Bros. price list (JTDC 2003: 1300 BNE). The R.O. Clark price list relates to the period of the 1906 trade agreement between R.O. Clark, Carder Bros. and seven other firms, and 'was used to base the prices of all the products produced by nine firms as far south as Lake Taupo' (Eaves 1990: 111).

The 1906 price list includes both interior and exterior views of the pottery works, and illustrations of its products. The photographs can be assumed to be contemporary, showing the current extent of the works in 1906, and after the major improvements to the works recorded in 1903 (see previous section). Clark House (completed in 1902) is shown in the background to some of the photos, and the photos show what is clearly a new (unsooted) chimney in the centre of the works. This presumably relates to the remodelling of this area for the new boiler and pipemaking machinery installed in 1903.

Comparison between these and other photos allows a reasonable relative chronology of the layout of and changes to the pottery works to be established. The photographs are shown in shown Figure 14 to Figure 26 in chronological order, and the details are discussed below.

Continued on next page

THE POTTERY WORKS, *CONTINUED*

Figure 11. The cover of R.O. Clark's 'Illustrated Price List of Goods Manufactured at Hobsonville Pottery, Auckland, New Zealand' (1906)



Continued on next page

THE POTTERY WORKS, *CONTINUED*

1881 Plan

The 1881 survey plan (Figure 12, enlarged from Figure 5) shows Clark's pottery as a rectangular shaped structure oriented approximately northwest to southeast, with a small addition on the western end. It is set back slightly from the shoreline, shown prior to the reclamation of the foreshore evident from modern cadastral plans (Figure 13). The overlay, in conjunction with an analysis of the layout of the works based on photographic information (see below), indicates that the building would have occupied about half the length of the structures shown in a 19th century photograph taken by Richardson (Figure 14), and was located to the rear of them.

The damage report carried out for Waitakere City by Geometria suggests that 'Due to the large scale of the original map this position has a low level of accuracy. It is quite possible that the position of this building is further to the south-west of the original map' (Geometria 2007: 14). Felgate, in his damage report for the HPT, makes a similar suggestion, based on the assumption that the early building was one of the structures shown in the 19th century Richardson photograph, and has overlaid the structure in a position further to the southwest in his figure 51 (Felgate 2006).

However, structures drawn on early survey plans are often reasonably accurately located, and shifting it to the southwest within the area of the buildings recorded on the 19th century photograph would place it partly in the reclamation, which had not yet been undertaken. It would also move it further away from the road defining the eastern boundary of the pottery works. There is near contemporary archival evidence confirming that the works were not only close to the road on the east of the works but had in fact encroached onto it. In March 1882 the *Auckland Weekly News* (18 March p.21) reported:

'Mr Clark ... has raised quite a commotion by closing a road through his property, that has, so I am informed by other old settlers, been used by them for the last 21 years [this was the road to the church, the land for which had earlier been given by Clark]. ... Mr Smythe, the Chairman of the County Council ... called on Mr Clark, and tried to arrange with him about opening the road. It is reported that the only terms that Mr Clark would come to were that he would open the road if the Council would allow him to close another public road running between his farm and his pottery, a road of equal importance to the district, part of which road he is at present utilising as a portion of his pottery works, the end facing the water being occupied by a brick kiln, coal shed, and general storage for pipes....Mr Clark's proposition was ... unanimously declined...' (transcribed by Jack Diamond, JTDC 1298, our emphasis)

Continued on next page

THE POTTERY WORKS, *CONTINUED*

1881 Plan, *continued*

However, it is not clear whether this encroachment was of recent occurrence, as part of the expansion of the early 1880s, or a longer standing situation. In any event, the works are always likely to have been located close to the road for ease of access.

A month later the topic was still a hot one:

'The meeting also discussed the means that ought to be adopted to prevent the further destruction of the public road leading to Mr Clark's pottery and the creek. The lower portion of this road Mr Clark is cutting away to the depth of 5 or 6 feet and utilizing the clay in the manufacture of drain pipes. It was unanimously agreed that the chairman communicate with Mr. Clark, requesting him to remove all obstructions on this road, and fill in the cuttings or proceedings would be taken against him. A settler informed the meeting that he had remonstrated with Mr. Clark, telling him that he had closed one road from his residence, and was now destroying a public road that saved him a mile walking daily in attending his duties. The answer that he received from Mr. Clark was, that he supposed he knew what remedies to take and advised him to take them.' (AWN 15.4.1882: 20)

No further references to Clark's use of the road were made in the *Auckland Weekly News* for the rest of that year, and Clark appears to have continued to have used the public road for his own purposes, as the site investigations and plan overlays confirm (see below).

The cutting down of the lower portion of the road almost certainly relates to the reclamation of the foreshore. The investigation showed that the foreshore was reclaimed using clean clay fill (see Excavation Results), and it appears that the removal of clay was not all for the manufacture of drain pipes, but to level and fill the area into which the pottery works would expand. A date of 1882 for the reclamation can therefore be assigned with reasonable confidence.

In conclusion, it seems likely that the April 1881 plan provided a reasonably accurate representation of the location and orientation of the works prior to this date, and that later, following reclamation work and as part of the expansion in the early 1880s, the works were shifted forwards onto the reclamation area, as indicated in the overlays shown below (see Figure 47). The size of the structures shown in the 1881 plan seems consistent with the 1879 description of a single kiln and the use of horse power rather than steam (see History section). There is no evidence supporting the suggestion that the original works were located further to the southwest, and if the location of the original shoreline prior to reclamation is taken into account, it is clear that they were not.

Continued on next page

THE POTTERY WORKS, CONTINUED

19th Century Photograph

A photograph of the works was taken by James Richardson, whose work dates from the 1860s through to the 20th century (Figure 14). The photograph is undated, but we can be reasonably confident that it relates to the 19th century as the extent of the works is smaller than that recorded in the early 20th century photographs in R.O. Clark's 1906 Price List. The photo shows a line of buildings in a similar northwest-southeast orientation to that of the 1881 plan, but with the easternmost building at right angles to the rest. There are three chimneys – two larger ones at either end and a smaller one in the middle. These three chimneys can be traced through successive photographs until 1908 and (except for the central chimney) beyond. The two chimneys at either end (numbered 1 and 3 in the figures below) are still in evidence in a 1940s aerial photo (Figure 26) and their location on the ground can therefore be determined with reasonable accuracy (see Figure 47, Figure 48).

It is suggested in the Geometria report that the two larger chimneys are kiln chimneys and that the central smaller chimney indicates the location of a steam engine (Geometria 2007: 8). This is a reasonable assumption, and reflects the layout of the works recorded in the 20th century, with banks of kilns at either end of the works and machinery in the centre (described by Ockleston n.d., quoted below).

The photo clearly post-dates 1879, when the works had only one kiln and no steam engine, and presumably shows the layout of the works after the expansion and investment of the early 1880s.

The orientation of the kiln building closest to the road (containing chimney 1) is at right angles to the building shown in the 1881 plan and does not appear to be the same structure. Overlays (Figure 47) show that this building extends into the area of reclamation and that chimney 1 is located within the reclamation, confirming that it postdates the structures shown on the 1881 plan.

1906 Photographs

These photographs (Figure 15, Figure 16, Figure 18, Figure 19) are included in the R.O. Clark's 1906 Price List. They were presumably taken close to the date of publication and show the extent of the works at that date, with Clark House (completed 1902) in the background in those taken from the bay. Comparison with Figure 14 shows that the works have been expanded since the Richardson photo was taken, with a long shed and a shorter one added to the rear, and a new chimney (no. 4) in the centre of the works adjacent to chimney 2. The chimney is clearly of very recent construction. In the photos which show it clearly (Figure 15, Figure 16, Figure 18) the chimney has not darkened at all even at the top and it cannot be more than a year or two old on this basis. The chimney must relate to the recorded expansion of the works in 1903 when a new boiler, a new pipe machine and other modern appliances were installed.

Continued on next page

THE POTTERY WORKS, CONTINUED

1906 Photographs, continued

Figure 17 to Figure 19 show the waterfront, with low fronted buildings extending close to the water's edge, and boats moored alongside at two locations, roughly in front of chimneys 1 and 3. The memoirs of Captain Peter Higham (Diamond 1993: pp.75 and 75A) contain the following description of water access at around this time:

'Holland's Pottery, Hobsonville. There was a brickyard of this name working on the same Creek as Carders and Clarke. I took a load of coal to this yard in the "Glenae" and brought back a load of bricks which were landed at Peter Bryant's yard.'

'I also traded to Carder's and Clark's yards at Hobsonville. The "Glenae" would be taken up to the landings up a shallow channel running beside the kilns which were built about 50 feet from them. The water in this channel at high tide was about six feet deep At Clark's landing they had a crane for loading and unloading cargo ... There were shell banks off the Whau River and in Limeburner's Bay ... We would take a load of shell from these places.'

Higham owned the *Glenae* between 1904 and 1907 (Diamond 1993). The crane he refers to must have been in operation at this time but is not clearly shown on the photographs. A crane platform was identified along the waterfront between two landings in 1966 by Jack Diamond (Figure 27, below).

1908 Photographs

Figure 20 was published in the *Auckland Weekly News* and shows the extent of the works in 1908. In the c.2-3 years since the photos were taken for the 1906 Price List several further changes have been made. Two additional chimneys, both of them round rather than square, have been built:

- a) Chimney 5 at the west end of the works housed in a new building extending beyond the western limit of the works in 1906 and replacing earlier buildings beside chimney 3.
- b) Chimney 6 at the east end to the rear of chimney 1.

Additional sheds have also been added to the rear of the works. Chimney 2 is concealed behind chimney 4 in this view, but another photo showing the same layout and presumably of similar date, shows that chimney 2 is still present (Figure 21). The main difference between the two photos is that in Figure 21 the western wall of the new building containing chimney 5 is framed but not cladded. Chimney 4 has darkened at the top since the 1906 photos were taken, and chimneys 5 and 6 are also darkening at the top, after only a year or two's use at most.

Continued on next page

THE POTTERY WORKS, CONTINUED

Later Photographs

The works were enlarged yet again sometime after the 1908 photos were taken. The central part of the works was completely remodelled (Figure 22 to Figure 24). A large three-storey building now extends out to the water's edge, and chimney 2 has been removed to make way for a tall building with a hipped pyramid roof beside chimney 4. The date of this remodelling is not known, but it may have taken place not long after the 1908 photos, if the condition of chimneys 5 and 6 in Figure 22 is anything to go by. A description of the works 'around the end of WWI' (Ockleston n.d.) describes elements shown in the photographs, which Jack Diamond suggests date to around the 1920s (JTDC 2003: 1298).

Figure 24 appears to have been taken at a later date again as chimneys 5 and 6 have darkened and there appears to be an additional small double gabled structure at the front of the works to the south of chimney 5. There is also an additional low chimney (no. 7) that may be present in previous photos (it is hard to be sure), but is not present in the 1908 photos. This chimney was located in the investigations, and dates to post 1914 on the basis of the bricks used in its construction (see Excavation Results).

The description of the works by Ockleston quoted in Felgate (2006: 3) applies to the works at their largest and latest extent, after the central part of the works had been remodelled, as Ockleston refers to the 'higher central part', to more than one floor above the pipe extrusion machine, and to 'drying sheds which had side walls which could be tilted to allow the breeze to speed the drying of the raw pipes' (the latter are clearly visible in the photos, Figure 22 to Figure 24).

Ockleston's Description of the Works at the end of WWI

Ockleston's description is found in a document titled 'Random recollections of Hobsonville around the end of WWI', and is worth quoting in full:

"The Pottery" – R.O. Clark Ltd – was the only large employer of labour in Hobsonville, and as it brought a steady flow of cash into the area, it's [sic] fortunes had a great influence on the whole district. It produced almost exclusively earthen sewerage pipes up to two feet in diameter, and at it's peak production in the early twenties, employed around fifty five men.

The huge wood and corrugated iron building covered about two and a half acres, and sprawled along the bank of the tidal creek which ran along the bank of Limeburners Bay. It stretched from below the church to behind the home of Mr. T.E. Clark – now occupied by the Airforce Medical Centre. (This two storey house is a lasting example of what can be done with glazed earthenware, but which was too expensive at a time when wood was plentiful and cheap).

Continued on next page

THE POTTERY WORKS, *CONTINUED*

**Ockleston's
Description of
the Works at
the end of
WWI,
*continued***

At either end of the works were the beehive kilns with their tall chimneys. In the higher central part were the boilers, main engine and heavy machinery, such as the pug mill, pan mill and pipe extrusion machine. The main steam engine was a vertical triple expansion marine engine, which had seen previous service at sea. This was later replaced by a large sprawling two cylinder pumping engine from the Thames goldfields. The boilers had been previously installed in the Hobson St. power station (Waste hot water from this station was used to heat the Auckland Tepid Baths.) Like most factories of that time, power was distributed by a series of shafting and belts. To smooth out the greatly varying demands for power from the various machines, there were two large flywheels, weighing in all about twelve tons, on the main ten inch shaft. On the first floor, next the pipe extrusion machine, were the spindles on which the pipes were flanged by hand. Here, and on the floors above, were the large drying sheds, which had side walls which could be tilted to allow the breeze to speed the drying of the raw clay pipes. They were then stacked in the kilns and burnt for about five days – only the best Westport coal could produce the intense heat required.

All the suitable clay at the church end of the property had by this time been worked out, and the clay pits were extending behind Mr. T.E. Clark's home and up the hill towards his tennis courts. A network of narrow gauge light rails allowed the tiptrucks, when filled, to run down the incline to the works. Fine blue-black beach mud was dug at low tide from off Scott's farm and brought by barge to blend with some types of clay to improve their quality when burnt.

The works scow, "Hobsonville", would come into the creek on the tide, tie up alongside the embankment, and discharge it's load of coal direct into the works. With it's flat bottom, it could sit on the mud when the tide went out and later load and take a cargo of pipes to the R.O.C. yard in Beaumont St. With the increasing demand for pipes, the launches "Ethel W." and "R.O.C." were used to tow barge loads to the Akd. Depot.

From it's early days, the pottery provided housing for some of it's workers. There were several houses and bachs above the works, but as the claypits extended, they gradually disappeared. On the road, just past the store, there is still the long double building built with Clarks glazed building blocks.' (Ockleston n.d)

Continued on next page

THE POTTERY WORKS, CONTINUED

1940s Aerial

The pottery works, although closed in 1931, still appear to be largely intact in the 1940s when the aerial photograph shown in Figure 25 was taken. The 5 tall chimneys visible in the 1908 photographs are clearly visible, casting long shadows to the southeast (Figure 26). Another chimney (no. 7) is located to the south of chimney 3, but is not a tall structure as it casts very little shadow - a low chimney is visible in Figure 24 in this location.

Ockleston (1952) reports that the iron and timber materials were removed for use in the Company's works elsewhere. However, the roofs themselves seem to have been left in place, including those over the sheds at the rear of the works. There is no sign of the former Holland's works to the west, however, or any of the workers houses shown in Figure 23.

1960s Sketch Plans

In 1965 a field trip to Limeburners Bay by Jack Diamond with Gerald Bloomfield and Don Goodall (Geography Department, University of Auckland) noted '*a fantastic array of products made at the works scattered around in the scrub back from the landings*', but did not explore far because of wet conditions. Jack Diamond returned in January 1966 and recorded the surviving remains of the Clark pottery '*after site had been partially bulldozed*' – see Figure 27 to Figure 29 (JTDC 2003: 1298). He recorded four kilns and a chimney on the eastern part of the site, and another four kilns and one or two chimneys (compare Figure 27 with Figure 29) on the western part of the site. Between the two banks of kilns, towards the rear of the works close to the western kilns he sketched details of machine foundations made of concrete, a brick base with a concrete top and a possible boiler foundation. Between the two banks of kilns, close to the eastern kilns near the foreshore, he recorded an area of wooden foundation blocks every 12 ft. Remains of a tramway were recorded to the rear of these, and along the foreshore he noted two landings, a crane between them, the embankment faced with pipes, and the remains of an iron vessel and 'old World War II barges'. He also noted a midden area on a tidal inlet to the west of the works.

The position of the chimney stacks close to the foreshore on east and west indicates that they are chimney no. 1 (east) and no. 5 (west) (compare the aerial, Figure 26). Chimneystack 7 is shown in one of the sketches (Figure 27) but not on the later copy, while what was identified as an outlying kiln in the original sketch is identified as a chimney (no. 5) in the later copy (the latter is correct as confirmed by the investigations – see Excavation Results). Chimney 1 is located on reclaimed land close to the foreshore (see Figure 47, below).

Continued on next page

THE POTTERY WORKS, CONTINUED

1978 Field Trip

Jack Diamond made a return visit in 1978 and noted:

‘The flat back from the channel has again been bulldozed successfully filling in all depressions where the kilns and machinery were situated. I was fortunate to have taken a plan after the first bulldozing as even the concrete bases for the machines and building foundations have been bulldozed away.... The rubbish has again been bulldozed over the landings into the tide hiding many of the areas previously seen there’. (JTDC 2003: 1298).

By 1978, then, the site had been bulldozed at least twice.

Summary of the Development of the Works

From the date the works were formally established in 1864 until c.1880, the pottery operated on a fairly small scale, with only one horse-powered kiln. The works were close to the road and original foreshore as shown on the 1881 plan.

From c.1880, with R.O. Clark junior now playing a significant role in the management of the works, there was considerable expansion. Steam power was clearly introduced, judging from the recorded scale of production, a large area in front of the old works was reclaimed in 1882 and the works were extended onto it, chimney 1 being built on the reclamation. The works now had three chimneystacks (nos. 1-3), two of which were kiln stacks. During the 1880s the business acquired its own boat to transport its wares into town and established an office in Customs St West. The Richardson photo (Figure 14) relates to this period.

Having weathered the Long Depression, R.O. Clark junior began the construction of his house above the works c.1897, using an innovative ceramic block construction, completing it in 1902.

From 1903 another major phase of expansion started and appears to have continued over several years between 1903 and the 1920s. A new boiler, pipe machine and chimney 4 were installed in 1903, and the photos in the 1906 Price List (Figure 15 to Figure 19) show the extent of the works at that date. Two more chimneystacks (5 and 6) were in place by 1908, appearing in photos taken during that year (Figure 20, Figure 21). By c. the 1920s the whole central part of the works had been redesigned, with work space on three levels, and tilted side walls for the drying floors, while one of the earlier chimneysacks (no. 2) was removed in the process. This phase is shown in undated photos (Figure 22 and Figure 23), possibly dating to the early 1920s.

At a later stage further changes were made to the western part of the works, with the addition of two small buildings and a low chimneystack (no. 7) (Figure 24). This was probably the final layout, the works closing in 1931.

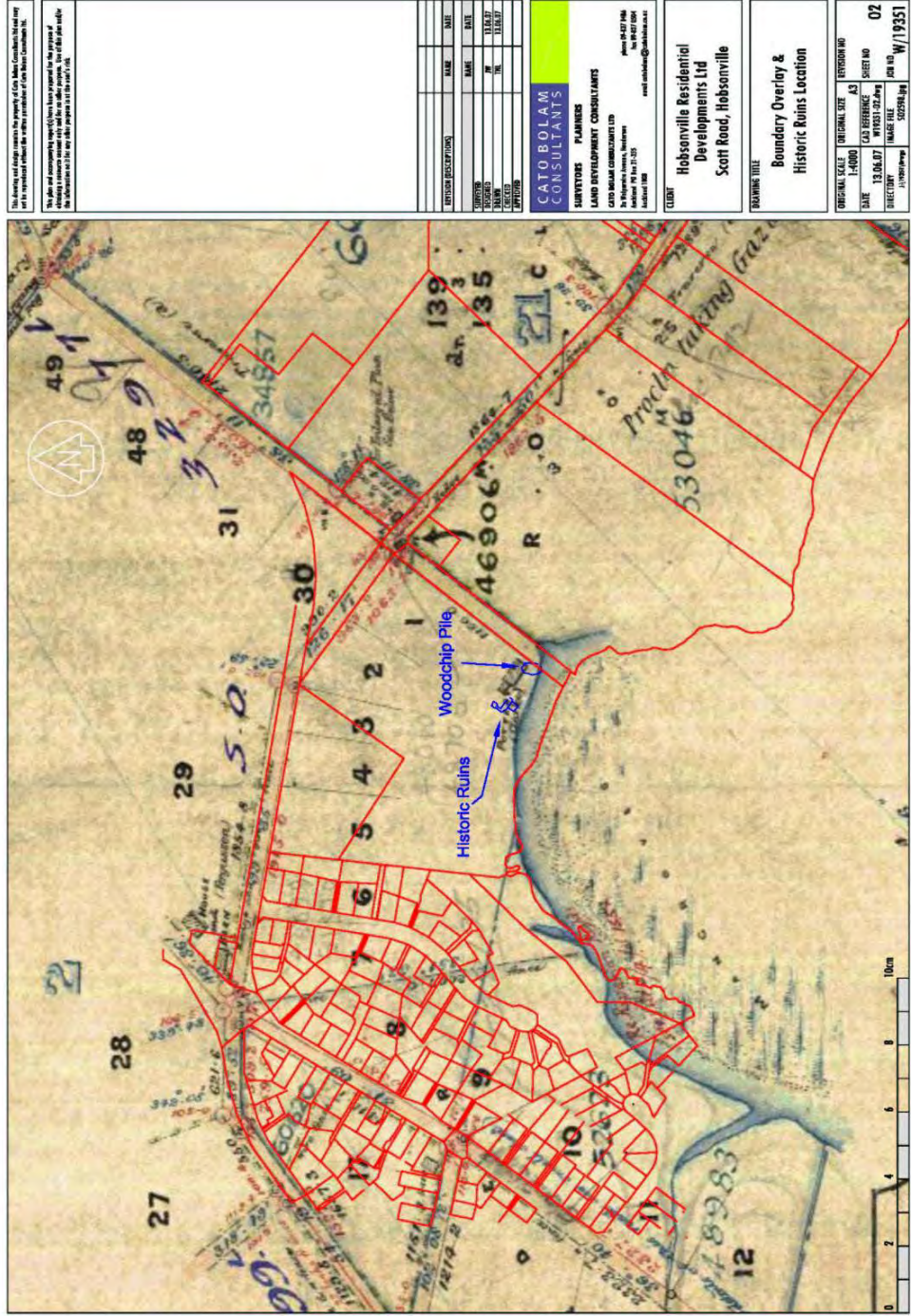
Figure 30 summarises the extent of the pottery works at different periods.

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Figure 12.
SO2598, showing
location of
brickworks in
1881 – prior to
reclamation and
expansion. The
pottery is shown
within Lot 1, set
back slightly
from the
shoreline

Figure 13.
 Overlay of
 modern cadastral
 plan onto 1881
 plan showing
 extent of
 reclamation
 ('historic ruins'
 refers to the
 concrete machine
 bases that were
 the main visible
 features on the
 site prior to the
 investigation)



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<p>This plan and accompanying report (when taken together) are the property of the author. It is not to be used for any other purpose without the written consent of the author.</p>	
<p>DATE: 13.06.07 PROJECT: W/19351 SHEET NO: 02 PROJECT: W/19351</p>	
<p>ORIGINAL SCALE: 1:4000 DATE: 13.06.07 PROJECT: W/19351 SHEET NO: 02 PROJECT: W/19351</p>	
<p>CLIENT: Hobsonville Residential Developments Ltd Scott Road, Hobsonville</p>	
<p>DRAWING TITLE: Boundary Overlay & Historic Ruins Location</p>	
<p>CONTRIBUTORS: LAND DEVELOPMENT CONSULTANTS LAND DEVELOPMENT CONSULTANTS LTD 100/101/102/103/104/105/106/107/108/109/110/111/112/113/114/115/116/117/118/119/120/121/122/123/124/125/126/127/128/129/130/131/132/133/134/135/136/137/138/139/140/141/142/143/144/145/146/147/148/149/150/151/152/153/154/155/156/157/158/159/160/161/162/163/164/165/166/167/168/169/170/171/172/173/174/175/176/177/178/179/180/181/182/183/184/185/186/187/188/189/190/191/192/193/194/195/196/197/198/199/200/201/202/203/204/205/206/207/208/209/210/211/212/213/214/215/216/217/218/219/220/221/222/223/224/225/226/227/228/229/230/231/232/233/234/235/236/237/238/239/240/241/242/243/244/245/246/247/248/249/250/251/252/253/254/255/256/257/258/259/260/261/262/263/264/265/266/267/268/269/270/271/272/273/274/275/276/277/278/279/280/281/282/283/284/285/286/287/288/289/290/291/292/293/294/295/296/297/298/299/300/301/302/303/304/305/306/307/308/309/310/311/312/313/314/315/316/317/318/319/320/321/322/323/324/325/326/327/328/329/330/331/332/333/334/335/336/337/338/339/340/341/342/343/344/345/346/347/348/349/350/351/352/353/354/355/356/357/358/359/360/361/362/363/364/365/366/367/368/369/370/371/372/373/374/375/376/377/378/379/380/381/382/383/384/385/386/387/388/389/390/391/392/393/394/395/396/397/398/399/400/401/402/403/404/405/406/407/408/409/410/411/412/413/414/415/416/417/418/419/420/421/422/423/424/425/426/427/428/429/430/431/432/433/434/435/436/437/438/439/440/441/442/443/444/445/446/447/448/449/450/451/452/453/454/455/456/457/458/459/460/461/462/463/464/465/466/467/468/469/470/471/472/473/474/475/476/477/478/479/480/481/482/483/484/485/486/487/488/489/490/491/492/493/494/495/496/497/498/499/500/501/502/503/504/505/506/507/508/509/510/511/512/513/514/515/516/517/518/519/520/521/522/523/524/525/526/527/528/529/530/531/532/533/534/535/536/537/538/539/540/541/542/543/544/545/546/547/548/549/550/551/552/553/554/555/556/557/558/559/560/561/562/563/564/565/566/567/568/569/570/571/572/573/574/575/576/577/578/579/580/581/582/583/584/585/586/587/588/589/590/591/592/593/594/595/596/597/598/599/600/601/602/603/604/605/606/607/608/609/610/611/612/613/614/615/616/617/618/619/620/621/622/623/624/625/626/627/628/629/630/631/632/633/634/635/636/637/638/639/640/641/642/643/644/645/646/647/648/649/650/651/652/653/654/655/656/657/658/659/660/661/662/663/664/665/666/667/668/669/670/671/672/673/674/675/676/677/678/679/680/681/682/683/684/685/686/687/688/689/690/691/692/693/694/695/696/697/698/699/700/701/702/703/704/705/706/707/708/709/710/711/712/713/714/715/716/717/718/719/720/721/722/723/724/725/726/727/728/729/730/731/732/733/734/735/736/737/738/739/740/741/742/743/744/745/746/747/748/749/750/751/752/753/754/755/756/757/758/759/760/761/762/763/764/765/766/767/768/769/770/771/772/773/774/775/776/777/778/779/780/781/782/783/784/785/786/787/788/789/790/791/792/793/794/795/796/797/798/799/800/801/802/803/804/805/806/807/808/809/810/811/812/813/814/815/816/817/818/819/820/821/822/823/824/825/826/827/828/829/830/831/832/833/834/835/836/837/838/839/840/841/842/843/844/845/846/847/848/849/850/851/852/853/854/855/856/857/858/859/860/861/862/863/864/865/866/867/868/869/870/871/872/873/874/875/876/877/878/879/880/881/882/883/884/885/886/887/888/889/890/891/892/893/894/895/896/897/898/899/900/901/902/903/904/905/906/907/908/909/910/911/912/913/914/915/916/917/918/919/920/921/922/923/924/925/926/927/928/929/930/931/932/933/934/935/936/937/938/939/940/941/942/943/944/945/946/947/948/949/950/951/952/953/954/955/956/957/958/959/960/961/962/963/964/965/966/967/968/969/970/971/972/973/974/975/976/977/978/979/980/981/982/983/984/985/986/987/988/989/990/991/992/993/994/995/996/997/998/999/1000/1001/1002/1003/1004/1005/1006/1007/1008/1009/1010/1011/1012/1013/1014/1015/1016/1017/1018/1019/1020/1021/1022/1023/1024/1025/1026/1027/1028/1029/1030/1031/1032/1033/1034/1035/1036/1037/1038/1039/1040/1041/1042/1043/1044/1045/1046/1047/1048/1049/1050/1051/1052/1053/1054/1055/1056/1057/1058/1059/1060/1061/1062/1063/1064/1065/1066/1067/1068/1069/1070/1071/1072/1073/1074/1075/1076/1077/1078/1079/1080/1081/1082/1083/1084/1085/1086/1087/1088/1089/1090/1091/1092/1093/1094/1095/1096/1097/1098/1099/1100/1101/1102/1103/1104/1105/1106/1107/1108/1109/1110/1111/1112/1113/1114/1115/1116/1117/1118/1119/1120/1121/1122/1123/1124/1125/1126/1127/1128/1129/1130/1131/1132/1133/1134/1135/1136/1137/1138/1139/1140/1141/1142/1143/1144/1145/1146/1147/1148/1149/1150/1151/1152/1153/1154/1155/1156/1157/1158/1159/1160/1161/1162/1163/1164/1165/1166/1167/1168/1169/1170/1171/1172/1173/1174/1175/1176/1177/1178/1179/1180/1181/1182/1183/1184/1185/1186/1187/1188/1189/1190/1191/1192/1193/1194/1195/1196/1197/1198/1199/1200/1201/1202/1203/1204/1205/1206/1207/1208/1209/1210/1211/1212/1213/1214/1215/1216/1217/1218/1219/1220/1221/1222/1223/1224/1225/1226/1227/1228/1229/1230/1231/1232/1233/1234/1235/1236/1237/1238/1239/1240/1241/1242/1243/1244/1245/1246/1247/1248/1249/1250/1251/1252/1253/1254/1255/1256/1257/1258/1259/1260/1261/1262/1263/1264/1265/1266/1267/1268/1269/1270/1271/1272/1273/1274/1275/1276/1277/1278/1279/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Figure 14. Richardson photograph, undated but presumably 19th century (Auckland City Libraries 4-RIC101). Looking southwest towards the rear of the works. Note three chimneys at this stage

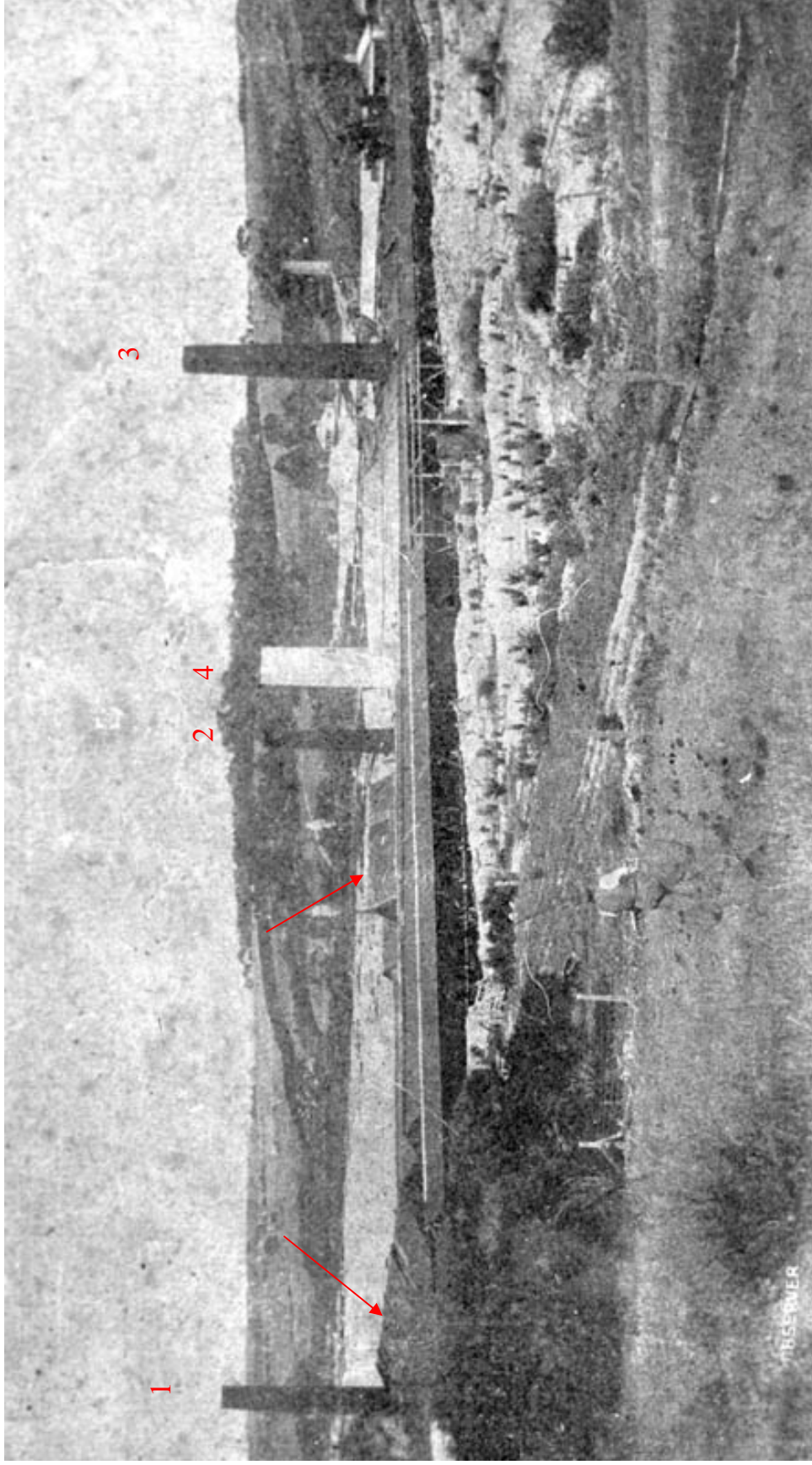


Figure 15. Photo from R.O. Clark's Illustrated Price List 1906, looking southwest towards the rear of the works. Long sheds have been added to the rear of the buildings shown in the Richardson photo (Figure 14), some of which are still visible (arrowed). A fourth chimney has been added. Waitakere City Council (WCC) LIS, JTDC.2003.6.PH.4258

