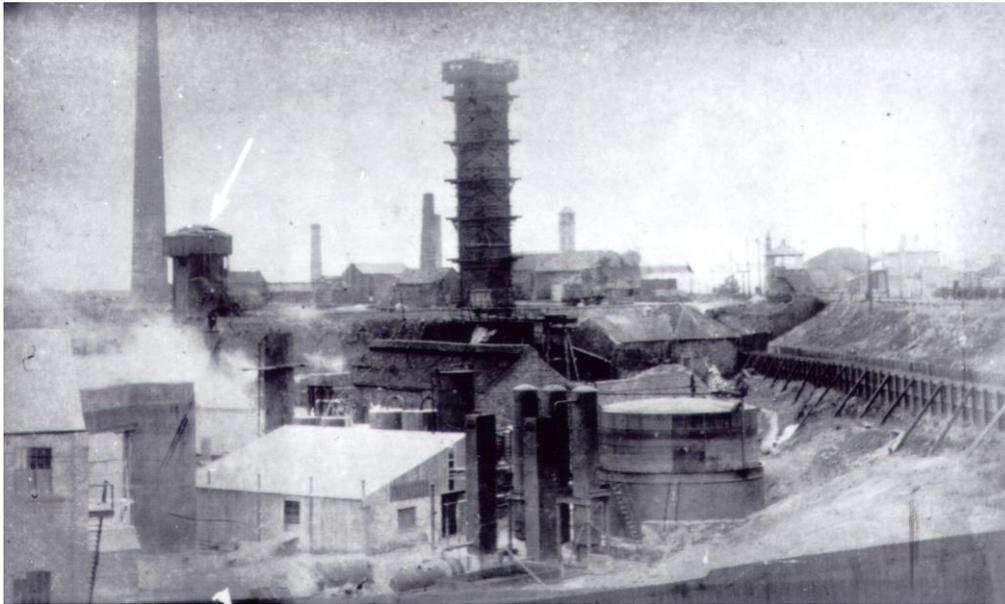




Archaeo-Environment Ltd



**Desk Top Assessment of the former Washington
Chemical Works for Sunderland City Council.**

March 2004
Project Code PTW/WCC/03/04

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CHH March 04.

Summary

The development proposal will impact on the remains of Washington Chemical Works, a potential nationally important monument. Hugh Lee Pattinson founded the chemical works in the late 1830s or early 1840s. The works are the site of a number of innovative techniques used to advance the chemical industry in the 19th century. The works started as a lead, silver and paint manufactory before moving into magnesia and alkali production. It subsequently moved into the production of insulation materials and converted the Wire Rope Works, which had been incorporated into the site, into a Cork Plant. In time, asbestos became the main insulating material used and this continued until recent times. A large part of the proposed development area has been reclaimed and offers no constraints to future development. However a number of zones have been identified where archaeological remains may survive and appropriate mitigation has been recommended in each case.

1.0 Introduction

1.1 This desktop study provides an assessment of the predicted impact, upon the historic environment, of any future development at the former Washington Chemical Works site, located in Washington in Sunderland City Council. The aim of the assessment is to identify any significant historic environment constraints within the study area, identify any predictable impacts and propose appropriate mitigation strategies.

1.2 The historic environment is considered to include all recorded archaeological remains, including scheduled monuments, designated sites (such as registered parks and gardens or battlefield sites) and other archaeological remains. The potential for previously unrecorded archaeological remains within the proposed development boundary is also assessed. This chapter also addresses the predicted impact of the proposed development upon the built historic environment, and in particular upon any listed buildings and conservation areas within the study area.

1.3 The boundary of the study area for the assessment is based on the proposed development site and an area extending up to 200m from the boundaries of the application site. References are made to sites outside this area in order to help place the historic interest of the site in a wider context.

1.4 The assessment describes the location of the proposed development and its environs. It also outlines the assessment and prediction methodology and describes the baseline environment with respect to the historic environment. The potential impacts of both the construction and operation of the development upon the historic environment

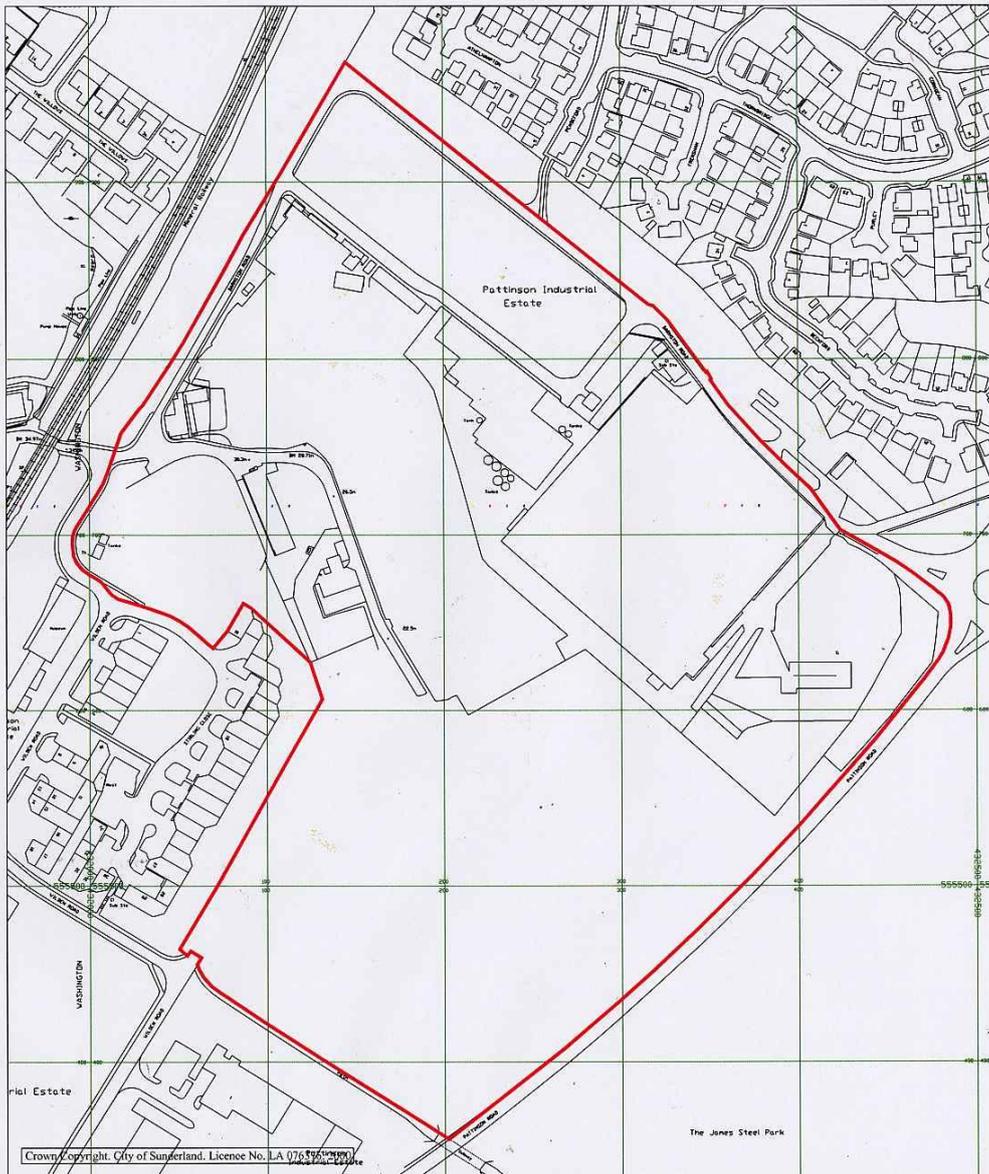
are set out, together with associated mitigation measures and the resultant residual impacts.

2.0 Site Description

2.1 The site is located about 1.5km south of Washington Village and 0.5km north of the River Wear at NZ 3206 5574. The development area is bounded by Barmston Road to the north and west, Stirling Close to the south west and the corner of Wilden Road across to Pattinson Road to the east. It currently consists of derelict land where Pattinson Town once stood, Cape Insulation continues to occupy the main complex of buildings fronting on to Barmston Road. Instrip Demolition occupies some of the former chemical works buildings dating to the 1930-40s, and use land to the rear of these buildings to dump demolition waste. Station Road runs through the centre of the development area and has a number of small businesses located along its route. These businesses operate from former chemical works buildings dating to the 1930-40s. A large part of the development area to the south is now grass fields reclaimed from former magnesium spoil tips.

2.2 Information on the drift geology of the development site is unknown, being simply labelled as “made ground” in the BGS. The wider area consists of Upper or Pelaw clay, laminated clay, glacial or boulder clay and undifferentiated drift and Middle Coal Measures. The underlying solid geology consists of strata of Carboniferous (Westphalian B) Middle Coal Measures; the Hylton Marine Band directly below the drift. The Middle Coal Measures contain a number of coal seams including the Ryhope 5 Quarter, the Ryhope Little and the High Main. Neither coal seam is directly below the development site.

2.3 The development area was visited in February 2004 however access to parts of the site was not possible. Land belonging to Cape Insulation and Instrip Demolition was not visited but viewed from a distance. Station Road and the land where Pattinson Town once stood was visited. Inspection was made, at the owner’s invitation, of private land to the rear of Turnbull’s Garage and The Icing Parlour on Station Road and a brief visit was made to the end of Station Road to identify the remains of an early railway bridge abutment. However this area was very overgrown, had open drains and has been used for dumping in recent times, therefore a thorough inspection was not possible. Land above Station Road, to its south and west was visited.



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	Project Washington Chemical Works	Approved by I.Hall
	Subject Site Boundary	Drawn by C.Hogarth
	Drawing No. PO 76.38/001	Date 06 Nov. '03
		Scale 1:3000
		North 
		Sheet size A4
		Revisions A

Figure 1. The development area

3.0 *Planning Context*

3.1 The relevant planning policy context, with respect to the historic environment includes the following.

3.2 PPG15 (1994) on Planning and the Historic Environment emphasises the importance, which the Government gives to preserving and enhancing conservation areas, listed buildings and their settings, and the wider historic landscape and seeks effective protection for all aspects of the historic environment. It states that the historic environment is to be valued and protected for its own sake and that it is an irreplaceable record, which contributes to our understanding of the present and the past. It also emphasises the historic environment's contribution to the quality of our lives, by enhancing the familiar and cherished local scene and by sustaining a sense of local distinctiveness.

3.3 PPG16 (1990) on Planning and Archaeology sets out the government's policy with respect to archaeology and planning. Where nationally important remains, whether scheduled or not, and their settings are adversely affected by proposed development there should be a presumption in favour of their preservation. In cases involving archaeological remains of lesser importance the planning authority will need to weigh the relative importance of the archaeology against other factors, including the need for the proposed development.

3.4 The Sunderland Unitary Development Plan sets out policies on archaeology, listed buildings, conservation areas and parks and gardens. Of particular relevance here, are policies B11-14, which seek to promote the archaeology of the Sunderland area and ensure that any remains discovered will be either physically preserved or recorded. Provision is made to ensure that adequate information is known about the extent, nature and significance of a site before planning permission is granted, and to ensure that nationally important sites have a presumption in favour of protection.

4.0 *Prediction Methodology*

4.1 *Potential Impacts*

4.2 No details of the proposed development are known, therefore an assessment will be made as to the likely impact of reclamation works leading to a light industrial or retail use. Such a development has the potential to cause physical damage to the historic environment through ground disturbance associated with the removal of spoil, site stripping operations, the excavation of building foundations, piles and service trenches, the construction of roads, landscaping and drainage. Where buildings are upstanding,

any future development can also damage historic remains through demolition and lead to a loss of local distinctiveness.

4.3 In addition to physical damage, the setting of important historic sites, buildings and areas can be damaged by development that materially affects their character and setting.

5.0 *Assessment Methodology*

5.1 The assessment represents a comprehensive desk-based review of published and readily accessible documentary, cartographic and aerial photographic information relating to the historic environment up to 200m from the application boundary. The information derived from this review was supplemented by walkover surveys of the area of the proposed development. The principal aims of the assessment are:

- to identify known or previously unrecorded archaeological sites within or in the vicinity of the proposed development
- to identify the extent to which archaeological remains, relating to the former chemical works in particular, survive within the development boundary and to assess the impact of any future development on these remains.
- to assess the physical and visual effects of the proposed development upon historic buildings or archaeological sites and their settings
- to propose appropriate mitigation measures which could either be carried out in advance of any planning application or permission, or which could be built into the development proposals to avoid, reduce or remedy any potential adverse effects identified.
- to assess the suitability of any future development with respect to local plan policies and national planning guidance on the historic environment.

5.2 The assessment is based upon a review of existing available information and desk studies. A full list of sources and organisations consulted is given at the end of this assessment. The following organisations were researched or consulted:

- Tyne and Wear Historic Environment Record
- English Heritage
- Sunderland City Council
- Sunderland Local Studies
- Tyne and Wear Archives

- Beamish Museum
- Washington Town Centre Library
- Durham University Palace Green Special Collections
- Durham Records Office
- Cranstone Consultants

The following data sources were utilised for the assessment:

- Tyne and Wear Historic Environment Records
- National Monuments Record
- vertical aerial photographs archived with the NMR
- published and unpublished historical and archaeological studies (see Bibliography for details)
- cartographic sources (Ordnance Survey maps, tithe map and Washington Chemical Company maps)
- statutory list of scheduled monuments
- statutory list of buildings of special architectural or historic interest

Site walkover inspections of the development area were made with David Cranstone of Cranstone Consultancy in February 2004.

6.0 Assessment of Impacts

6.1 The significance criteria for predicting the impacts of the proposed development on the archaeological and historic resource are as shown below:

Severe	Major direct impact on internationally significant archaeological site or multiple sites or historic buildings of national importance or their settings. Integrity would be severely damaged or destroyed. Mitigation measures would not remove or modify such effects.
Major	Substantial direct impact on a nationally or regionally important archaeological site or historic building where the significance of the elements directly affected is considered to be high. Development would destroy or significantly compromise its integrity. Mitigation measures would not totally remove or modify such effects. Impact on the setting of sites, buildings, monuments or landscapes of national or regional importance would result in their character or appearance being compromised to the extent that appreciation or understanding is destroyed or substantially diminished.

Moderate	<p>Direct impact on regionally or nationally important archaeological site or historic building which would partially damage or compromise but not destroy its integrity. Adequate partial or total mitigation measures can be specified.</p> <p>Impact on the setting of sites, buildings, monuments or landscapes of national or regional importance that would result in their character or appearance being compromised to the extent that appreciation or understanding is partially diminished.</p>
Minor	<p>Impact on regionally or nationally significant archaeological sites or historic buildings, which would not substantially compromise the integrity of the site. Impact on locally significant archaeological sites or historic buildings, which would destroy or substantially compromise its integrity. Adequate partial or total mitigation measures can be specified.</p> <p>Impact on the setting of sites, buildings, monuments or landscapes of regional or national significance, which would result in their character or appearance being compromised. Impact on the setting of sites, buildings, monuments or landscapes of local significance that would result in their character or appearance being compromised to the extent that their appreciation or understanding is substantially or partially diminished.</p>
Negligible	<p>No appreciable impact upon archaeological sites or historic buildings and their settings. The integrity or understanding of the sites or buildings would not be affected.</p>

7.0 Baseline Environment

7.1 Archaeological Sites

Archaeological sites and finds recorded within the development area and the wider study area are listed in Table 1 below. The location of the sites and the development area is indicated on Figure 2. Sites are allocated a unique reference number, but where they are recorded on the HER, or have listed building status, a cross reference is supplied. A central grid reference, suggested classification and date are provided for all sites, which are graded in archaeological significance as of 1 (national), 2 (regional) and 3 (local) importance. Grading is based upon professional judgement and the criteria set out in Annex 4 of Planning Policy Guidance Note 16 on Archaeology and Planning (DoE 1990). The current condition of the site has an impact on the significance assigned to each monument; those sites in poor condition will be considered less important than those sites in good condition.

7.2 Due to the complexity of the Washington Chemical Works site within the development area, land use information is summarised in tabular form in Table 2 before being discussed in more detail in section 8.

Table 1: List of sites within the wider study area (sites within the development area are in **bold**)

Site/HER no.	NGR	Classification	Period	Grade	Source
1(3057)	NZ3215 5542	Waggon Ways	19 th century	3	1 st edition OS 1856 1:2,500
2(3059)	NZ3244 5515	Shipbuilding Yard	19 th century	3	1 st edition OS 1856 1:2,500
3	NZ3243 5517	Saw Pit	19 th century	3	1 st edition OS 1856 1:2,500
4(3060)	NZ3234 5495	Timber Yard	19 th century	3	1 st edition OS 1856 1:2,500
5	NZ3249 5524	Well	19 th century	3	1 st edition OS 1856 1:2,500
6	NZ3248 5516	Crane	19 th century	3	1 st edition OS 1856 1:2,500
7	NZ3249 5519	Foresters Arms	19 th century	3	1 st edition OS 1856 1:2,500
8	NZ3235 5506	Earl of Durham Inn	19 th century	3	1 st edition OS 1856 1:2,500
9	NZ3242 5524	Staith Inn	19 th century	3	1 st edition OS 1856 1:2,500
10	NZ3239 5527	Wesleyan Chapel	19 th century	3	1 st edition OS 1856 1:2,500
11 LB	NZ3254 5517	Well	19 th century	1	1 st edition OS 1856 1:2,500
12(3064?)	NZ3250 5521	Firebrick Works	19 th century	3	1 st edition OS 1856 1:2,500
13	NZ3160 5526	Victoria Place	19 th century	3	1 st edition OS 1856 1:2,500
14	NZ3253 5524	Crane	19 th century	3	1 st edition OS 1856 1:2,500
15	NZ3249 5518	Ferry Crossing Point	19 th century	3	1 st edition OS 1856 1:2,500
16	NZ3256 5527	Ferry Crossing Point	19 th century	3	1 st edition OS 1856 1:2,500
17	NZ3210 5502	Aqueduct	19 th century	3	1 st edition OS 1856 1:2,500
18(3052)	NZ31675552	Coke Ovens	19 th century	3	1 st edition OS

			century		1856 1:2,500
19	NZ3165 5522	Old Station	19 th century	3	1 st edition OS 1856 1:2,500
20(1721)	NZ31705529	Signal House	19 th century	3	1 st edition OS 1856 1:2,500
21 Outside study area and not depicted on fig 2)	NZ3143 5523	Washington Iron Works	19 th century	2	1 st edition OS 1856 1:2,500
22 Outside study area and so not depicted on fig 2)	NZ3136 5541	Biddick Row	19 th century	3	OS 1856 1:2,500
23	NZ3164 5532	Well	19 th century	3	1 st edition OS 1856 1:2,500
24	NZ3160 5523	The Railway Tavern, Victoria Place	19 th century	3	1 st edition OS 1856 1:2,500
25	NZ3190 5575	Mill Lane	19 th century (or earlier)	3	1 st edition OS 1856 1:2,500
26	NZ3170 5528	Electric Telegraph	19 th century	3	1 st edition OS 1856 1:2,500
27	NZ3184 5554	Cistern	19 th century	3	1 st edition OS 1856 1:2,500
28(3055, 3054)	NZ31905554 NZ31825557	Engine and Boiler	19 th century	3	1 st edition OS 1856 1:2,500
29 (2290)	NZ2815 5405 (not depicted)	Railway, Pontop and South Shields	19 th century	3	OS 1898 1:10,000
30(3625)	NZ24696385	North Eastern Railway, Newcastle,	19 th century	3	OS 1898 1:10,000

	NZ32024917 (not depicted)	Leamside and Ferryhill			
31	NZ3219 5572	Bleachery Works	19th century	3	TWA 1759/13
32	NZ3219 5572	Papermill	19th century	3	An undated copy of the Sunderland Echo, but probably 1963 – Sunderland Local Studies.
33	NZ3211 5570	Washington Chemical Works	19th century	1/2	Various, see Table 2
33.1	NZ3201 5559	Blast furnace	19th century	1/2	OS 1856, 1:2,500
33.2	NZ3204 5562	Chimney	19th century	1/2	OS 1856, 1:2,500
33.3	NZ3211 5579	Gasometer	19th century	1/2	OS 1856, 1:2,500
33.4	NZ3212 5575	Station Road	19th century	1/2	OS 1856, 1:2,500
33.5	NZ3204 5570	Condenser	19th century	1/2	OS 1856, 1:2,500
33.6	NZ3204 5572	Chimney	19th century	1/2	OS 1856, 1:2,500
33.7	NZ3208 5576	Cistern	19th century	1/2	OS 1856, 1:2,500
33.8	NZ3208 5578	Gasometers	19th century	1/2	OS 1856, 1:2,500
33.9	NZ3219 5569	Lead Tanks	19th century	1/2	OS 1856, 1:2,500
33.10	NZ3219 5561	Railway Bridge (rems)	19th century	1/2	Site visit
33.11	NZ3219 5567	Gasometers	19th century	1/2	OS 1896 1:2,500
33.12	NZ3215 5550 NZ3226 5558	Waste Magnesia Tipping	19th –20th century	1/2	OS 1896 1:2,500

33.13	NZ3230 5570	Cape Insulation	20th century	2	OS 1:10560 1921
33.14	NZ3214 5583	Extent of railway sidings and gears	20th century	1/2	OS 1:2,500 1920
33.15	NZ3211 5588	Tanks	19th century	1/2	OS 1:2,500 1896
33.16	NZ3209 5584	Tanks	19th century	1/2	OS 1:2,500 1896
34	NZ3196 5582	Reservoir	19 th century	3	Tithe Map 1843 and OS 1856 1:2,500
35	NZ3199 5583	Sluice for reservoir	19 th century	3	OS 1856, 1:2,500
36	NZ3220 5589	Pattinson Town	19th century	1/2	OS 1:2,500 1856
37	NZ3190 5555	Engine House	19 th century	3	OS 1:2,500 1896
38	NZ3228 5589	Allotments for Pattinson Town	19 th century	1/2	OS 1:2,500 1896
39	NZ3215 5603	Former terrace housing	19 th century	3	OS 1:2,500 1896
40	NZ3211 5602	Signal Box	19 th century	3	OS 1:2,500 1896
41	NZ3238 5531	Terrace Housing	19 th century	3	OS 1:2,500 1896
42	NZ3186 5542	Washington Wire Ropeworks	19 th century	1	OS 1:2,500 1896
43	NZ3159 5559	Belgravia housing	19 th century	3	OS 1:2,500 1896
44	NZ3166 5546	Terrace housing	19 th century	3	OS 1:2,500 1896
45	NZ3179 5555	Gasometer	19 th century	3	OS 1:2,500 1896
46	NZ3194 5549	Reservoir	19 th century	3	OS 1:2,500 1896
47	NZ3199 5548	Brickworks	19 th century	3	OS 1:2,500 1896
48	NZ3196 5544	Clay Pit	19 th century	3	OS 1:2,500

			century		1896
49	NZ3179 5531	Brickworks	19 th century	3	OS 1:2,500 1896
50	NZ3189 5529	Railway sidings leading to tipping	19 th century	3	OS 1:2,500 1896
51	NZ3202 5526	Well	19 th century	3	OS 1:2,500 1896
52	NZ3198 5565	Brickworks	19 th century	3	OS 1:10,560 1898

7.3 A total of 49 sites, including Washington Chemical Works, have been recorded within the development area and a further 3 (excluding components of Washington Chemical Works) within the vicinity. Only one listed building has been identified in the wider study area, but this is not sufficiently close for any development within the development area to have any impact on it or its setting. No Conservation Areas are sufficiently close to the development area to impose any constraint to development. Today, there are no surviving historic hedgerows within the boundary of the proposed development and therefore none, which would qualify as “important” with respect to archaeology and history under the terms of the Hedgerow Regulations (1997).

