

A Proposal for a Sustainable Aviation Fuel Production Facility, Port Talbot Docks

4.0 Design Development

4.7 Site Layout

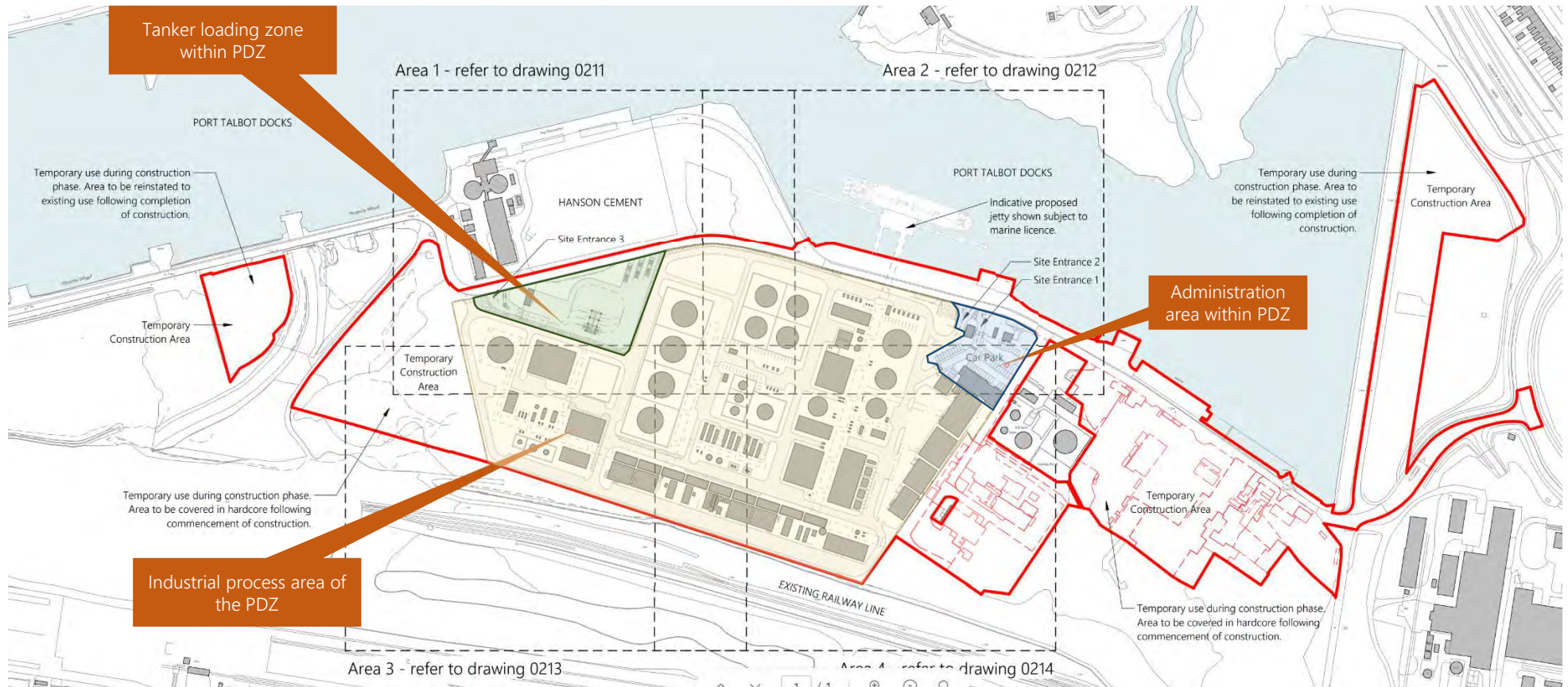


Figure 65 – Site Areas.



4.8 Buildings



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4.0 Design Development

4.8 Buildings

There are several buildings required on the site including the following:

In the Administration Area of the PDZ

- a) **Gate house 1** – This is the primary access to the developed area of the site (known as the production development zone, PDZ) excluding the tanker loading zone. The proposed occupancy of this building is likely to be 1 no person, but space is provided to accommodate an additional security guard when required. In order to allow the security guards to remain continuously on-post, this building includes a small kitchenette and an accessible toilet. This building, like the administration building, is public facing and materials and construction have been selected accordingly. It is also worth noting that this gatehouse is outside the industrial process area of the PDZ and therefore can be afforded a brown roof treatment as the risk of fire overall is lower owing to separation from the industrial process equipment.
- b) **Administration building** – This building, also outside the industrial process area of the PDZ, is a small facility for authorised visitors and office-based employees to the site. Accommodation provided includes office space, meeting rooms, a kitchen and toilet facilities. The administration building also provides plant space for itself and plant space that serves the nearby process control building and laboratory. Locating this enlarged plant room outside the more secure industrial process area of the PDZ allows for regular maintenance of building services without requiring access to what is a restricted space.

In the tanker loading area

- c) **Gatehouse 2** – There is a designated area of the site set aside for the road transportation of the sustainable diesel fuel product, known as the tanker loading area. This area is separated from the main body of the PDZ for reasons of safety such as fire, security, the avoidance of potential for contamination and safe interaction between vehicles of differing types. This area is controlled by a second gatehouse, of a more simplistic aesthetic design reflecting its more industrial role. Otherwise, the design of the gatehouse is alike that of gatehouse 1.

Inside the industrial process area of the PDZ

- d) **Process control building** – The industrial process activity on site is controlled from the process control building. In order to ensure the operation of the building and its control of the industrial process during an emergency, this building is constructed to be blast proof and have limited windows and doors. A central feature of this building is a large control and instrument monitoring suite. Other facilities in the building include a permit office, changing and mess facilities for staff working in the industrial process area of the PDZ.
- e) **Laboratory** – A small industrial building is provided for testing sustainable fuels, feedstock materials and product during the stages of the process. This building will only be occasionally occupied as the need arises but includes a small bathroom in addition to the main testing area.



Figure 67 – Early-stage development of building arrangement, site access and building form. It was later decided to move the process control building out of the administration area into the industrial process area of the PDZ. This assists in communication and control of security for the facility.



