

Dun Laoghaire Baths

Investigation Works

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1. Introduction & Purpose of the Report

The purpose of this report is to report on investigative works carried out at the Dun Laoghaire Baths site, undertaken on behalf of Dun Laoghaire-Rathdown County Council. The aim of the work was to investigate the potential survival (if any) of Glasthule Battery, built c.1804-1805, as part of a group of 28 fortifications (comprising Martello Towers and Battery Forts) built between Balbriggan, Co. Dublin and Bray, Co. Wicklow to defend Dublin City.



Figs 1 & 2: The position of the foreshore battery is shown on the first edition ordnance survey map (left) – note the position of Glasthule Martello Tower to rear above the granite quarry, the site of which now forms part of the People's Park of Dun Laoghaire.

IMPORTANT

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2. Methodology

2.1 Desktop Study: Review of known maps, plans, drawings and illustrations of the battery to identify the previous extent of, and historic changes to, the site and to enable targeted investigation and opening-up works to take place.

2.2 Visual Assessment: The assessment examined the layout and alignment of the existing Baths to determine any areas where original material may survive. A comprehensive visual assessment of all accessible wall surfaces was undertaken to determine the survival of any traces of the battery and its attendant structures (including but not limited to the battery walls, guardhouse, officers quarters, gun emplacements, mortar emplacement, ammunition store, shot furnace, boundary walls, boundary stones etc), its site (including quarried rock outcrop which may have historically delimited the extent of the battery) or any other traces of other archaeologically significant materials, features or deposits which may have an impact on the proposed development.

2.3 Investigative Works: Targeted opening-up of the twentieth century structure was undertaken as part of investigative works. This comprised the opening-up of blocked-up doorways (undertaken by an independent contractor under the authority of Dun Laoghaire-Rathdown County Council) to gain access to the interior of the bath complex. The modern plaster was removed in a number of locations to determine the nature (and archaeological potential) of any underlying masonry. This took the form of the removal of <0.5 x 0.5 m sections of external render and internal plaster surfaces. All opening-up will be carried out using hand-tools only following best conservation practice, except in one location at basement level where a power-tool was used to open a <0.5 x 0.5 m section of a concrete retaining wall. Masonry likely to have formed part of the 1804-5 battery was identified by comparison to extant battery and tower structures in the Dun Laoghaire-Rathdown group, and the key characteristics of said historic masonry surfaces¹. Results were recorded using a combination of note-taking, marking-up of plans/photographs as on-site conditions permit.

2.4 Reporting: The results of the investigative works to be presented to Dun Laoghaire-Rathdown County Council. Results to indicate the extent of survival (if any) of the fabric of the early nineteenth century battery, together with an assessment of potential archaeological implications.

3. Historical & Archaeological Context

3.1 Archaeological Context: Glasthule Martello Tower No.12 is recorded as an archaeological monument (DU023-017) however the accompanying battery is not. The anomaly in recording is mirrored at other fortification sites such as Dun Leary where Martello Tower No. 13 (DU023-052001) and the promontory fort (DU 023-052003) on which it stood are recorded on the RMP, but the now-lost Battery No. 13 is not; and Sandycove where again Martello Tower No.11 (DU023-019) is recorded but the neighbouring Battery No.11 which still stands, is not included in the RMP. There are no other archaeological sites or monuments recorded on the RMP at or in the vicinity of the Dun Laoghaire Baths. There are a number of shipwrecks recorded in the area, but as the baths are located in an area of reclaimed shoreline, and the battery was built on a rocky granite shoreline, the



Fig 3: Bernard Scale's 1779 revision of John Rocque's map of Dublin showing 'Monkstown Common' and the rocky shoreline of 'Scotchmans Bay'.

3.2 Historical Context:

In the late 18th century, Ireland absorbed the influence of the ideas of the American and French revolutions. The United Irishmen, founded in 1791, initially pushed policies of democratic reform and Catholic emancipation, though events rapidly led to aid from French revolutionary forces to assist with rebellion. The last years of the 18th century saw ill-fated French landings at Bantry in December 1796 and Killala in August 1798, and the 1798 Rising leading to the Act of Union. At the beginning of the nineteenth century, Dublin City was very poorly defended. The city walls were in ruins and Anglo-Norman castle of Dublin had been militarily obsolete for centuries. In an age dominated by naval warfare and huge continental armies, Dublin was simply not seen as a credible risk by Ireland's political and military leaders. The Earl of Carhampton, Master-General of the Ordnance in Ireland, was the first to seriously consider an attack on Dublin in 1796:

“of all Ireland the most exposed is its capital ... a body of 3,000 men and a few field pieces might be ... landed in the vicinity of Dublin and possess it before the inhabitants were well aware of the attempt ... I do assert that an attempt of this nature could not fail of success at this very hour”.