7.4 Pre-Industrialisation Sites

7.5 Although there is evidence for early settlement in Washington Village and possibly in Washington Staith, there is no evidence for any pre-industrial use of the land within the development area. Conventional techniques to identify early remains, such as aerial photography, are of limited value due to the disturbance within the development area before aerial photography commenced in the late 1940s.

7.6 The examination of early mapping can sometimes help to identify earlier field patterns, which may be indicative of settlement nearby. However, the earliest map of the area seen is the tithe map dating to 1843 and this depicts a conventional tree or hedge lined enclosure type pattern, with no hint of an earlier field system.

7.7 Place name evidence can also be used to suggest earlier settlement or land use. While there is ample evidence in Washington, there are no surviving field names from within the development area, to suggest earlier discoveries or sites.

7.8 Had any pre-industrial remains survived on the site prior to the 1850s, it is unlikely that they would have survived the subsequent building and tipping programme brought about by the construction of the chemical works.

7.9 There is therefore little or no potential for the development to destroy any archaeological sites from pre-industrial periods.

7.10 Modern Land Use in the Vicinity of the Development Area.

7.11 The earliest detailed cartographic evidence for the area is the tithe map dating to 1843 (Figure 4). This is not especially accurate as it only depicts titheable land and appears to ignore major industries. The map for this particular area has less detail than maps for adjacent areas, bearing no description of land use that normally accompanies these maps. If the map is to be believed, the area in 1843 was still largely agricultural in nature. The reservoir and a building, which may be the bleachery which Pattinson used to start his chemical works, are depicted, along with the waggon way leading from the Staiths, but there is no evidence for any new building associated with the chemical works. This may suggest that Pattinson made use of the bleachery building in the early stages of his new business, and then expanded as profits permitted. The 1st edition OS map dating to 1856, depicts an area with early signs of industrialization, particularly at Washington Chemical works (see below), but also at Washington Staith, which was already a substantial industrial community. Two phases of waggon way (site 1) leading down to the Staith were

depicted, an earlier one referred to as the “Old Waggon Way” (presumably the one seen on the tithe map) and a contemporary one. Within Washington Staith, a shipbuilding yard, and a saw pit (sites 2 and 3) were already established as were a Firebrick Works (site 12) on the opposite bank. Quarries in the surrounding area were relatively small scale (site 13) and one already out of use. Two cranes for loading produce on to ships were already constructed, one of them by Pattinson for his chemical works (DRO/D/Bo/G99/21). The community at Washington Staith was already well served with three public houses (Sites 7,8 and 9) and a Wesleyan Chapel (site 10); the growth of non-Conformism being directly associated with the growth of industrial communities. The only listed building within the vicinity of the development area is located here; Alice Well (site 11), dated 1885 (DoE 1985). The strategic position of the Staiths next to the Wear was to ensure that in only a few years, it was to become absorbed into the chemical works.

7.12 Of particular interest, in terms of providing a context for the early chemical works, is the presence of the Copperas Works (outside the study area) on the opposite bank of the River Wear. Here we have another predecessor of the chemical works. Copperas occupied a key position in commercial chemistry from the mid 18th to the mid 19th centuries, but its use goes back to the 16th century. It was used to produce ink or black dyes for hats (indeed there was an Act of Parliament in 1565 forbidding the use of any other dye for black caps) (Campbell, 1971, 33). The chemical trade developed in coal areas because coal was critical to the process of extracting the sulphuric acid. The trade declined when better ways were developed of obtaining sulphuric acid; methods which were to be used by Pattinson at his Washington Chemical Works.

7.13 South-west of the chemical works, Washington Iron Works (site 21) was already established by 1856. Located by an old coal pit, with its own sidings on to the main railway line, it consisted of an L-shaped arrangement of buildings with workers presumably residing at Biddick Row (site 22) and Victoria Place (site 13). Just north of Victoria Place, three batteries of Coke Ovens (Site 18) were located along with their own sidings on to the railway network. At this stage in the 1850s, Washington Station was just that; a station. Thanks to the growth of industry in the area and the chemical works in particular, it was to become the location for many chemical works buildings, including offices and canteens, as well as a large residential area.

7.14 This then was the area that the Washington Chemical Works was founded; close to good communication lines in order to ensure that the many products required for a successful alkali business could be imported, and the end product shipped out on the Wear or carried out on train.

7.15 Washington Chemical Works

The growth of the chemical works is complex, with its function and name changing several times during its lifetime: Washington Chemical Company – Magnesia Coverings Ltd - Newall’s Insulation Co Ltd – Turner and Newall Ltd – Cape Insulation. The present day Turner and Newall group of companies, now known as T&N Ltd include elements from Washington Chemical Works including Newall’s Insulation and Washington Insulation. The Cape group of companies and T&N are now the major asbestos product manufacturers within Britain and Cape Insulation is still located on site.

7.16 A number of sources have been used to create a table of events in chronological order covering the development of the Washington Chemical Company through to its partial demolition and land reclamation in the 1970-80s. Some sources are conflicting (such as the date when the works were founded), and some attempt is made to examine these conflicts in the discussion, which follows.

Table 2 Summary of land use events within the development area

Date	Event/land use	Source
1821	The population of Washington township is 1243.	Whellan, F 1894, 1168
1834	Pattinson resigns his post where he was manager of the lead works owned by Beaumont near Alston. In partnership with John Lee and George Burnett he establishes a chemical works at Felling, Gateshead.	www.ncl.ac.uk/library/speccoll/dagart3.html
1834	John Glover becomes the agent for the chemical works in Washington.	An undated copy of the Sunderland Echo, but probably 1963 – Sunderland Local Studies Library.
1834	A bleach works (site 31) is listed in the Washington entry of Pigot’s National Commercial Directory as Washington Bleach Mill, the bleacher being Robson Clark. It also lists brick and tile makers, coal owners, and iron founders. We know from other sources (see below) that Pattinson	Pigot and Co 1834 National Commercial Directory.

	took over the bleach works to build his chemical works.	
1837	<p>The chemical works were apparently commenced in 1837 (<i>but see 1842 and 1846</i>).</p> <p>The Chemical Works were started at Washington Station in 1837 by Hugh lee Pattinson.....He took over what had been a bleaching mill.... The Washington Chemical Company was established in 1842.</p>	<p>An undated copy of the Sunderland Echo, but probably 1963 – Sunderland Local Studies.</p> <p>Whellan, F 1894, 1168</p> <p>Miller, S and Nairn, G 1998 The People’s History Around Washington, 94-5</p>
1840	Before Hugh Lee Pattinson took over the old paper mill site (site 32) for the erection of the chemical works in 1840, the place was already in use as a bleach mill (site31), but the present road from the Glebe Schools to Waterside was called Paper Mill Lane (site 25). The buildings were used afterwards as stables for the chemical works.	An undated copy of the Sunderland Echo, but probably 1963 – Sunderland Local Studies.
1841	Robert Stirling Newall, who married Pattinson’s daughter, devised wire rope and built a machine for its manufacture. His company laid many of the first trans-ocean cables around the world. The wire rope works were subsequently taken over by the chemical works. The wire rope manufactory lay just outside the development area (site 42).	<p>http://www.afundit.co.uk/washington1.htm</p>
1841/42	Pattinson patents a process for manufacturing magnesia alba and a simple method for obtaining white	<p>www.ncl.ac.uk/library/speccoll/dagart3.html.</p>

	lead.	
1842	<p>Washington Chemical Company founded to manufacture lead carbonate for paint making and small quantities of magnesia alba were also produced for pharmaceutical purposes.</p> <p>The works were designed to make muriatic acid (hydrochloric acid) as its main product. Soda was a by-product.</p>	<p>Turner and Newall, 1970, 9</p> <p>SMR 3056</p> <p>Campbell, 1964, 62</p> <p>Warren, K 1980, 67</p>
1842	Glover becomes the manager of Pattinson's new works at Washington	Campbell, 1964, 62
1843	Land depicted on the tithe map consists only of enclosure type fields. The reservoir (site 34) is depicted with a small building nearby. This building may have been the bleach works referred to above. No other signs of industry are evident within the development area.	Tithe map 1843
1843	From this date the ledger from Washington Chemical Works records the paying of wages, the purchase of building materials and the employment of a carpenter.	Durham Records Office D/Bo/G99/19-21
11 August 1845	<p>Land is leased from Sir James Musgrave Bart, Robert Eden Duncombe Shafto and Sir Wilfred Lawson to Hugh Lee Pattinson, a manufacturer of carbonate of lead and magnesia for 63 years. The lease states that the land is already being used by Pattinson and that 7 acres or thereabouts was formerly used as a bleachery.</p> <p>Although the map which was attached to the original indenture is</p>	<p>1759/32 Agreement for sale and purchase dated 1 July 1893, which summarises previous leases and agreements.</p> <p>Tyne and Wear Archives 1759/1 Abstract of the title of R J Newall Esq to leasehold premises at Washington...held under lease from Sir James</p>

	now missing, a copy of the indenture at the DRO lists the area leased which includes the reservoir (site 34), land south of the reservoir, west of the railway, the land where the chemical works are already occupying, east of the road, workmen's gardens, waste ground, field, vacant ground, private railway, Pontop and Shields Railway (site 29/SMR 2290). It refers to stone building(s) being there already.	Musgrave Bart and others.
1846	Hugh Lee Pattinson founds the Washington Chemical works.	1759/62 Letter dated 1908 reference the founding of Newall's Insulation Co Ltd
End of 1840s	By the end of the 1840s the Washington works were involved in magnesia production.	Warren, K 1980, 67
1848	Hugh Lee Pattinson is listed in Slaters Directory as a magnesia manufacturer, Washington.	Slaters (late Pigot and Co) Royal National and Commercial Directories 1848, 266
1850	The works were by now producing magnesia, carbonate of lead, alkali, lead oxide and soda crystals.	SMR 3056
1.5.1850	Although land at Washington is now being used for the chemical works, the lease is not drawn up until 14.2.1856 and is backdated to today for 63 years.	Tyne and Wear Archives 1759/8 Lease of premises at Washington in the County of Durham for a term of 63 years from the first day of May 1850.
1850	Hugh Lee Pattinson admits his sons in law (Isaac Lowthian Bell and Robert Benson Bowman) into partnership with him.	Tyne and Wear Archives 1759/1 Abstract of the title of R J Newall Esq to leasehold premises at Washington...held under lease from Sir James Musgrave Bart and others.
13 May 1850	A lease between the Marquis of Londonderry and Hugh Lee Pattinson, Isaac Lowthian Bell and William Swan.	Tyne and Wear Archives 1759/32 as above
14 October	A further lease of land allowing	Tyne and Wear Archives

<p>1850</p>	<p>Robert Stirling Newall and others to leasehold premises at Barmston for 63 years. An accompanying plan shows 4 fields east of the railway line with an existing building (presumably the bleachery) located at NZ. 323 557. Also land at the Staith. The lease covers all works necessary for “carrying on the business of a chemical or other manufactory.”</p>	<p>1759/32; 1759/2 Abstract of title of R S Newall to leasehold premises at Barmston held under lease from the Marquis of Londonderry.</p> <p>1759/13 Indenture, most Hon Charles William Vane, Marquis of Londonderry and Hugh Lee Pattinson and Isaac Lowthian Bell, chemical manufacturers and co-partners in trade.</p>
<p>1850s</p>	<p>By the 1850s the works were much enlarged. Isaac Lowthian Bell built a big plant for oxychloride of lead.</p> <p>Workshops and offices are referred to in a valuation as being built in 1850, of stone. These are a range of buildings 230 x 60 ft comprising a Joiners Shop, a Coopers Shop, a Plumbers Shop, a Millwrights Shop, a Smiths Shop, a Paint Mill and Shop, and Alkali Mill and Warehouse, a clock tower and bell, 2 offices and a warehouse or store. No map accompanies the valuation.</p>	<p>Warren, K 1980, 67 (refers to Lewis, 1831, 1848;CN 23 Dec 1904 p316 – not seen)</p> <p>Durham Record Office D/Bo/G99/21.</p>
<p>1851</p>	<p>The population of Washington township is 1224, not a significant change since the creation of the chemical works.</p>	<p>Whellan, F 1894, 1168</p>
<p>1851</p>	<p>At the exhibition of 1851, Mr Bell contributed specimens of Pattinson’s patent oxichloride of lead, with illustrations of its use in oil painting. Also specimens of magnesia alba and calcined magnesia; galena, finely ground in water; muriatic acid, as produced at the soda works; rough chloride of lead, made from lead ore,</p>	<p>Hind, A 1976, 106-7</p> <p>Fordyce, W 1857, 741</p>

	by combining with muriatic acid; oxichloride of lead, as precipitated by lime, ground in oil. The residue left contains chloride of silver; and a plate of silver made from this residue and manufactured at the Washington Chemical Works.	
14 February 1856	A further lease of land (backdated to 1 5.1850) in the names of Sir Wilfred Lawson, Wilfred Lawson, Hugh Lee Pattinson, Robert Benson Bowman, Sir Isaac Lowthian Bell. The land already has a building in the corner between the railway and what was presumably the waggonway to the Staiths (approx NZ319555). In the centre of the field, a chimney is located (approx NZ322556).	Tyne and Wear Archives 1759/32 and 1759/8 Lease of premises at Washington in the County of Durham for a term of 63 years from the first day of May 1850 (only partially seen due to poor condition).
10.10.1856	Lease of land by Hugh Lee Pattinson and others from Frances Anne Marchioness of Londonderry. The land leased is to the west of the railway line and outside the development area.	Tyne and Wear Archives 1759/3 and 1759/11
1856	The discovery of iron ore in Cleveland led to furnaces being erected at Washington in 1856 by Messrs Bell Brothers (until 1875)	Atkinson, F Vol 1 1974, 88
1856	Washington Chemical Works is depicted on the 1 st edition OS map as a substantial complex of buildings. At the northern end, Pattinson Town (site 36) has been built at right angles to the North East Railway. It consists of a row of terraced houses. Each house has a long garden facing on to the road (now approximates to Barmston Road). From a valuation of the works carried out in 1856, we know that these houses were workers	OS 1 st edition 25" 1856 (survey date) OS 1:10,560 1862 (surveyed in 1857). Durham Records Office D/Bo/G99/19-21, 23-25

	<p>cottages consisting of 3 rooms each with a pantry, coal house, piggery and attached garden. There were 28 workers cottages in all, 2 cottages occupied by cartmen. Also on the site a managers house with 8 rooms and a garden, a foreman's house and a clerks house. A footpath leads from the houses to the field containing the works. The original bleach works appears to still be there, but are now surrounded by gasometers, lead tanks, chimneys, cisterns, blast furnaces, engine house, and an assortment of large buildings with no indication as to their purpose. However the 1856 valuation lists the full range of buildings (see appendix B) for the Soda Works, the Magnesium works and the Iron Works – all of which formed the Washington Chemical Works. Railway sidings run into the site from the main line.</p> <p>A waggonway and an old waggonway run parallel to each other from the railway and the chemical works to Washington Staith. North of this, a tree lined gill runs from the corner of the works containing the lead tanks down to the River Wear. This gill was to be dramatically changed after 1864.</p> <p>The surrounding landscape is still agricultural in nature with enclosure pattern fields, tree lined.</p>	
1857	<p>Fordyce writes that Washington Staiths is another hamlet, containing</p>	<p>Fordyce, W 1857, 741</p>

	<p>a chapel belonging to the Wesleyan Association and 2 public houses. There is also a ship building yard (site 2), a firebrick manufactory (site 12), a coke manufactory and the extensive chemical works of Isaac Lowthian Bell Esq; who resides at Washington House.</p>	
1858	<p>Pattinson retires to study astronomy, maths and physics.</p> <p>He adds a codicil to his will appointing executors. He sells his shares to Bell and Swan.</p> <p>He dies on the 11th day of November 1858.</p>	<p>www.ncl.ac.uk/library/speccoll/dagart3.html</p> <p>Tyne and Wear Archives 1759/1 Abstract of the title of R J Newall Esq to leasehold premises at Washington...held under lease from Sir James Musgrave Bart and others.</p>
1859	<p>Glover, the works manager, erects the first Glover Tower at the Washington Chemical Works (see front cover). This revolutionary new way to reduce sulphuric acid loss is quickly adopted by all major chemical industries.</p> <p>A photograph now lodged with the Beamish Museum depicts the Glover Tower in the centre of the works; the photograph is undated but appears to date to the late 19th century.</p>	<p>Campbell, 1971, 33, 19</p> <p>Beamish Museum Archive Record Photo No. 16158.</p>
1861	<p>The population of Washington township is 1829.</p>	<p>Whellan, F 1894, 1168</p>
1863	<p>The Alkali Act compels alkali makers to condense 90 per cent of their acid fumes. Washington Chemical Works and Pattinson and Co are registered under the Act.</p>	<p>Campbell, 1964, 50-1</p>
26 March 1864	<p>Lease between Marquis and Marchioness of Londonderry and</p>	<p>Tyne and Wear Archives: 1759/32 and 1759/4 abstract of</p>

	Isaac Lowthian Bell and others, concerning a “ravine with a muddy bottom and swampy sides”, which, it is proposed, should be culverted and filled to form a level surface capable of being used as a road to the wharf. This ravine was the route to the Staiths from the chemical works, located at NZ 323 553.	title of RS Newall to leasehold premises at Barmston, Washington...under lease from the Marchioness of Londonderry.
1871	The population of Washington Township is 2203, a significant increase also seen in the historical mapping through the construction of new housing.	Whellan, F 1894, 1168
1873	Frederick Stirling Newall assumes a senior role in the company, which was in the sole ownership of his father Robert Stirling Newall. At his instigation, production of magnesia is increased. By the end of the 19 th century, the company will be the largest manufacturer of magnesia chemicals in the world.	Turner and Newall 1970, 9 www.afundit.co.uk/washington1 .htm
14 Feb 1874	A further lease of land for Sir Wilfred Lawson and others	1759/32
20.12.1875	An indenture dealing with land on the west side of the railway and outside the development area. Also refers to Isaac Lowthian Bell retiring from the partnership and Robert Benson Bowman and Robert Stirling Newall to carry on the chemical works.	Tyne and Wear Archives 1759/5.
1878	The partnership, which has run the business, is dissolved. Robert Stirling Newall buys out Robert Benson Bowman.	Tyne and Wear Archives 1759/1 Abstract of the title of R J Newall Esq to leasehold premises at Washington...held under lease from Sir James Musgrave Bart and others
1887	A short distance from the works a new industry was commenced by R S	Hind, A 1976, 107

