Hydrock

Oldfield Road, Hampton

Basement Assessment

For Shurgard UK

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S2	P01	19/03/2024	First issue
S2	P02	23/05/2024	Inclusion of additional groundwater monitoring and details of basement use and text to reflect proposal to use secant pile wall cofferdam

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1. Introduction

Hydrock have been instructed by Shurgard UK Ltd (the Client) to prepare a Basement Assessment (BA) for the site. The site is located off Oldfield Road, Hampton, TW12 2HS. It is situated approximately 5km west of Kingston upon Thames town centre and centred on National Grid Reference 513148, 169753.

The proposals include construction of a multi-storey storage facility, which includes a basement, and are presented in the planning drawings listed in Section 3.

1.1 Conditions

This BA is prepared on the basis of data and information available to Hydrock at the time of writing. Hydrock take no responsibility for conditions that have not been revealed in the available records. Hydrock have not designed or undertaken any investigation of the site and interpretation of the site conditions is based on review of available documentation only. Hydrock cannot accept liability for the accuracy of source information and data.

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This BA is prepared in accordance with 'Richmond Basement Assessment User Guide (2021)'. This guidance applies to all development proposals that feature basements, cellars, or other subsurface structures with the London Borough of Richmond upon Thames area. The guidance defines that the London Borough of Richmond upon Thames' 'Strategic Flood Risk Assessment' (SFRA) and associated 'Further Groundwater Investigations (2021)' document is utilised in preparation of this BA.

With consideration of the 'Further Groundwater Investigations' document, it is noteworthy that the site is not located in a catchment area, and not within a 'throughflow catchment area' or 'throughflow and groundwater policy zone'.

With consideration of the requirements of 'Good Practice Guide on Basement Developments', according to the Groundsure report presented in Appendix B, there are no listed buildings within 250m of the site and therefore a Structural Impact Assessment is not required.

2. The Site

A full site description and a description of the environmental setting for the site is presented in Sections 2 and 3 of Brownfield Solutions Ltd report 'Phase I & II Geo-Environmental Assessment Report', 2023, ref: CO/M5478/12423. This report is appended in Appendix B.

The site is bounded by a residential building to the west (~9.5m from the nearest basement wall), a supermarket to the east (~13m from the nearest basement wall), Oldfield Road to the south (~8m from the nearest basement wall) and a railway to the north (~2-2.5m from the nearest basement wall to the boundary fence). There are two Thames Water Sewers that pass through the site, situated to the west of the proposed basement.

2.1 Ground conditions

Refer to Sections 3.2 and 7 of Brownfield Solutions Ltd report 'Phase I & II Geo-Environmental Assessment Report', 2023, ref: CO/M5478/12423, appended in Appendix B.

The encountered ground conditions are Made Ground (concrete, sand and clay), overlying Taplow Gravel Formation (sand, gravel and sandy clay), overlying London Clay Formation (silty clay).

2.2 Hydrogeology

Refer to Sections 3.5 and 7.5 of Brownfield Solutions Ltd report 'Phase I & II Geo-Environmental Assessment Report', 2023, ref: CO/M5478/12423, appended in Appendix B [P02] and additional groundwater monitoring results presented in Appendix C. [P02]

During the fieldwork, no groundwater was encountered, although the Taplow Gravel Formation was noted as being wet. Post fieldwork monitoring recorded a groundwater body perched within the Taplow Gravel Formation, with a depth to the groundwater table ranging from [P02] 2.15-2.6mBGL [P02]. Evidence of water perched within the Made Ground was also evident, however the installation was very shallow and water may have accessed the well from the surface.

The Taplow Gravel Formation is a Principal Aquifer and the London Clay is unproductive. The Principal Aquifer has a high vulnerability.

The Richmond Strategic Flood Risk Assessment presents Environment Agency data and indicates that the site is within an area with 50-75% susceptibility to flooding from groundwater. Government data states that 'flooding from groundwater is unlikely'. The Groundsure report shows that the site is in an area of medium to high risk of flooding from groundwater, and the railway immediately to the northeast is deemed to have a high risk of flooding from groundwater.

2.3 Hydrology

Refer to Section 3.6 of Brownfield Solutions Ltd report 'Phase I & II Geo-Environmental Assessment Report', 2023, ref: CO/M5478/12423, appended in Appendix B.

The Richmond Strategic Flood Risk Assessment presents Environment Agency data and indicates that the site has a less than 1 in 1000 risk of flooding from surface water. Considering a 1 in 1000 flood, the railway immediately to the northeast of the site, Oldfield Road to the south of the site and the residential plot to the west of the site would flood with a predicted water depth of 0.3m. Government data states that there is a 'very low risk' of surface water flooding.

The Richmond Strategic Flood Risk Assessment presents Environment Agency data and indicates that the site is outside the 1 in 100-year flood extents for all watercourses in the borough. Government data states that there is a 'very low risk' of flooding from rivers or the sea.

The Groundsure report indicates that there is one reservoir within 250m of the site. This is associated with the Hampton Water Treatment Works to the south.

3. Details of the Development

The planning drawings listed in Table 3-1 present details of the proposals.

Table 3-1: Planning drawings

Drawing number	Drawing title
23053GA-D-001	Location Plan
23053GA-D-002	Site Plan
23053GA-D-003	Basement Floor Plan
23053GA-D-004	Ground Floor Plan
23053GA-D-007	Proposed Elevations
23053GA-D-008	Proposed Contextual Elevations

These drawings are included in Appendix A. It is envisaged that the proposed works include the following:

1. Demolish the existing structure on site.
2. Install a secant pile wall to form a cofferdam, as per the design and in agreement with adjacent third-party asset holders.
3. Install piles for foundations, if carrying out all piling from a single level (or, see Item 5)
4. Undertake excavations within the cofferdam, whilst installing temporary propping, if required, and dewatering. Break down foundation piles if installed from the higher level (see Item 3)
5. Installation of piles from the basement level, if not previously installed (see Item 3) and construction of pile caps
6. Construct basement slab and walls, whilst removing/replacing temporary props, as required
7. Construct ground floor slab and remove temporary props, subject to designed sequence

The base of the basement floor slab is given as ~3.25m below the ground floor level. Assuming that the ground floor finished floor level (FFL) aligns with the current ground level and in the absence of a subbase layer, available investigation data suggests that the basement will either extend wholly through the Taplow Gravel Formation, or that up to 1.15m of Taplow Gravel Formation will remain below the basement floor slab.

[P02] The proposed use of the basement will be additional self-storage units. The basement shall provide additional storage space or rentable area that is integral to the business case. The inclusion of a basement ensures that the scheme is financially viable. [P02]

4. Screening

The Richmond Basement Assessment User Guide (2021) requires that the basement assessment process enable the London Borough of Richmond upon Thames to assess the potential impacts of a proposed subsurface development.

To identify if a Basement Impact Assessment (BIA) is required, a screening assessment is to be carried out to identifying potential issues requiring more detailed investigation. The following areas are to be covered as part of the screening assessment:

- Subterranean characteristics
- Land stability
- Flood risk and drainage

The first step of the screening assessment is to verify that the assessment is required. As per Section 2.2, it has been established that the site is situated in an area with 50-75% susceptibility to flooding from groundwater, meaning that a screening assessment needs to be completed.

The next step of the screening assessment is to review a series of questions given in the Richmond Basement Assessment User Guide (2021) in order to establish if a BIA is required. The following subsections present this review. If the answer to any given question is “yes” or “unknown”, the matter is to be investigated as part of a BIA. If the answer is “no” and is justified with accompanying information and supporting evidence, no further discussion is required.