4.0 Design Development

4.8 Buildings

Inside the industrial process area of the PDZ (Continued)

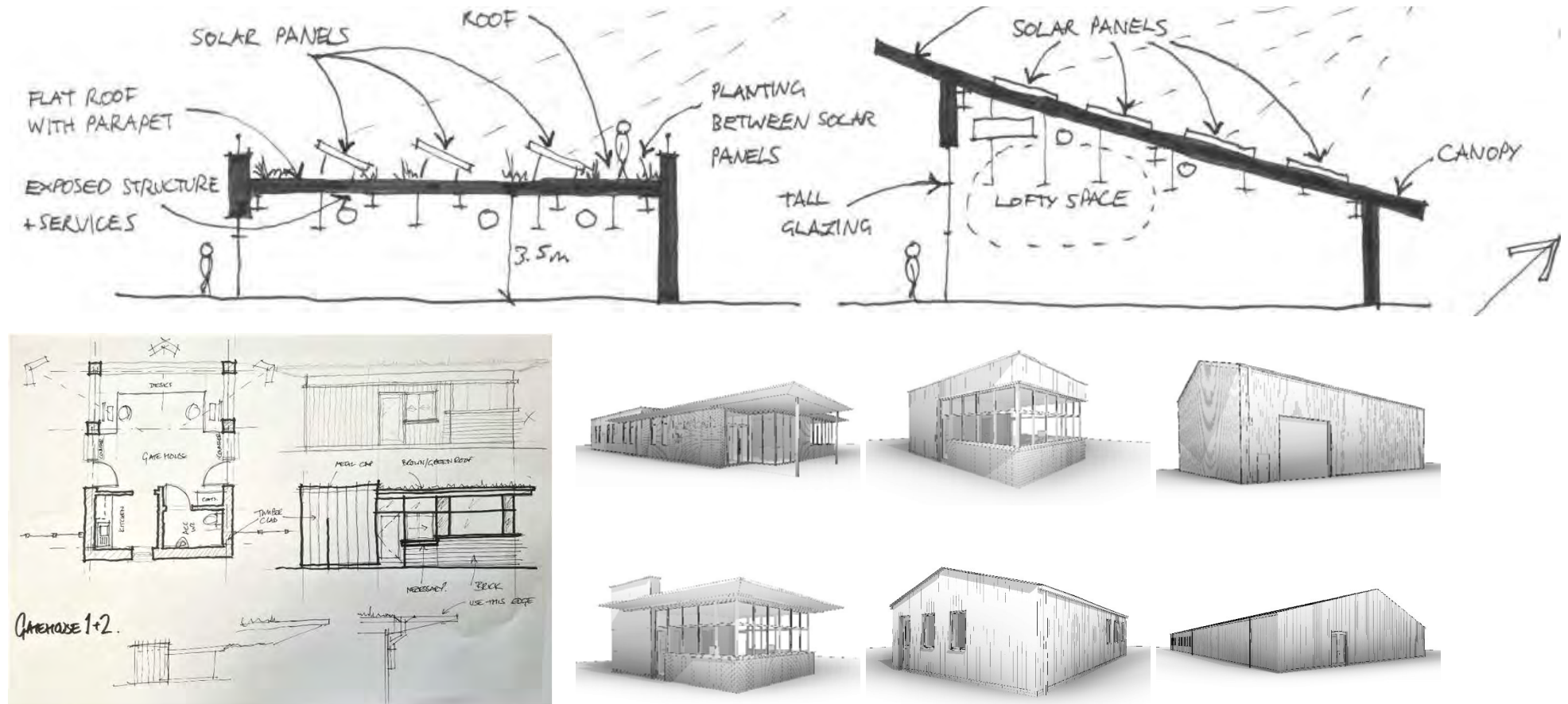
- f) **Warehouse** – There is a need to store spare equipment and other consumables on site to ensure the industrial process can remain operational in all circumstances. The warehouse is a functional building sized to accommodate the likely needs of the industrial process. It is likely to contain racking and have a floors and entrance ways suitable to allow a forklift truck to bring items from an HGV on the apron outside into the building. The building will be clad with simple insulated panels to all sides, have a roller shutter door to the main elevation and have rooflights to reduce its energy consumption.*
- g) **Workshop** – Periodically, an item of equipment will require repair or maintenance and a small industrial building, similar to the warehouse provides a suitable environment for this work. The building will be equipped with a crane to allow lifting of heavier items.*
- h) **Amenity Shelters** – Shelters for staff are provided in two locations, one in the administration area and one in the industrial process area, allowing staff from each access without changing secure zones.*
- i) **Waste Collection** – An area of the administration building is set aside for the temporary storage of general commercial waste. Locating the waste collection in this area allows for a collection lorry to enter the car park area and leave without venturing into the industrial process area of the PDZ. For further details on waste management refer to the Waste Management Plan provided by Stopford.*



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4.0 Design Development

4.8 Buildings and site



Figures 68 to 76 – Ideas have progressed from simple sketches exploring the possible arrangement for roofs to detailed visualisations. One key component of the design has been trying to secure sustainability and ecology measures in an environment where maintenance, control and critically, fire protection are high priorities. The viable options include provision of solar panels to enable some on site energy generation, and brown roofs to provide some additional habitat space. Buildings are split into two types, the first being where they face the public and are of a more aesthetic nature and the second being those inside the PDZ that are primarily functional in design.



A Proposal for a Sustainable Aviation Fuel Production Facility, Port Talbot Docks

4.0 Design Development

4.8 Materials and Colours



Figure 77 - Colours and Materials – For the industrial installation. Mostly colours such as silver coloured or galvanised metals, white coatings for tanks, pipework, ducting and supporting structure. Some items will be finishes in warning colours such as yellow or red, typically being access walkways, stairs, balustrades, safety equipment.



Figure 78 - Colours and Materials – For the buildings. Materials include insulated panels used chiefly on functional buildings and grey bricks used on administration buildings. Feature colours, used sparingly, and selective are based on LanzaTech corporate colours. The emphasis in colour selection is on ensuring the overall development is discrete when viewed from the wider Port Talbot area and creating low landscape and visual impact.



