

**FLOOD RISK ASSESSMENT  
&  
SUDS Strategy for Planning**  
**Compliant with London Plan Policies SI.12 / SI.13**  
**Croydon Local Plan Policy DM25.3 compliant**  
**PPG 2022 Update Compliant**

**Demolition & Erect mixed use commercial & residential scheme**

**Change to scheme: No residential on the  
Ground Floor**

**EA approved pragmatic response to residual hazard**  
**Maximised porous / permeable areas**  
**Incorporate new oversized SUDS areas**

at:

1a Brighton Road, Croydon CR2 6EA

March 2024

ARK Environmental Consultancy Ltd

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*If this report has been released electronically, the appendices referred to herein can be found in the annexed zip folder/s as .pdf or .dwg files. If this report has been released in hard copy the appendices will be bound into the back of this report. Plans may be annexed separately as A1 or A0 copies where a bound-in A3 copy is not appropriate.*

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## 1.0 Scope

This report contains the details of a Flood Risk Assessment carried out by Ark Environmental Consultancy Limited (“ARK Ltd”) for 1a Brighton Road, Croydon CR2 6EA, henceforth referred to as “the site” in this report.

This report has been prepared for ATF Construction Ltd and must not be relied upon by any other party without the explicit written permission of ARK Ltd.

All parties to this report do not intend any of the terms of the Contracts (Right of Third Parties Act 1999) to apply to this report. Please note this report does not purport to provide definitive legal advice nor can it be used to demonstrate that the site will never flood in the future.

The Executive Summary contains an overview of key findings and conclusions. However, no reliance should be placed on the Executive Summary until the whole of the report has been read. Other sections of the report may contain information which puts into context the findings noted within the Executive Summary.

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## 2.0 Executive Summary

This FRA&SUDS Strategy for Planning has been carried out in accordance with the National Planning Policy Framework (NPPF) and NPPG to assist the council and EA in their assessment of the planning application.

The proposed development is for demolition and erection of a new mixed use scheme with new Source Control SUDS and porous & permeable areas maximised.

- Site is in part EA FZ1 and part FZ2/FZ3 culverted fluvial undefended / surcharging sewer: residual
- EA acknowledged the modelling is limited and site not likely inundated; residual hazard
  - No residential on the ground floor: approved design response in this flood specific setting and habitable located away from flood source: sequential approach achieved
  - Full flood resilience / resistance
- Surface water: same as per fluvial hazard hence design responses are appropriate
- REDUCES FLOOD RISK OVERALL
  - Maximise highest forms of SUDS and porous / permeable areas
  - Prioritise surface storage and source control SUDS
  - Oversized storage
  - Over-sized SUDS store on site and restrict for previously unattenuated areas
- Resilient and resistant measures

The assessment considers the Exception Test can be passed.

Given the residual risk flood setting and the raised habitable areas, the level, extent and depth of flooding on the site can be managed in terms of resistant and resilient measures, precautionary mitigation measures and a flood response management plan.

Based on the likely flooding risk and small scale of the proposed development, it is considered that the proposed development can be constructed and continue to be operated safely in flood risk terms, without increasing flood risk elsewhere; it is therefore considered appropriate development in accordance with the NPPF / PPG.

### 3.0 Introduction

The FRA combined a desktop study, review of available information, consultations and an assessment of all sources of flooding posed to and from the site and proposed development, in accordance with NPPF & NPPG. Appropriate flood mitigation measures were then considered, either as already incorporated within the scheme or recommended for inclusion at detailed design stage. The suitability of the proposed development was also reviewed in the context of the NPPF/NPPG and any relevant technical guidance accompanying the NPPF.

### 4.0 Purpose of the Report

This FRA has been carried out in accordance with National Planning Policy Framework (NPPF) & PPG. The report provides the following information in accordance with the NPPF:

- An assessment of the flood risk posed to the site based on flood information and mapping provided by the EA and Strategic Flood Risk Assessment (SFRA);
- An assessment of the proposed development in terms of surface water run-off; and
- Proposals for measures to mitigate the flood risks posed to and from the development where appropriate.

### 5.0 Report Information Sources

The information source used to undertake this FRA has been collected from the following sources:

- British Geological Survey Website & iGeology App
- EA Website & Data
- Croydon Local Plan Local Plan Policy DM25.3: SUDS Requirements
- London Borough of Croydon Strategic Flood Risk Assessment
- London Borough of Croydon Preliminary Flood Risk Assessment (2011 and as updated)
- Croydon Flood Investigations Jan-Mar 2014 (URS, 2015)
- Croydon Local Flood Risk Management Strategy (2016-2020)
- Internet mapping and searches.

### 6.0 Consultation

Where appropriate, the EA and local council will have been contacted to request any available and relevant flooding data.

### 7.0 Overview of British Legislation

#### 7.1 National Planning Policy

The National Planning Policy Framework (NPPF) and NPPG supercede all Planning Policy Statements (PPS's) and Planning Policy Guidance (PPG's). Flood risk is retained as a key development consideration.