Carhampton's warnings fell on deaf ears, as the general consensus was that the natural harbours and ports of the south and west coasts should continue to be the focus for defence, with only isolated strongholds needed elsewhere in the country. The reality was that fortifications were expensive, and the Irish

government simply did not have the necessary funds to invest in coastal defences when Ireland's military and political leaders saw no need for speculative fortress-building.

The situation changed after the Act of Union in 1801. The Royal Irish Artillery was disbanded and absorbed into the Royal Artillery and the Board of Ordnance with its significant resources and budget were made responsible for Ireland's fortifications. International events, driven by the failure of the Peace of Amiens, and the threatened invasion by Napoleon Bonaparte, meant that defending vulnerable coastlines became an immediate priority. In the winter of 1803, Lieutenant-General Cathcart, the new military commander of Ireland, toured Ireland's defences in the company of Captain Birch RE, an officer who had formerly served in Menorca and who was familiar with Martello Tower design. During the tour, Rear Admiral Robert Calder who was stationed at Berehaven, Co. Cork and was responsible for the defence of the south-west coast, requested fortifications to defend supply ships anchoring off Bere Island. In January 1804, Cathcart sent Captain Birch to Bere Island with orders to fortify the island with Martello Towers. At the same time, intelligence was received suggesting that the French were planning an invasion on the east coast of Ireland. Consequently, Lieutenant-Colonel Benjamin Fisher was authorised on the 2nd June 1804 to begin construction of Dublin's Martello Towers.

A defensive 'chain' of twenty-eight sites consisting of Martello Towers and gun batteries was set in place, extending from Bray, Co. Wicklow to Balbriggan, Co. Dublin. The sites were numbered 1-16 'South of Dublin', and 1-12 'North of Dublin'. The most heavily fortified section of coastline was the rocky shoreline between Bullock Harbour and Sandymount, which was defended by five 18-pounder Martello Towers, one 'double-tower' at Williamstown and three gun batteries, including the battery at Glasthule.

4. Historical References to the Battery at Glasthule

The now-lost fortification at Glasthuleⁱⁱ consisted of two sites: a gun battery on the shoreline, with a supporting Martello Tower on higher ground to the rear; a defensive arrangement mirrored by the adjacent fortifications of No. 11 Sandymount and No. 13 Dun Leary. Scotman's Bay and Dunleary appear to have been considered a likely position for enemy ships to anchor and unload men and supplies from, and this stretch of coastline was defended by three multi-gun shore batteries supported by four Martello Towers – the most strongly defended position in Dublin. The two plots of land at Glasthule were purchased for £90 and 10 shillings from "Lords Longford, De Vesci, and Mr Daniel Sexton" in 1806; though the lands had already been legally transferred in trust to Benjamin Fisher RE the year before, once the fortifications had been completed and armed:

"Lands legally transferred in trust to Benjamin Fisher at "an Inquisition taken at Blackrock in the County of Dublin on the Seventh day of October One thousand eight hundred and five ... for the absolute purchase of all that and those that part of the lands of Glastool in the County of Dublin on which the Battery and Martello Tower Number Twelve had lately been erected with the road thereto containing two roods and thirty six perches Statute measure"

The "three gun battery at Glasstool" was built by John Murray, who was also responsible for the batteries and towers at Dun Leary, Sandycove, and Seapoint. Glasthule battery was armed with three 24-pounder guns positioned behind an angled bastion on the rocky foreshore of Scotsmans Bay.

