

Pre-1923 Survey of the Industrial Archaeological Heritage of the County of Waterford

Dublin Civic Trust

April 2008



SURVEY OF PRE-1923 COUNTY WATERFORD INDUSTRIAL HERITAGE

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CONTENTS

1.	Introduction	1
2.	Executive Summary	1
3.	Methodology	3
4.	Industrial Archaeology in Ireland	6
	- Industrial Archaeology in Context	6
	- Significance of Co. Waterford Survey	7
	- Legal Status of Sites	9
5.	Industrial Archaeology in Waterford	12
6.	Description of Typologies & Significance	15
7.	Issues in Promoting Regeneration	20
8.	Conclusions & Future Research	27
	Bibliography	30
	Inventory List	33
	Inventory of Industrial Archaeological Sites	36

Knockmahon Mines,
Copper Coast, Co. Waterford



1. INTRODUCTION

Waterford County Council, supported by the Heritage Council, commissioned Dublin Civic Trust in July 2007 to compile an inventory of the extant pre-1923 industrial heritage structures within Waterford County. This inventory excludes Waterford City from the perimeters of study, as it is not within the jurisdiction of Waterford County Council.

This survey comes from a specific objective in the Waterford County Heritage Plan 2006 – 2011, Section 1.1.17 which requests "...a database (sic) the industrial and engineering heritage of County Waterford". The aim of the report, as discussed with Waterford County Council, is not only to record an inventory of industrial archaeological heritage but to contextualise its significance. It was also anticipated that recommendations be made as to the future re-use of such heritage assets and any unexplored areas be highlighted. Mary Teehan buildings archaeologist, and Ronan Olwill conservation planner, for Dublin Civic Trust, Nicki Matthews conservation architect and Daniel Noonan consultant archaeologist were the project team.

2. EXECUTIVE SUMMARY

- This is a baseline analysis of industrial archaeology in Co. Waterford. A catalogue of the significant extant industrial heritage sites has been recorded and a brief background investigation compiled. It is strongly recommended that a comprehensive study be undertaken to fully understand the findings of this report in the context of Waterford City, Munster and, indeed, on a national industrial heritage level.
- A comprehensive desktop survey was undertaken with the co-operation and help from many local people and owner/occupiers.
- After numerous field survey visits, the number of sites surveyed and recorded was 100. Of these 19 sites, all upstanding structures were now gone.
- A sampling strategy was put in place to enable best practice in carrying out the survey. All Type A typology sites were recorded as they were deemed to be of most significance, and also, under most threat of development. A strategic sample of Type B sites were recorded to illustrate the various typologies and to alleviate time and quantative issues.
- While the main sites in the county have been surveyed, with a focus on urban areas, it is understood that others may come to light in the future and be added to this document.
- This survey is National Inventory of Architectural Heritage compatible. The standards and format of recording at all

stages are according to levels set out by Recording and Conserving Ireland's Industrial Heritage by Fred Hamond and Mary McMahon.

- Although industrial activity in Waterford dates back to the Bronze Age along the Copper Coast, the Earl of Cork, Richard Boyle, established the foundations of the Industrial Age in Waterford with his iron workings in the 17th century centring around important hubs such as Cappoquin and along the Blackwater Valley.
- Industry in Waterford County was mainly agriculturally based, centring on grain milling. However, two of most significant site in the county is Portlaw Cotton Mill and Tankardstown Mine.
- Industry in the 18th – 19th century was fuelled by the land owning class in the county, the Duke of Devonshire and Lord Waterford. Yet, as a result of industrialisation an entrepreneurial class emerged. The Flahavan's of Kilmacthomas, Hanan's of Tallow and the Malcomson's of Portlaw.
- There was a strong rural/ urban divide in the location of mill sites. Rural grain mills dated mostly from approximately mid 18th – early 19th century and served the farming population of the local hinterland. Urban mills were on a larger scale, on a commercial industrial level. These mills tend to date from approximately mid 18th – 19th century but with additions in the late 19th century serving enlargement/ adaptations in use.
- Topographical features, specifically the Rivers Blackwater and Suir divided by the Comeragh Mountains create two distinct areas, East and West Waterford.
- Many of rural sites remain in their original setting with little disturbance over the decades. This has resulted in a minimum of intrusion. Industrial sites have often been re-used for agricultural purposes. Urban sites have been considered for development or have been demolished.
- Waterworks were difficult to access due to abundance of vegetation and ruinous sites. However, a large amount of mills had associated mill ponds, particularly in rural areas to provide a constant water source some times in unusually sited areas, such as at Nicholastown Mill.
- Industrial heritage sites in Waterford, due to the high percentage of extant buildings, have high potential for dynamic re-use and are key buildings in urban areas.
- Due to their location and the increased interest in such areas as adventure sports, the tourism potential for re-use is considerable.
- Ownership of these sites will have to be considered in any plans for development.

3. METHODOLOGY

In surveys of industrial archaeology it is ideal that all relevant sites be surveyed and recorded. However, in this case there were time constraints. Of the 120 entries on the original site list it was found that the sites known to Waterford County Council were from varying sources and not readily identifiable, necessitating extra desktop survey and cartographic research prior to field survey. Some sites were problematic. For example, Shanakil, is known in four different parts of the county.

Therefore, a sampling strategy was decided upon in discussions with Waterford County Council. Type A sites included largely extant typologies –

- Mills
- Miller's Houses
- Store/ Warehouses

Type B sites were to be sampled with appropriate examples. This classification included:

- | | |
|---------------------------|------------------------------|
| • Bakeries | • River & Coastal Industrial |
| • Breweries/ Distilleries | Heritage Features |
| • Canals | • Waterworks |
| • Creameries | • Waterpumps |
| • Forges | • Weighbridges |
| • Ice Houses | • Worker's Houses |
| • Limekilns | |
| • Mines | |

Some fragmentation was found with sites. For example, Portlaw waterworks and Portlaw Cotton Mill are intrinsically linked as they powered the mill. Also, Ballyrafter Mill and Glenview Mill House were part of the one complex. In such cases it was decided to merge sites to enable a more comprehensive understanding of a site and individual relationships between structures.

Desktop Survey

Documentary survey was undertaken to Level 2 as described in the publication Recording and Conserving Ireland's Industrial Heritage by Fred Hamond and Mary McMahon.

The baseline taken for this survey was the 1927 3rd edition Ordnance Survey maps of County Waterford, published at six inches to a mile. They formed a cut off point around the specific date of the survey brief and indicated whether sites were in use, disused or, in some cases, still extant in the early 20th century. It was not taken as a definitive answer. Where a site was not indicated and field survey was carried out, sites were sometimes found in a ruinous state. Cartographic material was referred to in the form of 1st edition OS maps and the 1817 Grand Jury maps for Waterford. These proved to be particularly helpful for the urban areas, as some settlements such as Tallow had many overlapping sites in the original site list.

The original site list comprised a list of c.120 sites from various sources, including word of mouth, local historians, the RPS list, Griffith Valuation, and Forbas Forbatha and the NIAH. A comprehensive desktop survey of all available sources was necessary, not only to understand the industrialisation of Waterford and its specific sites but to decipher the 1) exact location and 2) chronology of many entries that seemed to overlap in the site list. For example, Tallow Flour Mill became Tallow Saw Mill in the later 19th century, both came to the attention of Waterford County Council through differing sources. Coolfin Brickworks and Coolfin Saw Mill are one and the same. Some primary and secondary sources, excluding above listed cartographic material, consulted were:

- Civil Survey of County Waterford 1656,
- Samuel Lewis's Topographical Dictionary, 1837
- Griffith Valuation Records c.1850
- Poor Law Union Valuation Records c.1874-75
- Smith, Charles. The Ancient and Present state of the County and City of Waterford. 1746
- Various articles for the Journal of the South-East of Ireland Archaeological Society
- Photographic collections of the NLI and Architectural Archives
- A Forbas Forbatha; Revised July 1977 Report on Areas and Sites of Historic/Artistic Interest in county Waterford. Available in Waterford County Council Heritage Office.
- The National Inventory of Architectural Heritage; Record of Protected Structures for Co. Waterford.
- Record of Monuments and Places for Co. Waterford
- Archaeological inventory for County Waterford. Michael Moore, Govt. of Ireland 1999

Invaluable research and guidance was also given from local historians Niall O'Brien, Willie Power, Sean Murphy and helpful others.

