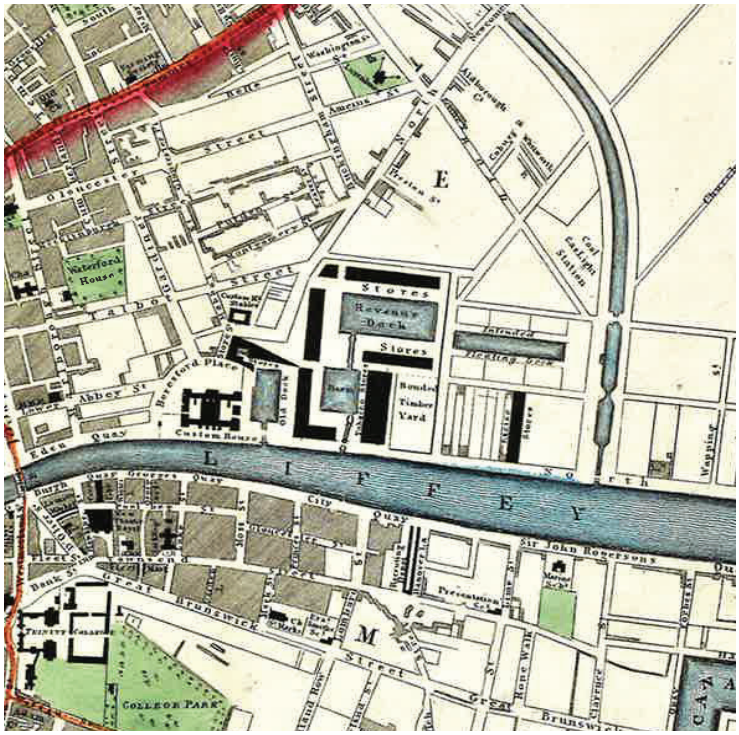
WHITE WATER RAFTING CENTRE
DUBLIN 1



CONSERVATION REPORT

August 2019

HOWLEY HAYES ARCHITECTS

Howley Hayes Architects were commissioned by Dublin City Council to prepare a conservation report for George's Dock, a protected structure on the north quayside of the Liffey, in Dublin 1. Site surveys of George's Dock were undertaken in early 2019. The purpose of this report is to assess the condition and significance of the docks and its setting, to inform the development of the site for recreational and commercial use.

CONTENTS

1.0 INTRODUCTION

In 1791 the new Dublin Custom House was completed on the north quay of the River Liffey. Widely considered to be the master-piece of the English-born architect James' Gandon, the building was commissioned by John Beresford, First Commissioner of the Revenue, as part of a large scale redevelopment of the customs and shipping operations for the city of Dublin. Three wet docks were constructed directly east of the Custom House in subsequent years; the East Dock, or Old Dock, completed in 1796, George's Dock, in 1821, and finally Revenue Dock, or Inner Dock, completed in 1824.

The East, or Old dock, was also constructed to the designs of architect James Gandon, but was completely infilled in 1927 to make way for the extension of Amiens Street to the quays. No evidence of this structure remains.

George's Dock and the Inner Dock were designed by Scottish Engineer John Rennie, who was also responsible for the design of the tobacco storehouses constructed alongside the docks. The dock was named for King George VI, who visited Ireland in 1821, and was invited to officially open the dock, but he failed to appear on the day. One warehouse, Stack A, was refurbished in 2005, and is now known as the CHQ building. It is a significant industrial building in its own right, incorporating an interesting and innovative cast and wrought iron roof truss design.

The dock structures consist of coursed limestone ashlar walls, with granite copings. Originally constructed to a depth of nine metres, George's Dock has now been infilled with a gravel bed, which sits approximately four metres below the granite coping. In 1997, a residential development was completed on the north and east sides of the Inner dock, which included two apartment blocks built within the basin itself, supported on concrete piles.

A large pontoon currently sits in George's dock, which has been leased for various events in recent years. George's Dock is a protected structure (RPS 3173).

Fig. 1 George's Dock and the Inner Dock, with the Custom House to the west (Google Aerial View 2019)

2.0 HISTORICAL DEVELOPMENT OF THE SITE

Early History

The first custom house in Dublin was constructed in 1621 on the south side of the River Liffey close to the present-day Grattan Bridge. In 1707 a new custom house, designed by Thomas Burgh, was constructed on Essex Quay close to Temple Bar, at the site of the present day Clarence Hotel. However by the late 1770s it had become difficult for large ships to navigate this far upstream, and the building itself was deemed unsafe. The Rt. Hon. John Beresford, who was appointed Chief Commissioner in 1780, proposed a new Custom House, with associated warehouses and docks further downstream. This decision was greatly opposed by the city merchants who feared it would devalue their properties along Essex Quay, but these protests fell on deaf ears. Beresford, along with several of the emerging wealthy elite of Dublin, had purchased almost one square mile of swamp land on the north side of the river opposite George's Quay, and were determined to relocate the customs and excise operation to this location to enhance the value of their landholding.

Beresford initially approached the London based, Sir William Chambers to be the architect, but as Chambers was too busy, he recommended his English-born assistant James Gandon be commissioned. The Custom House was to become Gandon's first major commission in Ireland, after which he went on to design the Four Courts, King's Inns and Emo Court, all significant buildings in their own right.

Works on the new Custom House commenced in 1781, and took ten years to complete, at an exorbitant cost. Lewis describes the building as a 'stately structure of the Doric order….of which the south is entirely of Portland stone, and the others of mountain granite'. Gandon went on to design the first dock associated with the Custom house, initially called the Revenue Dock, though it came to be known as the East or Old Dock, and was completed in 1796. It was a simple rectangular basin, built of undressed battered stone walls, with a single set of gates and timber base at the entrance. Unusual for the time, it did not contain a two-gate system, or lock, which reduced reliance on the tidal change of rivers during operation, and by that date had become commonplace in many contemporary

Fig.2 Dublin, looking west, 1817- aquatint and etching by T.S. Roberts (National Gallery of Ireland)

dock structures, including William Jessop's work at the Grand Canal Basin in Dublin. Gandon's dock, with one gate, could only admit or release ships for a couple of hours either side of high tide, as it was still dependant on the tidal flow.