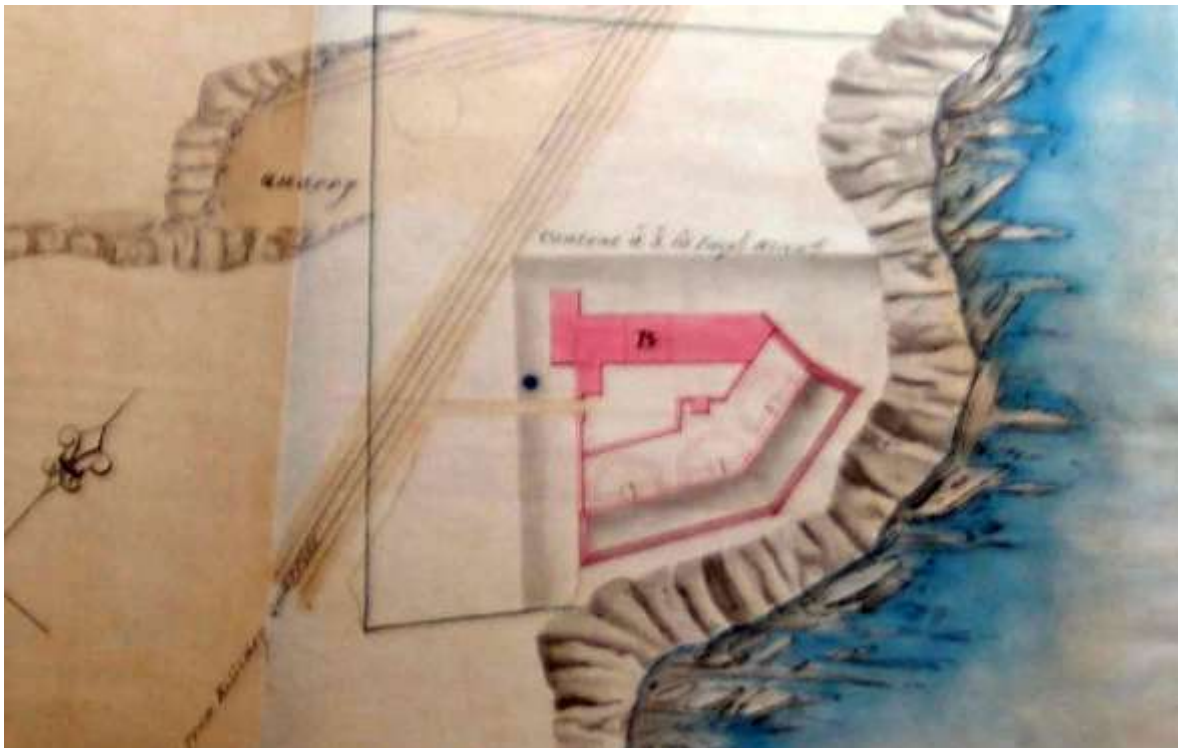


Fig 4: The 1831 Board of Ordnance Plan of "No. 12 Glossdool" shows the position of three 24-pounder gun emplacements, the L-shaped Guard Room, the rectangular shot furnace forming part of an internal wall, the entrance and pathway to the site, the external earthwork defences (shown shaded) and the surrounding plot owned by Board of Ordnance lands indicated in green. Both line of the 'metals' tram road and the granite quarry encroached on ordnance property, but had no physical impact on the battery structure.

The battery continued to be manned after the end of the Napoleonic Wars in 1815, with occasional references surviving to soldiers quartered at Glasthuleⁱⁱⁱ. The battery began to be eroded by the sea from about 1818, a process then attributed to “the rebound of the Surge” from the newly-built east pier of Dun Laoghaire Harbour^{iv}:

“Gentlemen, As the late heavy Gales from the Eastward, which have done so much damage to the new Pier constructing at Dunleary, have also from the rebound of the Surge, washed away part of the bank at the N.E. angle of the Redoubt at Glafstool, No.12, and thereby endangered the wall of this building (to which as well as the Battery No.13, being the only Defences for the new Harbour, considerable importance is attached) I have directed the enclosed estimate (amounting to £58) to be made, of the expense that would attend the formation of a small breakwater for its security, and to obviate the heavy expense that would be incurred by rebuilding the Battery. In order to keep this Estimate as low as possible, it has been calculated on a presumption that the Dunleary Commissioners will consent to drop the requisite quantity of stone on the spot, as their Railway runs close to the Battery. It appears reasonable to conclude that the Commissioners will accede to your proposition to this effect, from the consideration that the injury alluded to has been occasioned by the construction of the Pier, and that the Ordnance have readily acquiesced in their application for leave to occupy the Tower No. 12, and to carry the Railway thro’ the Ordnance Lands”.



Fig 5: Duncan’s 1821 map engraving shows the single-storey Guard House as the highest point of a fortification which appears to slope down towards the sea. Note that the granite walls of the battery appear to have been lime-washed landward throughout. The entrance into the battery is shown as a single lintelled doorway in the landward side of the battery enclosure (a similar doorway survives on Dalkey Island). The horse is pulling carriages along the tram line which ran through Board of Ordnance property.

The Battery was occupied by the Preventative Service Water Guard (later renamed the Coast Guard) in the 1820s. The 1828 ‘return’ records only one 24-pounder cannon (originally three were mounted) in position at ‘12 – GlassTool’ battery, with both gun and carriage “unservicable ... Incapable of standing 40 or 50 rounds” with a note that “Nos.2 and 3 Gun Carriages and Traversing Platforms given in to Storekeeper in Dublin”. The site was armed with “Side arms complete and fit for service with the exception of six

handspikes”, and though remaining in active military use, the battery was no longer functioning as an active coastal artillery station.

