codling wind park

Onshore Substation Architectural Design Statement

CODLING WIND PARK
ONSHORE SUBSTATION
Architectural Design Statement

FAULKNERBROWNS
ARCHITECTS

CONTENTS

Prepared by AC
Checked by ND

1.0 INTRODUCTION

1.1 PREFACE

This report is prepared with regards to the Codling Wind Park onshore substation buildings, an onshore infrastructure component of the overall Codling Wind Park planning application.

This document has been prepared by FaulknerBrowns Architects with contributions from Mott MacDonald, on behalf of Codling Wind Park, the applicant for the development.

1.2 INTRODUCTION

Codling Wind Park represents one of the most significant energy infrastructure investments in Ireland in the past ten years. Located off the coast of Wicklow, the offshore wind farm is set to become one of Ireland's largest.

To help achieve the goals set out in Ireland's Climate Action Plan, Codling Wind Park will contribute to decarbonisation by creating a source of renewable energy. Providing the equivalent of up to 70% of Irish households with electricity, up to 1.7 million tonnes of CO_2 savings will be made each year.

The project is composed of a series of offshore and onshore components, one of which is the subject of this design report: the onshore substation located on Poolbeg Peninsula.

The site location for the onshore substation has a compact footprint surrounded on three boundaries by water and then by a mixture of industrial uses. To facilitate the infrastructure and layout required, it has been stacked vertically, giving taller volumes than typically required for an onshore substation of this type. Given the sensitivity of the surrounding fabric, which includes Pigeon House Power Station, it was crucial that the visual impact of the onshore substation buildings was reduced where possible, while creating a strong design that reflects the context in a contemporary way. FaulknerBrowns was commissioned to design the onshore substation facades and to achieve these design objectives. The following pages document the design narrative, development and outcome.

This design statement should be read in conjunction with the other documentation submitted as part of the planning application.

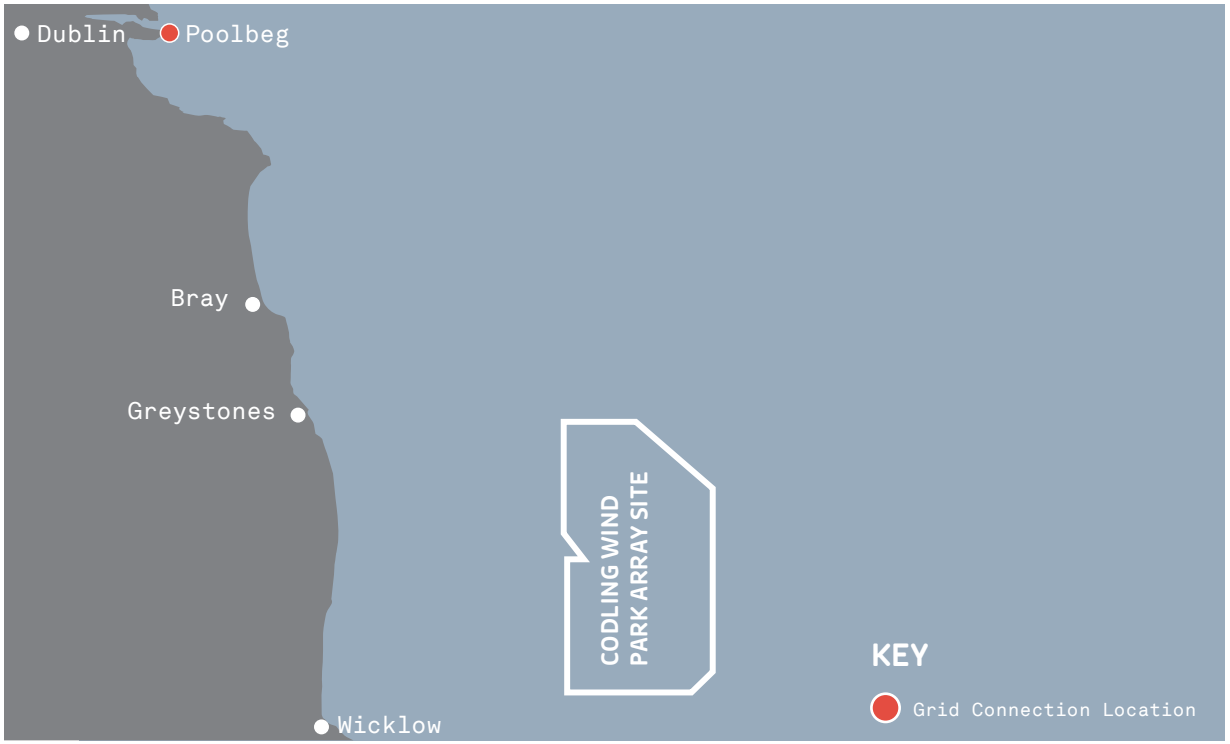
1.3 OFFSHORE WIND FARM AND ONSHORE SITE

Offshore wind farm array site
Codling Wind Park offshore wind farm is located approximately 13 to 22 kilometres off the County Wicklow coast, between Greystones and Wicklow Town.

The total area of the array site is approximately 125 km², with up to 75 turbines.

Onshore substation site selection
The Grid Connection Assessment process for Codling Wind Park identified Poolbeg as the only suitable location to connect the array site to the existing onshore transmission grid. Several locations on Poolbeg Peninsula were considered for the onshore substation site as illustrated on the page opposite.

The selected site is bound to the north by the mouth of the River Liffey, with the protected structures of the Pigeon House Precinct located to the east and the wastewater treatment plant to the south. The context is a rich mix of industrial and heritage fabric, ranging from the Dublin Waste to Energy Facility to the Pigeon House.



Location of the Codling Wind Park array site and grid connection location

An offshore wind farm

Onshore infrastructure: Site selection at Poolbeg Peninsula

1.4 PROJECT EVOLUTION

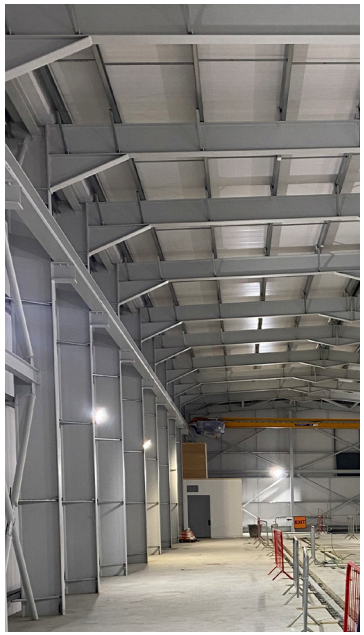
Due to the prominence of the site within Dublin Port and the special nature of the protected buildings in close proximity, the facade design and visual impact of the substations were of a greater consideration than in typical circumstances.

As indicated in the diagram on the opposite page, the site is more compact than is normally allowed, requiring a stacking of volumes and therefore an increase in building height.

The buildings were originally designed from an engineering perspective, with a focus on industrial buildability and efficiency, as per the initial drawing below. The combination of an industrial, insulated panel facade finish (see image of standard substation design to the right) and considerable height raised the question as to whether this approach was suitable for the unique nature of this location.

Following these queries, FaulknerBrowns was appointed to create a facade design which represented the architectural narrative of the past, present and future of Dublin Port.

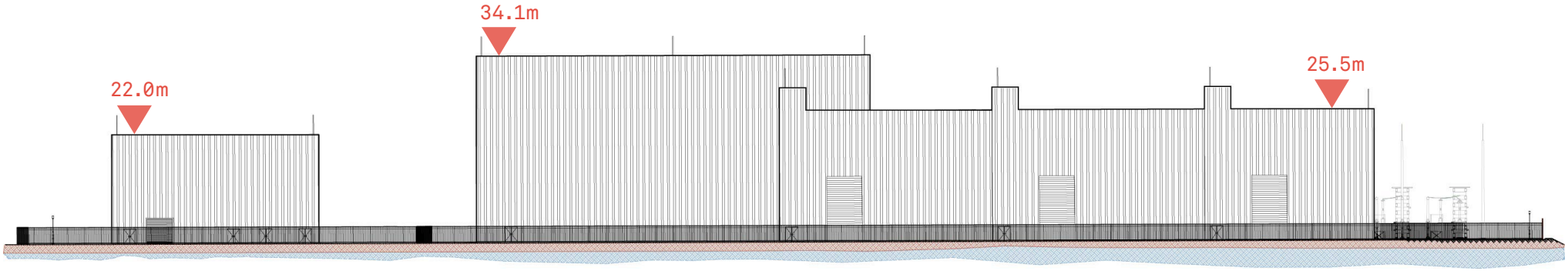
Standard substation design



Standard substation design

Cladding style

Cladding style



Poolbeg substation initial design

View of selected site, taken from the ferry terminal dock

1.5 SITE CHALLENGES

Visual impact
As is evident from the image on the left, the onshore substation site is clearly visible from many key viewpoints, such as the ferry terminal. Therefore, the facade design must ensure the substation buildings sit comfortably within the composition along the water's edge.