4.0 Design Development

4.8 Buildings and site

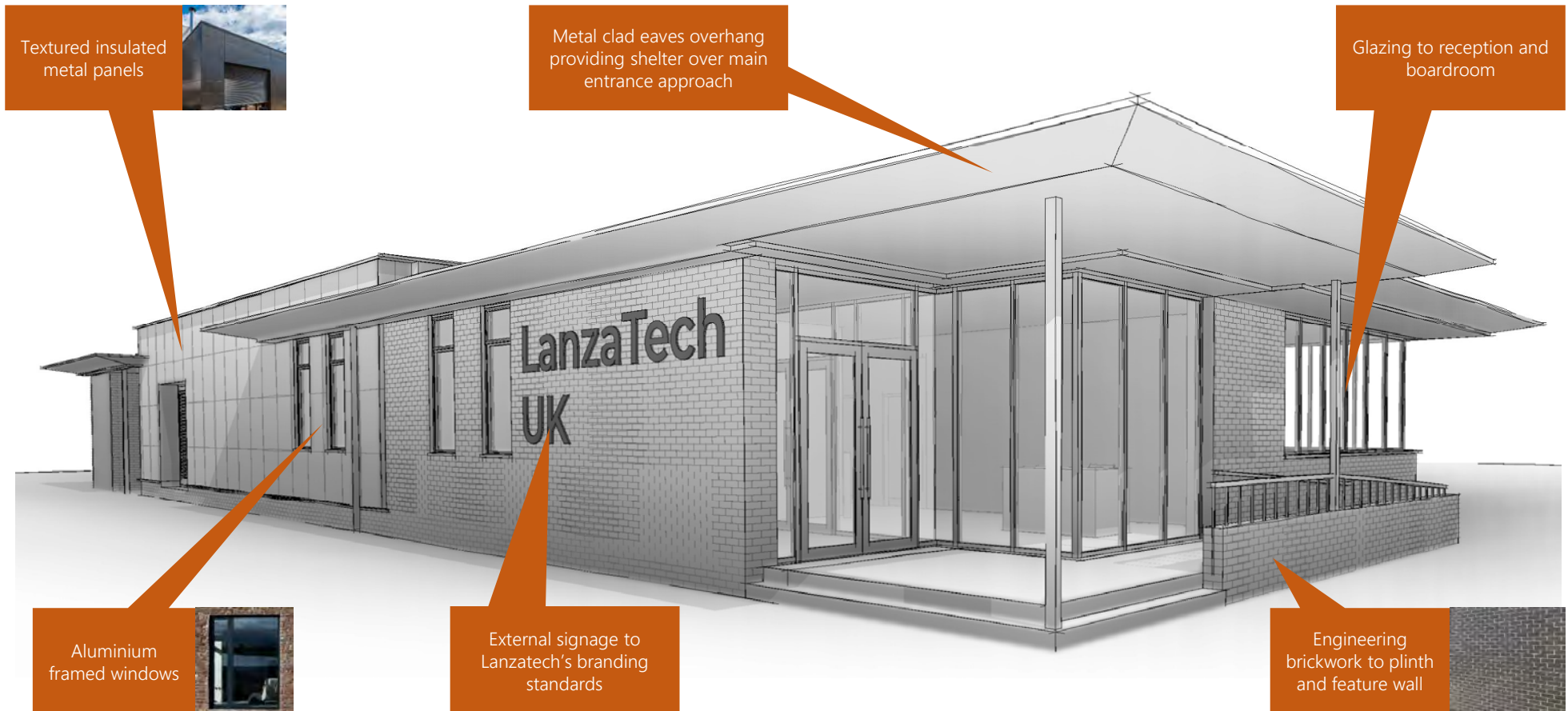


Figure 79 – Ideas and development of the administration building. This is the most prominent building in the development and will be used as an office a meeting space for authorised Lanzatech representatives, as well as site-based employees.



4.0 Design Development

4.8 Buildings and site

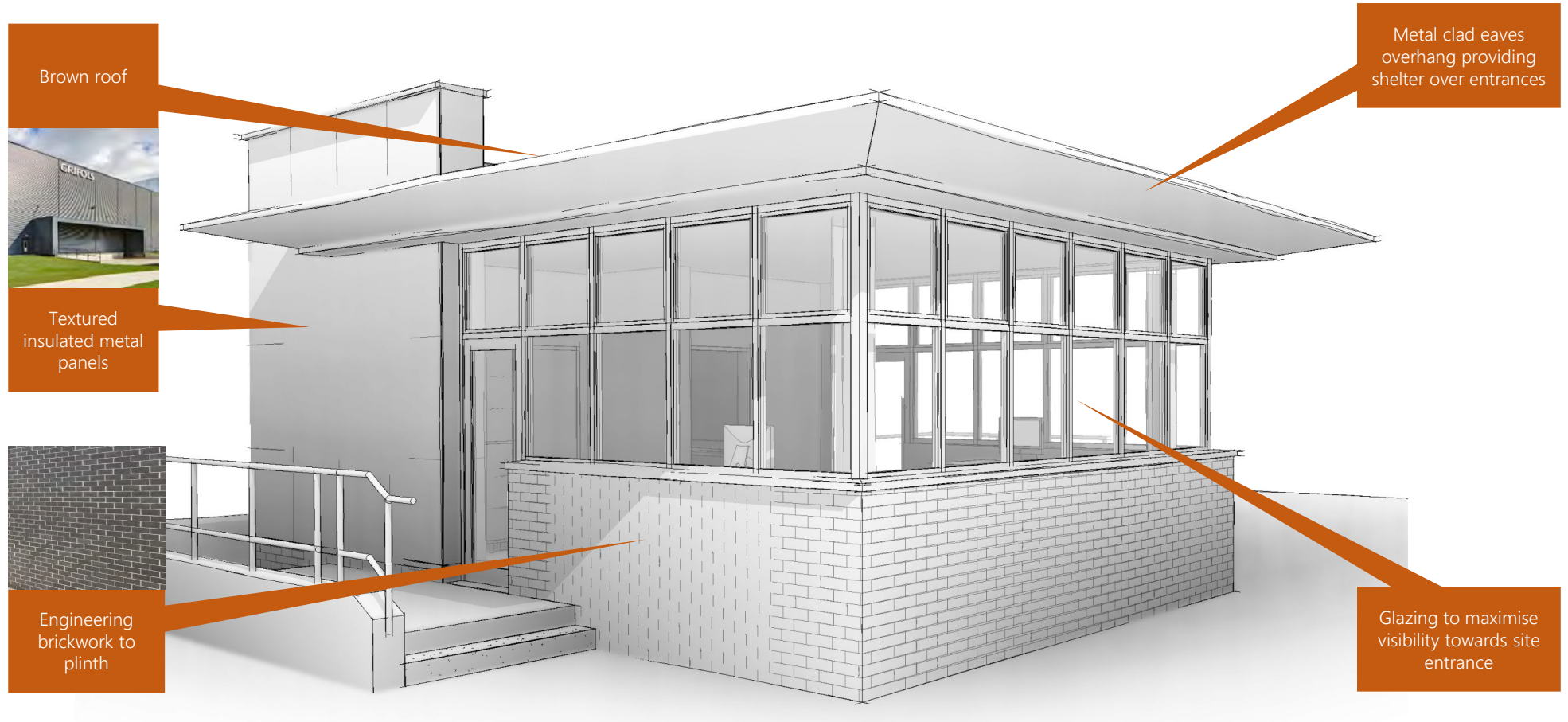


Figure 80 – Ideas and development of the gatehouse 1 building. This building controls the main entrance to the site, including the administration area.