	Newall and Son, manufacturing wire ropes (site 42).	Undated Sunderland Echo, but probably 1960, from Sunderland Local Studies.
1880s	A photograph, possibly dating from the 1880s depicts the works with Isaac Lowthian Bell's blast furnace for smelting aluminium. In the foreground a lead lined tank used in soda ash production can be seen. In the centre below a chimney, was the crystallizing house. To the left of the tank a building housed pyrites burners with a gantry to the left of this. The LeBlanc process was used at this time.	Beamish Museum Archive Record photo no. 3948.
1881	The population of Washington township is down to 1123.	Whellan, F 1894, 1168
1891	Over the last 10 years the population has grown enormously to 3322.	Whellan, F 1894, 1168
1891	The Washington Chemical Company acquired from America the process for making non-conducting coverings from magnesia. From this time the business steadily increases and the plant requires continual extension.	Tyne and wear Archives 1759/62 Draft letter dated 1908 from solicitors at St Nicholas Chambers summarising the development of Washington Chemical Works.
1 July 1893	Frederick Stirling Newall (grandson to Hugh Lee Pattinson) sells his leasehold and the right to use the name "Washington Chemical Company" to the Washington Chemical Company. The company is now a private company consisting of FS Newall, his family and friends with works also located in Liverpool.	Tyne and Wear Archives 1759/62 Agreement dated 1906 to sale and purchase of Magnesia cork Coverings by the Washington Chemical Co Ltd and Newalls Insulation co Ltd 1759/32 Agreement for sale and purchase. Frederick Stirling Newall to the WCC. 1759/62 Letter dated 1908 from solicitors in St Nicholas Chambers.
1893	The manufacture of the new	Turner and Newell, 1970, 11

	magnesium insulating material begins at Washington. Initial acceptance of the product is slow, so the company branches out into the insulation contracts business.	
1894	Whellan writes that the Washington Chemical Company “has of years greatly declined”.	Whellan, F 1894, 1168
1896	<p>The maps depict a much expanded chemical works, Pattinson Town (site 36) and the Wire Rope Works (site 42) to the south of the chemical works. Pattinson Town now consists of two rows of houses, although the newest row does not yet have gardens. On the north side of the road, allotments have been carved out for the residents. A school has been built to the east of the town. The centre of the works has shifted from the original complex which appears now to be used for dumping, over to the north-east towards Pattinson Town. Railway sidings now extend through the site and around its perimeter (site 33.14). A new range of buildings has been constructed on the southern end of the site and brickworks have appeared where the waggon ways used to be. The landscape is changing, the gill running to the Staith has been filled up and no trees are visible here or around the field margins.</p> <p>Washington Staith is growing too, as rows of houses are built to the north west, gradually closing the gap between the chemical works and the Staith.</p>	<p>OS 1896 1:2,500</p> <p>OS 1898 1:10,560</p>

<p>1903</p>	<p>A sister company called Magnesia Coverings Ltd is launched to deal with insulation contracts.</p> <p>The Memorandum and Articles of Association list the function of the works as: the manufacture of magnesia coverings and chemical products and drugs of all kinds, bricks, cement, artificial stone, coke, sanitary and disinfecting preparations and mineral and aerated waters and the trade or business of stone and limestone quarry owners, lime business, iron and brass founders, mechanical engineers, manufacture of rolling stocks and locomotive engines and other machines, tool makers, millwrights, machinists, smiths, painters, builders, metallurgists, electrical engineers, water supply engineers, farmers, printers, carriers, merchants, builders, construction... winning and working of minerals.</p>	<p>Turner and Newell, 1970, 11</p> <p>Tyne and Wear Archives 1759/62 Memorandum and Articles of Association of Magnesia Coverings Ltd 1903.</p>
<p>1903</p>	<p>A draft agreement is drawn up to lease Washington Wire Rope Works from R S Newall and Son Ltd to the Washington Chemical Co Ltd. The rope works covers two acres of land. An earlier lease is referred to with Frederick Stirling Newall. The schedule lists a dwelling house, offices, works, stables, railway sidings and other buildings, plant and machinery.</p>	<p>Tyne and Wear Archives 1759/33</p>
<p>1906</p>	<p>In addition to manufacturing magnesia and Magnesia Coverings, the works also supply the neighbourhood with Coal Gas and</p>	<p>Tyne and Wear Archives 1759/62 letter dated 1908.</p>

	Liquified Carbonic Acid Gas on a large scale. The Washington Chemical Company now occupies 26 acres adjoining the North East Railway and have sidings to the railway. In the past, profits have been used to expand the plant, but this was to be reassessed in the light of creating a new company. A valuation was carried out by Wheatley, Kirk Price and Co.	
1906	Turner Bros make an abortive attempt to acquire Magnesia Coverings. (The Washington Chemical Company had been buying partially processed asbestos insulating products from Turner Bros).	Turner and Newell, 1970, 11
17.1.1907	A transformer house (sub station) is built adjacent to the stables and cart shed.	Tyne and Wear Archives UD/WS G99 Building Plans 1905-7).
31.7.1908	The earlier draft lease is still in draft form for Washington Wire Rope Works to lease to Washington Chemical Works. The lease refers to an earlier lease of 1892 with Frederick Stirling Newall. The lease allows any activity for carrying on the business of cork manufacturing. Comments from FSN in the margins.	Tyne and Wear Archives 1759/32
1908	Magnesia Coverings, which had acquired the rights of Non Pareil Cork and other coverings (the Armstrong Cork Co), becomes Newalls Insulation Co Ltd with the object of ‘promoting the use of and selling special forms of insulating material used for the insulation of hot surfaces such as boilers, steam pipes and flues, and cold surfaces such as	Turner and Newell, 1970, 11 Tyne and Wear Archives 1759/63 letter dated 1908 Tyne and Wear Archives 1759/62 Agreement as to sale and purchase of Magnesia Cork Coverings.

	<p>cold stores and refrigerating plant.</p> <p>The Washington Chemical Company and the Armstrong Cork Co of USA agree to buy Non Pareil Cork Insulation business for the UK, Europe, Africa and Australasia and the British Colonies and agree to erect a cork plant on land adjoining their present works. The WCC will supply magnesia, cork and other coverings to the new company.</p> <p>Later maps show the Cork Plant to be located on the site of the Wire Rope Works. An extension is built onto the Rope Works.</p>	<p>Tyne and Wear Archives 1759/62 Letter dated 1908 from solicitors at St Nicholas Chambers.</p> <p>Tyne and Wear Archives UD/WS G99 Building Plans 1908-10, application dated 24.11.1908.</p>
1914	<p>World War One created an unprecedented market for magnesia industrial chemicals, especially in the rubber industry that had raised input to meet wartime needs.</p>	<p>Turner and Newall, 1970, 11</p>
4.9.1919	<p>An application is submitted for approval for an ambulance garage with an inspection pit at the Washington Chemical Works.</p>	<p>Tyne and Wear Archives UD/WS/44/5</p>
1920	<p>The OS maps depict an area surrounded by spoil tips; every available space between the Chemical Works and the Staiths has been filled with waste. Pattinson Town has a row of gardens added to the most recent terrace and the rear of the gardens now abut on to works buildings and sidings. Of the structures labelled on the maps, gasometers, chimneys and tanks (sites 33.15 and 33.16) are clear, but other large buildings are more difficult to ascertain their function. A</p>	<p>OS 1920 1:2,500</p> <p>OS 1921 1:10,560</p>

	<p>large area at the west end of Pattinson Town is plotted out for a new building, which is built by the following year (site 33.13). This broadly correlates to the site of the present day Cape Insulation building, which covers a slightly larger area.</p> <p>The brick works adjacent to the wire rope works are still depicted as are the clay pits which provided the raw material here and further south-east, opposite Wilden Terrace (site 47 and 48).</p> <p>The rows of terraced housing which first appeared on the 1896 map spreading out of Washington Staith are now named Blast Row and Wilden Terrace. Middlefield Row and Walker's Buildings also provide terraced accommodation for workers Allotments have been created opposite Blast Row.</p>	
1920	Turner and Newall's founded in order to acquire the shares and to amalgamate the businesses of Turner Bros Asbestos Ltd, The Washington Chemical Company Ltd, Newalls Insulation Co Ltd and J W Roberts Ltd.	Turner and Newall 1970, 3
11.5.1922	The Washington Chemical Company writes to its solicitors in Newcastle regarding a patent for the manufacture of Hydrated Carbonate of Magnesium and its compounds.	Tyne and Wear Archives 1759/63
1922	A workers athletic club pavilion is erected near Pattinson Town, but the Council insists that it should have WCs not dry closets as proposed!	Tyne and Wear Archives UD/WS 43 Building Plans 1905-7).

<p>1925</p>	<p>Turner and Newall begin a long association with the motor industry (Ferodo) and purchase asbestos mines in South Rhodesia, South Africa and Canada.</p> <p>New insulation products are developed at the Washington Chemical Works site during the course of the 1920s.</p>	<p>Turner and Newall, 1970, 11</p> <p>Turner and Newall, 1970, 26</p>
<p>1929</p>	<p>A new building is constructed for manufacturing insulating products. It has a brick retaining wall and a roof covered with Turners Trafford Tiles. The walls were constructed of redwood framing covered with tiles. This building corresponds to the present day Cape Insulation building (site 33.13), which had a further extension in 1930 and 1937, taking the building up to the Barmston Road. It is not clear from the plans whether this building is to replace the building constructed in 1920, or whether it is to add to it.</p>	<p>Tyne and Wear Archives UD/WS 43 Building Plans 1929, 1930, 1937.</p>
<p>1934</p>	<p>Works are carried out at the Cork Insulation Works.</p>	<p>Tyne and Wear Archives UD/WS 43 Building Plans 1934</p>
<p>1936</p>	<p>The office blocks on Station Road are joined together.</p>	<p>Tyne and Wear Archives UD/WS 43 Building Plans 1936</p>
<p>26.5.1938</p>	<p>A plan of the Washington Chemical Works branch of Turner and Newall Ltd shows Pattinson Town (site 36) and its allotments (site 38), a large modern square building on the end of the row of houses at Pattinson Town, first seen on maps dating to the 1920s (site 33.13), plus a number of long thin buildings to the rear of Pattinson Town. A large complex of buildings is located on land, which may have</p>	<p>Tyne and Wear Archives 1759/72 drawing no. 120/A/18 26 May 1938 1:2,500.</p>

	had the earliest building – the bleach works, on it. The plan is not especially detailed as it is designed to show land ownership and leases rather than the buildings. The offices are located outside the development area west of the railway line and south of the reservoir (site 34).	
1938-9	A new canteen was constructed in 1938 south of Pattinson Town (and within the development area) and east of the railway line. The canteen was roofed with Turners Postlite Asbestos Pantiles. A new factory and gas meter house was constructed in 1939.	Tyne and Wear Archives UD/WS/ 43 1938, 1939
1940	The Ministry of Supply declares Turner and Newall controlled undertakings. Washington Chemical Works erects a new plant for extracting magnesium from seawater.	Turner and Newall, 1970, 26
1941-43	Permission is granted for a lavatory and cloakroom to be attached to the research lab. The labs are located just past the Time Office on the road to Washington Staiths (now outside the development boundary). A main lab has two smaller labs on one side. The labs are further extended in 1942. The plans show a CO2 bottle house, a tin smiths and an engine room. Offices next to Pattinson Town had alterations and additions made to create additional office space in 1943, the building was 2 storeys and brick built.	Tyne and Wear Archives UD/WS/ 43 1945-46
1946	The contemporary maps do not show significant change in the extent of	OS 1946 (surveyed in 1939) 1:2,500

	<p>buildings, but do provide a little more detail on their function. Gasometer tanks continue to be located throughout the site, but 6 lime kilns are also depicted in the north half of the site adjacent to tanks.</p> <p>Adjacent to the main railway line and running parallel to it are brick works, located in linear buildings and sidings running in to them (now just outside the development area).</p> <p>Two boiler houses are located in the centre of the site next to two chimneys, tanks and an engine shed.</p> <p>At the end of the row of terraces known as Pattinson Town, an enormous building has been constructed, along with some smaller additional buildings designed to serve the town. East of the town, between the Town and the school a small recreation area has been created consisting of tennis courts, a putting green and a pavilion.</p> <p>Outside the current development area, a recreation ground has been constructed at the end of Middlefield Row and a hall next to Wilden Terrace and Blast Row.</p>	
4.2.1946	A works Time Office is built next to the Canteen and Pattinson Town.	Tyne and Wear Archives UD/WS/ 43 1945-46
1946	A new Fibre Store Building is constructed adjacent to the Time Office. This replaces an earlier fibre store and allows more light into Pattinson Town.	Tyne and Wear Archives UD/WS/43 1945-46
1952	A plan of Washington Chemical	Tyne and Wear Archives

	<p>Company shows that Pattinson Town no longer exists and that the road through it, due to become Barmston Road, is dedicated for road widening. The land use of the former town is not clear, the land is divided into thin strips and may be the former buildings. However a photograph (see plate 2) taken during the demolition of Pattinson Town, places its demolition into the 1960s. It is gone from aerial photographs taken in 1964.</p> <p>Railway sidings extend into the centre of the site and a number of tanks and cylinders are plotted.</p>	<p>1759/72 Plan of Washington Chemical Company 1952 1:2,500.</p> <p>Washington Town Centre Library RIV 158</p> <p>Washington Town Centre Library Aerial Photographs taken for the Washington Development Corporation in 1964.</p>
1953	<p>Washington Chemical Company establishes a small pilot plant for the production of calcium silicate insulation, which, it is hoped will replace its magnesia insulating products.</p>	<p>Turner and Newall, 1970, 36</p>
1960s	<p>Photographs possibly dating to the 1960s show the tall chimneys and towers of the chemical works towering high above the spoil heaps (see Appendix D).</p>	<p>Washington Town Centre Library RIV 019.</p>
1964	<p>The insulation production of the company in Washington exceeded its chemical production so the company changed its name to Newall's Insulation and Chemical Co Ltd.</p> <p>The company streamlines its materials so that it uses calcium silicate and glass fibre to cover extreme high and low temperatures.</p>	<p>Turner and Newall, 1970, 36</p>
1964	<p>Aerial photographs taken for the Washington Development</p>	<p>Washington Town Centre Library, Washington</p>

	<p>Corporation show additional large works buildings to the north of Pattinson Town (now demolished). The works have also spread to the south-east with two large circular structures, but possibly the plant designed to extract magnesium from sea water. These have been built into the spoil from the earlier works and the white spoil remains around the site.</p>	<p>Development Corporation Aerial Photographs 1964.</p> <p>Turner & Newall Ltd 1970 (?), 32.</p>
18.3.1969	<p>A map last revised in 1969 shows the loss of some buildings around the periphery of the site and at the Staiths.</p>	<p>1759/72 drawing 120.A.18 1:200</p>
1970	<p>The company officially abandoned magnesia manufacture by sea water.</p>	<p>Turner and Newall, 1970, 36</p>
15.1.1971	<p>All land south of Barmston Road is now developed as part of the site, including the land that once housed Pattinson Town. The main complex of buildings was located to the east of Pattinson Town (site of) and to the south. Railway sidings extended into the central area and around the periphery. Small groups of other buildings were located across the site. All are within the current development area.</p> <p>To the east and outside the current development area, two large circular structures were located towards the Staiths area – these may have been the plant designed to extract magnesium from sea water.</p>	<p>Tyne and Wear Archives 1759/72 drawing no. 120/A/18D 15 January 1971 1:2,500.</p> <p>And 1759/72 drawing no. 120/A/18D a Plan of Newalls Insulation and Chemical Company Ltd April 1971 1:2,500</p>
6.10.1972	<p>A meeting of members of the Washington Development Corporation note that negotiations are complete for the purchase of 95.84</p>	<p>Tyne and Wear Archives DC/WS/1/9</p>

	acres of land from Turner and Newalls.	
1973	By the time of the publication of the OS map (1:1,250) refuse tips and slag heaps cover the majority of the site.	OS 1:1,250 1973
Unknown date, poss 1970s	Photographs show reclamation works underway on part of the site (see Appendix D).	Washington Town Centre Library RIV 166
1973 - 1980	Various contracts are let by the Washington Development Corporation to carry out land reclamation works, highways works and advance preparation works.	Tyne and Wear Archives DC/WS/2 Papers no: 138/73; 209/73; 15/77; 7/77; 137/77; 217/77; 150/79; 226/79; 182/79; 277/79; 25/80; 26/80; 40/80; 41/80; 48/80; 77/80; 104/80; 94/80; 151/80.
May 1979	<p>The process of demolition and reclamation is underway. Pattinson Town is gone. The spoil is being removed or spread around the site; the main spoil area formerly around the two circular structures (possibly for extracting magnesium from sea water) is being levelled in stepped stages away from the Wear (part of this area now forms Zone F, see below). The two largest works buildings to the east and north of Pattinson Town remain (one of which is now Zone E, see below). A road network with roundabouts is being driven into the site. Many of the buildings on the earliest part of the site remain, but the wire rope works building has gone.</p> <p>The terraced housing once built near the Staiths has gone (outside the current development area).</p>	Washington Town Centre Library, Washington Development Corporation Aerial Photographs May 1979.
1981	The site is levelled into 2 plateaus	OS 1:1,250 1981
June 1983	The two former areas of spoil	Washington Town Centre

	(outside the development area) are clearly visible as disturbed ground, but now flattened. The two largest works buildings remain and the area occupied by the earliest buildings is still in use. A large reclaimed area to the west of what is now Pattinson Road has started to regain some vegetation growth.	Library, Washington Development Corporation Aerial Photographs June 1983.
October 1985	Much of the site is reclaimed, and grass covered. However the earliest area to be used by the chemical works is still occupied. The two large buildings, one of which is the present Cape Insulation building, remain.	Washington Town Centre Library, Washington Development Corporation Aerial Photographs October 1985.
May 1987	There is some activity in the area that was subsequently to be occupied by Instrip Demolition. The area between the site of the former Pattinson Town and Station Road is disturbed leaving white magnesium scars across the area. The extent of disturbance is not clear but goes no further than Station Road. Subsequent visits to the area show that a number of buildings survived this phase of reclamation and spoil tips to the rear of Instrip appear to pre-date Instrip's later demolition dumping on the land. The two large modern buildings remain on either side of Barmston Road..	Washington Town Centre Library, Washington Development Corporation Aerial Photographs May 1987.
1989	Clay pits and slag heaps from the surrounding area are re-levelled and access roads rebuilt. The James Steel Park is constructed.	OS 1:10,000 1989
April 1992	A photograph taken in 1992 shows that the spoil heaps no longer dominate the Staiths and the views from Cox Green are now of trees rather than white spoil.	Washington Town Centre Library RIV 137.

<p>Jan 2004</p>	<p>Geo-Technical analysis by Atkins over part of the site shows made ground varying between 0.5m and 1.5m of magnesia pulp. A further layer of coarse brick, clinker, concrete sandstone and limestone varying between 4m and 12m deep. No asbestos fibres were found. The variable density of material found during bore holes suggests that there are below ground obstructions.</p> <p>The made ground contains highly elevated concentrations of Total Hydrocarbons, Polyaromatic Hydrocarbons, arsenic, selenium, magnesium sulphate, sulphide and elemental sulphur. Slightly elevated concentrations of copper, chloride, nitrate and ammonia were found in groundwater.</p> <p>No shallow coal seams or mine workings were found</p>	<p>Atkins, 2004. Pattinson South Industrial Estate Site 22/5, Washington Vol 1 and 2.</p> <p>P2-8</p> <p>P6-3</p> <p>P7-3</p>
<p>February 2004</p>	<p>A site visit to the site confirmed that some earlier remains do survive above ground and that there is a high potential for the remains of early chemical works buildings and Pattinson Town to survive below ground. Not all magnesia spoil tips have been reclaimed and land adjacent to Station Road appears to still consist of magnesia spoil. New tipping has taken place at Instrip Demolition to add to the layers of made ground burying possible remains from the chemical works.</p>	<p>CHH/ DC 24.2.04</p>

8.0 Discussion

8.1 A number of sources refer to the presence of a bleachery (site 31) and a paper mill (site 32) on the site before Pattinson took it over to become a chemical works (Sunderland Echo, 1963? and Tyne and Wear Archives, 1759/32). The presence of these early industries on the site of the future chemical works is no great surprise. The early chemical trade was inextricably linked with these industries. It was the demand for soda to make hard soap in the textile trade, which provided the main outlet for Leblanc alkali. Similarly bleaching powder was initially made on a large scale in order to utilize a troublesome waste material of the Leblanc factories, until it became the mainstay upon which those factories depended for their economic survival (Campbell, 1971, 63). The crude bleaching powder produced from the 1830s, was more efficiently produced after the 1840s when Gossage Towers were introduced at Walker (Campbell, 1964, 14). In the middle years of the 19th century there was a great expansion in the paper trade. Excess chlorine available in the alkali factories was used for bleaching Esparto grass, and also made possible the use of a lower quality of rags (Campbell, 1964, 26). Coal was required for all processes and this could be found in abundance in the coalmines operated nearby. The iron works (site 21) would also have had a close relationship with the growing chemical industry. The iron-bearing residues from pyrites burners could be worked up in the adjacent iron works, a relationship seen at the Walker Alkali Company (Campbell, 1964, 14). The presence of a good rail and waterways network was also vital in the chemical trade and both were readily available at Pattinson's chosen site.