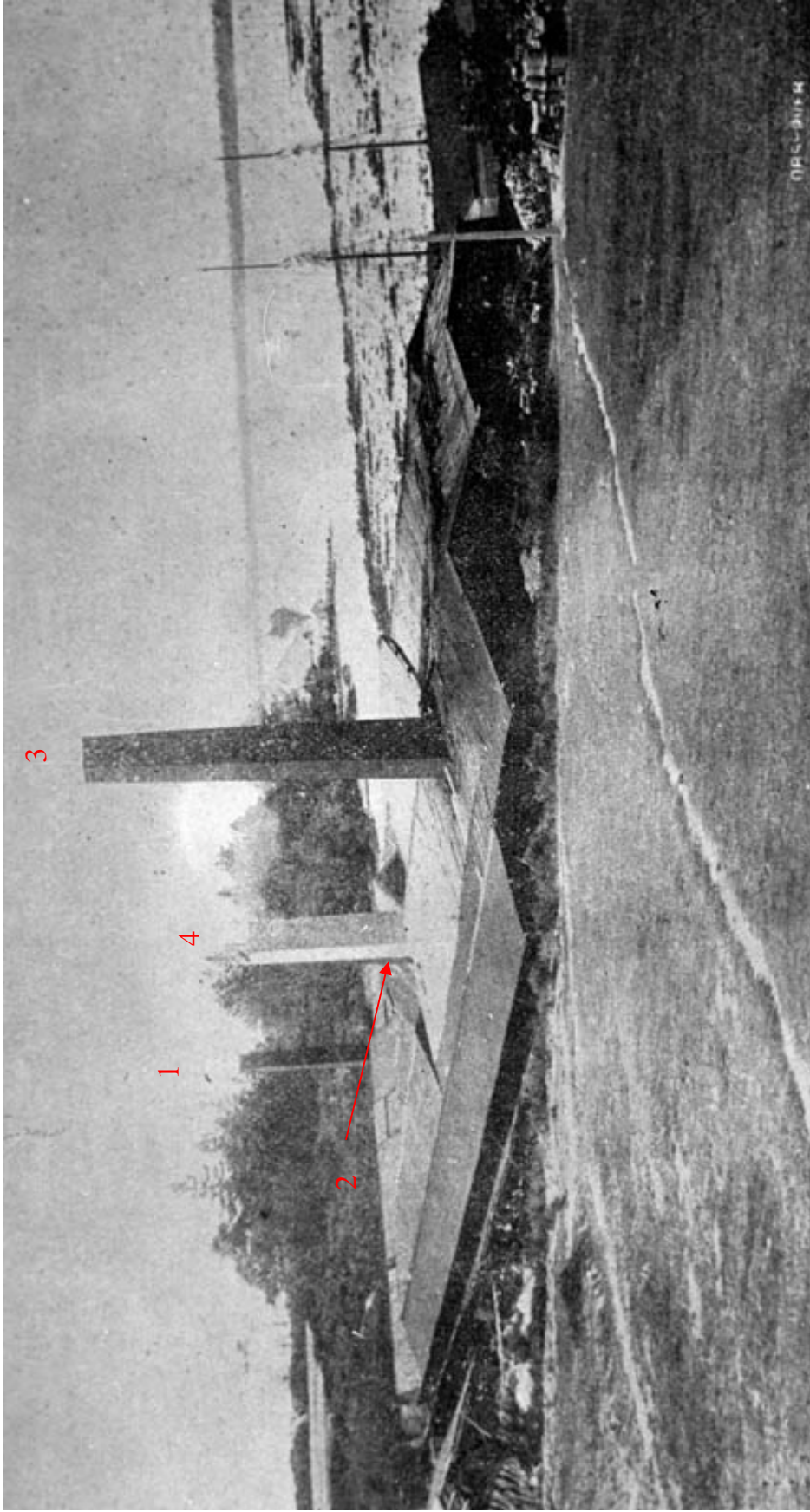


Figure 16. Photo from R.O. Clark's Illustrated Price List 1906. View from the rear looking southeast, showing chimneys 1, 3 and 4 clearly. Chimney 2 is just visible (arrowed) behind the new chimney (4). WCC LIS, JTDC.2003.6.PH.4256

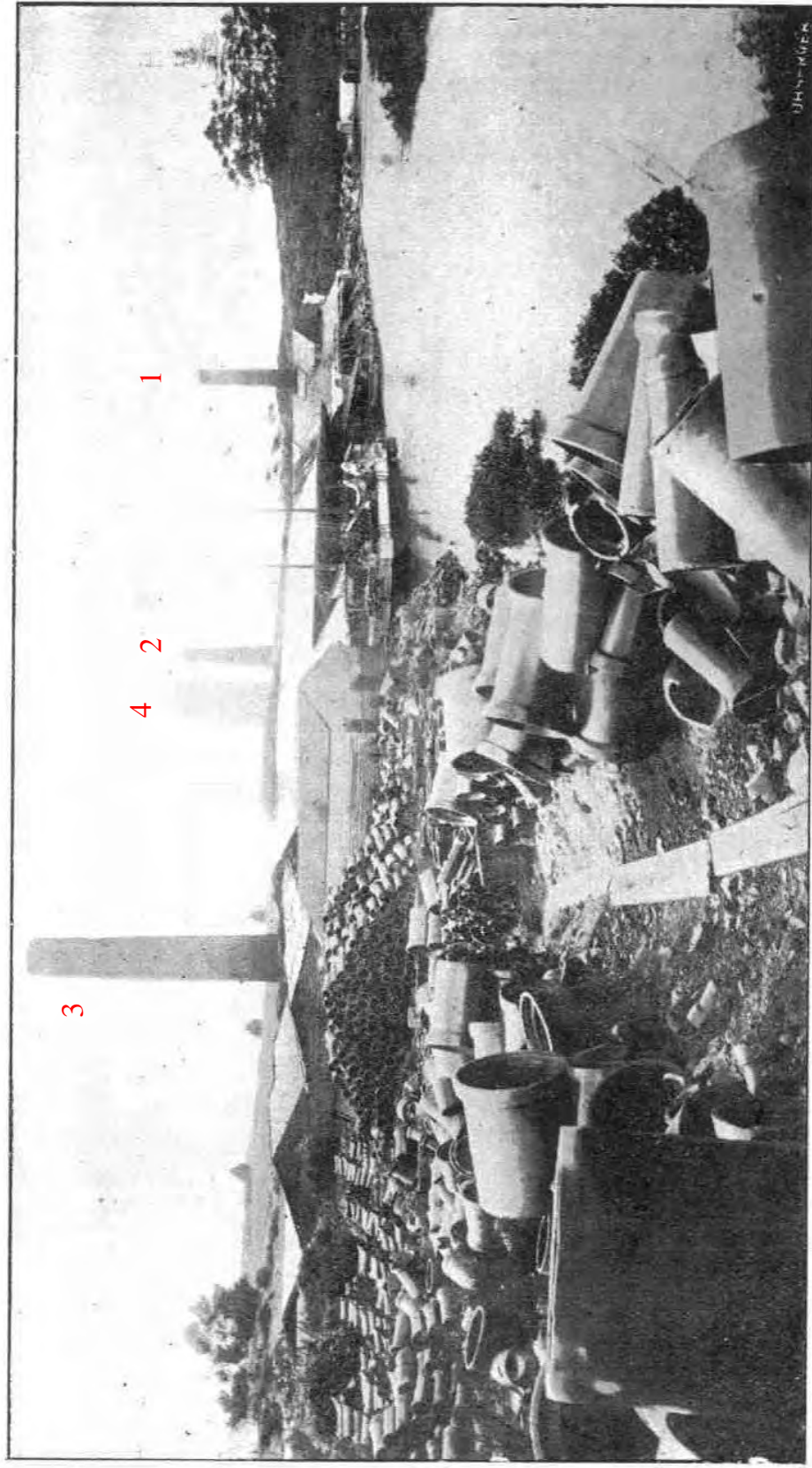


Figure 17. Photo from the Hahn Collection reproduced in Geometria 2007 as Figure 4. This shows a similar extent of the works to that in Figure 15 and Figure 16 from the 1906 Price List, as four chimneys are visible (though the central two are faint) and the rooflines of the westernmost buildings are the same. Looking east

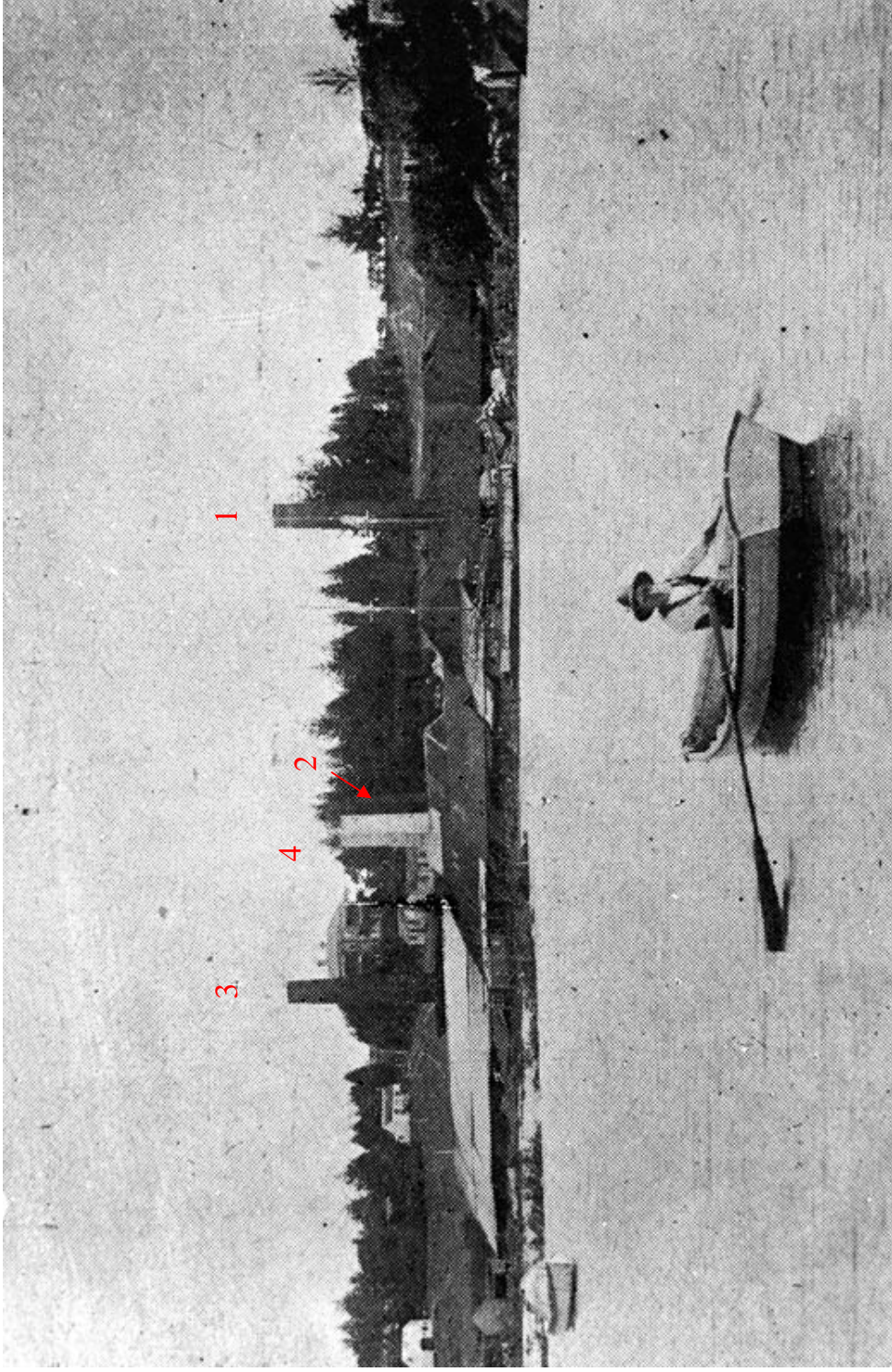


Figure 18. Photo from R.O. Clark's Illustrated Price List 1906, looking northwest and showing Clark House in the background behind chimney 3. Chimney 2 is present, though in shadow. WCC LIS, JTDC.2003.6.PH.4258

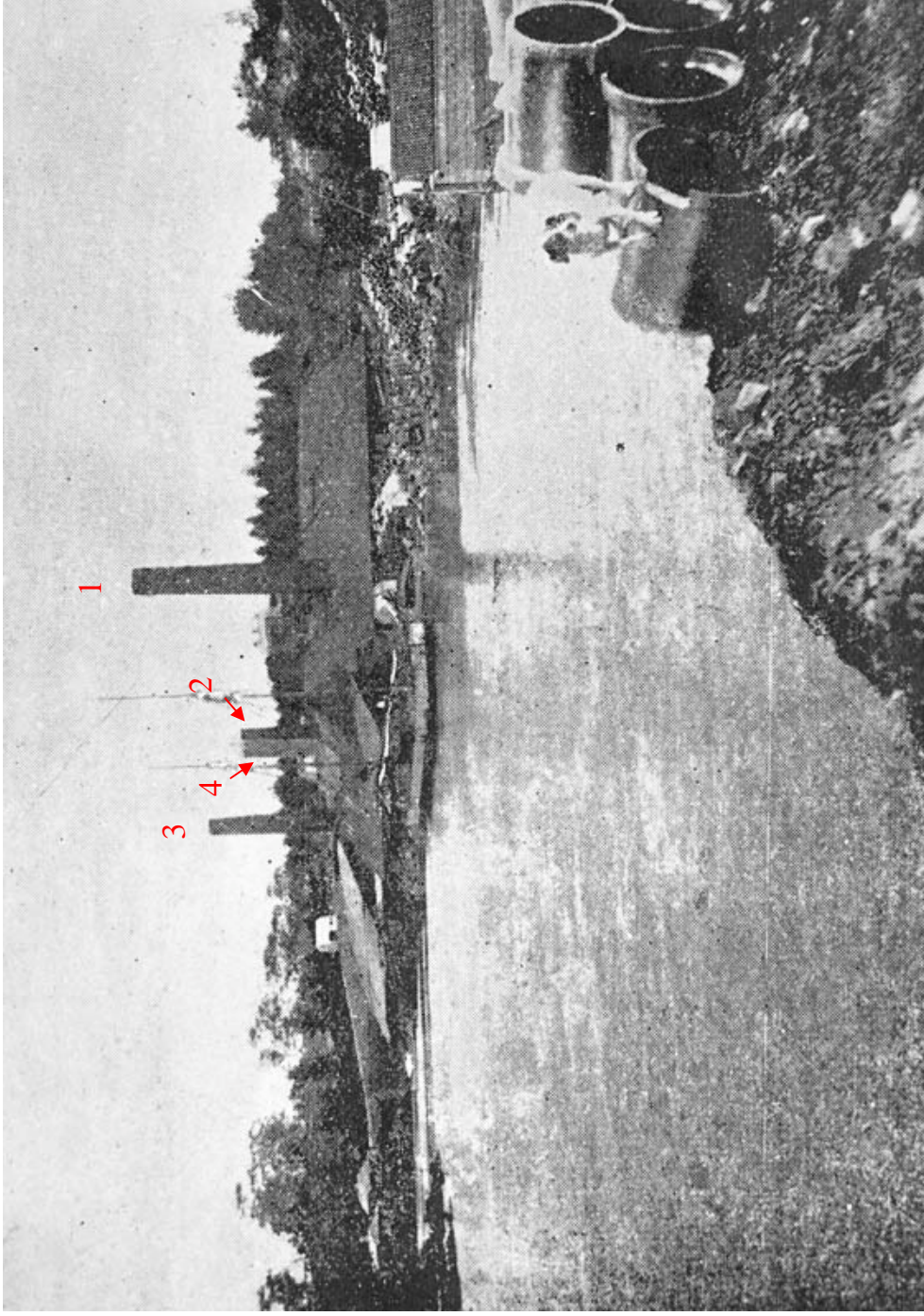


Figure 19. Photo from R.O. Clark's Illustrated Price List 1906, looking northwest. WCC LIS, JTDC.2003.6.PH.4255

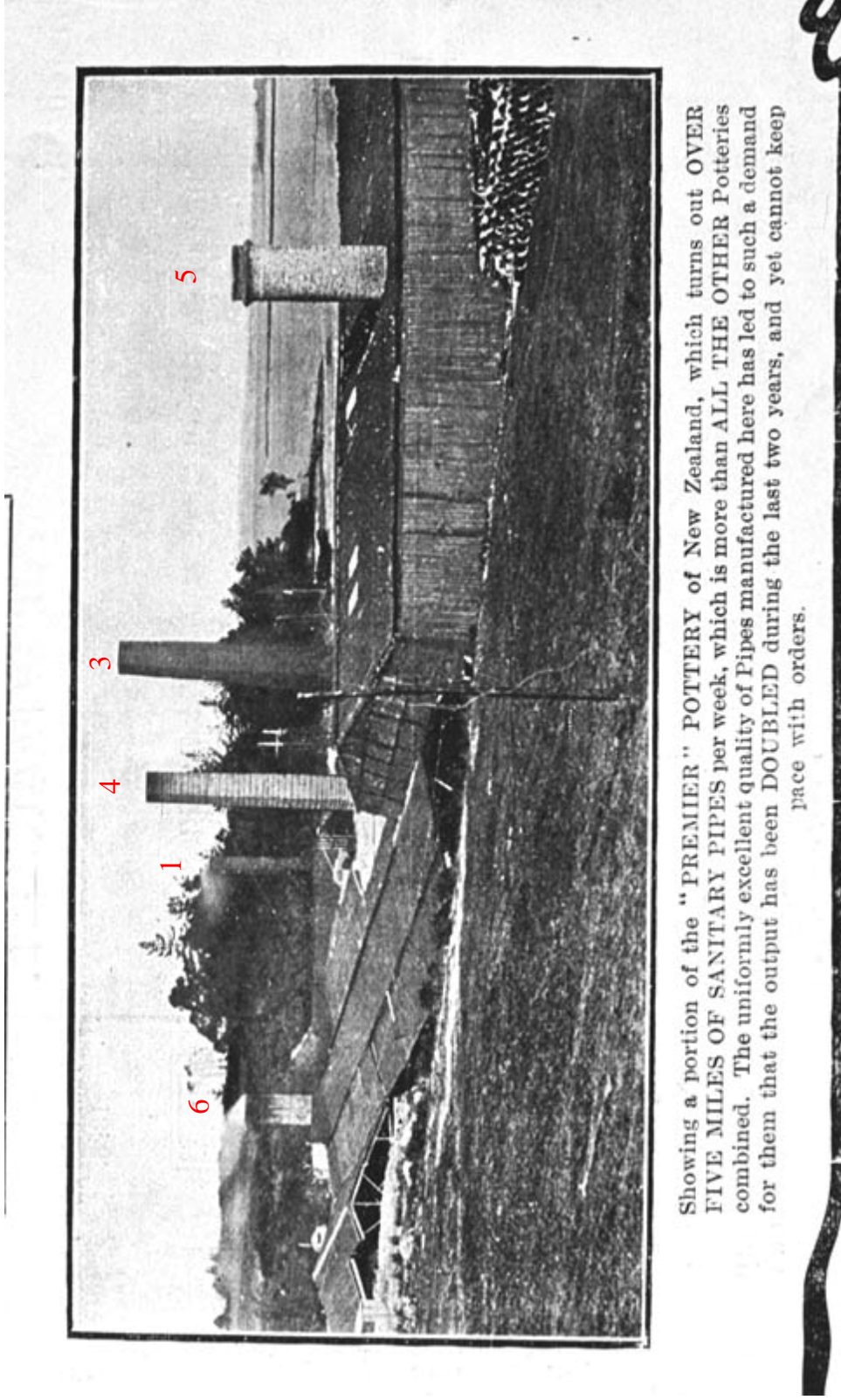


Figure 20. Photo reproduced from the *Auckland Weekly News* 1908, taken from the rear looking southeast. Two new chimneys have been constructed (5 and 6), and chimney 2 is not visible in this view but probably present behind chimney 4 (compare Figure 21). Additional buildings have been added to the rear compared with Figure 15 and Figure 16. WCC LIS, JTDC.2003.6.PH.5213.1



Figure 21. View from similar period to that in Figure 20 (1908), looking southwest. All six chimneys are visible in this view, and a similar extent of development to the rear of the works (Alexander Turnbull Library ¼-002771-F). Presumably taken slightly earlier than Figure 20 as the west wall of the new building is uncladded

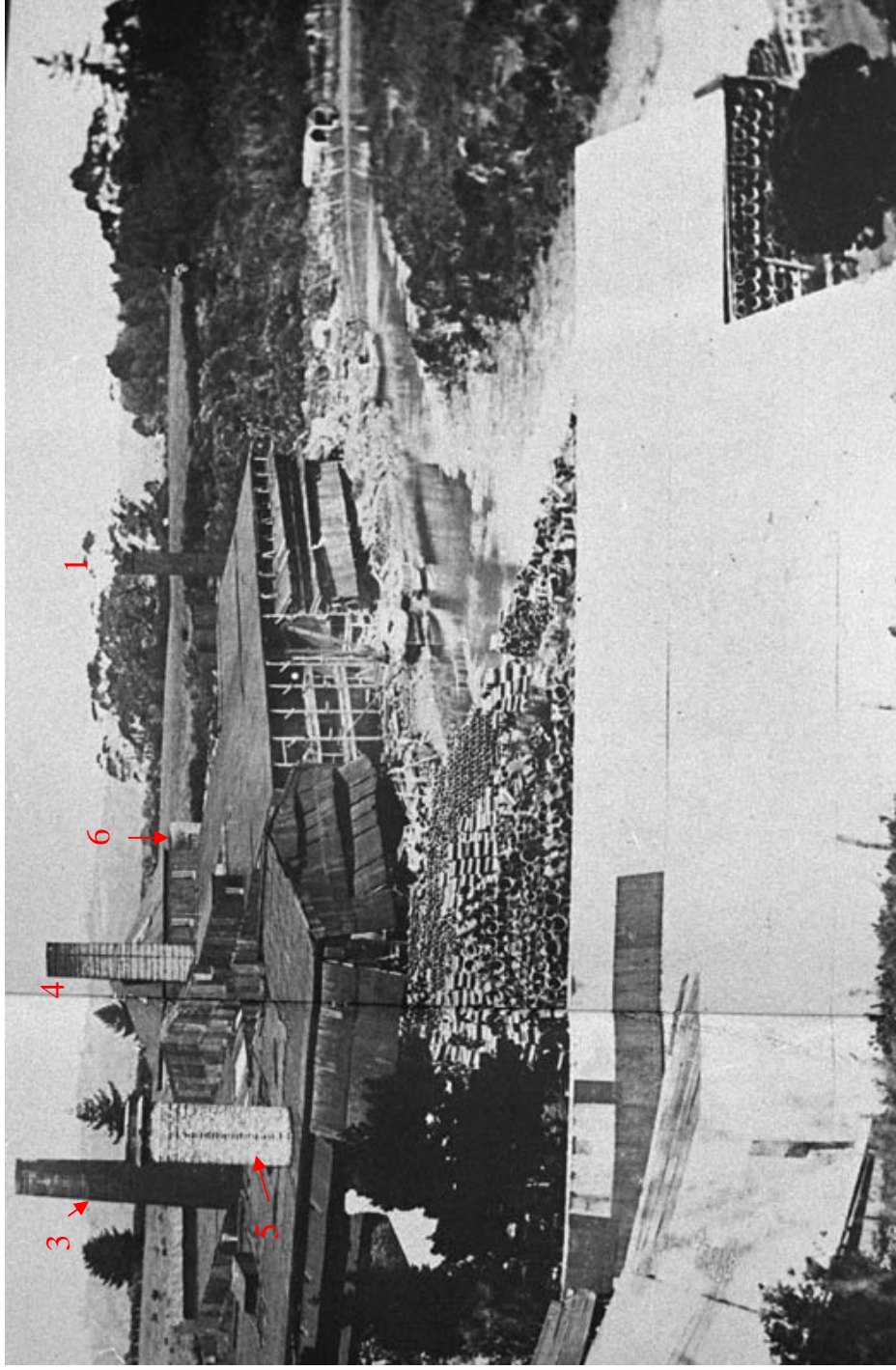


Figure 22. Undated photo looking east (WCC LIS, JTDC.2003.6.PH 5636.6). It shows one of the last phases of development at the Clark works. Chimney 2 has been removed and the central part of the works completely remodelled and increased in height. Note three storey structure extending close to water's edge, and higher building with hipped pyramid roof beside chimney 4. These changes were made after 1908 (compare Figure 20, Figure 21)

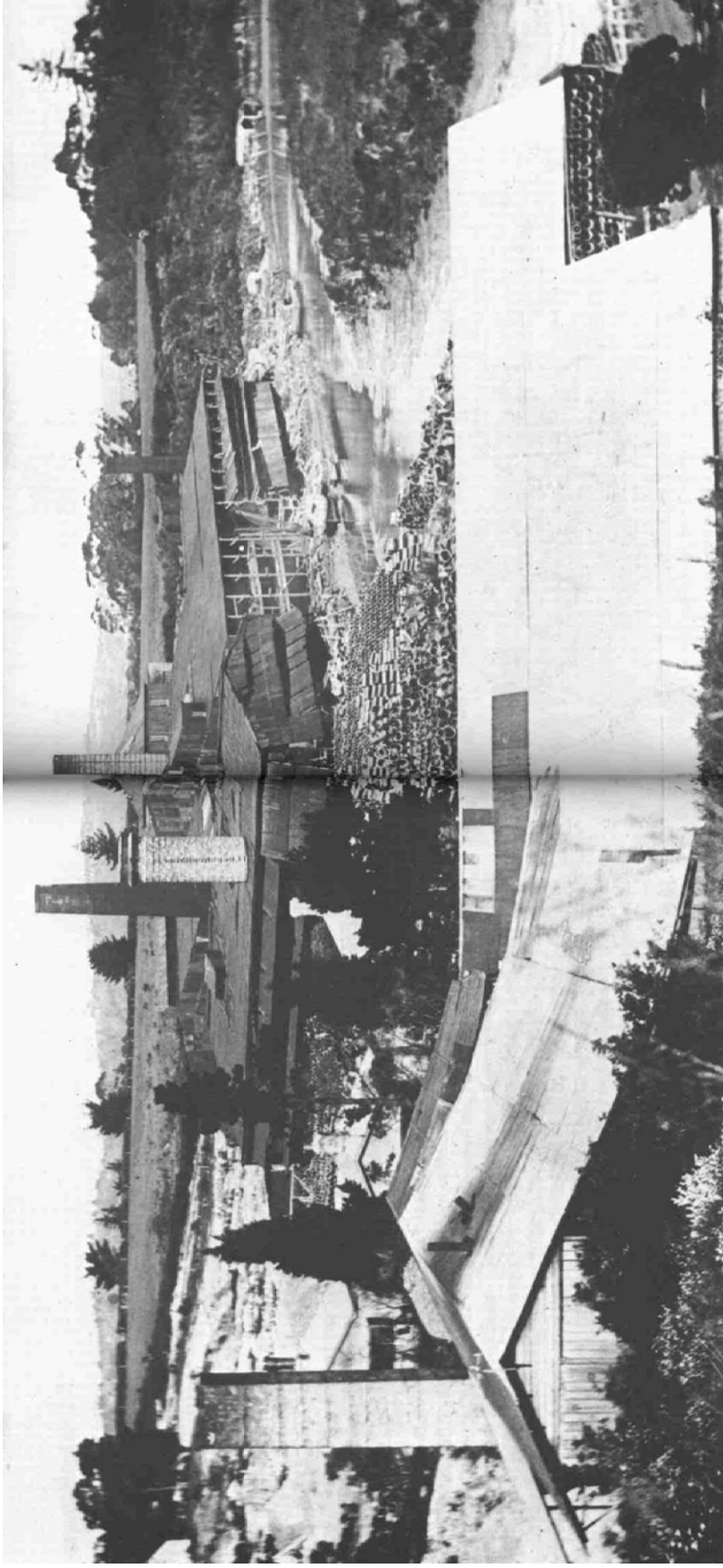


Figure 23. The same photo as Figure 22, showing wider view. Smithies (1983) identifies Holland's brickworks (part of Clark's brickworks since 1909) in the foreground and workers cottages shown at left between Holland's and Clark's. WCC LIS, JTDC.2003.6.PH.5636.2

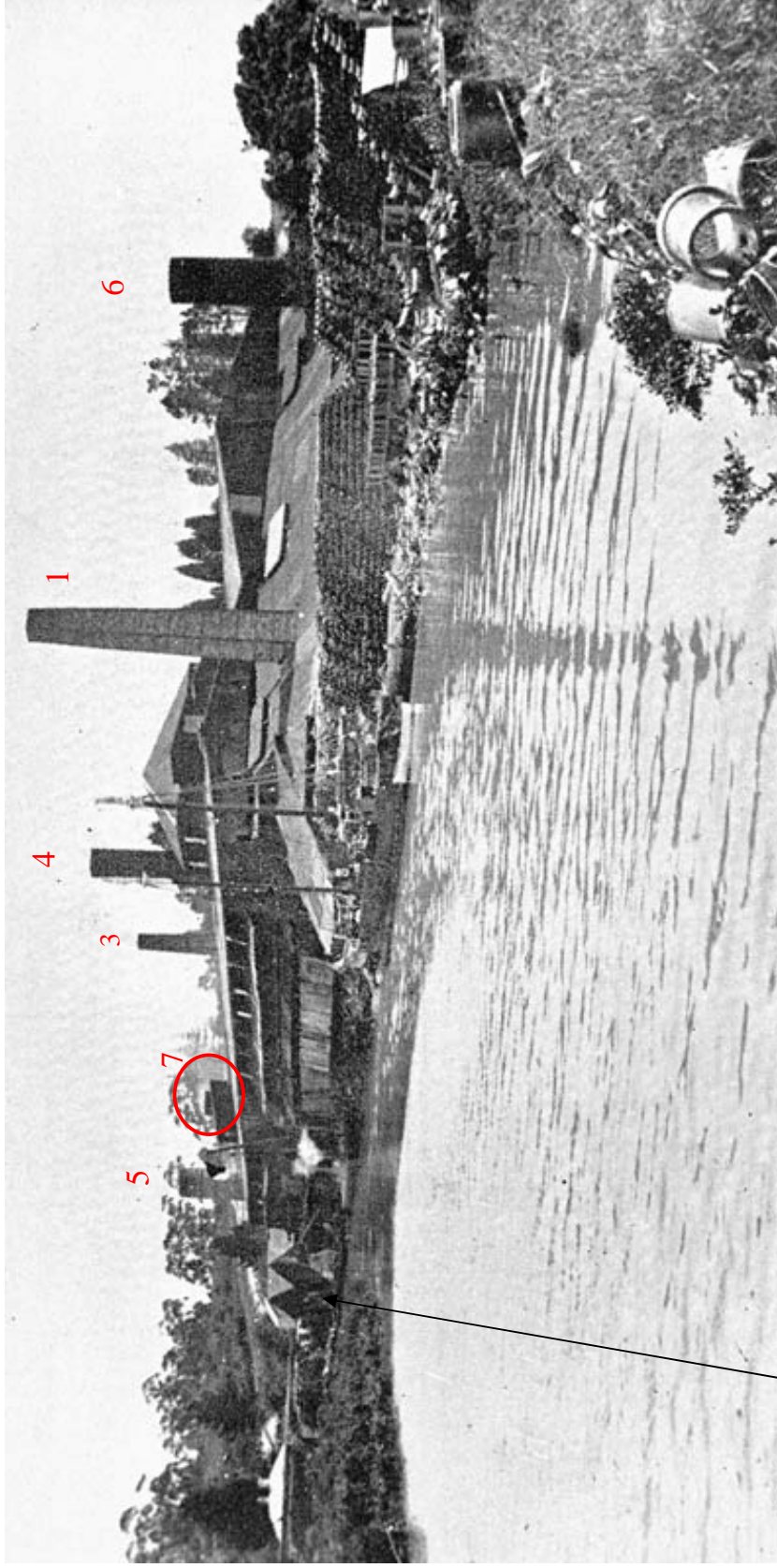


Figure 24. View towards the northwest, showing similar development to that in Figure 22, with the three storey structure extending close to water's edge, and a higher building with a hipped pyramid roof beside chimney 4. However, there is new double gabled structure at the front (arrowed) and what appears to be a low additional chimney (circled). WCC LIS, JTDC.2003.6.PH.4798