Early Nineteenth-Century Development

By the early nineteenth century plans for two additional docks were underway, to be located further to the east of the Old Dock to accommodate the growing number of ships arriving in Dublin. Dock engineering had continued to progress in the intervening years, and the east dock had become obsolete and was no longer fit for purpose.

In 1814 Scottish engineer John Rennie was commissioned to design and supervise the building of George's Dock, the Inner Dock and two substantial tobacco warehouses. A keen and experienced engineer, Rennie had already completed dock commissions in London, Hull and Grimsby, and unlike Gandon, was an engineer first and foremost, interested in modern techniques in maritime construction. Rennie assessed the condition of the East dock, determined it inadequate for reuse, and proposed substantial rebuilding of three of the walls along with the entrance channel.

Rennie's designs for George's dock and the inner dock incorporated many of the advancements of the late eighteenth century, including brick and

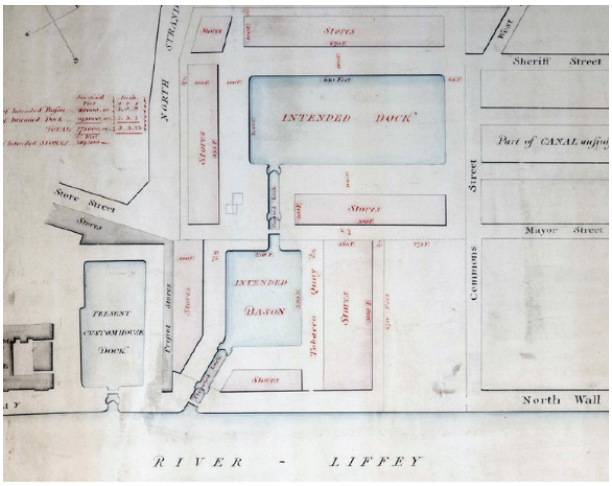


Fig.3 Proposed Custom House Docks, c.1813, Rennie (National Library of Ireland).

Fig.4 The Triumphal Arch, in its current position beside the CHQ.

masonry bases at the entrance locks, two sets of curvilinear lock gates and curved walls. Regular counter-forts; cantilevered retaining walls or buttresses, were constructed to the outer side of the dock wall to deal with lateral thrust.

George's dock was completed in 1821, and named after King George VI, who was to have presided at the official opening. He was, however, delayed by a personal engagement, and failed to arrive in Dublin, and instead Lord Castlecoote officiated at the ceremony. Rennie died in October of that year, and the second dock, the Inner Dock, was completed in 1824 under the supervision of British engineer Thomas Telford.

The triumphal arch, constructed in 1813, also designed by Rennie, marked the formal entrance to the docks from Amiens Street, and originally sat to the east end of Eden Quay.

Mid to late Nineteenth-Century Development

Despite the engineering prowess of John Rennie, by the mid 1830s the Custom House docks had started to become out-dated; the locks too small for the larger steamers and the Liffey tides restricting hours of operation. In 1869 the Ballast Board, established for the preservation and improvement of the Port of Dublin, purchased the Custom House docks and warehouses from the Crown. Plans for

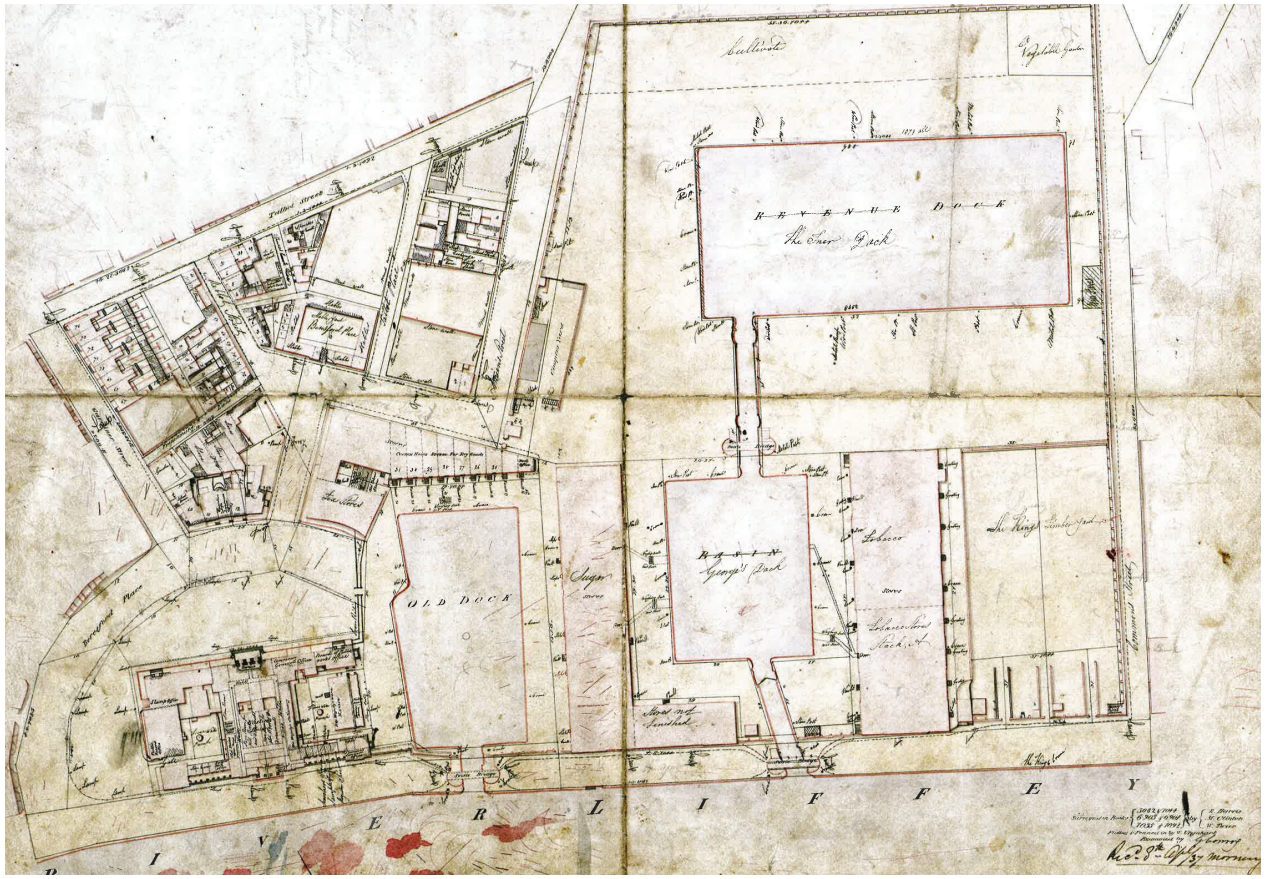


Fig.5 North Wall, 1836, from the Ordnance Survey preliminary plan, Dublin city (National Archives of Ireland).