Field Survey

A field survey was undertaken to Level 3 as described in the publication Recording and Conserving Ireland's Industrial Heritage by Fred Hamond and Mary McMahon.

A recording sheet based on the NIAH template was drawn up and adapted. Industrial Archaeological recording aimed specifically at the main typology of this survey – mills. NIAH rating, condition, current/ original use, owner, date, power source were classifications to be recorded. All aspects of the structure, including machinery, were to be noted in composition. A photographic inventory was taken on site and numbers noted on the sheet. A GPS reading was also taken. Sketches were traced roughly on most sheets but due to the nature of some sites this is a very rough reference and proves difficult to transpose onto the computer record.

138 site visits were made over 12 days in the summer of 2007. Because of the growth at that time of year, many of the sites were overgrown, ivy clad and hindered comprehensive access to all areas of a site.



Ordnance Survey Map of Kilmacthomas, showing Corn and Woollen Mills,
3rd ed., 1927

4. INDUSTRIAL ARCHAEOLOGY IN IRELAND

4.1 INDUSTRIAL ARCHAEOLOGICAL CONTEXT

The cut off date of 1700 for the inclusion of archaeological sites deemed worthy of study and preservation under the National Monuments Act tends to be problematic as it is an artificial timeline at best, which can exclude specific activities from proper recording and consideration. Industrial activity spans the Bronze Age to the 21st century in Ireland. Whereas, the Industrial Age in Ireland was relatively short lived extending through the C18th to the C19th, was on a much smaller scale compared to Britain and had an agricultural emphasis due to the natural resources available.



Coolfin Brick Kiln,
West of Portlaw

The specific study of industrial sites was not undertaken to any great extent until the 1970's, most notably by An Forbas Forbatha. In the following years, some planning authorities commissioned studies of their own, such as Co. Kilkenny and Co. Dublin. It is estimated that over 100,000 industrial sites have operated in Ireland at various times with less than 5% identified and recorded (Hammond & McMahon, 2000). Specific interest areas such as the railways and canals were given special regard, and numerous successful restoration projects have been achieved due to these early initiatives. However, the other areas of our collective industrial past were not so well served and the small societies established during the 1970's did not manage to raise the enthusiasm or support to gain momentum for this topic. Since 1996 the Industrial Heritage Association of Ireland (IAHI) has actively promoted appropriate standards of surveying, conservation best practice and the development of government policy for the preservation of the country's industrial heritage.



Millstreet Creamery
This typology was previously not well regarded or understood as part of the industrial past. It is a core building common to many towns and villages in the county and central to working life.

A recent article from the Heritage Council of Ireland suggests upwards of 100,000 sites of industrial archaeological interest still survive in Ireland varying in size from small rural kilns to larger milling complexes to extensive mining landscapes in the case of Tankardstown, County

Waterford. The Gunpowder Millis at Ballincollig Co. Cork, comprising of 435 acres, is considered the largest industrial archaeological site in Ireland and the second largest of its type to have been constructed in Europe, a factor, which influenced its conservation and presentation as a major tourist attraction. For the most part many industrial sites in County Waterford appear to have survived due to lack of hitherto economic pressure. The region has been fortunate not to have experienced the burden of rapid development wrought by the 'Celtic Tiger' which has profoundly changed the use of both land and settlement patterns in commuter counties around the Dublin hub. County Waterford's remoteness from the pressures of the metropolis in this instance has ensured that the integrity of much of its built heritage has remained undiscovered and for the most part preserved in-situ in various stages of decay.



Halfway House Forge and Stables, Drumgorey – a surviving forge with ancillary outbuildings as a landmark in the midst of the county's road network

4.2 THE SIGNIFICANCE OF THE COUNTY WATERFORD SURVEY

Carrying out the field survey for this inventory it was evident that the tradition in the county of on-going repair and adaptation of use has ensured that many early and rare building types have survived in use such as the late medieval mill at Ballinvella.

The county's past industrial efforts appear to have been initiated by powerful landlords and then driven by the early C19th industrialists, focusing mainly on milling activities and the exporting of produce to Europe and the markets of the new world. Access to the sea appears to have been an overriding concern in the location of new industry during the C18th and C19th for these early industrialists and Irish industries tended to be concentrated within the environs of ports. The standing remains of these sites, the towns, which were built and the housing provided for the workforce are intrinsically linked and should be considered as the primary record of the human endeavour and enterprise undertaken at the time.



Salterbridge Mines as part of the Salterbridge Demesne – its past activities buried beneath dense vegetation

Much of the structural fabric associated with this period has remained concealed in the undeveloped natural landscape of the county preserved until now in the written word or references on historical mapping. The decision to undertake a thematic inventory of this industrial typology in County Waterford is timely and visionary. It has been a rewarding pursuit as it has revealed a richer and undervalued resource in the county, which previously harnessed the valuable sources of water at remote sites on the coastal plains or on the major river courses running through the county. Coupled with the remarkable natural beauty of the county these forgotten sites undoubtedly afford a major tourist opportunity or product to be developed in the county.

The prerequisite of putting in place appropriate planning policy and providing guidance for future development and conservation of industrial heritage is to identify record and understand the range of the building types that are representative of the county's industrial heritage. It was apparent however that the number and location of sites in the county were only known to particular individuals; for the most part these historical sites had never been formally located or mapped so that their situation in the county was not known. Indeed their relationship to natural features or to each other not immediately apparent, nor the association of the industrial site to adjoining landed estates, ports and harbours considered.

The importance of the survey undertaken in 2007 can not be over stated as for the first time the Planning Authority now possesses an overview of the range of structures to be planned for, their rarity value, condition and potential. Arising from this inventory the setting up of a dynamic database, which will allow the future coordination and review of this survey material with similar thematic surveys is desirable, as it allows structures to be added, updated or detracted from the process as necessary. The recording of the sites has also been completed in line with best practice of recording sites, their functions and their machinery as established by McMahon & Hammond. Interestingly very few examples of



Particularly well-preserved kiln site at Halfway House Ballycanvan Little, where a cluster of industrial sites have been identified in close proximity to each other during the course of the inventory work undertaken.



Rocketcastle – lime kiln
The inventory has also allowed for the first time comparison to be made between individual sites.

completely intact machinery in-situ were found, thus making those sites, which have partially retained machinery all the more significant.

4.3 LEGAL STATUS OF INDUSTRIAL ARCHAEOLOGICAL SITES

The completion of the industrial survey allows awareness of the industrial heritage in the county to be generated amongst the community and professionals alike and not just the immediate special interest groups. Changes in the legislative framework governing the protection of the built heritage now affords greater protection opportunities to be attached to historical sites and buildings. Key legislation includes the following; The Architectural Heritage (National Inventory) Act of 1999 (NIAH) empowered the Minister for Arts, Heritage, and the Gaeltacht and the Islands to recommend to local authorities that historic buildings and sites to be included in their schedule of protected structures. The use of criteria to rate structures was introduced by the NIAH and structures reviewed under this system of evaluation can be listed as being of regional, national or international significance. Under the Heritage Act 1995 which established the Heritage Council as a statutory body, Section 10 (4), structures in public ownership for instance Bord na Mona, ESB were designated heritage buildings.