Compact footprint
The compact footprint of the site increased the height of the substation buildings, as illustrated in the diagram below.

Proximity to protected structures
The importance of the built heritage of the Pigeon House power station, Great South Wall and Pigeon House Hotel calls for a design which responds to the character of these historic structures.

01 Typical substation volume

02 Stacked volumes to accommodate compact site

03 Taller than typical substation

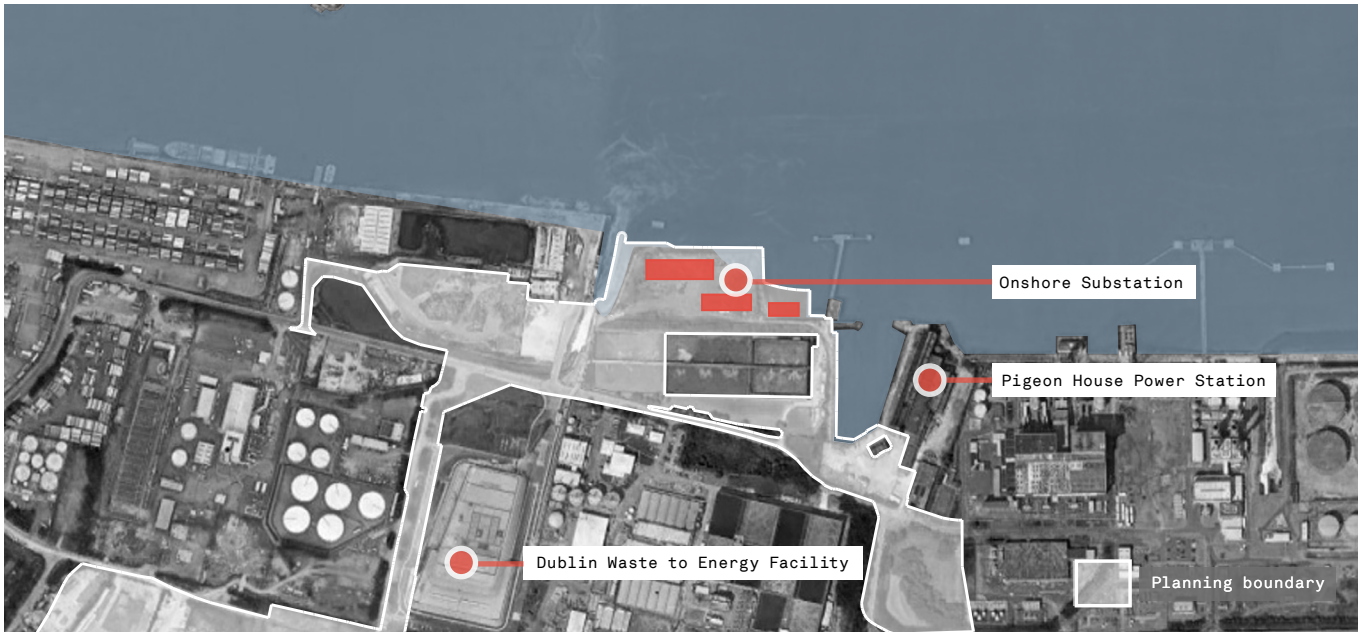
2.0 SITE & CONTEXT

2.1 SITE OVERVIEW

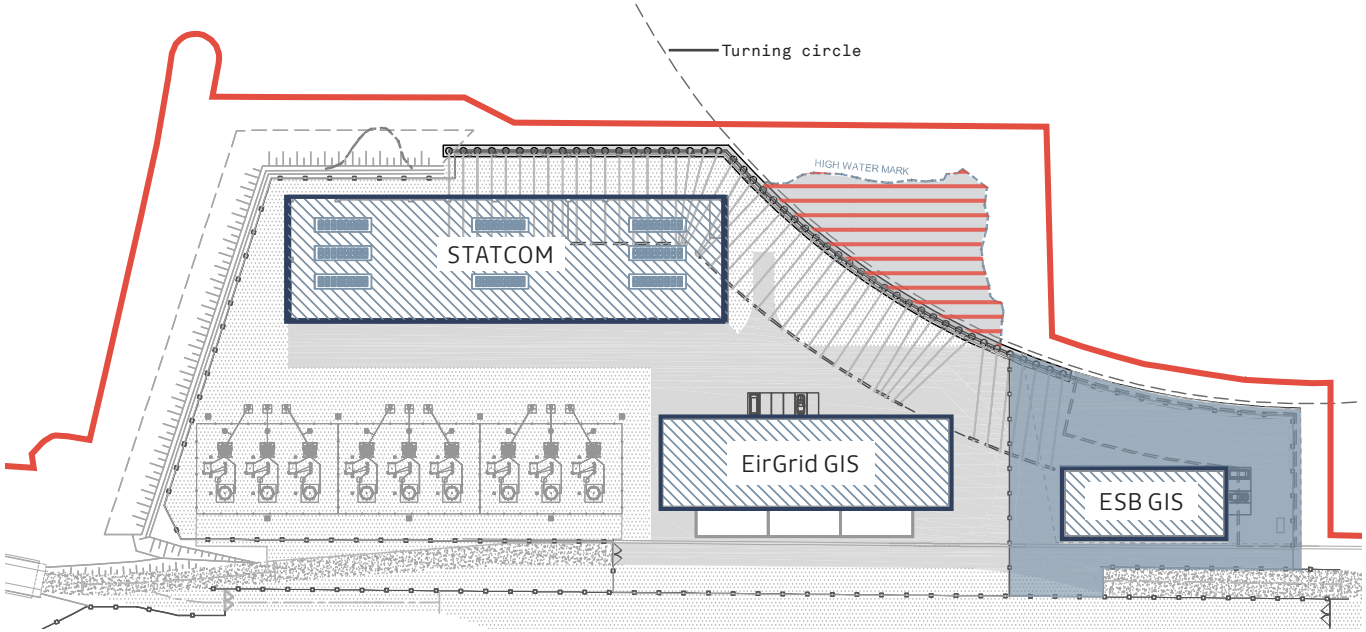
The onshore substation will be located on Poolbeg Peninsula, east of Dublin city.

This site has direct frontage to the water of the River Liffey and sits directly across from the Irish Ferries terminal.

Location of site: Poolbeg Peninsula



Location of onshore substation: Poolbeg Peninsula



Onshore substation: Poolbeg Peninsula

2.2 SITE LAYOUT

The site is currently unused land on the southern bank of the River Liffey, reclaimed by Dublin Port Company (DPC) in c. 1998 and surrounded on three boundaries by water and then by a mixture of industrial uses. The decommissioned Pigeon House Power Station lies to the east of the site, with Dublin Waste to Energy Facility in close proximity to the south.

The site's boundary will be manipulated to take account of the DPC 3FM Project. This includes a proposal to construct a 325m diameter ship turning circle within the River Liffey, immediately in front of the onshore substation site. The proposed turning circle will require the removal of part of the reclaimed land, upon which onshore substation will be built.

The onshore substation design also includes an ESB GIS building between the onshore substation and the grid connection point at the Poolbeg 220kV substation. This will require an extent of land reclamation adjacent to the onshore substation site.