The Sequential and Exception Tests are retained. The accompanying NPPF Technical Guidance / NPPG also include Tables 2 and 3 to assist with flood risk vulnerability classifications and development suitability. NPPF & PPG 2022, New Climate Change Allowances and Government SUDS guidance compliant.

## 7.2 Local Policy

The Strategic Flood Risk Assessment (SFRA) is a key source of flood risk specific information for the area. The SFRA provides a more detailed review of flood risks and recommendations for ensuring developments can be constructed and operated safely in accordance with the NPPF. Greater detail of the SFRA is provided in the report where appropriate. London Plan SI.12 and SI.13 compliant.

## 8.0 Site Status and Environmental Setting

### 8.1 Site Status, Topo & Existing Drainage & Greenfield Calcs

The site is c. 0.091ha (910.0m<sup>2</sup>); it is a fully developed brownfield site with existing footprint from commercial / retail uses.

Location plan included in Appendix A. The site is at c. 48.8mAOD to 48.9mAOD. See Topo in App A.  
Existing Drainage

There is no evidence of any SUDS on the site.

The site discharges 100% of the hard surfaces 100% un-attenuated to the adjacent sewer.

There are existing manholes adjacent and within the site.

An assessment of the Greenfield equivalent discharge for the site has been carried out. This has confirmed an average discharge rate (QBAR) of less than 0.1 l/s. This low rate is due to the relatively small size of the site.

The standard “3 times the Qbar” is not possible nor necessary to restrict to such a low rate.

### 8.2 Existing Flood Risk

Flood Sources	Site Status	Comment on flood risk posed to / from the development
Fluvial / Tidal	Site is on the edge of the floodplain River Wandle is in fact a Thames Water sewer in this location This is not an EA “main” watercourse Site is in part Flood Zone FZ1 part FZ3 but low residual hazard Low Risk	No detailed data available or required in terms of site specific flood levels given culverted watercourse as a residual hazard as per other approved schemes Sequential approach: locate the habitable areas away from the flood source The scheme can incorporate suitable mitigation measures to address residual surface water risk Exception Test considered passed
Groundwater	SWMP indicates site not in potential elevated future groundwater risk for above ground	The proposed development will not increase the risk of groundwater flooding; New slabs can be engineered / waterproofed appropriately to industry standard Non return valves and sump Low Risk
Artificial Sources	No artificial sources within 250m	Low Risk
Surface Water / Sewer Flooding	Site is in NO – VERY LOW hazard area	Scheme can REDUCE FLOOD RISK OVERALL: see main sections below Scheme incorporates new oversized SUDS storage for greater area of impermeable area than actual and for 40% climate change Development will not increase the peak flow or volume of discharge from the site Low Risk No further drainage assessment required
Climate Change including new allowances	Addressed based on the residual hazard of culverted watercourse as a Thames Water sewer and Sequential approach to design within the site used as precautionary approach	Development will not increase the peak flow and volume of discharge from the site Low risk posed to and from the development



### 8.3 Geology (for SUDS)

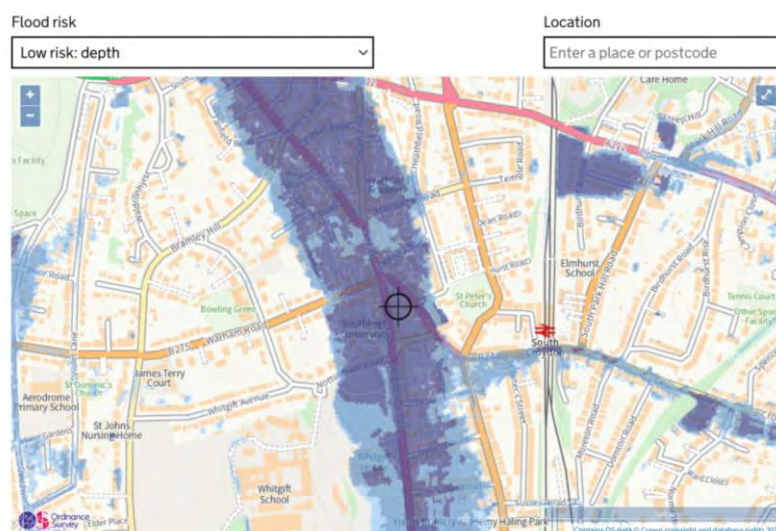
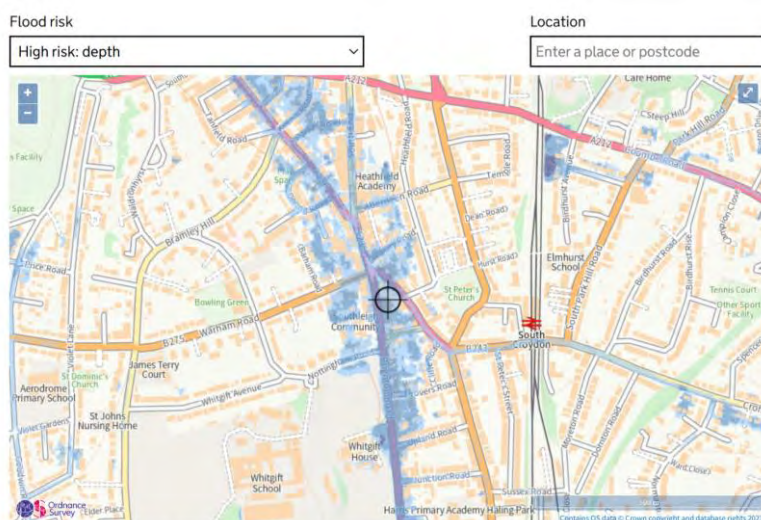
Based on BGS mapping and surrounding adjacent boreholes:

- Bedrock: Lewes Nodular Chalk
- Superficial: Hackney member Gravels

This Chalk and Hackney Gravels are water bearing stratum. However, due to the site constraints, it is not possible to meet the engineering / guidance requirements for 5.0m distance from footprint and 2.0m distance from a site boundary. Informal infiltration is feasible but there is already a viable connection from the existing operating site; attenuation and discharge to sewer is the option which passes the SUDS hierarchy test for this site.

## 8.4 EA 2024 Surface Water Risk and Hazard Summary

- Site is in medium hazard in EA's high risk scenario / high hazard in Low risk scenario
- Residual hazard addressed by the design response to the fluvial / sewer surcharge flooding
  - **No habitable on the ground floor and full flood resilience is the correct and EA approved design response**
- Formal SUDS to address and reduce risk overall



## 8.5 SFRA / LFRMS Surface Water Mapping & Hazard

NOTE: the resolution of the SFRA and SWMP mapping is not appropriate to be site specific. The mapping corroborates the data in the more detailed mapping above.

- Floodwaters not likely to immediately reach the property or inundate the site
- Regardless: scheme can REDUCE FLOOD RISK OVERALL to be policy compliant



## 8.6 Fluvial Hazard Assessment: EA acknowledged residual risk

The adjacent watercourse the Wandle is fully culverted in a Thames Water sewer upstream and downstream of the site for greater than c. 2kms; it follows the line of Brighton Road for the relevant sections in this area.

It is not categorised as an EA main watercourse for this reason.

The actual flood risk required for design has been discussed with the EA many times.

It is accepted that there is always a risk of surcharge from a culvert due to blockage / capacity issues.

However, the modelling that created the flood extents is of poor resolution and it is well known and acknowledged by the EA that the inputs to the modelling have created a flood outline that is significantly exaggerated.

The modelling did not incorporate:

- a) the balancing pond at the upstream end of the culvert
- b) the capacity of the culvert itself
- c) ground truth approach for how surcharging would actually inundate these areas (both depths and extent)

For this reason, the EA have been accepting of a pragmatic approach to the flood zone setting and design of “More Vulnerable” uses i.e. residential

- The retail / commercial areas are located on the ground floor adjacent to the flood source.
- All residential habitable uses are located on the first floor and above
  - Sequentially located away from the flood source and above the worse case likely flood design level for all sources and within the FZ1 area of the site.

## 8.7 Climate change allowances: all sources of flooding

For the reasons above, the EA have been accepting of the principle of applying the sequential approach and the control / design out the hazard.

- No habitable uses on the ground floor: **achieved**

There are no flood levels to apply a climate change uplift and no further assessment of the fluvial climate change allowances is considered necessary in line with the EA’s guidance for developments in this site and catchment specific flood setting.

All habitable at first floor and above also addresses the residual surface water hazard

## 9.0 Assessment of Proposed Development

### 9.1 Proposed Development

The proposed development can be seen in Appendix B.

The proposed development comprises:

- Demolition and new build of mixed used scheme
- Commercial / retail located on the ground floor within the FZ3 culverted extents
- No habitable areas on ground floor
  - Sequential approach to design achieved
- Full flood resilience for all ground floor areas
- Remove all other impermeable areas
  - Maximisation of porous / permeable areas
- **Reduces flood risk overall**
  - New modern flood resilience – see below
  - New porous / permeable and oversized SUDS areas – see below
- Full waterproofing of all ground floor structures to industry standard

**As an appropriate response, the site will operate as existing with an improvement based on the design:**

- 1) robust resilient construction techniques in order to minimise the damage caused by water entry and also to reduce the time taken to return the property to use after a flood (see later sections)
- 2) Reduce flood risk overall with new lower water demand white goods: betterment of surface water management on the site as a result of the scheme where feasible

### Drainage

The existing connections will be retained / additional secured with the water company; non- return valves can be utilized as standard.

### Foul

There is an existing connection / connections to the foul sewer.

It is proposed to re-use the connections wherever feasible as this is the most sustainable approach.

Subject to the approval of Thames Water, it is proposed to connect the foul discharge to the public foul sewer via the existing connections, subject to condition and level.

Thames Water have not noted any capacity issues in this area of Croydon.

Based on the existing connections and the proposed scheme, gravity connections will be feasible.

If required, the development will secure a new connection to adjacent sewers where appropriate for the foul. This will be confirmed during detailed design with the water company.