Development proposals for redundant industrial sites entering the planning process for the first time can now be requested by the Local Authority to be fully recorded as a prerequisite of planning thus providing the opportunity to deliberate upon them in a wider county context as the overall significance of a site can be determined based on the National Inventory (NIAH) Criteria denoted as part of the survey. Sites of particular significance can be planned for accordingly and using the mechanism of scheduling sites as a 'protected structure' and adding them to the Record of Protected Structures will assist their future conservation in accordance with the Planning and Development Act 2000 and the statutory



Refurbished mill complex at Kilmacthomas – lost of internal and external character due to the proposed reuse and alteration into multiple apartments.



Harbour Mill Dungarvan
A mixed use scheme comprising of open plan gallery spaces at ground floor level, with multiple apartments over. Adverse impact of 'add-on' balconies and the enlargement of original openings.

Architectural Conservation Guidelines produced by the Department of the Environment, Heritage and Local Government (DOELG). Planning & Development Act also allows for the setting up of Architectural Conservation Areas (ACA's), in which groups of important buildings and their settings can be afforded protection in local authority plans. The introduction of the internationally recognized model of the Conservation Plan (The Burra Charter) has been actively promoted by the Heritage Council in partnership with Local Authorities as a means to resolving conflicts of significant sites. It is particularly useful when dealing significant industrial complexes, which may have environmental issues to overcome or to balance against certain heritage values as part of their regeneration. An example of such a plan was prepared for Portlaw, Co. Waterford as the means to resolving complex funding, environmental, conservation and development issues attached to a significant industrial heritage site, which influenced the layout and development of a whole town.

All of these planning mechanisms noted above need to be enshrined in the future planning policy of the county development plan as the first step in safe guarding the industrial heritage sites. The database from this survey needs to be regarded as a dynamic database of the county's assets, to which access must be provided to all parties involved in the planning process. The focus of the industrial heritage survey as commissioned by Waterford County Council had a specific time frame requesting structures, which fell during the period between 1700 and 1923 to be reviewed. This has specifically exempted all C20th industrial structures from consideration and record. Experience suggests that the rate of redundancy that is over taking this more recent building period is already increasing and that these sites are becoming more prevalent for redevelopment. Many of these industries were purpose designed using innovative materials and refer to the international architectural style or movement. Some provision for the proper review of their respective significance under the NIAH criteria needs to be put in place as part of the overall



Redundant Machinery; mill wheel at Nicholastown Mill. In general insufficient information about industrial processes or activities in the county. Very few mechanised buildings have survived.



Scotch Oven – Barron's Bakery
A rare industrial site that has remained in continual use since establishment in 1887

planning policy for managing industrial archaeology. Indeed many more extensive complexes may have these more recent structures as part of the morphology of the sites to be assessed.

5. INDUSTRIAL ARCHAEOLOGY IN WATERFORD

Prehistoric Industrial Activity

Waterford County has a rich archaeological history of industry dating back to the Bronze Age. The oldest recorded primary activity of an industrial nature in Waterford is copper mining. Waterford offers three to four possibilities for this prehistoric mining industry at Ballynarrid, Knockaturnory, Bunmahon and Knockatrallane. Copper is one of the few metallic elements to occur in its native state as well as occurring in its oxidised state. The copper would have to be extracted from the rock and then taken to a furnace to be smelted or melted. No evidence for this exists near the mines but it may have been carried elsewhere to undergo this process. Once smelted down and mixed with tin the bronze was used for weaponry, household vessels, ornaments and even currency (ingots). Copper mining flourished in one form or another from the Early Bronze Age right up to the early 17th century. Other resources have also been extracted from the rock outcrops of the copper coast during the prehistoric era. These include iron ore and rhyolite. A quarry at Monvoy, Tramore, Co. Waterford, excavated 1986-1989 (Zvelibil, M, Moth & Petersen) yielded finds of over 10,000 artefacts. These included cores, blades, flakes, rough-outs and retouched tools as well as high concentrations of debitage. Waterford's industrial era resulted in large scale mining which could have obliterated any earlier mining workings of a prehistoric nature. A number of 19th century boreholes have been discovered at these sites along with other evidence for more recent mining activity.

Alongside the copper mining there is also a very large body of evidence for fulachta fiadh which were prolific throughout Waterford County. Commonly referred to as burnt mounds fulachta fiadh are generally dated to the period 1800 BC – 800 BC. They are determined by a horseshoe shaped mound of charcoal rich burnt stone. Their use is undetermined but suggestions range from cooking to tanning to animal fat production.

Medieval – Post Medieval Industrial Activity

Technological advancements brought with Christianity saw the introduction of corn mills in the 6th Century AD. Up to this point archaeological evidence is minimal and there is a level of uncertainty regarding this era. Evidence for the corn mill structures place industrial type activity at Kiloteran, Co. Waterford, and Ballycanvan Big and Ballycanvan Small. During this particular era there is also archaeological evidence to show that other activities were occurring in the form of iron works such as smelting.

The archaeological evidence for industry from the late Viking Age to the medieval period is quite extensive in Waterford City. Excavations carried out between 1986 and 1992 recovered sufficient evidence to support industrial

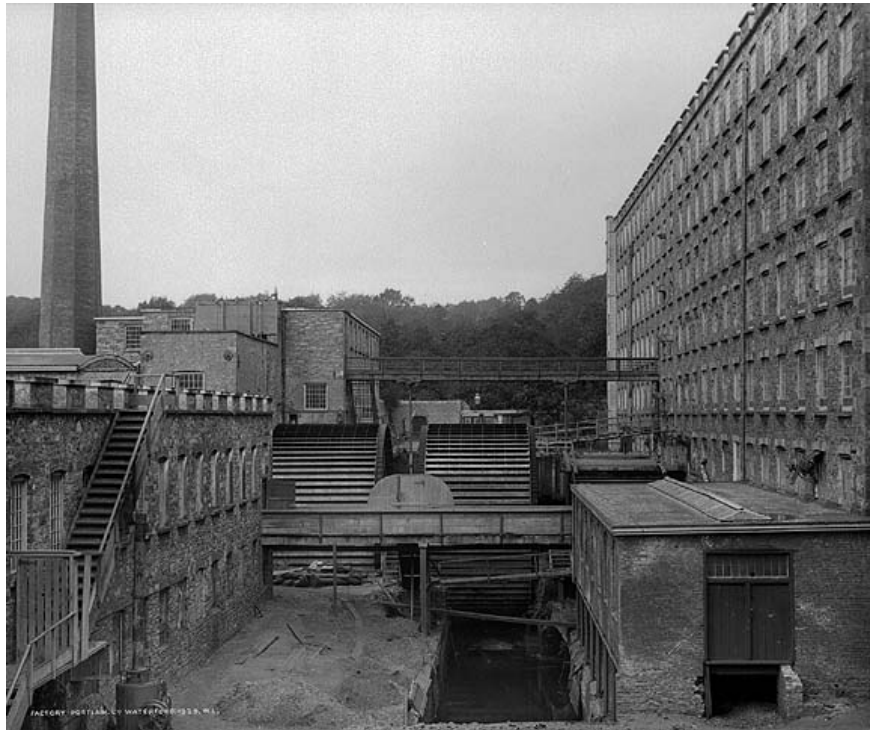
economic activities. Although no central industrial zone was identified a number of ovens and kilns relating to various activities have been recovered. "A range of size and function of kilns are represented: limekilns, drying kilns, clay pipe kilns and possibly smokehouses" (Hurley, M.F & Sheehan, C.M 1986-92, 274). Hurley and Sheehan also suggest that one kiln which pre-dated the 15th century was possibly used to supply materials to the construction of St. Peter's Church which was built in the 12th century.