In 1841, land values in Dun Laoghaire and Glathule had risen considerably, and the Board of Ordnance in Dublin received a series of unsolicited offers from landowners and former ‘servants of the Ordnance’ offering to buy the Ordnance property at Glathule for sums averaging £300. The tone of the enquiries to buy often emphasized the lack of military value of the site. An offer dated 5th October 1841 from Mr. C.A. Duff who owned the land adjoining No. 12 Battery opened his gambit by requesting the Board of Ordnance contribute to the costs of erecting a wall between his property and the “South east side of Battery No.12 at Glasdool”, but swiftly moved on to offering to buy the battery outright:

“if the Ordnance will dispose of the Battery, and can confirm what Terms, & Hath the liberty to say that it cannot now be of the slightest possible use, [illegible] as it is completely jamm’d in at Land side by Houses closely erected thereto, by the Tram Road of the Public Works, by Public Baths, and by the Grounds in my possession now being built upon, and at the Sea Side year and year more decaying, so much so that during the storm of last January a portion of the South and West side under the cut stone enclosure upon which the Building stands was swept away, and at South east side completely eaten in by the Power of the Sea – Awaiting your answer ...”

While Mr Duff’s observations on the condition of the battery must be examined critically (as he was making a pitch to purchase the property as a ‘derelict’ site), it is likely that his letter reflects weathering – most likely to be weathering of joints and masonry on the south-east side, and the loss of some masonry units.

In response to these unsolicited offers, Lt. General Sir. F.W. Mulcaster, the Commanding Royal Engineer in Ireland, immediately launched an investigation into the state of the Glathule fortifications, including any previous authorizations for encroachments onto Ordnance lands, and new surveys of both the tower and the battery sites. A coloured plan of the battery and cross-sections of the buildings and battery wall dated 30th November 1841 shows the three gun emplacements against the seaward wall of the angled battery, the internal structures and the Guard house along the west wall, the encroachment of stone quarrying and the railroads from Killiney Hill on Ordnance Property. Lt. General Mulcaster reported his findings and recommendations to the Inspector-General of Fortifications stressing the speculative investment nature of the offers and the continuing military value of the battery for the defence of the coast:

“all proprietors of the neighbouring grounds are covering their lands with buildings ... the valuation of the ground upon which the Battery alone stands, about £1000. The Battery Buildings consists of a Barrack 75 feet long and 18 feet wide calculated for 20 Men but it is not very substantial. The Sea seems to have a tendency to encroachment to undermine the cliff upon which the Battery stand ... with respect to the land on which No. 12 Tower is erected ... its site is on the border of a quarry, 60 feet above the level of No. 12 Battery and a distance therefrom of about 165 yards. This Tower and the land on which it is situated is coveted as well as its dependent Battery; it is therefore become requisite for me to proceed to represent the bearing of these Works of Defense for the protection of Dublin Bay; in which view alone the question as to the propriety of disposing of the property would appear to consist.

The position of this Work of Defense will be seen upon inspection of the Sketch of the coast to be favourably disposed for cooperating with No.11 Tower & Battery for the defense of Sandy Cove and

for the protection of the reverse of the pier forming the southern side of Kingstown Harbour. This Tower and Battery formerly co-operated with No.13 Tower & Battery, but which work, have been removed by the Commissioners for Public Works, they having been sold by the Board to that Body for £1700, per Boards Order 30th December 1836. No. 12 Tower & Battery would also very advantageously co-operate with any Works of Defense which might be erected at the entrance of Kingstown harbor, according to the understood intention of Government at the time of No. 13 Tower and Battery being taken down.

No. 12 Battery, it will be seen from the plans, is formed to receive 3 heavy Guns on Traversing platforms, & it derives its support from the Tower which carries 1, 24 Pounder traversing round its top platform. – At present there is nothing to obstruct the fire of the latter upon the Bay, no from giving the Battery full protection, but, as the intervening ground is private property, & intended that it is said to be shortly built upon, the view of the Battery from the Tower will be intercepted. – The communications from the one to the other is by means of a circuitous road coloured brown on the Sheet.

Although therefore No.12 Tower & Battery are likely to have in a short space of time their sphere of Action a good deal cramped by the Buildings going forward in their neighbourhood, yet, as the command of the Bay cannot be shot out from the Battery, nor wholly from the Tower, I do not think that it expedient to weaken the chain of Defence which at much expense has been formed for this part of the coast ... ”.