4.1 Subterranean Characteristics

Table 4-1: Subterranean Characteristics (Screening)

Question	Response	Details
Does the recorded water table extend above the base of the proposed subsurface structure?	Yes	See Sections 5 and 6
Is the proposed subsurface development structure within 100m of a watercourse or spring line?	No	The Groundsure report does not indicate that springs or watercourses are present within 100m of the site. The site is also note within a ‘throughflow catchment area’ or ‘throughflow and groundwater policy zone’.
Are infiltration methods proposed as part of the site’s drainage strategy?	No	No infiltration is proposed due to limitations associated with distance from structure and site boundary and/or foundations.
Does the proposed excavation during the construction phase extend below the local water table level or spring line (if applicable)?	Yes	See Sections 5 and 6
Is the most shallow geological strata at the site London Clay?	No	The shallowest soils are Made Ground, overlying Taplow Gravel Formation. Refer to Appendix A for further information.
Is the site underlain by an aquifer and/or permeable geology?	Yes	See Sections 5 and 6

4.2 Land Stability

Table 4-2: Land Stability (Screening)

Question	Response	Details
Does the site, or neighbouring area, topography include slopes that are greater than 7˚?	No	The site and adjacent ground is broadly level. A topographic survey for the site is presented in Appendix A. Photographs for the rear of the existing structure is presented Figure 4-1 showing that there is limited slope between the site and the railway tracks.
Will changes to the site's topography result in slopes that are greater than 7˚?	No	The proposals do not involve forming slopes. Refer to the drawings included in Appendix A.
Will the proposed subsurface structure extend significantly deeper underground compared to the foundations of the neighbouring properties?	No	While the foundation details for adjacent structures are unknown, the proposed basement is single storey and therefore is of limited depth. The drawings in Appendix A show that the base of the proposed basement is proposed to be ~3.25m below FFL of the ground floor level. Assuming a foundation depth difference (D) of 2.5m and considering a minimum offset (L) to adjacent structures of 9.5m, the ratio of L/D=3.8. Accordingly, the depth of the proposed subsurface structure is not deemed significantly deeper than the foundations of neighbouring properties.
Will the implementation of the proposed subsurface structure require any trees to be felled or uprooted?	Yes	See Sections 5 and 6
Has the ground at the site been previously worked?	Yes	See Sections 5 and 6
Is the site within the vicinity of any tunnels or railway lines?	Yes	See Sections 5 and 6

View from far-side cess, with site to the right

View from near-side cess, with site to the right

Figure 4-1: photograph of railway to rear of site, facing east, dated 2007

4.3 Flood Risk and Drainage

Table 4-3: Flood Risk and Drainage (Screening)

Question	Response	Details
Will the proposed subsurface development result in a change in impermeable area coverage on the site?	Yes	See Sections 5 and 6
Will the proposed subsurface development impact the flow profile of throughflow, surface water or groundwater to downstream areas?	Yes	See Sections 5 and 6
Will the proposed subsurface development increase throughflow or groundwater flood risk to neighbouring properties?	Unknown	See Sections 5 and 6

4.4 Screening Assessment Conclusion

Multiple questions were answered with “yes” or “unknown” and the associated matters are to be investigated as part of a BIA. In accordance with the Richmond Basement Assessment User Guide (2021), a screening step is to be carried out prior to preparing the BIA.

5. Scoping

The Richmond Basement Assessment User Guide (2021) states that prior to carrying out the BIA, a scoping step should be carried out to determine the extent of the potential impacts identified as part of the screening assessment. The purpose of the scoping step is to set the boundaries of the BIA and establish what the assessment will address.

The scoping step has been prepared to discuss the extent and potential impacts associated with those questions to which the answer was "yes" or "unknown". Only these questions are brought though to the following subsections.

5.1 Subterranean Characteristics

Table 5-1: Subterranean Characteristics (Scoping)

<table>
<tr><th>Question</th><th>Discussion – extent and potential impacts</th></tr>
<tr><td>Does the recorded water table extend above the base of the proposed subsurface structure?</td><td rowspan="2">The base of the proposed subsurface structure is shown as being ~3.25m below the FFL of the ground floor level. Groundwater was encountered at [P02] 2.15-2.6mBGL, so the structure extends below the measured groundwater level by up to 1.10m. Maximum proven thickness of Made Ground was 1.3m, indicating that at least a 0.85m thickness of Taplow Gravel Formation was found to be unsaturated/'dry' throughout the monitoring period. [P02]

Potential impacts include localised groundwater level increase on the up-gradient side of the basement and increased groundwater flood risk, as a result of the basement interacting with the groundwater by up to 1.05m. The impact is, however, expected to be very localised due to the small volume of structure in the large expanse of the aquifer.

The construction methodology is unknown, however given the proximity to the railway, embedded retaining walls are expected to be required for the basement construction. These would extend into the underlying London Clay aquitard and, if left in place, may inhibit the flow of water below the basement slab if the Taplow Gravel Formation is encountered there (thickness underlying the slab is expected to be limited, if present).</td></tr>
<tr><td>Does the proposed excavation during the construction phase extend below the local water table level or spring line (if applicable)?</td></tr>
<tr><td>Is the site underlain by an aquifer and/or permeable geology?</td><td>The Taplow Gravel Formation is a principal aquifer. The material is expected to have a high permeability and to be in hydraulic conductivity with the surrounding Kempton Park Gravel River Thames.

Potential impacts include contamination of the aquifer and localised impact on the groundwater flow regime (as discussed above). Additionally, the proposed basement construction may necessitate dewatering, which may cause subsidence of the neighbouring structures and railway if the dewatered area is not isolated from the aquifer.</td></tr>
</table>

5.2 Land Stability

Table 5-2: Land Quality (Scoping)

Question	Discussion – extent and potential impacts
Will the implementation of the proposed subsurface structure require any trees to be felled or uprooted?	Certainly two trees will be removed from the site as part of the development. It is not known if trees in the southern landscaping border will be retained throughout construction, or removed and replanted, but they are shown on the Site Plan. Furthermore, a number of minor trees are present in the northwest corner of the site and it is not known if these will be removed as part of the work, as they are not shown on the proposed Site Plan. Removal of trees can raise the natural moisture content of the nearby soils and, depending on the ground conditions, result in volume change. Volume change associated with the removal of trees can result in damage to structures, due to movement of foundations. As the ground conditions are predominantly coarse-grained, the risk of damage to structures resulting from removal of trees is expected to be very low.
Has the ground at the site been previously worked?	As reported in Brownfield Solutions Ltd report 'Phase I & II Geo-Environmental Assessment Report', 2023, ref: CO/M5478/12423, appended in Appendix B, the site has historically been a coal yard and railway sidings and may therefore exhibit some historical subsurface foundations or features associated with the site history. Potential impacts include the presence of historic foundations or ground conditions underneath the structure that are different to those identified during the previous ground investigation. Variation to ground conditions under the existing building footprint may impact on the proposed basement design and construction.
Is the site within the vicinity of any tunnels or railway lines?	A railway is present immediately to the north of the site. The site is approximately level with the railway and a level crossing is nearby to the northeast. Two Thames Water sewers are present on the site and are expected to be in close vicinity to the western basement wall. Potential impacts on tunnels and railways associated with the proposed works include the inducement of movement of the Thames Water assets to the west and the Network Rail assets to the north. There may be additional services on adjacent land that will be affected by the works, which needs to be considered in design.

5.3 Flood Risk and Drainage

Table 5-3: Flood Risk and Drainage (Scoping)

<table>
<tr><th>Question</th><th>Discussion – extent and potential impacts</th></tr>
<tr><td>Will the proposed subsurface development result in a change in impermeable area coverage on the site?</td><td>A landscaping zone is to be added as part of the development. The Site Layout drawing in Appendix A states that the proposed landscaping zone is 493m^2. This indicates a reduction to the impermeable coverage across the site.

The possible impact of a reduction to the impermeable coverage is that additional water will be retained on site and will slowly percolate into the underlying aquifer. This may result in localised ponding of water at surface within landscape areas during heavy rainfall. It is however expected that the surface water flood risk to adjacent sites would be reduced, as the surface water is retained on site for a longer duration as it percolates into the ground or flows through vegetation.</td></tr>
<tr><td>Will the proposed subsurface development impact the flow profile of throughflow, surface water or groundwater to downstream areas?</td><td rowspan="2">The proposed basement will have interaction with groundwater, having a very localised impact on groundwater flow profile and groundwater.