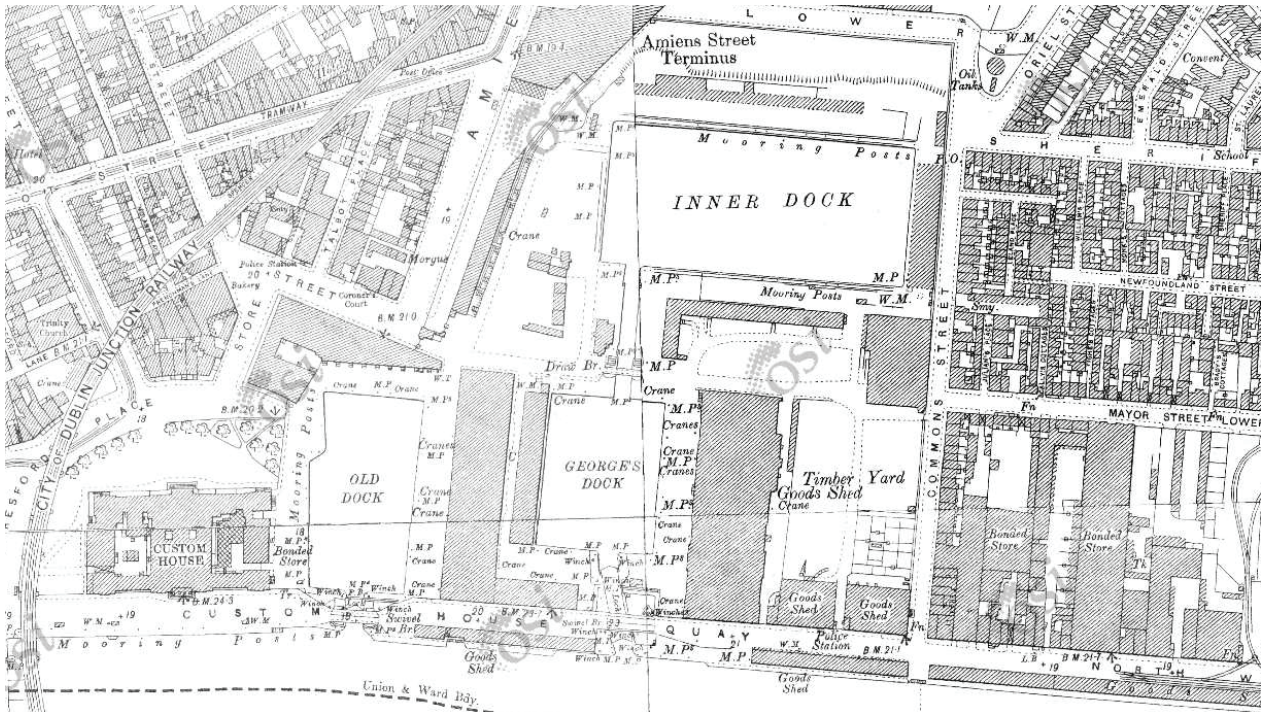


Fig .6 Ordnance Survey Map of 1888-1913 (25 inch).

Fig. 7 The Scherzer Bridges, on the north quay

Fig. 8 The Custom House

the upgrade of the docks never materialised and focus instead shifted to the development of new docks further upriver, unhampered by narrow locks and better able to accommodate larger ships. By 1885 the extension of the north wall was well underway. In the late 1880s, the docks at custom house quay were rented from the Ballast Board by Heiton's, a large coal import company, which carried out delivery and storage operations at the site until well into the twentieth century.

Twentieth-Century Development

The two Scherzer bridges, which are lifting bascule bridges, were erected in the 1934, replacing an older narrow swing bridge along Custom House Quay. These wrought iron bridges would lift to allow ships enter the dock, but are no longer in use. A matching pair, constructed in 1911, still exist further down the quay, at Grand Canal Dock.

The Custom House, represents the epitome of British rule in Ireland, housing various government departments such as Inland Revenue, Local government and Income Tax. During the Irish War of Independence the building was the target of an IRA attack in 1921, when much of Gandon's interior was lost, and the copper dome melted and collapsed. In the following years the newly established Irish government carried out comprehensive repairs and refurbishment works, including the construction of a new dome, and today it houses several government departments.

In 1927 the Old Dock was filled in, to make way for the Memorial Road, or extension of Amiens Street. By the mid to latter part of the twentieth century the demand for coal began to wane, as oil became a more popular source of fuel, and the docks eventually fell into disuse.

Established in 1987 the Custom House Docks Development Authority sought to redevelop eleven hectares of land, including the docks and warehouses for commercial and residential use. This resulted in the relocation of the triumphal arch in 1988 to its current position outside the CHQ building. Between 1988 and 1994, a number of new commercial developments were raised around the docks, including the International Services Centre, situated directly west of George's Dock and No. 1 Harbourmaster Place, north west of the dock, and directly west of the middle lock. A marketing centre (as noted on the Ordnance Survey map of 1994) was constructed on the north quay wall in front of Stack A, and is now a Dublin City Council office.