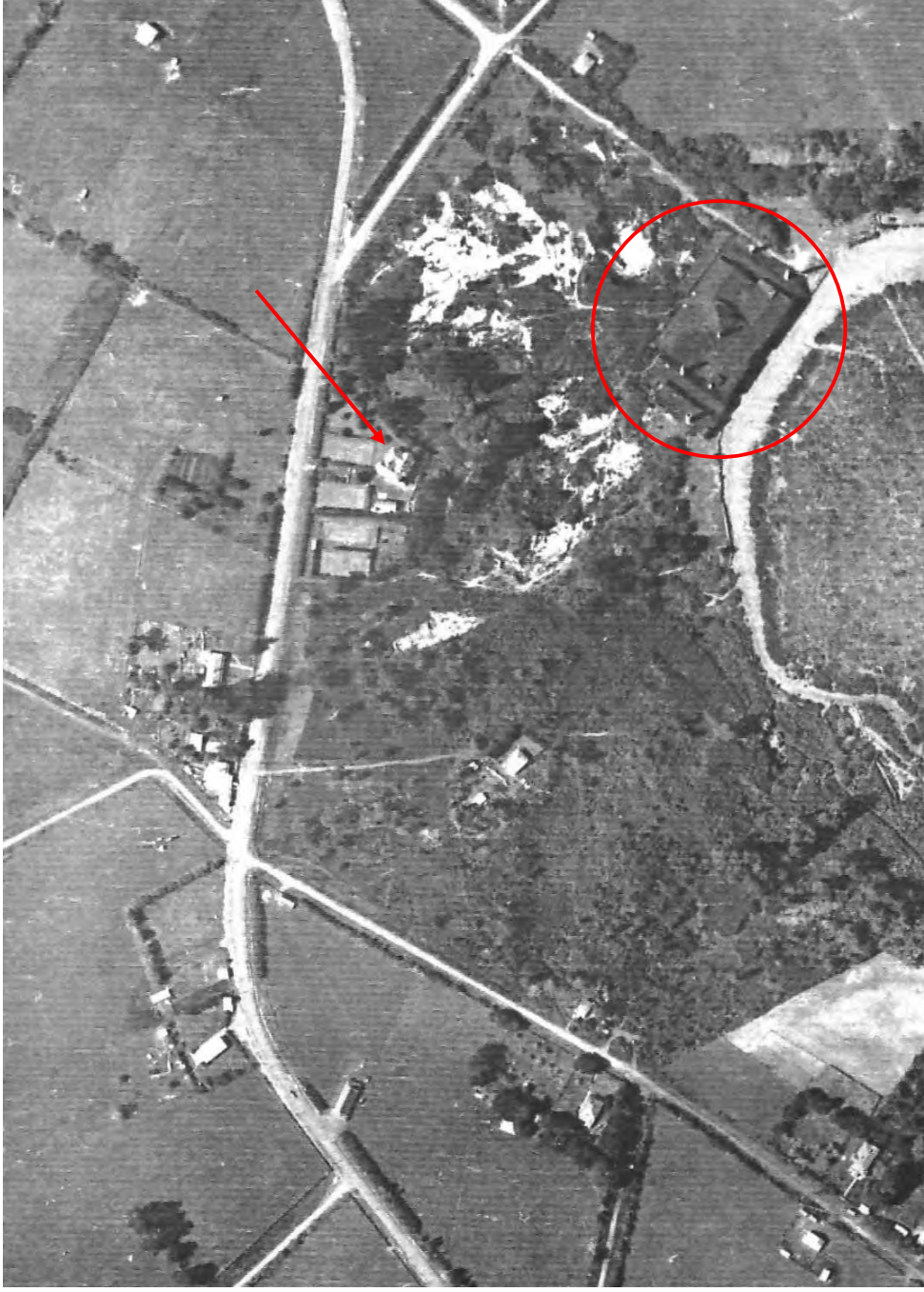


Figure 25. 1940s aerial showing the extent of the brickworks (circled). Clark house is arrowed. Note areas of bare ground where clay has been quarried

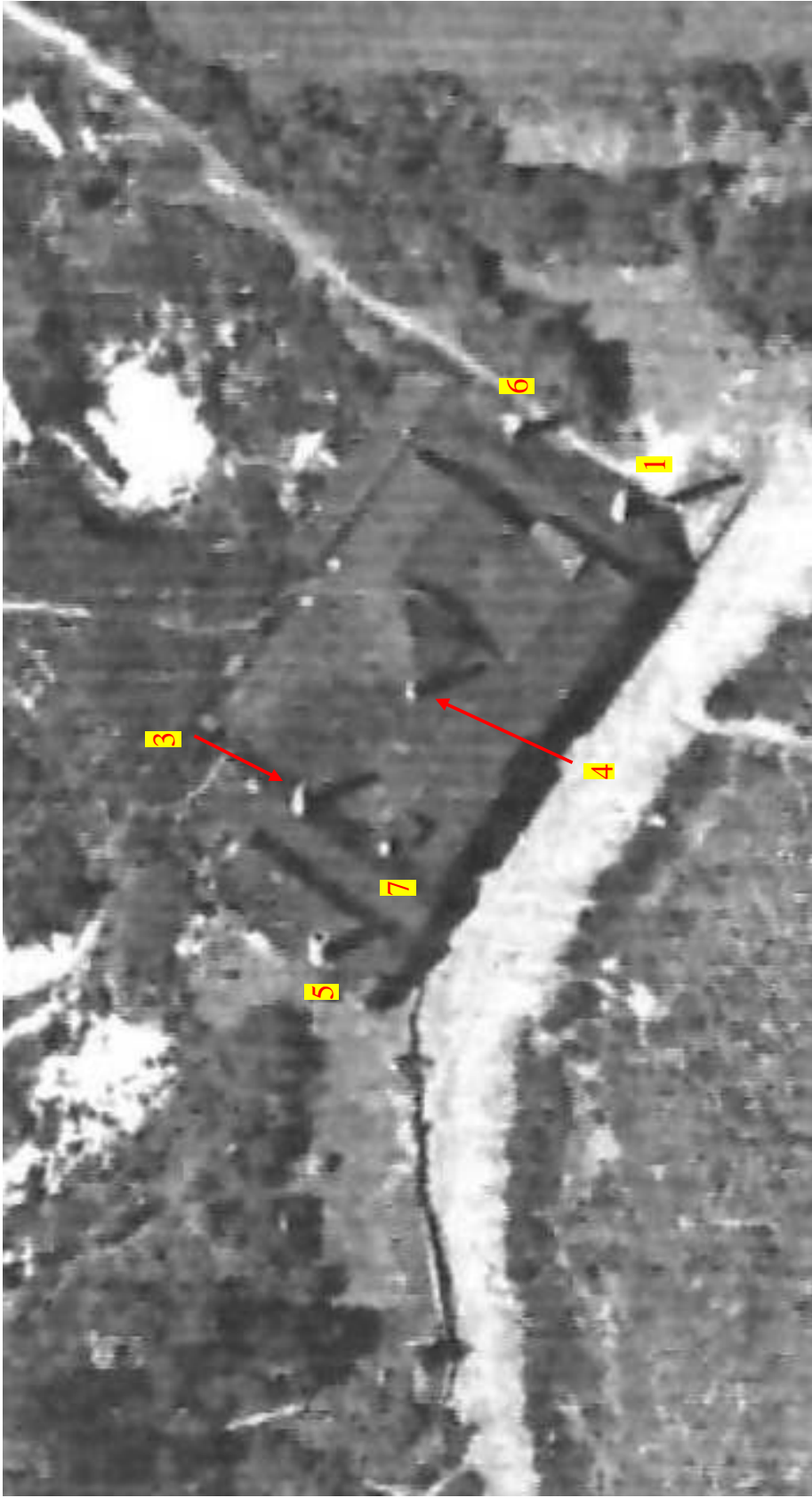


Figure 26. Close-up of the works in the 1940s aerial, showing the chimneys still standing. Chimney 7 is not a tall structure as it casts only a very small shadow. Compare Figure 24

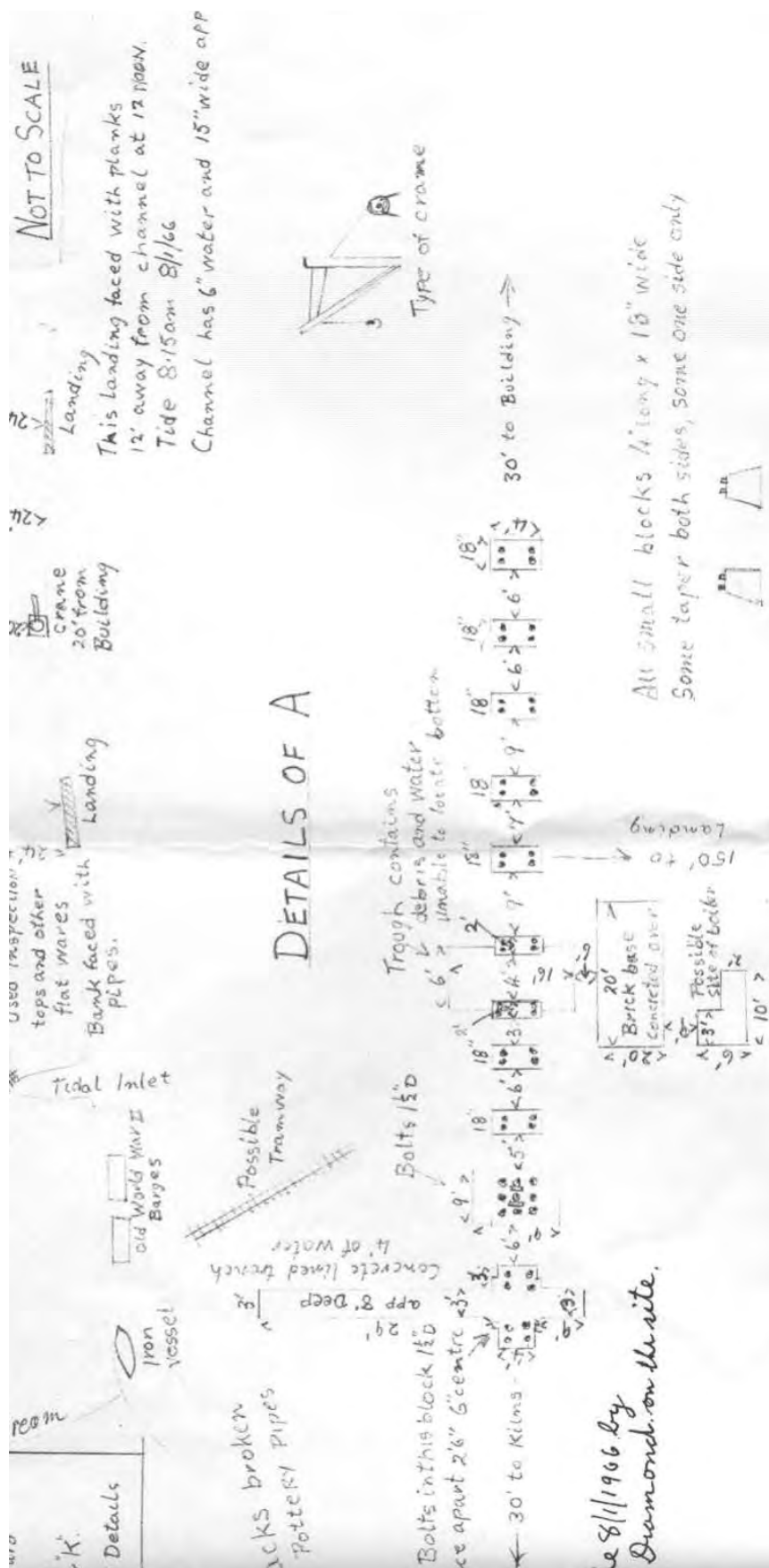


Figure 28. Lower part of the plan shown in Figure 27, showing details of the machine bases and crane (JTDC 2003: 1298)

THE POTTERY WORKS, *CONTINUED*

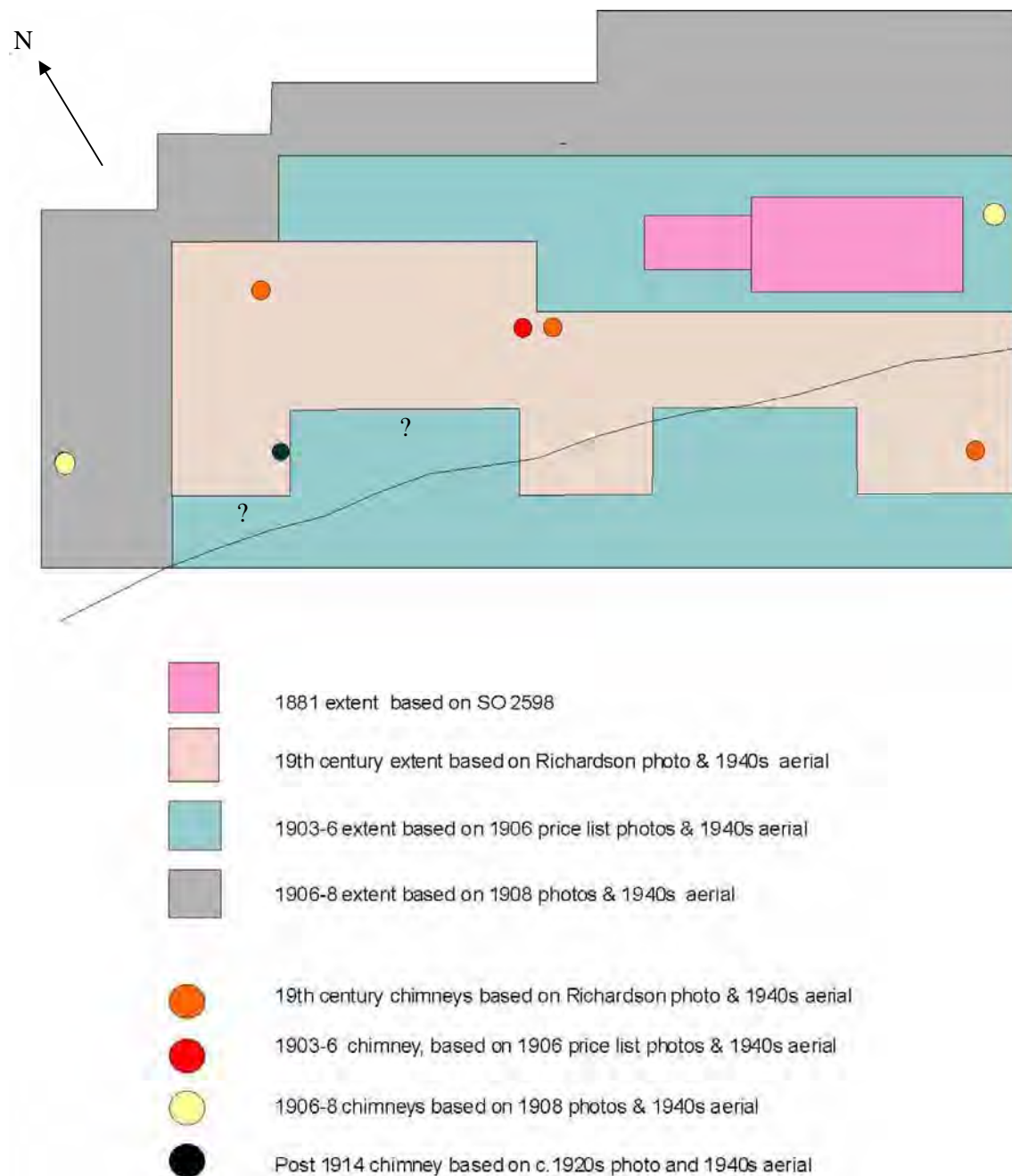


Figure 30. The extent of the Clark pottery works at different periods, based on plans and photographs, with original shoreline indicated. The southward extent of the 19th century works shown in the Richardson photo is unclear, however, as some areas are not visible. The post 1914 date for the last chimneystack was confirmed through excavation (see below)

Continued on next page

THE POTTERY WORKS, CONTINUED

Inside the Works

The Price List also contains several photographs showing the interior of the works and ‘some of the processes passed through during manufacture’ (Figure 31 to Figure 37). Figure 31 is of particular interest as it shows a kiln in the course of construction inside a building. The list states that there are seven of these kilns and two currently under construction (making 9 in all). The kiln under construction is presumably located within one of the existing buildings on the east or west of the works, close to chimneys 1 or 3. Additional kilns are likely to have been built in the eastern building, because a second chimney (no.6) had been added to the eastern building by 1908. The western building was also extended further to the west by 1908 and a new chimney (no. 5) constructed (Figure 20).

Another photo (Figure 32) shows pipes being drawn from an operational kiln, and Figure 33 and Figure 34 show the pug mill inside one of the buildings. The clay was evidently barrowed or carted up a ramp to the ‘patent pug mill’ for processing. Figure 35 to Figure 37 illustrate the moulding, junction sticking and drying processes.

The Products

Figure 38 to Figure 40 some of the products advertised in 1906 Price List. The majority are pipes and sanitary wares of various sorts, but more decorative wares are also featured, such as garden edging, decorative as well as plain bricks, a range of chimney pots, water filters, finials and balusters, and kitchen wares such as bread pans and jars. It is likely that the decorative wares were made by Carder’s rather than Clark’s, as many of the illustrations used are the same ones that appear in a contemporary Carder’s Price List (JTDC 2003: 1300BNE). Carder’s was known to produce these wares while Clark’s focussed on pipes and sanitary wares.

The Price List also advertised ceramic building blocks of the type used to build Clark House:

‘These building squares or blocks will shortly be introduced to the market for the FIRST TIME. They were the invention of Mr. R.O. Clark, senr., who built his first house of them. So well were they liked, that when erecting his new house, nothing else was used in the foundations, outside walls, or partitions. To the best of our knowledge, this is the only house of its kind in existence at present’ (1906 Price List, p.36).

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THE POTTERY WORKS, *CONTINUED*

The Products, *continued*

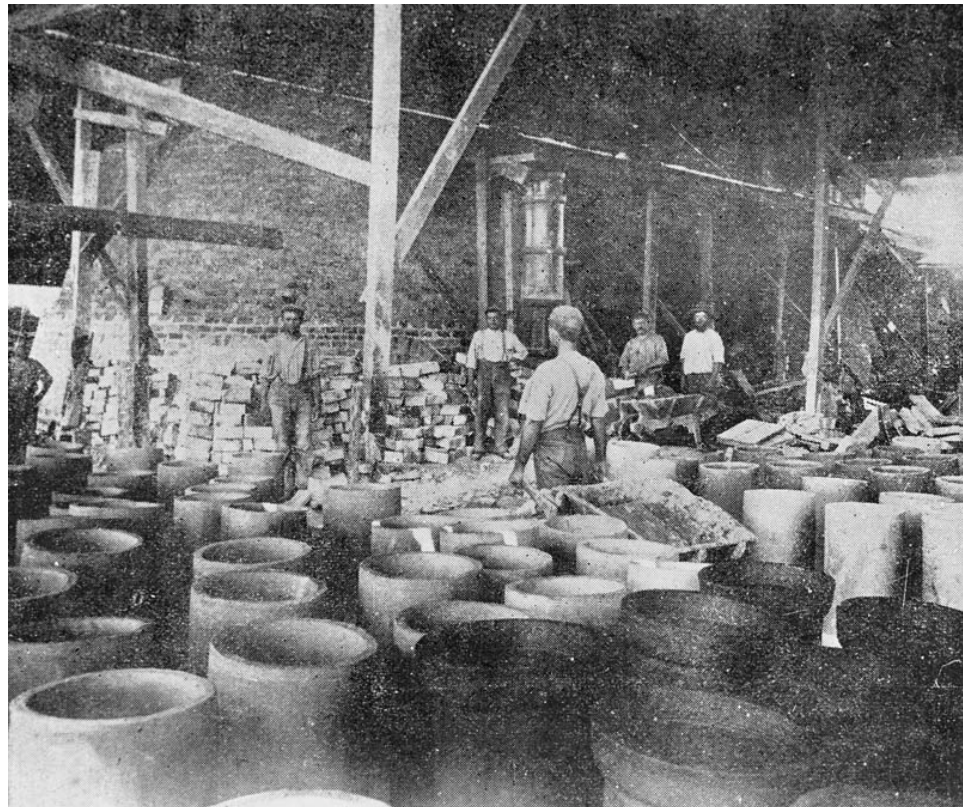
Another forthcoming building material was also announced:

'Don't forget that we shall shortly be introducing the material that gets damaged in the burning (i.e., broken pipes), for concrete.

Scoria is largely used, but we claim that our material takes much less lime or cement to coat it over than does scoria, and it sets much harder and binds closer. We have a 12ft. diameter chimney built of this material, and also a 34ft. diameter kiln partly built of the same at our works, and find that the concrete even exceeds our expectations for strength, with a minimum of lime and cement.' (1906 Price List, p.44).

This material was evident on site in the area where the machine bases were located (see Excavation Results). The 12ft diameter chimney can only have been chimney 4, also located in this area, as chimneys 1-3 had been in place for many years and chimneys 5-7 had not yet been built.

Figure 31. 'One of the Kilns in course of construction', from R.O. Clark's 1906 Price List, p.16. WCC LIS, JTDC.2003. 6.PH.4261



Continued on next page

THE POTTERY WORKS, CONTINUED

Figure 32.
"'Drawing" or
unloading a kiln
of pipes. There
are seven of these
kilns and two
more building',
from R.O.
Clark's 1906
Price List, p.18.
WCC LIS,
JTDC.2003 1298

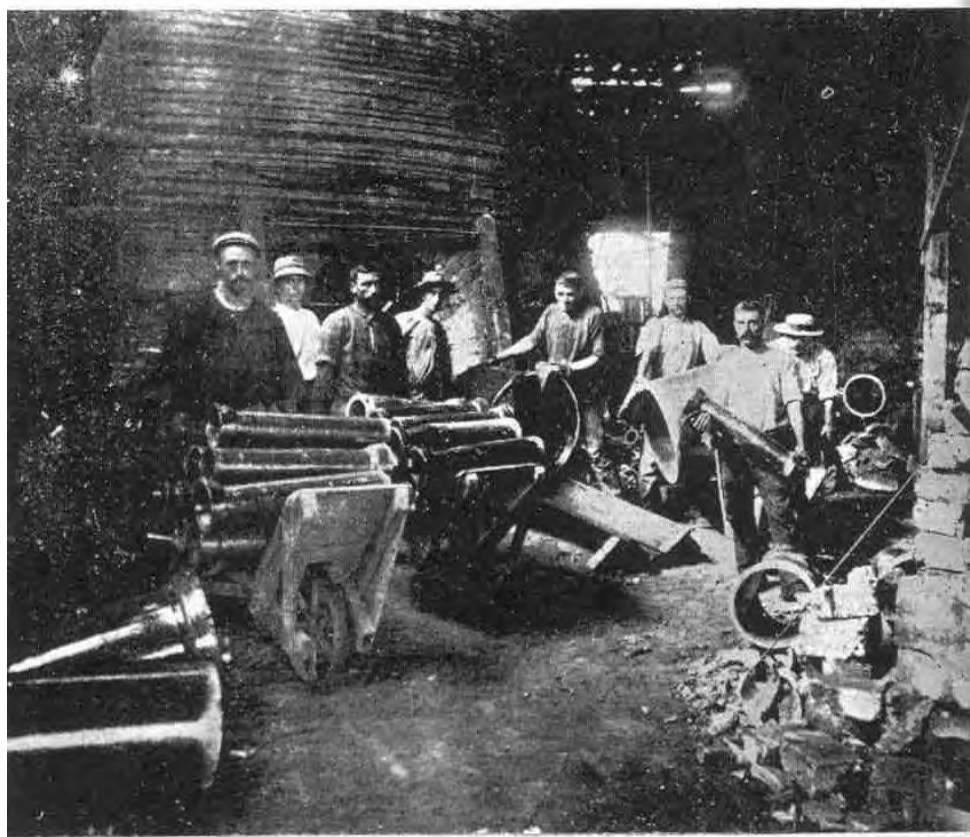
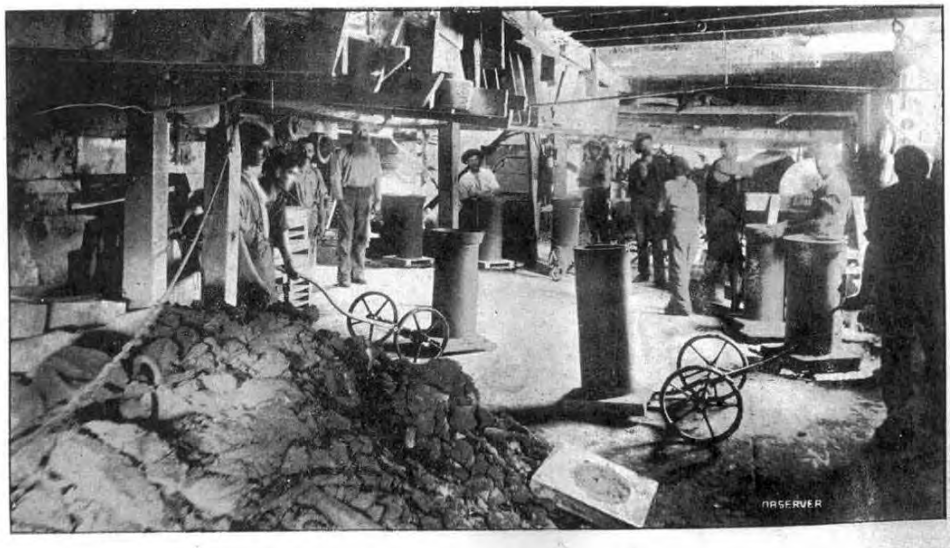


Figure 33.
'Scene at the
bottom of one of
the Patent
Pugmills', from
R.O. Clark's
1906 Price List,
p.61. WCC LIS,
JTDC.2003 1298



Continued on next page

THE POTTERY WORKS, CONTINUED

Figure 34. 'Scene at the top of one of R.O. Clark's Patent Pug-mills', from R.O. Clark's 1906 Price List, p.59. WCC LIS, JTDC.2003 1298

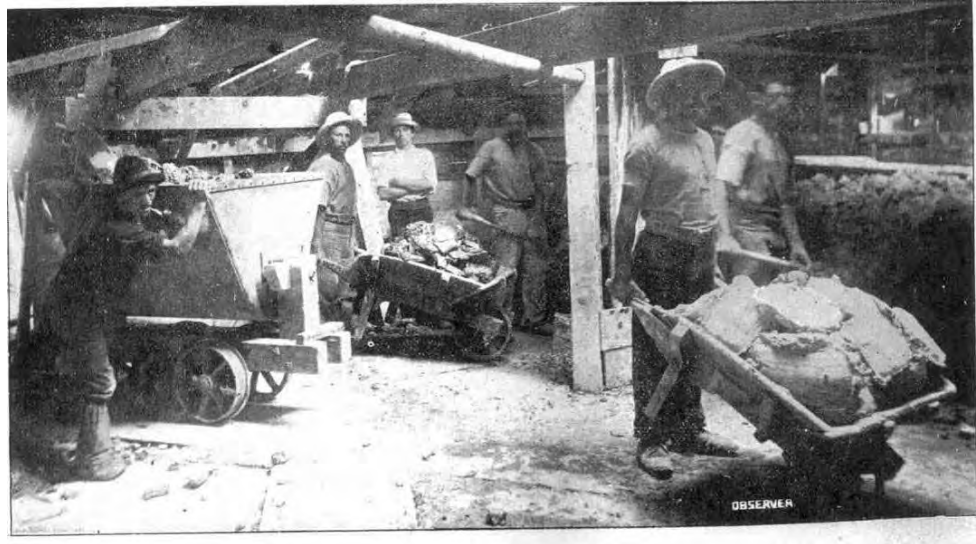
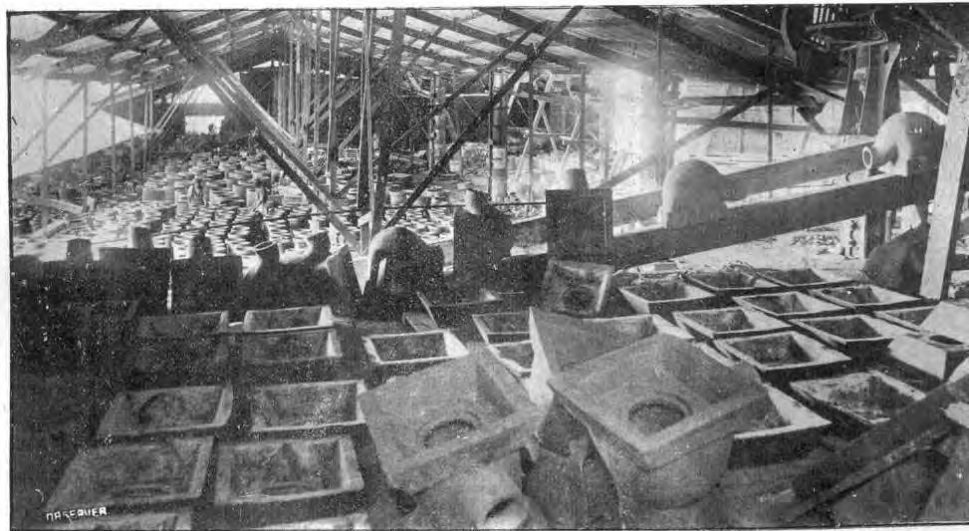


Figure 35. 'A look through the works, showing portions of both moulding and drying sheds', from R.O. Clark's 1906 Price List, p.57. WCC LIS, JTDC.2003 1298



Continued on next page

THE POTTERY WORKS, CONTINUED

Figure 36.
‘Showing the
junction stickers
at work making
elbows,
junctions, and
various traps and
cess-pits’, from
R.O. Clark's
1906 Price List,
p.57. WCC LIS,
JTDC.2003 1298

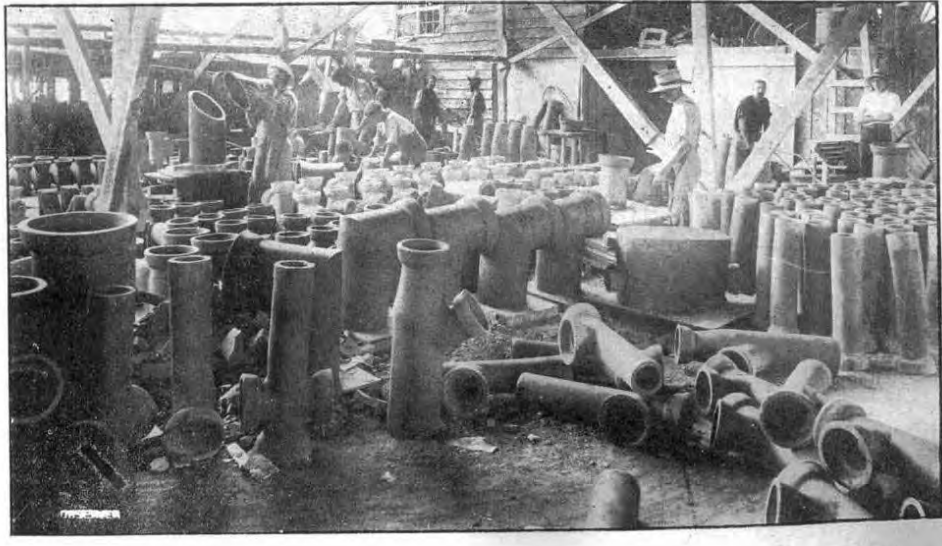
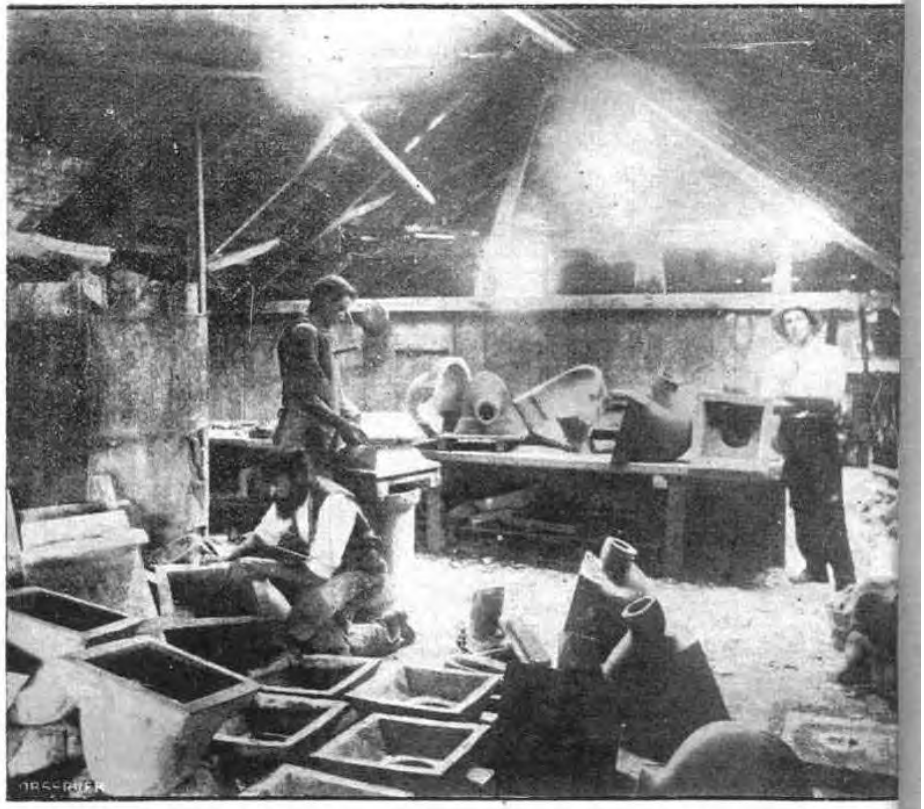