8.2 The date of the founding of the Washington Chemical Works is not clear from the sources, many of which conflict. The start date ranges from 1837 (Whellan 1894, 1168) to 1846 (Tyne and Wear Archives 1759/62). The tithe map displays no chemical works in 1843, but two buildings, one of which may have been the bleachery, are depicted. Perhaps Pattinson had not yet developed the site by 1843, but was simply reusing the existing building? Tithe maps are not always reliable indicators of land use as they are produced only to document titheable land. In this instance the chemical works were not titheable and so may have simply been excluded. The accounts from the chemical works date from 1843, the same date as the tithe map, and show wages being paid and some staff employed to carry out building works. So the chemical works were certainly in existence by then. Prior to the works being constructed, the land had to be acquired, and the earliest leases run from 1845, two years after the works are already running according to Pattinson's own books. It is possible that the leases were simply confirming an earlier gentleman's agreement. The trade directories list the bleachery that was to become the chemical works in 1834, setting the creation of the chemical works

post 1834. So using the main primary sources, the chemical works were built on site after 1834 and before 1843.

8.3 The earliest buildings were presumably merged into the first stage of expansion of the chemical works in the 1850s. At this stage we know that a range of stone buildings were constructed including offices and workshops (DRO D/Bo/G99/21). An earlier lease (Tyne and Wear Archives 1759/32) depicts an existing building on the site, which is presumably the bleachery. This building can be traced in later maps, suggesting that it was reused at least until 1856 (OS 25" 1856) and possibly in an extended form until 1896 (OS 1:2,500). After the 1850s expansion, the chemical works consisted of 4 main operations, all linked by their processes and the overhead rails known as "gears" that ran through the works to connect them - the Soda Works, the Magnesium Works, the Iron Works and the workers housing, workshops and offices. The works continued to expand and covered an area on both sides of the main railway line and land between the chemical works centre and the Staiths.

8.4 The appearance of a 19th century factory producing soda using the Leblanc process is described by Campbell (1964, 18). It would appear as a "collection of long low buildings to house furnaces, overlooked by the huge rectangular pile of the chambers and dominated by the tall chimney from which clouds of acrid fumes would issue at intervals of a few hours; and outside the walls, gradually attaining an eminence of its own, the waste heap, an eyesore at all times, and in wet weather an offence to the nostrils". A series of photographs held by the Beamish Museum Archive Record depict the chemical works, possibly from the 1880s (Photo no.s 16158, 93483, 3948, 3963a, 3963b, 3937). The image they convey is of chimneys, furnaces, the Glover Tower, white dust and waste. The waste heaps are so high, they are battened back with timber revetments.

8.5 The need for bricks on the site would have been constant, not just for new build, but because furnaces constantly required repair and renewal. So brickworks and their associated clay pits were an essential part of the chemical works operation and are depicted on a number of late 19th century maps (sites 12, 47, 48, 49, and 52).

9.0 The Significance of Washington Chemical Works

9.1 The alkali industry arguably started on an industrial scale in 1823 when the Government suspended the heavy salt duty. This allowed the large-scale works to grow up including the Jarrow Chemical Works, which started in that year. By the middle of the 19th century there were a dozen separate concerns on Tyneside alone, all making alkalis and by-products such as bleaching powder. So where does Washington Chemical Works sit in relation to these many works?

9.2 It was not the earliest works, but it was the site of some major technical achievements. Washington was the site of the first ever Glover Tower in 1859, designed by Washington manager John Glover and taken up by all main chemical works thereafter. “This was a classic invention, quickly recognised and universally adopted, and it is still the most prominent feature of the process. It is to his undying credit that no patent was taken out and full details of his achievement were given freely to the world” (Warren, K 1980, 162)

9.3 The magnesia industry dates from the discovery in 1841 of a new method of making *magnesia alba* from local dolomite by Hugh Lee Pattinson. On the basis of his patent, work started in 1852 at Washington on the production of magnesia for heat and noise insulating materials and pharmaceutical purposes. (The early works at Washington worked with lead rather than magnesia and produced soda, paint and silver). The production of magnesia using this technique remained until the 1970s (Campbell, 1971 33). This was not the only patent to materialise out of the Washington works. In 1922, the company sought a patent on its technique for manufacturing Hydrated Carbonate of Magnesium and its compounds. The Washington works was also the first company to extract aluminium in 1859 at Isaac Lowthian Bell’s Aluminium Plant, which formed part of the works (Beamish Museum Archive Record photo no. 3937).

9.4 English Heritage has recently looked at the chemical industry as part of its Monument Protection Programme. This programme seeks to identify sites of national importance and then considers how best to protect them. Archaeological remains associated with the chemical industry pose particular conservation problems. They tend to be located on brownfield sites subject to constant reuse. This means that any remains are usually altered from their original form. Because they tend to be associated with pollution and the buildings are often considered to be eyesores, there is little public sympathy for scheduling them as Ancient Monuments. Further, the waste produced by such sites is often hazardous and so regeneration of contaminated land has usually taken place, destroying remains of the industry. However, the low survival rate of such sites and the lack of any research into them has resulted in English Heritage taking the view that the history of the alkali industry is of national and regional importance for both the scientific and technological developments and in social and economic history. Although the origins of the alkali industry lie in France, it soon became one of the most important chemical industries in this country.

9.5 As the level of survival of chemical works is low nationally, the requirements for survival in order to be considered nationally important are also low. Consequently, any remains, which can be associated with the Leblanc process, even if they are underground remains only, are considered to be potentially nationally important. The Step One report written for English Heritage into the chemical industry therefore states

that if significant surviving below-ground stratigraphy exists for a site associated with the LeBlanc process, then it will be considered to be archaeologically significant and considered for preservation (Cranstone Consultants 2000, 30). This combined with the innovative achievements of Pattinson and his predecessors at Washington means that any remains associated with the 19th century chemical works at Washington may be nationally important depending on the level of survival below ground. This can only be determined by further evaluation. Sites which are nationally important are sometimes scheduled as ancient monuments, however because of land contamination issues, national importance in this case, is more likely to lead to a requirement for preservation by record.

10.0 Research Potential

10.1 Very little is known about the early chemical trade in Britain...”The recent trend towards the recovery and landscaping of derelict industrial land provides an opportunity which the student of the chemical industry should not neglect” (Campbell, W A 1971, 125).

10.2 *“At the peak of its prosperity the chemical trade on Tyneside gave direct employment to 10,000 workers. It is surprising therefore that, as a class, the chemical workers have left so little evidence of their way of life”* (Campbell, 1964, 42). We know from the study of other chemical manufactories that housing was constructed on most sites for the workers and their families. This was supplemented by the provision of sanitary facilities and schools. At Washington, we have evidence of Pattinson Town (within the development area), along with its school, allotments and recreational facilities. But even where the chemical workers are studied, albeit briefly in Campbell (1964, 42) no mention is made of the workers at Washington. The Beamish Museum Archive (photo no. 3937) depicts women working in the chemical works making Pattinson’s Magnesia, which has been pulped and allowed to drain. So clearly there were gender divisions in labour within the works. The chemical industry as a whole has been unrecognised and overlooked by the industrial archaeologist, but the study of the workers and their lives is even more so.

10.3 The proposed development area includes most of Pattinson Town and affords an opportunity to carry out further research into the daily lives of the chemical workers. The valuation of 1856 (DRO/D/Bo/G99/19-21,23-25, see Appendix B for a summary) has given an account of the facilities of the earliest phase of Pattinson Town, but the historic mapping is not sufficiently detailed to provide a good ground plan of the dwellings. Photographs taken of the town prior to its demolition (see plate 2) show the outside, but not the interiors. Archaeological recording of a small area of this site would remedy this lack of information.

10.4 The town had two main phases of construction and it should be possible to examine the main changes in layout and facilities between the two different phases of construction. Likewise, any domestic refuse in the yards will allow a study of daily consumption and the differences in diet between different grades of worker.



Plate 2. Demolition of Pattinson Town in the 1960s. Photo: Washington Town Centre Library

10.5 Most of the former spoil heaps have been reclaimed, but there is still at least one above Station Road (Zone B, see below) which has avoided reclamation to date. In theory, the different strata within a spoil heap can reveal a relative chronology of works at the site. In many instances these layers can be given absolute dates and be related to specific processes on site. The need to accommodate spoil was constant and new areas were brought into use as a dumping ground for waste all the time. Of particular interest at Washington is the pre-1896 phase of works, which was subsequently used as a dump for brickworks waste and magnesia, suggesting that the chemical works may still survive below the heap. Any remains here are likely to be associated with the 19th century works and the LeBlanc process and are therefore potentially nationally important. If these building remains survive to any extent below the spoil heap, they will provide a rare opportunity to study the early alkali industry and its processes.

11.0 Potential Impact of Development

11.1 No listed buildings or conservation areas have been identified which are sufficiently close to the site to be directly or indirectly impacted upon by any future development on this site. Likewise, no hedgerows which might be considered to be “important” under the terms of the Hedgerow Regulations (1997) have been identified. The potential for archaeological survival varies throughout the site and therefore the appropriate mitigation also varies. The development area has been divided into zones, each with a different mitigation response.

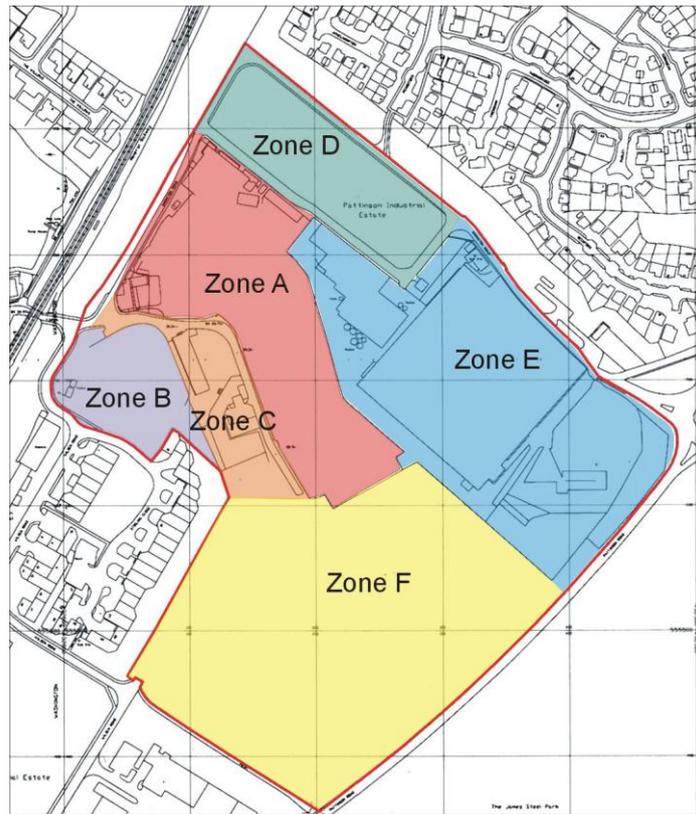


Figure 3. Zones of potential survival and mitigation.

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11.2 Zone A

11.3 The earliest remains within the development area are likely to be the former bleachery (site 31) and paper mill (site 32) that occupied the site before the chemical works were founded. Maps, which were drawn to accompany Hugh Lee Pattinson's lease for the land (TWA, 1759/2), place the bleachery at about NZ323 557. A building of this shape, dimension and location appears on subsequent maps until 1896 (OS 1:2,500), suggesting that it was reused by Pattinson. It may also appear on maps dating to 1896 in an extended form, but this is not clear. The location of this building is on the site of the present Instrip Demolition business and access to the site was not possible. However it was clear that in addition to the chemical works tipping, present day tipping is also taking place, thus ensuring that any earlier remains are buried below several metres of spoil.



Plate 3. Modern tipping at Instrip Demolition

11.4 The latest buildings on the site, now partially demolished, date to the first half of the 20th century. Photographs in the Washington Town Centre library depict the demolition of a number of buildings in this area in the 1980s (Plates 25-28). The demolished buildings are the same design and date as the extant buildings, namely brick built with concrete window sills mimicking sandstone. Any earlier buildings associated with the 19th century chemical works were presumably demolished before these more recent buildings were constructed. There is however, some potential for 19th century foundations to survive below the tipping. The present day buildings are also former chemical works buildings, latterly Cape Insulation, albeit relatively late in the sites development and would also be affected by any redevelopment. These buildings are already partly demolished in some places, while others are still in use by Instrip Demolition. There is therefore a high risk of early manufactory buildings, including the remains of the former bleachery, being uncovered beneath the spoil tips if there are any proposals to remove or reshape them or insert piles into them. Any future redevelopment will also affect the remaining mid 20th century buildings which are still extant. The predicted impact on these remains is therefore dependant on the nature of the development. Reclamation works, which involved the removal of the spoil, would have a major impact on the earlier remains. If the spoil was stabilised and left in situ the impact would be negligible. The extant buildings date to the later use of the site and are of less archaeological interest than the 19th century remains. Any development involving the demolition of these buildings would have a minor impact on the historic resource.

11.5 Zone B

11.6 The maps of 1896 (OS 1:2,500) depict a significant change in the layout of the manufactory. The area, which had contained amongst others, a condenser, a chimney, a cistern and various large buildings not annotated, was no longer used, but appeared to be undeveloped. These buildings would have included many of the works referred to in the valuation of 1856 (DRO D/Bo/G99/21) but were presumably redundant by 1896. It is not clear from the maps whether these buildings were demolished completely, or whether they were abandoned and the land subsequently used for tipping. Space to dump

waste was a perennial problem for the alkali industry and no vacant land was likely to be left so for long. Indeed by the time of the publication of the 1920 OS map (1:2,500), the land consisted of waste spoil. The presence of railway sidings leading into the spoil area from the brickworks in the 1920s, suggests that the land was used to dump waste from the brickworks. At the foot of the waste tip on land now occupied by Turnbull's Garage, a section through the spoil has revealed magnesia spoil at the base (see plate 5). The mound therefore appears to consist of magnesia spoil in its early stages and was then used to dump brick waste. Today, this area consists of a waste heap, which has never been reclaimed. It is highly likely that below this waste heap, there are the remains of the pre-1896 buildings. Any works within this area south-west of Station Road has the potential to damage buildings associated with the earliest phases of the chemical works, probably dating from 1850-1896. The predicted impact on these remains, should the spoil be removed or recontoured, is therefore considered to be major. If the spoil is left in situ, the predicted impact on the remains by the development is considered to be negligible.

11.7 Zone C

11.8 The present day Station Road appears to reflect an earlier roadway through the chemical works, first identified on the 1st edition OS map (1856). The north side of the road forms the boundary to the rear of Instrip Demolition. This boundary, with only a few minor changes, is exactly the same as the building boundaries on the 1856 map. The brick wall which remains today has a number of different phases of construction, but the earliest phase, in some places survives to only a few courses high. The brick is clearly early and may well be the remains of the earliest chemical works buildings. Behind the brick wall, an iron column can be seen still attached to the wall. We know that the pre-1856 buildings were supported by iron columns (DRO D/Bo/G99/21) and this could be the remains of one of those columns. Other supporting columns from the site are of a different type and date to the first half of the 20th century. Any proposal to develop in the Station Road area may have a moderate impact on these remains.



Plate 4. Brick wall along Station Road with supporting column behind.

11.9 The land on either side of Station Road has seen two phases of development. The first phase is already in existence by the time of the publication of the 1st edition OS map (1856, 1:2,500). Substantial buildings ran down both sides of this road at this time. By 1896, all buildings to the west side and within the current development area had been removed and buildings on the east side had undergone radical changes. By the 1920s the vacant land south west of Station Road had clearly been used for tipping for some time and only a gasometer and railway sidings leading from the brickworks to the heaps were located there. By 1939, the land was still being used for tipping, but some new buildings had been erected on the tip site north of the gasometer. These new buildings are still located on Station Road and are used by a number of businesses, including Turnbull's Garage and the Icing Parlour. In order to create a level area to erect these buildings on the spoil tips were cut into revealing magnesia spoil at the base.



Plate 5 Magnesia Spoil Behind Turnbull's Garage

11.10 The present owners of Turnbull's Garage recall the gasometer to the rear of their premises and also a kiln. The kiln is not depicted on OS maps, but the footprint of both is still visible and foundations to support the gasometer can still be seen on the roadside. The gasometer was apparently taken down c. 1990 (Mr D Turnbull pers comm).



Plate 6 Site of gasometer behind Turnbull's Garage

11.11 Any development along land to the south west of Station Road will therefore disturb the base of the spoil tips developed from the late 19th century and depending on the level of ground disturbance, may uncover earlier buildings associated with the 1850s manufactory (see Zone B). Although the present day extant buildings on Station Road are relatively recent, dating to the 1930-40s, they do nevertheless represent the later phases of development at the site. They also display a number of interesting architectural features, such as the brickwork detail along the wall top on Station Road or the combination of brickwork and concrete sills mimicking sandstone sills. Of more interest archaeologically, the boundary wall running along the north side of Station Road may contain the last above ground vestiges of the 19th century works. Any redevelopment of the area would have a moderate impact on these extant remains.



Plate 7. The Icing Parlour on Station Road

11.12 Zone D

11.13 Pattinson Town ran across the northern boundary of the site and consisted of two rows of housing. The earliest phase dates to around 1850, with the later phase appearing on maps dating to 1896. Since the demolition of the town (see plate 2) the site does not appear to have been developed and no tipping has taken place here. The reclamation works seen on aerial photographs taken in 1987 (Plate 33) do not depict disturbance on the site of the town itself. There is therefore a high potential for archaeological remains to be discovered during development. Any development of this area would therefore have a major impact on the buried remains.



Plate 8. Site of Pattinson Town on Barmston Road

11.14 Zone E

11.15 A large part of the development area is still used by Cape Insulation, which appears to consist of a relatively modern building (site 33.13) fronting on to Barmston Road. However the origins of this building date back to 1920 (OS 1:2,500), when the land is depicted on the OS maps as being laid out for the future building and by 1921 the structure had been built (OS 1:10,000). By the time of the publication of the 1939 map, the main building includes a number of extensions carried out in the 1930 and 40s (Tyne and Wear Archives DS/WS/43). As no access to the building was possible, it is not clear to what extent it may be of archaeological interest, but a view from the rear of the main complex highlights some earlier buildings, including a two storey brick built building (see plate 9) which may relate to a building plan dating to 1943 to accommodate offices (Tyne and Wear Archives DS/WS/43). Therefore, any redevelopment of this complex has a high potential of having a moderate impact on any buildings of this date.



Plate 9. Older building within the Cape Insulation Complex

11.16 Zone F

11.17 This area was reclaimed in the 1970-80s from two large spoil tips. The land is now a featureless green pasture field (plate 14). The footpath, which runs along the

southern edge of the two fields, follows the approximate route of two former waggon ways (site 1). This footpath forms the development area boundary. Oxclose waggon way, which ran down to Washington Staiths, is depicted on a photograph archived in the Beamish Museum Archive Record (Photo no. 3937). The earliest waggon way is partly outside the development area, and partly the southern boundary, however the later waggonway appears to have run just inside the development area. It is not clear to what extent the waggon way will have survived the reclamation works, however it is thought unlikely that they will survive in good condition, if at all. The predicted impact of any development here is therefore considered to be none to negligible.

12.0 Recommended Mitigation

12.1 Without detailed development proposals, it has not been possible to provide detailed mitigation measures. These will need to be determined as the development proposals are produced. However an indication of the likely form of mitigation required has been produced in order to comply with planning guidance relating to archaeological remains. In particular, emphasis has been placed on the potential national importance of the 19th century remains and the need to preserve by record, rather than preservation in situ. See figure 3 for zones.

12.2 Zone A

12.3 The areas of archaeological interest consist of the extant buildings currently used by Instrip Demolition and any buried remains under the spoil which may relate to the early manufactory buildings, including the bleachery. Any proposal to reuse or demolish the extant buildings should be preceded by an archaeological record of the buildings; a level of survey which broadly equates to RCHME Level 2.

12.4 There are considerable difficulties in recommending appropriate mitigation for potentially nationally important features buried below several metres of spoil. Conventional evaluation techniques such as geophysical survey and trial trenching will not work or will be impractical and bore hole survey results are too difficult to distinguish between dumped brickwork and in situ foundations. There are also health and safety implication in carrying out archaeological work in potentially hazardous disturbed spoil. Subject to the development proposals and appropriate health and safety measures, mitigation should therefore involve acquiring an archaeological record of any remains uncovered towards the base of the spoil tips, should the spoil be removed or recontoured. The best way to accomplish this will need to be discussed in detail once the reclamation proposals are clearer, but may require an archaeological presence during the earthwork moving operations, with an opportunity to record any exposed remains in more detail. Archaeological recording should target 19th century structural remains or

process residues, which will provide information on the early processes carried out at the chemical works.

12.5 Zone B

12.6 This area may contain the fossilized remains of the 1850s chemical works, abandoned by 1896. Unfortunately these may be buried below many metres of magnesia and brickwork spoil. This area poses the same challenges as in Zone A in terms of appropriate evaluation and mitigation. Ideally a programme of evaluation should examine the level of survival and date of any buried buildings, but the presence of metres of spoil make this impractical. Therefore, if reclamation of this land involves removing the waste or recontouring it, then the process should be accompanied by archaeological recording in order to preserve by record, these potentially nationally important archaeological remains. In the event that any exposed remains are considered to be in good condition and are associated with the 19th century industry, discussions with the County Archaeologist should explore the practicality for preservation in situ or a more detailed programme of investigation.

12.7 The natural topography of this area appears to be a gradual slope from the top of Station Road (the Classic Car Garage) down to the bottom of Station Road (Turnbull's Garage). It is therefore possible, that building remains relating to the early chemical works could be exposed at any level. Provision should therefore be made, subject to health and safety requirements, for an archaeologist to be present during earth moving operations and for adequate time and resources to excavate and plan any 19th century building remains exposed.