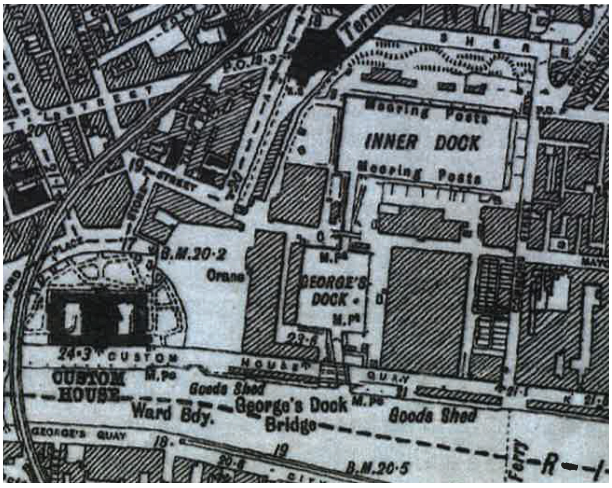


Fig. 9 Extract from Ordnance Survey map of 1938

Fig. 10 George's dock, drained with the gravel bed exposed, and the pontoon visible on the east side (2019)

Fig. 11 Apartment blocks constructed in the Inner dock in 2006.

A number of the old warehouses were removed to make way for these developments, including one side of Stack A, and the warehouse in front of it, on the north wall quayside.

A large scale residential development consisting of five apartment blocks and located on the north east perimeter of the Inner dock was completed in 1996. It included two apartment blocks situated within the basin itself, sitting on concrete piles, and surrounded by water.

Twenty First Century Development

In recent years a large pontoon was installed in George's dock, supported on a concrete slab, with associated foundations, and much of the dock has been infilled with gravel. It has been used a venue for festivals such as the Oktoberfest and also as an urban beach in 2008. It is no longer in day-to-day use.

The former harbourmasters house, which is located to the north west corner of George's Dock, and constructed in the 1830s, was converted and redeveloped in c. 2000 for commercial use. The tobacco warehouse, or Stack A was refurbished extensively and converted for commercial and retail use in 2005. Today it is now known as the CHQ building, and houses Epic, the Irish Emmigration Museum.

George's dock and the inner dock now lie within the docklands business district, with the IFSC on one side, and a refurbished CHQ building on the other. The red LUAS line, which was extended to the Point, now Three Arena, in 2009, crosses the middle lock on a new traffic bridge. Additional residential and mixed use developments have sprung up between both basins. A stainless steel handrail has been installed around George's dock on all sides set back from the granite coping stones.

Fig. 12 The refurbished CHQ building on the north wall quay.

3.0 DESCRIPTION OF THE DOCKS

The docks and associated locks are important, early nineteenth-century maritime structures. George's dock, approximately 1.25 acres in size and measuring 96m x 72m, is constructed of dressed granite and coursed ashlar limestone, with a puddle clay base. A system of interlocked stone counterforts, or buttresses, are spaced at equal intervals behind the walls, to prevent lateral thrust, and the walls are built on a continuous curve from top to bottom, rather than being constructed with a batter, in order to increase stability. Rennie also specified a heel to the back foot of the wall in order to increase its resistance to movement, and a series of drainage culverts around the perimeter to minimise the risk of horizontal pressure from surrounding water-logged soils. At the time of construction the walls were 35 feet (or 9m) high, and the base of the dock consisted of a puddle clay, a typical material specification at the time.

Fig. 13 The refurbished CHQ building on the north wall quay.

Fig. 14 The lock gates at the entrance lock to George's dock.

The Inner dock, is approximately 4.5 acres in size and is of similar construction and depth to George's Dock. There are two locks, the entrance lock, which connects George's Dock to the Liffey, and the middle lock, which connects the two docks. Both are of similar construction to the dock walls, incorporating counterforts, although the lock. walls are straight, and the base is an inverted arch of stone. Built at an angle, the entrance lock is positioned to make best use of the tidal flow, and ease of entry for ships. Rennie previously positioned the entrance lock at a different angle, which is shown in his initial drawings of the dock.

One of the pairs of curvilinear steel and timber gates, which were designed to sit neatly into recessed niches in the stone walls when open, is still in place in the entrance lock. A timber gang-way that runs along the top of the gates allowed for pedestrian crossing, and is reached by several granite steps built into the side of the lock wall. A second set of timber gates in the entrance lock sits under the Scherzer Bridges and is only accessible by boat.

A number of mechanical structures survive around the perimeter of the docks, including - three iron winches, two on the south end, and one by the Inner dock, and a dock crane on the east wall of George's dock, all dating back to the early nineteenth century. The wrought iron Scherzer Bridges are examples of a bascule bridge which originated in Chicago, designed by William Scherzer, and became immensely popular throughout the world.

4.0 CONDITION OF THE DOCKS

Howley Hayes Architects carried out preliminary visual inspections of Georges dock and the Inner Dock on the 7th and 24th January 2019. At that time, the water had been fully drained from George's dock, exposing the gravel base, with the temporary platform sitting on the concrete slab still in place. An access ramp was also still in place along the east wall. Inspection of the east wall was restricted due to the presence of the platform. In the Inner Dock, the water level was lowered, and access for inspection was provided by boat.

Nine irregular courses of stone are visible down to gravel level in George's Dock and the current 'bed' is approximately six metres below the granite coping stone. According to earlier records the dock is nine metres deep, and was subsequently infilled, but further investigations will be required to determine the exact level of the base of the wall. Twelve courses were visible in the Inner dock, extending down to water level.

The dock walls are in a reasonably stable condition but will require some repairs. The most significant issues include heavily weathered, wide open joints, poor previous repairs in brick and cement, water ingress from behind the dock wall, rusted fixings and biological growth.

Fig. 15 Biological growth and water ingress on the west wall of George's dock.

Fig. 16 Previous repair to the dock wall.

- Open joints – these vary in size, from several millimetres to two/three centimetres in width. Excessive wash out of pointing is evident in numerous locations, and a degree of the failure is likely due to movement in the walls.
- Poor previous repairs – crude cement coatings have been applied along with brick and block infills where the walls have failed. The brick and block infill appears to be stable.
- Water ingress is also evident, though not excessive. It is likely caused by ground water seepage from behind the walls, and this should be monitored further.
- Rusted iron hooks are embedded in the walls are regular intervals, along with rusted access stairs to each dock.
- Biological growth is sprouting from the open joints, and is more prolific on the west wall of the dock, which is quite exposed.
- The stonework on the Inner dock is heavily encrusted with sea-life below the usual water-mark line.