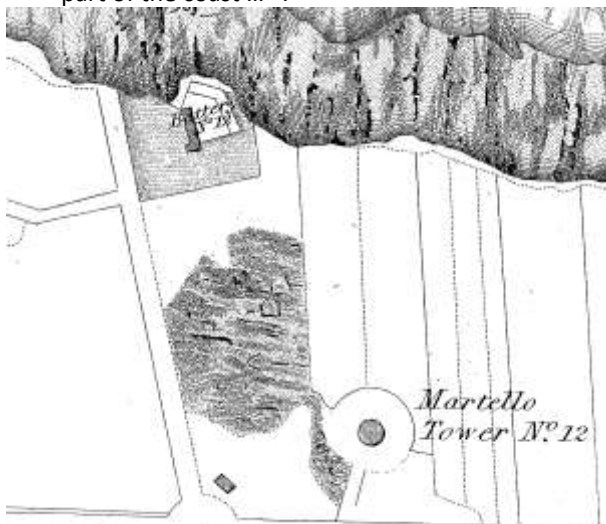


Fig 6: Detail of Rennie's 1820 map showing the battery, tower and Park Road.

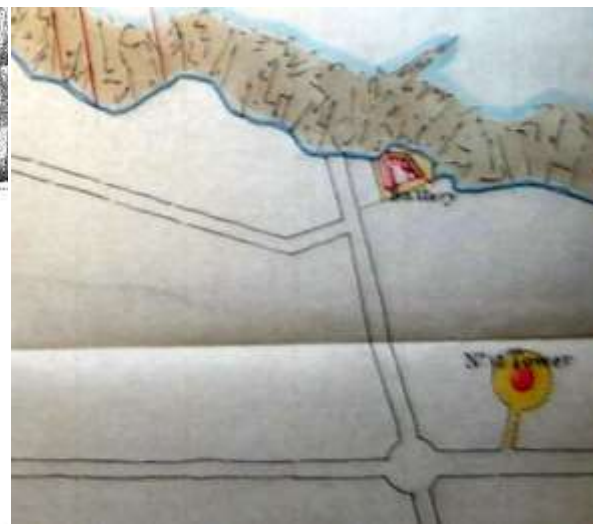


Fig 7: The 1841 Board of Ordnance plan of Glasstool battery and tower.

All offers to purchase the battery were rejected on foot of Lt. General Mulcasters 1841 report. However, on 18th September 1854, the Board of Ordnance sold the battery “to the then commissioners of Kingstown Harbour the premises”. The battery and the Guard Room survived almost unchanged till the early years of the twentieth century. Unlike the other suppressed military forts and towers, the battery was marked on the 1869 Ordnance Survey six-inch revision map as ‘Old Battery’, though it is not know what purpose the Harbour Commissioners used the site. On the 14th March 1907, the Commissioners of Kingstown Harbour sold the battery to Kingstown Urban District Council “at the price of five hundred pounds ..”. The detailed plan of the site accompanying the 1907 title deed shows the battery almost unchanged from the 1831 Board of Ordnance plan. However, the battery was quickly removed to develop the site as a public baths, and cannot be traced on the 1908 Ordnance Survey 25-inch map of the site. The baths were further developed and extended throughout the 20th century, though no existing plans or maps of the baths indicate the footprint of the battery.