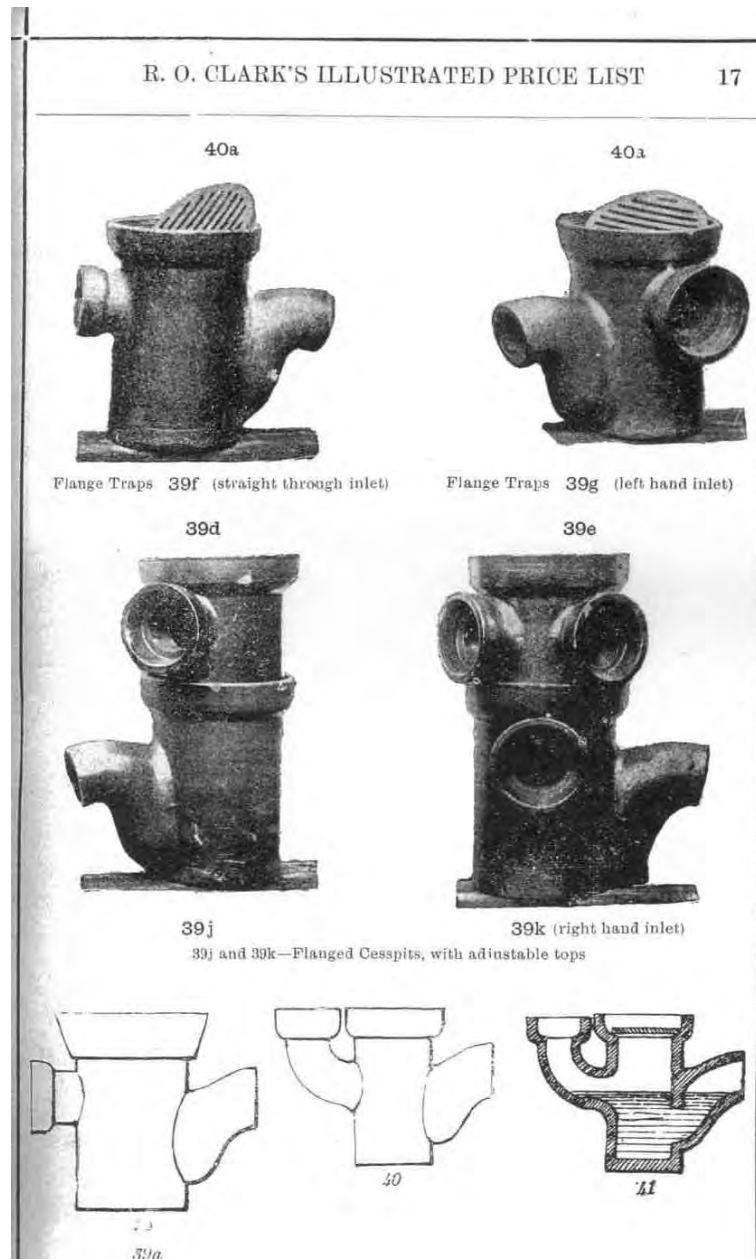
Figure 37. 'Two
Moulders at
Work', from
R.O. Clark's
1906 Price List,
p.14. WCC LIS,
JTDC.2003 1298



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THE POTTERY WORKS, *CONTINUED*

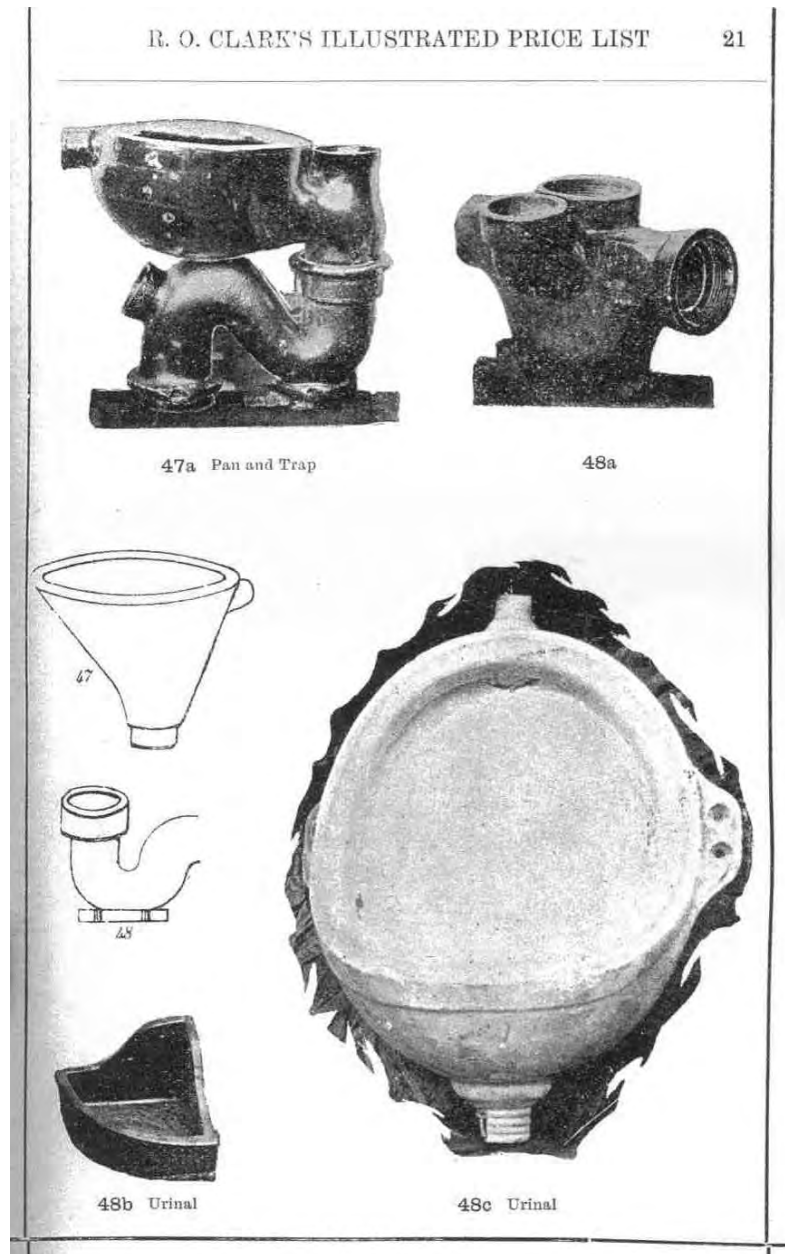
Figure 38.
Illustrated
examples of traps
and cess-pits,
from R.O.
Clark's 1906
Price List, p.17.
WCC LIS,
JTDC.2003 1298



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THE POTTERY WORKS, CONTINUED

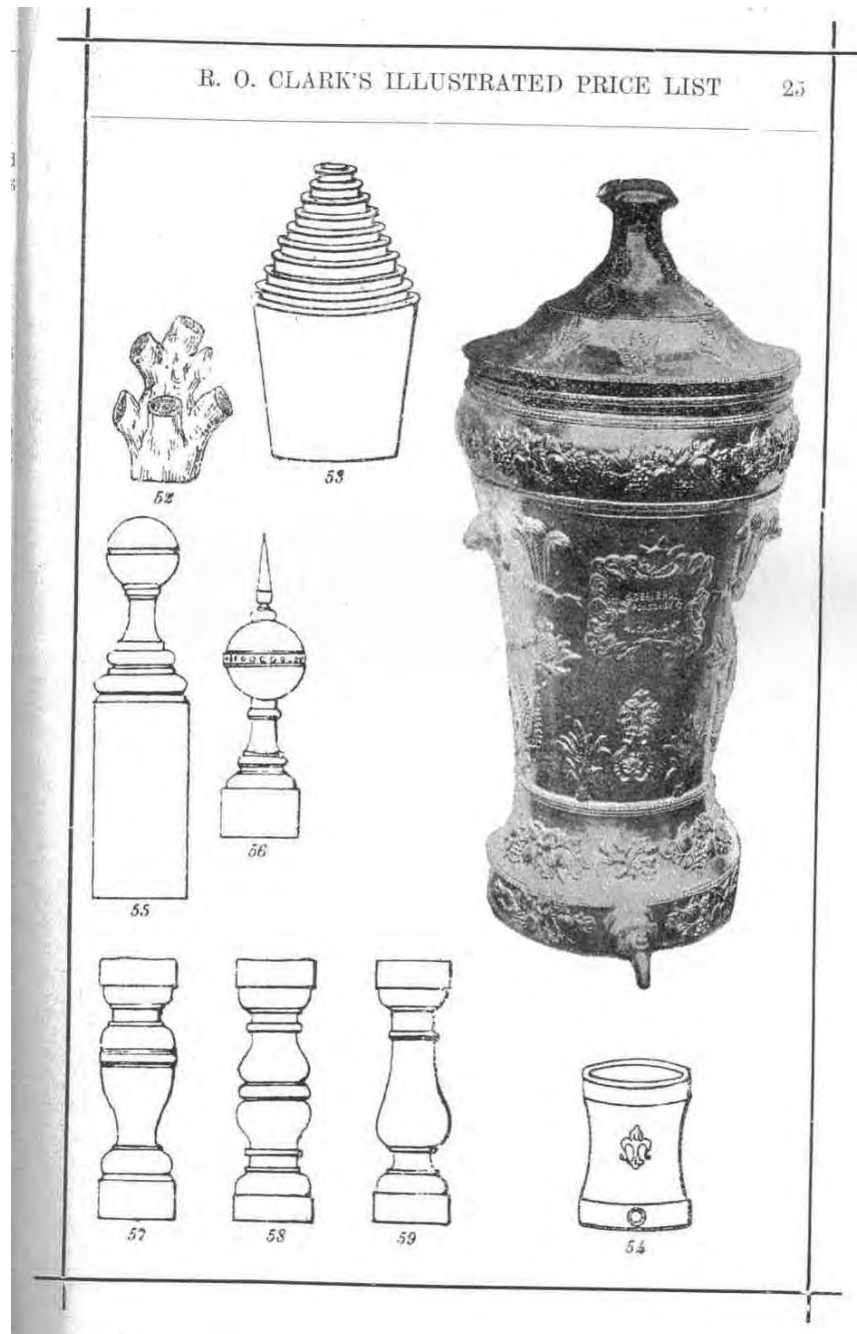
Figure 39.
Examples of
sanitary wares,
from R.O.
Clark's 1906
Price List, p.21.
WCC LIS,
JTDC.2003 1298



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THE POTTERY WORKS, *CONTINUED*

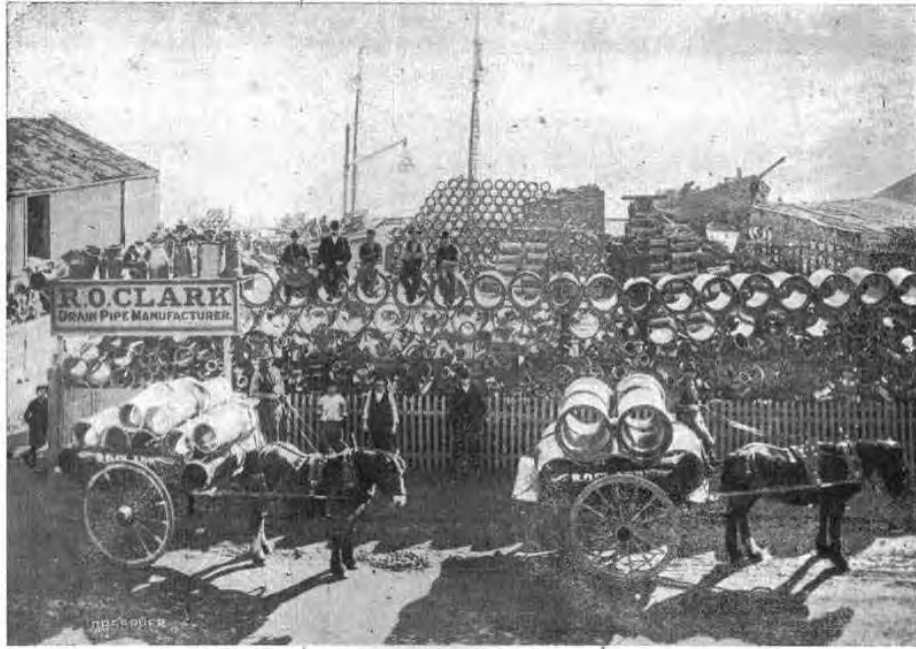
Figure 40.
Examples of
ceramic 'tree
stump' (52),
flower pots (53),
terracotta finials
(55-6) and
balusters (57-9),
and water filters
(54), from R.O.
Clark's 1906
Price List, p.25.
WCC LIS,
JTDC.2003 1298



Continued on next page

THE POTTERY WORKS, CONTINUED

Figure 41.
'Showing stock
always kept on
hand at the yard,
Customs Street
West', from R.O.
Clark's 1906
Price List, p.7.
WCC LIS,
JTDC.2003 1298



GEOPHYSICAL SURVEY RESULTS

Introduction

Matt Watson from Scantec Ltd was commissioned to undertake geophysical survey in the area of the brickworks and later to the rear of Clark House to identify and map features of archaeological and geological/geomorphological interest. Locations for geophysical survey of areas of archaeological interest were identified by Clough & Associates. The geophysical survey work was carried out between May and August 2007 and the results were provided to Clough & Associates by Matt Watson, overlaid on a base plan of the site elements of which were provided by David Stone, Project Manager, of Syndicate Group, and by Waitakere City Council. The survey results were of some assistance in identifying areas for investigation, and when compared with the excavation results (see below) provide a useful case study on the value and contribution of geophysical survey techniques to the investigation and interpretation of archaeological sites.

The main area surveyed was the coastal flats, which were the known location of the historic works. The lawn to the south of Clark House was also surveyed in an attempt to trace a reported former tunnel extending from Clark House to the pottery works.

Scope and Methodology

Criteria	Description
Objectives	The objectives were to: <ul style="list-style-type: none">• Identify geological/geomorphological features that might be of heritage value• Identify areas that might contain remnants of the earlier brickworks and also the historically reported tunnel running between the brickworks and Clark House.
Technique	Techniques used: <ul style="list-style-type: none">• Ground Penetrating Radar (GPR)• EM34 Conductivity survey• GSM-19 Gradiometer
Location & environmental conditions	This is a flat coastal environment located on Pleistocene clay deposits. The weather was fine during most surveys.
Interpretation	Described below
Testing	Testing of results was carried out as part of the S18 investigation.

Continued on next page

GEOPHYSICAL SURVEY RESULTS, CONTINUED

Techniques Used

The different techniques used reflect the different objectives:

- GPR has the highest resolution of the techniques and is used to create a 3D model of the ground by detecting different levels of dielectric permittivity, which is largely determined by the type of geological material and moisture content. It is also considered the most useful technique in an industrial environment where there has been a build up of historic debris which creates noise for gradiometer survey.
 - The EM34 is a conductivity meter which measures changes in the earth's electrical field resulting from both cultural and natural events. It is based on measurements of the electrical conductivity of the ground. The EM34 has a coarse grid with a coil separation of 10m making it suitable for deeper features.
 - The use of the GSM-19 gradiometer, which determines changes in the magnetic field, was used to complement the GPR and conductivity results. It was assumed that the modern rubbish piles and demolition which had dispersed numerous iron objects through the site would generate considerable noise in the GSM-19 signal but that large anomalies would still be detected above this background.
-

Results

The results of the survey proved variable but interesting (Figure 42-Figure 46). The EM34 survey was coarse grained and results (Figure 44) were generally insensitive to visible (and invisible) archaeological features, but did appear to produce a contour pattern probably relating to saline intrusion which appeared to provide an indication of the original shoreline prior to infilling of the bay.

Five GPR lines were run and indicated deep features in several areas (Figure 45-Figure 46).

Two passes (coarse and fine) were made over the area of the site with the GSM-19 Gradiometer, which also detected several areas of intense (positive or negative) anomaly (Figure 42-Figure 43). It produced a very strong pattern around the visible machine foundations in the centre of the site, which probably relates to the volume of iron bolts, pipes and plates in and around the concrete features. The exposed kiln (K1) did not produce a strong signal, while iron debris slightly to the west did. The western end of the site had four kilns and a stack when recorded by Diamond in 1966 (Figure 27), but apart from two or three small anomalies there was no indication of these features. The large rubbish heap in the east also produced a strong anomaly relating to the number of iron objects (car bodies, engines etc) in the pile. A strong area of anomalies was also detected in the southeast corner of the site where Diamond had recorded kilns in 1966.

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GEOPHYSICAL SURVEY RESULTS, *CONTINUED*

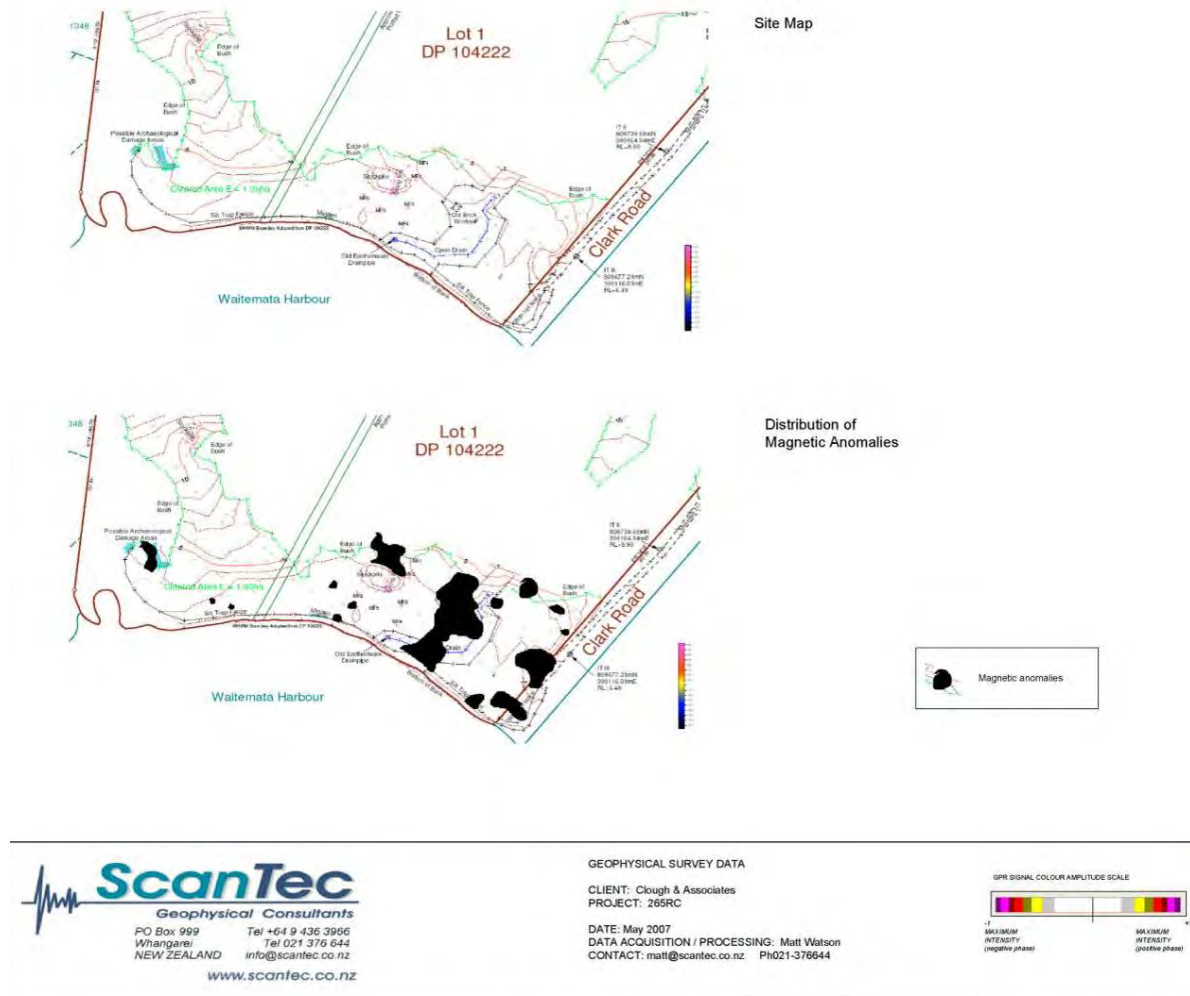


Figure 42. Distribution of magnetic anomalies based on survey using Magnetic Overhauser Gradiometer GSM-19

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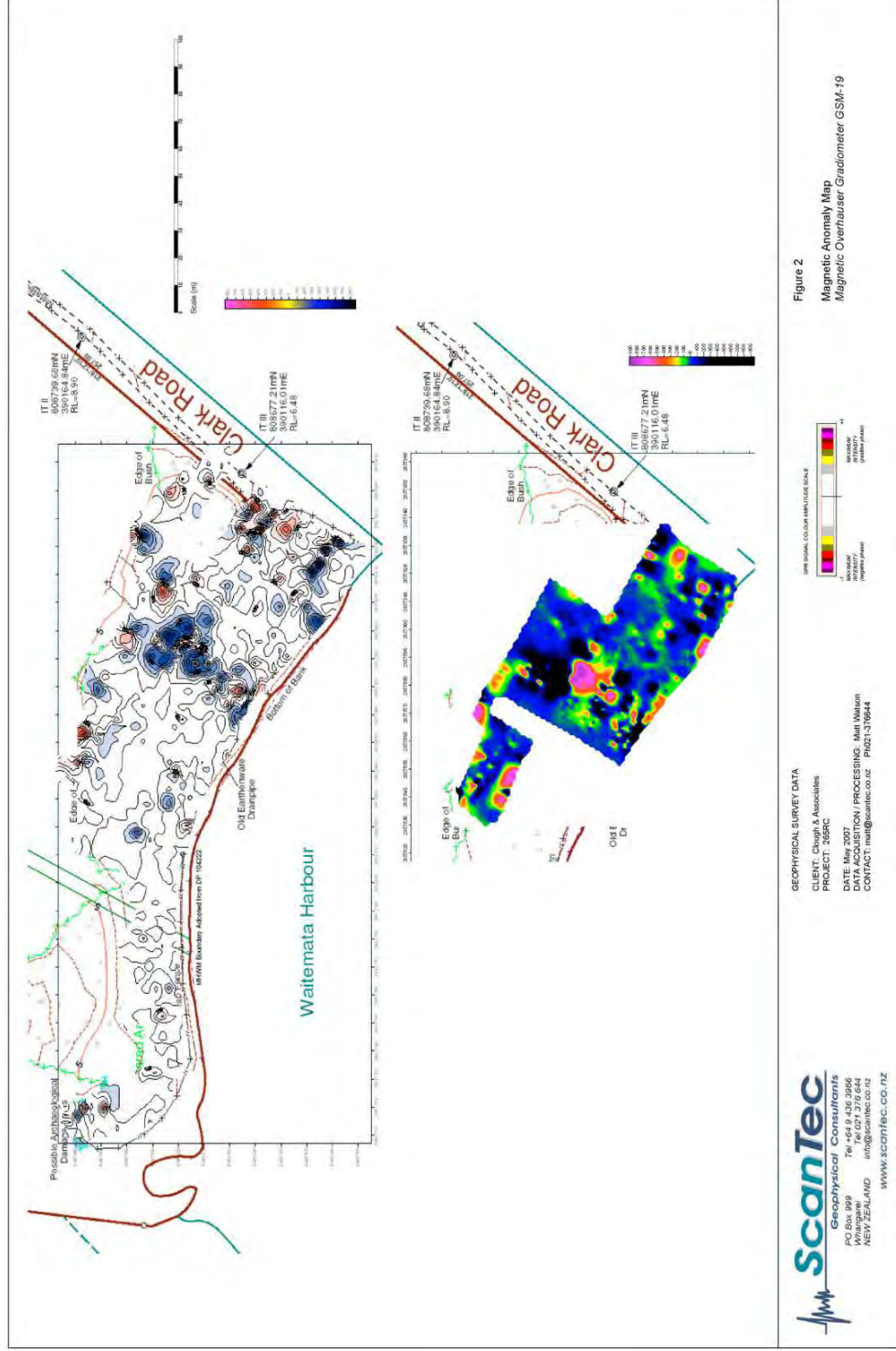


Figure 43. Magnetic anomaly map details (Magnetic Overhauser Gradiometer GSM-19)

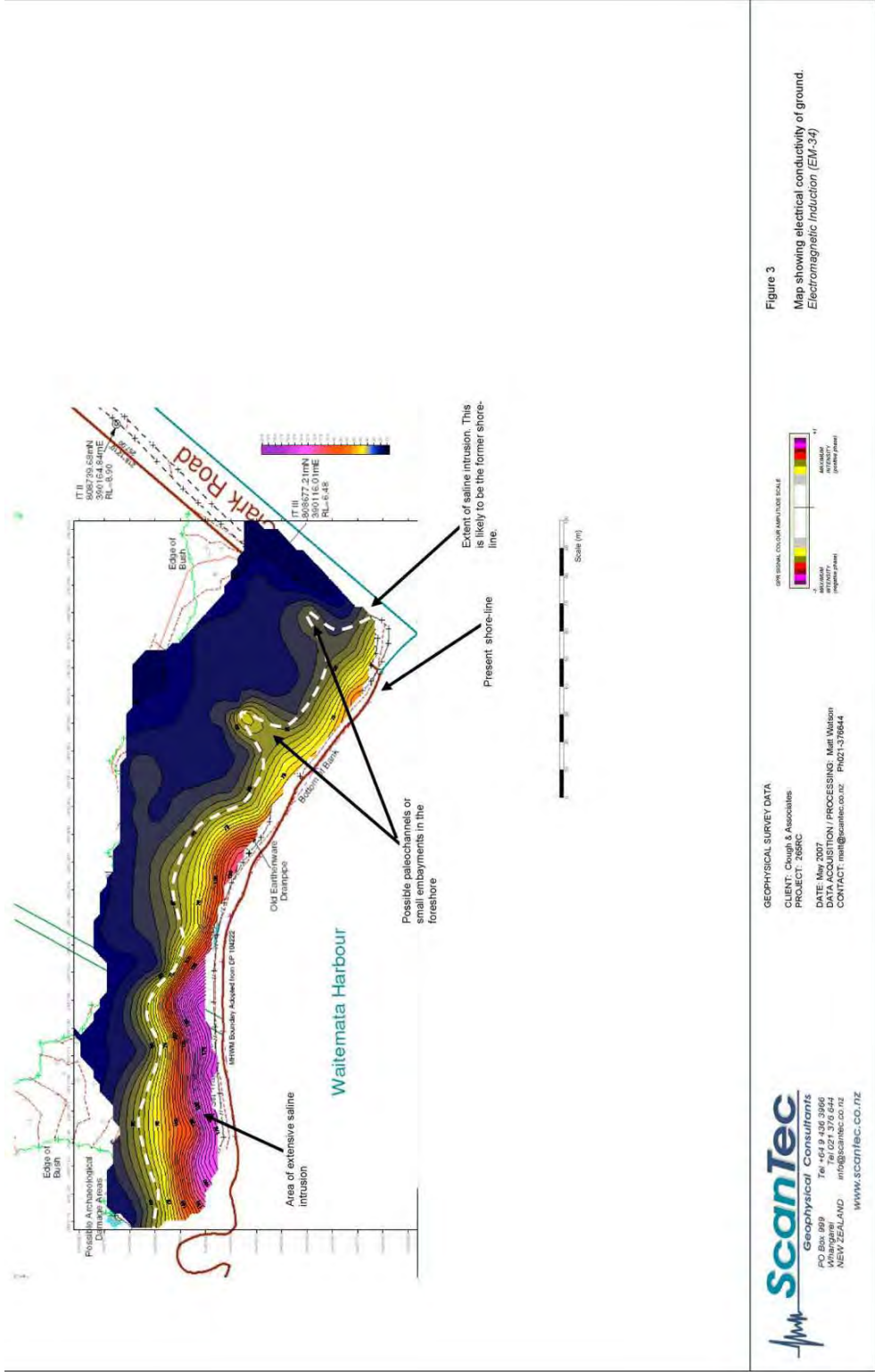


Figure 44. Map showing electrical conductivity of ground (Electromagnetic Induction (EM-34); white dotted line indicates the extent of saline intrusion and is likely to be the former shoreline

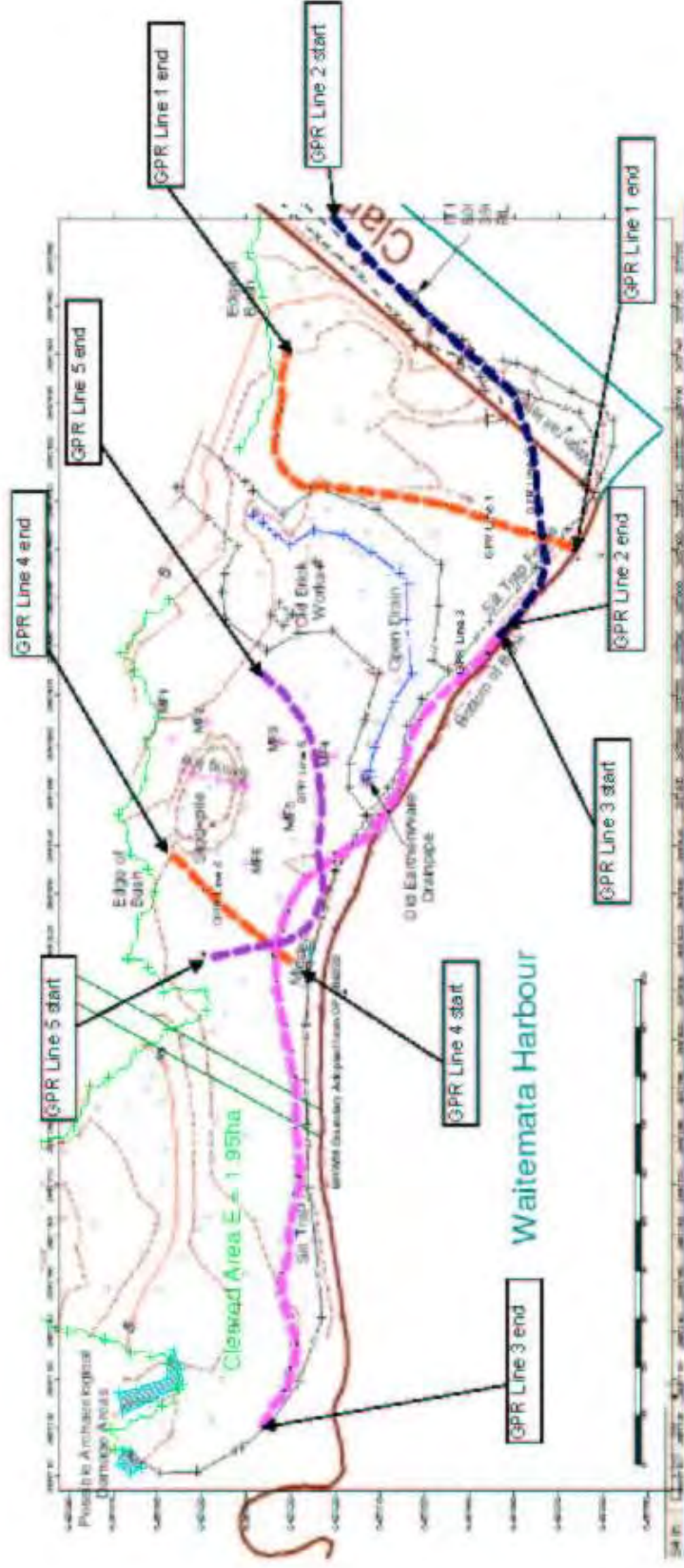


Figure 45. GPR survey line locations

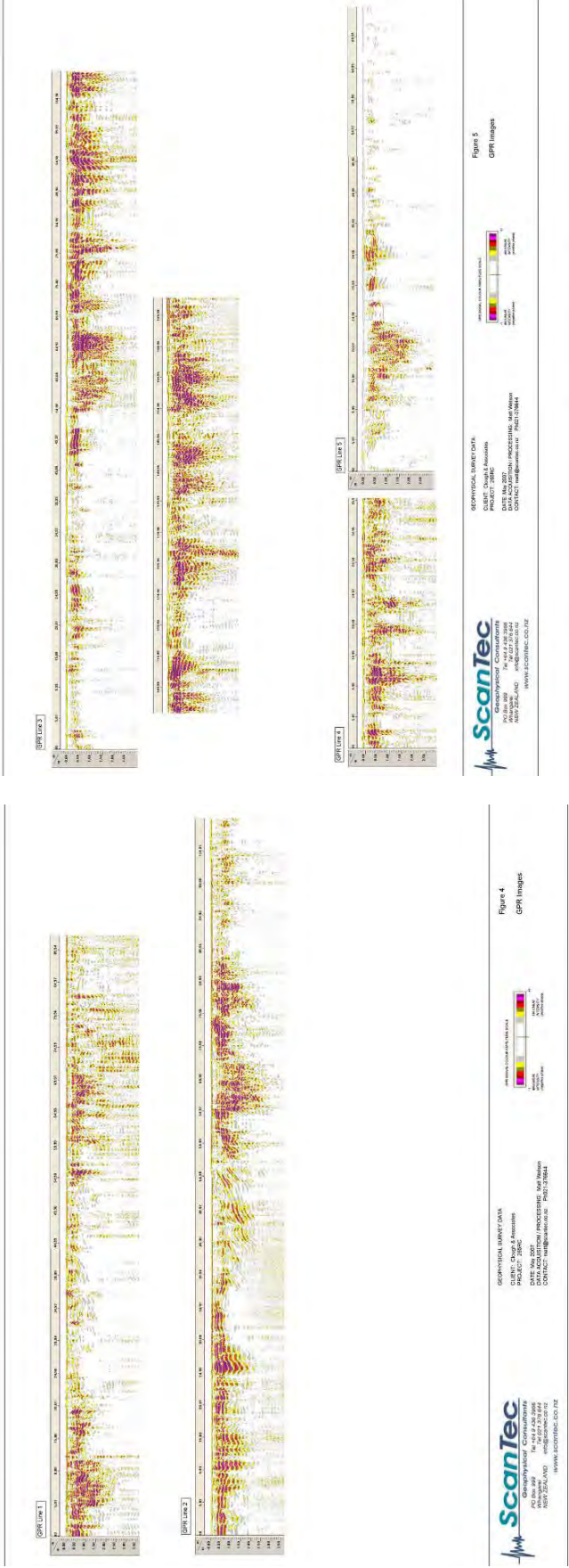


Figure 46. Ground Penetrating Radar results along GPR lines 1 (above left), 2 (below left), 3 (above right, top two profiles), 4 and 5 (below right)

EXCAVATION RESULTS

Introduction

The section 18 investigation of the site was carried out to determine the extent and nature of the remains of the historic brickworks. The results were expected to inform on the potential for preservation and presentation of the remains.