## 9.2 Croydon SUDS Compliance & Betterment Feasible

- Source control green and sedum roof areas
- Source Control rain gardens
- Source Control Permeable patios with perforated pipes / granular storage
  - Non soakaway / no infiltration: discharge to other SUDS storage
- Maximise porous and permeable areas
- Permeable and porous amenity area with underground geocellular storage (with non return valve if to combined manhole) will provide a tangible benefit and meet and better the LLFA and London Plan requirements

## 9.3 Note on Restriction Rates

The joint DEFRA/EA R&D rainfall runoff management for developments Report-SC030219 states that “a practicable minimum limit on the discharge rate from a flow attenuation device is often a compromise between attenuating to a satisfactorily low flow rate while keeping the risk of blockage to an acceptable level. This limit is set at 5 litres per second, using an appropriate vortex or other flow control device”.

Technology has indeed moved on and there are manufacturers providing improved flow control devices since the DEFRA/EA report was published, permitting flows lower than 5 l/sec through their devices without increasing the flood risk from blockages.

However, a self-cleansing velocity of 0.7 l/sec must be maintained in pipes and all pipes sizes should meet the Building Regulations Part H which require a minimum pipe size of 75mm for surface water drainage. This indicates that peak flow rates lower than 3.0 l/sec will either fail to meet BS EN 752-4 and/or the Building Regulations Part H requirements. This, in turn could increase the flood risk from blockages for the proposed development.

So, for clarity again:

- We use 3.0 l/s as the restriction rate in the calculations to make the calculations oversize the storage deliberately
- But the actual pipe and restriction device infrastructure and installation will need to be to Building Regs and British Standards.

However: by oversizing, the storage itself provides the necessary restriction and increasing the time before surface water on the site reaches the sewer.

## 9.4 SUDS Storage Calculations: new climate change allowances

SUDSUK oversized storage with a worse case of:

- Existing site is 100% impermeable
- Proposed site will be only 30% fully impermeable due to the significant commitment to Source Control SUDS and new porous / permeable areas
- Regardless the calculations use a worse case of 65% of the site being impermeable
  - Calculations therefore include a minimum 100% of all impermeable areas plus an additional 35% of the total area for oversizing the SUDS storage
- 40% climate change
- 2.0 l/s for the sizing only (lowest allowable due to size of pipes / restriction devices)
  - **30.0m3 of storage would be required**

Refer to Appendix C for the output calculations.

Compliant with London Plan Policy SI.12 / SI.13.

## 9.5 SUDS Specifications

Type of SUDS	Source Control	Dimensions	Total Storage
Sedum / Green Roof Areas with reservoir tray void storage	YES	<u>Top Roof:</u> 360.0m <sup>2</sup> minimum. Use 4.0cm height reservoir tray void storage = 14.4m <sup>3</sup> ; 85% void ratio = 12.24m <sup>3</sup>  <u>Lower Roof:</u> 22.0m <sup>2</sup> Use 6.0cm height reservoir tray void storage = 1.32m <sup>3</sup> ; 85% void ratio = 1.12m <sup>3</sup>  <u>Bin / Bike Store Roof:</u> 26.6m <sup>2</sup> Use 10.0cm height reservoir tray void storage = 2.66m <sup>3</sup> ; 85% void ratio = 2.26m <sup>3</sup> = <b>15.62m<sup>3</sup></b>	<b>15.62m<sup>3</sup> (minimum)</b>
Rain Garden Beds / Planters with void storage Discharge direct from RWP	YES	Assume worse case only 4.2m <sup>2</sup> of planter with void storage adjacent to the new footprint (see AppD layout) Use 0.4m height integrated void storage = 1.68m <sup>3</sup>	1.68m <sup>3</sup>
Porous and Permeable Areas Maximised	YES	> 25% of the site	n/a
Lined Cellular Storage under porous amenity  Not in areas of RPZ's as per SUDS layout plan	YES	Minimum shown of c. 62.0m <sup>2</sup> Use 0.4m depth of granular angular storage = 24.8m <sup>3</sup> Assume 95% void space = 23.56m <sup>3</sup>	23.56m <sup>3</sup>
<b>TOTAL</b>			<b>40.86m<sup>3</sup></b>  <b>Greater than the 30.0m<sup>3</sup> required</b>

See Appendix D for the SUDS layout.

## 9.6 Sedum / Green Roofs & Other SUDS

There is potential for a sedum roof at the top roof level.

Importantly, the rooftop areas do not need to be included in order to achieve the required volume of storage, this is appropriate because the exact make-up for a sedum / green roof would not be confirmed and additional storage at roof would have an impact on the foundations and superstructure cost etc.

**The SUDS strategy has been done in this way at this stage so there is no reliance on an unknown to demonstrate compliance.**

The inclusion of sedum / green roof areas will definitely have a tangible benefit i.e. interception, natural storage, and at detailed design can be used to reduce the amount of underground storage.

With respect to other higher end SUDS, whilst internal rainwater harvesting is not proposed, it is recommended that rainwater pipes that do not drain to rain gardens on the site are fitted with water butts wherever feasible. Whilst the use of water butts won't reduce the design criteria of the receiving below ground drainage system, their use will reduce the time of entry and provide a supply of water for irrigation.