Fig. 17 The access ramp along the east wall of the dock.

5.0 SIGNIFICANCE OF THE DOCKS

The guidelines to the Burra Charter states that: Cultural Significance is a concept, which helps in estimating the value of places. The places that are likely to be of significance are those which help an understanding of the past or enrich the present, and which will be of value to future generations. Cultural significance means archaeological, aesthetic, historic, scientific, social or spiritual value for past, present and future generations.

Assessment of Significance – George's Dock and the Inner Dock

It is important to establish the significance of the docks within these parameters, and to understand the opportunities and constraints that are found there, in order to develop a suitable conservation and development strategy for the site.

The docks were constructed as part of the relocation of Dublin's customs and excise operations, and sit east of James Gandon's Georgian masterpiece, the Custom House, on Dublin's North Wall. Gandon was also involved in the early dock infra-structure, and responsible for the design of the Old Dock, which is now filled in. The engineering and construction methods utilised in George's dock and the Inner dock were avant-garde in their day, and implemented by two engineers of note, John Rennie and Thomas Telford, the latter of which is

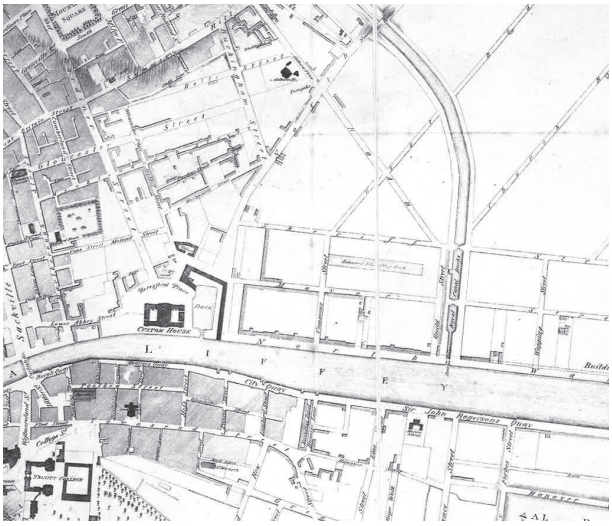


Fig. 18 Thomas Campbell map of Dublin, 1811 showing the site for the docks

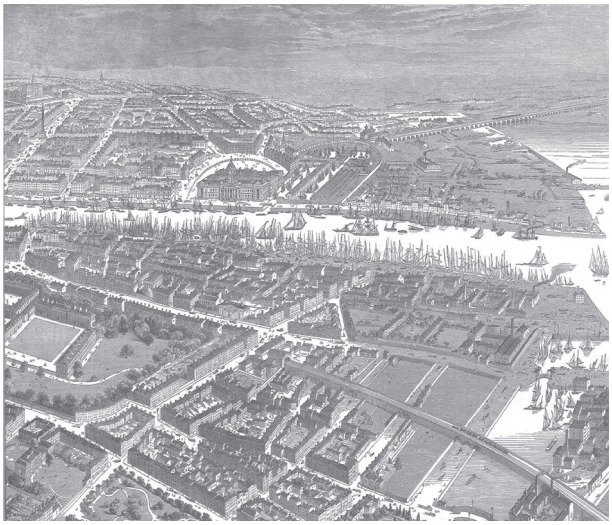


Fig. 19 City of Dublin (1846), artist's impression.

generally considered to be one of the greatest British engineers of the nineteenth century. These two structures, and their associated locks and warehouses, played an important role in the history of Dublin's docklands, which saw the relocation of the entire customs and excise operation further downstream at the turn of the eighteenth century.

The relocation of the shipping operations had a social impact; it affected the local merchants and shipping magnates, and resulted in reduced property values further upstream. Years later, in the early twentieth century the Custom House itself had become such a symbol of British power and wealth in Ireland, it was the focus of an attack by the Irish Republican Army. The wet docks and warehouses which have survived are remnants of the city's era of shipping and quayside development.

The site is of considerable industrial archaeological significance as is the Stack A warehouse, a cast iron and brick structure, with an impressive roof construction. A glasshouse was also shown west of Stack B, on Rocques map of 1756. No evidence of this structure remains on site today.

Threats to the Significance

Redundancy or inappropriate reuse are the biggest threats to the wet docks. Located in an area of considerable commercial and residential value, the docks have already been encroached on all sides,

and a previous intervention in the inner dock, the construction of two apartment blocks, has already detracted from historic value of the Inner basin.

Deterioration of the dock walls is also an on-going threat, and the evidence of washed out joints, biological growth and on-going water ingress will lead to further failures in the stonework if not remediated.

Statement of Significance
The significance of the dock lies chiefly in its historical, architectural and technical merit, as an integral part of the development of Custom House quay, and as an example of early nineteenth century maritime engineering on the north Dublin quayside.

Social significance lies within the role Beresford and Gandon played in the development of the custom house quay, which changed the fortunes of local merchants and impacted on property values along this stretch of the north wall.

The site is of industrial archaeological significance due to the innovative engineering designs executed by Rennie, in particular of the construction methods employed on Stack A, now the CHQ building.

6.0 CONSERVATION STRATEGY

The dock walls, entrance lock and associated structures should be retained and repaired with appropriate materials. George's dock will not be brought back to its original use, as an active wet dock, and instead will continue to function as a water basin or similar in the future. Conservation strategies and repair approaches should take account of this, and be appropriate to the future use of the dock.

The existing concrete slab and pontoon should be removed, as this is an inappropriate intervention, and access is required to the east wall of the dock, in order to carry out a condition survey.

A conservation strategies for the repair and maintenance of the dock walls and associated structures are outlined below. The Inner dock does not currently sit within the site area for these proposals, and so will not be subject to any repairs at this time.