The positioning of the investigation trenches was influenced by four sources of information:

1. Visible surface features such as concrete foundations and further features exposed during vegetation clearance
2. Jack Diamond's sketch of the remains on site in 1966 (Figure 27 to Figure 29) and
3. Geophysical survey (gradiometer, conductivity and GPR)
4. The historic works as depicted on the 1881 plan and subsequent photographs

In addition, the remains as they were exposed influenced the direction of the investigation.

Excavation Methodology

The first task was to move some of the piles of rubble resulting from several occasions of site clearance and bulldozing. One of the tasks was to extract as many bricks as possible from the rubble for possible future use in reconstruction of parts of the site. In addition to ceramic products (bricks, pipes, inspection covers) the rubble contained a considerable number of metal objects ranging from metal spikes to car bodies and engines (the site has been used as a dumping ground for a number of decades). Some of the metal objects (spikes, banding and stays) clearly related to the life of the brickworks; others such as hammer heads and crowbars may have done so; but many of the objects were the result of modern dumping. While some of these objects were recorded and photographed (e.g. Figure 144 to Figure 146 below), they were not mapped or recorded in any detail because they lacked provenance.

The investigation opened two main areas where kilns and remains had been observed in 1966 on the eastern and western parts of the site (Figure 27). The western area included the location of the damaged kiln (K1). The area opened at the eastern end of the site included the location of the early works shown on the 1881 plan. Two trenches were also dug running approximately north-south to investigate the nature of the reclamation that was both indicated on the historic plan (see Figure 13) and revealed through the conductivity survey (Figure 44).

The surface overburden and rubble were removed by machine and features were then exposed by hand to avoid unnecessary damage.

The archaeological features were mapped in outline using a total station EDM, and a detailed photographic record of features was made.

Continued on next page

EXCAVATION RESULTS, CONTINUED

The Archaeological Remains

Prior to the investigation the main visible in situ remains consisted of concrete machine foundations in the central part of the site, the kiln base (Kiln 1) exposed by recent site clearance, and remnant wharf features at the water's edge. A number of smaller (up to c.1.5 x 0.75m) foundations of concrete with ceramic aggregate and wooden insets were also visible, and an iron boiler had been placed near the wharf area.

During the investigation numerous remains relating to the pottery works were exposed and recorded. These included remains of 9 kilns, 2 stacks, brick service floors, numerous foundation piles, machine bases, foundation walls and drains. Unprovenanced artefacts, including ceramics, glass and metal were found in rubbish heaps and around the site.

The site features are shown in Figure 47 and Figure 48 in relation to the extent of the site apparent in the 1940s aerial photo and the original shoreline marked on the 1881 plan. Figure 49 and Figure 50 show enlarged plans of the eastern and western areas of the site. The dimensions of the kilns, stacks and drainage features are given in Table 1.

Photographs of the main features and details of their construction are shown in Figure 53 - Figure 123.

Excavation conditions, which were extremely wet (Figure 52), did not allow the bases of some features to be investigated at this stage, and it is clear that drainage will be an issue in any future preservation and presentation of the remains.

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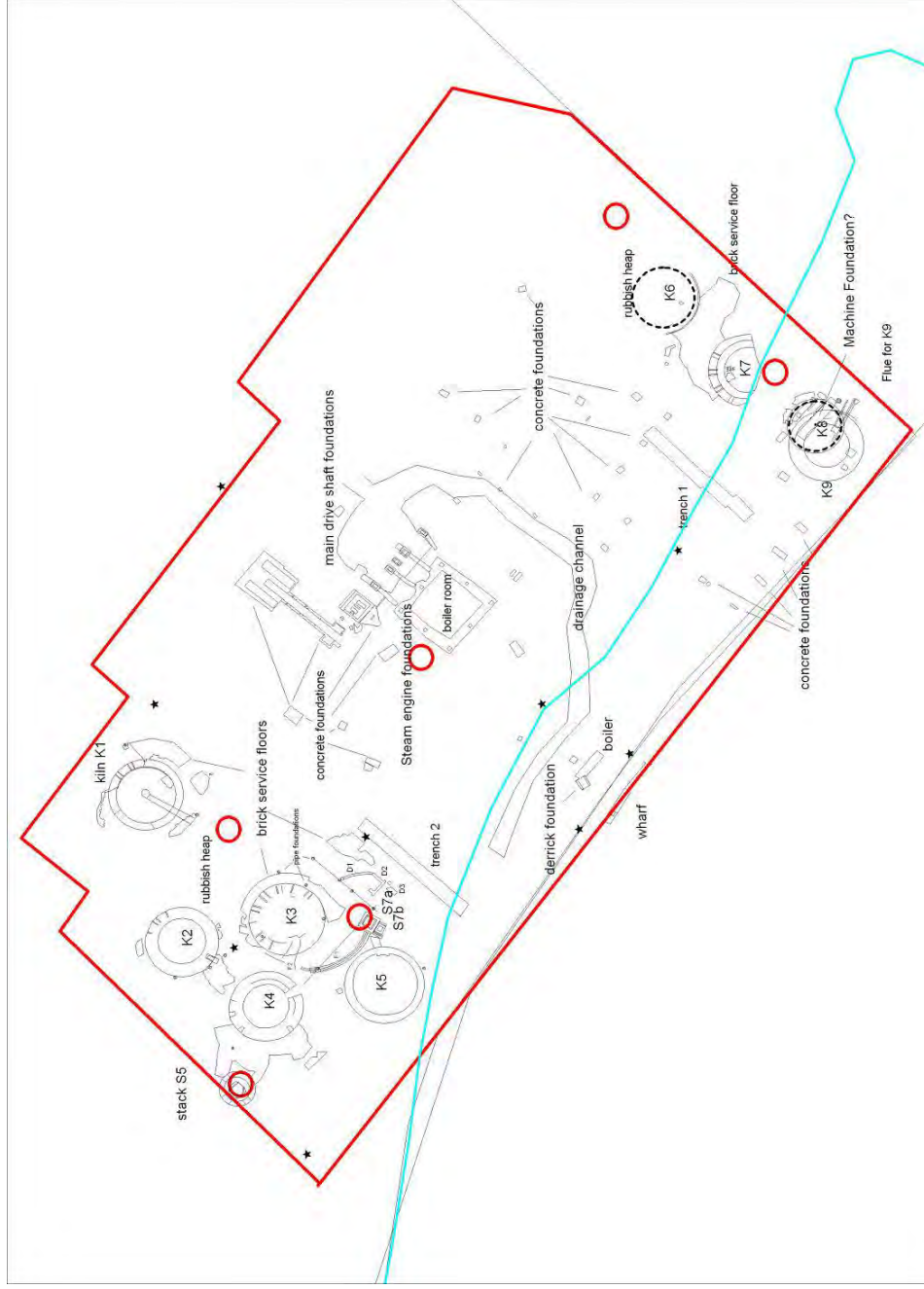


Figure 47. Plan of site with outline of buildings and stacks shown in 1940s aerial overlaid (in red) and original coastline shown in 1881 plan (in blue)



Figure 48. Site features overlaid on 1940s aerial. Note that the aerial is taken at a slightly oblique angle. Approximate locations of stack bases circled in red

Table 1. Dimensions of kilns, stacks and drains

Feature	Int. Diam.	Ext. Diam.	Wall Width	Chequer Floor	Firebox Ext. Wall	Firebox Int. Wall	Inter Firebox (outer)	Inter Firebox (inner)	Flue	Brick Detail	Brick Size
Kiln 1	7500	9500	1000		669	650	1600	1300	c.1400 wide	two courses of double sized arch bricks, mixed sq & rect bricks, including KAMO, A.G.Co., J.J. CRAIG, GLENBURN bricks	two sizes (cm): square c.23 x 23 x 11
Kiln 2											and
Kiln 3	7450	9500	1000		700	500	1650	1300		base of kiln wall mainly square bricks	
Kiln 4	7600	9500	850				1600			re-use of bricks, mixed bricks	
Kiln 5	8000	10200								mixed sq and standard	rect angular
Kiln 6			1000							chequer floor grid base, bricks on edge 130mm apart lengthways, 160mm apart sideways - chipped	c.21-23 x 10-11 x 7-8
Kiln 7	8000	10200	1000	5600		600mid		1350		ceramic aggregate filling base between brick grid - special chequer perforated bricks - heavily glazed	
Kiln 8	Kilns 8 and 9 only partly exposed but appear to be of similar size to Kilns 1-7										
Kiln 9											
Stack 5		4500	1050							internal wall single course glazed brick	
Stack 7a	1360x1380	2150x2150								bulk of bricks of inner skin pressed salt glazed, except 1 KAMO brick. Outer bricks mixed sq & rect reused, some 'DRURY'	
Stack 7b	600x600	1040x1160									
S7b gate housing	1020x80	800x1051									
Drain 1	300 collar	680mm I								ROC Ltd	
Drain 2	350 collar	680 I								ROC Ltd	
Drain 3	640	?								R.O.Clark (....onville)	

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EXCAVATION RESULTS, CONTINUED

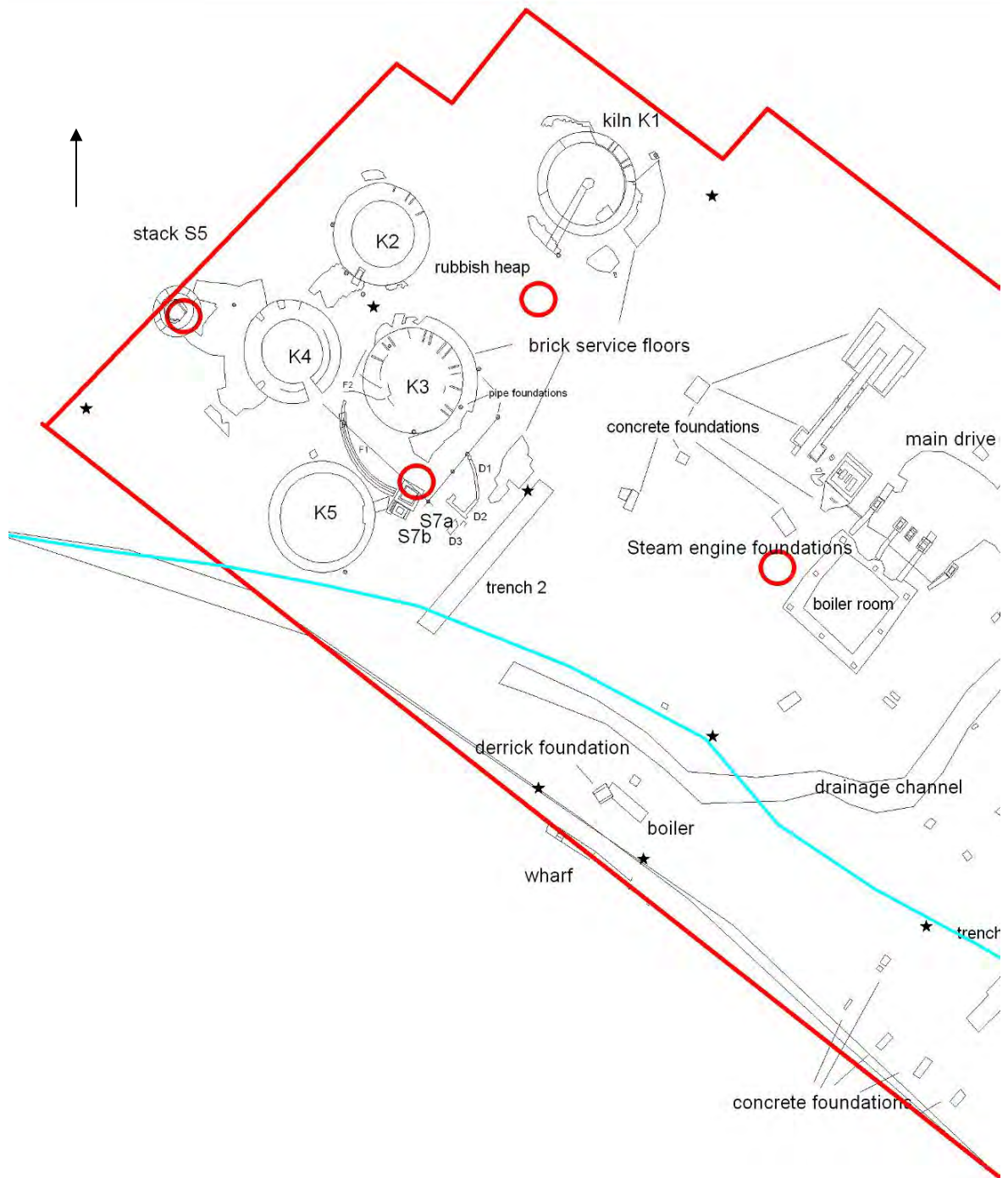


Figure 49. Plan of excavated and visible remains - western area

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EXCAVATION RESULTS, *CONTINUED*

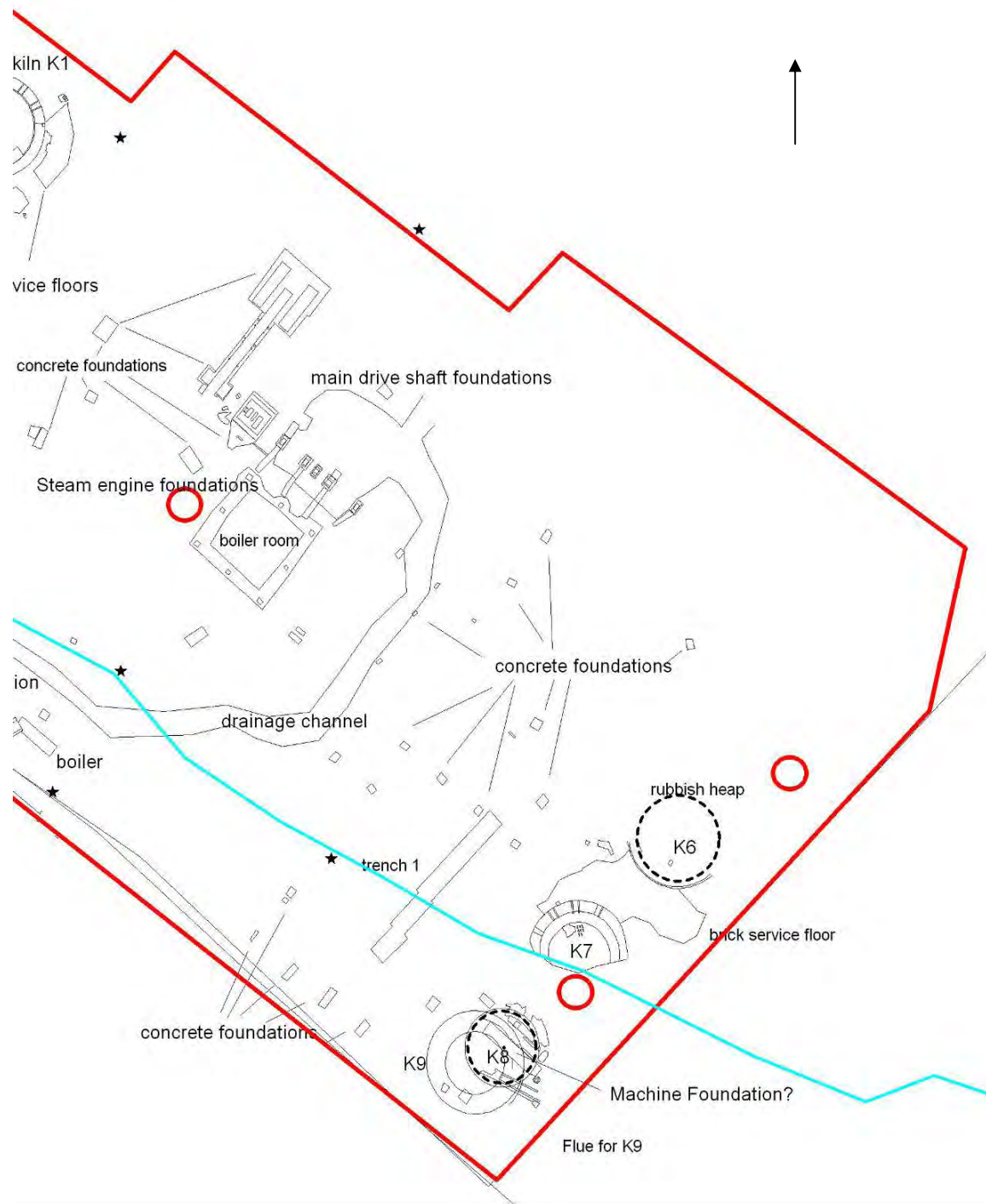


Figure 50. Plan of excavated and visible remains - eastern area

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EXCAVATION RESULTS, CONTINUED

The Kilns

The remains of 9 kilns were exposed during the investigation, 5 in the western area and 4 in the eastern. The kilns were in variable condition but some general observations can be made relating to their characteristics.

All were downdraft beehive kilns of similar dimensions, with external diameters between c.9.5 and 10.2m (Table 1). Although most kilns were demolished to the level of the service floor, most had sufficient remains to provide an approximate idea of the structure of these kilns, and a generic plan based on those investigated is provided in Figure 51.

All kilns would have had between 12 and 14 fireboxes, a wicket (a temporary opening for loading and unloading the kiln), a chequer (a ventilated loading floor) and a subfloor arched flue leading to an external stack, although many of these features had been removed during earlier demolition of the site.

Construction varied in both composition and design. Square double sized extruded bricks were found in all kilns, as well as in other features such as stacks and service floors, but they were often re-used and mixed with both normal and refractory bricks (e.g. Figure 55, Figure 58, Figure 59). Service floors around the kilns had an even greater mixture of brick sizes and degrees of use (overburns, old kiln bricks, old arch bricks, etc). Flues, where they remained, were constructed of a double layer of arch firebricks, which were often double sized bricks.

Fireboxes were largely the same size (c.700mm exterior width), but some were terminated at the outer wall by an iron bar (Figure 69), while others extended into the service floor (Figure 70).

One kiln (K7) contained the intact remains of part of the chequer (a perforated stacking floor within the kiln). This was smaller in diameter than the interior of the wall, indicating the presence of a muffle or bag wall separating the stacked wares from the direct heat of the fireboxes (Figure 109). Chequers had not survived in other kilns but K1 and K4 had indications of a similar construction in the form of parts of a sub-chequer floor.

Brick service floors surrounded all kilns and would have provided a working surface within the factory which covered and protected underground flues, water and drainage pipes.

Kiln K1 (Figure 53-Figure 61) had several courses of bricks extending over about a quarter of the circumference of the kiln wall. A central double skinned brick flue was largely intact, but the kiln floor had been demolished. Three fireboxes were present on the northern side. A few bricks inside the kiln were possibly the remains of a sub-chequer floor. Recent damage was confined to the top course of the surviving kiln wall. A few bricks with maker's marks (KAMO, J.J. CRAIG, GLENBURN (also made by J.J. Craig) and an Auckland Gas Co. brick) were incorporated into the construction of the kiln base.

Continued on next page

EXCAVATION RESULTS, CONTINUED

The Kilns, *continued*

Kiln K2 (Figure 62) was largely destroyed, but small areas of the kiln wall were partially intact, including one possible firebox. There was a 'HUNTLY FIREBRICK' in the adjacent service floor.

Kiln K3 (Figure 63-Figure 64) was more intact, with over half of the circumference of the kiln wall surviving at the firebox level. The remains of 8 fireboxes, varying in construction, had survived (Figure 65-Figure 70). A later foundation pile had cut through one of the fireboxes in K3.

Kiln K4 (Figure 77) had almost all of the lower course of the kiln wall, but there were only indications of 4 fireboxes. The wall was constructed predominantly of large square bricks (Figure 79). A remnant part of the flue leading to stack S5 had survived, and part of the sub-chequer floor.

Kiln 5 (Figure 64, Figure 78). The lower courses of bricks in the kiln wall were largely intact around the full circumference, built of a mixture of brick types held together with soft mortar (Figure 81-Figure 82), and a flue connected the kiln with stack S7 (Figure 83-Figure 84). There was no indication of fireboxes.

Kiln K6 (Figure 103, Figure 108). About a quarter of the circumference of the kiln wall on the southern side was exposed, and further remains are possible under a large rubbish heap to the north, but it is likely that the rest of the kiln has been destroyed. This kiln is unusual in that the service wall rises to meet kiln, whereas the other kilns have service walls either level with or sloping down to the kiln.

Kiln K7 (Figure 104-Figure 109) is one of most intact kilns, but was only partially excavated because it was covered by the access road. There were several courses of bricks in the kiln wall, and at least 4 remnant fireboxes. This is the only kiln with part of the chequer/loading floor. The chequer floor was heavily vitrified from its last use. The sub chequer floor is largely intact, with a grid of bricks supported in a red chip ceramic matrix providing the foundation for the chequer (Figure 107, Figure 112).

Kiln K8 (Figure 110) had largely been destroyed by the construction of kiln K9 and later machine foundations. Only about a sixth of the circumference of the kiln wall had survived, and a small section of the flue (largely destroyed) with no obvious fireboxes.

Kiln K9 (Figure 110-Figure 111) was partly intact around most of its circumference wall, and had a flue (Figure 115) both internal and external (as in kiln K1) leading in an easterly direction to a former stack (chimney 1, which was not located). The kiln cut through kiln K8 and was itself cut through by a later machine foundation and foundation piles (Figure 113-Figure 114)

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EXCAVATION RESULTS, CONTINUED

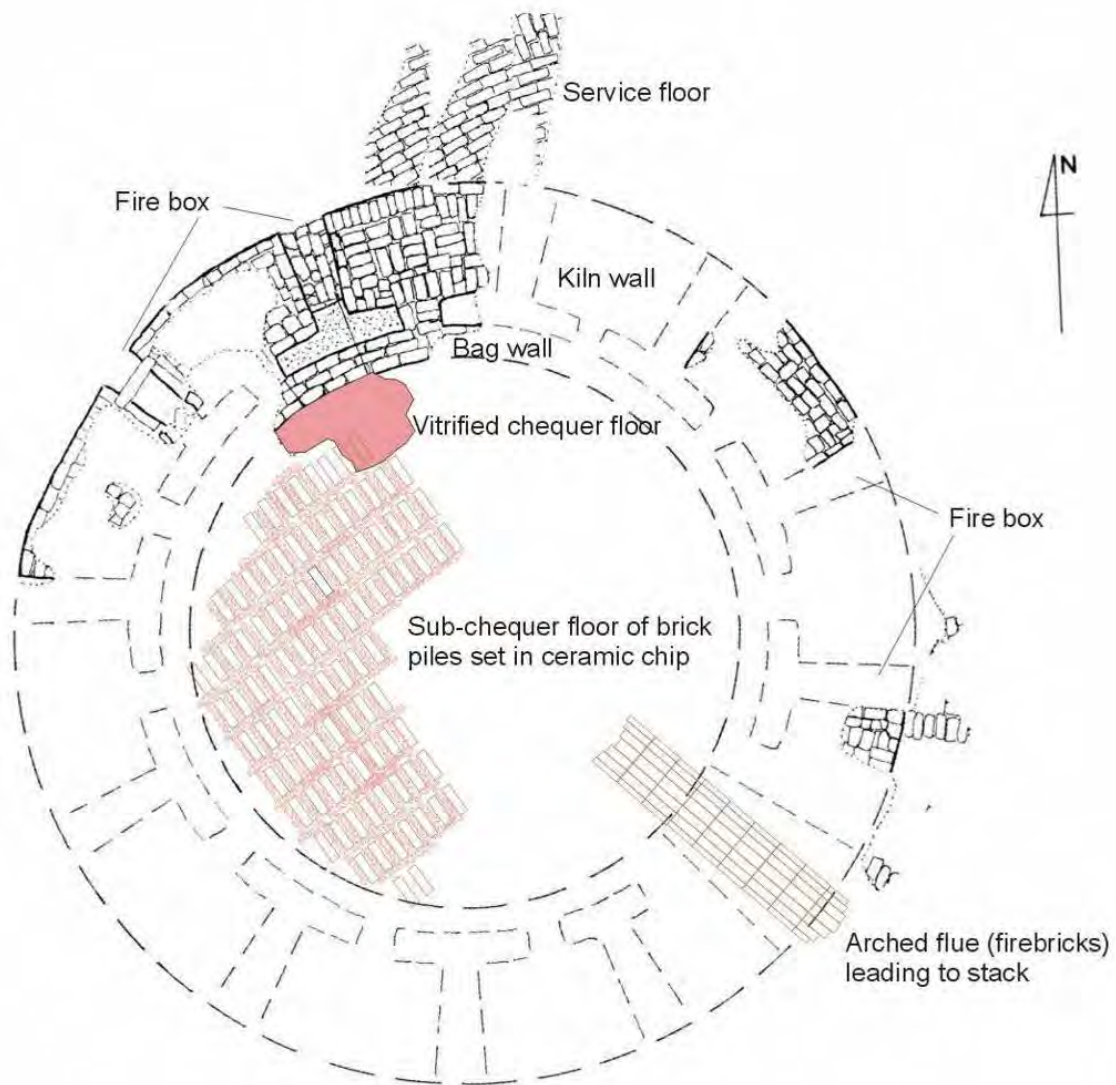


Figure 51. Generic plan of a downdraft beehive kiln based on those investigated at the Clark site. The wickets (temporary openings for loading and unloading the kiln) would have been at a higher level and were no longer present in any of the kilns

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EXCAVATION RESULTS, CONTINUED

The Stacks

Of the seven stacks recorded throughout the life of the pottery works, only two stack foundations were identified. Both were in the western area and their locations show them to be stack S5 and S7 (see Figure 24, Figure 26, and the site plan Figure 49).

Stack S5 (Figure 87-Figure 93) consisted of the base of a thick circular foundation wall, 4.5m in diameter. It has a central chamber leading to an arched flue heading in the direction of K4. Three collapsed areas or sections of the wall suggest that there were possibly 4 flue openings in the original design, although only the easterly flue was functional at the time the works closed. The remnant foundation wall was held together with external iron strapping and the iron strapping had one remnant adjustor bolt intact (Figure 89-Figure 90). The interior chamber of the stack is defined by a semicircular single brick wall, which was not fully excavated because of flooding. A rectangular cemented brick foundation pile was noted in the service floor adjacent to the stack (Figure 92).

Stack S7 (Figure 94-Figure 102) comprised two adjacent square/rectangular foundations 2.15m x 2.15m (S7a on Figure 49) and 1.04 x 1.16m (S7b) in size. The smaller structure (S7b) is attached to kiln K5 by an arched flue and has a sliding steel gate on the western side which would have been used to control the air flow between the kiln and the stack (Figure 97-Figure 101). On the northern side of the chamber another arched passage leads to the larger chamber (S7a). On the northern side of stack S7a is another arched entrance, but this has been bricked off by an internal single skin brick wall, leaving the only entrance to chamber S7a from S7b. However, the blocked off arch clearly indicates that the stack was originally constructed to service more than one kiln, in this case presumably kiln K3. The internal cavity of S7b had reinforcing iron bars (Figure 97). The bricks in S7b were mixed, but included 3 DRURY firebricks. Construction of the stack base for S7a was mixture of bricks but the internal single skin brick wall was largely constructed of machine pressed partially salt glazed bricks and included one KAMO brick. A dense layer of coal fines was exposed between S7a and the service floor for kiln K3 (Figure 94).

Continued on next page

EXCAVATION RESULTS, CONTINUED

- Feature 1** The construction of stack S7 had cut through an earlier feature (F1 on Figure 49) which consisted of a brick arc, possibly a remnant of a circular structure (Figure 83-Figure 86). The lower course was constructed of large hollow glazed ceramic blocks similar to those used in the construction of Clark House, on top of which was a double course of the square bricks found throughout the site. Feature 1 had also been cut by later concrete foundations and possibly represented one of the earliest structures at this end of the site. However, it does not appear to have been a kiln as the construction materials would not have been suitable.
-
- Feature 2** Another curved feature (F2) was encountered near F1 and kiln K3 (Figure 50, Figure 80). Feature 2 appears to be a collapsed double skinned arched flue. It has been extensively damaged but runs between kiln K3 and K4 and appears to overlie the lower course of K3.
-
- Machine Foundations** In the centre of the site, corresponding to the centre of the buildings shown in the 1940s aerial photo, there is a large complex of substantial foundations (Figure 48, Figure 116-Figure 119). These foundations are constructed of concrete, with broken pipe aggregate and have inset iron bolts and metal securing plates. The foundations are elevated by between 0.6m and 1m above the current ground level. They have been poured in situ using wooden boxing, both vertical and horizontal, the imprints of which can be seen on the foundations. A series of channels and steel pipes is associated with these foundations and relates to steam and water reticulation between the boiler and the driveshaft and elsewhere in the plant. No further investigation of this area was carried out.
- This line of concrete foundations extending over some 20m is the remnants of the foundations for the main driveshaft which powered various production machines, such as the pugmills, pipe and brick making extruders, brick presses, and blungers. At the western end of the driveshaft is a deep trench running towards the northeast. This would have housed the main flywheel off which several smaller shafts or flywheels would have been driven, presumably located on the upper floors of the buildings as described by Ockelston (n.d.).
- A large rectangular foundation adjacent and immediately to the south of the main driveshaft would have been the boiler room. It is immediately adjacent to Stack 4 shown on the 1940s aerial, and originally lay within a square multi storey building with a hipped pyramid roof (compare Figure 26 and Figure 48).
- A smaller concrete machine foundation cut through kiln K9 in the eastern part of the site (Figure 113-Figure 114), but it is not clear what this supported.
-

Continued on next page

EXCAVATION RESULTS, CONTINUED

Machine Foundations, continued

Evidence for production machinery was no longer present (in contrast to the Pollen Brickworks site where pugmills and other features were recorded: Best & Clough 1988), but this was to be expected as much of the manufacturing was carried out on the upper two floors of the works and machinery would have been dismantled, sold or moved to new premises in New Lynn around 1931.

Foundation Piles

A number of foundation piles that would have supported studs for the buildings enclosing the kilns and other areas of the works were largely constructed with 12in. or 24in. (305 or 610mm) ceramic pipes set vertically and filled with concrete and crushed pipe aggregate (e.g. Figure 54, Figure 120-Figure 122).

Along the foreshore at the eastern end of the site a grid of large rectangular concrete piles with ceramic aggregate and timber inlays, c.1.5 by 0.75m, was apparent (Figure 50, Figure 123). These are substantial foundations piles and would have support a substantial building – in this case their spacing can be correlated with the 3 storey structure shown on historical photographs postdating 1908 (Figure 22).

Drainage

The site was extensively drained with both 12in. and 24in. (305 and 610mm) salt glazed pipes. Three main drainage features were recorded, in the western area (Figure 49, Figure 74-Figure 76). In most areas the drainage had been laid prior to reclamation of the site as the drains were revealed under clean clay without any indication of trenching. Drain D1 was closely associated with a concrete pipe foundation, indicating that the downpipe had been strapped to the foundation post and used to drain waste water from either the roof or processes from the upper floors (or both).

Wharf Remains

The remains of a concrete wharf and some wooden piles sunk into the mud can be observed along the foreshore in the central part of the site. There are also foundations with inset steel relating to a former derrick used for loading and unloading the scows.