Potential impacts include groundwater levels down-gradient of the proposed basement being slightly depressed.

See Section 5.1 for further discussion.</td></tr>
<tr><td>Will the proposed subsurface development increase throughflow or groundwater flood risk to neighbouring properties?</td></tr>
</table>

6. Basement Impact Assessment (BIA)

The Richmond Basement Assessment User Guide (2021) states that the BIA should evaluate the potential direct and indirect impacts of the proposed development. The following subsections present an evaluation of each matter identified in the screening and scoping sections.

6.1 Groundwater and aquifer Interface

6.1.1 Groundwater levels

As discussed in Section 5.1 and 5.3, construction of a basement below the groundwater table may impact upon the localised groundwater flow profile and groundwater levels. This is due to the proposed basement structure extending into the groundwater body, requiring groundwater to flow around and/or beneath it.

Quoting from Peter Brett Associates 'Basement Developments: Review of Planning Implications', 2014, ref: 30045/001, prepared for London Borough of Richmond Upon Thames, the following is deemed applicable to the proposed development:

"A basement constructed below the groundwater table may locally obstruct the natural groundwater flow resulting in a local rise in groundwater level on the up-gradient side of the basement and a fall in groundwater level on the down gradient side. However, for a small isolated basement this impact is likely to be very localised because it is a relatively small volume of structure in a large expanse of aquifer with a relatively high permeability. Therefore, the groundwater will still be able to flow around and potentially below the basement. As such, in general, the impacts of isolated small single storey basements are unlikely to have a significant effect on the groundwater regime in the Borough."

With reference to the Groundsure report, the site is situated in an area of moderate – high risk from groundwater flooding. The land immediately up-gradient of the proposed basement, which is associated with the railway, is shown to have a high risk of groundwater flooding. As the railway is currently at a high risk of groundwater flooding, the construction of the basement cannot result in a worsening to the associated risk category (i.e. the railway can only remain at high risk, though flooding extent may increase). The land immediately down-gradient of the proposed basement is shown to have a moderate – high risk from groundwater flooding. As this land is down-gradient of the proposed basement, the risk of groundwater flooding would be bettered or unaffected.

Monitoring undertaken to determine local groundwater levels indicates that the groundwater table is [P02] 2.15-2.6mBGL. The anticipated interaction depth for the proposed structure therefore ranges from 0.65-1.10m and there is a minimum 0.85m thickness of unsaturated/'dry' Taplow Gravel Formation above the measured groundwater level. [P02]

The construction methodology is unknown, however given the proximity to the railway, embedded retaining walls are expected to be required for the basement construction. These would extend into the underlying London Clay aquitard and, if left in place, may inhibit the flow of water below the basement slab. It is therefore envisaged that groundwater will flow only around the outsides of the proposed basement.

With reference to the London Borough of Richmond upon Thames' SFRA, it is noteworthy that the site is not within an Increased Potential for Elevated Groundwater (GLA Drain London) area.

To develop an improved understanding of this hazard, additional ground water monitoring undertaken in a position up-stream of the proposed basement prior to and following construction of the proposed basement could be carried out. Consideration could also be given to additional flood risk assessment for the proposed works.

As stated in Richmond Basement Assessment User Guide (2021) mitigation measures include 'underground corridors with a high permeability'. The requirement for such mitigation measures should be considered in design.

6.1.2 During construction

Dewatering of excavations may have an impact on the local groundwater regime, which can result in settlement of the ground surface and foundations associated with neighbouring structures and induce strains upon buried services.

During construction of the proposed basement, it is likely that a cofferdam will need to be formed around the perimeter of the proposed basement with the embedded wall extending into the underlying London Clay aquitard. In this instance, on the basis that the excavation is impermeable, the excavation is isolated from the aquifer and ground movement due to dewatering is minimised.

Upon dewatering and excavating for the basement construction, the water will impose an unequal pressure upon any temporary retaining structures. Temporary retaining structures must therefore be subject to design to ensure it can resist earth pressures, water pressures and external loads.

To mitigate against issues associated with dewatering during construction, [P02] it is understood that the use of secant pile wall cofferdam is proposed to be [P02] installed prior to excavation and dewatering. Consideration should also be given to a sheet pile wall option, however vibrations generated during installation may be unacceptable to third-party asset owners.

Safe access and egress to the excavation are also important considerations for the design.

6.1.3 Permanent works

In the permanent case, the premises must be waterproofed and a strategy to remove water implemented during design. Removal of water in the long-term must not result in dewatering, as this could result in a lowering of the groundwater table and settlement of the ground surface and foundations associated with neighbouring structures and induce strains upon buried services.

Quoting from Peter Brett Associates 'Basement Developments: Review of Planning Implications', 2014, ref: 30045/001, prepared for London Borough of Richmond Upon Thames:

"Provided that basements are designed and constructed in accordance with industry guidance, groundwater ingress into a completed basement is not likely to be an issue."

6.1.4 Aquifer contamination

Contamination of the aquifer should be avoided throughout construction of the proposed basement. An assessment of sources of contamination and linkages could be undertaken to determine appropriate construction methodologies and any mitigation measures.

To understand the impact of construction upon the aquifer, in addition to monitoring of groundwater levels, water samples could be retrieved and tested to assess if there has been an impact on the local water body.

6.2 Vegetation

6.2.1 Removal

As discussed in Section 5.2, removal of the two trees within the footprint of the proposed basement is expected to have no impact on adjacent properties.

6.2.2 *Planting*

The geology beneath the site comprises granular Taplow Gravel Formation overlying the London Clay Formation. The interface between these soils is 3.0-4.4mBGL based on the data available.

Along the western boundary of the site, planting is proposed that may result in an increased draw of water from the ground. This can result in seasonal shrink/swell of susceptible materials. The Taplow Gravel Formation is not expected to be susceptible to shrink/swell, however no test data is available. The underlying London Clay Formation is highly susceptible to shrink/swell, however, due to the presence of a perched water table and a significant depth from surface to the London Clay Formation, it is unlikely that shrink/swell will affect the proposed basement. Further consideration should be given to whether or not the planting will have an impact on neighbouring structures.

6.3 Historical Site Workings

As detailed in Brownfield Solutions Ltd report 'Phase I & II Geo-Environmental Assessment Report', 2023, ref: CO/M5478/12423, appended in Appendix B, and the Groundsure Report therein, the site has a history as a coal yard and railway sidings.

Evidence of historical ground working may be evident beneath the existing structure and along the northern and eastern sides of the proposed basement. Such variable ground conditions, if present, is an important consideration during design of subsurface structures.

To mitigate this risk, additional ground investigation following the demolition of the existing structure could be carried out to prove the ground conditions across and beyond the footprint of the proposed basement.

6.4 Ground Movement

As discussed in Section 6.1.2, it is [P02] understood {P02] that a cofferdam will be formed to isolate the excavation from the surrounding groundwater. Upon constructing the cofferdam using secant piles, followed by dewatering and excavation, the structure is required to resist earth pressures, water pressures and external loads (e.g. from passing trains or road vehicles), which result in lateral movement of the retaining structure.

Lateral movement of retaining structures results in vertical and lateral movements of the retained ground, resulting in strains and movements being induced in buried services and displacement of foundations and surface infrastructure.

6.4.1 *Surface displacements*

Figure 6.16 from CIRIA C760 can be used to approximate the surface displacements at a distance back from a cantilever basement wall constructed in coarse-grained soils. Based on this figure and on the basis of a 3.25m deep excavation, vertical settlement of up to 10mm should be expected immediately behind the wall, which diminishes to no ground movement at ~8m from the wall. It is however noteworthy that the site conditions do not align perfectly with Figure 6.16 from CIRIA C760, due to the presence of London Clay Formation below the Taplow Gravel Formation, and the properties of any proposed retaining wall is not known, so these values are indicative only. It should therefore be expected that the works will have an impact on nearby third-party assets, such as Thames Water sewers and Network Rail rails and infrastructure, and that a detailed impact assessment will be required to meet the owners' requirements.