The George's Dock walls
The granite and limestone walls, which will be exposed on the current proposals, should be

Fig. 20 Revenue dock gate and entrance, James Gandon (National Library of Ireland).

cleaned using medium water pressure and bristle brushes. If this should fail to remove all stains, paint etc., a higher pressure clean will be trialled, and possibly appropriate poultices will be applied. The final cleaning method should be determined following cleaning trials on site.

All biological growth should be removed from the walls, by hand, including all roots.

The walls should be repointed with a suitable lime based mortar. Testing of the existing mortar should be carried out in order to determine the current mix, and a new mix of equal strength will be proposed. Wider joints may require stone inserts, in slate or limestone, to help close the joints.

Removal of all friable and loose cement where inappropriate repairs have been carried out, and structural assessment of the previous repairs will be undertaken. Any brick or block removed will be replaced with a suitable portion of limestone pieced in. Structural repairs should be limited to pinning with stainless steel rods, where required, or replacement of failed stone, with limestone or granite to match.

Removal of rusted iron ladders which pose a safety threat. New access ladders, if required, should not to fixed directly into the stonework, but into the joints.

The Entrance Lock

The existing curvilinear iron and timber lock gates will be fully recorded in situ, following removal of the existing fill in the basin. They will be dismantled and removed for storage off site. A methodology

Fig. 22 Granite steps in the entrance lock

is outlined in Appendix A. In the future, the gates could be relocated to the inner lock, where there are existing niches, but no gates in place.

Retention and repair of the granite steps either side of the lock should be undertaken.

Surrounding Structures

The Triumphal Arch does not currently sit in its original location, but will be retained under the current proposals. It should be fully protected during the works. See Appendix A for outline of protection works.

A photographic study will be undertaken of the various iron structures surrounding the dock, such as the winches and crane. It is anticipated that at least one winch may need to be temporarily removed for the duration of the works on site, and reinstated. This will be established prior to the construction works when further detail on the construction sequence is available.

Fig. 23 Existing winch, on the dock wall

7.0 DEVELOPMENT STRATEGY

Protective Curtilage & Development Zones

The protective curtilage proposed for the George's dock will include all historic granite coping stones, and areas where the historic granite extends beyond the coping, and in some instances include ancillary elements such as iron winches and a crane.

Further development around the perimeter of George's dock would not be appropriate and the dock side should be kept free of further interventions. A sub-station is required west of the triumphal arch, adjacent to the lock, which will be carefully screened to minimise visual impact. It's linear form is reminiscent of the coal sheds which would have once adorned the docks. There is an opportunity here to tell the history of the site on the elevations of this building, through story-boards. Landscaping, or reordering of the ground-scape around the dock would be acceptable, up to the edge of the granite stone, but should be of appropriate material and colour, and not distract from the granite.

Fig. 25 View of the new sub-station beside the Triumphal Arch.

Development within the dock itself should be considered, as it would be beneficial to the City if a new use could be found for the water basin. However all proposals should be fully reversible and not detract from the form and shape of the dock, nor impinge on or over-sail the dock walls.

Development of the Existing Dock

The proposed new use for the George's dock is a white water rafting facility, operating from a new building on the quay-side, which will replace the late twentieth-century former offices of the former DDDA.

Located within the dock itself, the white water rafting course will be self-contained within a new

Fig. 26 Model showing the white water rafting centre in the dock and new quayside building.

concrete housing. An island will be constructed in the centre of the housing, which will contain a canoe polo pool and a swift water rescue training centre at the north end.

A number of key aspects have been incorporated into the design, to ensure that the proposals do not detract from the historic value of the dock.

The primary issues are outlined below, with the mitigation response for each.

Appropriate Use

The proposed use is considered appropriate as it will reactivate the dock with a water based activity. It is considered to be of community benefit, and will draw the general public and tourists alike, allowing people to engage with the dock once again, visually and physically.

Reversibility

A separation layer, in the form of a compressible board, will be placed against the existing walls, and a new concrete wall will be formed against it. In the future, this concrete wall could be broken out, and the board removed, resulting in minimal impact on the existing walls. A separating sheet will be used to the back of the insulation, to resist any ground water which may seep through the old walls.

A new concrete slab will be required within the dock, however this will also be independent of the walls, and supported off a grid of concrete piles. The slab will be positioned approximately two metres above the base of the old wall, sitting 6.5m below the granite coping stone.

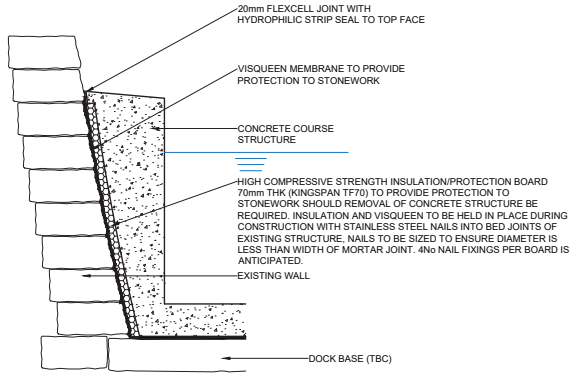


Fig. 27 Detail showing the construction of the new concrete wall alongside the existing dock wall.

Visual Impact

The visual impact on the dock was considered throughout the design process, particularly in relation to the height of any structures to be inserted within the basin. The top of the granite coping stones sit at +4.4m, and the island has been designed to sit lower than the wall in all locations, typically at height of +3.5m to +3.95m, except at its entry point on the south east corner.