## 9.7 Drainage Connections & Inverts

The existing connections will be retained / new connections installed subject to agreement with the water company. This is the most sustainable approach.

There is a proven viable connection from the existing site.

The inverts work for gravity drainage given the site still falls to the west.

## 9.8 Pipe sizes / Manholes / Pipe runs

These will be confirmed as part of detailed designs; specifications of landscaping and drainage products need to be confirmed through planning and at a later date.

Not required at this stage to demonstrate scheme can accommodate the surface water flows or meet London Plan and Croydon requirements.

## 9.9 Flood Resilience

The proposed development will utilize the flood resilient techniques recommended in the NPPF Technical Guidance where appropriate and also the recommendations that have previously been issued by various local authorities:

**The FRA provides the recommended resilient measures that can be incorporated, it will depend on the construction team as to what construction will actually need to be undertaken and what materials are used exactly. This does not invalidate the point and recommendations of this FRA. The FRA cannot simply specify the exact measures that need to be changed; they are not required of planning.**

- Non-return valves as standard for ground
- Waterproofing to be tied in to ground floor slab as appropriate; details to be provided at detailed design to building regulations requirements: to reduce the turnaround time for returning the property to full operation after a flood event.
- Waterproofing to be installed above ground level as appropriate
- Plasterboards will be installed in horizontal sheets on ground levels rather than conventional

vertical installation methods to minimise the amount of plasterboard that could be damaged in a flood event

- Wall sockets will be raised to as high as is feasible and practicable in order to minimise damage if flood waters inundate the property
- Any wood fixings on ground floor will be robust and/or protected by suitable coatings in order to minimise damage during a flood event
- Airbricks will be raised to as high as is feasible and practicable
- The Damp Proof Membrane / ground waterproofing will be installed above the main floor slab and tied in to the walls where appropriate, to reduce the turnaround time for returning the property to full operation after a flood event.

## 9.10 Refuge and Evacuation

Based on the likely flood risk and associated warning time, evacuation is usually preferred and feasible at this site, floodwaters are also not likely to enter the building; refuge is a preferred flood response for the upper dwelling.

### Range of Flood Events

The site is on the edge of the floodplain in part FZ1 and relating to a culverted watercourse which the EA acknowledge would unlikely flood to the extent demonstrated by the poor resolution and minimal input modelling. Based on the data and design approach, the habitable areas will not be inundated as they are all located at upper levels and not on the ground floor.

A full flood response management plan can be provided for both the retail / commercial and the residential users.

## 9.11 Annual Monitoring

It is recommended that tenants should contact the EA on an annual basis to confirm the flood status of the property.

If the flood status has changed, the evacuation and refuge plan should be reviewed and updated by suitable flood risk consultants as appropriate.

## 9.12 Climate Change including New Allowances

The impact of climate change in accordance with the NPPF / PPG is likely to be an increase in the rainfall intensity in the future, which will increase peak storm flows to sewer. The proposed development will incorporate low flush and reduced water demand showers and toilets, such that the combined flows to sewer are likely to have a negligible impact; in any case, the scheme removes the unattenuated surface flows from reaching the foul sewer. It is considered therefore that flows in the future are not likely to have a significant impact, even with an allowance for climate change.

It has already been assessed that the raising of the habitable areas to the first floor and above and having full ground floor height flood resilience is the appropriate design response.

The scheme includes new porous and permeable areas to address residual surface water risk and to encourage 100% storage within the site.

SUDS calculations use oversized storage volume and include for the 40% climate change. Confirmation from Thames Water should be sought as appropriate.

## 10.0 Flood Storage

It is considered that flood compensation given the residual hazard from a culverted watercourse and based on the EA's interpretation of the modelled extents.

## 11.0 Conclusion

The proposed development is for demolition and erection of a new mixed use scheme with new porous & permeable areas maximised; ground floor flats and bedrooms considered appropriate.

- Site is in part EA FZ1 and part FZ2/FZ3 culverted fluvial undefended / surcharging sewer: residual
- EA acknowledged the modelling is limited and site not likely inundated; residual hazard
  - **No residential on the ground floor:** approved design response in this flood specific setting and habitable located away from and above all flood sources: sequential approach achieved
  - Full flood resilience / resistance
- Surface water: same as per fluvial hazard hence design responses are appropriate
- REDUCES FLOOD RISK OVERALL
  - Maximise highest forms of SUDS and porous / permeable areas
  - Prioritise surface storage and source control SUDS
  - Oversized storage
  - Over-sized SUDS store on site and restrict for previously unattenuated areas
- Resilient and resistant measures

The assessment considers the Exception Test can be passed.

Given the residual risk flood setting and the raised habitable areas, the level, extent and depth of flooding on the site can be managed in terms of resistant and resilient measures, precautionary mitigation measures and a flood response management plan.

Based on the likely flooding risk and small scale of the proposed development, it is considered that the proposed development can be constructed and continue to be operated safely in flood risk terms, without increasing flood risk elsewhere; it is therefore considered appropriate development in accordance with the NPPF / PPG.