The onshore substation layout includes three main buildings, referred to throughout this statement as blocks:

Block 1: STATCOM Block (static synchronous compensator)
Block 2: EirGrid GIS Block (gas insulated substation)
Block 3: ESB GIS Block

KEY

- Planning application boundary
- Land cut
- Land fill

2.3 SITE CONTEXT

Poolbeg has a rich industrial and historic context. The peninsula has some of the tallest structures in the city, which can be seen from locations across Dublin. The Great South Wall is a popular walking destination for residents, providing a scenic view of the bay.

The materials surrounding the site context consist of brick, stone and industrial metal structures.

Site colours and materials

Dublin Waste to Energy Facility

Poolbeg chimneys from Great South Wall

View from shore line, looking towards Pigeon House Power Station

View from the Great South Wall, looking west

Pigeon House Power Station and Poolbeg chimneys

View from Tom Clarke Bridge looking east

Pigeon House Power Station

Pigeon House Hotel

View entering Dublin Port, looking towards the proposed site

2.4 KEY SITE VIEWS

Key site views were identified for consideration of the visual impact of the new onshore substation buildings. The buildings' form and materials were tested in the context of these views throughout the design process. Further information can be found in section 3.6 '*Testing materials in context*'.

Please refer to the separate Landscape Visual Impact Assessment, submitted as part of this application, for a detailed appraisal of the project's visual impact.

Clontarf Promenade

Sandymount view

Great South Wall

Bull Road Clontarf

2.5 HERITAGE AND FABRIC

The historic fabric of Poolbeg was researched and mapped during the design process with reference to the MP2 Project's 'Conservation Strategy and Industrial Heritage Appraisal', in order to understand the significance of the site and the surrounding fabric.

As previously mentioned, the site is close to protected structures such as the Pigeon House Power Station (RPS 6796), as well as national monuments such as the Pigeon House Fort (DU019-038001) and Hotel (DU019-027) and Great South Wall (DU019-029002).

The significance of the historic surroundings required a sensitive design approach with an appreciation of the context.

Historic view of Pigeon House Harbour

Historic view along the quays looking east

View from North Wall Quay, 1950s

Aerial view, Ringsend and Hanover Quay, 1952

Pigeon House Power Station

Poolbeg Lighthouse

Power station chimneys

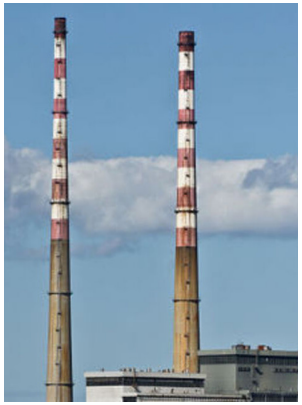
Pigeon House Fort (national monument)

Great South Wall (national monument)

Heritage landmarks and protected structures

The Great South Wall

Pigeon House Power Station



Power station chimneys

Poolbeg Lighthouse

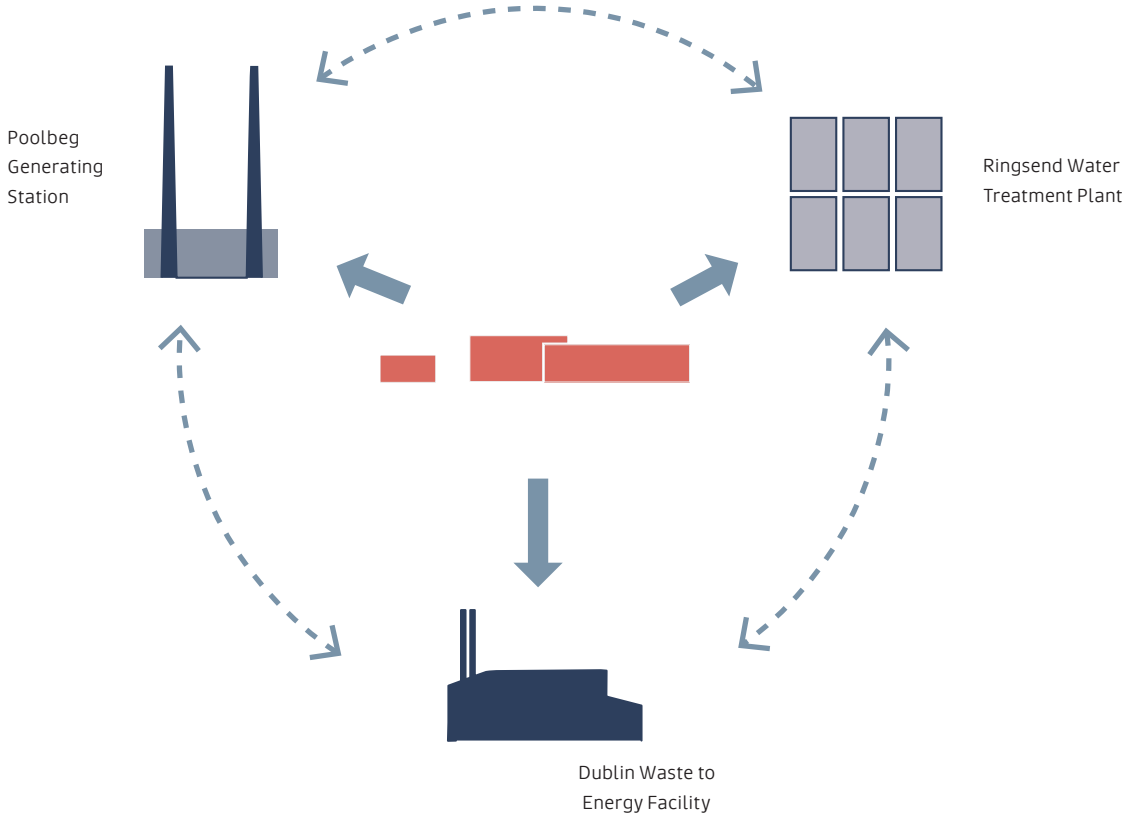
2.6 BUILDING HEIGHTS

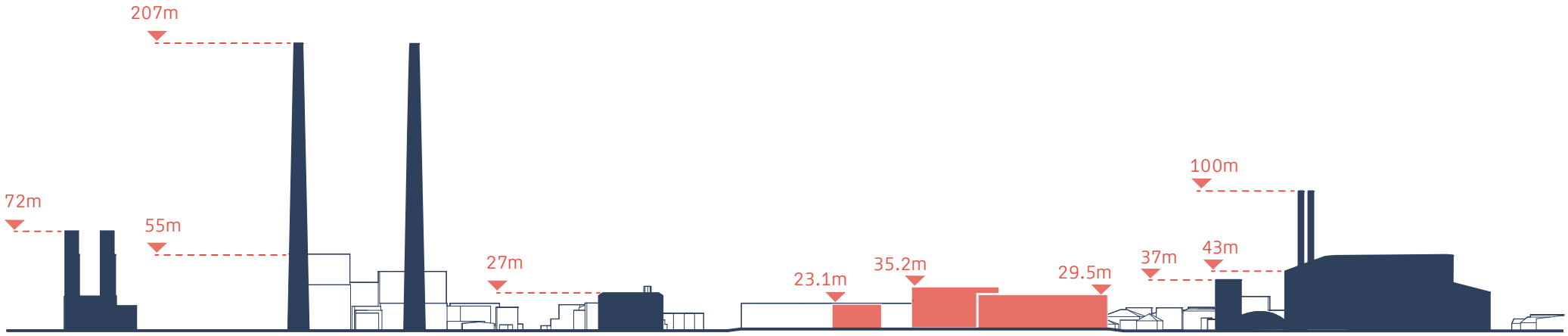
The diagram below highlights the proposed building heights against the heights of surrounding significant buildings.

2.7 WORKING HEART

Poolbeg has a strong history of siting key city infrastructure, ranging from energy to waste. A municipal sewerage scheme was introduced at Pigeon House Harbour in the late-19th century, with Pigeon House Power Station following shortly after in the early-20th century.

Today, Poolbeg Peninsula is dominated by the working services for Dublin city, from wastewater treatment to Dublin Waste to Energy Facility. This industrial location feels appropriate for the onshore substation facilities required for the offshore wind farm, marking an evolution in energy production in Ireland.