Cooneen Mill & Quay Complex, c.1910, courtesy of National Library of Ireland

The next phase of industrial activity from which we have archaeological activity coincides with the Anglo Norman arrival. This particular activity related to the introduction of windmills. However the earliest evidence for a windmill in Waterford dates to 1591 by which time the Anglo Normans had been assimilated into the Irish culture of the time. The Normans also set up their own local pottery kilns, "the output of which made them the closest thing to factories before the Industrial Revolution" (Wallace, 1981b, 253-254) quoted in McCutcheon, C 2006, 19. Archaeological evidence from the 15th and 16th century in the form of mill complexes, pottery kilns, corn- drying kilns, iron smelting, smithworks, lead mining, brick and tile production and glassworks all would have coincided with the beginning of the English invasion proper.

From here we see a series of technological advances which bring us right up to the Industrial Revolution of the 18th and 19th centuries. In order for these individual industries to survive a number of important factors had to taken into account, namely location of factory in close proximity to the raw materials, coastline or riverine location (mills), transport facilities, a labour force and a market.



Portlaw Cotton Mill and Wheel with Chimney in background, c.1910,
courtesy of National Library of Ireland



Loading coal onto 'Christina' boat, c.1910, Ferrybank Quay, Waterford,
courtesy of National Library of Ireland

6. DESCRIPTION OF TYOLOGIES & SIGNIFICANCE

CANALS

These are man-made inland waterway systems for transporting goods and passengers. Canals date back to Roman times and 17th century France had many canals. The first Irish Canal was the Newry Canal, completed in 1731. It was built to carry coal to Dublin and was the first canal in Britain. Between 1730-87 £800,000 was put towards the development of a canal network as it was thought the poor road infrastructure would impede the development of industry in Ireland. They were feats of engineering for their time as the natural contours of the land had to be overcome and a constant supply of water had to be maintained. Locks, aqueducts, reservoirs and pumping stations are all associated features of canals. Wharves and warehouses were built alongside canals, and many factories and mills in industrial towns were also built to ease the transport of raw materials and finished goods, as at Ballyrafter Mill, Lismore. There are four different types of canal – tub boat size (carrying about 5 tons), narrow canal (carrying 25-30 tons at 7ft wide), broad canals (carrying 50 tons) and ship canals. The canals in Waterford were not part of the major navigation systems in Ireland. The Lismore Canal was the most industrious. Some of the others, such as the Dooneen/ Whitfield canal appear to have been private ventures by wealthy land owners. The demise of the canal network came with the advent of the railway system in the early-mid 19th century.

CREAMERIES

Technological advances in the late 19th century resulted in the introduction of a power-driven mechanical separation machine, designed by George Laval. The machine used centrifugal separators which enabled a more efficient and thorough way for separating the cream from the milk. A regular power supply was necessary for the operation of the separator therefore water turbines were a common feature at the creamery along with steam engines in some cases. Irish creameries were generally rectangular in plan, single-storey and constructed with a range of rubblestone and corrugated iron. In 1875 there were creameries in Ballymacarby, Bunmahon and Kealfoun. The first co-op creamery to be established in Waterford was in Gaultier in 1894. Further creameries developed at Ballinamult 1895 and Dungarvan 1920. Other creameries which had been established by the 1930's were at Kilmeaden, Millvale (located between Rathgormack and Carrick-on-Suir), Stradbally & Comeragh Valley and Blackwater Valley at Cappoquin, which supplied milk to Knockmeal.

LIMEKILNS

Constructed mid to late 19th century.

- circular/ rectangular in plan- a tower built into the hill-side
- stone built
- within the kiln was the pot from which the lime was emptied
- flue/ flues supplying air/ stokehole
- supply of fuel for firing
- usually built in close proximity to a limestone outcrop
- provide lime for the iron and steel industry
- lime could also be used for large scale agricultural customers, such as Coolfin, Rocketscastle
- also used as a bleach in papermaking/ leather making

Limestone rocks were piled into the limekiln to be burnt at temperatures of 1000°C. The result was a process referred to as calcining. High temperatures convert the calcium carbonate of the limestone into calcium oxide, commonly referred to as quicklime. This would be further treated in a process called slaking which enabled the lime to be used for different types of mortar and cement. Unslaked lime was spread on the fields to be used as a fertiliser. Technological advances of the later 19th century in the line of sea transport and chemical science enabled new products to rival that of the quicklime. Limekilns continued to be used in areas where the distance between farm and kiln was short but overall the industry began to fall into decline.

MILLS

Watermill was one of the first machines to harness a natural power source since it uses the energy of flowing water to turn a wheel to rotate grindstones. Corn mills may be divided into two types depending on whether the wheel lies in a horizontal or vertical plane. Horizontal mills are more primitive and inefficient. A watermill is entirely dependant on its water supply and is vulnerable to droughts and flooding. Reservoirs or mill ponds, such as those as Corrigina and Portlaw, provide a reserve against drought. River water is fed onto the mill wheel from upstream or from the mill pond, via a headrace which incorporates a sluice to control the flow, and leave the wheel via a tailrace back into the river, downstream. The power developed by a waterwheel depends on its diameter, width, and point of entry of the water onto the wheel circumference. In flat land, to work a large wheel, a weir is built across the river well upstream on a higher contour, and water is led from above the weir along a long channel into the mill pond or onto the wheel. Most watermills have a grain drying kiln attached. With the depopulation of the countryside after the Famine and the use of steam driven roller mills the water mill became obsolete. Some adapted to the change. Although not extant, Twig Lane in Cappoquin became a sawmill and braced the new steam power technology at the end of the 19th century.

Tidal Mills

Primarily located on the coastline or river estuaries, the tidal mill took advantage of the varying water levels. Millponds were constructed to hold the incoming water tide so as to ensure a permanent source of water from which the mill would be operated. A set of sluice gates enabled the water to hold up to three hours of water wheel action before and after the tide flow. Tidal mills date from the very early medieval period circa 617AD to the 19th century AD. Examples of tidal mills in Waterford can be found at Ballycanvan Big NGD 26582/ 11046. Recent excavations at Kiloteran, Co. Waterford revealed structural evidence for a tidal vertical wheeled water mill. Radiocarbon dates of cal. AD 410-650 and 340-600 were returned for two oak planks. The structure had been constructed on a mill race that had been artificially dug along the centre of the marsh. The mill would have taken full advantage of its proximity to the River Suir which was tidal at this point. A wheel house and mill room were also recovered during excavation. The wheel house was rectangular in shape with dimensions 2 m in length by 1.5 m. However, their power source was their biggest flaw as the sea water often eroded wooden waterworks. Mills that did not depend on mill ponds worked according to the tides.