Continued on next page

EXCAVATION RESULTS, CONTINUED

Figure 52.
Conditions on
site; looking
southeast



Figure 53. Kiln 1
(the damaged
kiln) during
excavation
showing the top
of the flue
running through
the centre of the
kiln, and at least
5 courses of
bricks; looking
north



Continued on next page

EXCAVATION RESULTS, CONTINUED

Figure 54. Kiln K1 showing kiln and flue; concrete filled ceramic pipe foundation pile (arrowed); looking north



Figure 55. Use of mixed bricks including extruded squares and narrow bricks near firebox, K1



Figure 56. Wire cut extruded bricks in K1

Continued on next page

EXCAVATION RESULTS, CONTINUED



Figure 57. 'KAMO' brick in K1 wall/firebox



Figure 58. K1, mixed wall bricks and mortar between two fireboxes



Figure 59. Example of fire damaged square brick reused in kiln wall, and soft buff coloured mortar



Figure 60. K1 close up of double skinned flue



Figure 61. K1, fire damaged flue within kiln

Continued on next page

EXCAVATION RESULTS, CONTINUED

**Figure 62. Kiln
K2 (only partly
exposed); looking
northwest**



**Figure 63. Kiln
K3 from spoil
heap - 8
fireboxes;
looking south**



Continued on next page

EXCAVATION RESULTS, CONTINUED

Figure 64. Kilns K3, K5, stack S7 and part of K4; looking south

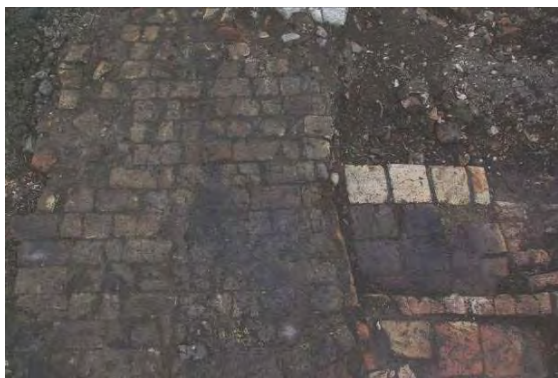


Figure 65. K3 fireboxes



Figure 66. K3 firebox terminating with iron bar at service door



Figure 67. K3 wall and firebox, mixed recycled bricks



Figure 68. K3 junction of kiln wall and service floor

Continued on next page

EXCAVATION RESULTS, CONTINUED



Figure 69. K3 metal bar at back of firebox



Figure 70. K3, firebox with no metal bar, extending into service floor



Figure 71. K4 burnt area of firebox



Figure 72. K4 remnant burning of firebox with square bricks in wall



Figure 73. Soft buff sandy mortar wall of K5, junction of flue

Continued on next page

EXCAVATION RESULTS, CONTINUED

Figure 74.
Drains D1
(right), D2
(centre) and D3
(left). Service
floor for K3 at
top right, with
layer of coal fines
top left. Looking
northwest



Figure 75. Drain 1 terminating at foundation pile in service floor for K3



Figure 76. Junction of drains D2 and D3

Continued on next page

EXCAVATION RESULTS, CONTINUED

**Figure 77. Kiln
K4 with part of
K2 in
foreground;
looking west**



**Figure 78. Kiln
K5; looking
south**



Continued on next page

EXCAVATION RESULTS, CONTINUED



Figure 79. K4 predominant use of square bricks on lower course



Figure 80. Feature 2 running between K3 and K4, probably a collapsed flue arch



Figure 81. Part of K5 wall showing mixed bricks, with no evidence of fireboxes



Figure 82. Soft mortar on lower course of K5

Continued on next page

EXCAVATION RESULTS, CONTINUED

Figure 83. Kiln K5 (left) and circular structure (F1, right), with stack S7 in front of and between the two; looking west



Figure 84. Looking at stack S7 with flue from K5. S7 cuts through the circular wall of another structure (F1, left); looking east



Continued on next page

EXCAVATION RESULTS, CONTINUED



Figure 85. Feature 1 cut by later foundation pile (looking south towards S7, which also cuts F1)



Figure 86. Section view of F1 showing layer of hollow ceramic blocks overlaid by double course of square double sized bricks

Figure 87. Stack S5 (foreground) and K4 with service floor between them. Iron banding still in situ around stack. Looking northeast



Continued on next page

EXCAVATION RESULTS, CONTINUED

Figure 88. Stack S5 showing strapping and service floors and arch; looking southeast



Figure 89. Iron strapping around S5



Figure 90. Adjustor bolt for iron strapping, S5

Continued on next page

EXCAVATION RESULTS, CONTINUED

Figure 91. Stack S5 inner skin of extruded glazed bricks; arched flue on left; looking southwest



Figure 92. Cemented foundation bricks on service floor next to S5



Figure 93. Mixed shell cement mortar of foundation, S5

Continued on next page

EXCAVATION RESULTS, CONTINUED

Figure 94. View of stack S7 looking south, and dark coal layer between stack and K3



Figure 95. Juxtaposition of S7b gate controlling flue, flue and K5 at top. F1 on right (square bricks on long hollow glazed ceramic blocks). Looking west



Continued on next page

EXCAVATION RESULTS, CONTINUED

Figure 96. S7, flue and F1 (curved wall on right cut by S7), with coal fines layer and service floor for K3 top left. Looking east



Figure 97. S7 close up of flue control box with recycled DRURY bricks in firebox – steel gate with lifting hook on left



Figure 98. Close up of gate controlling air flow from K5. Iron guides for the gate once extended above the present level but have been cut off

Continued on next page

EXCAVATION RESULTS, CONTINUED



Figure 99. S7 showing blocked arch in front, open arch behind leading to S7b; flue to K5 on right. Looking south



Figure 100. Showing the arch through the inner skin and main wall of S7a to S7b



Figure 101. Junction of flue from K5 and gate to S7



Figure 102. Loose inner 'skin' of S7, machine pressed bricks with one KAMO brick in stack wall

Figure 103. Kiln K6, with spoil heap to north



Continued on next page

EXCAVATION RESULTS, CONTINUED

**Figure 104. Kiln
K7 with part of
chequer floor;
looking east**



**Figure 105. K7
close up of
chequer floor;
looking east**



Continued on next page

EXCAVATION RESULTS, CONTINUED

**Figure 106. K7,
looking west**



**Figure 107. K7
chequer floor
looking
northwest**



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EXCAVATION RESULTS, CONTINUED

Figure 108. View of K7 looking north, with K6 to the north

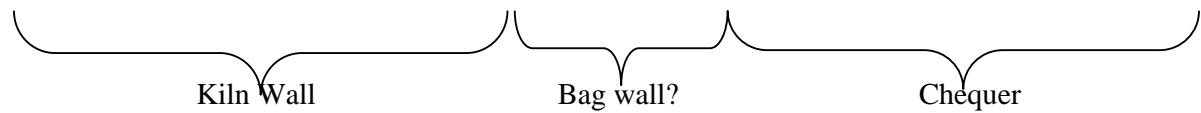


Figure 109. Kiln K7 wall and floor construction details

Continued on next page

EXCAVATION RESULTS, CONTINUED

Figure 110.
Intercutting kilns
K8 (wall on
right) and K9
(centre top) and
machine
foundations
(left). Remains of
flue for K8
centre bottom.
Looking
northwest



Figure 111.
Remnant flue of
K9 (centre) and
intercutting
machine
foundation
(right); looking
northwest



Continued on next page

EXCAVATION RESULTS, CONTINUED



Figure 112. K7 close up of sub floor structure beneath chequer.



Figure 113. K9, machine foundation and ceramic pile foundation



Figure 114. Close up of machine foundation cutting through K9



Figure 115. Double arched bricks of K9 flue

Continued on next page

EXCAVATION RESULTS, CONTINUED

Figure 116.
Machine
foundations
looking west (K1
excavation in
distance)

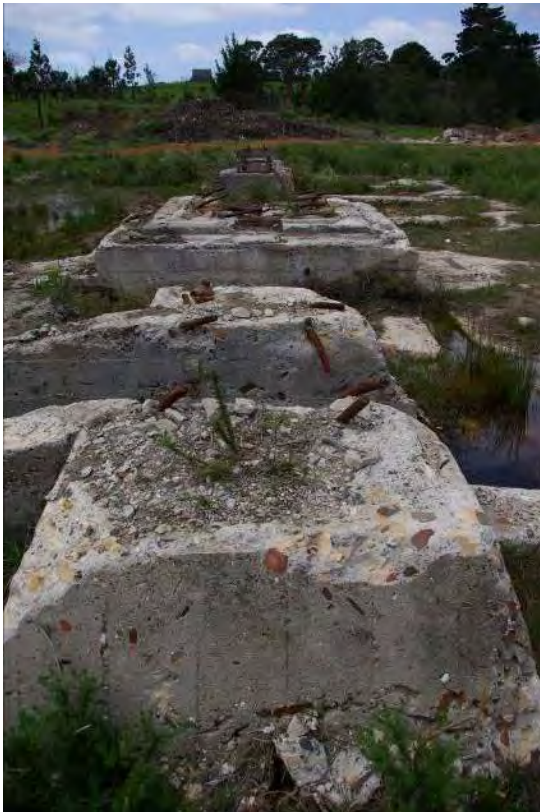


Figure 117. Long view of machine bases, looking northwest



Figure 118. View from western end of machine foundations

Continued on next page

EXCAVATION RESULTS, CONTINUED

Figure 119.
Main wheel
trench, looking
north



Figure 120. Foundation pile with ceramic aggregate



Figure 121. Foundation pile in a firebox of K3

Continued on next page

EXCAVATION RESULTS, CONTINUED



Figure 122. Foundation pile, ceramic pipe filled with concrete and small amounts of shell



Figure 123. Concrete foundation pile near foreshore, with wooden inset (from Geometria 2007)

Summary of the Construction Sequence – Western Area

Kiln K1 was separated from other features by the rubble heap but is connected to a brick feature currently under the heap. There is no stratigraphic association between K1 and other features investigated, but the presence of a KAMO brick (1914-29, see below) in the kiln wall suggests that it is contemporary with S7.

Kilns K2, K4 and stack S5 appear to be linked by a continuous service floor.

Kiln K4 was also linked to S5 by a flue and is therefore contemporary with it.

Kiln K5 is contemporary with S7, to which it is joined by a flue.

F1 (the remaining arch of a former circular feature constructed of hollow ceramic blocks supporting bricks) is truncated by S7 and is therefore earlier than S7 and K5.

The K3 service floor appears to be cut by S7 and therefore pre-dates K5 and S7.

Continued on next page

EXCAVATION RESULTS, CONTINUED

Construction Sequence – Western Area, continued

K3 is also cut by later foundations (predominantly vertical pipes with concrete and broken pipe aggregate).

F2 (a collapsed flue?) appears to overlie part of the wall of K3 and therefore post dates K3.

Foundations (mostly in pipes) cut through K3 and its service floor and F1.

Drain D1 is contemporary with the concrete and pipe foundations (the downpipe is attached to a foundation). D1 cuts D3 and is therefore later.

Summary of the Construction Sequence – Eastern Area

Kilns K6-K7 are contemporary and are connected by a common service floor and possibly a flue.

K8 is cut by K9 and is therefore earlier.

A machine foundation cuts K8 and K9 and is therefore later than both kilns.

Several pipe foundations (with concrete and broken ceramic aggregate) cut both K8 and K9.

Large concrete (with broken pipe aggregate) foundations appear to post date the kilns, but the relationship between the machine foundation cutting K8 and K9 and the foundations is uncertain.

These large foundations are very similar in composition to the machine (steam engine and flywheel) foundations (main drive shaft foundations) in the central part of the site.

There was no indication of any remains in the vicinity of the 1881 works other than more recent concrete foundations on the northern side.

Drain Pipes

In the late 1980s a number of large glazed ceramic drainage pipes, the products of the Clarks pottery works, were still stockpiled on the site. However, these had been removed by the early 1990s when the site was still owned by Mr Banning (R. Clough, pers. obs.). Large ceramic pipes (12in. or 24 in. diameter) were used around the site as foundation piles, filled with concrete and aggregate (Figure 120-Figure 122), and also for drainage on site (Figure 74-Figure 76). A glazed thick walled T-junction pipe with grooved ends to facilitate the junction with other pipes was found loose on the site (Figure 143); it was probably a pressure pipe.

A variety of inspection caps for drainage systems were noted lying loose around the site. They included circular, oval and other shapes (Figure 130-Figure 133).

Continued on next page

EXCAVATION RESULTS, CONTINUED

Bricks

Bricks used in the construction of kilns, service floors and stacks were a mixture of extruded and machine pressed bricks. Both die marks and scratches from wire cutting were characteristic of the extruded bricks (Figure 124-Figure 127), while others had press mould marks and in some cases they also had impressed maker's marks. Maker's marks comprised 'KAMO' (kiln K1 and stack S7), 'HUNTLY FIREBRICK' (service floor near kiln K2), 'DRURY' (Stack S7), 'A.G.CO./DUN SUB', an Auckland Gas Company brick (kiln K1), 'J.J. CRAIG AUCKLAND' (kiln K1), and 'GLENBURN' (service floor near kiln K3 and in K1) (Figure 137 - Figure 142).

The date of production of these bricks ranges from the late 19th century to the 20th century. The KAMO bricks were only produced between 1914 and 1929. The brickworks were set up initially as the Kamo Brick & Tile & Pottery Co. Ltd, but went into voluntary liquidation in 1919. The works were taken over by Gardner Bros and Parker Ltd of Auckland and continued in production as Kamo Potteries Ltd until 1929, when the firm was merged with the Amalgamated Brick & Pipe Co. Ltd (Menefy nd: 139). The damaged kiln K1 (with a KAMO brick low down in its foundation wall) and stack S7 (which contained one in the inner wall of S7a) can therefore be dated to post 1914.

J.J. Craig set up his brickworks in 1896, which soon became one of the largest in the country, and continued manufacturing until 1929 (Scott 1979: 109, 117; Eaves 1990: 9). The bricks marked J.J. Craig and those marked GLENBURN were both products of his brickworks (Eaves 1990: 9; Scott 1979: 133). The production dates of the Auckland Gas Company brickworks are given by Eaves (1990: 9) as 1885-1970. The Drury Pottery and Fireclay Works also had a long period of operation, between 1863 and 1933 according to Eaves (1990: 9). The Drury Coal and Pottery Company (probably an earlier name for the same company) is listed as winning a gold medal for its fireclay products in the 1906 International Exhibition (Official Record: Appendices). The DRURY bricks found in Stack 7 presumably to date to the 20th century, being associated with the KAMO brick (1914-29) and being part of a structure not recorded in any of the historic photographs until after 1908. The date of the HUNTLY firebrick is post 1911, when the Huntly Brick & Fireclay Co. Ltd was established, the firm continuing in production under that name until 1960, and under other guises until the present day (information from the Waikato Coalfields Museum).

No handmade bricks (sandstock or slop moulded), with or without frogmarks, were observed on the site, although extensively searched for with the assistance of Dr Simon Best.

Continued on next page

EXCAVATION RESULTS, CONTINUED

Bricks, *continued*

A few firebricks were observed in structures such as stack S7 and the service floors for kilns K1 and K3. The firebricks were all machine pressed and produced elsewhere as there was no suitable clay for firebricks locally. Their production began at the end of the 19th century. However, their location in service floors indicates reuse of bricks and suggests a 20th century construction date. This is confirmed in both stack S7 and kiln K1, where they are associated with KAMO bricks dating from 1914.

The bricks used in the construction of kilns, service floors and stacks were generally of two sizes – a square double sized brick measuring c.23 x 23 x 11cm and rectangular bricks measuring c.21-23 x 10-11 x 7-8cm. Size variations related to the mixed origin of the bricks which included seconds – often overburns which resulted in smaller bricks. Single and double sized arch bricks were used in the flues (Figure 128, Figure 129). The bricks used to construct the chequer floor in kiln K7 were specially shaped bricks (Figure 134 - Figure 136).

The mortar used in kiln construction was generally a soft sandy mortar to enable kilns to be dismantled, repaired and rebuilt (e.g. Figure 59).

Boiler

A riveted iron boiler lies adjacent to the wharf and foundations of the loading derrick, having been placed there during recent site clearance operations (Figure 147). This is the boiler recorded by Jack Diamond in 1966, at which stage it had already been moved from its original location. It would originally have been located on the square foundation immediately to the east of what was chimneystack 4 (see Figure 50).

Related Remains

Areas beyond the immediate extent of the Clark works shown in the 1940s aerial were not investigated, but areas of interest were noted.

To the west of the Clark works is an area of rubble relating to the Holland works (1904-9, subsequently incorporated into the Clark works). To the north of the works in the bush is a large industrial well approximately 1.8m in diameter constructed of large square bricks (Figure 149-Figure 150). There are two pipes coming out of the well and it would almost certainly have supplied water to the boiler. Ceramic debris also extends onto the neighbouring property to the east (Figure 148). This was the original property owned by R.O. Clark, where his earliest experiments with field tiles would have taken place. The foreshore of the property continued to be used to store ceramic pipes from the Clark works in the 20th century, as shown in a 1906 photograph (Figure 19).

Continued on next page

EXCAVATION RESULTS, CONTINUED



Figure 124. Square brick with dye tooling marks



Figure 125. Close-up of Figure 124



Figure 126. Extrusion dye marks from tooling



Figure 127. Square bricks with dye tooling marks



Figure 128. Arch brick



Figure 129. Wire cut partially glazed arch brick

Continued on next page

EXCAVATION RESULTS, CONTINUED



Figure 130. Inspection cap



Figure 131. Inspection caps and test ring



Figure 132. Base of inspection caps



Figure 133. Circular inspection cap



Figure 134. Side view of chequer brick from base of kiln – machine pressed firebrick

Continued on next page

EXCAVATION RESULTS, CONTINUED



Figure 135. Pair of chequer bricks glazed through use



Figure 136. Lower view of chequer brick with mould marks



Figure 137. 'GLENBURN' ?firebrick FROM J.J. Craig brickworks, machine pressed



Figure 138. 'DRURY' brick



Figure 139. 'JJ CRAIG' brick



Figure 140. 'A.G.Co./DUN SUB', Auckland Gas Co. brick

Continued on next page

EXCAVATION RESULTS, CONTINUED



Figure 141. 'HUNTLY FIREBRICK'



Figure 142. 'KAMO' brick in Stack 7



Figure 143. T-junction pipe, possibly pressure pipe, with grooved ends to facilitate junction with other pipes; very thick walled



Figure 144. Gear wheel (from extruder?)



Figure 145. Metal strapping from kilns and stacks



Figure 146. Iron spikes and spanner lying loose around site

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EXCAVATION RESULTS, CONTINUED



Figure 147. Boiler on foreshore, looking south

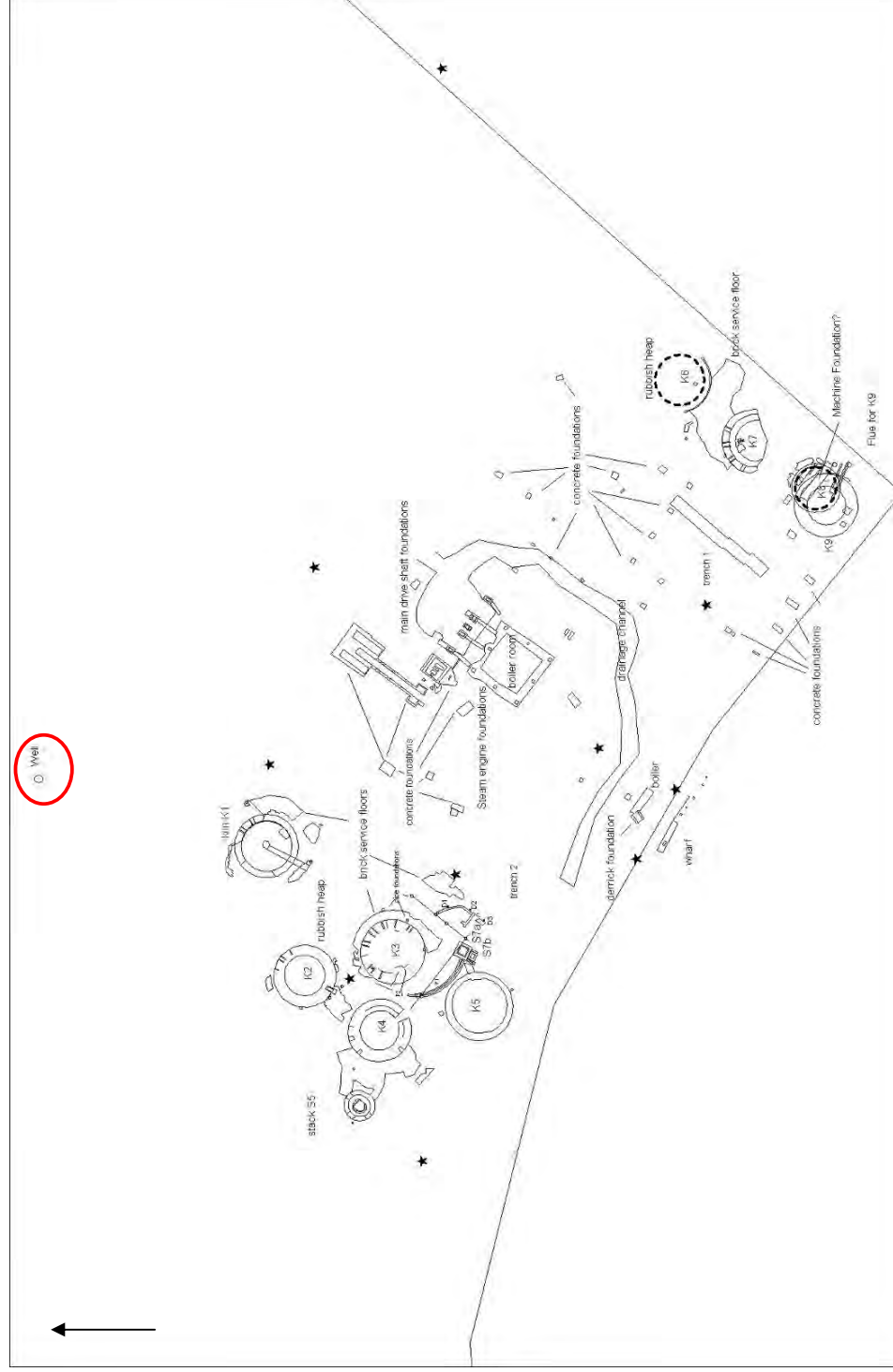


Figure 148. Ceramic debris on neighbouring property to the east



Figure 149. Well in bush behind (north) of works

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EXCAVATION RESULTS, CONTINUED

The Reclamation

An overlay of the 1881 plan on a modern cadastral plan indicated that there had been considerable reclamation of the foreshore (Figure 13). The EM34 Conductivity survey, while possibly too coarse grained to detect any of the brick kiln or other features on the site, did provide insights into the geomorphology of the site and historic reclamation, as it appeared to indicate the old shoreline and possible palaeochannels demarcated by saline intrusion (Figure 44).

Two trenches were excavated to investigate the nature of the reclamation and test the conductivity results. Their locations are shown in Figure 47. It was only possible to excavate to within a few metres of the existing shoreline. However, the results indicated that the early reclamation had been carried out by dumping clean clay from the quarry (Figure 152). Subsequently, more superficial layers had been placed to level the site which included metal, glass and ceramic debris (Figure 151). These elements may have contributed to the conductivity pattern, but as these deposits were shallow and not consistent across the site and the EM34 appeared to be generally insensitive to some of the larger features, it was concluded that the most likely explanation for the anomaly pattern was saline intrusion relating to the reclamation.

The clay was not easily distinguishable from the natural undisturbed clay, but drainage pipes were observed in section in both trenches below clean clay with no indication of later trenching to insert them (Figure 153, Figure 154). No old ground surface or topsoil interface between the original clay and the clay fill was detectable, indicating that the area had been cut back and levelled (probably in the process of earlier quarrying), removing the original topsoil layer. A transition from yellow to blue-grey marine clay is likely to indicate the change from fill to in situ deposits, but this could not be clearly established.

Continued on next page

EXCAVATION RESULTS, CONTINUED

Figure 151.
Trench 1 upper
layers containing
demolition debris



Figure 152.
Trench 1, lower
layers closer to
the foreshore,
showing yellow
clay with blue-
grey marine clay
at the base of the
trench



Continued on next page

EXCAVATION RESULTS, CONTINUED



Figure 153. Trench 2 showing drainage pipes in section of clean clay, and overlay of clean yellow clay over blue- grey marine clay; looking north

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EXCAVATION RESULTS, CONTINUED

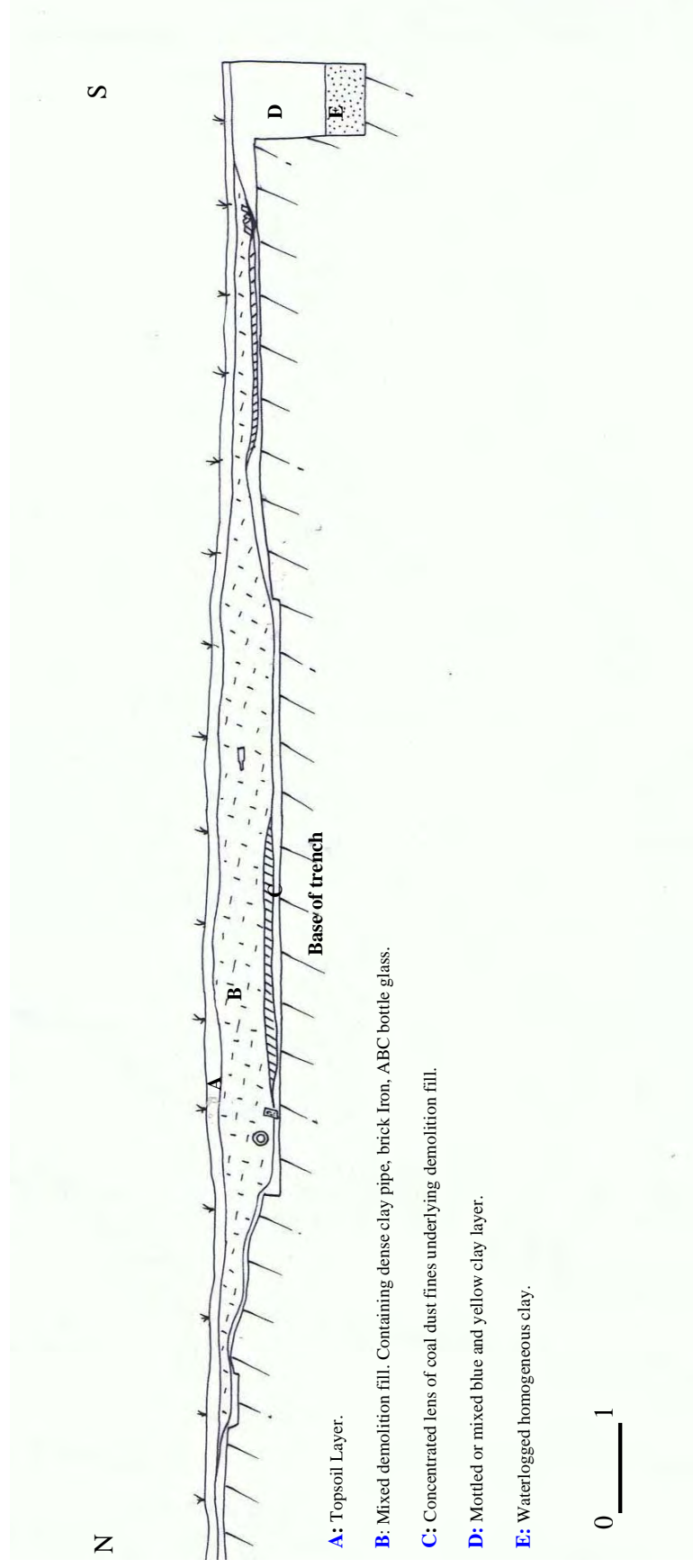


Figure 154. Section drawing of Trench 1, eastern face

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EXCAVATION RESULTS, CONTINUED

Correlation with Geophysical Survey Results

Some of the areas of deep features indicated in the five GPR lines (Figure 45, Figure 46) were tested during the investigations, and showed a clear correlation between the anomalies and archaeological features (Figure 155-Figure 159).

GPR Line	Anomaly/Investigation	Archaeological Features
1	A (not fully exposed) B (not excavated) but tested	Service floor and foundations Extensive area of substantial concrete with pipe aggregate foundations
2	C excavated D (not excavated)	Part of kilns K6 and K7 Several concrete foundations and a service floor in area.
3	E excavated in part	Kilns K3, K4 & K5 and stack S7 and underground flues, but there is further deeper material west of kilns in area of reclamation (detected as deep saline intrusion with EM34)
4	F (partly exposed)	Area of stack S5 and service floors – possible flue to kiln K2
5	G excavated	Area of kiln K4 and probable underground flue

Several areas of strong anomaly were detected by the GSM-19 Gradiometer (Figure 161- Figure 161), but in general the brickwork or structural remains of the kilns did not appear to be differentiated from the surrounding clay fill. Kiln K1 for example did not have a strong influence on the magnetic field, nor did most of the other kilns. However, areas of concrete floor – possibly with iron reinforcing, certainly with iron bolts and pipes – strongly interfered with the field as did deposits of modern rubbish. Several of these areas were exposed during the current investigation. The large magnetic anomaly in the centre of the site was not investigated but clearly related to the central concrete foundation complex which has large iron reinforcing bolts and steam pipes. The large anomaly in the northwestern corner (near the edge of the bush) related to an extensive spread of iron debris exposed during vegetation clearance. A smaller anomaly just below related to stack S7 and in particular the large iron gate which controlled air flow from kiln K5. The anomaly to the northwest of the latter equates with the remains of the base of stack S5 which had iron banding still intact.

Continued on next page

EXCAVATION RESULTS, CONTINUED

**Correlation
with
Geophysical
Survey
Results,
*continued***

At the eastern end of the site the larger of the anomalies related to a pile of modern debris which included car bodies and engines, while the southeasternmost anomaly related to the kiln complex around K8-K9. However, this area also had modern rubbish overlying it prior to investigation which would have contributed to the pattern. Kiln K7 was not indicated.

In general the distribution of iron scrap and objects spread around the site during former episodes of demolition created a lot of noise for the GSM.

The results of the EM34 Conductivity survey (Figure 162) were of interest as they appeared to identify the extent of saline intrusion into the site. However, a precise correlation between the results and the position of the earlier shoreline shown in the 1881 plan could not be made, as the extent of saline intrusion was far greater in the western end of the site than the shoreline indicated on the plan. In the eastern area, however, there was a much better correlation.

Geophysical survey (GSM-19 and GPR) was also carried out in the garden of Clark House in an attempt to identify a tunnel reported to have run between the pottery works and Clark House, providing heat from the works to the house. A tunnel extending downhill towards the works for a short distance is evident in the basement of Clark House, but terminates just beyond the driveway in the banks of a former sunken tennis court. No evidence of a tunnel beyond this point was located and if a tunnel was constructed it appears to have had a short life and to have been removed at an early stage. The distance between the pottery works and Clark House makes it unlikely that such a heating system would have been effective, and anecdotal information suggests that the house was always on the cold side. The ceramic block construction, though innovative, provided poor insulation.