North site elevation: spot heights

2.8 PIGEON HOUSE PRECINCT

The Pigeon House Precinct has a rich history which began with a blockhouse in the mid-18th century, used as storage serving the harbour. A military fort was later established in the late-18th century. The army vacated the fort in 1897 and Pigeon House Power Station began development in 1902.

Three key historic buildings remain in Pigeon House Harbour:

1. Pigeon House Power Station
2. Poolbeg Generating Station (chimneys)
3. Pigeon House Hotel

Plan key

01 PIGEON HOUSE POWER STATION

— One of the largest protected structures in Ireland (RPS 6796)

— The power station was initially developed to provide most of Dublin's electricity until the 1950s. It was finally decommissioned in 1976.

— The remaining industrial building retains its solid brick form and brick chimney, with the upper steel frame structure exposed.

02 POOLBEG CHIMNEYS: POOLBEG GENERATING STATION

— The Poolbeg chimneys are the most recognisable feature of the Poolbeg Peninsula. Visible from various vantage points throughout the city, they have become an iconic symbol of the area and synonymous with the Dublin skyline.

— The chimneys were part of the Poolbeg Generating Station, which produced electricity from 1971. The chimneys (which were built at separate times) served as exhausts for the generating station.

— The generating station units utilising the chimneys were decommissioned in 2010. Today, the Poolbeg CCGT (combined cycle gas turbine) unit is still in operation.

03 FORMER PIGEON HOUSE HOTEL

— Pigeon House Hotel is a protected structure (RPS 6795) and a designated national monument (DU019-027).

— It was built in 1793, and was later used by the military when they occupied Pigeon House Harbour from 1798.

2.9 PIGEON HOUSE ANALYSIS

To develop and inform the design of the substation buildings, the proportion and materiality of the adjacent protected structure, Pigeon House Power Station, was studied.

The Pigeon House facade is composed of a brick base with an exposed steel structure above. The proportion of brick to steel is illustrated in the diagrams opposite.

The facade can be roughly divided into five, giving a proportion of 1/5, and later 2/5, of steel structure to brick base.

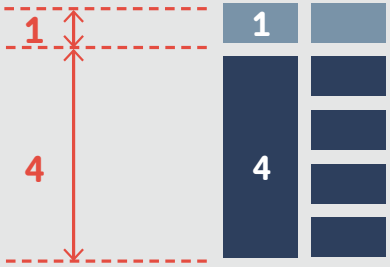
Pigeon House south facade

Pigeon House south-west facade

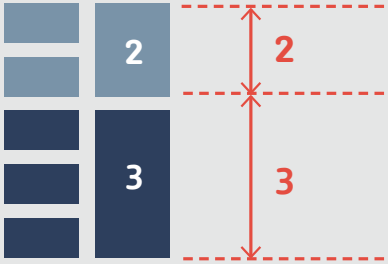
Pigeon House west facade

Pigeon House facade detail

PROPORTION A



PROPORTION B



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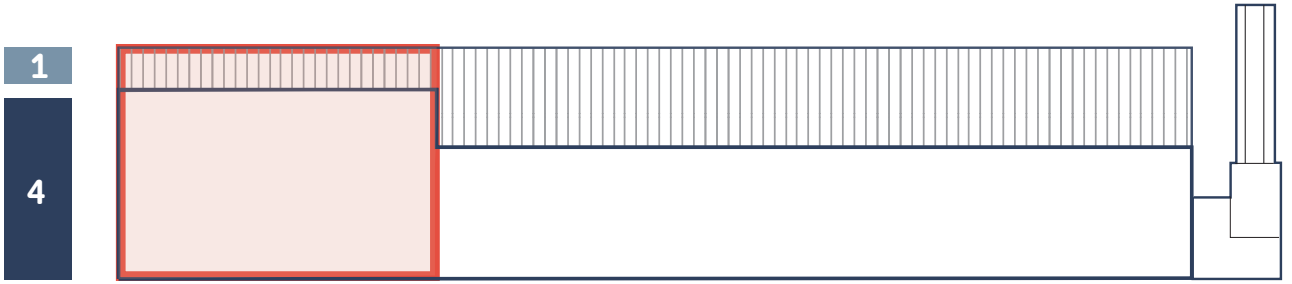
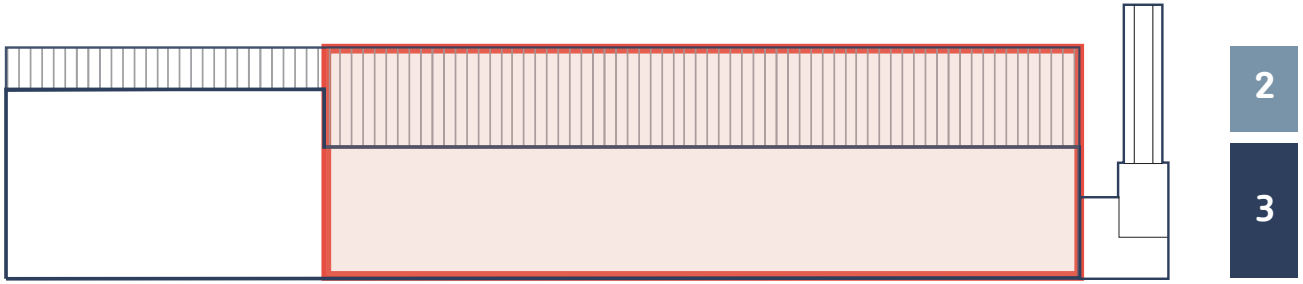


Pigeon House Power Station: north elevation, Part A

B

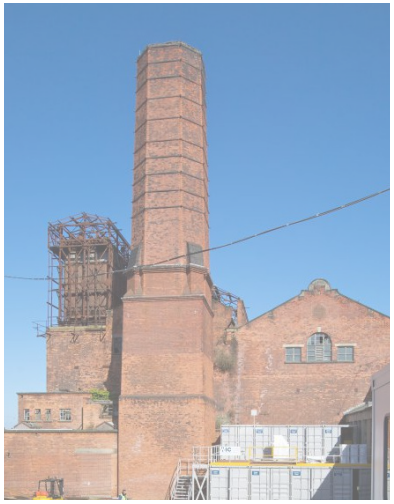


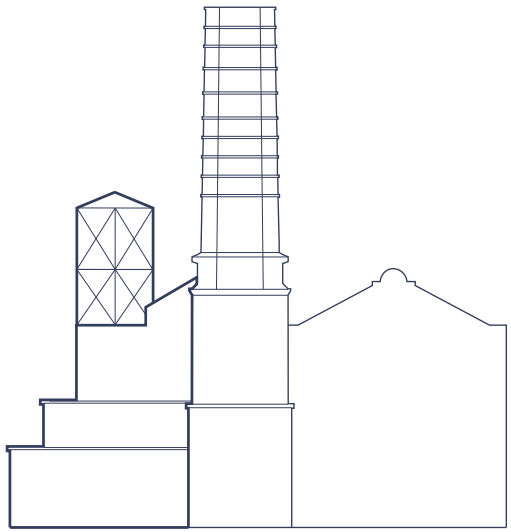
Pigeon House Power Station: north elevation, Part B