### 11.1 Recommendations for Further Work

1. Detailed drainage designs to be confirmed as part of construction stage design
2. Flood Response Management Plan for all uses on the site

## 12.0 Appendices

- A. Site Location & Existing Layout / Floor Plans
- B. Proposed Development Plans
- C. SUDS Calculations
- D. SUDS Layout
- E. SUDS Management and Maintenance Plan

## Appendix A



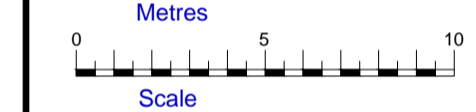
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**Hook Survey Legend**

Hedge		Telephone line	
Undergrowth		Power line	
Tree		Banking	
Bush		Contour line	
Building		Survey Station	
Glass Building		Gate	
Open Building		Level	
Ordnance Survey Benchmark			
Foul Drainage			
Storm Drainage			

**Abbreviations**

Animal Set	Sett
Air Valve	AV
Borehole	BH
Bus Stop	BS
Cover Level	CL
Earth Rod	ER
Electricity Pole	EP
Fire Hydrant	FH
Inspection Cover	IC
Invert Level	IL
Lamp Post	LP
Manhole	MH
Marker	MK
Name Plate	RNP
Power Pole	PP
Rain water Pipe	RWP
Road Sign	RS
Rodding Eye	RE
Reinforced Steel Joint	RSJ
Soil Vent Pipe	SVP
Stop Valve	SV
Survey Station	STN
Telegraph Pole	TP
Tree Stump	TS
Trial Hole	TH
Unable To Lift	UTL
Vent Pipe	VP
Water Valve	WV



**Notes**

All trees are identified where possible. Species, spread, height and girth are indicative only.  
 Drainage has been surveyed where found, and traced where possible.  
 Eaves and ridge heights of surrounding buildings have been surveyed where possible.  
 Rev A: Section AA added Dec 17

**HOOK SURVEY PARTNERSHIP**  
 Land & Building Surveyors  
[www.hooksurvey.com](http://www.hooksurvey.com)

Project:  
 No.1a Brighton Road,  
 CROYDON CR2 6EA  
 Client:  
 ATF Construction Limited