In this location a small raised portion of the island, which will house the pumps, will sit at +5m to +6.65m. Though sitting higher than the dock wall, this pumping station will not oversail the basin edge

Fig. 28 View across the white water rafting course looking south

Fig. 29 View across the white water rafting course looking north east (CHQ building on the left)

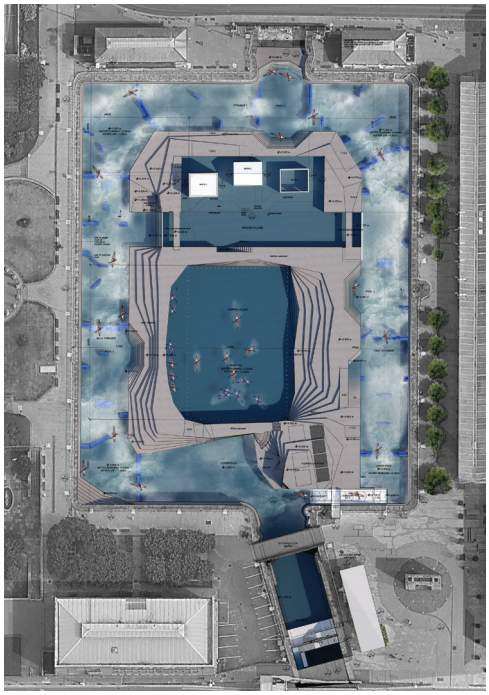


Fig. 30 Proposed White Water Rafting Course within George's Dock.

and will sit within the basin, sitting approximately 2m in from the dock edge. This unit has been positioned as low as possible, and considering the scale of the basin, should not prove overly obtrusive.

An initial proposal, to utilise the Inner dock as a source of fresh water, involved the insertion of a concrete basin in the inner dock, and works to the middle lock, in order to bring fresh water through to the white water rafting course. An alternative option, requiring an increase in the size of the pumping station, would remove the need for works to the middle lock and inner dock, with the pumping station providing sufficient fresh water for the full course.

Alternative locations for the pump station were explored, but the visual impact of this structure on the basin edge was considered highly obtrusive, and placing it within the basin will result in the majority of it sitting below the water level. A bridge is also required in this location to provide access to the island.

The new concrete channel which will be inserted around the island, to form the white water rafting

course, starts at a high level in the south east corner, and then drops continuously to its lowest point in the south west corner. The extent of existing wall which will be visible over the new concrete walls is indicated on the Howley Hayes Architects repair drawings (elevations).

Surrounding Structures
The existing maritime structures, winches, crane and lock gates will all be repaired and left in position, while the lock gates will be repaired and left open under the footbridge, sitting within their curved stone niches.

The triumphal arch will be retained in its current position and protected throughout the duration of any works.

Conservation Benefit
The new works will provide an opportunity to clean and repair the existing walls which are covered in grime and growth, with washed-out coursing and rusted fittings. A sizeable portion of the old dock walls will remain exposed, providing a historic backdrop to the new water course. This will greatly improve the aesthetic impact of the existing historic fabric which is certainly in need of conservation.

Fig. 31 Existing Dublin City Council office (former DDDA office) on the north quayside

Fig. 32 Proposed quay-side building - opening up views to the Liffey.

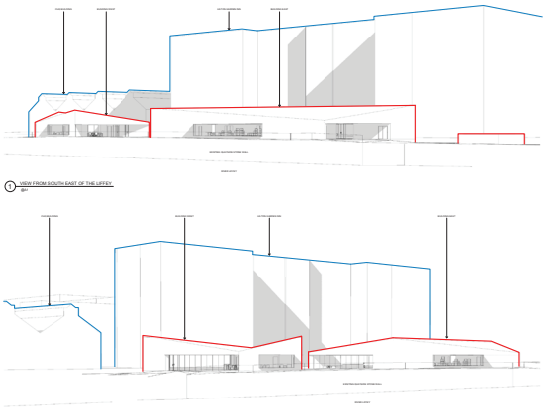


Fig. 33 Proposed quayside buildings shown in context

Fig. 34 Proposed quayside buildings shown with existing buildings behind.

Development of the North Quayside
Two new buildings are proposed on the north quay of the Liffey, in place of the existing former DDDA office, which is of poor architectural merit, and detracts from the quayside and provides a visual barrier to the Liffey for pedestrians and cyclists. The proposals for two new contemporary structures, which will house the white water rafting centre, together with conference facilities for Dublin City Council, will be designed to an appropriate arrangement and scale. An open area between both buildings provides views and access to the edge of the quay wall.

The new buildings will not oversail the quayside, as the current Dublin City Council area office (former DDDA office) does, and will allow the public access to the edge.

The foundations of the new buildings will be designed to ensure minimal impact on the existing quay walls, and any fixings to the Liffey quayside will be through the joints rather than the stonework. Repairs to the Liffey quay-walls where required, will be carried out using stainless steel pins, with appropriate mortars.

8.0 SUMMARY OF CONCLUSIONS

In 1791 the new Dublin Custom House was completed on the north quay of the River Liffey. Widely considered to be the master-piece of architect James' Gandon, the building was commissioned as part of a large scale redevelopment of the customs and shipping operations for the city of Dublin.

George's Dock, completed in 1821, and the Inner Dock, completed in 1824, were designed by Scottish Engineer John Rennie, who was also responsible for the design of the tobacco storehouses constructed alongside the docks.

Rennie's designs for George's dock and the inner dock incorporated many of the advancements of the late eighteenth century, including masonry bases in the locks, curvilinear lock gates and curved walls.

The dock structures consist of coursed limestone ashlar walls, with granite copings. Originally constructed to a depth of nine metres, George's Dock has now been infilled with a gravel bed, which sits approximately four metres below the granite coping, and in recent years a large pontoon was installed in the dock, supported on a concrete base.

The triumphal arch, constructed in 1813, designed by Rennie, marked the formal entrance to the docks from Amiens Street, and originally sat to the east end of Eden Quay. It was relocated in 1988 to its current position outside the CHQ building.

The two Scherzer bridges, which are lifting bascule bridges, were erected in the 1934, replacing an older narrow swing bridge along Custom House Quay.

By 1869 focus had shifted to the development of new docks further upriver, unhampered by narrow locks and better able to accommodate larger ships.

One warehouse, Stack A, was refurbished in 2005, and is now known as the CHQ building. It is a significant industrial building in its own right, incorporating an interesting and innovative, cast and wrought iron roof truss design.

Between 1988 and 1994, a number of new commercial developments were raised around the docks, including the International Financal Services Centre, situated directly west of George's Dock and No. 1 Harbourmaster Place, north west of the dock, and directly west of the middle lock. A marketing centre (as noted on the Ordnance Survey map of 1994) was constructed on the north quay wall in front of Stack A, and is now the area office for Dublin City Council, and was formally the DDDA office.