It is anticipated that the Network Rail and Thames Water assets would be affected by ground movements associated with movement of the retaining structure. The impact, however, is not expected to extend to neighbouring structures. This will need to be reviewed at design stage.

CIRIA C760 presents additional methods for determining ground movements during the design process. Liaison with Thames Water and Network Rail will be required during design process, to ensure that the impact on their assets is acceptable. Additional services may also be present that will also require consideration.

6.4.2 *Impact on Thames Water Assets*

Considering the position of the proposed western basement wall in comparison to the Thames Water sewers, the designer should consider the use of a propping system to ensure that microstrains and joint rotations induced in the sewers are within acceptable limits.

Installation of piles within the vicinity of buried pipelines can cause excess vibrations or strains that result in damage to sensitive assets. The methodology for construction of a cofferdam will therefore need to be developed in liaison with Thames Water.

Thames Water provide limitations of vibrations, microstrains and joint rotations that can be imposed upon their assets during development works. These limitations are typically defined based on the condition and form of construction of the asset. Guidance is provided in Thames Water 'Guidance on piling, heavy loads, excavations, tunnelling and dewatering', which states "no development or structure should be built within 5m of water transmission mains or 3m of water distribution mains".

London Borough of Richmond upon Thames 'Planning Advice Note: Good Practice Guide on Basement Developments', 2015, states that Thames Water agreement must be obtained "to carry out any building work over or within 3 metres of a public sewer to ensure that no damage is caused to it or restrictions made to the way sewers are used or maintained."

Available details associated with the Thames Water assets are limited, and so early engagement with Thames Water is suggested. As a minimum, the following will be required for the basement design to be developed and an impact assessment to be progressed:

- Development of methodology for basement construction
- Exact pipe alignment and depth and position relative to basement wall
- Pipe details, including diameter, material and wall thickness
- Allowable vibrations, joint rotations and microstrains
- Monitoring requirements

6.4.3 *Impact on Network Rail Assets*

The proposed northern basement wall will be constructed parallel to the railway, and the works associated with the basement construction may result in ground movement. It is expected that this interface will necessitate a Basic Asset Protection Agreement, which states: "The Customer shall be responsible for designing, carrying out and completing the Works and shall not damage the Railway and/or negatively impact upon the safety, structure or operation of the Railway and/or injure or negatively impact upon the safety of persons or property on or near the Railway".

It shall be required that the design of the proposed works meet Network Rail's requirements, which may include limiting predicted ground movements by using large piles or temporary excavations supports. It should also be expected that Network Rail will necessitate monitoring of the adjacent track throughout the works. Early engagement with Network Rail is suggested to ensure their requirements can be allowed for throughout the design process.

Installation of piles in the vicinity of railway assets can cause excess vibrations or ground strains that impact upon the railway. There is also a fall risk associated with failure of the piling platform that would have an exponential impact. NR/L3/INI/CP0063 provides guidance on this matter.

As a minimum, the following will be required for the basement design to be development and an impact assessment to be progressed:

- Development of methodology for basement construction
- Exact running line position relative to basement wall
- Any unusual external loads to be considered in design
- Allowable lateral and vertical displacement of the running lines
- Allowable vibrations imposed on the running lines and any sensitive infrastructure
- Monitoring requirements

6.4.4 Measures to reduce ground movement

To reduce the risk of ground movements exceeding those predicted in design, the following matters should be considered in design:

- Good workmanship to be achieved through compliance with ICE Specification for Piling and Embedded Retaining Walls and a site-specific specification
- Early installation of props during the construction sequence
- Avoid over-dig, to limit movement of the retaining walls
- Use of basement slab as a permanent support to the retaining walls
- Utilisation of a monitoring strategy to ensure vibration and displacement limits are not exceeded, including planned steps taken if the limits are exceeded, and that there are no resulting signs of distress caused to neighbouring buildings
- Allowance for reduction of stiffness due to corrosion or cracking, as applicable

6.5 Impermeable Area Coverage

Hydrock's 'Flood Risk Assessment', 2023, ref: 31569-HYD-XX-XX-RP-WENV-0001, provides discussion relating to surface water flooding and appropriate mitigation measures. The report identifies that on-site level-for-level compensatory floodwater storage should be provided.

7. Conclusion

This Basement Assessment has been prepared to comply with the steps defined in The Richmond Basement Assessment User Guide (2021) utilising data and information available to Hydrock at the time of writing. No information relating to construction methodology, sequence or constraints associated with proximity to third party assets have been defined at this stage.

The desk study shows that the site is in an area of medium-high risk from groundwater flooding. The adjacent railway is at high risk of groundwater flooding. Monitoring of groundwater has shown that groundwater is present at [P02] 2.15-2.6mBGL [P02], perched within the Taplow Gravel Formation. Measures to mitigate the risk of groundwater flooding include 'underground corridors with a high permeability'. The requirement for such mitigation measures should be considered in design.

During temporary works, dewatering will be required to provide a safe works area. A closed cofferdam, formed using bored secant piles, [P02] is expected to be used {P02] to allow for the excavation to be isolated from the aquifer. During development of the construction methodology and design, consideration should be given to the risk of ground settlement of adjacent land associated with dewatering beyond the footprint of the proposed basement, In the permanent case, the premises should be waterproofed and a strategy to remove water implemented. Removal of water in the long-term must not cause dewatering of the aquifer.

The construction methodology must be defined to avoid aquifer contamination and the impact on third-party assets should be minimised. Monitoring of third-party assets may be required to ensure vibration and strain limits are adhered to.

Additional ground investigation should be undertaken following demolition of the existing structure, to review the potential impact of the site history on the ground conditions and to inform design of the basement. Additional groundwater monitoring should be undertaken to inform design and to establish a baseline for groundwater levels.

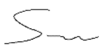
Assessment of ground movement and the associated impact on third-party assets is expected to be a significant factor in the development of the design. Early engagement with asset owners is suggested, to ensure their requirements can be accounted for throughout the design process. Sensitive assets may be affected that have not been discussed herein.