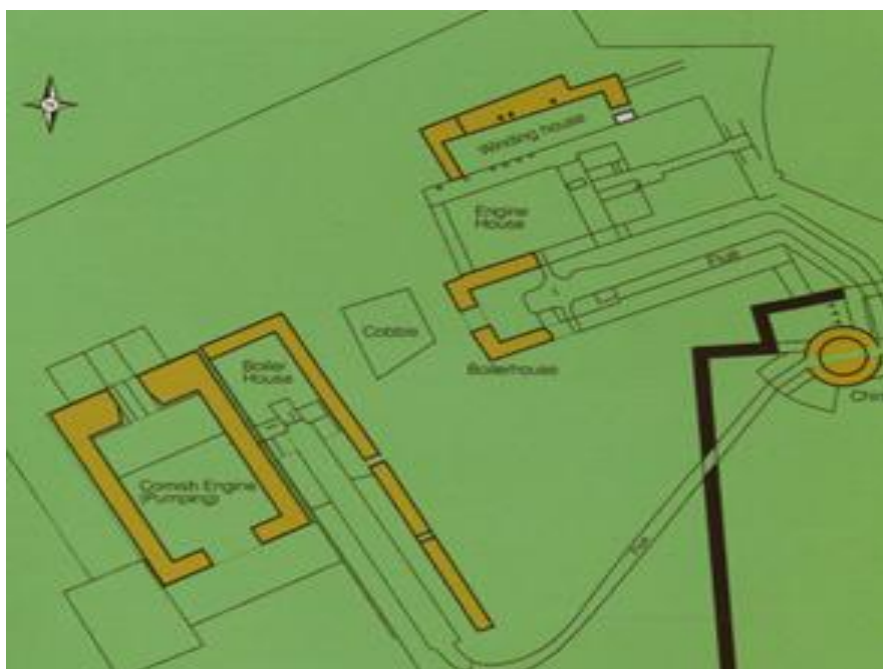
Wind Mills

Generally dated from medieval period to modern day; the windmill is believed to have been first introduced into Ireland by the Normans, after their invasion of 1169. Originally the windmill was a wooden structure referred to as a post mill. In post mills the actual building is rotated around a central wooden pivot in order that the sails face the prevailing winds, a Waterford example is Croke. From circa 17th century onwards the post-mill developed into a more substantial stone or brick built tower capped with a timber roof from which the large sails were attached and rotated, such as the prominent feature at Ballinvella. By the 18th century windmill construction had advanced in many ways to include a fantail wheel and the addition of more sails enabled more productivity. The windmill was nearly always built in close proximity to the watermills to enable the mill-owner to take full advantage of corn grinding procedures. An early depiction of a windmill in Waterford dates to a map of Waterford Harbour 1591.

MINES

Mining continued to be a feature of the landscape in Waterford since prehistoric times. The copper coast once again invited the miners to extract various minerals from its vital resources. Iron, lead and silver were now the desired minerals. Shaft sinking at Knockmahon, Kilduane and Bunmahon enabled the miners access to the deep fractured veins of red sandstone. References to a sea bed shaft at Foilnagloch, west of Danes Island indicated that "the workings extended eighty yards under the sea beds at depths of 60 and 72 feet beneath it"(Cowman,8). No documented evidence of workings involved underground are available. The ore was extracted from the veins

using gunpowder, sharp chisels and candlelight. The shaft consisted of pumping and winding sections from which water was pumped out. The ore was loaded onto a kibble and pulled to the surface to be transported to the ore dressing floors. Here the ore was separated from the rock and pulverised into a smaller and more manageable form. Knockmahon in particular produced a very pure and rich extraction of copper ore. Knockmahon mines yielded 42 tons of ore in 1879 (Bevan, G.P 1881, 691). The entrance shafts to the mines were located at different points throughout the area, as seen on the 1841 6" Ordnance Survey map. The Tankardstown mining complex also lies on the 'Copper Coast', Co. Waterford. This vast complex consisted of an array of machinery including a portable steam engine (installed to search the copper seam at Bunmahon)



Tankardstown Mine Complex indicating surface workings, Rynne, C., 2006

Earlier references to the mines at Tankardstown: Lewis' topographical dictionary makes reference to the 'quarries of limestone within Tankardstown. He also states that the R. Barrow 'affords great facility for the conveyance of its produce to Waterford'.

WATERWORKS

Water power was essential to the mills of the industrial era therefore advanced operating principles were both vital and necessary. In order to harness the full power of the water, for transport to a mill, was the weir. This was usually constructed across the river which enabled a build-up of water behind the weir. From here the headrace, a linear trench, carried the flow of water to the wheel. In some cases a sluice gate would exist at this point which controlled the level of the water. The wheel attached to the mill was usually equipped with buckets which in turn filled with water, the weight of which turned the

wheel. The point at which the water entered the buckets determines the type of water feed it is. These are generally referred to as undershot, overshot, breastshot and pitchback. The speed at which the wheel rotated depended on the supply of water from the headrace. By the mid 19th century water turbines were developed. The turbines were more compact, easier to maintain and more efficient. This enabled water powered sites to remain in the landscape and match the competition from steam powered mills.

WEIGHBRIDGES

This is a platform weighing machine placed in a pit so that vehicles can be driven onto it from the roadway without needing to be lifted. A platform weighbridge for carts was invented by John Wyatt (1700-66) of Birmingham in about 1740 using a compound lever system. The need arose out of the Turnpike Act of 1741 which authorized toll collectors to weigh carts to calculate tolls, although most toll houses were equipped with crane type weighing machines. The three weighbridges surveyed in Co. Waterford are of a later date. Portlaw and Cappoquin are interesting associated features of industrial complexes. Villierstown may have been used for a smaller market purpose.

WORKER'S HOUSES

There are five classifications of worker's houses.

- Linear Industrial Settlements - associated with the communication sector- canals and railways
- One-off Industrial settlements - usually single- storey detached houses influenced by the local architectural traditions to provide constant care to a certain area for example the entrance lodges at Ballycorus lead mines
- Expansional Settlements - Expansion of Industrial houses already in existence. Best example of these are the Guinness Houses in Dublin
- Newly Created Settlements - Commonly built for industries with fixed locational requirements. Portlaw in Waterford is a well known example of utopian industrial workers villages inspired by philanthropic ideals.
- Speculative - typically this housing was built for workers by building companies rather than the mill or factory owner and requires a high demand for housing in a specific area prior to construction such as those at Tallow.

7. ISSUES IN PROMOTING REGENERATION

Many of the sites visited during the Co. Waterford Industrial Heritage Survey could be considered to be undergoing a process of active deterioration. There are basically three ways to intervene in this process that are considered appropriate to ensuring the survival of built heritage.

Preservation; - stabilization of the site in its existing state

Restoration - the reinstatement of a former known state

Adaptation - the alteration of the site to some new use.

As such there is no specific national or internationally agreed guidelines for conserving industrial site. However, reference should be made to the basic guidelines set out by the Venice Charter 1964, the Burra Charter (ICOMOS Charter for the Conservation of Places of Cultural Significance and the Draft of the Nizhny-tagil Charter, proposed by TICCIH, the world organization representing industrial heritage and special advisor to ICOMOS.

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- The Principle of Conservation

- Monuments and places of cultural significance should be preserved in situ whenever possible
- Whilst it may be desirable to put monuments to new uses, their original character, layout and setting should be respected
- Conservation must be based on sound archaeological, historical and field research. All phases of construction should be retained except where the importance of revealing an earlier construction greatly outweighs the value of the later material
- The emphasis should be on minimal intervention
- It should be possible in the future to remove any new works without destroying



Pouldrew Mill – extant waterworks have been adapted to provide hydroelectricity



Loss of character and altered external appearance due to the use of inappropriate materials in repairs at Harbour Mill, Dungarvan

the original historic structure. (The concept of reversibility)

- Where possible, the retention and repair of original elements using matching traditional materials and techniques is preferable to outright replacement
- Reconstruction of missing parts must be in keeping with the original. It must also be clearly distinguishable and should stop short of conjecture.
- New additions must respect the character and setting of an original structure
- All works to a historic site should be properly documented before, during and after intervention. This record should be placed in a public archive
- A maintenance plan is essential if the site is not to deteriorate in the future.

Extract from 'Recording and Conserving Ireland's Industrial Heritage – An Introductory Guide', by F. Hammond & M. McMahon

- The Values of Industrial Heritage

- Industrial heritage is the evidence of activities, which had and continue to have profound historical consequences. The motives for protecting the industrial heritage are based on universal value of this evidence, rather than on the singularity of unique of sites.
- The industrial heritage is of social value as part of the record of the lives of ordinary men and women, and as such it provides an important sense of identity. It is of technological and scientific value in the history of manufacturing, engineering, construction, and it may have considerable aesthetic value for the quality of its architecture, design or planning.
- These values are intrinsic to the site itself, its fabric, its components, machinery and setting, in the industrial landscape, in written documentation, and also in the intangible records of industry contained in human memories and customs.



Fairbrook Mill, converted to private residence with extensive re-landscaping – adaptive reuse which has retained the integrity and character of the original complex with minimal intervention

- Rarity, in terms of the survival of particular processes, site typologies or landscapes, adds particular value and should be carefully assessed. Early or pioneering examples are of special value.