12.8 Zone C

12.9 Station Road has survived the many changes this landscape has seen over the last 150 years. Along its route are a number of historic features. While of no great age, they represent a form of local distinctiveness lacking elsewhere in this area. It would not be practical to retain all of these features, but consideration should be given to retaining any structures, which can be incorporated into the new development. Where this is not possible, an archaeological record should be made in advance of their demolition. For buildings, this should equate to RCHME Level 2 or 3.

12.10 Historic structures, which could be retained, include the bridge abutment at the top of Station Road, the brick wall with decorative finish on Station Road, any buildings considered to be structurally sound, such as Turnbull's Garage and the Icing Parlour.

12.13 Historic structures unlikely to be retained and which should therefore be recorded, include the brick wall which may include the mid 19th century remains of the chemical works and supporting iron column and the railway bridge, now overgrown at the foot of Station Road. The site of the kiln could be subject to brief evaluation (if the area is developed) and depending on the results briefly recorded. The existing mapping of the gasometer provides a sufficient record, but the supporting structure visible on the side of Station Road should be briefly recorded (RCHME Level 1).

12.14 Zone D

12.15 This area consists of the former Pattinson Town. It has already been highlighted that little research has been carried out on the people who worked in the chemical industry. The development of this land offers an opportunity to remedy this. The existing mapping of the site is not especially detailed, however we know from the 1856 valuation (DRO/D/Bo/G99/21) that workers housing at that time consisted of 3 rooms, a piggery, a pantry and conveniences. To what extent the cottages varied between different grades of worker and to what extent the houses varied between the two different phases of the town, is less clear. Any proposal to develop this area should be preceded by an archaeological evaluation in order to determine to what extent the foundations still survive. It should also explore the potential for domestic residues to be examined, in order to provide information about daily life, diet etc. If the preservation of the buildings is sufficient to develop research into the workers housing, then a programme of excavation should be developed which will sample areas of housing designed to meet the research objectives outlined above. This will sample houses from both phases of the Town, plus a sample which includes a mid terrace and an end terrace which will allow the difference in facilities for different grades of worker.

12.16 Zone E

12.17 The current Cape Insulation complex has not been visited, but dates from 1921 with later additions. Some buildings of potential historic interest were viewed from a distance, highlighting the need to explore this area further, should it be subject to development proposals. If development of the site is to be considered, access needs to be made available to the site to identify any archaeological potential. It is likely that any buildings or features identified within the complex, should be recorded to RCHME Level 2-3.

12.18 Zone F

12.19 A watching brief during any ground disturbance on a 25m strip of land adjacent to the footpath will provide an opportunity to record any surviving remains of the later (and possibly earlier) waggonway. No other constraints exist in this area.

13.0 Concluding Summary

13.1 Work carried out by English Heritage has concluded that the study of the chemical industry and the LeBlanc process in particular, is of national significance. Further, because the survival of sites associated with this early phase of the industry are increasingly rare, any sites where subterranean survival is good, are considered to be nationally important. The fossilisation of part of the site (Zone B) under subsequent spoil means that survival of this site may well be good and the site is therefore potentially nationally important. The fragmentary remains of early buildings within the boundary wall of Station Road may also be part of the 19th century works. However there is also recognition within English Heritage that the normal recourse of preservation in situ, is not always practical because of land contamination issues and the public perception of such structures as being ugly and hazardous. Therefore a programme of mitigation has been proposed which targets those areas likely to contain archaeological remains which will further the study of the chemical industry. Although no details exist on any future development, should these broad principles of mitigation be applied, then further development of the site will not conflict with any planning guidance relating to the historic environment. A large part of the site (Zone F) has been identified as having very little archaeological constraints at all.

13.2 No listed buildings or Conservation Areas have been identified within the vicinity of the site, the nearest listed buildings being located at Washington Staith. No hedgerows which might be considered to be “important” under the relevant legislation, have been identified within the development area.

Appendix A Map Regression

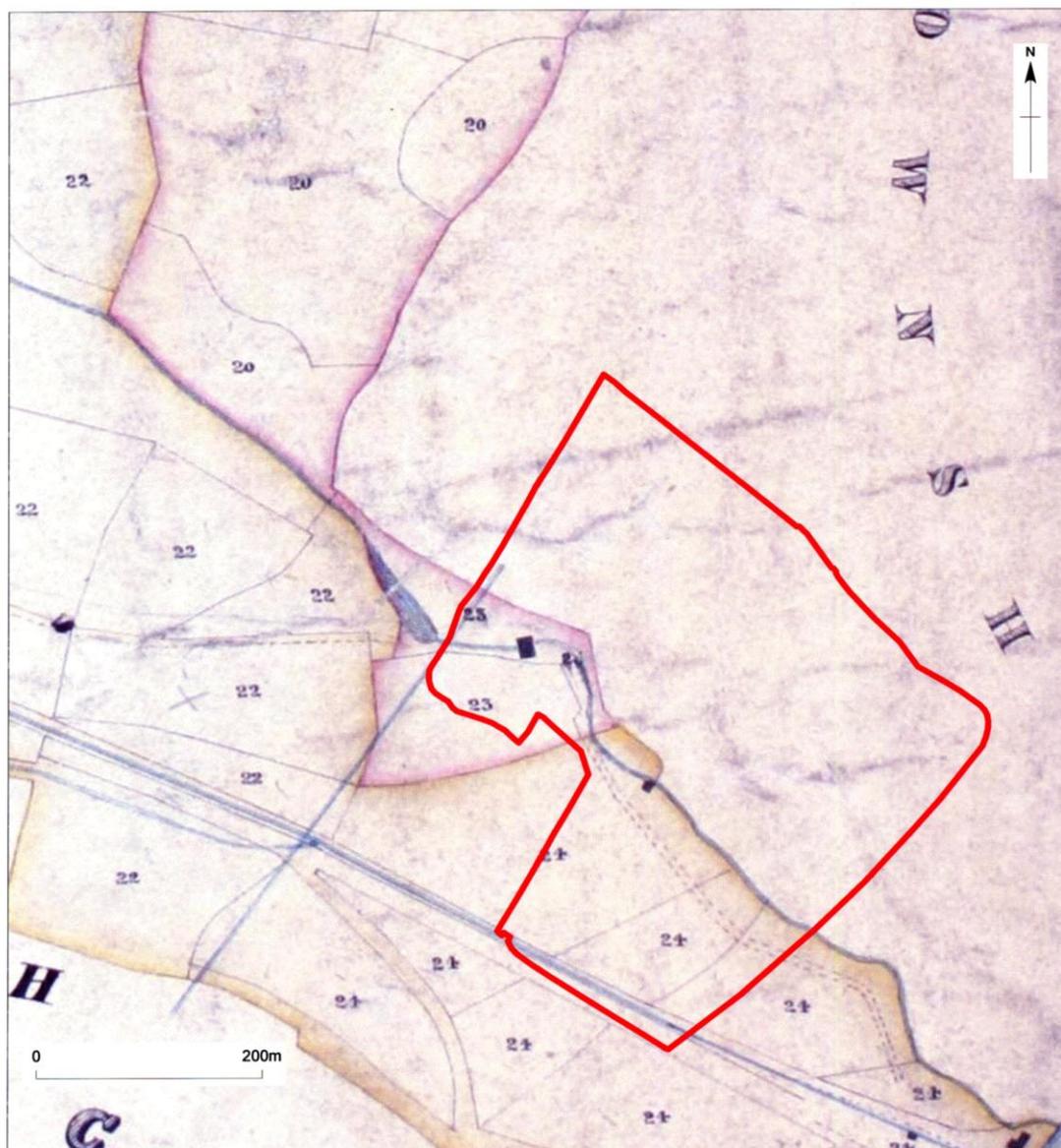


Figure 4. Tithe Plan 1843 showing development area (in red).

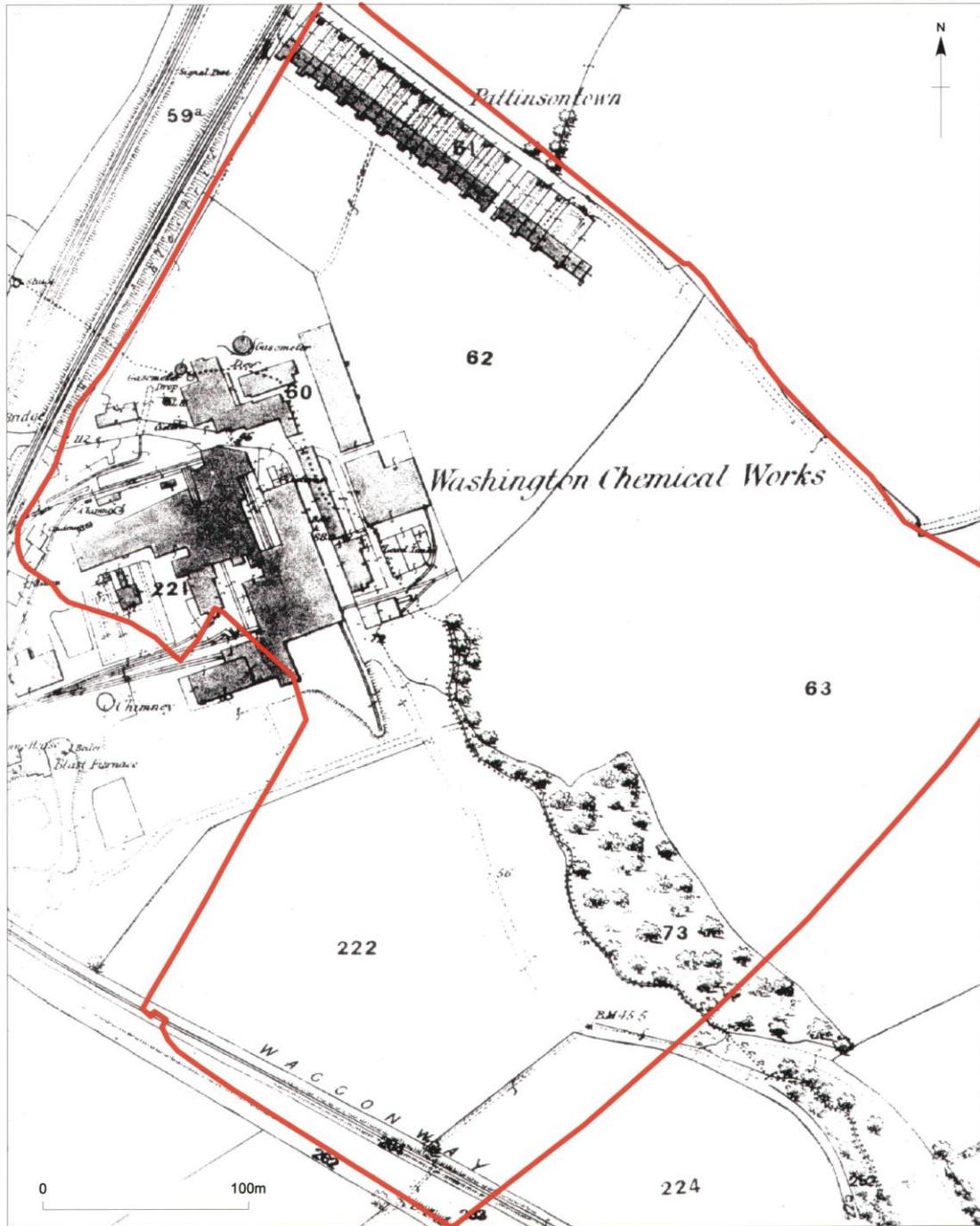


Figure 4 OS 1:2,500 1856 showing development area (in red).

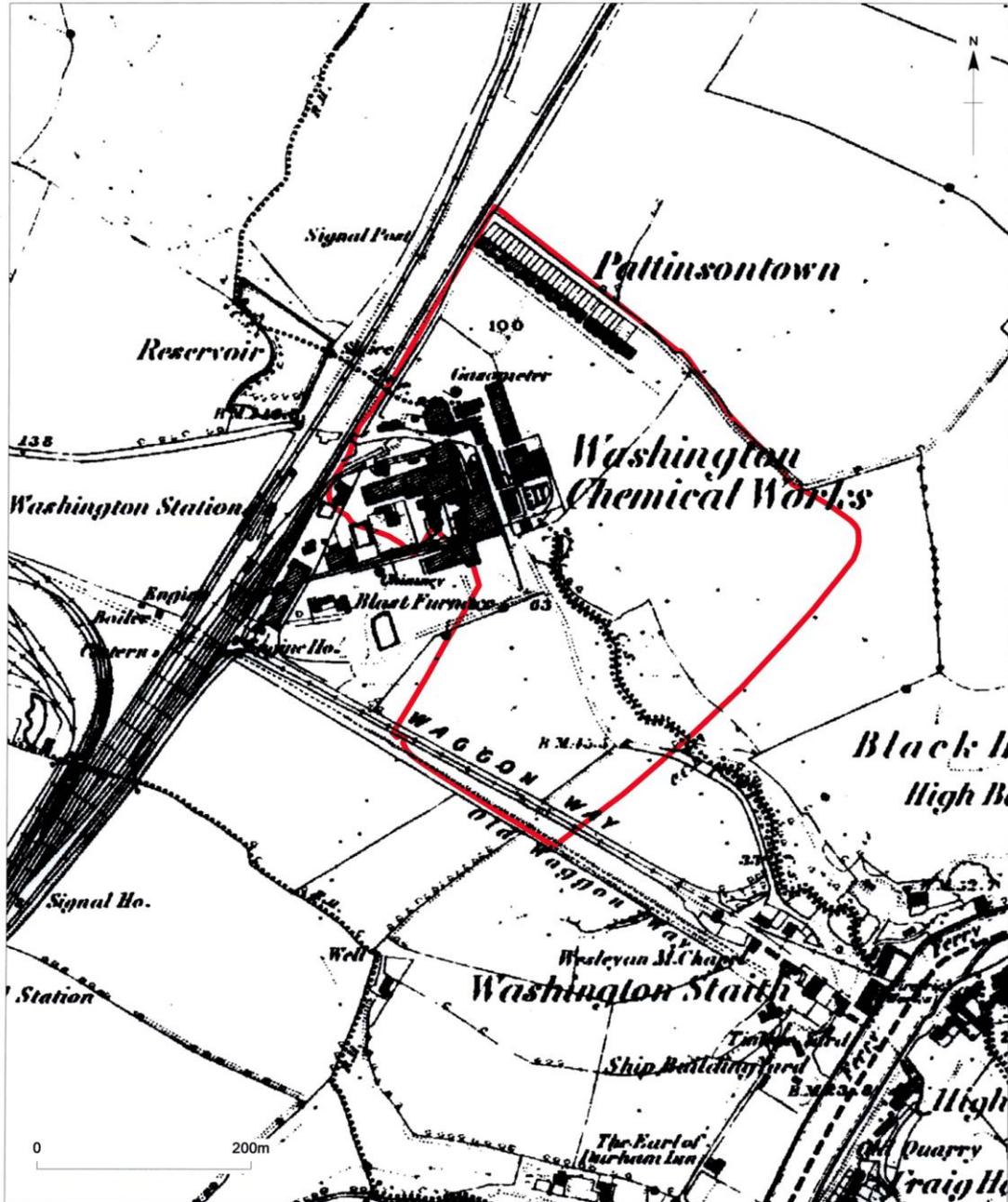


Figure 5 OS 1:10,560 1862 showing development area (in red).

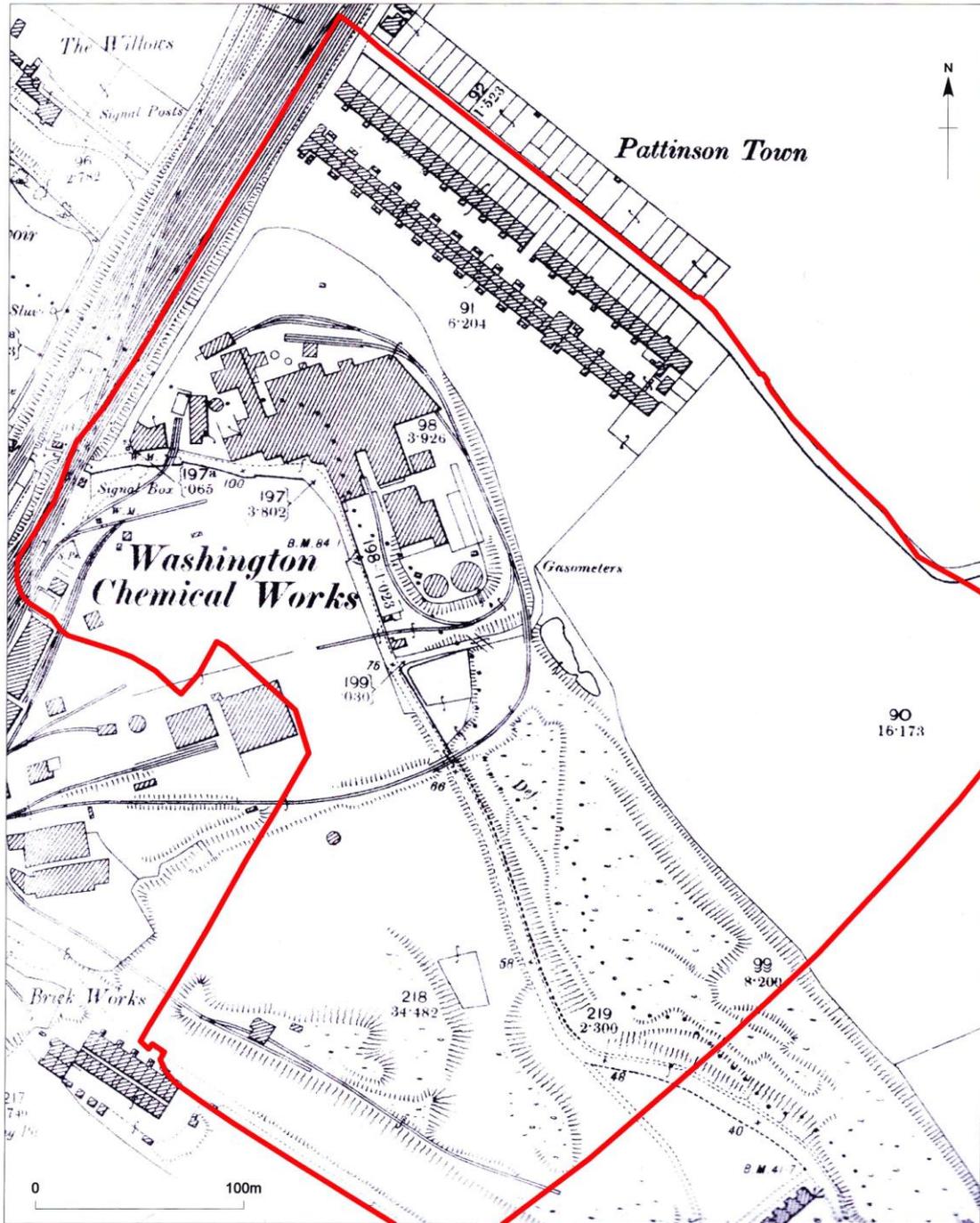


Figure 6. OS 1:2,500 1896 showing development area (in red).

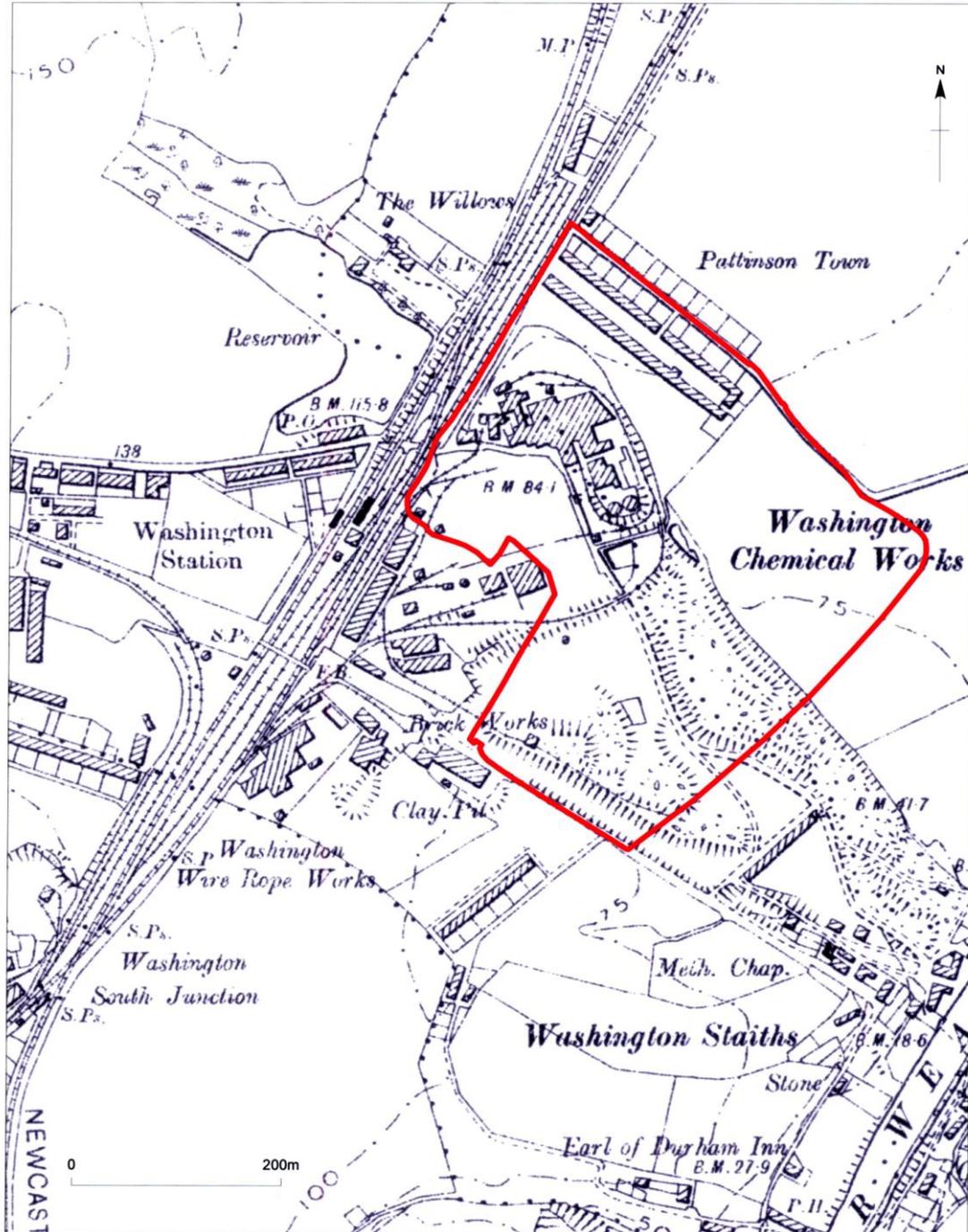


Figure 7. OS 1:2,500 1898 showing development area (in red).