8. Site and Assessment Verification Form

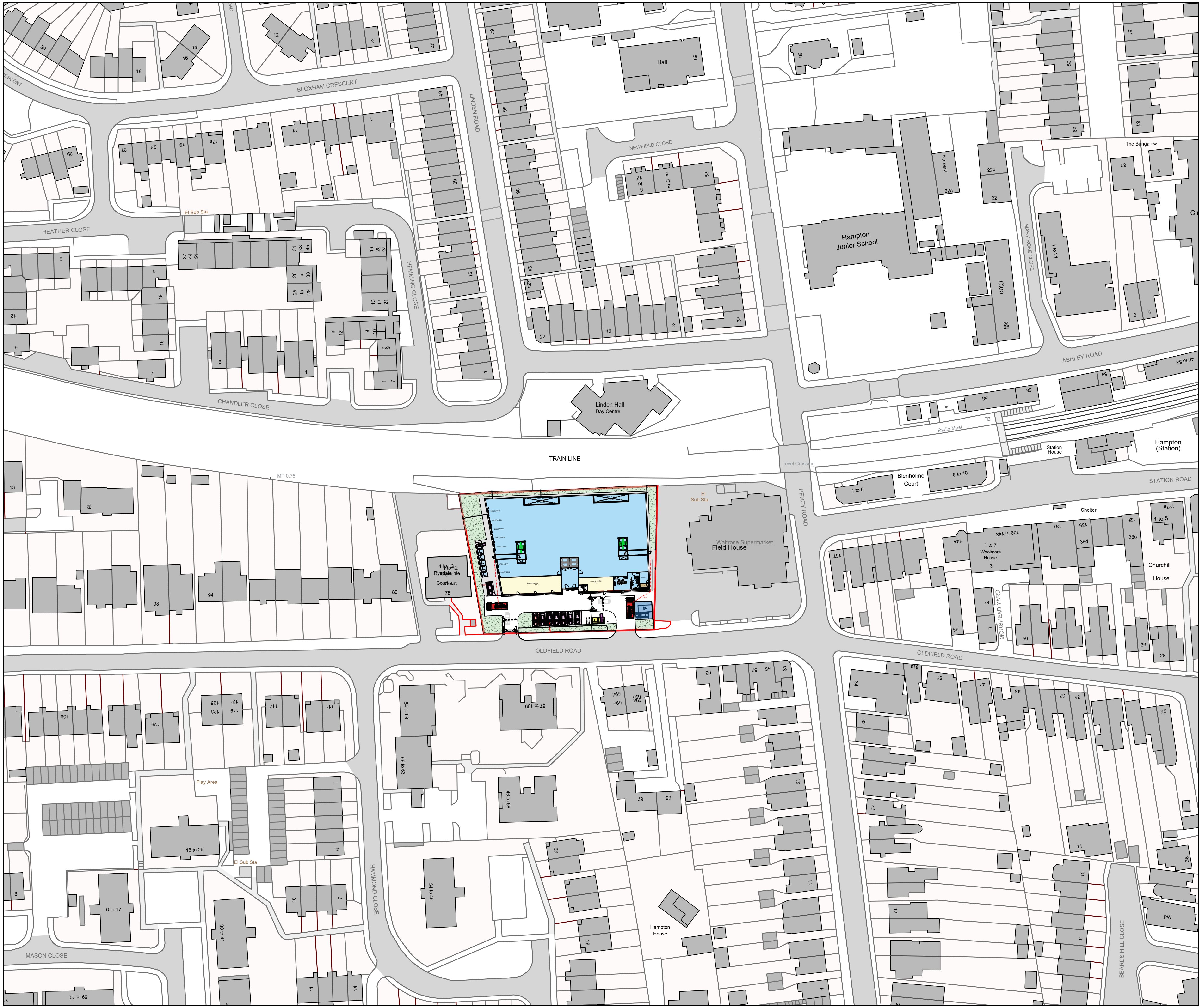
Site Details

Site Details	Applicant Information
Site name	Oldfield Road, Hampton
Planning application reference (if applicable)	TBC
Address & postcode	Suite C, 74 Oldfield Rd, Hampton TW12 2HR
Brief description of the proposed works	Construction of new storage facility with basement
Geology type	Taplow Gravel Formation over London Clay Formation
Presence of aquifer?	Yes
Total site area (Ha)	0.3085
Is the site currently known to be at risk of flooding from any sources?	Yes. The site exhibits medium-high risk of groundwater flooding.

Chartered Professional Verification

Professional Details	Applicant Information
Name	Samuel Doe
Profession / area of expertise	Geotechnical Engineer
Chartered institution and membership level	MICE
Brief description of assessment involvement	Review of available site data, screening, scoping and BIA utilising available data and current knowledge of proposals
Brief summary of the assessment results	Guidance on further site works required for design and important considerations during design development
Declaration of assessment results	Assessment results presented herein
Signature	

Appendix A Drawings



NOTES

ORIGINAL A3

All levels and dimensions to be checked on site prior to construction / fabrication; report discrepancies immediately.
Do not scale dimensions from this drawings.

REVISION

Site Boundary = 3094 m2

N

SCALE 1:1250

0 10 20 30 40 50m

PLANNING

SCALE	DATE	DRAWN	CHECKED
1:1250@A3	MAR'24	AF	DA

PROJECT

Shurgard
Oldfield Road
Hampton: TW12 2HR

DRAWING

Location Plan
As Proposed

Threesixty Architecture

10 MONTROSE STREET
GLASGOW
G1 1RE

t 0141 229 7575
www.360architecture.com

DRAWING No.

23053GA-D-001

NOTES

ORIGINAL A1

All levels and dimensions to be checked on site prior to construction / fabrication; report discrepancies immediately.
Do not scale dimensions from this drawings.
This drawing is copyright protected.

REVISION

Visitor Parking:
2 x Car space
(1 of which is Accessible)

Customer Parking:
7 x Car space
(2 of which are Electrical Charge points)

Staff Parking:
1 x Car space

Electrical Car "Twin" charging point

Bicycle Parking:
1 short stay Cargo Bikes
5 short stay - standard
20 long stay - of which 1 is cargo

Refuse Requirement = 0.1 sqm
Actual Refuse Store = 11m2

Landscaping zone = 493m2

Site Boundary = 3094 m2

SCALE 1:125

0 1 2 3 4 5m

N

PLANNING

SCALE	DATE	DRAWN	CHECKED
1:125@A1	FEB'24	AF	

PROJECT
SHURGARD UK
OLDFIELD ROAD, HAMPTON
TW12 2HR

DRAWING
Site Plan
As Proposed

Threesixty Architecture

10 MONTROSE STREET
GLASGOW
G1 1RE

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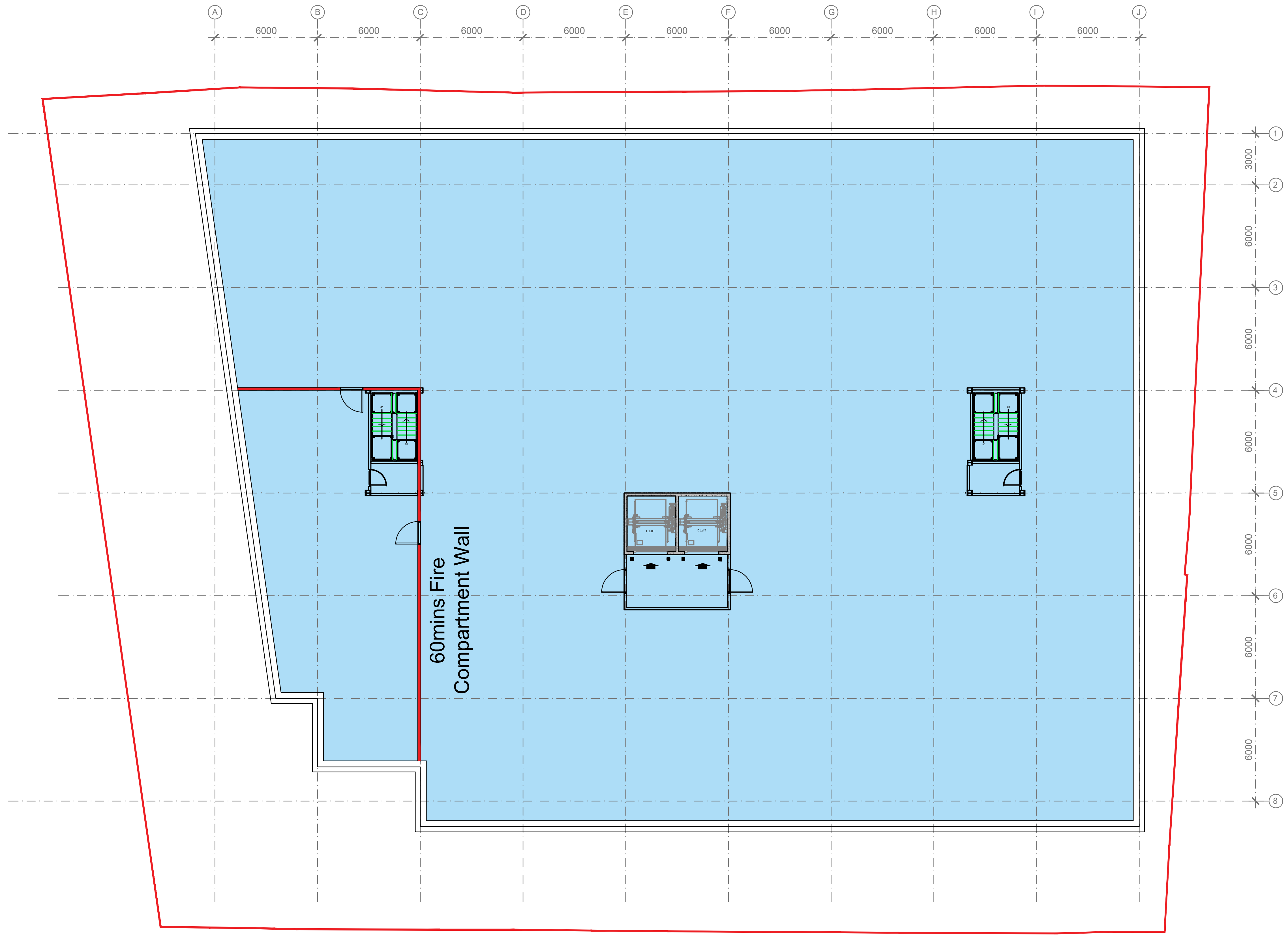
DRAWING No.
23053GA_D_002