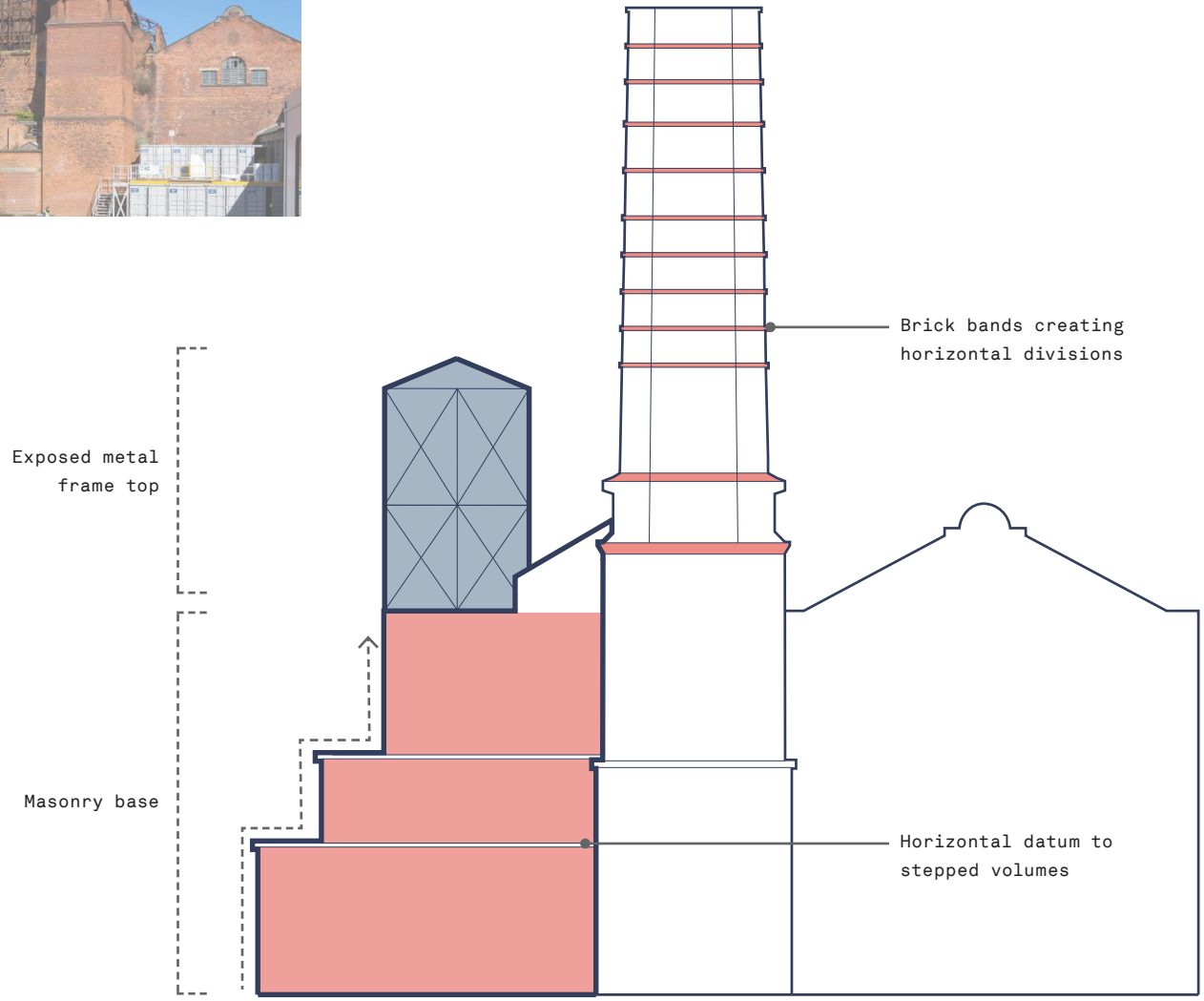
2.10 DATUMS AND VOLUMES

The Pigeon House Power Station south elevation is composed of a series of volumes, breaking down the impact of the primary mass. Brick bands and capping features further divide large forms and articulate particular datums.

The study informed the design concept for the onshore substation buildings in terms of material choice and proportionality.







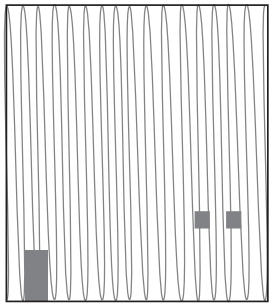
3.0 DESIGN APPROACH

3.1 CONCEPT DEVELOPMENT

The concept proposes breaking up the visual mass of the substation buildings by utilising two materials across the facade. A horizontal datum will be formed across each volume, creating a base plinth and upper section.

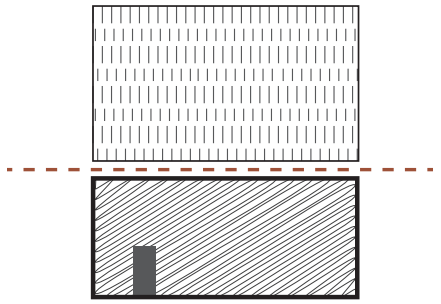
This facade approach has the ability to be robust and industrial, which is appropriate for the site setting and the building requirements.

01



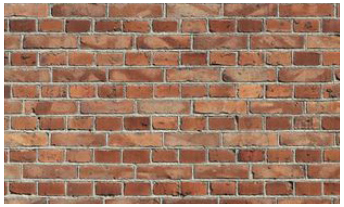
EXISTING SUBSTATION

02



BLOCK DIVIDED: BASE AND TOP

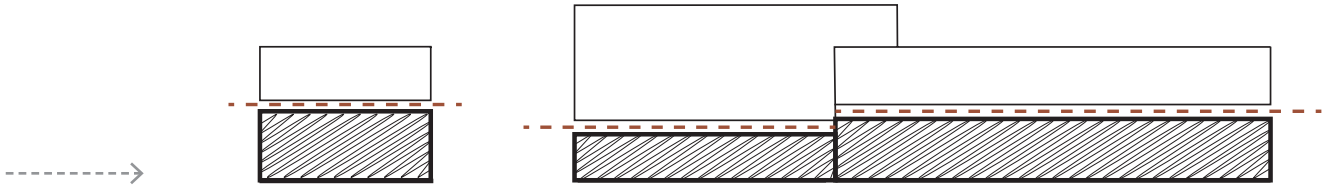
METAL CLAD TOP



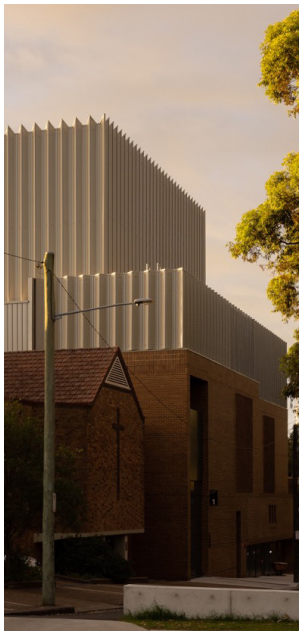
MASONRY BASE

The onshore substation site is in a prominent location on the Poolbeg Peninsula and will be viewed from various points in the context of existing area landmarks such as the Poolbeg chimneys, Pigeon House Power Station and Dublin Waste to Energy Facility.

The considered materiality proposed in this design approach allows the substation blocks to relate to both the prominent buildings that they will sit between and to visually stitch together the diverse industrial context.



PLAY OF DATUM ACROSS BLOCKS



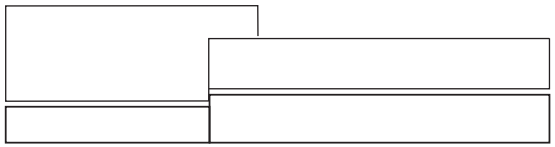
3.3 MATERIAL DEVELOPMENT

A material palette of brick for the base and metal cladding for the upper portion was selected for the building. The materials relate to the existing built context of the area while being used in a contemporary way.

Reflecting the materiality and proportions of Pigeon House Power Station, the substation base plinth will be of brick, with the facade above above clad in lightweight expanded metal panels.

This metal upper facade will also speak to contemporary structures such as the neighbouring Dublin Waste to Energy Facility.