4.0 Design Development

4.8 Buildings and site

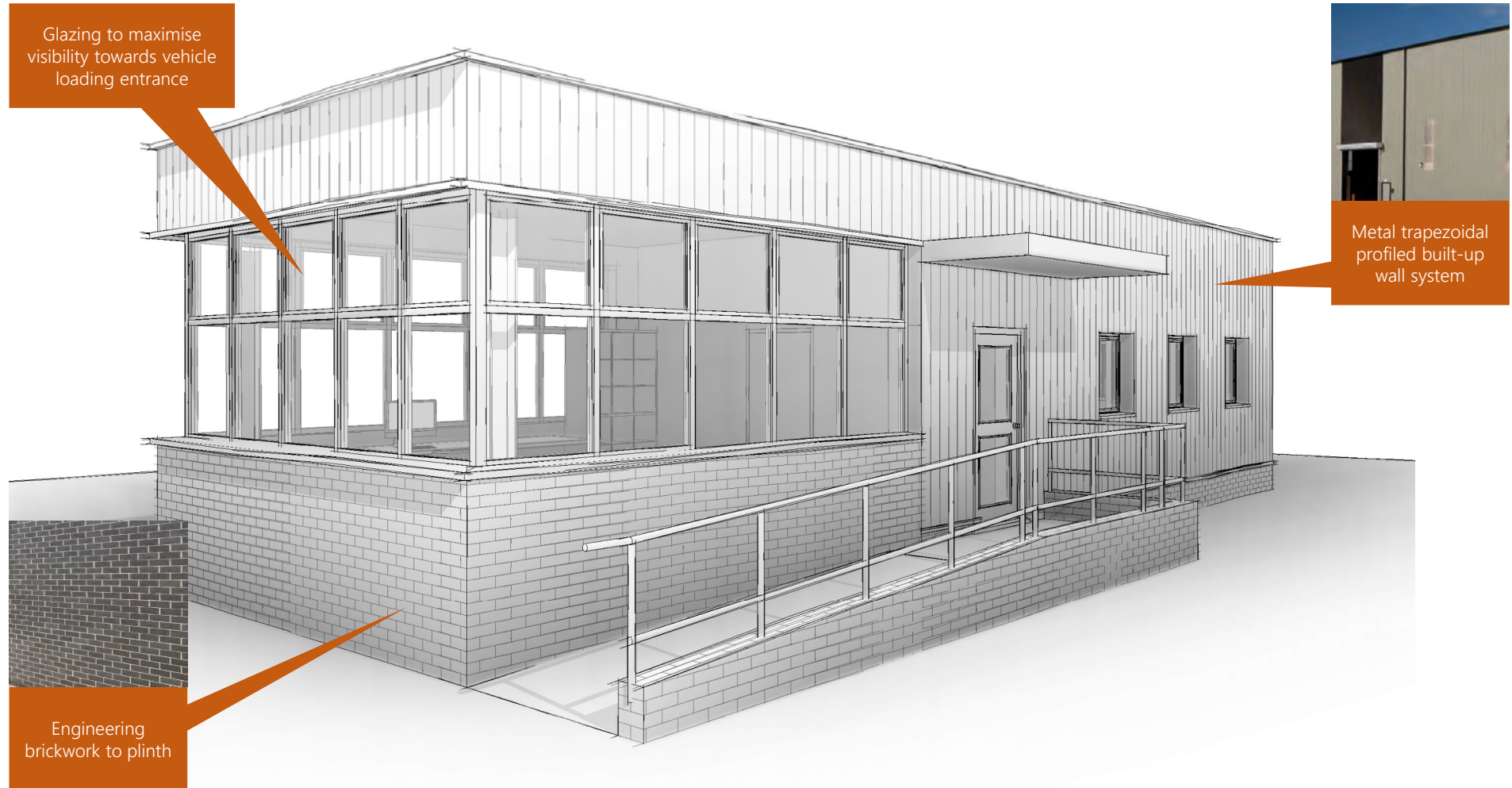


Figure 81 – Gate house 2 controls the HGV tanker refilling area where road-based vehicles take sustainable diesel fuel for use. As with gatehouse 1 there is extensive glazing allowing observation of the area under control, a small office space for up to two employees, a toilet facility and a small kitchenette with the building. To the rear of the building is a welfare space for operators in this area of the site.