A number of mechanical structures survive around the perimeter of the docks, including - three iron winches, and a dock crane, all dating back to the early nineteenth century.

The dock walls are in a reasonably stable condition but will require some repairs. The most significant issues include heavily weathered, wide open joints, poor previous repairs in brick and cement, water ingress from behind the dock wall, rusted fixings and biological growth.

The significance of the dock lies chiefly in its historical, architectural and technical merit, as an integral part of the development of Custom House quay, and as an example of early nineteenth century maritime engineering on the north Dublin quayside.

The dock walls, entrance lock and associated structures should be retained and repaired with appropriate materials. George's dock will not be brought back to its original use, as an active wet dock, and instead will continue to function as a water basin or similar in the future.

The protective curtilage proposed for the George's dock will include all historic granite coping stones, and areas where the historic granite extends beyond the coping, and in some instances include ancillary elements such as iron winches and a crane.

Further development around the perimeter of George's dock would not be appropriate and the dock side should be kept free of further interventions. Development within the dock itself should be considered, as it would be beneficial to the City if a new use could be found for the water basin.

All proposals should be fully reversible and not detract from the form and shape of the dock, nor impinge on or over-sail the dock walls.

The proposed use, a white water rafting facility, is considered appropriate as it will reactivate the dock with a water based activity. The triumphal arch will be retained in its current location and protected during the works.

Two new buildings are proposed on the north quay of the Liffey, in place of the existing Dublin City Council office, which is of poor architectural merit, and detracts from the quayside. The proposals for two new contemporary structures, will be designed to an appropriate arrangement and scale. An open area between both buildings provides views and access to the edge of the quay wall and the new buildings will not oversail the quay-side.

APPENDIX A

Conservation Works and Methodology

Outline Works

1. Remove all vegetation and biological growth from the existing dock walls by hand.
2. Removal of all debris and marine life fixed to the dock walls in the inner dock.
3. Assess all cracks and openings with structural engineer.
4. Repointing of joints where required, with suitable mortar mix. Note large open joints may require significant repointing to considerable depth, with stone inserts where required. Open joints will be closed. Existing mortar to be analysed to determine mix.
5. Investigate source of all ground water ingress. It is likely ground water seeping through the open joints. Note: repointing of the walls will ensure that this does not continue to the same extent. Adequate drainage channel to be provided to the base of the new wall.
6. Treat rusted elements in situ where possible - remove rust and apply rust resistant coating. Remove rusted elements beyond repair.
7. Remove all friable/ loose cement repairs.
8. Assess all infill brick/ block repairs for stability.
9. Full clean to all exposed stone work over proposed new concrete walls - areas noted on drawings. Cleaning trials to be carried out and agreed with conservation officer and planner during conservation works. Medium pressure water with fine aggregate clean should be sufficient to remove dirt, paint and other debris.
10. Remove all access ladders throughout. Photo record of ladders prior to removal. Retain one ladder onsite for future display. New ladders, if required, will not be fixed into existing historic stonework but fixed at bottom and top, beyond the granite copings.
11. Existing lock gates to be fully recorded, dismantled and stored off site.
12. Existing winches to be fully protected during the works. Winch to east of lock gates to be temporarily removed only if required.
13. Indent repairs to be employed where required. Samples of indent repairs to be prepared during investigation works package for review by planner and conservation officer.

Recording works

1. A full photographic record of the historic features and elements prior to commencement of the works.
2. Measuring and recording of the lock gates, and ladders, prior to removal. The lock gates will be carefully dismantled, tagged with stainless steel tags, and stored in a suitable off site location provided by Dublin City Council.

Samples to be provided during the investigation / opening up works, ahead of the main construction works:

1. Repointing sample
2. Rust treatment sample – with rust resistant coating
3. Cleaning samples – for areas to be exposed
4. Indent repair samples (if required)
5. Outline proposals have been developed for the repairing of cracks to the quay walls. This will be interrogated further on site, and one sample repair will be carried out for review by the Conservation Architect and Conservation Officer.

Protection works

Please refer to the Patrick Parsons Preliminary Construction and Demolition Management Plan for further information on the protection of existing historic elements during construction.

Removal of Interventions

The concrete liner will be cast against a separating layer and 70mm of insulation. This will allow for the removal of the concrete at a later date if ever required. Due to the presence of a visqueen sheet and 70mm of insulation board, acting as a buffer zone, it will be possible to knock out the concrete with minimal to no damage to the granite walls behind, under a careful sequential methodology devised by an experienced contractor. We would envisage a similar removal process as undertaken when a concrete slab, with a separating layer, is installed over a historic base, such as cobble stone. As this is a protected structure any future proposals to remove the concrete channel will require planning permission, and this removal process will be reviewed by the local authorities.

Howley Hayes Architects are recognised for their work in both contemporary design and for the sensitive conservation of historic buildings, structures and places. The practice has been responsible for the conservation and reuse of numerous buildings of national and international cultural significance, many of which have received RIAI, RIBA, IGS, Opus or Europa Nostra Awards. Under the Conservation Accreditation System, implemented by the Royal Institute of Architects of Ireland, Howley Hayes Architects is a Grade 1 Conservation Practice, and James Howley is a Grade 1 Conservation Architect. Over the years the practice has completed many projects for the restoration, conservation and adaptation of historic buildings and places including – Russborough, Lambay, the Law Society Headquarters at Blackhall Place; Hotel Ard na Sidhe; the Crawford Observatory & the Pavilion in the People's Park, Dun Laoghaire; together with numerous churches dating from the twelfth to the twentieth century. Howley Hayes Architects have to date been responsible for over 180 conservation plans, reports and strategic master plans for clients such as the Heritage Council, the World Monument Fund, the Department of Arts, Heritage, Regional, Rural & Gaeltacht Affairs, the Office of Public Works, together with many local authorities and private clients, including the Alfred Beit Foundation, Liebherr International, Diageo, several Irish Universities, numerous churches and the Governors & Guardians of Marsh's Library.