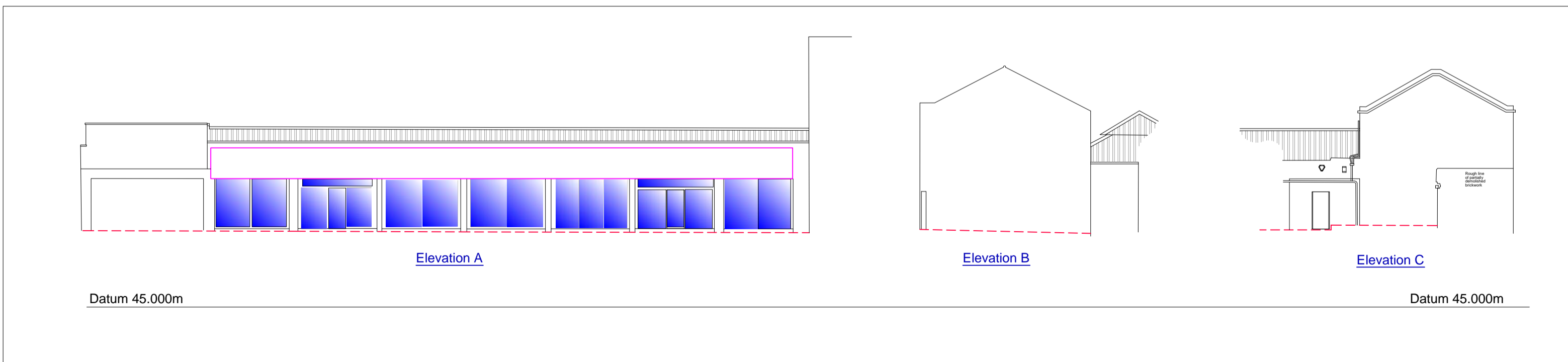
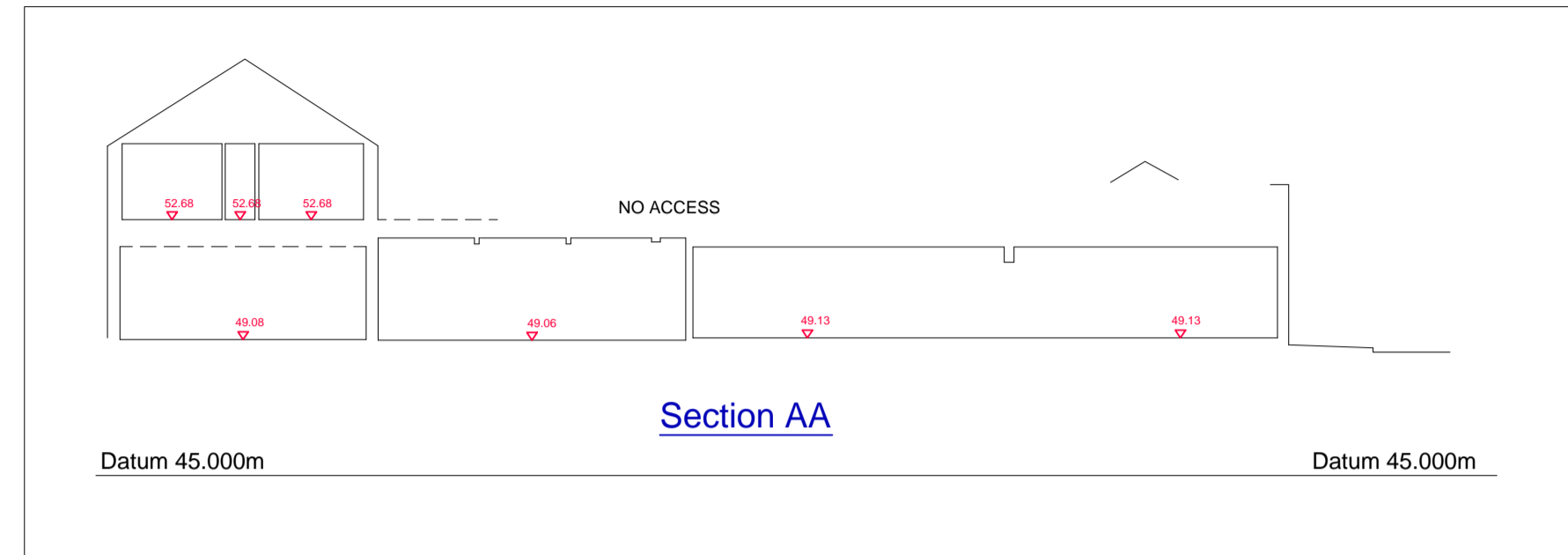
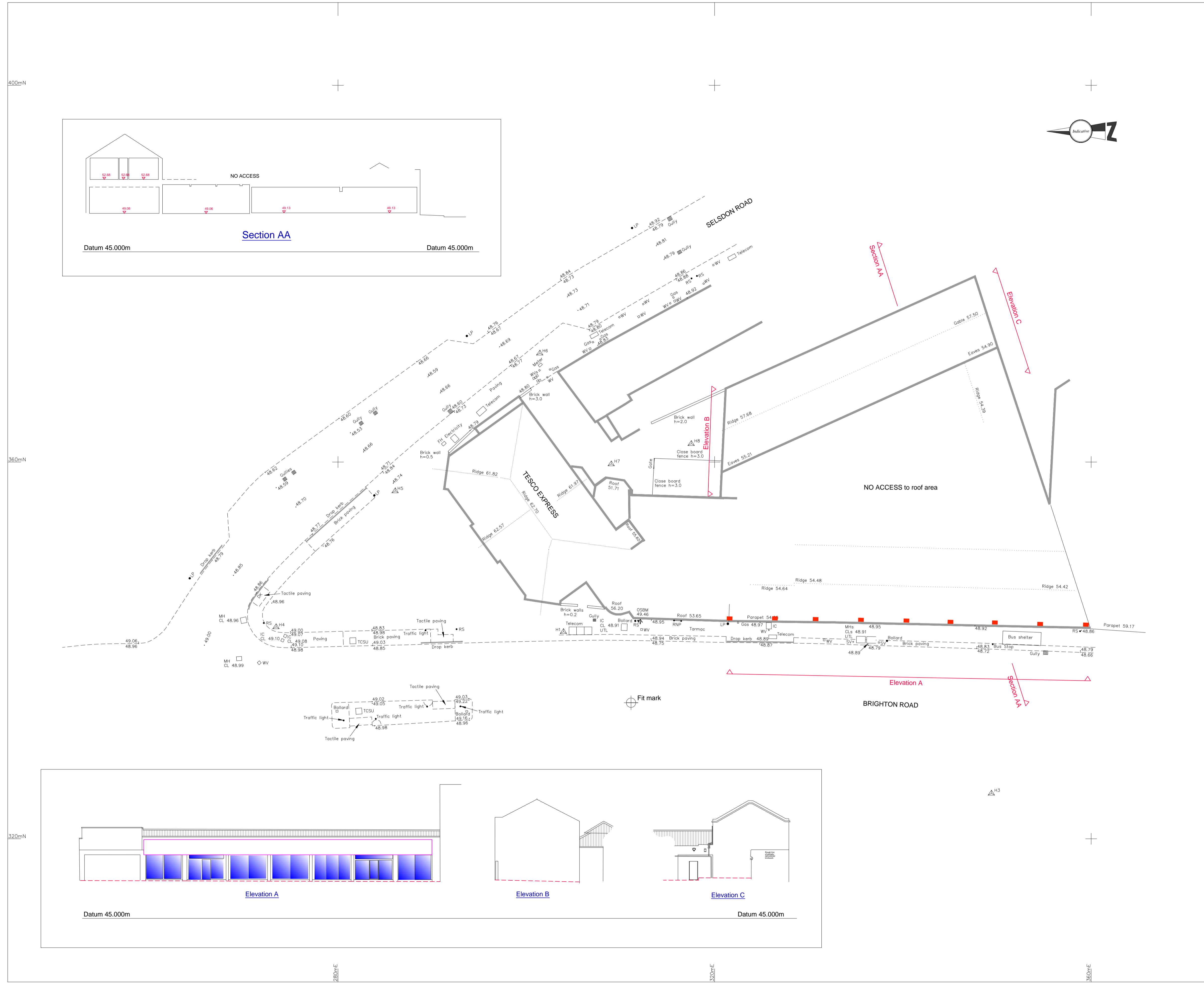
Drawing title:  
 Topographical Survey and elevations

Job No. : S17/6227	Dwg No. : S17/6227/01	Revision : A
Scale : 1:200	Date : December 2017	Drawn by : N.B.