4.0 Design Development

4.8 Buildings and site

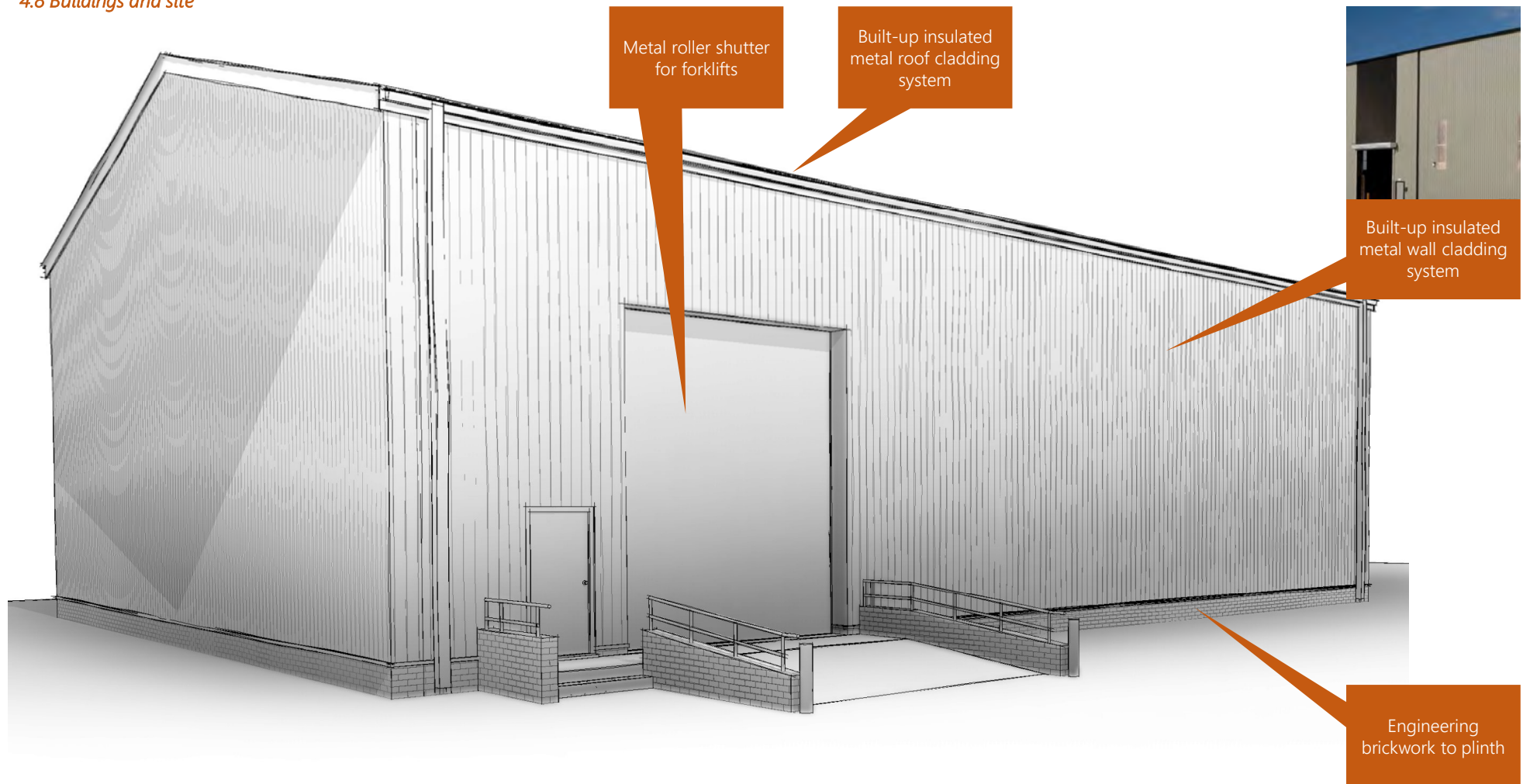


Figure 82 – The warehouse building is an economically constructed, tall storage unit with large format roller shutter doors and personnel access. The building is secure and utilitarian in nature and will store components for the industrial process and related consumables.



4.0 Design Development

4.8 Buildings and site

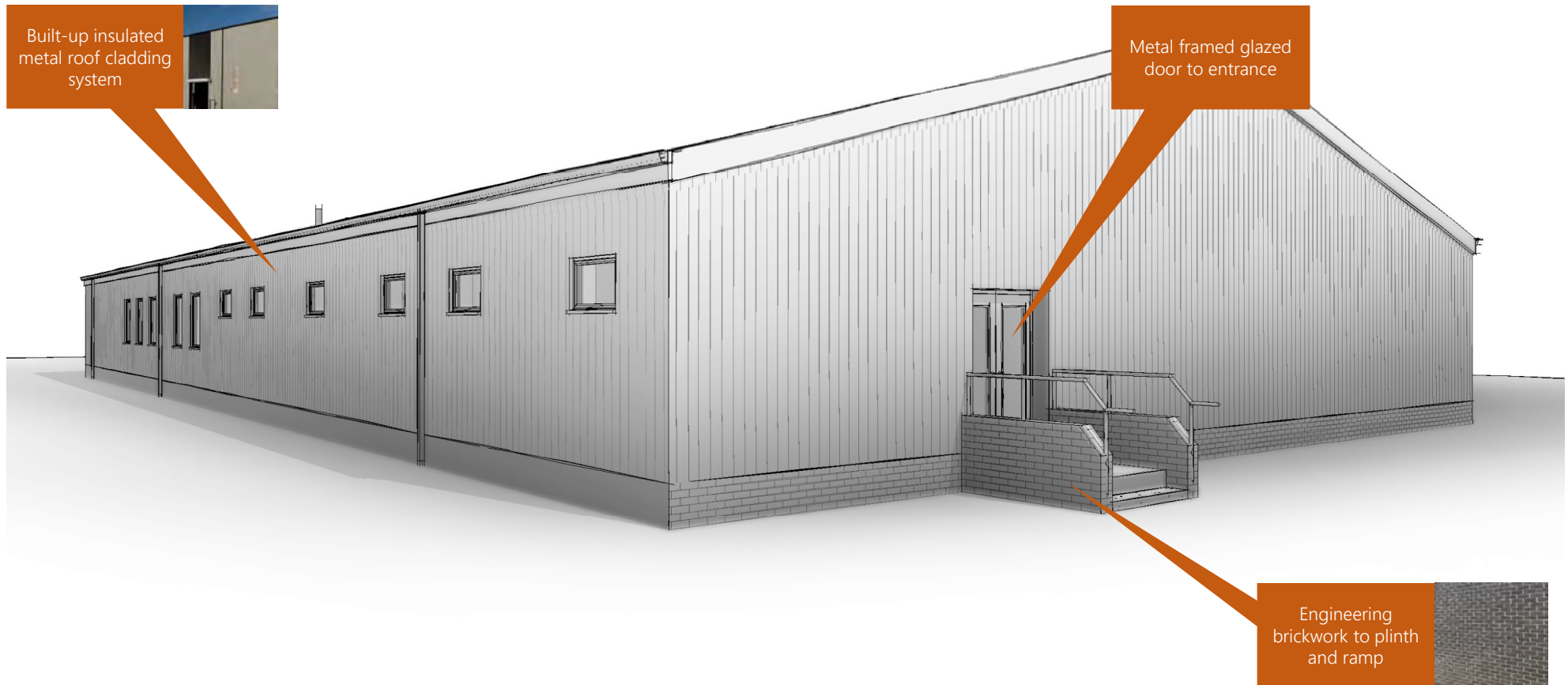


Figure 83 – The process control building is a blast proof building in which all aspects of the industrial process are monitored and controlled. The main elevation, facing towards the plant area is largely featureless to assist with blast protection and the side facing away from the plant houses the occupied spaces such as staff accommodation.