04



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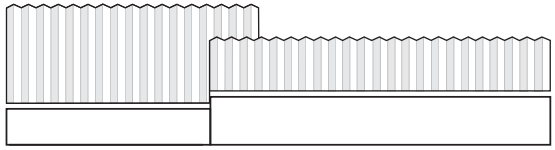
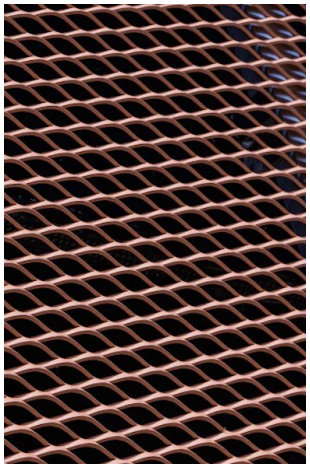
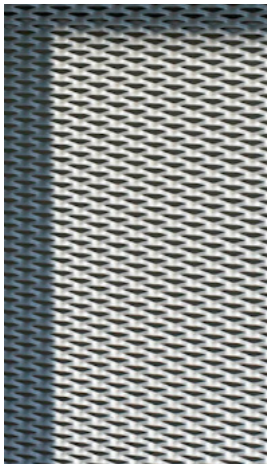
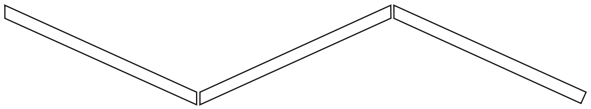


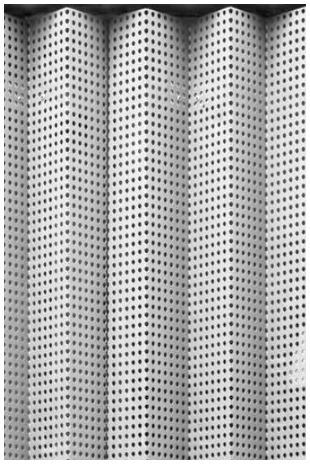
FLAT METAL CLADDING

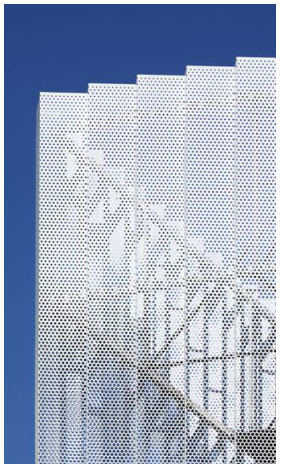




FOLDED METAL CLADDING







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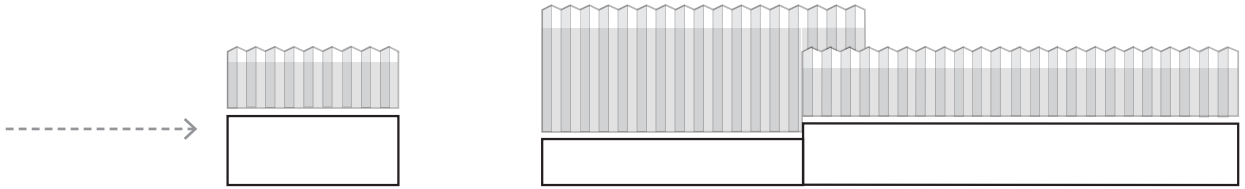
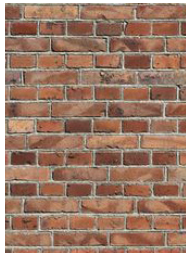


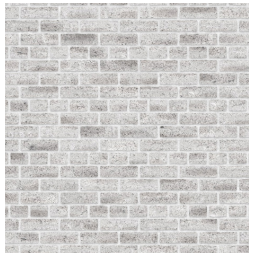
SOFTEN BLOCK EDGE

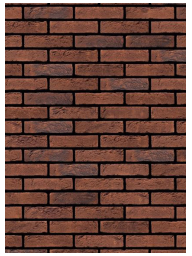
3.4 UPPER CLADDING

The expanded metal cladding selected as the upper material adds texture and transparency to the building surface. Additional depth is created by folding the expanded metal panels, enhancing the interplay of rhythm and shadow.

To soften the upper edges of the building and reduce the impact of the building volume on the skyline, the expanded metal panels oversail the parapet line, creating a delicate transition from facade to sky. The muted tones of the silvery metal cladding echo those of the surrounding context.





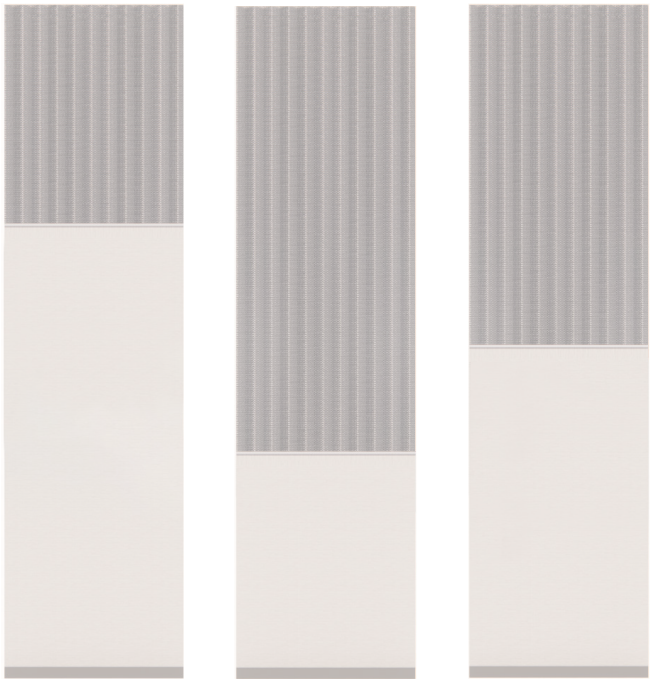


3.5 DESIGN DEVELOPMENT

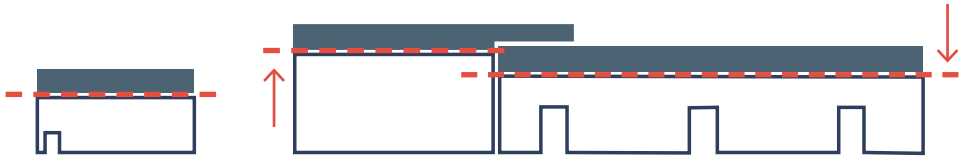
The onshore substation buildings are envisaged as a family of three buildings with the same materials and detailing, set apart by their varying height requirements, and further differentiated by a play on the datum line location and resulting proportions.

A series of studies was conducted to test the application of various proportions in optimising the visual impact of the three substation buildings. As part of the study, the proportions of the Pigeon House Power Station were applied and tested.

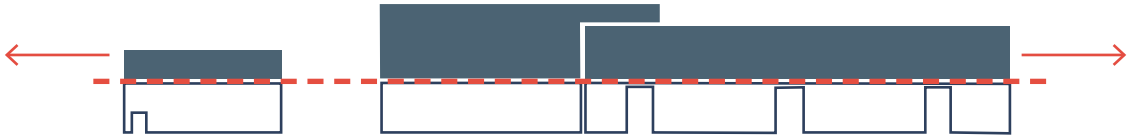
Right: Selection of north elevation study diagrams



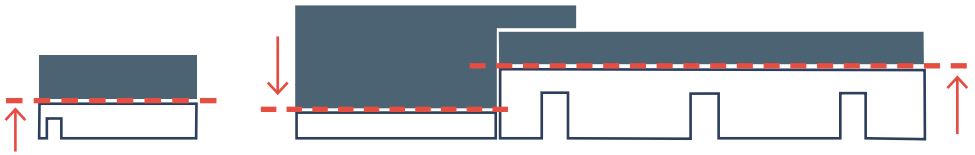
Images for material and datum testing



1. Base with equal 'crown' height on each block



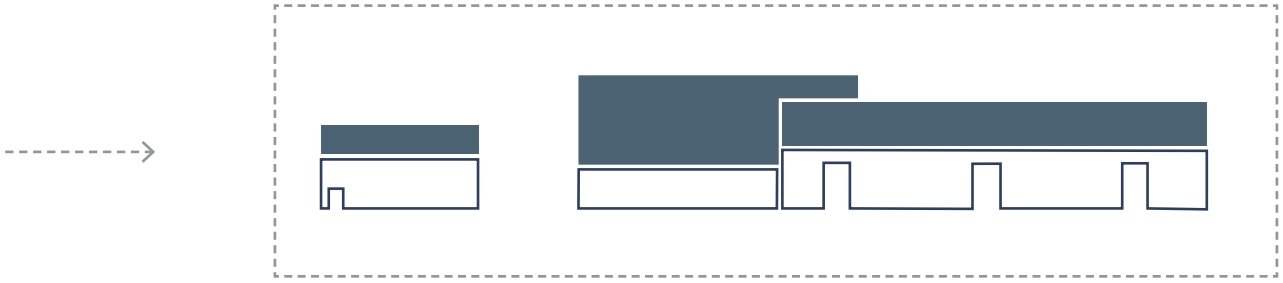
2. Equal datum line across three blocks



3. Shifting play of datum across blocks

DESIGN DEVELOPMENT

The image on the left illustrates the developed facade design. View from the ferry terminal looking south.