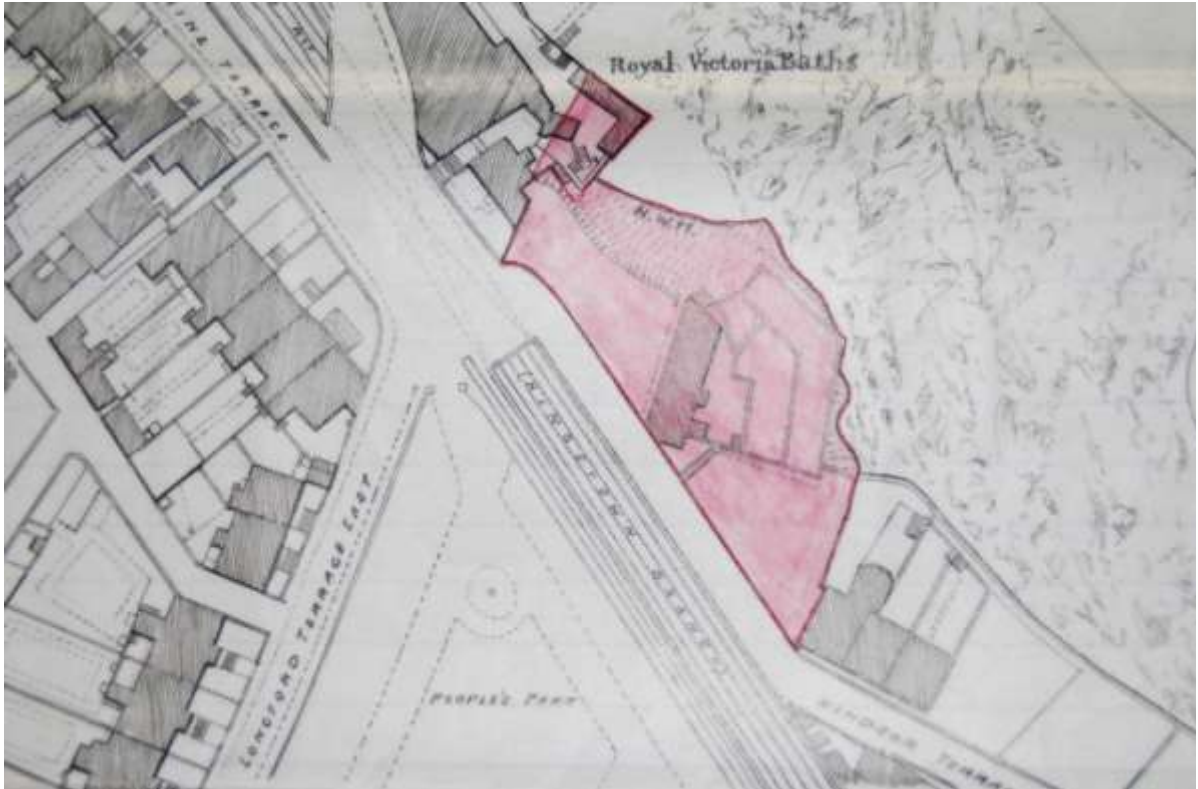


Fig 8: Copy of the 1907 deed plan map showing the battery and the extent of property purchased by Kingstown Urban District Council. The battery appears almost identical to its depiction on the 1831 Board of Ordnance map: the pathway to the external gateway has been re-aligned, and the three gun emplacements and the shot furnace are no longer marked. The foreshore had not been developed at this time, with no structures or pathways located on the seaward side of the battery.



Fig 9: Historic photograph showing the whitewashed and slate-roofed guard-house and part of the battery walls (arrowed) positioned below the then street-level.

5. Results of Investigation

Opening-up of the bath complex was arranged by Dun Laoghaire-Rathdown County Council⁹. The overall finding was that the battery structure appears to have been substantially removed during the development of the bath complex after the site came into the possession of Kingstown Urban District Council in 1907. Some sections of granite masonry appear to have been re-used to build new walls (which do correspond with the alignment of the walls of the battery complex)



Fig 10: Overlay of the title deed map with modern mapping of the Dun Laoghaire Baths (courtesy of Noelle Sweeney, Architect, Dun Laoghaire-Rathdown County Council) showing the surviving wall *in situ* coloured green, and the probable extent of wall and entrance taken down and re-built on a new alignment (coloured yellow) surviving within the baths complex.

5.1 Possible Rock-cut defences: At basement level, the granite bedrock has been cut (i.e. quarried) to form a battered near-vertical rock face. This type of feature is also found at No.11 Sandycove battery and No. 10 Bartra tower, and is also a feature of earlier fortifications where it forms part of the external defences. This vertical rock face is found below a poured concrete flooring structure within the bathing complex. A passage has been cut through the vertical rock face in this area to form a passageway leading to the boiler room and the rear of the complex.



Fig 11: General view of the bath complex (November 2011) showing the two doorways opened up at basement level. The rock-cut defences and re-used granite masonry are found within the eastern door (arrowed) with a substantial amount of 20th century concrete construction overburden.



Fig 12: Side view of the 20th century bath complex showing a concrete buildings and surface throughout.



Fig 13: The 20th century concrete bath complex enveloped 19th century granite boundary walls.



Fig 14: View of continuation of 19th century granite masonry wall (see in Fig 13) showing the concrete roof above and concrete walls adjacent.



Fig 15: View on further continuation of 19th century granite masonry wall to meet granite bedrock which has been cut back to form a beveled slope.



Fig 16: General view of the eastern end of the bath complex at basement level showing the 19th century granite masonry wall (seen in Fig 15) meeting the cut granite bedrock. This rock surface has been quarried back and is likely to have formed the lowermost part of the defences of Glasthule Battery.