4.0 Design Development

4.8 Buildings and site

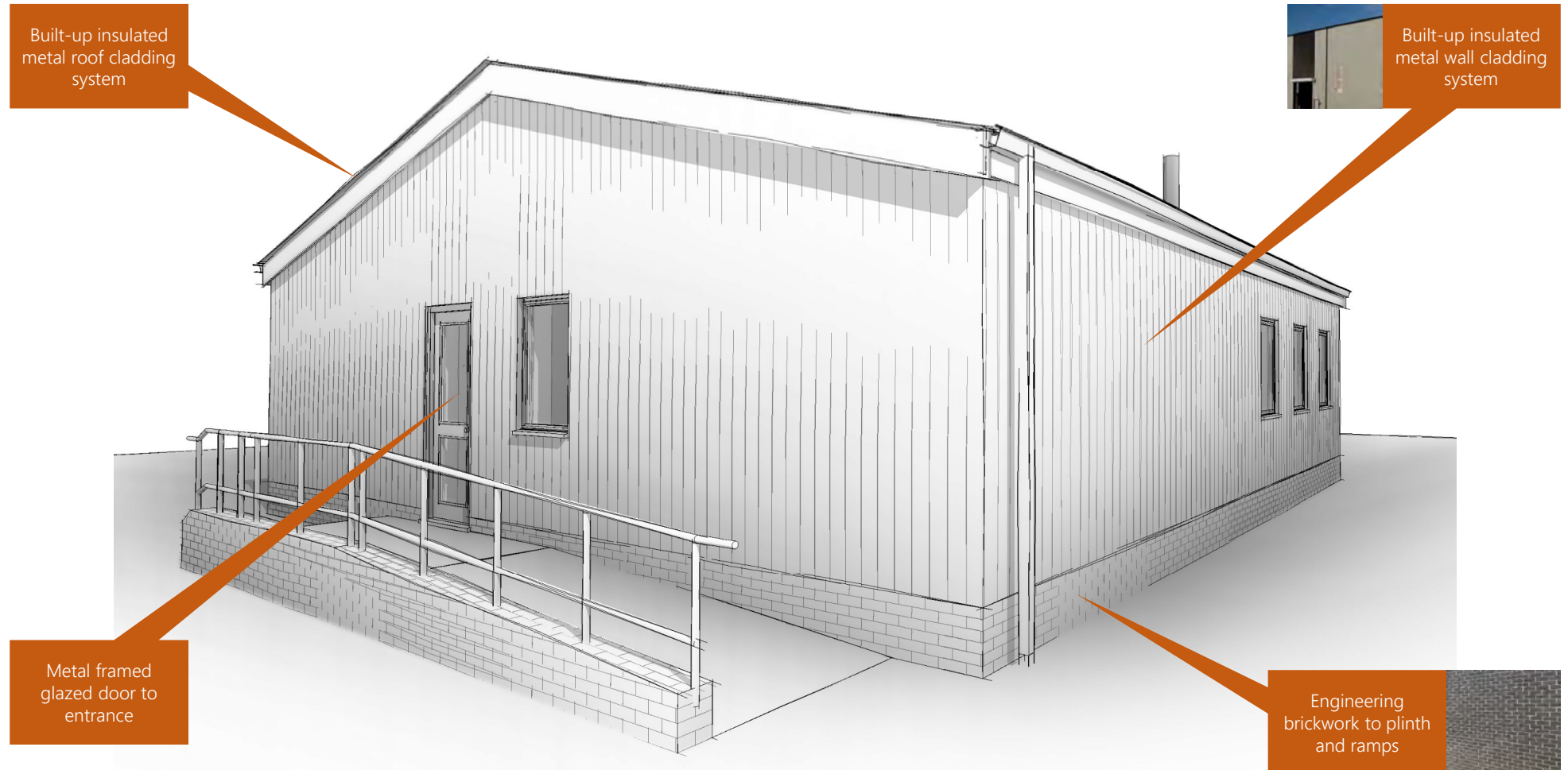


Figure 84 – The laboratory building is a small unit for monitoring and testing the quality of the sustainable aviation fuel product, feedstock materials and product during the stages of the process.