Extract from the Nizhny-tagil Charter, 2003. proposed by
TICCIH

Re-use of Industrial Sites

Due to lack of awareness of the significance of sites the focus or emphasis generally has been on preservation by record once a site has come up for re-development. Some typologies have generally survived due to inertia such as the limekilns, comprising of massive masonry having remained in fairly robust condition once dense vegetation has been kept at bay and roots have been prevented from undermining their structural integrity. Probably the more vulnerable typologies to change or heavy handed conversion are those structures closer to towns such as Kilmacthomas, where they have become more under pressure of redevelopment as part of housing/apartment schemes due to their perceived scale, character, site capacity and context adjoining watercourses. A typology previously not well identified prior to this study, is the commercial creamery typically at the heart of a smaller community, where the milk was collected at a central point for distribution or as part of a production process. These structures usually have an urban context and are set to an urban space, which facilitated the delivery of the milk to the central creamery by various forms of transport. Obviously the original use of these buildings is now defunct and several have survived through adaptation into a new use, most likely as storage, the original sense and significance of the structure lost.

In adaptation the importance of retaining the character and setting of the original character cannot be over stressed. The open plan nature of mill buildings and the volume of the internal space illuminated by a series of robust openings are typical and characteristics of these earlier industrial structures. Proposals for reuse need to be able to retain these features and the existing structure of



Prior to Conservation



Donore Castle – former steam engine house



the building. The unfortunate subdivision of these loft spaces into contemporary apartments are in some instances is a poor fit and becomes an exercise literally in shoe horning a square peg into a round hole. A recent successful conversion along these lines occurred in the Leinster Mill complex, c. 1795, Naas Co. Kildare, where the former Mill Manager's House and garden was set up as a crèche facility and the adjoining warehouses were retained entirely as open plan offices for the local branch of the HSE.

Conversion to contemporary apartment living needs to be based on a different or more sophisticated model, which allows more open planned spaces that relate to the historic fenestration and floor levels. Another pitfall that may adversely affect the conversion of historic mill structures arises in those that apply for building warranty or certificates of building standards. These standards are set for new build scenarios refuse the retention of the original timber structure as the main load-bearing component of the proposed apartment scheme. The successful securing of such a building certificate, which is thought to enhance the sale of the scheme results in the wholesale removal of all authentic character and structural components and ensures their replacement usually with a pre-cast concrete. This unfortunately happened at a scheme in Islandbridge where extensive mill buildings were converted into apartments and the original timber floors and roof members removed. A positive side of this scheme was the restoration of the square holding pond and connecting canals as a water feature in the midst of the apartment scheme retaining a significant element of the previous industrial site as an enhancing and rare feature.

The creation of new living accommodation within previous industrial complexes can also have adverse impacts on the setting of the structure. Many sites would have quite small or narrow entrances through archways or along narrow laneways. The parameters of Current building Regulations may require improved access to enable fire tenders to turn. Most developments require a car parking space per unit provided. The



Kilmacthomas Corn Mill
Waterford County has entailed the large scale re-facing of the building. Many of the associated features have been retained and add to the aesthetic its new use.



Redundant Machinery left to decay, ruined industrial complex at Portlaw

pressure of providing surface car parking can be quite onerous on the physical fabric of the site as well as 'clogging' the historic setting with cars. Waivers or relaxation in planning /conservation policy for car parking standards need to be considered in some instances as the provision of extensive car parking can have detrimental affect on very scenic settings or vegetated sites.

Some industrial sites may have preserved a continuous industrial use for hundred of years. Referencing readily available historical mapping of the county is essential to determining the provenance of a site. Where open spaces are visible within industrial complex and are seen to be available for development they may in fact conceal previous industrial activities, millraces etc and a desktop study of an industrial site should be a requirement for a pre-planning meeting with the Local Authority.

An unusual planning file arrived into the Conservation Office on a site in Donore Avenue off the South Circular Road in Dublin of a ruined tower. A quick review of the historical mapping suggested that the structure in question was a castle and a recorded monument in the Development Plan. However a site visit proved that this was a case of mistaken identity, that the castle was previously removed and that the standing stone remains was in fact a mid C19th Steam Beam Engine House associated with the Pim Family Linen works. The value of having an architectural overview of the significance of the structure indicated that this was one of two surviving examples of this building type, the other been in a better state of preservation in County Cork. The owner of the structure was hoping to develop a corporate headquarters immediate to the ruined structure, without addressing the precarious condition of the structure. The pre-planning process and the acquisition of additional conservation skills encouraged the full restoration of the Steam Beam Engine House as an intrinsic part of the overall corporate Headquarters as the main entrance, conference facility, providing a unique corporate identity



Conversion of mill site in to car park in New Ross. Little room has been left for reversibility as all interior has been altered structurally and upper elevations has been de-fenestrated.



Adjacent mill site in New Ross has more appropriate function. Hotel function allows reversibility and versatility with remodelling to current use.

A specific case arose in Dublin City Council, where the owner of a 'Fulling Mill', a site which had a tradition of milling extending back to medieval times notified the City Archaeologist that the operations of the mill were coming to a close, prior to the process being turned off. The benefit of the Local Authority being involved in the planning process prior to the site being put on the open market was that a Conservation Plan was commissioned in partnership with the owner with the support of the Heritage Council and the Local Authority, putting in place a report that recorded all aspects of the sites activities and provided planning policy to ensure that the significance of the site was identified retained as part of any future development. More importantly these issues were faced prior to speculative developers viewing the potential of the site.

Other observations worth noting about the Kilmainham Mill case was the issue of the redundant machinery left as part of the weaving process. These were assessed by a specialist in this area and identified as part of the various processes undertaken at the site. They were proposed in general to be preserved by record only and sample looms set aside for special consideration as part of the future development. However, a difficulty that was not anticipated was the protracted time from when the mill finally closed up shop to the completion of a design for the mill complex. During the Design/Planning process there was a marked deterioration in the historic fabric and the issue of vandalism and security from accidental fire etc was a large problem. Constant presence on the site was essential to the historic fabric surviving the on-going threat from vandalism. However once the manufacturing processes came to an end and the use of the structures lapsed there was a marked deterioration in the fabric of the structures as well as the machinery, particularly in areas where chemicals and water have been in constant use. Where industrial buildings are becoming redundant there earlier the significance of the machinery can be identified and proper management put in place to preserve them the more successful outcome is achieved.



Nora Herlihy Enterprise Centre, Tallow

Successful conversion of an industrial site with innovative use of space for current function



Barron Bakery

Rare site that has continued in use since establishment and branched out into café. Enhances streetscape of Cappoquin but also adds to both residential and tourist amenities

Shackleton's Mill in Lucan in the possession of Fingal County Council is an excellent example of this proactive approach which led to the roof of the mill complex being repaired as a top priority to secure the precious interior and its machinery content.

8. CONCLUSIONS & FUTURE RESEARCH

For the first time an overview of the County Waterford's Industrial Heritage has been established through the identification of a collection of sites known through previous surveys, documentary evidence, historical mapping or by word of mouth. The range of typologies and their inherent settings have also been identified as an intrinsic part of the process of understanding the built industrial heritage pertaining to County Waterford. The general consensus of the study team is that the industrial heritage of County Waterford is unique due to its origins as an integral part of the activities of several large estates and to the pioneering drive of the county's early entrepreneurs and their international trading. Today the dramatic topography and the mature natural settings of many of these surviving sites enhance the architectural quality and interest that can be attributed to these places of cultural significance. Waterford County has managed to preserve many sites which may be considered as having considerable development potential in the future. The extent that these sites will survive will be the measure of the planning policy and control that is put in place on foot of the completion of this inventory, and the raising of awareness that industrial archaeology is a key strand of Waterford's history to be passed on to future generations.