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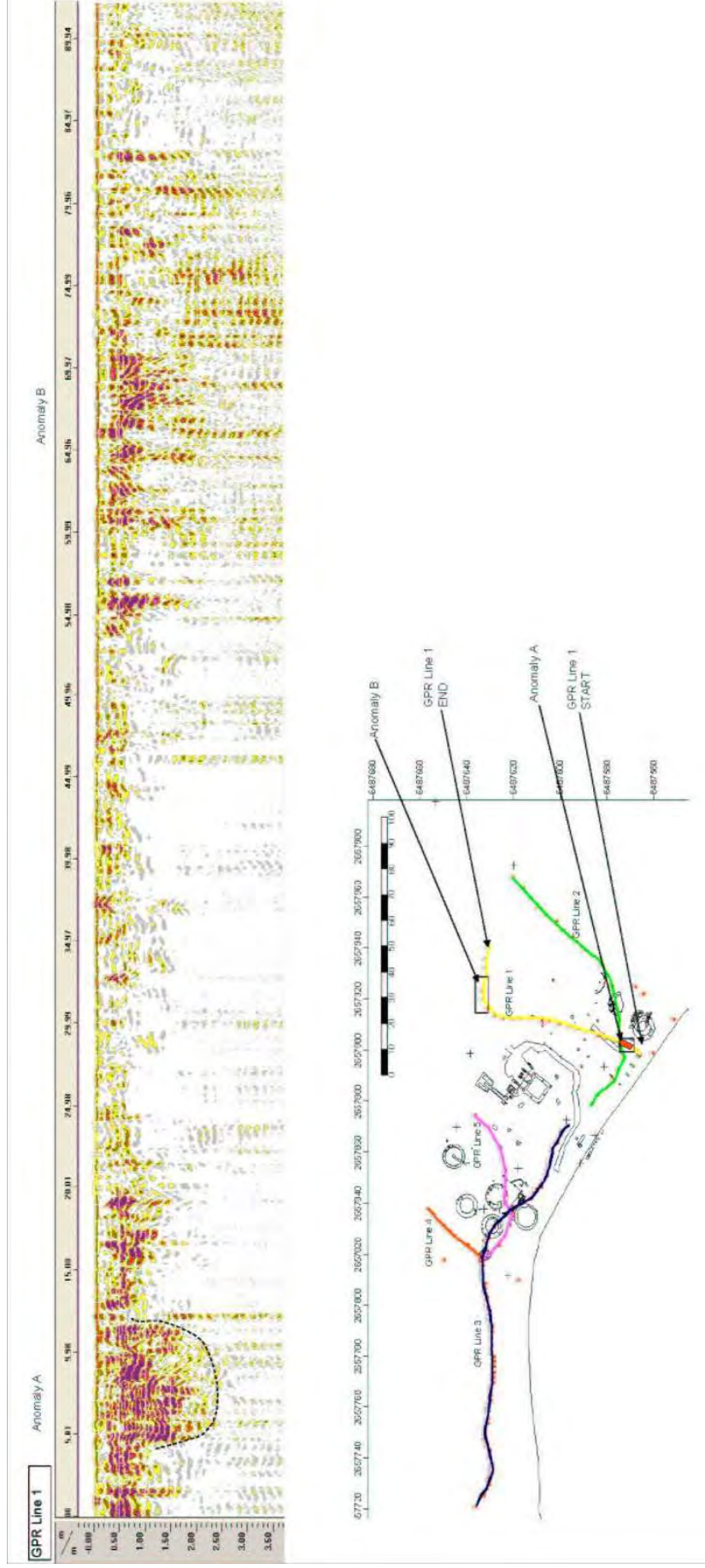


Figure 155. Grid lines overlaid on archaeology and corresponding anomalies (A and B) in GPR scan line 1

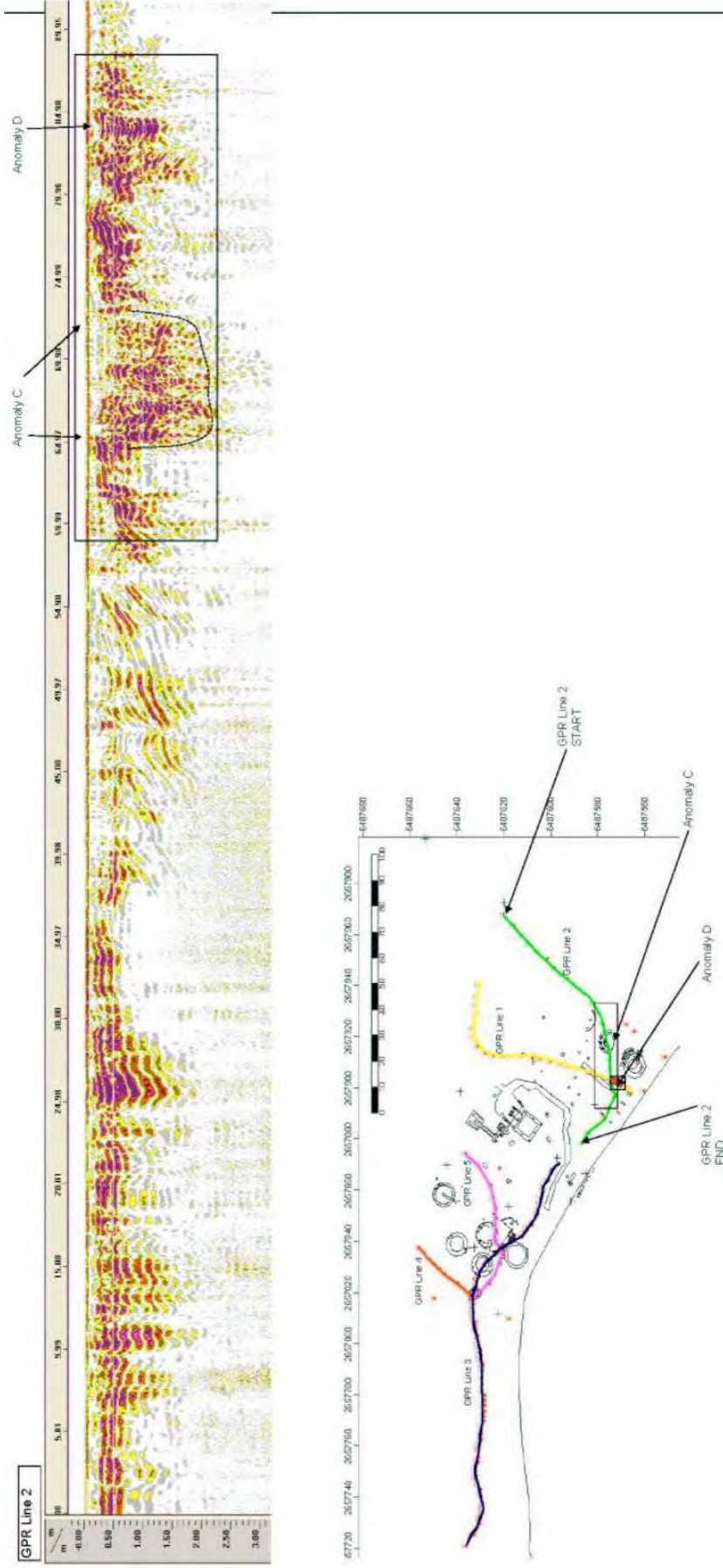


Figure 156. Grid lines overlaid on archaeology and corresponding anomalies (C and D) in GPR scan line 2

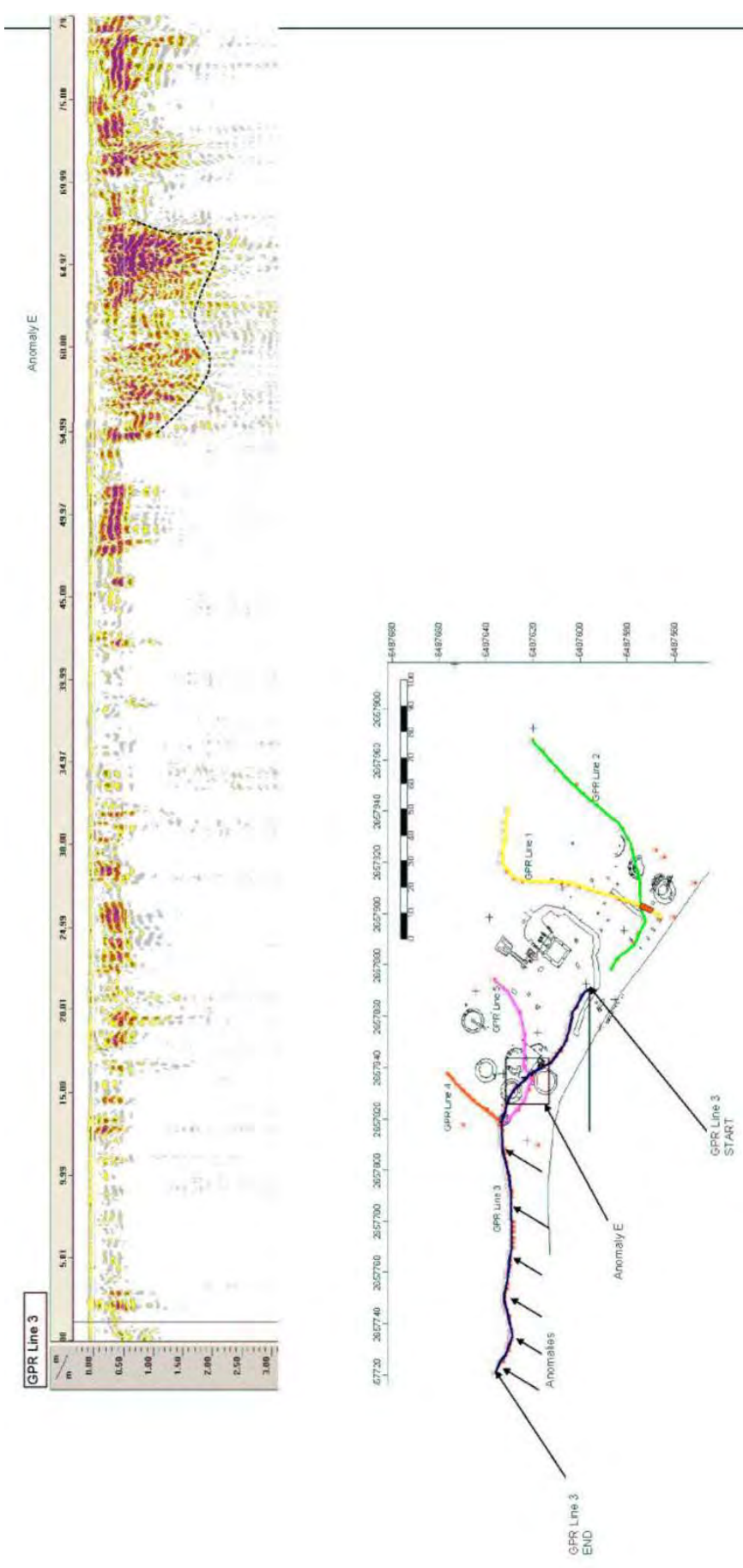


Figure 157. Grid lines overlaid on archaeology and corresponding anomaly (E) in GPR scan line 3

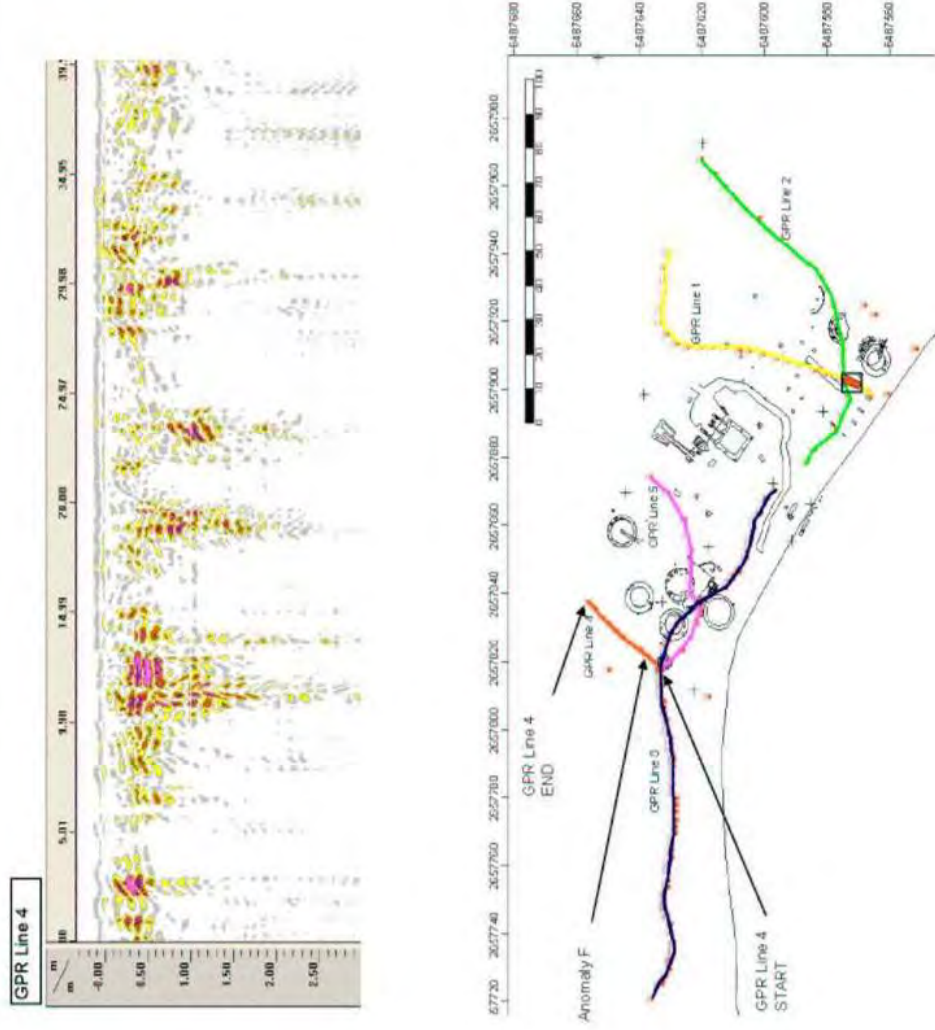


Figure 158. Grid lines overlaid on archaeology and corresponding anomaly (F) in GPR scan line 4

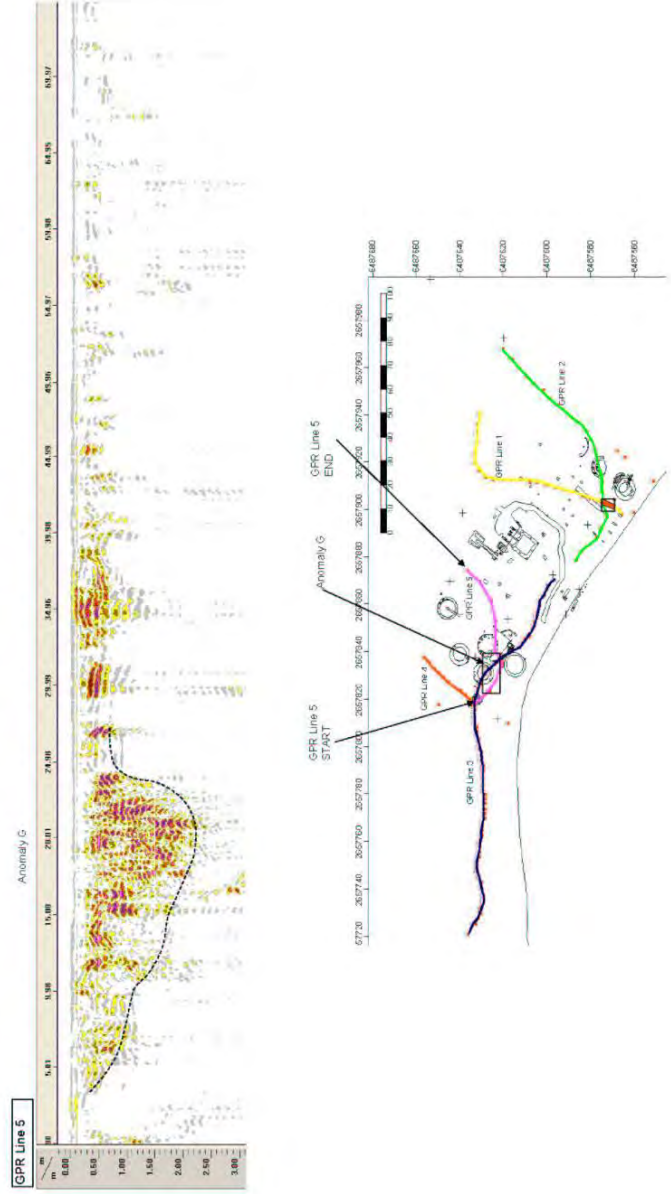


Figure 159. Grid lines overlaid on archaeology and corresponding anomaly (G) in GPR scan line 5

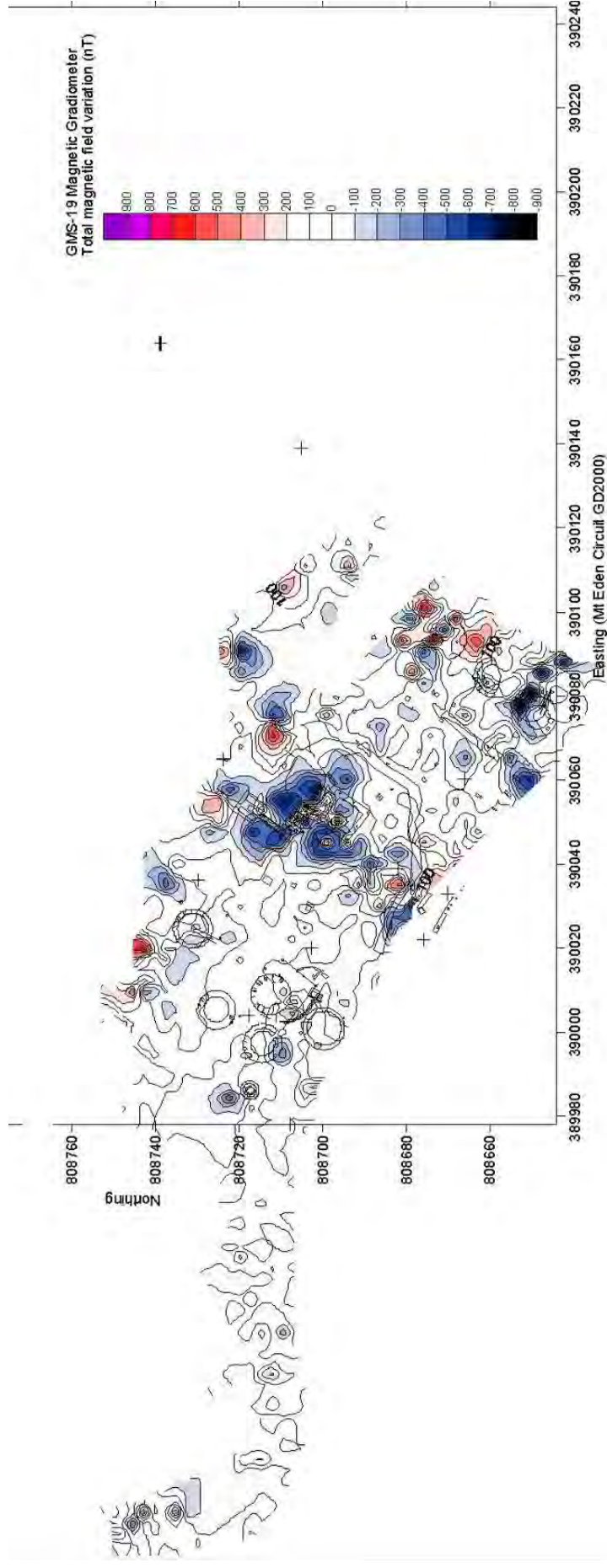


Figure 160. Anomalies detected by GSM-19 Gradiometer with archaeological features overlaid

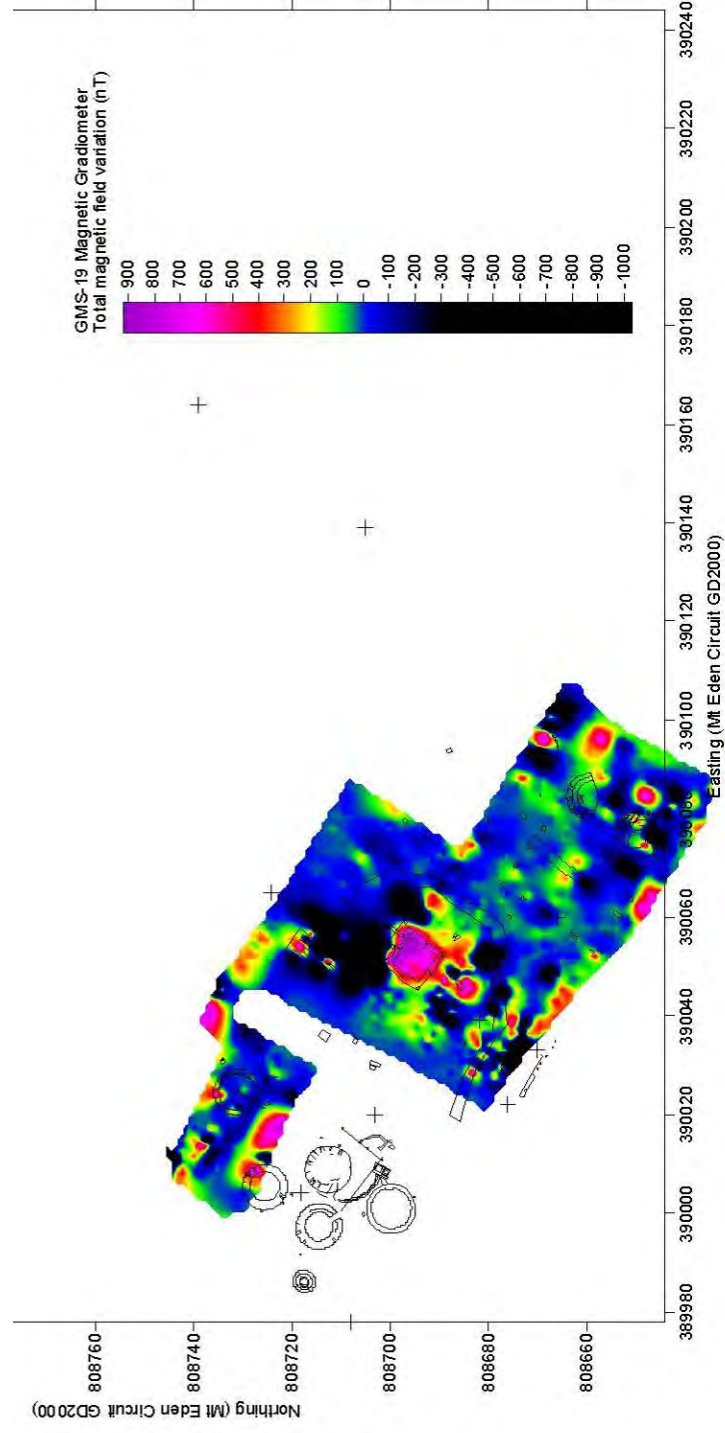


Figure 161. Higher resolution scan showing anomalies detected by GSM-19 Gradiometer over part of the site, with archaeological features overlaid

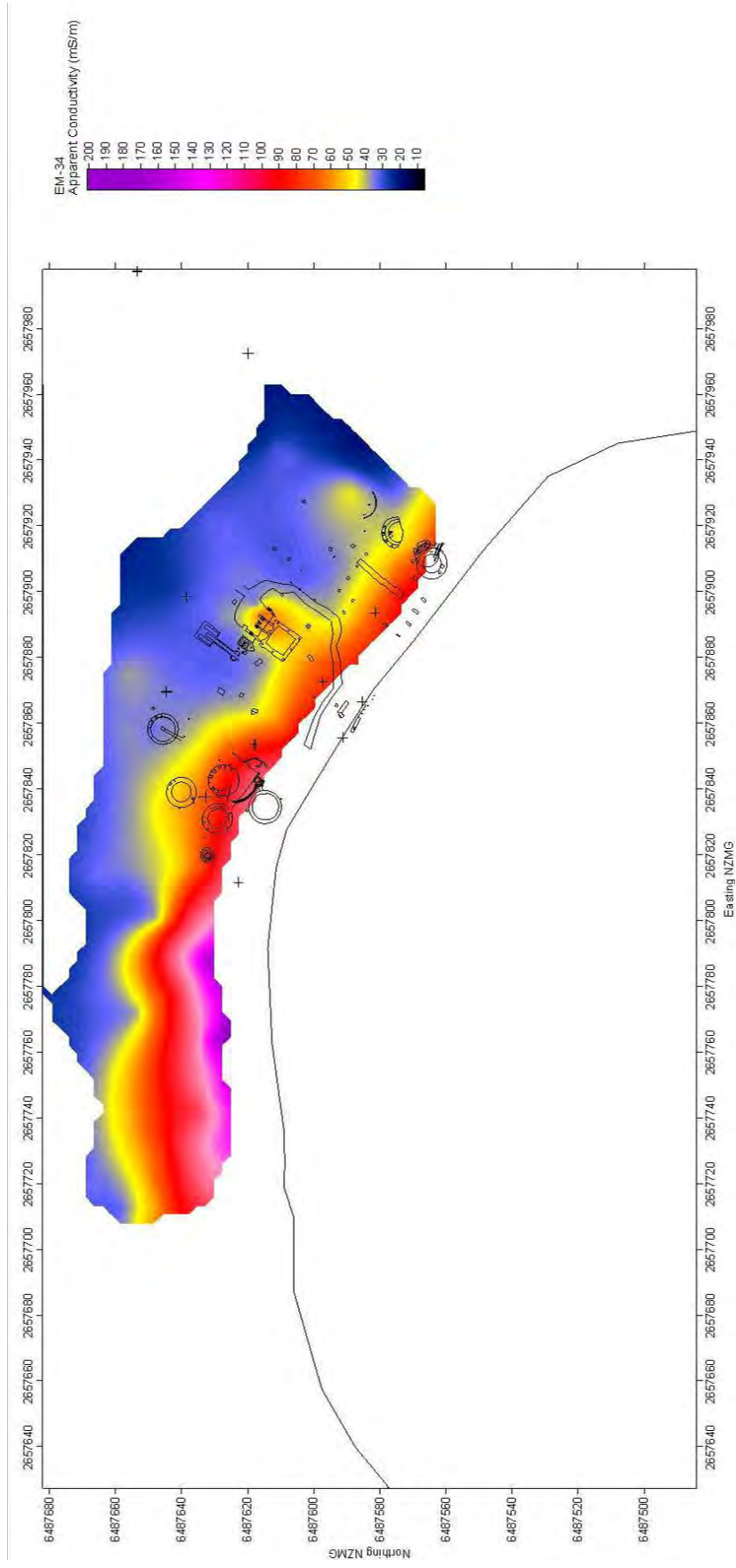


Figure 162. Results of EM34 Conductivity survey with archaeological features overlaid

DISCUSSION AND CONCLUSIONS

Introduction

While the current investigation has explored only part of the site, it is possible to establish a sequence of events on the basis of current knowledge and to demonstrate clearly the dynamic nature of this significant industrial site. The development of this sequence relies on both archaeological and historical information.

The Western End of the Works

The western end of the site contained the most extensive area of archaeological remains, revealing the remains of five kilns, two stacks, a large circular feature (F1) that does not appear to have been a kiln, the remains of three drains and a number of foundation piles. The circular feature F1 and kiln K3 appear on the basis of stratigraphic relationships and archival evidence to be the earliest features surviving in the western area. Both F1 and the service floor of kiln K3 were cut through by stack S7 (which was contemporary with kiln K5), and a collapsed flue (F2) overlies part of kiln K3, which was also cut into by later foundation piles. Kiln K3 almost certainly post dates F1, however, as it is relatively intact and cuts across what is likely to have been a further extension of F1. Kiln K3 is also likely to pre date kilns K2, K4 and stack S5, as these were located in an area of the works not developed until 1906-8 on the basis of photographic evidence (see Figure 30).

Kilns K2, K4 and stack S5 are earlier than stack S7 (and therefore kiln K5 which was connected to it) on the basis of photographic evidence, which shows that stack S5 and the building housing kilns K2 and K4 were constructed between 1906 and 1908, and that stack S7 was not in place at that time (compare Figure 20 and Figure 24). On the basis of bricks used in its construction (KAMO, 1914-29), stack S7 cannot have been built before 1914, and may well have been built some time afterwards.

The damaged kiln K1, while not linked stratigraphically with any other feature, also contains a KAMO brick and would therefore post date 1914, unless the brick was part of a later repair. This seems unlikely, though, as it occurred fairly low down in the structure. A 20th century date for the kiln is confirmed by the photographic evidence which shows that the area of the works in which kiln K1 was located was not developed until 1906-8 (see Figure 30). It is likely that the base of the stack for kiln K1 is still present under the spoil heap. Chimney no. 3 was recorded in this location in the 19th century Richardson photo, and it is likely that this chimneystack was later connected to K1.

Continued on next page

DISCUSSION AND CONCLUSIONS, CONTINUED

The Western End of the Works, *continued*

The earliest feature at the western end – the circular wall F1 – would also have been of relatively late construction. Its base course is constructed of hollow ceramic blocks similar to those used at Clark House (constructed c.1897-1902). This type of ceramic block was manufactured by Clark's between the very end of the 19th century and in the early 20th century. The blocks were an innovation by Clark's that was not patented for general production until 1907. The 1906 Clark's Price List announced that they would 'shortly be introduced to the market for the first time'.

In summary, stratigraphic relationships recorded during the investigation combined with archival evidence suggest that there were at least four phases of construction or reconstruction at the western end of the site post dating 1900. Contemporary accounts and photographs attest to extensive upgrading of the pottery works starting in 1903 (see 'The Pottery Works', above). A new chimneystack (chimney 4) was in place by 1906, at which stage two new kilns were under construction (although the records do not say whether these were at the western or eastern end of the works). Another chimneystack (S5) was built at the western end between 1906 and 1908, and another (S7) sometime after that (post 1914 on the evidence of the KAMO bricks). It seems probable that all the remains so far investigated at the western end of the site would have dated to 1903 or later, as there was no indication of any earlier development with the possible exception of the circular feature (F1). If this feature was of 19th century date it would belong to the very end of the 19th century on the basis of its ceramic block construction.

The Eastern End of the Works

At the eastern end of the site the remains of four kilns and foundations also revealed a similar dynamic pattern of change and remodelling of the plant. There were at least four phases of construction where earlier features had been cut or partially removed by later construction.

The construction and composition of the kilns at this end of the site was very much the same as at the western end. The bricks are similar, although there are no bricks with maker's marks to aid more precise dating. There was no indication of any handmade bricks (at either end of the site). Kiln 7 contained an excellent example of part of a chequer floor – a perforated stacking floor within the kiln.

Continued on next page

DISCUSSION AND CONCLUSIONS, CONTINUED

The Eastern End of the Works, *continued*

Kilns K6 and K7 were contemporary, being connected by a common service floor, but could not be stratigraphically linked to the other features at the eastern end. However, there were clear indications, i.e. the chequer floor surviving from the last firing in K7, that these kilns were in operation when the works ceased to operate around 1930. Given that kilns are regularly broken down and rebuilt during their lifetime it is certain that these are 20th century structures.

Kiln K8 had been cut and presumably replaced by kiln K9, which was later cut by a large machine foundation and other large concrete building foundations. It is not known what the machine foundation would have supported, but clearly by the end of the brickworks there was no operational kiln in the southeast corner of the works where kilns K8 and K9 were located. The positions of the concrete foundations can be correlated with the studs of a large triple storey building shown on the latest (undated but probably c.1920s) photographs of the works (see Figure 22).

The concrete of the building foundations was similar in composition to that of the main shaft drive foundations in the centre of the site – a hard Portland cement with large pieces of broken pipe used as aggregate. This material was also a 20th century innovation by the Clark pottery, and was announced as such in the 1906 Price List (p.44): *‘Don’t forget that we shall shortly be introducing the material that gets damaged in the burning (i.e., broken pipes), for concrete. Scoria is largely used, but we claim that our material takes much less lime or cement to coat it over than does scoria, and it sets much harder and binds closer.’* The advertisement went on to say that Clarks had built a 12ft. diameter chimney of this material, and had a 34ft. diameter kiln partly built of it. The chimney can only have been the new chimney (no.4), beside the boiler room in the centre of the site, as chimneys 1-3 had been in place for some time, and chimneys 5-7 had not yet been constructed (see ‘The Pottery Works’, above). None of the kilns investigated were constructed of this concrete, but only the base courses were present. If concrete was used for one of the kilns it was probably used for the lower parts of the walls and has been demolished. Large conglomerations of this material are still present in spoil heaps on the site.

The eastern end of the site was the location of the early pottery works recorded on the 1881 plan. The works prior to reclamation would have been set some way back from the current shoreline, and an overlay of the 1881 plan on a modern plan and the 1940s aerial places the early works to the rear of the works shown in the 19th century Richardson photograph, in an area later covered by sheds, slightly to the west of chimney no. 6 (see Figure 30). This area was machine stripped, but no remains were found apart from later concrete foundations that would have supported the sheds shown in 20th century photographs.

Continued on next page

DISCUSSION AND CONCLUSIONS, CONTINUED

The Eastern End of the Works, *continued*

No stack bases were identified, although Jack Diamond recorded a chimney in the southeast corner (chimney no. 1) in 1966 (see Figure 27). The stack base may still be present, however, buried under the access ramp to the site. A chimney in this location was recorded in the 19th century Richardson photo and would be one of the earliest features on the site. It is possible that remains of chimney no. 6, built between 1906 and 1908 on photographic evidence, are still present under the spoil heap.

As at the western end of the site, most of the surviving remains at the eastern end are of 20th century date. Kiln K8 might pre date 1900, but kilns K7 and K6 are clearly of 20th century date and kiln K9 is likely to be of similar date. The concrete foundations and the machine foundation came even later in the 20th century.

The Central Area

In the centre of the site, between the eastern and western banks of kilns, are the heavy foundations for the engine room of the works – the main foundations for the steam engine and drive shaft. No excavations were carried out in this area, and it is not known whether the base of the chimneystack adjacent to the boiler room (chimney no. 4) is present, although the GSM-19 results might indicate such a structure. As just discussed, this must be the chimney recorded in 1906 as having been constructed of concrete using broken ceramic pipe for aggregate. This is the same material evident in the construction of the machine foundations. The machine bases and chimneystack date to 1903 or just after on the basis of archival evidence. Two newspaper articles in 1903 describe extensive new works at the Clark pottery including a new pipe machine, boiler and modern appliances being installed (see ‘History’, above).

The Reclamation

A large part of the foreshore was reclaimed after c.1881, when a historic plan shows the pottery works in relation to the original shoreline. Excavation of two trenches into the reclamation area showed that the original ground surface had been cleaned back (possibly for clay quarrying purposes) and levelled prior to reclamation, and that the reclamation was achieved using clean clay fill quarried from other parts of the site, with the addition of some demolition fill in the top layer. The interface between the clay fill and in situ clay was not easily distinguishable. The EM34 Conductivity survey provided a clear indication of the extent of saline intrusion along the foreshore, but this extended further inland, particularly in the western part of the site, than the shoreline indicated on the 1881 plan. In the eastern area, however, it correlated reasonably well with the 1881 plan,

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DISCUSSION AND CONCLUSIONS, CONTINUED

The Reclamation, *continued*

The date of the reclamation can probably be established with reasonable accuracy on the basis of the archival sources. Two newspaper articles in 1882 refer to Clark senior expanding his works into what was a public road between his farm and his property, to the annoyance of the local population. One report states that *'The lower portion of this road Mr Clark is cutting away to the depth of 5 or 6 feet and utilizing the clay in the manufacture of drain pipes'* (AWN 15.4.1882: 20, see 'The Pottery Works', above).

It seems very likely that the cutting down of the road related to the reclamation of the foreshore, and to the levelling and filling of the area so that the pottery works could be expanded towards the south. The early 1880s was a period of expansion for the Clark pottery works, when R.O. Clark Junior became involved in their management, there was a change from steam to horse power and a significant increase in production. This was the decade when Clarks acquired their own boat to transport their wares to Auckland, and set up an office in town. The Richardson photo (Figure 14) shows the works following reclamation, with a chimneystack (no.1) built on the reclaimed area in the southeastern part of the site.

The Contribution of Geophysical Survey

The usefulness of the geophysical survey in helping to define areas for investigation on this complex industrial site was variable.

The EM34 conductivity survey provided some useful information relating to natural features combined with cultural events – in this case reclamation of the bay, where the conductivity pattern appears to identify saline intrusion demarcating the old foreshore prior to the post 1881 reclamation. However, the correlation between the extent of saline intrusion indicated in the conductivity survey and the shoreline marked on the 1881 plan was much better at the eastern than the western end of the site. Because of the coil separation (c.10m) it is generally not suited to the finer grained and shallower deposits of most archaeological sites, where the EM38 would be more useful.

The GSM-19 Gradiometer highlighted areas rich in metal such as the foundations around the boiler house and drive shaft but failed to identify some significant brick structures exposed during the investigation (or earlier), for instance K1, K4, K5 and K7. One of the difficulties with the gradiometer in industrial or complex sites, particularly where there are later demolition layers, is that the metal spread throughout the various layers creates a noisy signal and raises the baseline for detection. Normally, this equipment would detect a brick structure even in a clay matrix but its sensitivity to background material suggests that in this environment the lack of a strong anomaly cannot be interpreted as a lack of features. The modern rubbish heaps had numerous metal objects and significantly influenced the gradiometer readings.

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DISCUSSION AND CONCLUSIONS, CONTINUED

The Contribution of Geophysical Survey, *continued*

GPR was perhaps the most useful technique on this site as it identified several areas of archaeological activity, and defined the depth of the anomalies. Subsequent overlays demonstrated that these anomalies correlated with kiln and stack features. Features were indicated in all GPR lines but only a portion of these were investigated with subsurface testing. The GPR signal often indicated features 1-2m below the surface, but because the focus of the present investigation was on identification and preservation rather than total excavation, the deeper levels were not investigated. The presence of kilns K4, K5, K6 and K7 was detected along with that of stacks S5 and S7.