NOTES ORIGINAL A3

All levels and dimensions to be checked on site prior to construction / fabrication; report discrepancies immediately.
Do not scale dimensions from this drawings.
This drawing is copyright protected.

REVISION



	Gross External Area	
	SS GEA	Business C. GIA
Basement Floor :	2138msq	
Ground Floor :	1624msq	170msq
Level 01 :	1640msq	
Sub Total :	5,402msq	170msq
Grand Total :	5,572msq	

SITE BOUNDARY
AREA = 3,085 sqm

N

SCALE 1:250

0 2 4 6 8 10m

PLANNING

SCALE	DATE	DRAWN	CHECKED
1:250@A3	MAR'24	AF	DA

PROJECT
Shurgard
Oldfield Road
Hampton: TW12 2HR

DRAWING
Basement Floor Plan
As Proposed

Threesixty Architecture
10 MONTROSE STREET
GLASGOW
G1 1RE
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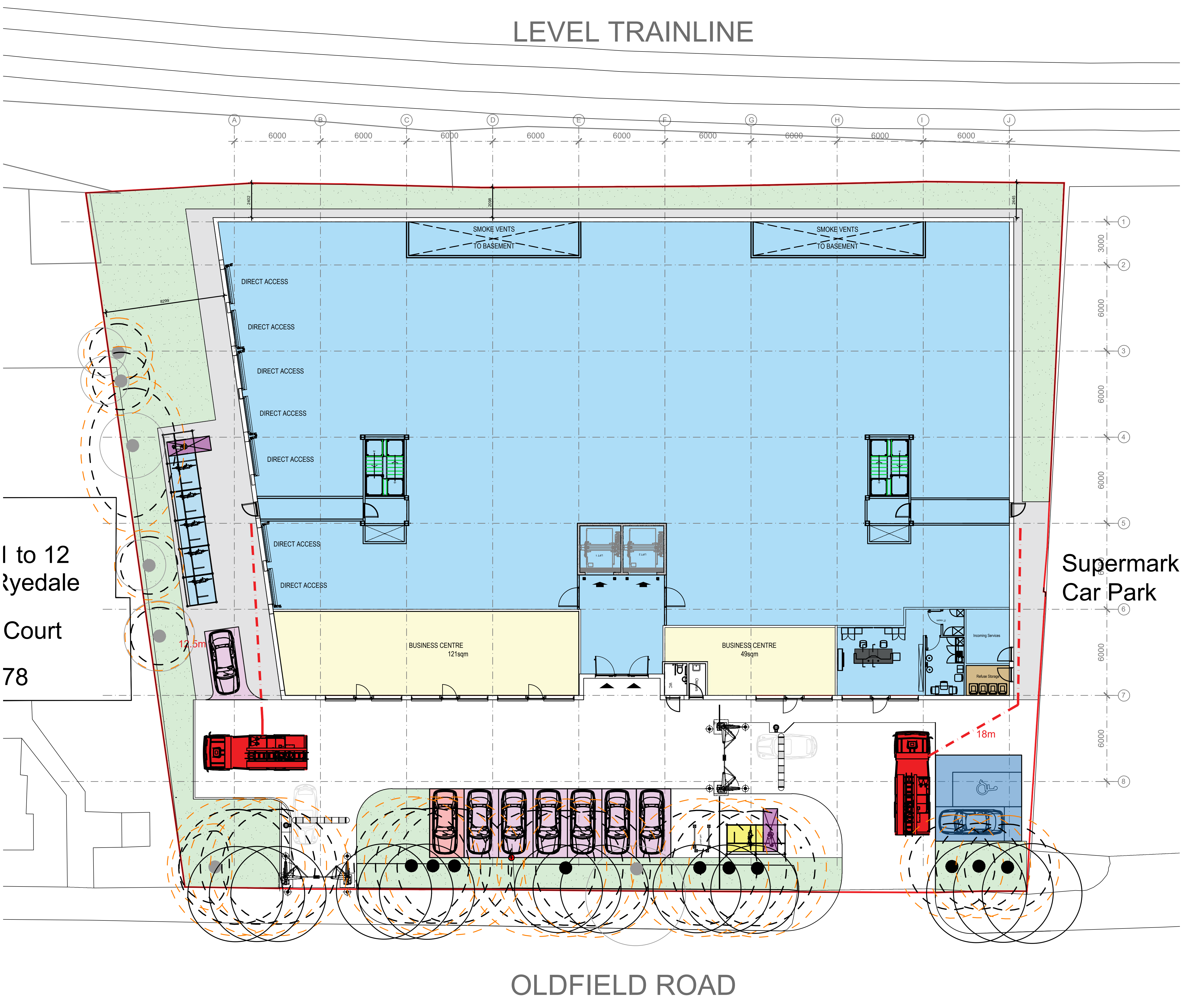
www.360architecture.com

DRAWING No.
23053GA_D_003



NOTES | ORIGINAL A3

All levels and dimensions to be checked on site prior to construction / fabrication; report discrepancies immediately.
Do not scale dimensions from this drawings.
This drawing is copyright protected.

REVISION

	Gross External Area	
	SS GEA	Business C. GIA
Basement Floor :	2138msq	
Ground Floor :	1624msq	170msq
Level 01 :	1640msq	
Sub Total :	5,402msq	170msq
Grand Total :	5,572msq	