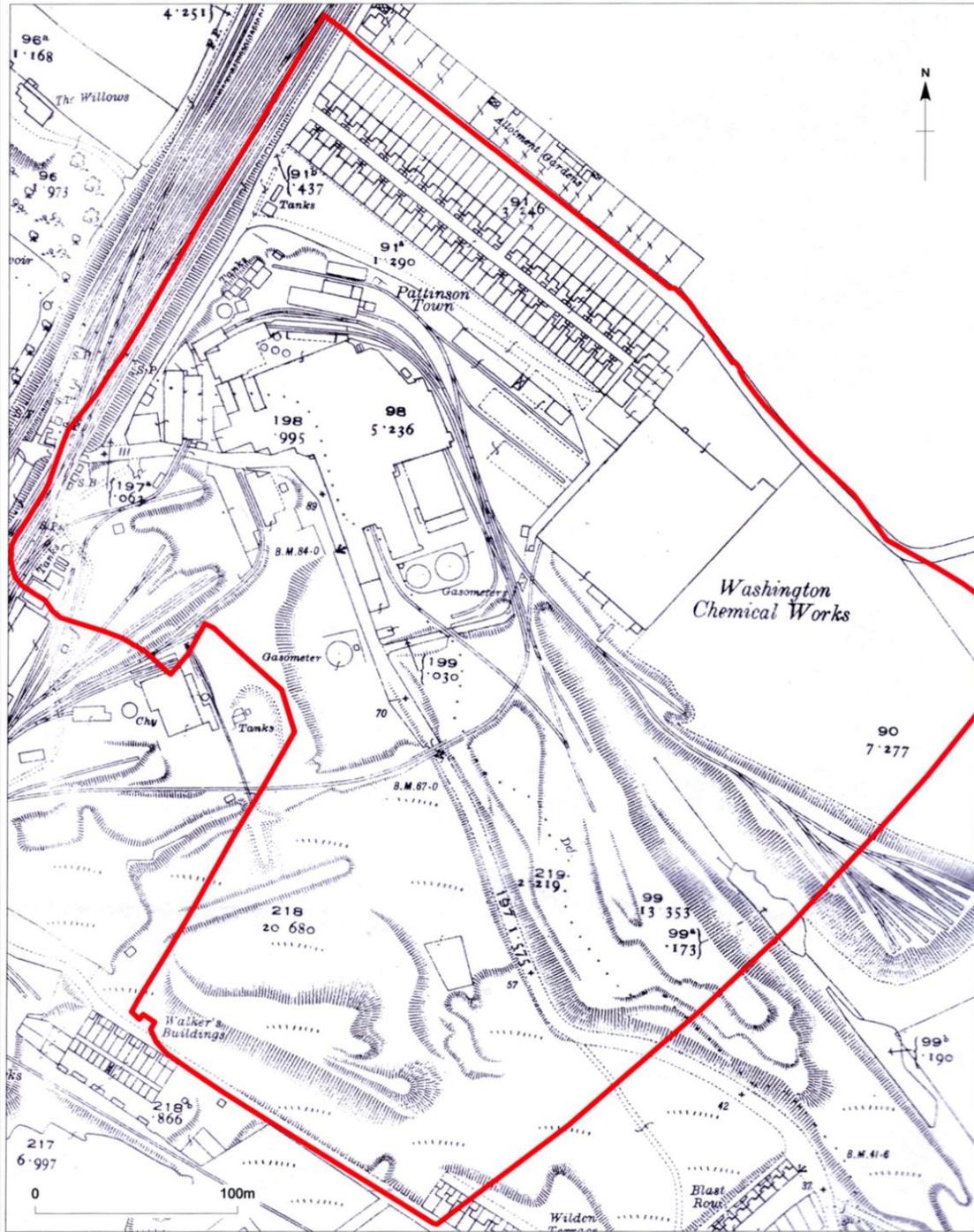


Figure 8. OS 1:2,500 1920 showing development area (in red).

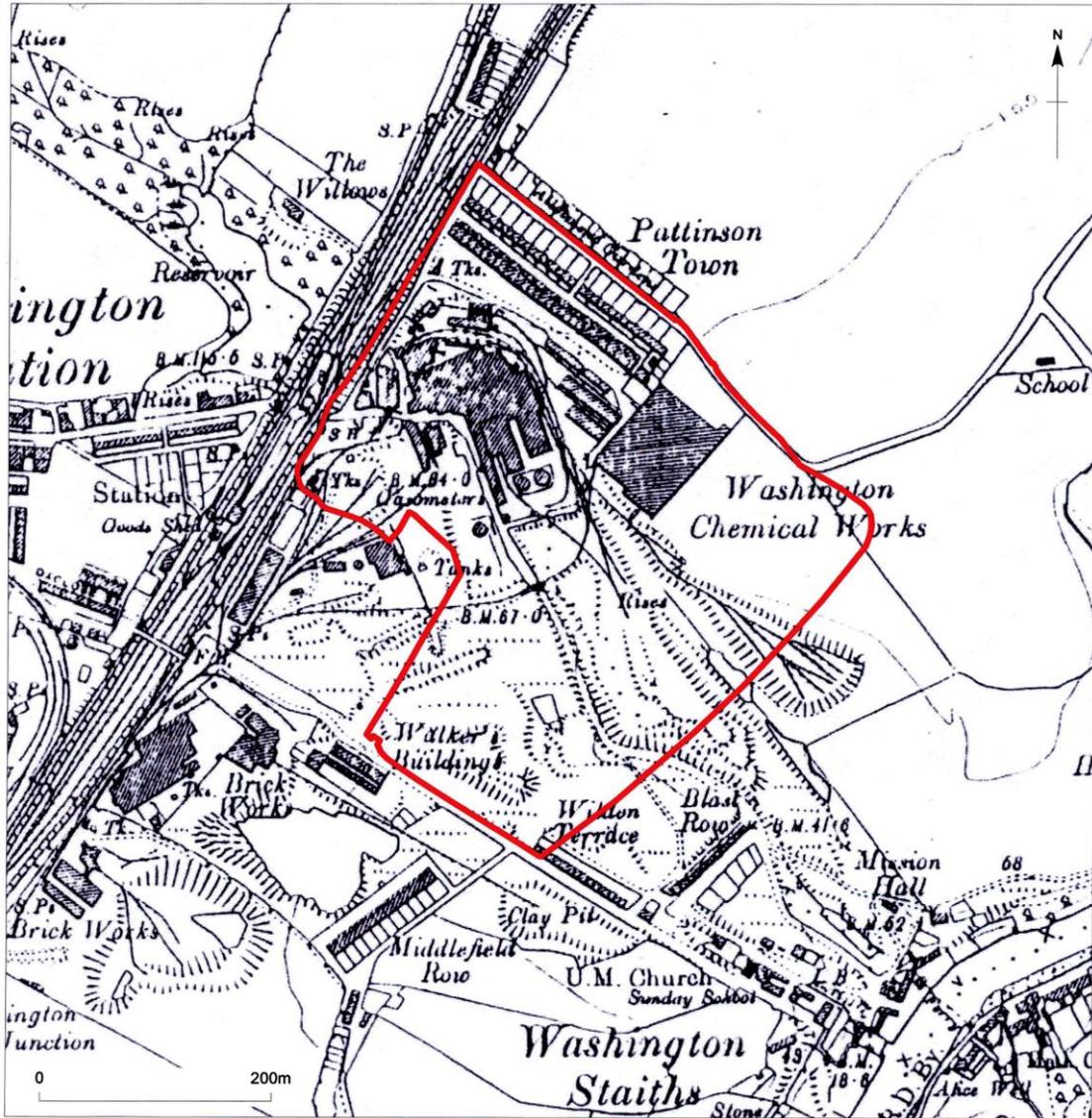


Figure 9. OS 1:10,560 1921 showing development area (in red).

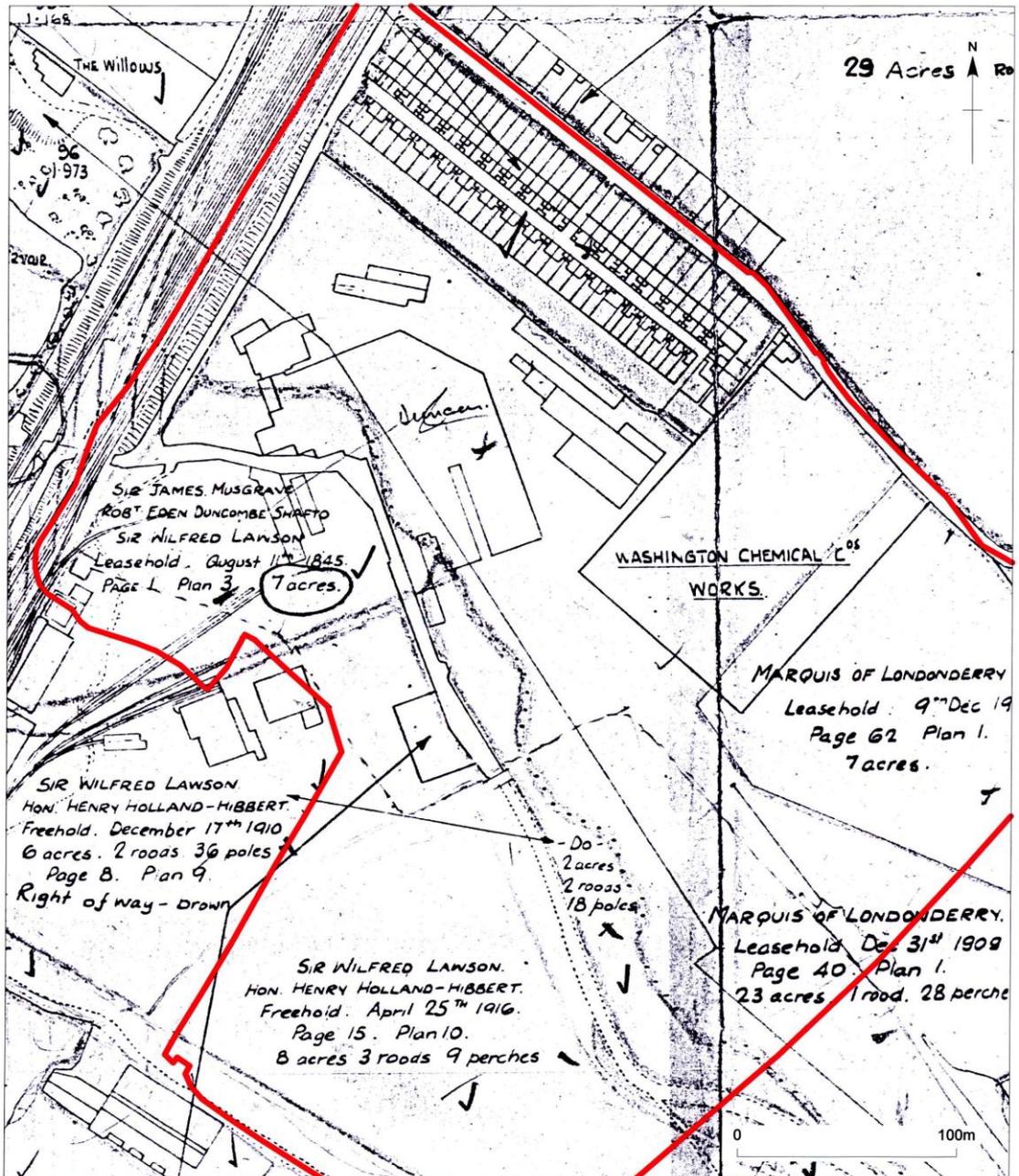


Figure 10. Tyne and Wear Archives 1759/72 Drawing 120A/18. Washington Chemical Company Branch of Turner & Newall Ltd. 1:2,500 26th May 1938. The development area is shown in red.

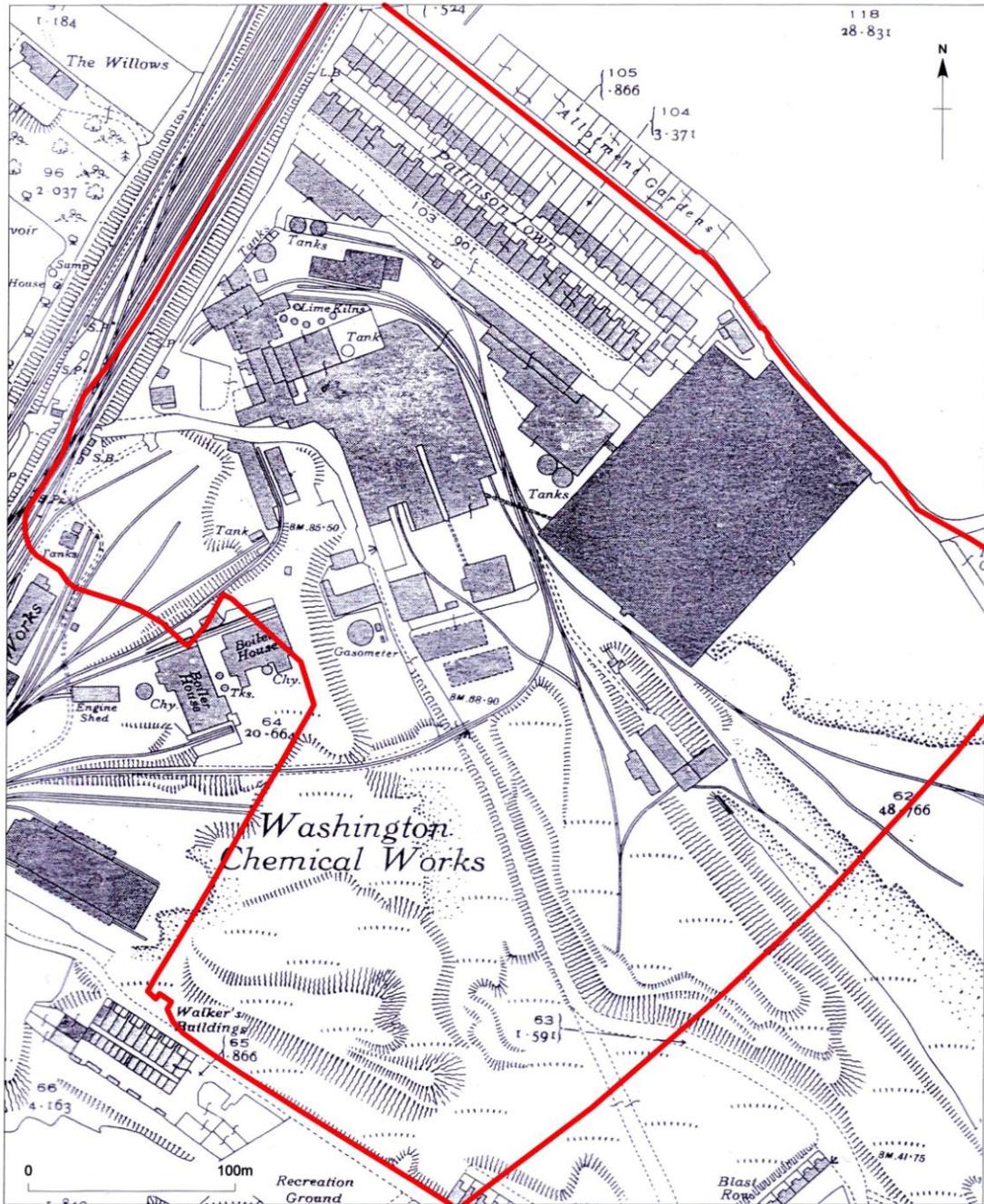


Figure 11. OS 1:2,500 1939 showing development area (in red).

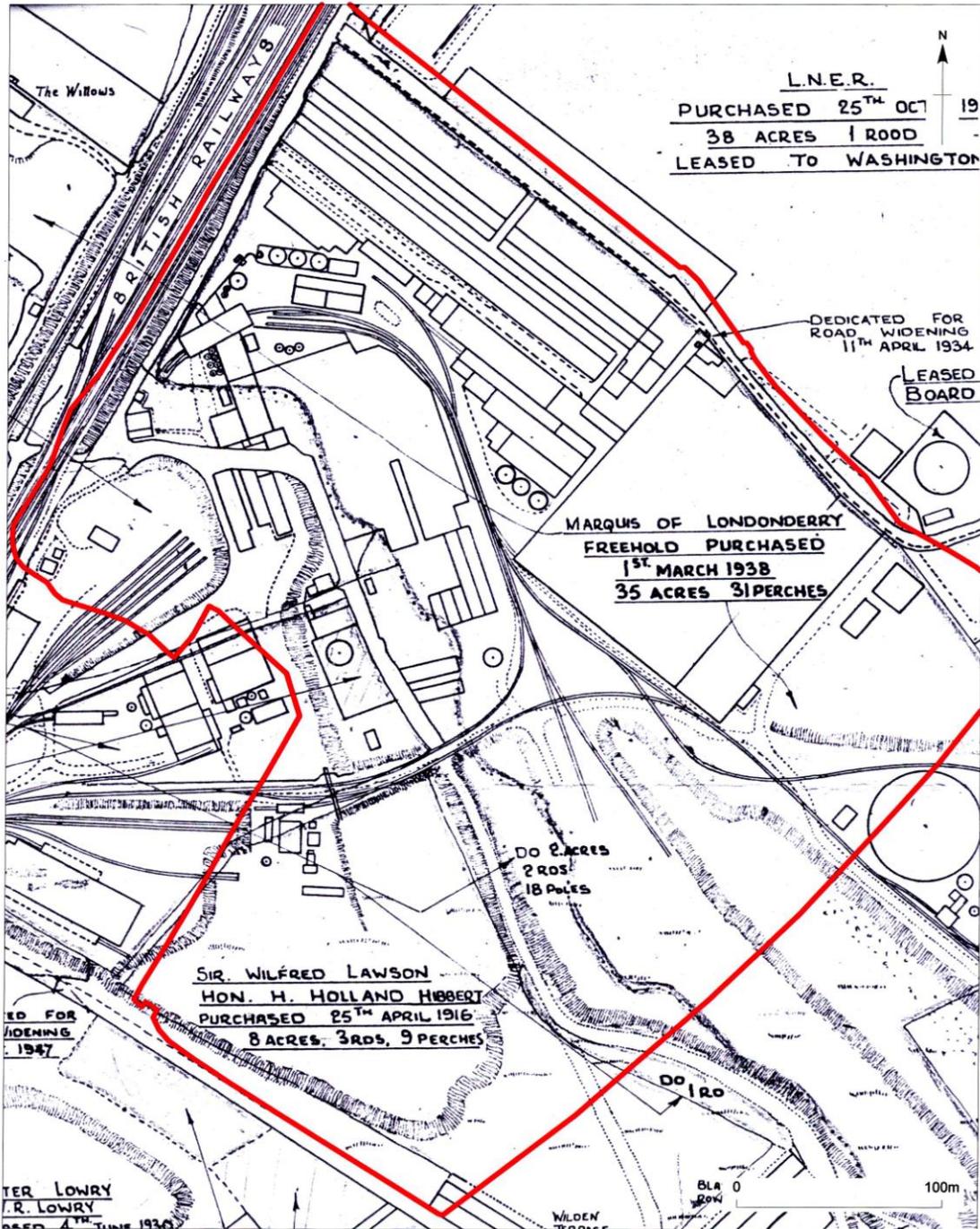


Figure 12. Tyne and Wear Archives 1759/72 Drawing 120.A.18. The Washington Chemical Co Ltd, Turner & Newall Ltd. 1:2,500 11.9.1952.