KEY RECOMMENDATIONS

TOURISM OPPORTUNITIES

- The completion of this industrial inventory is timely as it illustrates the extent of Waterford County's history of manufacturing and international trading, which has been hitherto scantily sketched out. This information should be used to raise awareness in general of this aspect of the built heritage and key information should be extrapolated into a small guide or publication on the industrial past in County Waterford.
- The identification of industrial sites already conserved in the County and presented as part of Waterford's tourism product
- The introduction of comprehensive signing and information located at key sites with good access as part of raising awareness of industrial archaeology in the county.
- Set up or commission an exhibition of industrial heritage that can be re-assembled in tourism centres, libraries and county museums.
- The grouping of key industrial sites with walking, cycling routes or interlinked by the water network as a potential eco-friendly tourism product in the county
- Improve access to the Portlaw, the town, the industrial complex and its artefacts as the most significant industrial site in the county
- The Irish Landmark Trust is an organisation who constantly seeks to lease unique properties to refurbish as holiday letting destinations. The conservation of a mill building to best practice standards, retaining

internal and external character as a model for other properties in the county would be a very positive demonstration of the value of these properties. Where owners of mill structures were open to this approach of conserving/adaptation of original structures contact can be made with the ILT in Eustace Street, Dublin

PLANNING/CONSERVATION STRATEGY

- A planning policy review regarding industrial archaeological sites should be put in place at the earliest opportunity, which enshrines the recording and assessment of former industrial sites where they arise in the planning process as a prerequisite of pre-planning discussions/applications.
- Specific policy regarding the on-going role and management of industrial sites should be drafted into the next county development plan. Site considered of specific merit should be scheduled for protection as protected structure or as Architectural Conservation Areas.
- The adoption of Conservation Plans to determine the outcome of key industrial sites or complexes as part of the planning process and the setting aside of funding by the Local Authority to support this process to encourage interest and to assist in the identification of proper adaptation.
- The setting up of a partnership approach with the Heritage Council to encourage/facilitate the commission of appropriate consultants to carry out the task of delivering the Conservation Plan.
- The identification of industrial archaeological sites in the ownership of the Local Authority and the putting in place a Conservation Plan, to demonstrate best practice in the management of complex industrial sites. Establishing a way forward for a complex site may encourage other parties to invest in the conservation/adaptation of a redundant site

OTHER RESEARCH

- Complete an inventory of C20th industrial sites in County Waterford
- Record where possible former workers memories that were involved in past industrial sites as part of retaining a record of industrial site
- Review of the Conservation Plan on Portlaw, 2003 and monitor what progress if any has been made to date on the most significant industrial site in the county
- Encourage an on-going liaison or interaction with WIT on the recording, measuring activities of industrial sites and their structures.
- The scheduling of all archaeological investigations on industrial sites in the county to date as part of the readily accessible information to the general public so that it can be easily disseminated and researched.
- Collate from historical records or information the intensity and level of export from the county during the peak of its industrialisation.

- Research into the historical records of the major estates industrial activities of Portlaw and Lismore to identify the level of manufacture, export etc.
- Research into the emerging entrepreneurial class of Waterford, such as the Flahavan's and Hanan's milling families.
- Review the research on the mining works completed by C. Duggan, MUBC

Bibliography

Bielenberg Andy (Ed.) 2003. Irish Hour Milling, A History 600-2000. The Lilliput Press, Dublin.

Bradley, John Andrew Halpin and Heather A. King, 1989. Urban Archaeological Survey of Waterford City, Part XIII (ii). Office of Public Works.

Bradley, John Andrew Halpin and Heather A. King, 1989. Urban Archaeological Survey of Waterford City, Part XIII (i). Office of Public Works.

Buckley, Victor 1990. Burnt Offerings International Contributors to Burnt Mound Archaeology. Wordwell Ltd. Dublin.

Craig Maurice, 1997. The Architecture of Ireland, From the earliest times to 1880. Lambay Books, Dublin.

Cowman, D 2006. The Making and Breaking of a Mining Community: The Copper Coast, County Waterford 1825-1875+. Mining Heritage Trust of Ireland.

Cox, Ronald 2006. Engineering Ireland. The Collins Press, Cork

Crossley, David 1994. Post-Medieval Archaeology in Britain. Leicester University Press

Fraher, William 1991. A Guide to Historic Dungarvan. Dungarvan Museum Society 1991.

Hamond, F. and McMahon, M. 2002. Recording and Conserving Ireland's Industrial Heritage, An introductory Guide. The Heritage Council

Hearne, J .M. 1998. Glassworks .1783-1851. Waterford Archaeological & Historical Society.

Journal of the Waterford Archaeological & Historical Society, 1998. Decies No. 54.

Hunt, Tom 1997.. The Origin of Development of the Portlaw cotton Industry, 1825-1840. Journal of the Waterford Archaeological & Historical Society, Decies No.53.

Irish, Bill 2001. Shipbuilding in Waterford 1820-1882 A historical, technical and pictorial study. Wordwell Ltd.

Irish, Bill Waterford Steamships Company. Journal of the Waterford Archaeological & Historical Society, Decies No.53. Waterford Archaeological & Historical Society.

Lantry, Margaret (Ed.) 2007, Journal of the Cork Historical and Archaeological Society 2007. Volume 112. Article by Colin Rynne 2007. A Medieval watermill at Ballyine, County Limerick.

Late Viking Age and Medieval Waterford. Excavations 1986-1992. Waterford corporation

McEneaney, Eamonn 2001. Discover Waterford. The O'Brien Press Ltd. Dublin.

Moore, Michael (Compiled by), 1999. Archaeological Inventory of County Waterford. Archaeological Survey of Ireland.

Mulligan, Paul 2005. A Short Guide to Irish Antiquities Wordwell Ltd. Bray, Co Wicklow

Murphy, D 2005 Excavations of an early medieval vertical watermill at Killoteran, Co. Waterford, in , Settlement, Industry and Ritual NRA Monograph Series 2005

Nolan William and Thomas P. Power, (Editors) 1992. Waterford History and Society.

O' Brien, W 1996 Bronze Age Copper Mining Shire Archaeology

O'Keeffe, Peter and Simington, Tom, 1991. Irish Stone Bridges History and Heritage. Irish Academic Press Ltd.

O' Sullivan, M& McCarthy, K Cappoquin A walk through history

Palmer Marilyn and Peter Neaverson, 1998. Industrial Archaeology Principles and Practice. Routledge London and New York.

Philips, Bevan G 1881 The Industrial Resources of Ireland- Journal of the Statistical Society of London Vol.44, No.4 (Dec.,1881), pp 675-721.

Power, Patrick C. 1990. History of Waterford City and County. The Mercier Press Limited. Dublin.

Power, T.P 2001. Waterford's Iron Exports and the 30 Years War Journal of the Waterford Archaeological & Historical Society, Decies no.57.

Proudfoot, Lindsay J. 1995. Urban Patronage and Social Authority, The Management of the Duke of Devonshire's Towns in Ireland, 1764-1891. The Catholic University of America Press, Washington, D.C.

Rynne, Colin 1999. The Industrial Archaeology of Cork City and its Environs. The Stationary Office, Dublin.

Rynne, Colin 2006. Industrial Ireland 1750-1930An Archaeology. The Collins Press, Cork

Robertson, Alistair1999. Limekilns of the North Pennines. North Pennines Heritage Trust.

Robertson, A 1999 Limekilns of the North Pennines. The Countryside Agency

Scally, Georgina 1998. Industrial Heritage Association of Ireland, 1998. Taking Stock of Ireland's Industrial Heritage. Article by Industrial archaeology survey of County Dublin.

Watts, Martin 2002. 'The Archaeology of Mills & Milling. Tempus Publishing Ltd.