Overall, geophysical survey can be a useful guide to investigation, particularly in the absence of good archival material. The gradiometer, however, has significant limitations on this sort of site and the EM34 conductivity meter is suited more to geological/geomorphological applications, although it provided some useful information in this instance. GPR is perhaps the best technique for complex industrial sites.

On this particular site, the archival information was extensive, and the sketch plan of the extant remains compiled by Jack Diamond in 1966 provided the best guidance for excavation areas. In general, archival information where available appears to be a much more accurate guide to possible remains than geophysical techniques.

Potteries and Brickworks in West Auckland

Investigation of the Clark works adds a valuable element to our archaeological knowledge of heavy clay industrial sites in Auckland. Detailed surveys or investigations of six potteries and brickworks in West Auckland have now been carried out, the other five comprising:

- Pollen Brickworks and Pottery on the Whau River, Rosebank Peninsula (R11/1509), c. 1855-1870 (Best & Clough 1988).
 - Burke Brickworks on the Whau, Avondale (R11/1922), c.1871-early 20th century (Best & Clough 1998).
 - Carder Brickworks adjacent to the Clark works at Limeburners Bay, Hobsonville (R11/1508), c.1863-1929 (Waitakere City Council 2000).
 - Te Atatu Brick and Tile works located at the mouth of the Whau, (R11/1724), mid 1880s to 1895 (only limited investigation has been carried out). (Clough & Best 2000).
 - Gardner Bros. and Parker Ltd 1902-1971; a downdraught kiln in Ambrico Place off Totara Avenue, New Lynn, built c.1926, is largely intact and has been preserved as a historic site (Reynolds 2005).
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DISCUSSION AND CONCLUSIONS, CONTINUED

Potteries and Brickworks in West Auckland, *continued*

Each of these sites provides insights into the history of the heavy clay industry around the Waitemata Harbour between 1855 and 1930.

The Pollen site was spread out along the banks of an inlet to the Whau River, and was based first around a clamp kiln (where the bricks to be fired are simply stacked and covered with a temporary roof during firing) and later a Scotch kiln. Scotch kilns are 4-walled rectangular brick updraught kilns with a variable number of fireboxes on both of the long walls, with a wicket (loading and unloading opening) at both ends and a temporary iron roof. Clamp and Scotch kilns represent the simplest types of rectangular updraft kiln – small in scale and generally inefficient with a high proportion of over and under burns (Best and Clough 1988). Power for the pug mills and other machinery, if not manual, was supplied by horse. Bricks were manufactured in conjunction with pottery produced by James Wright, and it is possible that there was a smaller kiln for the pottery – if so it was not discovered. The remains of a pugmill, or whim, and blunger relating to the production process were excavated at the Pollen site, in contrast to Clark's, where evidence of these processes has not survived, being carried out (in the later period) on upper floors which were demolished after the works closed.

The Burke brickworks, which started operations slightly later than the Pollen works and continued into the 20th century, was based on a much larger Hoffman kiln, a more efficient process designed for continuous firing (rotating around 14 chambers with cycles of loading, firing, cooling and unloading). Hoffman kilns were patented in England in 1859, the first being built in 1862 (Searle 1956: 418, Hammond 1981: 23-4 cited in Eaves 1990: 83). Initially round, a rectangular form was designed in 1870 (Searle 1956: 418).

The kiln at Burke's Brickworks was rectangular and large, around 34m x 9.5m in size. It was therefore considerably larger than the 7-8m diameter kilns at Limeburners Bay, but was essentially a number of kilns in one structure. However, the capacity of the Hoffman kiln outstripped demand, whereas a series of small kilns could more flexibly cope with the changes in the market. It was evident that the kiln at Burke's brickworks was not being used to full capacity, at least in its later years, as some of the wickets were bricked up, most of the side flues were blocked off, the floor slits had been filled, and it was being used as either an updraught or a downdraught kiln. The kiln was still standing in 1906 according to archival evidence.

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DISCUSSION AND CONCLUSIONS, CONTINUED

Potteries and Brickworks in West Auckland, *continued*

The Carder works (also part of site R11/1508) operated over a similar time period to the Clark works (c.1863 to 1929, although it was probably not operating during the 1890s) and the surviving kilns demonstrated a similar technology to Clark's, based on a series of beehive downdraught kilns stretching along the foreshore of the bay. Beehive downdraught kilns were in use in Staffordshire in 1856 (Baker 1991: 113), but may not have been introduced to New Zealand until around the 1870s. In general, the Carder site has been less impacted on following the closure of the works and the kiln remains are more substantial than at Clark's (in some cases over 1m in height), providing information relating to fireboxes and bag walls no longer available at the Clark site. At the Carder site there were a number of wells and sub-ground tanks which are not apparent at the Clark site.

The Te Atatu Brick & Tile Company site at Te Atatu was fairly short lived. The company exhibited its wares at the New Zealand Industrial Exhibition in Wellington, which included 'bricks made by the double-press dry process, the clay being taken from the bank into press, then straight into kiln and burnt without any further drying' (*New Zealand Industrial Exhibition 1885*: 46). However, the company also owned the Point Pottery at Hobsonville at this stage, and it is not clear whether the Te Atatu site used this innovative new process (possibly the first use of this technique in Auckland). Test excavations have shown that the foundations and floor of the kiln are present, constructed of extruded wire cut bricks, but they have not been investigated in detail, and the type of kiln has not been established.

The Gardner Bros. & Parker kiln is a rectangular downdraught kiln constructed c.1926. The firm was established in 1902 and the kiln was originally adjacent to a Hoffman continuous kiln built c.1904. The entire structure of the kiln has survived and has been conserved.

These potteries and brickworks are just some of the c.80 concerns recorded in Auckland in the 19th and early 20th centuries.

Pollen's, Carder's and Clark's were potteries producing a range of ceramic products as well as bricks, whereas as far as we know the Burke, Te Atatu and Gardner Bros. & Parker works were mainly for the production of bricks. While there are references to Clark producing considerable numbers of bricks in the mid 1880s, pipes were also an important product, and in later years Clark specialised in ceramic drainage pipes and sanitary wares, a decision that allowed the firm to successfully weather the Long Depression of the late 19th century and emerge in the 20th century claiming to be the largest pottery works in the country.

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DISCUSSION AND CONCLUSIONS, CONTINUED

Potteries and Brickworks in West Auckland, *continued*

Although the 1906 R.O. Clark's Price List shows an extensive range of ceramic wares, including decorative items such as garden edging, water filters, finials and balusters, it appears that many of the decorative wares were made by Carder Bros. and perhaps some of the other seven firms which had joined with them in a trade agreement in 1906. Only utilitarian wares (ceramic drainage pipes, inspection caps, bricks) were found on the Clark site, whereas domestic pottery and decorated wares were noted on the Carder site. Clark's, however, was innovative in its production of building materials, developing hollow ceramic building blocks which were later reinforced with concrete and metal rods (a forerunner of reinforced concrete block construction), and promoting the use of ceramic pipe kiln wasters as a concrete aggregate. Both these materials were recorded during the investigations at the Clark site.

Limeburners Bay and Hobsonville

Figure 2 shows the location and dates of operation of the Hobsonville potteries. At Limeburners Bay, the Clark and Carder works were established within a year of each other in the early 1860s. By 1879 the Clark works and the Carder works (then owned by Vazey, Joshua Carder's son-in-law), were relatively small concerns. The Clark pottery had a single kiln and used horse power to operate its machinery, while Vazey's was on a similar scale though less extensive, according to contemporary accounts. At this date the Dowden works at Scott Point were larger and used steam power. (See 'History', above).

The Clark works expanded considerably in the early 1880s, extending onto reclaimed land, and were evidently steam powered by the middle of the decade, on the basis of their recorded output of bricks. Carder's was presumably also steam powered at this stage. The 19th and 20th century photographs and the features investigated indicate that the Clark works used beehive kilns from the period of expansion in the 1880s through to the closure of the works in 1931, possibly because these were best suited to the firing and salt glazing of sanitary wares (sewage pipes, etc), which appeared to be the predominant product during the 20th century at least. Photographs show virtually every vacant area stacked high with salt glazed pipes. Carder's works used similar downdraught beehive kilns.

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DISCUSSION AND CONCLUSIONS, CONTINUED

Limeburners Bay and Hobsonville, continued

The Clark works was the most successful concern in Limeburners Bay (and the rest of Hobsonville), continuing in production throughout, while Vazey, at the works founded by Joshua Carder, failed in 1888. Although taken over by the Carder Brothers at that stage, the works may not have operated for some years afterwards. A 1903 newspaper article stated that '*Messers Carder Bros Pottery is now in full work, the busy hum of machinery of the two potteries make Hobsonville quite lively*' (AWN 5.3.1903), indicating that the Carder works had either ceased operating in the years before, or were operating well under capacity. The Carder Brothers pottery in Ponsonby, however, had continued in production during this period and was evidently a successful concern. A 1903 article in *The British Clayworker* (JTDC 2003: 1300 BNE) describes the extensive Ponsonby works in detail, including the use of tilted side walls to ventilate the drying sheds (a feature not apparent at Clark's until 1908).

The potteries at Scott Point (Carder Bros. Point Pottery 1872-76, Dowden Point Pottery 1878-81; Cater 1881-83, Auckland Brick & Tile Co. 1883-87), although initially larger and more technologically advanced, also failed during the Long Depression and were closed by 1887.

The two other recorded pottery works at Hobsonville were Robert Holland (1904-09), immediately adjacent to Clark's in Limeburner's Bay and absorbed by Clark's from 1909, and J. & W. Ockleston (1903-09), which became the Ockleston branch of R.O. Clark (1909-c.1914).

Conclusions

The S18 investigations at Limeburners Bay revealed most of the layout of the Clark pottery works, which operated for almost 70 years from 1864 to 1931, at its final extent in the 1920s. In addition to the visible surface remains (the concrete machine foundations, the landing areas, the boiler and the recently exposed kiln K1), the S18 investigation of the Clark pottery works site exposed the remains of a further 8 kilns that had been largely demolished during the latter part of the 20th century. In addition to the kilns, the bases of two chimneystacks, several flues, large areas of service floors, foundations and a network of drainage pipes were also exposed, revealing much of the final extent of the former brick and pottery works.

A number of identifiable/stamped bricks were incorporated into several features at the western end of the site and provided evidence for the date of construction of those features, confirming and adding to the information available from historic photographs of the site.

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DISCUSSION AND CONCLUSIONS, CONTINUED

Conclusions, *continued*

In combination with stratigraphic evidence showing the relationships between the various structures, and in conjunction with archival information, these datable elements indicate that most if not all of the surviving remains at the western end of the site can confidently be dated to the late expansion of the works in the early part of the 20th century, from 1903 onwards.

The eastern end of the site also revealed a sequence of change which would be consistent with the documented expansion of the works in the 20th century. The concrete foundations across the site are largely composed of a concrete using ceramic pipe wasters as aggregate – a new construction method being trialled by Clark in the early 20th century. The location and spacing of some of the foundations along the embankment also accord with a three storey structure built sometime between 1908 and the 1920s.

It is clear from the excavated material in combination with the archival sources that the works were being constantly remodelled in the 20th century with the expansion of the company to maintain the position of the R.O. Clark as a leader in the industry.

The reclamation of the foreshore evident from a comparison of the shoreline shown in an 1881 plan with a modern cadastral plan, can be shown on the basis of archival information to have occurred c.1882. Excavation revealed that the original ground surface had been quarried and levelled, and the reclamation achieved with clean clay fill difficult to distinguish from the in situ clay.

The information recorded by Jack Diamond in 1966 and 1978, which included a sketch plan of the features visible in 1966 and a description of past bulldozing of the site, in conjunction with the exposed kiln K1, provided the most reliable guidance regarding areas to be investigated.

Geophysical survey (using GPR, GSM-19 Gradiometer and EM34 conductivity survey) was carried out prior to excavation but, with the exception of GPR, provided less guidance to the location of archaeological features. GPR gave a useful indication of deeper features on the site. The GSM-19 clearly identified archaeological features with high metal content but was less convincing elsewhere. The gradiometer clearly had significant limitations on this type of complex industrial site, where the noise created by metal bearing demolition layers obscured any indication of brick structures. The conductivity survey provided interesting data regarding the shoreline in earlier periods based on the extent of saline intrusion, but this could not be easily correlated with the shoreline shown in the 1881 plan except in the southeastern area of the site. Overall it was concluded that archival sources, where available, provide a more useful indication of the location of archaeological remains on historic industrial sites.

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DISCUSSION AND CONCLUSIONS, CONTINUED

Conclusions, *continued*

The S18 investigation, both archaeological and archival, has provided a great deal of information on this important industrial site. The excavations confirmed that most if not all of the remains visible today relate to the early 20th century, between 1903 and 1931. The Clark pottery works were the longest lasting and most successful in the Hobsonville area, and played a major role in the West Auckland ceramics industry. The remains of this site, with the more intact remains of the Carder works to the west, merit preservation and interpretation so that the history of the area is not lost. Despite several episodes of bulldozing enough remains of the bases of kiln and stack features and machine foundations at the Clark site to achieve this.

SITE DAMAGE

Introduction

The discovery of an intact kiln base during site clearance works by Hobsonville Residential Development's contractors in October 2006 halted work and Clough & Associates were asked by Hobsonville Residential to provide an archaeological assessment for resource consent purposes. An initial assessment to guide future development plans taking the heritage remains into account was prepared by Clough & Associates in November 2006 and provided to the NZ Historic Places Trust and Waitakere City Council for their information. Subsequently both organisations commissioned damage reports to determine the extent and nature of any archaeological site damage. M. Felgate completed a report for the HPT in December 2006 and Geometria completed a report for Waitakere City in March 2007 (based on fieldwork carried out in December 2006).

There were disparities between the Geometria and Felgate reports in terms of the 19th century layout of the site, and between these two reports and Clough 2006 in terms of the likely date of the visible remains. The Clough & Associates report had concluded that:

'Most of the remains visible today, such as the concrete foundations, will relate to the early 20th century. The kiln remains will also relate to the 20th century but may well have 19th century origins or elements. It is possible that the base of the kiln dates back to the 19th century. Kilns were frequently rebuilt and it is unlikely that any kiln present in 1929, when the works closed, would have survived from the 19th century without being rebuilt.'

The two damage reports (Geometria 2007; Felgate 2006), however, concluded that the damaged remains were of 19th century origin. One of the objectives of the current investigation, including further detailed archival research, was to establish the layout and date of the various parts of the pottery works with greater certainty and in particular the date of the damaged kiln.

The date of any damaged remains is a factor in determining whether an archaeological site as defined in the Historic Places Act 1993 (see below) has been damaged and an offence committed.

The Waitakere City District Plan adopts the same definition of 'archaeological site' that is in the Historic Places Act. The Clark pottery site, however, is also a scheduled heritage item in the Waitakere City District Plan (ref. no. 181).

Continued on next page

SITE DAMAGE, CONTINUED

Legal Definition of Archaeological Site

An archaeological site is defined in the Historic Places Act 1993 S.2 as:

‘Any place in New Zealand that –

(a) Either –

*(i) Was associated with human activity that occurred before 1900;
or*

*(ii) Is the site of the wreck of any vessel where that wreck occurred
before 1900; and*

*(b) Is or may be able through investigation by archaeological methods
to provide evidence relating to the history of New Zealand.’*

Under S.9(2) of the Historic Places Act a site of later date may be legally defined as an archaeological site if it is:

‘declared by the Trust on reasonable grounds, by notice in the Gazette and by public notice, to be a site that is or may be able, though investigation by archaeological methods, to provide significant evidence relating to the historical and cultural heritage of New Zealand’.

The definition of archaeological site in the Waitakere City District Plan is:

‘any place that was associated with human activity that occurred before 1900 and is or may be able through investigation by archaeological methods to provide evidence relating to the history of New Zealand.’

Key Conclusions of the Damage Reports

The damage reports (Felgate 2006; Geometria 2007) came to three broad conclusions:

- That the kiln and other remains impacted on were highly likely to be of 19th century date.
- That the damage to archaeological remains caused by Hobsonville Residential Developments was extensive.
- That the damage was intentional (Felgate 2006).

However, the archival and on site investigation does not support the first two conclusions, and the actions of Hobsonville Residential Developments both before and after the discovery of the intact base of a kiln do not bear out the third conclusion. The three points are addressed in sequence below.

Continued on next page

SITE DAMAGE, CONTINUED

The Date of the Kiln and other Damaged Remains

The Felgate (2006) report includes a reasonable amount of historical background derived mainly from secondary sources (Scott 1979), and some additional research into general aspects such as the use of concrete as a building material in New Zealand, and the industrial process within a pottery works. The Geometria report includes a briefer historical summary. Both reports refer to photographic information to assist in establishing the date of developments in the pottery works, but neither author was able to establish the dates of any of the photos used, and this has resulted in incorrect conclusions being reached regarding the date of developments at the works.

Felgate had access to the 1881 plan and the Richardson photograph (which he correctly concludes shows the works after the expansion of the early 1880s). He includes the photos shown in Figure 21 (taken c.1908, and certainly post 1906) and Figure 23 (after 1908), but has concluded that they show the extent of the works in the 19th century. He believes that the date of 1905-9 for the photo in Figure 21 supplied by the Alexander Turnbull Library is ‘probably incorrect’, and that the second photo ‘could date anywhere from the late 1880s to the 1920s’. As demonstrated above, however, these photos show the extent of the site in and after 1908 following a great deal of new 20th century development.

Geometria also had access to the 1881 plan and a number of historical photos, but did not have reliable information about the date of the photos used. Two of the photos in the Geometria report (figures 5 and 6) are from the 1906 Price List, and a third (figure 4) is clearly contemporary with them. Two photos (figure 7 and 8) show the works after 1908. Lacking this information, Geometria suggests that the 1906 photos date between the 1880s and 1902, and the later photos to post 1905 (p.13).

Felgate and Geometria both assume an early date for the damaged kiln and the concrete foundations. On p.3 of his report, Felgate states ‘It is not clear from Scott’s account whether any substantial reinvestment in plant and machinery actually occurred in the early 20th century’. On this basis, and because concrete was used to some extent in the 19th century (pp.48-51), he concludes that the surviving remains, including the concrete machine bases, were likely to be of 19th century date (p.65). Geometria also concludes that the kiln and the majority of the concrete foundations were of 19th century origin, but believes them to date back to the early to mid 1880s (p.27). In fact, as discussed above, there are accounts in contemporary newspapers showing that a major expansion which included the installation of new machinery, and therefore the bases to mount them, commenced in 1903. The bases are made of concrete using kiln wasters as aggregate (see Excavation Results), a material that was new to the market and about to be released in 1906 (Price List: 44).

Continued on next page

SITE DAMAGE, CONTINUED

The Date of the Kiln and other Damaged Remains, continued

The location of the damaged kiln in an area of the works that was not developed until 1906-1908, combined with date of some of the bricks used in its construction, confirms that it belonged to the 20th century period of expansion. One of the bricks stamped 'KAMO' must post date 1914 while others such as the J.J. Craig are likely to relate to earlier in the 20th century.

Both reports also refer to an area of damaged 'shell midden' located close to the foreshore (Felgate 2006: 20; Geometria 2007:24). This deposit was noted in Clough 2006 (figs. 16-17). It is not shell midden in the archaeological sense, and highly unlikely to be associated with pre-European activity. It is mixed with vitrified fuel ash from kiln rakeout and located on the surface in an area that has been much disturbed. Jack Diamond recorded that '*scrub and pampas had been pushed over into the channel [by bulldozing] so that the pipes and landings were hard to find*' in 1966 and in 1978 that '*the rubbish had again been bulldozed over the landings into the tide hiding many of the areas previously seen there*' (JTDC 2003: 1298). No midden was recorded by Jack Diamond in his 1966 site plan in this location, although he does note midden further to the west.

In conclusion, the kiln and concrete foundations were of 20th century not 19th century date. All the photographs except the Richardson photo post-date 1905 and confirm a 20th century date for the majority of the physical remains on site. There are contemporary accounts of the expansion undertaken in the 20th century from 1903 onwards. A 20th century date for most of the surviving remains is very much what one would expect to find on an industrial site that continued successfully well into the 20th century, with the majority of the surviving visible remains relating to the later periods not the earlier ones.

Extent of Damage Caused by Hobsonville Residential Developments

The Geometria report (2007) describes a number of exposed features on site, some but not all of which have been damaged, and some of which had been damaged at an earlier stage. Of 17 features noted, 3 were not damaged, 2 had been previously damaged, 1 was not an archaeological feature (the area of shell and ceramic), and 1 (Feature 12) appears to be an area exposed by Felgate in the course of an informal investigation of the site (Felgate 2006: 15). Three of the features were in the area of the Holland pottery, which was not established until 1904, and are therefore part of a 20th century site.

Of the remainder, 6 small areas of concrete and brick foundations had received surface scrapes from an excavator, and some of the machine foundations had also been scraped. In none of these cases can the damage be considered to be more than superficial – I would agree with Felgate (2006: 64) that 'The machinery bases and other archaeological features have suffered cosmetic and minor structural damage'.

Continued on next page

SITE DAMAGE, CONTINUED

**Extent of
Damage,
*continued***

The main area of damage was to the kiln base, where c.3m² of the top surviving course of bricks in the kiln wall had been removed before the work was halted. Exposure of the rest of the kiln base during the current investigations indicated that the majority of the base remained intact.

Both damage reports also refer to a new drain having been dug. 'A large drain was dug around this feature [the machine bases] without concern for the underground archaeology and several footings have been destroyed' (Geometria 2006: 17-18). 'The drainage swale shown in Figure 51 has been freshly excavated by hydraulic digger ... this work has been carried out without regard to archaeological features' (Felgate 2007: 57). However, there has been a drain in this general location prior to Hobsonville Residential taking ownership of the property (R. Clough pers. obs.), and there is no evidence of the many cubic metres of excavated soil which would have been dug out of it if it was a newly created feature. Footings have certainly been destroyed as Geometria notes, but not by Hobsonville Residential. Four of the concrete blocks recorded by Jack Diamond in 1966 (Figure 28) are no longer in situ, but this was done at an earlier stage as is evident from his 1978 field notes (JTDC 2003: 1298). The only evidence of recent work appears to be the cleaning out of an existing drain, with little if any recent damage to any in situ features.

The Felgate report (fig. 51) shows this drainage channel cutting through a building identified as the building shown on the 1881 plan, and therefore potentially damaging 19th century remains. This is incorrect, however, as an overlay of the 1881 plan onto a modern plan shows the building further to the north. The Felgate overlay appears to be based on his interpretation that one of the buildings in the Richardson photo was the building shown in the 1881 plan. There is no evidence to support this interpretation, however, and it is clear from the archival information and the results of the investigation that the early building cannot have been in the location shown in Felgate 2005: fig. 51, because prior to reclamation in 1882 the building would have been located partly in the sea. Geometria's figure 9 and 10 show a more correct overlay, with the drain running between the machine bases and the recorded location of the 1881 building.

Neither report attempts to quantify the extent of the recent damage in relation to the extent of the site as a whole (usually a consideration in archaeological damage reports). However, this would have been difficult to assess prior to the Section 18 investigation. Leaving aside the 'cosmetic' and 'minor' damage caused by surface scraping, the main damage is to the kiln base. Now that the rest of the kiln base and many other features on the site have been exposed, the damage to the kiln base cannot be said to be significant in terms of extent.

Continued on next page

SITE DAMAGE, CONTINUED

Extent of Damage, continued

The kiln damage amounts to about 2% of the kiln area, and a much smaller percentage of the surviving structure, as up to 6 courses of bricks were found to have survived below the ground surface and the recent damage only affected the top course. In terms of the Clark site as a whole, which covers an area of over 6000m², the damaged area of the kiln accounts for less than 0.1%.

The other aspect relevant to archaeological damage assessments is the extent to which evidence relating to the history of New Zealand has been destroyed or damaged. As set out above, archaeological sites are legally defined by their ability to provide evidence through archaeological investigation, and the loss of potential to retrieve such information is one of the main criteria for assessing site damage. It is clear from the investigation that the loss of a small part of one of the 9 surviving kiln bases (or parts of kiln bases), has not affected our ability to gain information from this site in any way.

One major shortcoming of the damage reports is that the recent damage has not been adequately differentiated from the earlier extensive damage to the site by previous owners, although both reports do recognise that earlier damage has taken place. However, this is not given a great deal of weight in either report, and Felgate refers merely to ‘some anecdotal evidence relating to bulldozing on site ...’ (p.13). In this respect both authors would have been disadvantaged by the fact that they were not familiar with the appearance of the site prior to the recent site works and therefore had no basis for comparison. The authors of the Geometria report do not claim to have visited the site previously, and Felgate states that he had only briefly visited the parts of the site in the active coastal zone and immediate land backdrop in 1994 (p.13).

As discussed in previous sections, the site had already been partially bulldozed in 1966 and had ‘*again been bulldozed successfully filling in all the depressions where the kilns and machinery were situated*’ by 1978; ‘*even the concrete bases for the machines and building foundations have been bulldozed away*’ (JTDC 2003: 1298). The previous landowner, Mr Reg Banning, had extensively bulldozed the area again between 1987 (R. Clough’s first visit) and 1989 (R. Clough’s second visit). Many of the ceramic pipes previously observed around the site were removed subsequently during Mr Banning’s period of ownership.

The vast majority of the damage to the site, including the demolition of some of the machine bases, was done at an earlier stage. Much of the crushing noted by Felgate can be demonstrated stratigraphically to relate to earlier demolition and compaction. The work undertaken by Hobsonville Residential Developments’ contractors related to the clearance of rubble created by these previous episodes of bulldozing, other dumped rubbish, and the weeds that had grown over the site subsequently. Clearance of bulldozed rubble would not normally be considered damage to an archaeological site.

Continued on next page

SITE DAMAGE, CONTINUED

Evidence of Intent

Attempts to determine whether or not archaeological site damage was intentional are not normally part of damage reports undertaken by archaeologists, and it would be difficult to determine intent on the basis of site damage alone. The Geometria report does not attempt to draw any conclusions regarding intent, although it does suggest that damaged areas ‘have been deliberately covered with mulch’ (p.27). However, the Felgate report addresses this aspect at some length (pp.24, 30, 31), and concludes that the damage was intentional. This appears to be based on the fact that material within the damaged kiln consisted of too coherent a mixture of kiln demolition material to be other than recent, and the fact that more than one scoop into the intact part of the kiln base was made by the digger.

This does not stand up to scrutiny. As described by Jack Diamond in 1978, the site had been bulldozed for a second time, and ‘all the depressions where the kilns and machinery were situated’ filled in (JTDC 2003: 1298). This would have resulted in a very coherent mixture of kiln debris within the damaged kiln. Nor does the fact that several passes were made with a digger indicate intent – it might well take several passes before it was realised that part of an intact kiln base was being hauled up as opposed to the rubble and heavy concretions of demolished material that were present all over the site, especially since the bricks were held together by fairly soft mortar.

In conclusion, none of the evidence presented by Felgate is inconsistent with R. Clough’s understanding of events, which is that once it was realised by the contractor that intact remains were present the contractor informed Hobsonville Residential Developments, who called a halt to the work pending an assessment by Clough & Associates. The piles of mulch were presumably left where they lay at the time, rather than being deliberately placed to conceal damage.

We would also note that earlier contact between Hobsonville Residential and Clough & Associates indicated that the company was interested in the history and archaeology of Limeburners Bay and in protecting the industrial remains. On a previous occasion, during subdivision of another property in the Bay at 54 Bannings Way, Clough & Associates were asked by Hobsonville Residential to identify and mark out the remains of the Carder works to ensure that they were not damaged during construction work. Before the issue of site damage arose, Hobsonville Residential had expressed a great deal of interest in R. Clough’s suggestion of a heritage walkway to the Carder remains as part of the subdivision, and in preserving many of the industrial features exposed along the embankment.

Continued on next page

SITE DAMAGE, CONTINUED

Evidence of Intent, continued

However, Hobsonville Residential were not aware that there were likely to be intact archaeological remains relating to the Clark brickworks, especially since they were in possession of a 1989 letter to Mr Reg Banning from R. Clough, writing on behalf of the Department of Conservation, advising that the site had no archaeological value (in terms of public appreciation) and could be developed providing that the Carder works were preserved (DOC CHI 047). It was only when the site was being cleared of rubble that the presence of intact remains became apparent.

Conclusions

It is clear from both archival information and archaeological investigation that the remains that were scraped (in most cases) or damaged (in the case of the K1 kiln base) during vegetation and rubble clearance on the site were all of 20th century date and do not constitute archaeological remains within the meaning of the Historic Places Act 1993, or as defined in the Waitakere City District Plan.

The damage was negligible, affecting only a small proportion of the surviving remains on the site, and did not affect the potential of the site to provide evidence relating to the history of New Zealand. Almost all the damage to the site pre-dated Hobsonville Residential Developments' ownership of the property.

Hobsonville Residential Developments acted appropriately in halting the work once it was apparent that intact features (as opposed to demolition rubble) were being affected, and in calling Clough & Associates in to carry out an archaeological assessment.

FUTURE MANAGEMENT

Limeburners Bay Heritage Trail

In the future it is hoped that the Clark pottery site will be incorporated into a Limeburners Bay heritage trail that incorporates the parts of the Clark works that can be stabilised for display to the public, the much more intact Carder's works to the west, Clark House (Figure 7), the church, cemetery and other historic features at Hobsonville.

A draft concept plan for a heritage trail was commissioned by Hobsonville Residential from Mandy McMullin (landscape architect) showing features that could be incorporated into the heritage trail and how they could be linked (Figure 163, Figure 164).

Some of the surviving archaeological remains at Clark's brickworks are damaged and unstable (K1, K2, K3 and drainage features), and will be grassed over to protect them. Other features, such as the chimney and kiln bases on the western side of the site, can be stabilised and left partly exposed (K4, K5, S5 and S7 and some service floors). It is also hoped that K7, which has the only intact portion of chequer floor, might be stabilised and left exposed although there are difficulties in achieving this. Ongoing maintenance and drainage of the site are significant management issues.

The Carder works are at present in a reserve managed by Waitakere City Council, and require vegetation clearance and stabilisation work before they can be presented to the public. It is likely that part if not all of the Clark's site will form part of the reserve contribution for the subdivision, but this is still to be determined. If the heritage trail is to be achieved there will need to be an ongoing commitment from the Council to conserve and maintain the historic remains and install visitor facilities such as pathways and interpretation. The future management of the area is currently under discussion.

Continued on next page



Figure 163. Limeburners Bay Heritage Trail draft concept plan (by Mandy McMullin)



Figure 164. Heritage Trail draft concept plan (by Mandy McMullin)

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APPENDIX: SITE RECORD FORM

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION SITE RECORD FORM (METRIC) Metric map number sheet R11 Metric map name Auckland NZMS 260 map edition		NZAA METRIC SITE NUMBER R11/1508 DATE VISITED October 2007 SITE TYPE Historic Pottery Works SITE NAME: Clark/Carder/Holland works OTHER													
Grid Reference		Easting 2657900	Northing 6487500												
1. Aids to relocation of site (attach sketch map) The site is located at Limeburners Bay, Hobsonville and encompasses the remains of three pottery works along the foreshore of the bay: R.O. Clark's (1864-1931), Carder's (1863-1929) and Holland's (1904-1909)															
2. State of site and possible future damage The Clark pottery has been bulldozed on a number of occasions and is located in an area where subdivision is proposed, but is likely to be avoided by the development. The bases of kilns, chimney stacks and concrete foundations survive at and below ground level, and some substantial concrete machine foundations above ground level in the centre of the site. More intact remains of the Carder works survive to a height of c.1m but are currently overgrown. Subsurface remains of the Holland works are likely to be present.															
3. Description of site (Supply full details: history, local environment, references, sketches, etc. If extra sheets are attached, include a summary here) An investigation of the Clark works was carried out in October 2007, and a full report completed (R. Clough, S. Macready & M. Plowman, R.O. Clark's Pottery (1864-1931), Limeburners Bay, Hobsonville: Archaeological Investigation. Report on S18 investigation of site R11/1508 in fulfilment of NZHPT Authority No. 2005/355 prepared for Hobsonville Residential Developments Ltd, January 2008). The investigations exposed the remains of 9 kilns, 2 stacks, drainage systems and foundations. A site plan is attached, but refer to the report for further details. The Carder works has been mapped and described in Waitakere City Council, Conservation Plan for Carder's Heavy Clay Pottery Works at Limeburners Bay, May 2000.															
4. Owner Current – Hobsonville Residential Developments (Clark and Holland), Waitakere City Council (Carder) Address		Tenant/manager Address													
5. Nature of information (hearsay, brief or extended visit) - S18 investigation Photographs (reference numbers and where held) Aerial photographs (reference numbers and clarity of site)															
6. Reported by Clough & Associates Ltd Address 321 Forest Hill Rd, Waitatara, Waitakere City 0612		Filekeeper Date													
7. New Zealand Historic Places Trust (for office use) <table border="0"> <tr> <td><input type="checkbox"/></td> <td>Type of site</td> <td><input type="checkbox"/></td> <td>Present condition and future danger of destruction</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Local environment</td> <td><input type="checkbox"/></td> <td>Local body</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Land classification</td> <td></td> <td></td> </tr> </table>				<input type="checkbox"/>	Type of site	<input type="checkbox"/>	Present condition and future danger of destruction	<input type="checkbox"/>	Local environment	<input type="checkbox"/>	Local body	<input type="checkbox"/>	Land classification		
<input type="checkbox"/>	Type of site	<input type="checkbox"/>	Present condition and future danger of destruction												
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Extent of features at the Clark pottery works investigated and recorded in October 2007, in relation to extent of works shown in 1940s aerial (red outline) and original shoreline recorded on 1881 plan S02598(light blue line)