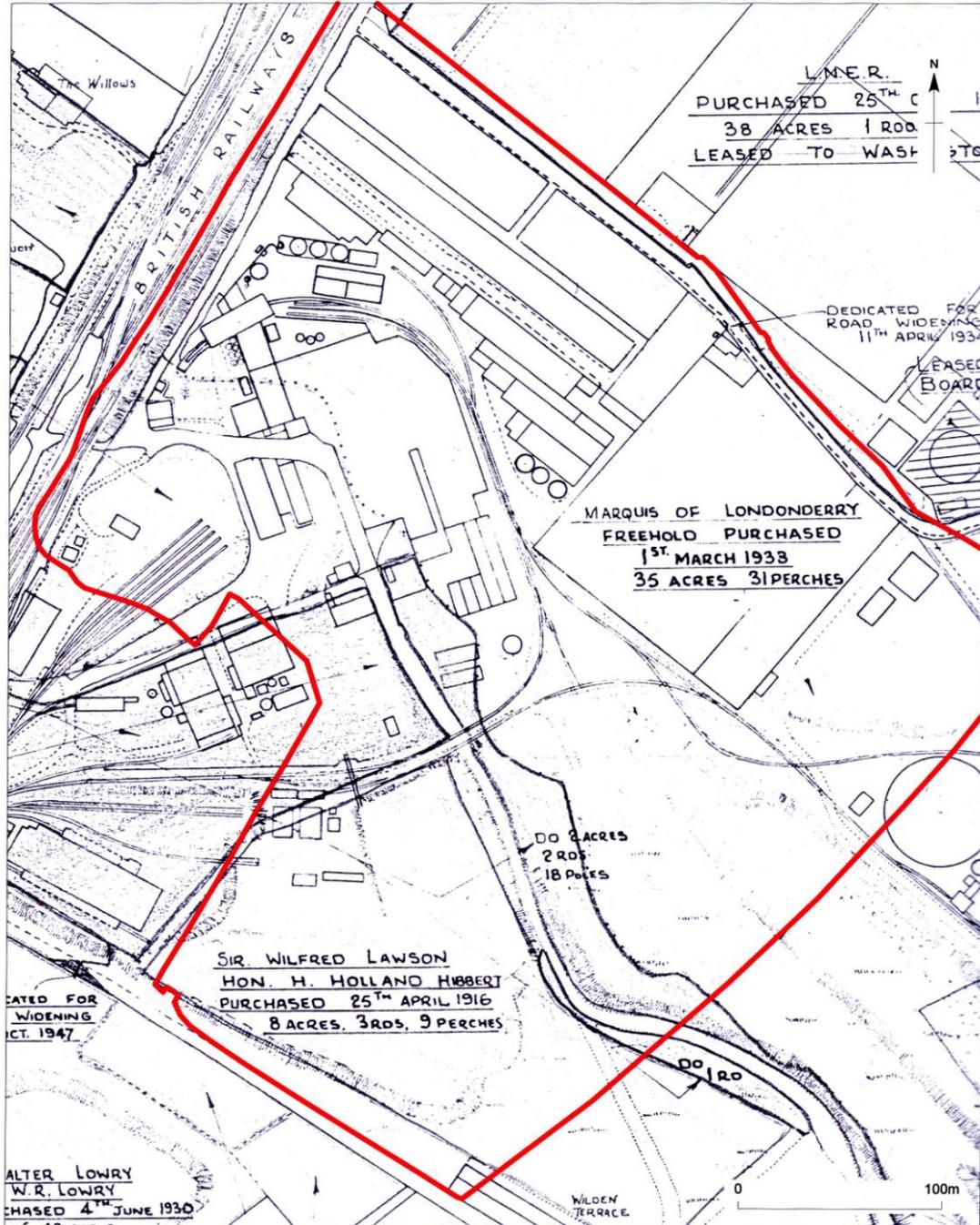


Figure 13. Tyne and Wear Archives 1759/72 Drawing 120.A.18. Newalls Insulation & Chemical Co Ltd 1:2,500 18.3.1969.

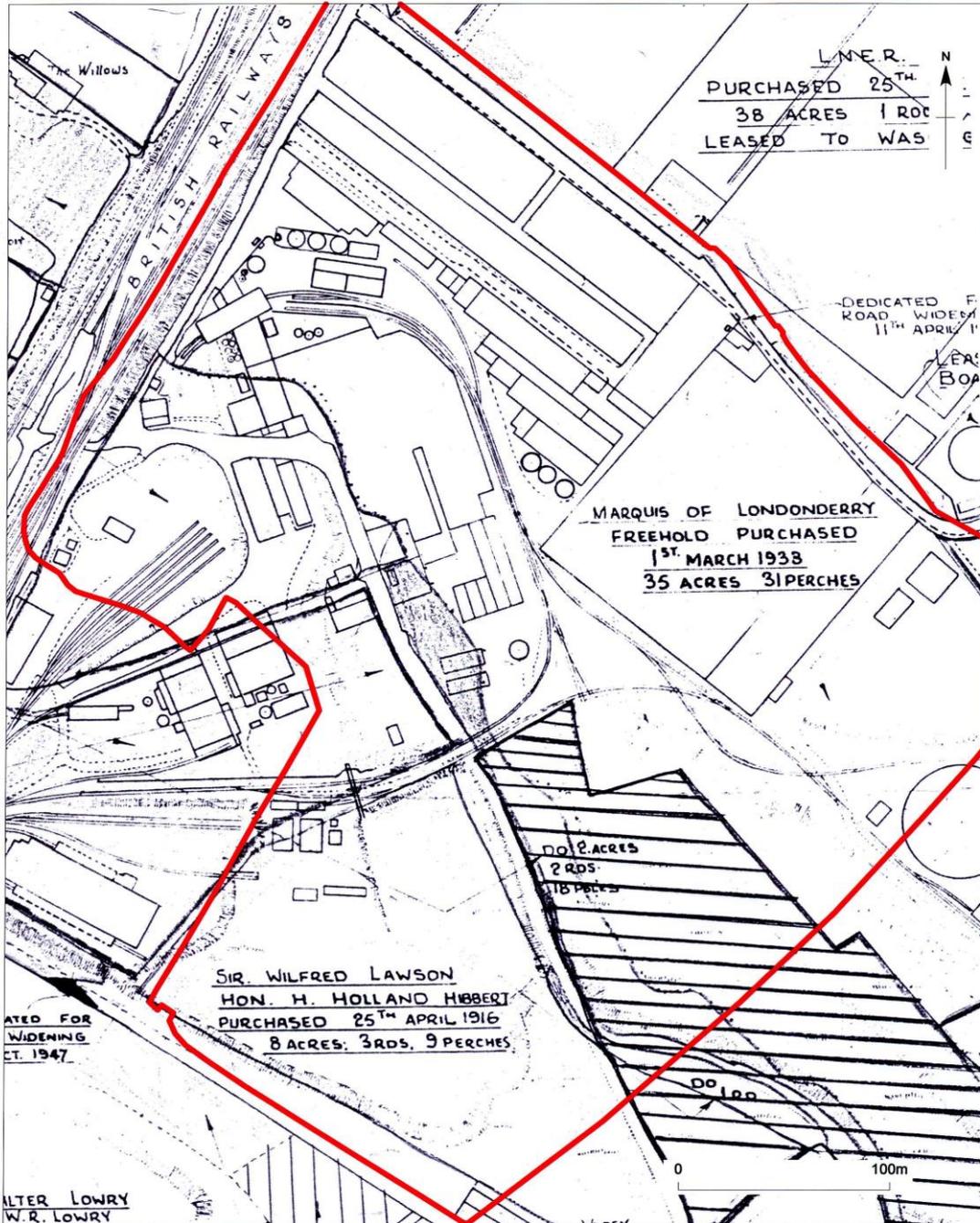


Figure 14. Tyne and Wear Archives 1759/72 Drawing 120.A.18D. 1:2,500 Turner and Newall's 15.1.1971.

Appendix B

A valuation was carried out at Hugh Lee Pattinson's request at Washington Chemical Works in June 1856 by J Sewell of Newcastle. In it, he describes the chemical works and the buildings. A summary of his account follows:

The soda works consist of several buildings used for the manufacture of soda, one of which contains 4 sulphuric acid chambers. An Old Burner House is mentioned. Also included are steam boilers, 4 coke ovens under the boiler, air pumps, lead chambers, burners, railway gears, brass stampers, Pyrites kiln house and a sulphur warehouse. A large building is used as a store for salt with railways and gears passing through them, with a turntable. There is also a decomposing house which has a turntable, condensers for Muriatic acid, plus smaller ones. Also Burnett condensers and flues. A chalk kiln is also part of the soda works. The Ball Furnace house is described as a large building supported by metal columns, with railway and gears passing through it to convey coal. It has coal shutes and a turntable, 4 ball furnaces with salt pans and vats.

The carbonating and alkali house is a large building with 5 carbonating furnaces, with pans. One alkali salt pan with a boiler and drying furnace, 4 salt plates, one boiling down furnace and a railway passing through them. Coal shutes area also present and a railway bridge.

The Dissolving and crystallizing houses are located in a building with a roof supported by strong metal columns. They contain 5 dissolving pans, 5 iron settlers, 40 crystalizing pans or cones, a boiler and water balance pipes.

A new soda house is being built.

An Alkali Mill also forms part of the Soda Works and the Soda Works are valued at £17,531.

Magnesium Works

Several buildings are used to manufacture magnesium and contain 2 generators, 2 gasometers, 3 lime kilns, 2 boilers, 2 metal cylinders for carbonating limestone, carbonic acid pumps, 14 cisterns, 3 drying beds, stores for drying magnesia with iron shelving and a packing warehouse. (*A photograph of women laying out magnesia pulp on these drying beds is now lodged at Beamish Museum Archive Record Photo no. 3937*)

The White Lead Works are for lead ore grinding and also have decomposing mills. Chloride of lead, settling house, a building with 6 large vats for settling the solution of Chloride Lead, which is quite a new building.

The Still House contains 3 stills or making chloride of lead from lead ore. An engine for driving the lead washing apparatus is also used (10 horse power). There are also buildings with apparatus for dissolving chloride of lead.

The Lime Settling House is a covered building with 4 very large tanks and water pipes.

There are buildings with apparatus for mixing chloride of lead and lime water which includes a waterwheel. A warehouse and a building fitted up with stores is also part of the complex, as is a pumping engine house.

A Smelting House is used for drying and smelting lead residues with ore and slag hearths. Catch pools prevent lead wastage.

The next main component of the works is the Iron Works.

These consist of a blast furnace with 2 blast engines, 12 coke ovens. This is in the course of the being built during the valuation and it is expected to be finished and in use within two months. A gas works and a gas house with gasometer and tank area also found here. Chimneys and flues – there is a large 16ft in diameter chimney, 202 feet high connected by a brick flue with the soda works. Also a smaller chimney 100 ft high used partly for decomposing furnaces from the soda works and the Ball Furnace House, Work Shops etc. There are 2276 yards of railway.

The Laboratory consists of 2 rooms with 4 stores and is a substantial building.

Workshops and offices. These are a range of buildings 230 x 60 ft comprising a Joiners Shop, a Coopers Shop, a Plumbers Shop, a Millwrights Shop, a Smiths Shop, a Paint Mill and Shop, and Alkali Mill and Warehouse, a clock tower and bell, 2 offices and a warehouse or store. All are built of stone with tiled roofs and built in 1850.

Dwelling Houses and a cottage are also part of the Washington site. The Managers House contains 8 rooms with a garden attached and other conveniences – it is in the course of being removed to a more airy location as it's current position is preventing the chemical works from expanding.. There is also a Foreman's House and a Clerk's House, each having 3 rooms (it is a dwelling house divided into 2). There are 28 Workman's Cottages each having 3 rooms, a pantry, a coal house, piggery and garden attached. 2 cottages are occupied by cartmen, each having 3 rooms and other conveniences.

There are stables with 3 stalls and a loft and a harness room.

There is also a lime kiln, a brick shed and an Old Building used as a cooperage.

The Staiths adjacent to the River Wear are held on lease from the late Marquis of Londonderry for 63 years, a crane has been built by the company there.

Source: Durham Record Office Acc No. D/Bo/G99/20-21

Appendix C Chemicals Associated with Washington Chemical Works

Below is a list of chemicals, which may have been found at the Chemical Works at various times. Some are brought on to site as raw materials, others are by-products or waste and some are products to be sold on. The same chemical can change as it moves through the processes; so all changes are listed where they have been picked up from historical sources. This list has been derived from sources used while studying Washington Chemical Works, but some chemicals have been listed because of their presence on other chemical works sites, rather than any direct evidence for them at Washington.

Acetic acid

Ammonia – nitrogen and hydrogen combined, sulphate of ammonia, ammonium chloride, ammonium carbonate

Anhydrite (calcium sulphate)

Arsenic from arsenical pyrites

Arsenic Sulphide

Calcium sulphide (tank waste, usually found in waste heaps)

Caustic Soda, Epsom salt

Chlorine, hypochlorites

Copper

Cyanide – for the gold industry, made from sodium metal. Barium cyanide

Charcoal

Glycerol

Hydrochloric acid (gas)

Iron sulphate (copperas)

Lead oxide (litharge)

Limestone, quick lime, slaked lime

Magnesia alba

Manganese dioxide (pyrolusite) ; manganese ore

Nickel oxide, nickel chloride

Nitric acid, Nitre (caliche)

Platinized asbestos

Potassium Carbonate

Potassium chloride

Pyrites (coal brasses)

Sodium Carbonate

Sodium Chloride (salt)

Sodium sulphate (saltcake)

Silver

Sulphuric acid (often combined with salt to make highly corrosive mixture), sulphur in waste heaps

Sulphuretted hydrogen

Superphosphates

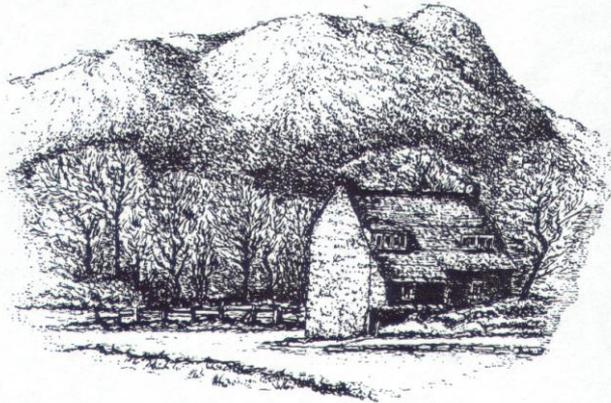
Thiosulphate, hyposulphites

Turners Yellow Lead (chloride of lead)

Urea

Zinc for the paint and rubber trades

Appendix D Images of Washington Chemical Works

	Title and source
	Plate 10 “Hills of refuse from the works tumble down to the riverside” from Hind, A 1976,106
	Plate 11 Redundant iron columns probably dating to the 1930-40s to the rear of Turnbull’s Garage, Station Road
	Plate 12 Foundations for former Gasometer on Station Road.

	<p>Plate 13 Typical brick and concrete buildings, probably dating to 1930-40s on Station Road</p>
	<p>Plate 14 Reclaimed spoil heaps. Now Zone F.</p>
	<p>Plate 15 Land adjacent to Cape Insulation, now Zone E and not visited. The brick structure was formerly marked as spoil on historic mapping (OS 1939 1:2,500)</p>

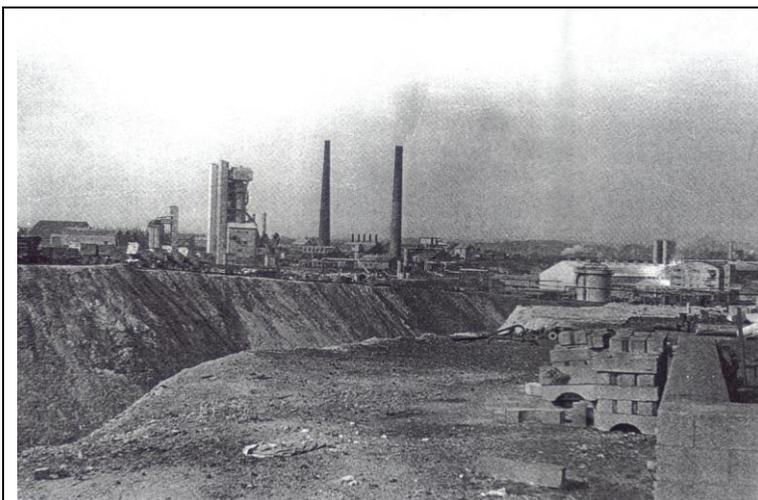


Plate 16
Newall's
Chemical Works
from Miller, S and
Nairn, G 1998, 94

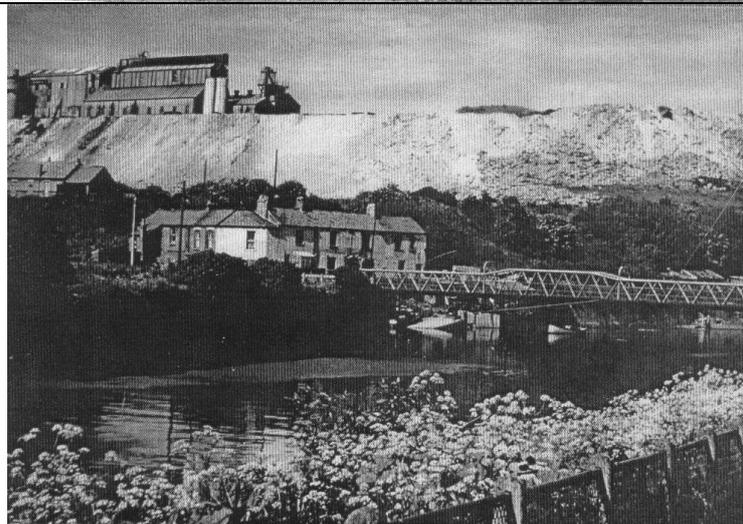


Plate 17
Washington
Staiths with
Turner & Newall
in the background
above the waste
magnesite. Photo
from Washington
Town Centre
Library RIV 008.



Plate 18
The chemical
works in the
1950s. Photo from
Washington Town
Centre Library
RIV 190.



Plate 19
Turner & Newalls
in the 1960s (?)
Photo from
Washington Town
Centre Library
RIV 016.



Plate 20
Aerial photograph
of Turner &
Newalls. Photo
from Washington
Town Centre
Library RIV 017



Plate 21
Photo of Turner
and Newalls in the
1960s (?). Photo
from Washington
Town Centre
Library RIV 019.



Plate 22
The chemical works from Cox Green. Photo from Washington Town Centre Library RIV 032.



Plate 23
Reclamation works at the chemical works in the late 60s/ early 70s. Photo from Washington Town Centre Library RIV 166.

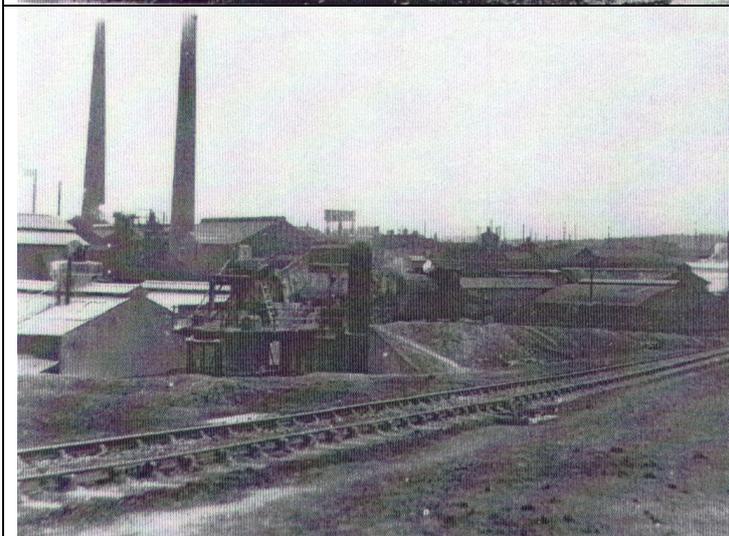


Plate 24
The chemical works. Photo from Washington Town Centre Library RIV 168.