4.0 Design Development

4.8 Buildings and site

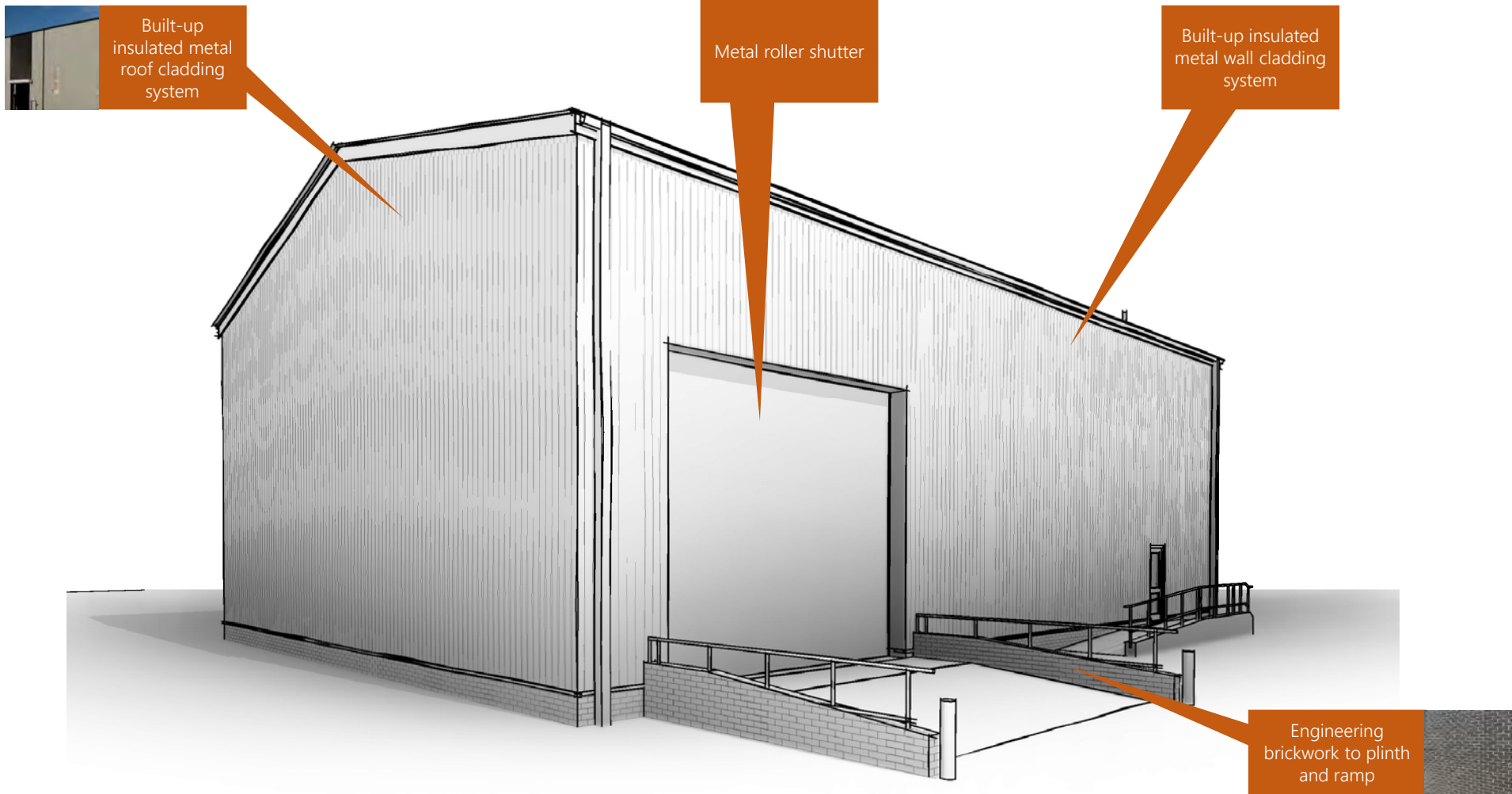


Figure 85 – The Workshop building is similar to the warehouse building but its purpose is to allow for the maintenance, repair and assembly of items for industrial process. Contents will include a large workshop space, a crane and basic staff facilities.



4.0 Design Development

4.9 Marine environment

There are two main factors in assessing a development in an exposed marine environment. The first is that in a marine environment some building materials and construction types can be adversely affected. Key points include the effects of driven wind, salt laden air and high levels of humidity. The proposals respond to these environmental factors in the:

- Selection of materials – using corrosion resistant materials throughout the site such as galvanised steels and anti-corrosive cladding panels and coatings.
- Selection of building forms – limiting development heights, selecting roofs forms and constructions suitable for exposed area. – no tall roofs to habitable buildings, canopies to provide shelter near building entrances and simple, durable forms have been adopted.

The other important considerations is the prospect of construction materials having an unseen deleterious effect on the nearby marine environment and the proposals will therefore avoid, where possible the following materials: alkylphenols, asbestos, bisphenol, cadmium, chlorinated polyethylene, chloro-sulphenated polyethylene, chlorofluorocarbons, chlorobenzene, chloroprene, chromium, chlorinated polyvinyl chloride, formaldehyde, halogenated flame retardants, hydrochlorofluorocarbons, lead, mercury, polychlorinated biphenyls, perfluorinated compounds, phthalates, polyvinyl chloride, polyvinylidene chloride, short chain chlorinated paraffins, wood treatments containing creosote, arsenic or pentachlorophenol and volatile organic compounds.

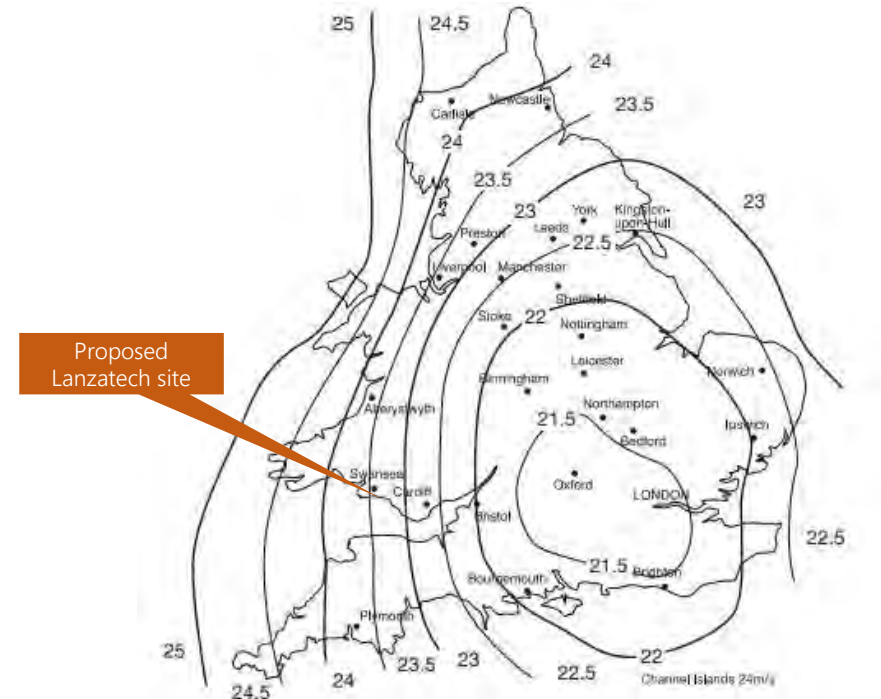


Figure 86 – Wind exposure areas in Britain.



5.0 Sustainability and Green Infrastructure

5.1 Sustainability summary

There are four major aspects to the sustainability of the proposals, which are:

- a) **The sustainability benefits of the development** - Producing sustainable fuels from waste-based ethanol is an important step in reducing the emission of climate changing gases associated with aviation travel and the various uses of fossil diesel fuels. When compared with conventional fossil fuel jet fuel, SAF made by the facility is expected to reduce greenhouse gas emissions by around 70% on a lifecycle basis. The facility has the potential to produce approximately 100 million litres of SAF a year, making up around 10% of the UK Government sustainable aviation fuel 2030 target. For further details on this please refer to Turley's document 'Sustainability Strategy Position' and the 'Environmental Statement Chapter 10 Climate'.*
- b) **The sustainability measures within the development** - There is scope to provide some sustainability measures within the PDZ, but these are limited by the needs of the industrial process, general security, safety in operation and in particular fire safety. With these constraints in mind, only some areas of the landscape and external works will be able to receive ecological treatments that encourage pioneer species and aid bio-diversity. Careful and thorough thermal radiation modelling has been conducted in order to ensure that brown roofs and solar will only be placed in safe areas. These areas are demonstrated in EDP's landscape proposals drawings. Similar constraints apply to buildings within the industrial process area of the PDZ and only some buildings will be able to receive treatments such as brown roofs and solar power. Smaller sustainability measures within the development include the provision of 25% of car parking spaces being equipped with electrical car charging points. Heating and hot water supplies for the buildings will be powered by air source heat pumps.*
- c) **Waste management during demolition and construction** - Control of this element of the project is important as it can be a considerable contributor to CO2 emissions, disruption to local roads, generation of noise, casual pollution of the environment through improper waste management procedures. It therefore proposed that a 'Construction Waste Management Plan' aligning to WRAP Cymru vision is produced and agreed by condition with the local planning authority.*
- d) **Waste management during operation** - There is a comprehensive assessment of the industrial process in operation in the Turley document 'Sustainability Statement' and in the submitted 'Waste Management Plan' prepared by Stopford. The chief waste product from the industrial process is water from the dehydration of ethanol to ethylene. Notably, this water is cleaned and used as a source of water for the boiler equipment, thereafter it is lost as clean steam to the atmosphere or condensed for re-use. There are some other forms of waste including some solid waste that originate from the process, and these are documented in Waste Management Plan.*