SITE BOUNDARY
AREA = 3,085 sqm

SCALE 1:250

0 2 4 6 8 10m

N

PLANNING

SCALE	DATE	DRAWN	CHECKED
1:250@A3	MAR'24	AF	DA

PROJECT
Shurgard
Oldfield Road
Hampton: TW12 2HR

DRAWING
Ground Floor Plan
As Proposed

Threesixty Architecture
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GLASGOW
G1 1RE
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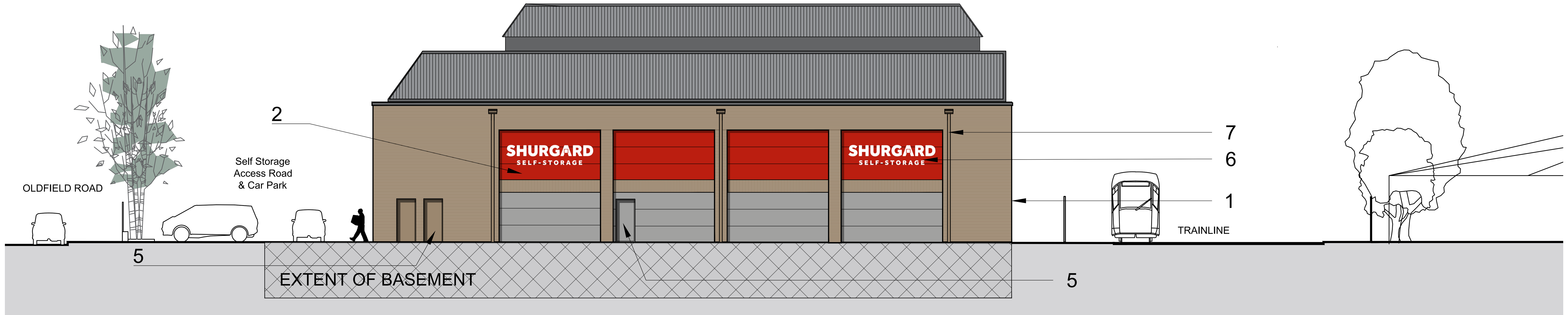
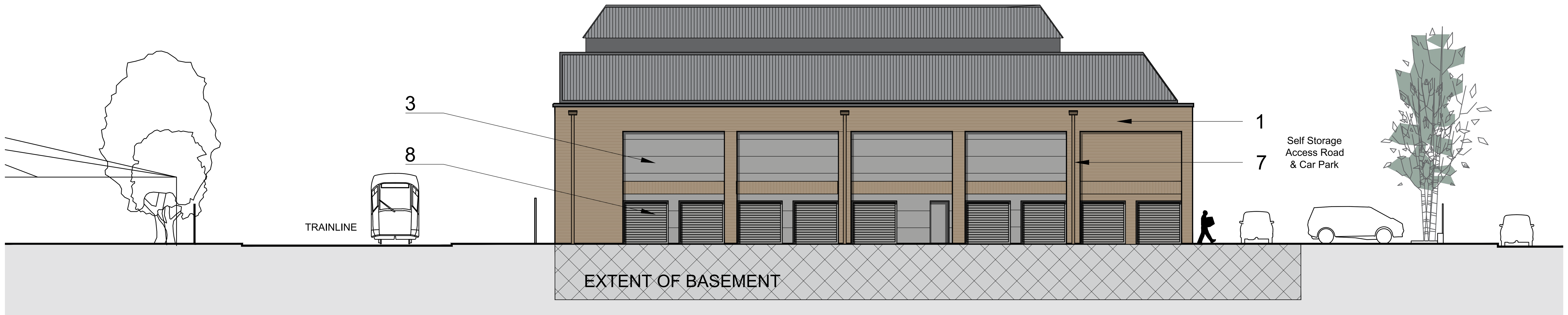
DRAWING No.
23053GA_D_004

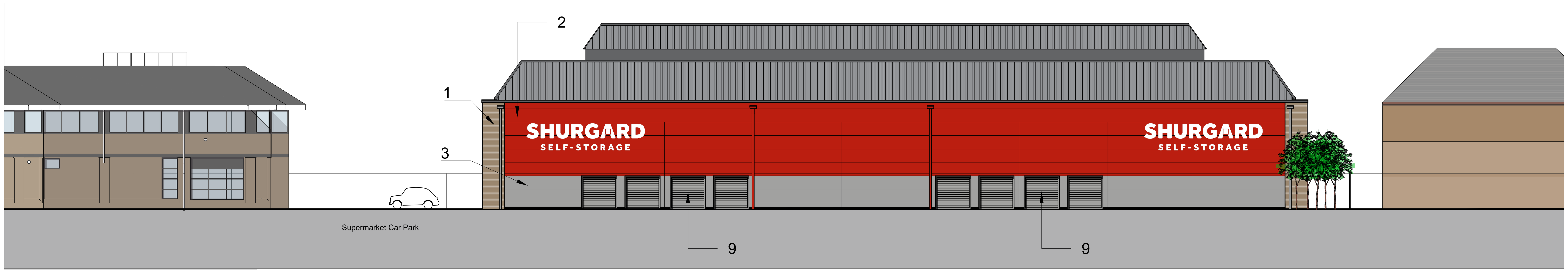
SOUTH ELEVATION TO THE OLDFIELD ROAD



EAST ELEVATION TO WAITROSE CAR PARK



WEST ELEVATION



NORTH ELEVATION FROM THE TRAINLINE

NOTES

ORIGINAL A1

All levels and dimensions to be checked on site prior to construction / fabrication; report discrepancies immediately.
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This drawing is copyright protected.

REVISION

MATERIALS KEY:

1 - FACING BRICK:

IBSTOCK:Ivanhole cream original 0054 Facing Brick Slipp Cladding System on 220mm thk Kingspan KS1100CS Karrier panel secure to perimeter beams.

Brick style: London Stock Brick
Colour: Buff

2 - FLAT METAL COMPOSITE WALL CLADDING PANEL:

KINGSPAN QUADCORE ARCHITECTURAL WALL PANELS
KS1000FL Longspan
[150mm thk. to be confirmed by Cladding contractor]
To achieve 60mins Fire Rating - (where illustrated)
Colour: Traffic Red - RAL3020

3 - PROFILLED METAL COMPOSITE SYSTEM:

KINGSPAN QUADCORE ARCHITECTURAL WALL PANELS
KS1000LV
Vertically applied Longspan [120mm thk to be confirmed by Cladding contractor]
Colour: Spectrum Silver - RAL 9006

4 - CURTAIN WALLING Principlal Elevation:

Proprietary double glazed curtain walling

Fenestration Colour: Traffic Red - RAL 3020

5 - FIRE EXIT DOORS:

Proprietary PPC steel security single leaf.

Colour: To match surrounding cladding panels.

6 - SHURGARD SIGNAGE:

Vinyl lettering applied to Brick
Size & Colour: Extra small (black) to south facade
Small (black) to North facade
Bespoke white (smaller < XS) to east facade

7 - RWP'S & GUTTERS:

Proposed to be new ppc aluminium.

Colour to match colour of walls.

8 - ACCESS ROLLER SHUTTER DOORS:

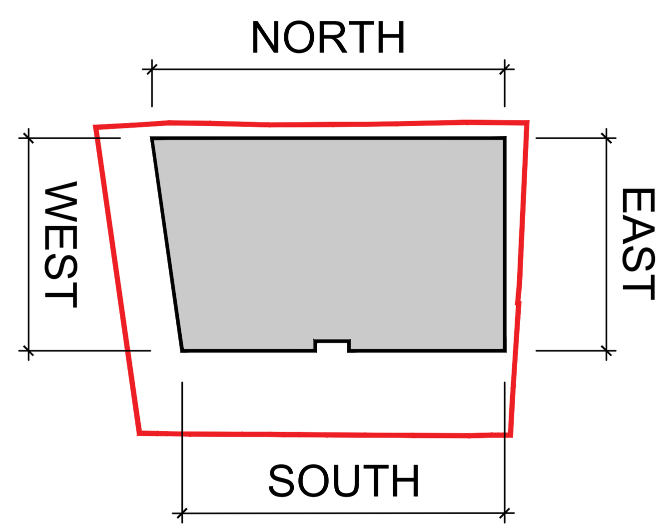
Proprietary PPC steel security shutters.