Fig 17: The north face of No. 11 Sandycove Battery illustrates how the ashlar masonry of the battery could incorporate the granite bedrock within the defences. Similar to the bedrock within the baths (seen in Fig 16), the granite outcrop has been cut back and slightly beveled and forms part of the defences of the battery. This double-effect of using a source of building stone to form part of the defences is common to fortifications from all periods in Ireland and internationally^{vi}.





Fig 18: The masonry above the rock-cut defences appears to have been removed, though some granite masonry fragments remain. It should be noted that these granite blocks are not ashlar masonry and so cannot be definitively attributed to the battery structure. It appears that the ashlar masonry of the battery was taken down/demolished, though fragments of the masonry may survive incorporated as coarse aggregate or masonry artifacts within the 20th century bath structures.



Fig 19: The bedrock has been cut to allow access into the boiler room and the rear of the complex. The current opening is lined with concrete retaining walls and is considered to be 20th century work. However, there is a reference in the 1830s for a rock-cut drain running from Glasthule Quarry (now the site of the People's Park) through the grounds of the shoreline^{vii}.

5.2 Traces of Battery and Original Structures: There are no standing structures or masonry walls which can be confidently said to form part of Glasthule battery, though stretches of boundary walls from properties built east of the battery during the nineteenth century have survived.

Fig 20: Location of a surviving property boundary wall (coloured green) shown on the 1907 deed plan map of the site.



Figs 21 & 22: Granite masonry wall found at higher level within the Baths complex which retains salt-weathered granite, slate pinnings and sea-sand rich mortar aggregate.

5.3 Re-used elements of Battery:



Fig 23: Detail from an engraving of Duncan's 1821 map showing the entrance to Glasthule Battery. The single pedestrian entrance was a common feature of all the Dublin batteries, and was placed on the landward side of the fortification where it would not be exposed to fire from enemy ships.



Fig 24: This view of No 9 Dalkey Battery and Martello Tower gives an indication of how the angular gun battery of Glasthule, also built on a rocky granite shoreline, appeared from seaward.



Fig 25: Note the contrast with the high quality ashlar masonry of the exposed seaward sides of Dalkey Battery (expected to take fire) with the coursed and squared rubble masonry adjacent to the single entrance into the battery complex.



Fig 26: A short stretch of over-painted coursed and rough hewn-squared granite masonry survives at basement level^{viii}. The doorway is most probably the entrance to the entrance shown in the 1821 engraving (see Fig 23) with similar doorway and masonry surviving at Dalkey battery (see Fig 25). However, this granite wall does not follow the known alignment^{ix} of Glasthule battery, but follows that of the Edwardian baths. A likely scenario is that the landward battery wall (coloured yellow in Fig 10) was taken down and re-used once the property began to be developed for municipal bathing.

Fig 27: Another view of the re-used doorway and granite masonry showing the concrete pier it now abuts, and the iron 'I' beams the wall supports.



Fig 28: The boiler room at basement level^x retains coursed concrete walling which incorporates some granite masonry. This masonry is brown-stained and fragmentary. The concrete floor was excavated to a depth of 300mm in this room. However, no surviving granite flags or traces of the granite gun emplacements, or any wall alignments suggestive of intact features of the 1804/5 battery were recorded.



Fig 29: There are a small number of granite masonry blocks visible at basement level which have been incorporated in the Edwardian municipal baths. This stone, re-used as a support for an iron 'I' beam has a groove. Similar grooves are found to house the iron racers on which the guns were moved to direct fire on enemy shipping (see Fig 30 below for *in situ* examples).



Fig 30: Granite gun emplacement, No. 9 Dalkey Island Battery showing grooves cut into the top surface of the granite masonry blocks forming the semi-circular gun positions. Glasthule battery had three similar emplacements armed with 24-pounder cannons. Each emplacement had a 24-pounder gun mounted on a wooden carriage with wheels that can along an iron racer which was set into these grooves. The corroding iron racers can be seen on half of the emplacement in the foreground, and survives entirely on the emplacement in the background in the photograph above.