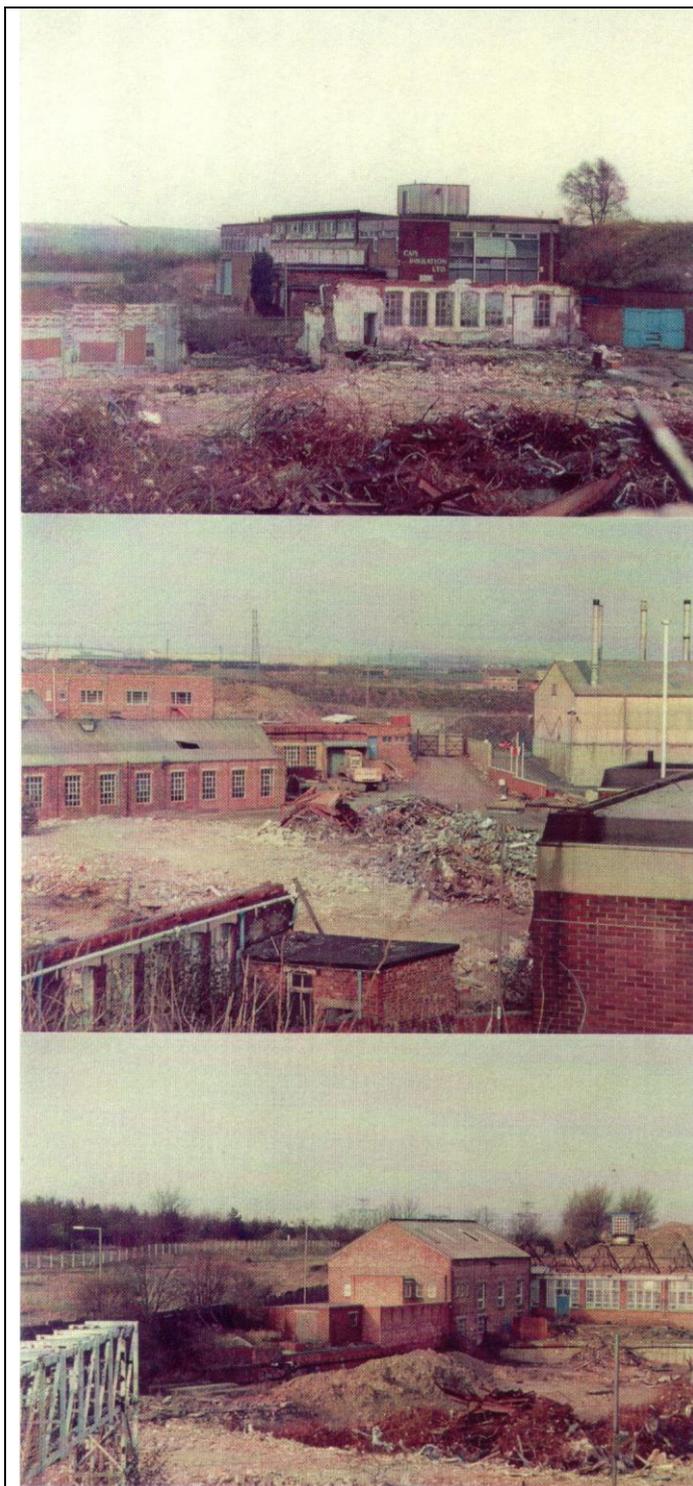
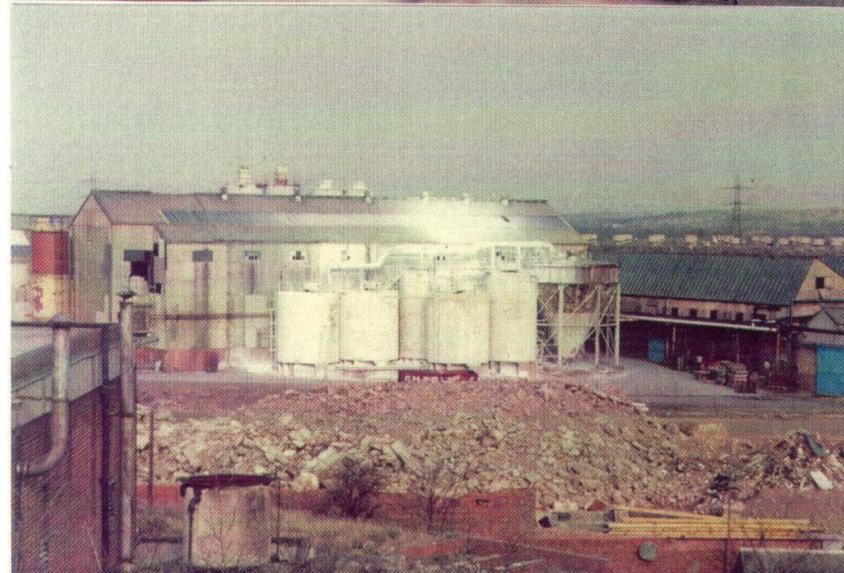
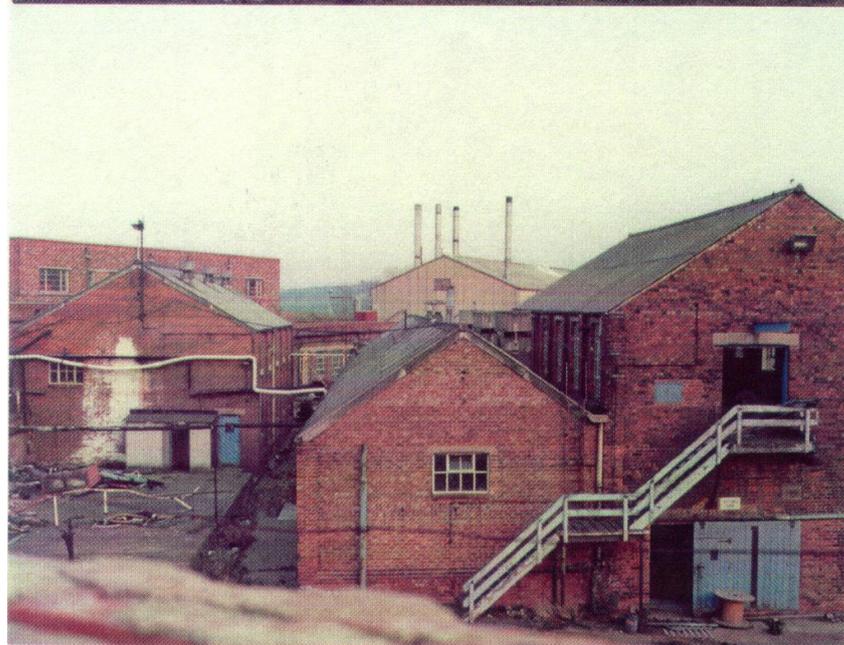


Plate 25
Demolition of
Cape Insulation
buildings,
possibly in the
1980s. Photo from
Washington Town
Centre Library
RIV 112-4.



Plate 26
Demolition of
Cape Insulation
buildings,
possibly in the
1980s. Photo from
Washington Town
Centre Library
RIV 115-8



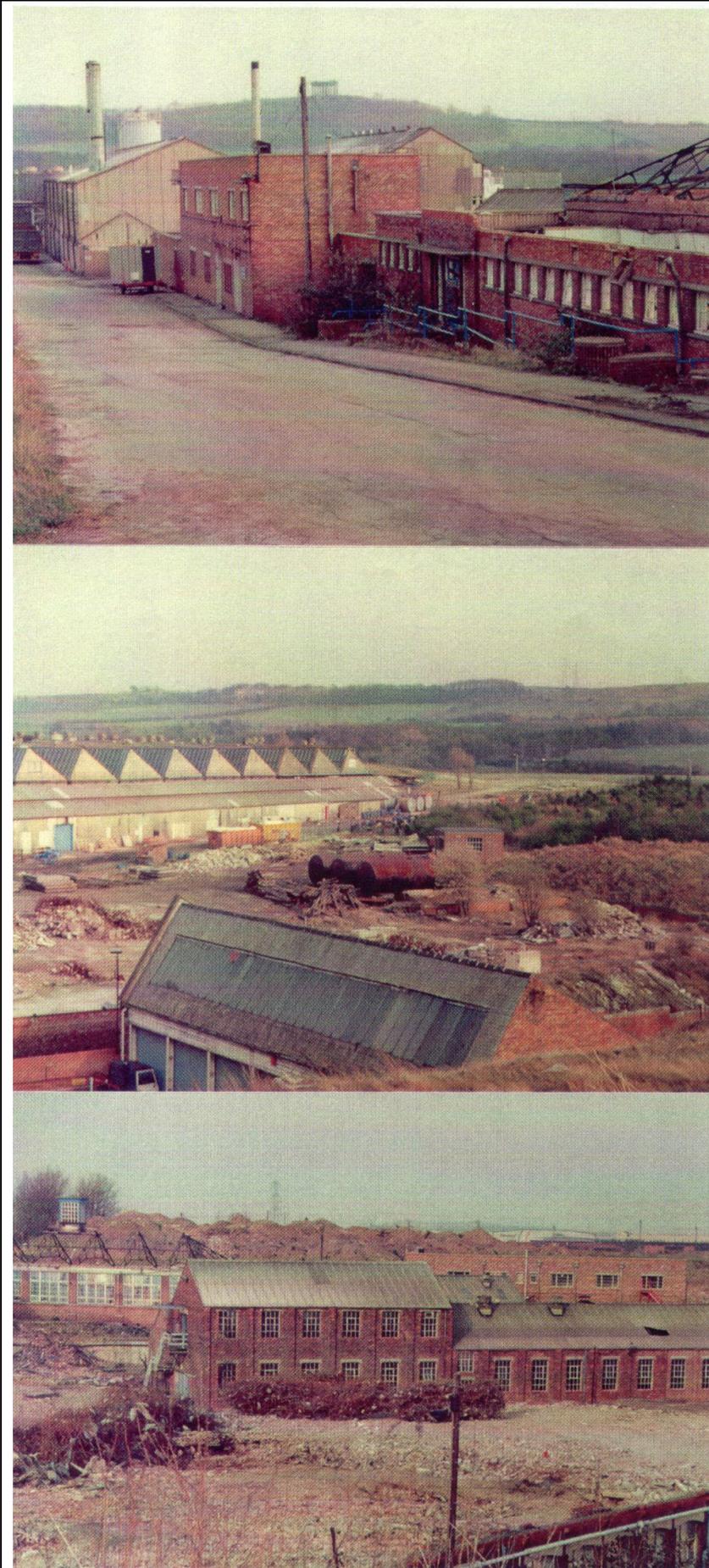


Plate 27
Demolition of
Cape Insulation
buildings,
possibly in the
1980s. Photo from
Washington Town
Centre Library
RIV 119-21.
Top picture =
Zone A. Middle
picture is modern
Cape Insulation
building in the
distance, Zone E.

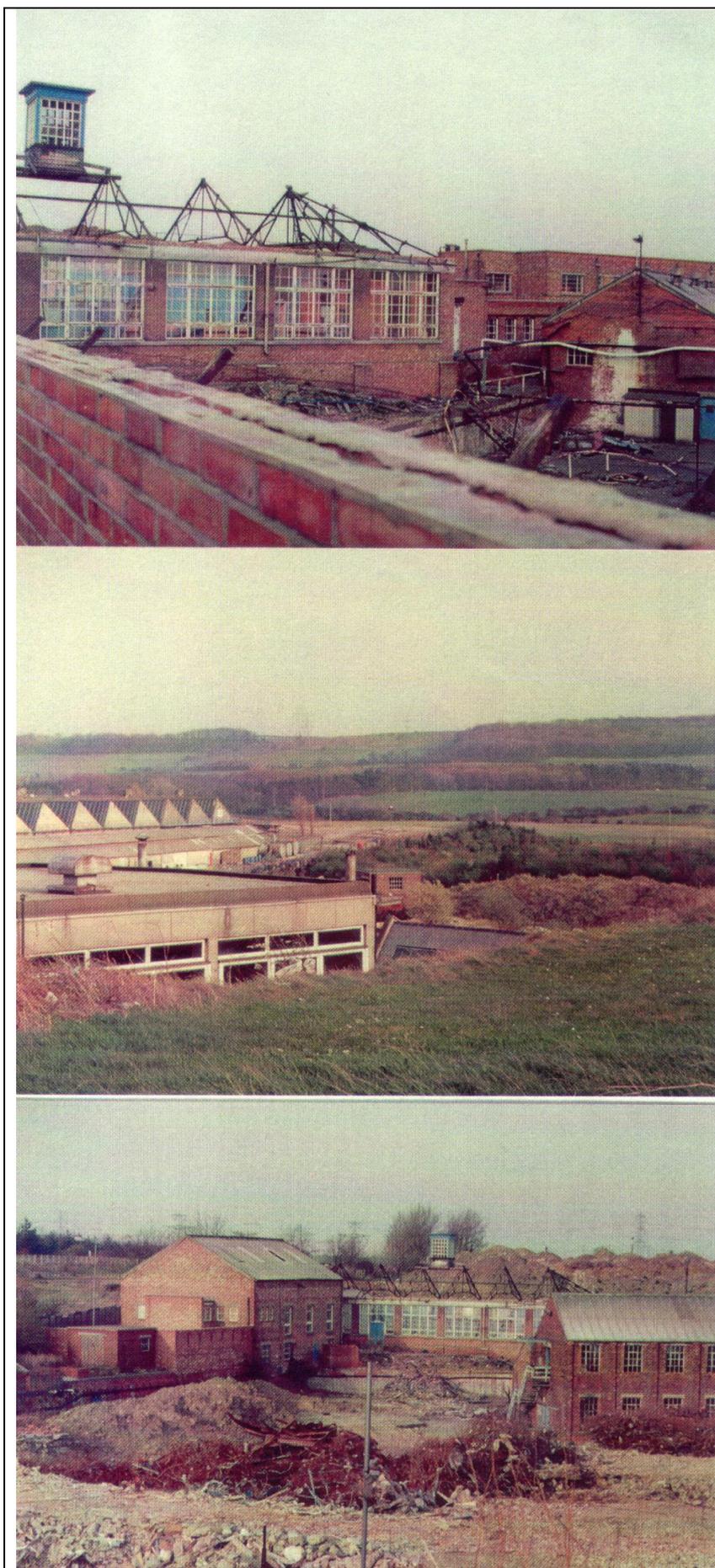


Plate 28
Demolition of
Cape Insulation
buildings,
possibly in the
1980s. Photo from
Washington Town
Centre Library
RIV 122-4.
Middle picture is
view from top of
spoil tip, Zone B.



Plate 29. Aerial photograph taken for Washington Development Corporation 1964 from Washington Town Centre Library.



Plate 30 Aerial photograph taken for Washington Development Corporation 1979 from Washington Town Centre Library.

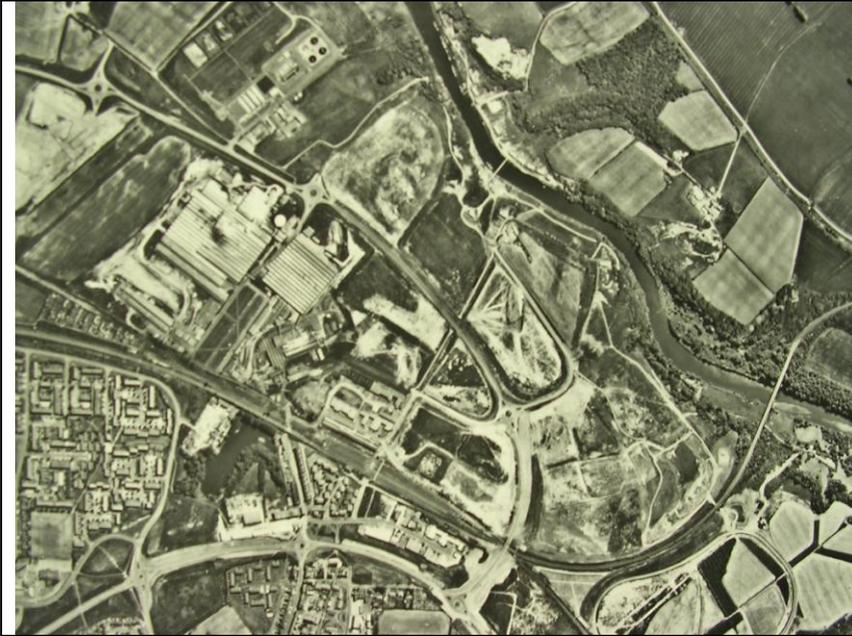


Plate 31 Aerial photograph taken for Washington Development Corporation 1983 from Washington Town Centre Library.



Plate 32 Aerial photograph taken for Washington Development Corporation 1985 from Washington Town Centre Library.



Plate 33 Aerial photograph taken for Washington Development Corporation 1987 from Washington Town Centre Library.

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Tyne and Wear HER
English Heritage NMR
Sunderland City Council

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6” surveyed in 1857, published in 1862 Durham 13
1896 1:2,500
1898 2nd edition 6” Durham 13
1920 1:2,500
1921 6”
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A sketch of the Leblanc Process unattributed – from Tyne and Wear HER

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- 1759/72 Plan of Washington Chemical Company Ltd, Turner and Newall Ltd, 1:2500. Redrawn and revised 11.9.52
Plan of Newalls Insulation and Chemical Company Ltd 1:2500
Revised 1971 Drawing 120.A.18/D
Plan of Newalls Insulation and Chemical Company Ltd. 1:200.
Drawing No. 120.A.18. Revised 18.3.1969.
Plan of Washington Chemical Company Branch of Turner and Newall Ltd. 1:2500 drawing No. 120A18. Revised 26.5.1938
- 1759/1 Abstract of the title of RJ Newall esq to leasehold premises at Washington dated 11.8.1845, with additions dated 20.12.1875.
- 1759/2 Abstract of Title of R S Newall to leasehold premises at Barmston dated 14 October 1850.
- 1759/3 Lease of land dated 10.10.1856
- 1759/4 Abstract of the title of RS Newall to leasehold premises at Barmston dated 26 March 1864
- 1759/5 Assignment of premises at Washington dated 11.8.1845.
- 1759/8 Lease of premises at Washington dated 14.2.1856 (only half the document read as conservation was required).
- 1759/10 Indenture concerning land on Washington Farm dated 20.12.1875.
- 1759/11 Lease of ground at Barmston dated 10.10.1856.
- 1759/13 Indenture dated 1850 between Hugh lee Pattinson and the Marquis of Londonderry for land in Barmston and Peareaths Staith.
- 1759/32 Agreement for sale and purchase between FS Newall and the Washington Chemical Company dated 1.7.1893. (Includes a useful summary of previous leases).
- 1759/33 Agreement for lease of Washington Wire Rope Works (draft) from RS Newall and son Ltd to the Washington Chemical Company Ltd 1903.
- 1759/62 Agreement on sale and purchase of magnesia Cork Coverings between the Washington Chemical Company Ltd and Newall's Insulation Co Ltd dated 2.10.1908. Also a letter regarding the formation of the new company dated 1908. Also an undated and unassigned list of pros and cons regarding the best venue for the new company: Washington or Hull? And Memorandum and Articles of Association of Magnesia Coverings Ltd 1903
- 1759/63 Letter dated 9.12.1908 regarding the creation of a new company
Letter dated 11.5.1922 from Washington Chemical Company to solicitors regarding the patent for the manufacture of hydrated carbonate of magnesium.
- 1759/92 Mortgage deeds
- DC/WS/1/9 Minute concerning the purchase of land from Turner and Newalls by Washington Development Corporation 6.11.1972.
- DC/WS/2 Papers presented to Washington Development Corporation
- UD/WS/43/1 1898-1901 Building Control
- UD/WS/44/5 Proposed ambulance garage at Washington Chemical Works 4.9.1919.

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Sunderland Echo 7.3.1963; 14.3.1963; 21.3.1963; 2.5.1963?; undated but probably 1963;

Durham University Palace Green Archives

Tithe Map: tithes in the township of Washington in the county of Durham. 1843.

Washington Town Centre Library

Collection of images of Washington Chemical Works:

RIV 008; 016; 017; 019; 020; 026; 032; 045; 112; 113; 114; 115; 116; 118; 119; 120; 121; 122; 123; 124; 137; 157; 166; 168; 190

Aerial Photographs taken for the Washington Development Corporation in 1964,

Beamish Museum

Photo numbers 16158,93483,3948,3963a,3963b,3937.

Durham Records Office

D/Bo/G99/12-15 Extracts from leases to land in Barmston and Washington used as sites for the manufacture of chemicals, lead and magnesia 1845,1850,1856.

DBo/G99/16 Letter from J Sewell to Hugh Lee Pattinson re his proposal for raising a mortgage on the chemical works 24.4.1856.

D/Bo/G99/17-18 Letter from T Bell and J Sewell re the prosperity of the chemical works 30.4.1856.

D/Bo/G99/19-21 Valuation of the Washington Chemical Works with analysis of expenditure (1843-1855). June 1856

D/Bo/G99/22 Draft letter from T Bell to John Sewell, Gresham House re above valuation, 14 June 1856.

D/Bo/G99/23-25 Description and valuation of the buildings on the site of the chemical works 14 June 1856.

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RAF/106G/UK/1038. 1:10,000. 27.11.1945.

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<http://www.afundit.co.uk/washington1.htm>

<http://website.lineone.net/~pjoiner/genuki/DUR/washington/>

<http://sine.ncl.ac.uk>

<http://www.ncl.ac.uk/library/speccoll/dagart3.html>

<http://www.lkaz.demon.co.uk/ban37.htm> (British Asbestos Newsletter)

Future potential sources of information

Beamish Museum have 6 photographs of the site but delivery of these pictures was too late to incorporate fully into the study. Consequently only poor quality photocopies were seen, with the exception of the image used on the front cover of this report. If photo quality copies are ordered, it may be possible to locate individual 19th century buildings in sufficient detail to plot them on to the 1st and 2nd edition OS maps.

Gateshead Public Library – has information relating to the Felling Chemical Works check to ensure that no additional information on Washington

Durham County Record Office – sources already checked, but other records relating to Washington may include additional information.

Newcastle upon Tyne Chemical Society minutes etc.

British Association records (Hugh Lee Pattinson became a vice president of the chemical section in 1838. He was also a fellow of the Geological Society)

Royal Society (Hugh Lee Pattinson was elected a Fellow in 1852)

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Hurter, The Alkali Makers Handbook – early source material on the chemical processes.

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Tyne and Wear Archives have many records relating to this site. These were prioritised according to those thought most likely to contain information necessary for the DTA. However any future research into the site may benefit from looking at additional records not listed in the sources consulted above.