5.2 Green Infrastructure

- a) **Existing condition of the site** – The existing condition of the site is well documented in the information provided by Turley and EDP. The predominant ecological feature of the site being the high levels of Japanese knotweed that has thrived on the brownfield environment. As it stands the proposed course of action to remove the knotweed involves treatments which are likely to leave a starting point for this development as having low green infrastructure value.*
- b) **Proposals for the site** – As described in the section 5.1 the opportunities for the incorporation of Green infrastructure items within the development are few. Where they are acceptable and safe to incorporate measures have been adopted.*



6.0 Proposals

6.1 Preparation of the Site

Some works are being undertaken by the site owners prior to planning application, these include:

- The clearance, containment and treatment of the Japanese knotweed in the PDZ. This is an extensive process and involves repeated spraying over a lengthy period to minimise the impact of the plant on the development in the future. It will be necessary over time to ensure that it does not re-grow as part of a site-wide maintenance programme. The buildings and plant installation will be constructed mindfully and managed to minimise adverse consequences should any Japanese knot weed persist.*
- A scheme of contamination investigation is underway and will be prepared ready for this application. Works to remediate any contamination risks will be underway before this application is determined. Details of these works can be found in the suite of site investigation documents completed by TEC and submitted in support of the application.*
- The introduction of reptile barriers across the site to ensure that any such animals can be safely relocated prior to the works proceeding.*
- Demolition of buildings to the East of the PDZ to create additional laydown space. The details of the demolition can be seen on Inspire Architects 200 series drawings and accounts for the demolition of buildings with a gross external footprint of 4,526m².*



Figure 87 (Left) – Area of building to be demolished to make additional construction laydown space. The extent of demolition will be to ground level only. Where possible any masonry or concrete materials will be crushed and re-used as hardcore surfacing to the laydown area. On complete the area will be left as a hardcore finish for pioneer species to recolonise.

Figure 88 (Below) – Typical buildings in the area of demolition are low level, industrial use and constructed of masonry, concrete and steel.



6.0 Proposals

6.2 The Proposed Development

Preparatory work following the grant of planning permission

A major component of the development of the site will be levelling the site. At present there is some undulation across the site with levels varying from c.7.0 AOD to c.9.6 AOD (refer to drawing 2143.01-IA-ZZ-ZZ-DR-A-0400 for details). The proposal is to provide levels across the site that are a level and flat working surface at approximately 8.1m AOD. This is a balance of cut and fill that allows for the formation of a good working substrate that is above the current flooding level (7.5m AOD) and the envisaged, future flooding level (7.75m AOD). Refer to JBA Consulting's document 'Crown Wharf Flood Consequences Assessment' for further details.

Development works

The developed area of the site (the PDZ) will be divided into three areas:

- i. **Administration Area** - an administration area situated at the main entrance to the site. This area will contain a gatehouse which will control entry into the industrial process area and the administration building. Car parking will be concentrated in this secured area with 57no spaces provided including accessible spaces as generally cars will not be permitted into the industrial process area. HGV's and van that operate in the industrial process area are also controlled via the gatehouse when arriving and exiting. A small covered cycle stand is also provided adjacent to the gatehouse. 25% of the car parking spaces in this area will be provided with an electrical charging point.*
- ii. **Industrial Process Area** - an industrial process area which will consume the majority of the site and its function is documented in preceding chapters.*
- iii. **Tanker Loading Area** - a loading area for sustainable fuels onto tankers for distribution is provided on the north-western corner of the site. This area contains a separate gatehouse building, weighbridges, parking and fuelling gantries.*



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6.0 Proposals

6.2 The Proposed Development - Building summary

Building Name	GIA (m2)	Anticipated Occupation	Function	Description / Notes
Gatehouse 1	35	1 - 2 persons	A control point for Northeastern entrance to site, this building represents the main point of control for the car park area and PDZ. It controls access and the CCTV making it a focal point for security.	This building and the administration building have enhanced architectural materials and design as they are in the more prominent areas of the site and are more likely to be visited by people outside the operation of the industrial process.
Gatehouse 2	35	1 - 2 persons	Control point for HGV fuelling area controlling both the entrance to the area and the exit via secondary gates. This building is linked to gatehouse 1 and holds security responsibility for an area with an enhanced risk of unauthorised access and fuel theft.	As above, but functional in design
Administration Building	342	Varies, typically 5 persons, max capacity 20 persons	Office and meeting space for staff on site and other Lanzatech employees visiting site.	This building lies outside, but on the edge of, the PDZ. Large plant room to serve building and the process control building, reducing the need for maintenance personnel entering the more secure area.
Amenity 1	Ext	1 - 5 person	External shelter for workers	Covered space, not enclosed
Amenity 2	Ext	1 - 5 persons	External shelter for workers	Covered space, not enclosed
Process Control Building	700	Typically, 5 persons	Dedicated control centre for the industrial process where instruments and controls monitoring the plant are located and monitored.	The building is of blast proof construction and has limited windows and doors to promote blast security.
Laboratory	84	Normally unoccupied but occasionally 1-2 persons	Small building for monitoring the quality of feedstock materials, partially processed materials and the finished products.	Basic industrial building with specialist fit out
Compressor Building 1	415	Normally unoccupied	Weatherproof, acoustically-attenuating housing to compressor equipment	Basic industrial building with acoustic cladding and louvres to reduce noise from within
Compressor Building 2	415	Normally unoccupied	Weatherproof, acoustically-attenuating housing to compressor equipment	Basic industrial building with acoustic cladding and louvres to reduce noise from within
Warehouse	399	Normally unoccupied but occasionally 1-4 persons when working	Storage of spare parts and consumables for the industrial process.	Basic industrial building with internal racking
Workshop	337	Normally unoccupied but occasionally 1-4 persons when working	Workshop space for the repair and maintenance of items in the industrial process.	Basic industrial building with workshop facilities including a crane

Table 3 – Building descriptions