Selected proportion

3.6 TESTING MATERIALS IN CONTEXT

Different brick and metal cladding combinations were tested to find a palette appropriate to the context, considering the red tones of Pigeon House Power Station and the silver tones of Dublin Waste to Energy Facility as well as the industrial fabric found in the wider context.

The metal cladding options were tested in combination with the brick selection to determine an appropriate colour finish for both materials.

The images (right) illustrate a selection of the material testing in context that was carried out during the design process.

A) Great South Wall: red brick and metal cladding

A) Great South Wall: grey brick and metal cladding

B) Bull Road Clontarf: red brick and metal cladding

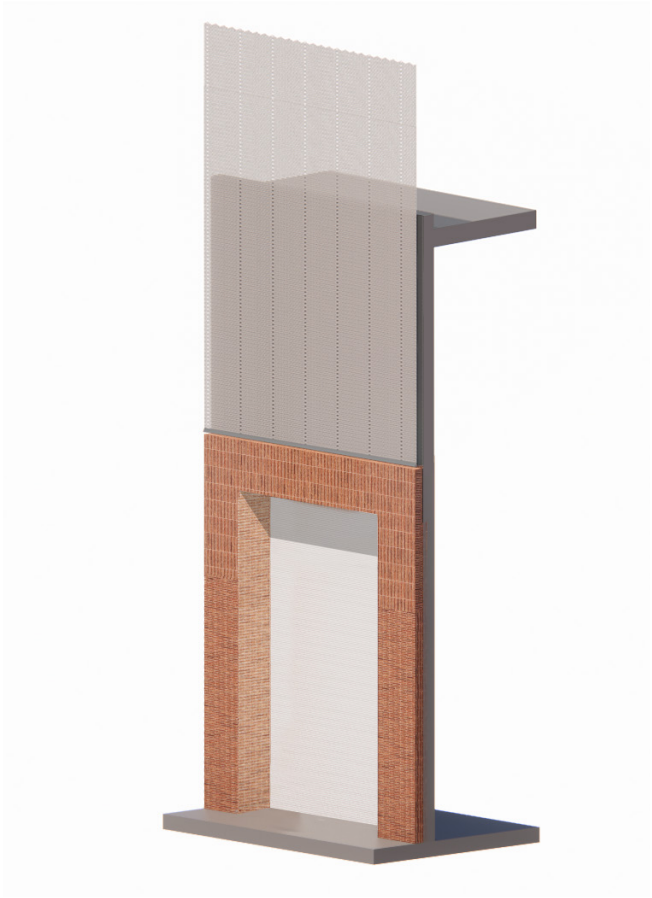
B) Bull Road Clontarf: grey brick and metal cladding

3.7 MATERIALITY

After conducting a series of material tests and evaluating the success and suitability of the combinations within the context, a palette of grey brick and silver metal cladding was selected.

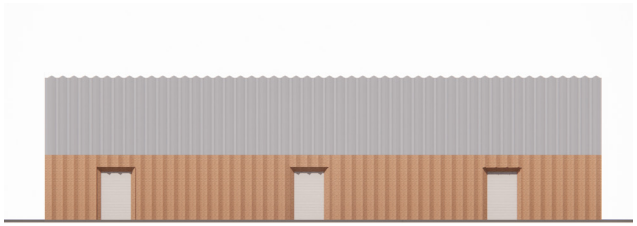
This material combination was less impactful in the immediate architectural environment and sat comfortably within the blue-grey tones of the Dublin sky and water frontage.

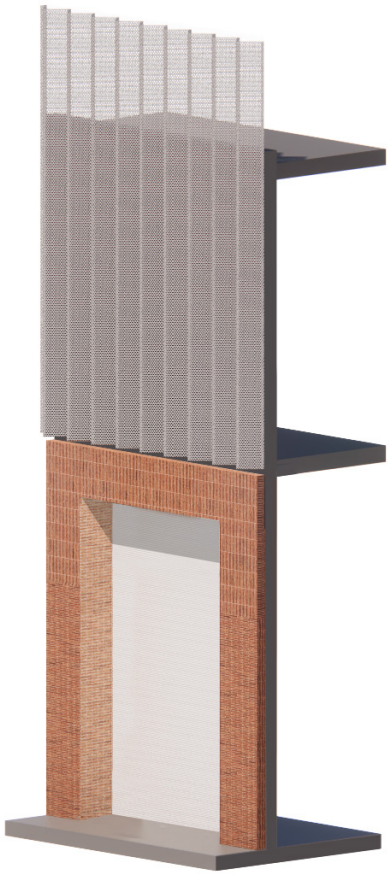
The grey brick base speaks to the nearby historic brick structures, while referencing the grey-toned contemporary buildings such as the Waste to Energy Facility.



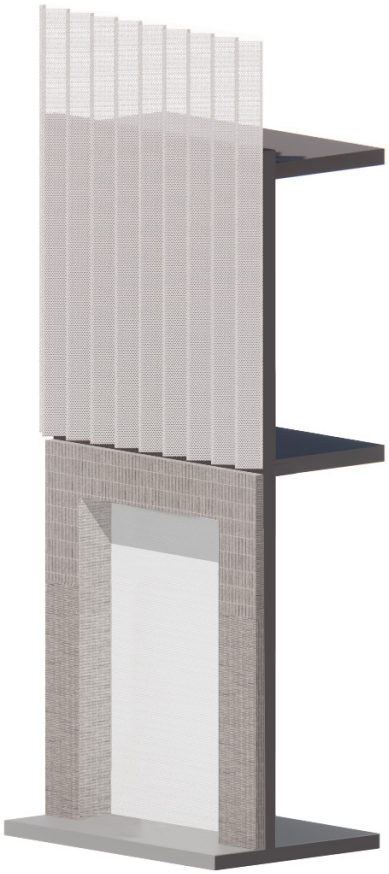
01 RED BRICK BASE, SILVER CLADDING

02 RED BRICK BASE, CORTEN STEEL CLADDING



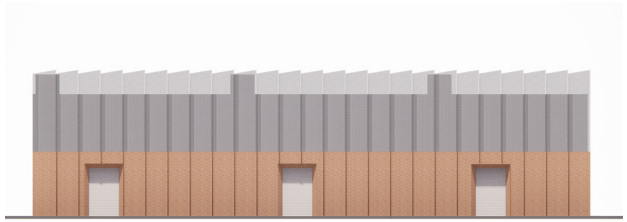


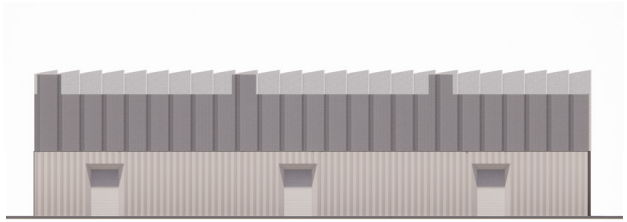
03 RED BRICK BASE, SILVER FOLDED CLADDING