5.4 Potential for further remains: All rooms, compartments and areas within the Edwardian bath complex were fully explored^{xi}. There are areas within the complex which could not be accessed due to the ‘over-burden’ of twentieth century concrete construction (see Figs 12-19). However, these areas are very close to sea-level, and there does not appear to be any scope for any significant remains of Glasthule battery to have survived. Within the existing complex, there is one small stretch of (probable) re-used granite masonry from the rear of the battery, a few hewn blocks and one grooved stone suggesting re-use of some masonry, and fragments of brown-stained granite used as coarse aggregate within the concrete walls of the battery. The early twentieth century municipal baths were built on an entirely new alignment to that previously used for Glasthule battery. None of the existing walls found within the bath complex align with the orientation of the battery known from historic plans, maps and illustrations. The early twentieth century development also involved the phased reclamation of the foreshore. The ordnance survey 25-inch map sheet (published in 1908 but based on an earlier survey) shows a pier in front of the battery^{xii}. Consequently, the fate of the ashlar masonry^{xiii} of the seaward side of Glasthule Battery^{xiv}. It is possible that some remains of the battery survive as areas of collapsed masonry buried within the twentieth century construction. However, the insertion of concrete retaining walls and concrete structures (in many areas visible rising from the granite bedrock) coupled with the absence of any significant alignments with the known layout of Glasthule battery lead to the **conclusion that there is only a very slight possibility of significant or recognizable remains of No. 11 Glasthule Battery surviving within the Dun Laoghaire Baths complex.**

5.5 Recommendations for further work: Further investigative work is unlikely to uncover any new significant findings, and it appears that substantial remains of the battery do not survive. The surviving fragments of re-used granite masonry salvaged during the removal of Glasthule battery and now found at basement level only of the existing bath complex could be considered as Edwardian *spolia*, however it is difficult to argue that they have any significant archaeological value. However, it would be prudent to undertake archaeological monitoring of the demolition of any of twentieth century structures, especially where concrete flooring surfaces are to be disturbed, as there remains a slight possibility of some original features surviving behind current retaining walls^{xv}.

Endnotes

ⁱ Including stone dimension, character, surface dressing, evidence of historic weathering forms, NDT *in situ* mortar analysis.

ⁱⁱ Although many spelling variations of the placename are known.

ⁱⁱⁱ For example, in October 1817 the Board of Ordnance wrote to the Dunleary Harbour Commissioners complaining "It has been reported that a quarry has been opened near Glastool tower and battery to which it is so near that great danger arises to the men quartered there from splinters of the rock while blasting the Same" (OPW8/Kingstown/66). John Aird, Directing Engineer of the Dunleary harbour project, responded stating "only one instance occurred and that was a small piece of stone which fell on the slated roof of the battery and which was instantly repaired" (OPW8/Kingstown 70(2) and 71(3). Quotes and references taken from Goodbody, R. (2010) *The Metals: from Dalkey to Dun Laoghaire*. Dun Laoghaire-Rathdown County Council.

^{iv} in a letter dated 28th April 1818 from W. Fyers RE to his superiors in the Board of Ordnance

^v Opening-up was mainly confined to opening up 20th century doorways blocked-up with late 20th century concrete blockwork. A small hole was made in a 20th century concrete retaining wall at ground level to determine the nature of the material behind this (no features or structures were noted), and a small hole (c. 300 mm deep) was made in the concrete floor of the boiler room (found to be concrete throughout, bedrock was not reached at 300mm and work was stopped at this point.

^{vi} Irish examples range from the *chevaux de frise* at Dun Aonghasa, Aran Islands, Co. Galway, to the rock cut mottes of the Anglo-Norman 'Black Castle' of Wicklow and Ferns Castle, Co. Wexford, and the rock-cut battered outcrops visible at Carlingford Castle, Co. Louth and other sites around the country.

^{vii} John Aird, Directing Engineer of the Dunleary harbour project, wrote to the Board of Ordnance for permission to run a drain from the bottom of Glasthule Quarry through the grounds of Glasthule battery to the shoreline (OPW8/Kingstown/885(2).

^{viii} There are no plans currently available for this level.

^{ix} The alignment of the battery walls are shown consistently from the earliest maps and plans to it's last depiction on the 1907 deed plan map.

^x There are no plans currently available for this level.

^{xi} This included opening-up of blocked-up doorways to access the interior, the opening up of one section of concrete flooring to a depth of 300 mm (no historic features were found), the opening-up of a small section of the retaining wall (which contained fragments of brown-stained granite masonry, but no recognisable features or structures which could be confidently assigned to Glasthule battery).

^{xii} This is the granite ashlar pier enveloped in concrete foreshore bathing areas which were added to Dun Laoghaire Baths as the twentieth century progressed.

^{xiii} This is presumed to be ashlar masonry based on comparison with the batteries at Sandycove and Dalkey.

^{xiv} Initially it was thought possible that the ashlar of the battery could have been re-used for the construction of this feature (especially as comparison with course heights at Dalkey, Sandycove and Seapoint showed that ashlar coursing was irregular in height). However, the ordnance survey map shows that the pier and the battery co-existed for a short period of time.

^{xv} It should be noted that masonry surviving in these areas is most likely to have been significantly disturbed, and used as 'fill'.