Williams Jeremy, 1994. A Companion Guide to Architecture in Ireland 1837-1921 Irish Academic Press Ltd.

Additional Information:

Critchley, Martin A survey of Tankardstown Mine, Bunmahon, Co. Waterford in Journal of Mining Heritage Trust of Ireland No.2 (2002)

Documentary information available through the Irish Agricultural Organisation Society.

Site List – Type A Priority Structures

Site	Site Type	Description	RPS Listing	Extant
001	Mill Complex	Aglish Flour Mill	N/A	N
002	Mill Complex	Ballinvella Windmill	N/A	Y
003	Mill Complex	Ballinwillin Corn Mill, Cappoquin	N/A	Y
004	Mill Complex	Ballylaneen, Carrig Castle	N/A	Y
005	Mill Complex	Ballymacart Corn Mill	N/A	N
006	Mill Complex	Ballynamuck Woollen Mills	N/A	Y
007	Mill Complex	Ballynamult Mill	N/A	N
008	Mill Complex	Ballynatray Flour/ Sawmill	No.27	Y
009	Mill Complex	Ballyristeen Corn Mill	N/A	N
010	Mill Complex	Ballyvoyle Corn Mill, Stradbally	N/A	N
011	Mill Complex	Boherawillin Corn Mill	N/A	N
012	Mill Complex	Brook Lodge Corn Mill	N/A	Y
013	Mill Complex	Cappoquin Corn/ Timber Mill, Twig Lane	N/A	N
014	Mill Complex	Cappoquin Grinding Mill, The Green	N/A	N
015	Mill Complex	Cheekpoint Tidal Mill, Ballycanvan Big	N/A	Y
016	Mill Complex	Clonea Corn Mill, Ballyneal	N/A	Y
017	Mill Complex	Clonea Castle Corn Mill, Ballyneal	N/A	Y
018	Mill Complex	Comeragh Corn/ Saw Mills	N/A	Y
019	Mill Complex	Coolfin Sawmills/ Brickworks, Portlaw	No.181	Y
020	Mill Complex	Cooneen Mills & Quays	N/A	Y
021	Mill Complex	Corragina Mill	N/A	Y
022	Mill Complex	Crooke Windmill	N/A	Y
023	Mill Complex	Curraheha Corn Mill	N/A	N
024	Mill Complex	Dungarvan Harbour Mill	N/A	Y
025	Mill Complex	Fairbrook Mill & Miller's House	No.316	Y
026	Mill Complex	Kiladangan Indian Corn Mill	N/A	Y
027	Mill Complex	Kileeshal Corn Mill	N/A	Y
028	Mill Complex	Kilmacthomas Corn Mill	N/A	Y
029	Mill Complex	Kilmacthomas Woollen Mill	N/A	Y
030	Mill Complex	Kilmacthomas Corn Mill, Kilnagrange	N/A	Y

031	Mill Complex	Kilrossanty Corn Mill	N/A	Y
032	Mill Complex	Kinsalebeg Flour & Corn Mill	N/A	Y
033	Mill Complex	Lismore, Ballyin Mill & Miller's House	No.152	Y
034	Mill Complex	Lismore, Ballyrafter Mill & Miller's House	No.323 & No.322	Y
035	Mill Complex	Lismore, Sawmills	N/A	Y
036	Mill Complex	Mount Stuart Corn Mill	N/A	N
037	Mill Complex	Nicholastown Corn & Flour Mill	N/A	Y
038	Mill Complex	Niervale Mill and Miller's House, Ballymacarbry	N/A	Y
039	Mill Complex	Pilltown Tidal Mill	N/A	Y
040	Mill Complex	Portlaw Cotton Mill Complex	No.180	Y
041	Mill Complex	Pouldrew Corn Mill	No.131 & No.317	Y
042	Mill Complex	Shanakill Corn & Tucking Mill	N/A	N
043	Mill Complex	Tallow Bride Valley Mill & Stores	N/A	Y
044	Mill Complex	Tallow Flour/ Sawmill	N/A	Y
045	Mill Complex	Twomilebridge Corn Mill	N/A	N
046	Mill Complex	Villierstown Flax Mill	N/A	N
047	Store/ Warehouse	Cappoquin, Barrack Street	N/A	Y
048	Store/ Warehouse	Cappoquin, Castle Street	N/A	Y
049	Store/ Warehouse	Dungarvan, Church Street/ Quay Street	N/A	Y
050	Store/ Warehouse	Dungarvan, Galwey's Lane, Harbour Mill	N/A	Y
051	Store/ Warehouse	Dungarvan, Thompson Lane, Maloney's Mill	N/A	Y
052	Store/ Warehouse	Tallow, Nora Herlihy's House	No.222	Y
053	Store/ Warehouse	Tallow, Convent Street	N/A	Y
054	Store/ Warehouse	Tallow, Bride Valley Stores	N/A	Y
055	Store/ Warehouse	Tallow Community Centre	N/A	Y
056	Store/ Warehouse	Tallow, R & R Agricultural Machinery	N/A	Y
057	Store/ Warehouse	Tallow, West Street	No.208	Y
058	Bakery	Cappoquin, Barron's Bakery	No.59	Y

059	Brewery	Tallow Ale & Porter	N/A	N
060	Brickworks	Coolfin Brickworks & Sawmill	N/A	Y
061	Canal	Lismore Canal	N/A	Y
062	Canal	Clodiagh Canal, Portlaw	N/A	Y
063	Canal	Dooneen/Whitfield, part of Suir Navigation	N/A	Y
064	Canal	Brickey Canal	N/A	Y
065	Creamery	Ballynamult	N/A	Y
066	Creamery	Millstreet	N/A	Y
067	Distillery	Clashmore Distillery	No.78	N
068	Forge	Kilmacthomas Forge	N/A	Y
069	Forge	Halfway House, Drumgorey	N/A	Y
070	Gasworks	Lismore Gasworks	N/A	Y
071	Ice House	Ballycanvan Little	N/A	Y
072	Ice House	Lismore, Ballyin	N/A	Y
073	Kiln	Annestown Coastal Kiln	N/A	Y
074	Kiln	Ballyvoyle Coastal Kiln	N/A	Y
075	Kiln	Carrigegan	N/A	Y
076	Kiln	Coolfin, Brick Kiln	No.181	Y
077	Kiln	Coolfin, Complex Type	N/A	Y
078	Kiln	Coolfin, Rocketscastle Complex Type	No.175	Y
079	Kiln	Glendalough, Lyre, Simple Type	N/A	Y
080	Kiln	Halfway House, Ballycanvan Little 1	N/A	Y
081	Kiln	Halfway House, Ballycanvan Little 2	N/A	Y
082	Mines	Deerparkhill Mines	N/A	Y
083	Mines	Drumslig/ Lyre Mines	N/A	N
084	Mines	Knockbaun Mines	N/A	N
085	Mines	Salterbridge Mines (SALTERBRIDGE	N/A	N
086	Maritime	Baile na nGall Pier	N/A	Y
087	Maritime	Dungarvan, Colligan Weir	N/A	N
088	Maritime	Helvick Harbour	N/A	Y
089	Maritime	Villierstown Jetty	N/A	Y

090	Railway Station	Lismore	N/A	Y
091	Waterpumps	Cappoquin	N/A	Y
092	Waterpumps	Portlaw	N/A	Y
093	Waterpumps	Villierstown 1	N/A	Y
094	Waterpumps	Villierstown 2	N/A	Y
095	Waterpumps	Villierstown 3	N/A	Y
096	Waterworks	Tramore, Tankfield	N/A	Y
097	Weighbridge	Cappoquin, The Green	N/A	Y
098	Weighbridge	Portlaw, Cotton Mill Complex	N/A	Y
099	Weighbridge	Villierstown, Main Street	N/A	Y
100	Worker's Houses	Tallow	N/A	Y