04 GREY BRICK BASE, SILVER FOLDED CLADDING

SELECTED OPTION

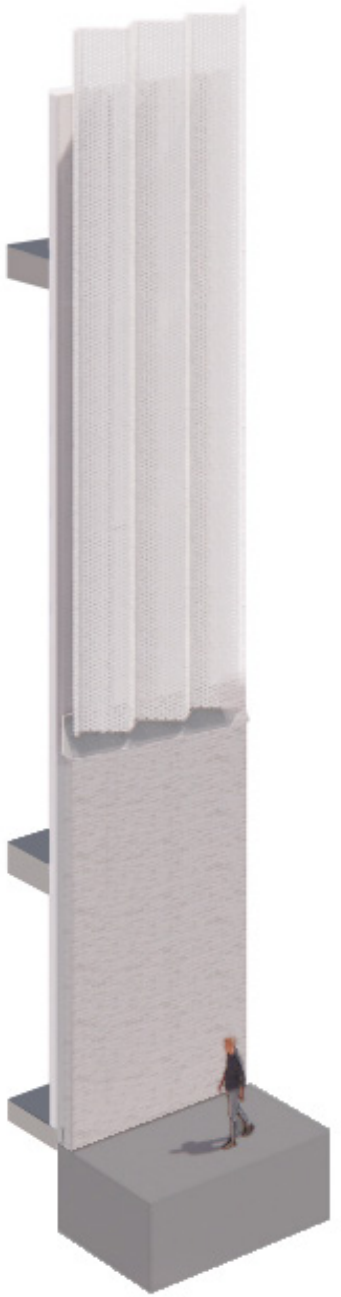




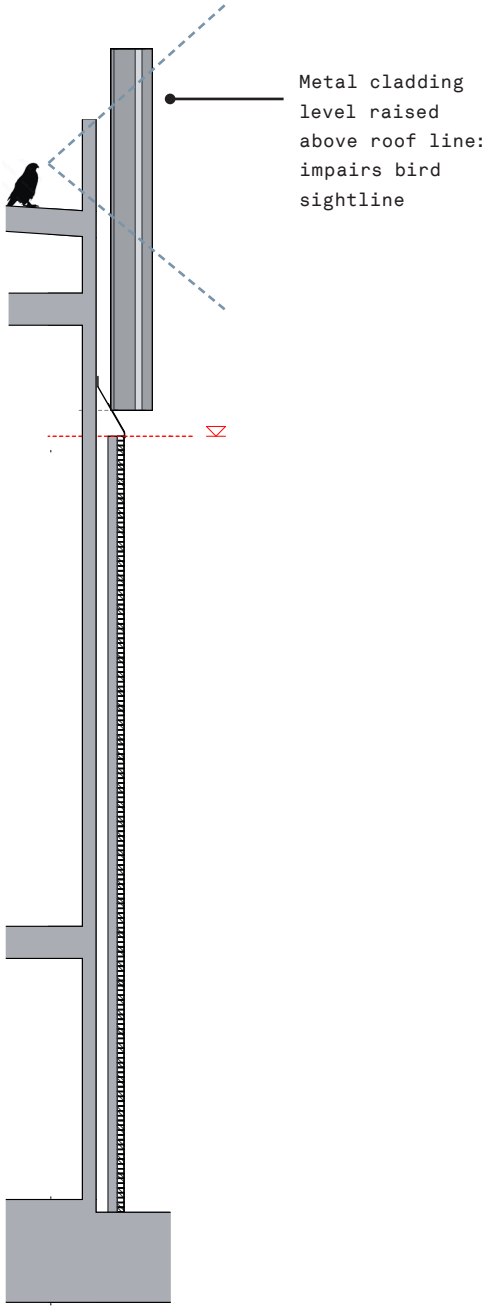
3.8 DETAIL

Right: 3D testing of selected materials and the detail where the two materials meet.

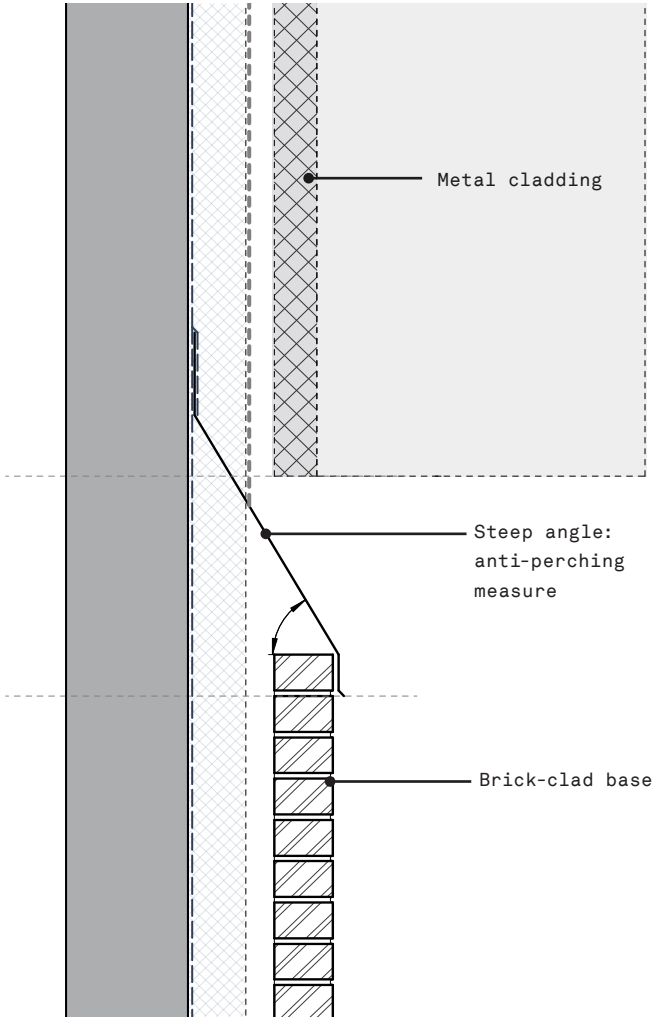
01 ESB GIS building datum



02 EirGrid GIS building datum



03 ESB GIS building section



04 Cladding junction section

3.9 DETAIL: BIRD OF PREY DETERRENT

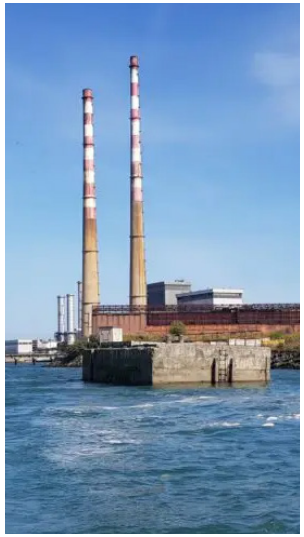
Arctic terns, a protected species of bird, nest in the region of the harbour close to the site. A series of platforms is located around Dublin Bay to facilitate their breeding, one of which - CDL Dolphin - is located in the water to the north of the onshore substation site. It was therefore important that the building design did not facilitate birds of prey to use the substations as perch/ surveillance points to prey on the nearby terns.

Two potential perch points were identified and mitigations were put in place:

1) Creating a steep angle (+60°) to the band between the brick base and metal cladding above.

2) Raising of the metal cladding above roof parapet, impairing hunting birds' view of target platform.

Please refer to ornithological reports that accompany the planning application for further information.



Tern platform

Tern

4.0 CONCLUSIONS

4.1 CONCLUSIONS

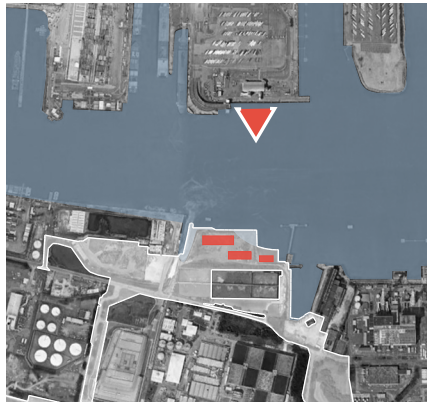
The Codling Wind Park onshore substation on Poolbeg Peninsula will provide a key piece of energy infrastructure to Ireland as part of the wider offshore wind farm development, helping Ireland to reach its climate ambitions.

It is fitting that this development could continue the legacy of the provision of industrial and energy services at Poolbeg. It is therefore important that the buildings reflect the historic significance of the site and become part of the wider story of Poolbeg Peninsula.

Our ambitions for the facade design were to:

- Give care and consideration to the historic context
- Consider the architectural language of the buildings and provide a design that responds well to the site
- Provide a contemporary design that reflects the modern infrastructure, while also being appropriate to the industrial setting
- Consider how the buildings would be viewed from different points in the city and respond accordingly; and
- Respond to the ornithological requirements to protect the nesting of terns

The proposed scheme has addressed these objectives, providing a design that respects the context and reflects the architectural history in a contemporary manner. Consideration has been given to reduce the visual impact of the development through material selection, colour and detail design, while creating an architecture of value for the district of Dublin Port.



View keyplan

View from Irish Ferry Terminal dock

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