Colour: Traffic Red - RAL 3020

9 - SMOKE VENTS TO BASEMENT

Proprietary PPC steel vents

Colour: Spectrum Silver - RAL 9006



SCALE 1:150

0 1 2 3 4 5m

PLANNING

SCALE	DATE	DRAWN	CHECKED
1:150@A1	MAR'24	AF	DA

PROJECT
Shurgard
Oldfield Road
Hampton: TW12 2HR

DRAWING
Elevations
As Proposed

Threesixty
Architecture

10 MONTROSE STREET
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G1 1RE

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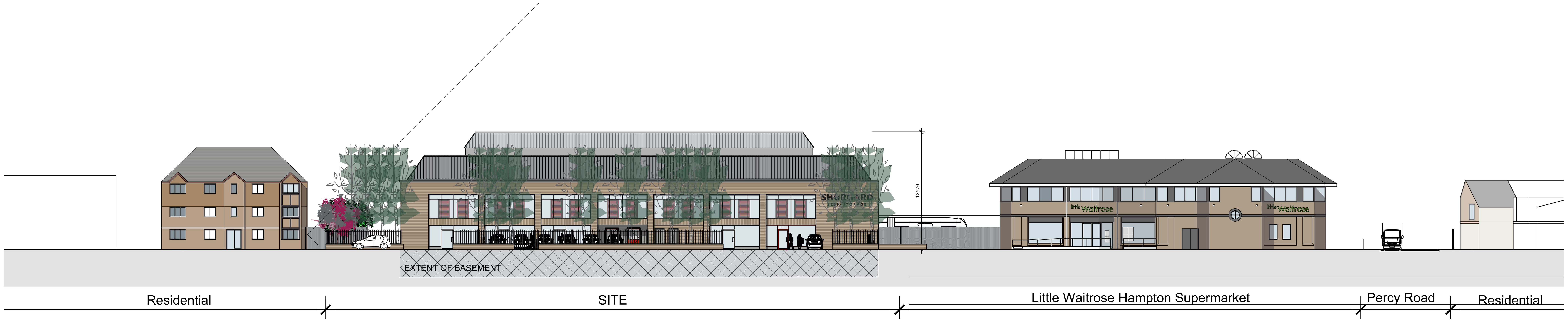
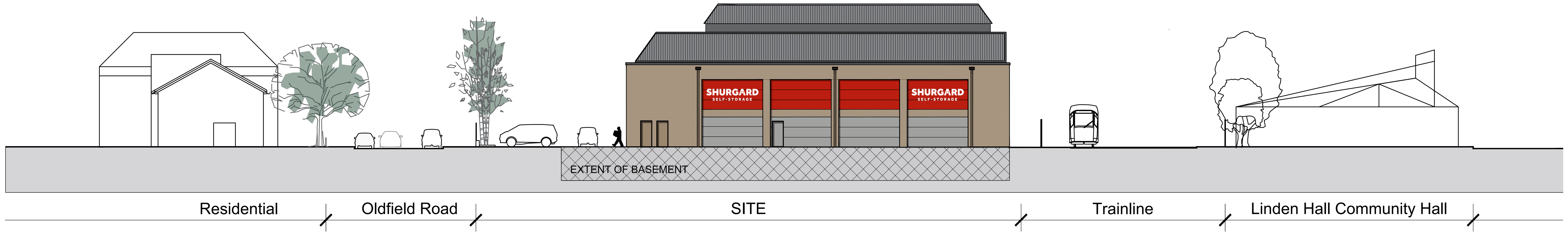
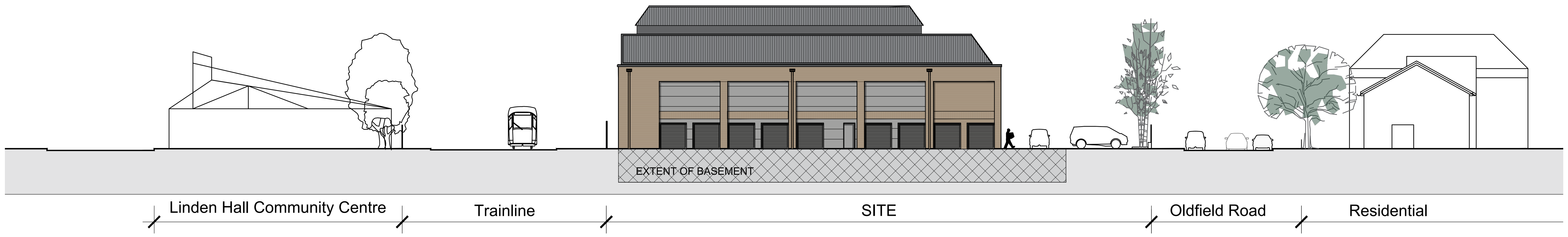
DRAWING No.
23053GA-D-007



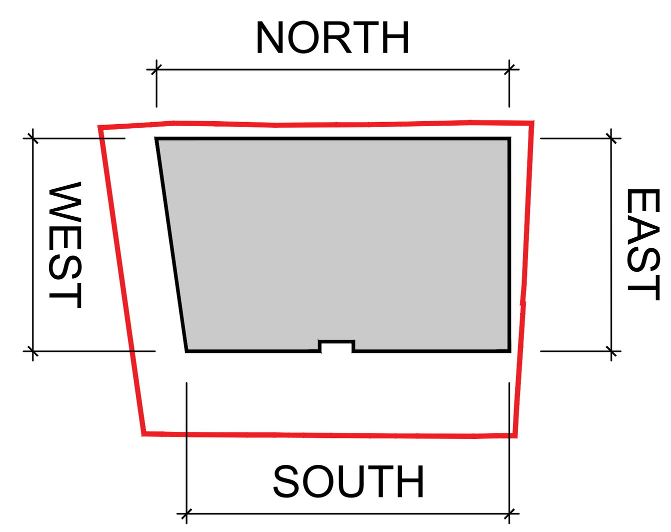
SOUTH ELEVATION TO THE OLDFIELD ROAD

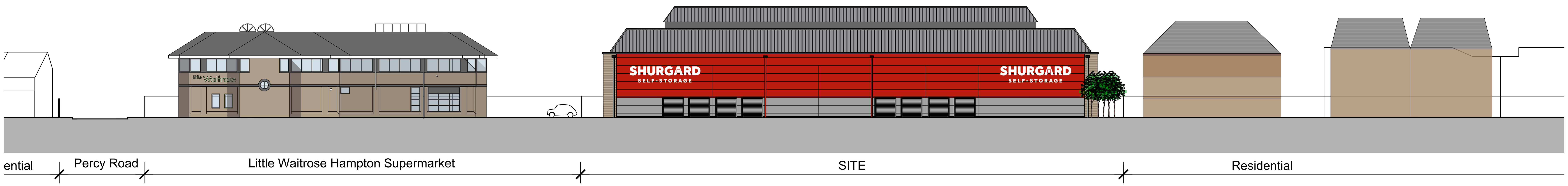


EAST ELEVATION TO WAITROSE CAR PARK



WEST ELEVATION





NORTH ELEVATION FROM THE TRAINLINE

NOTES

ORIGINAL A1

All levels and dimensions to be checked on site prior to construction / fabrication; report discrepancies immediately.
Do not scale dimensions from this drawings.

REVISION

SCALE 1:250
0 2 4 6 8 10m

PLANNING

SCALE	DATE	DRAWN	CHECKED
1:250@A1	MAR'24	AF	DA

PROJECT
Shurgard
Oldfield Road
Hampton: TW12 2HR

DRAWING
Contextual Elevations
As Proposed

Threesixty Architecture
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G1 1RE
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www.360architecture.com

DRAWING No.
23053GA-D-008

Appendix B Brownfield Solutions Ltd report ‘Phase I & II Geo-Environmental Assessment Report’, 2023, ref: CO/M5478/12423

Appendix C [P02] Additional groundwater monitoring data [P02]

CLIENT:	JOB NO:	SITE:
SHURGARD UK LTD	M5478	OLDFIELD ROAD, HAMPTON

Groundwater					
BH Ref	31/08/2023	08/09/2023	21/09/2023	02/10/2023	15/05/2024
BH01	2.41	2.34	2.30	2.31	2.15
WS04	0.91	0.88	0.83	NGW	NGW
WS06	2.58	2.45	2.38	2.49	
BH03	2.41	2.24	2.21	2.33	2.41
WS01			2.56	2.21	

Min (m bgl)	Max (m bgl)
2.15	2.41
0.83	0.91
2.38	2.58
2.21	2.41
2.21	2.56

Overall Min (m bgl)	Overall Max (m bgl)
0.83	2.58

Base Depth					
BH01	4.53	4.53	4.53	4.54	4.59
WS04	0.96	0.96	0.96	0.96	0.96
WS06	2.68	2.68	2.68	2.68	
BH03	2.98	2.98	2.98	2.96	3.10
WS01			2.78	2.57