Grid & Levels related to :  
 Arbitrary Grid shown at 40m intervals  
 Levels related to OSBM value 49.46m

**Head Office**  
 Unit 1, Bybow Farm  
 Orchard Way  
 Danford, Kent  
 DA2 7ER  
 Email > [mail@hooksurvey.com](mailto:mail@hooksurvey.com)  
 Tel > 01322 277221

**Midlands Office**  
 54 Stratford Road  
 Shipston on Stour  
 Warwickshire  
 CV36 4AZ  
 Email > [midlands@hooksurvey.com](mailto:midlands@hooksurvey.com)  
 Tel > 01608 430346

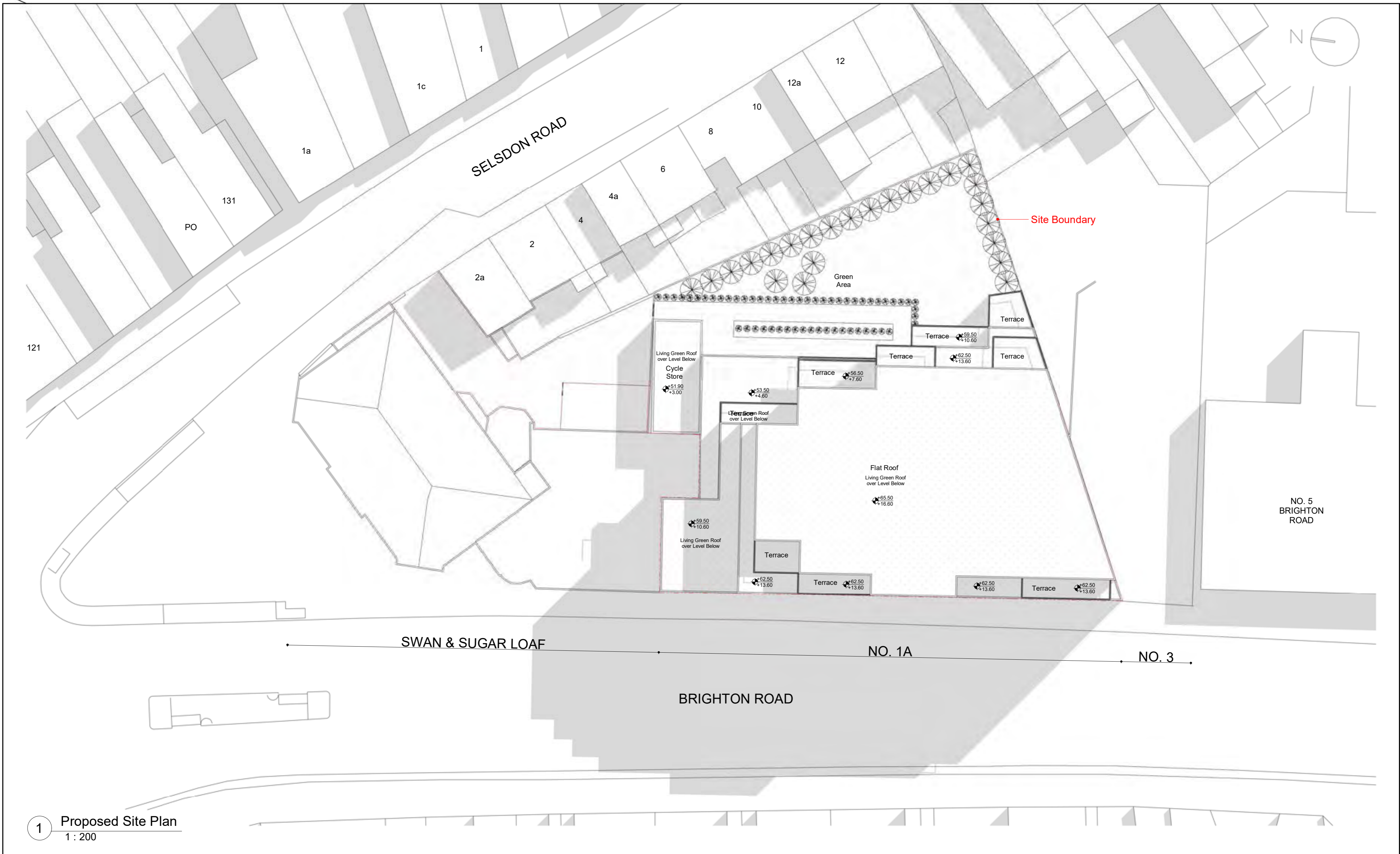


## Appendix B

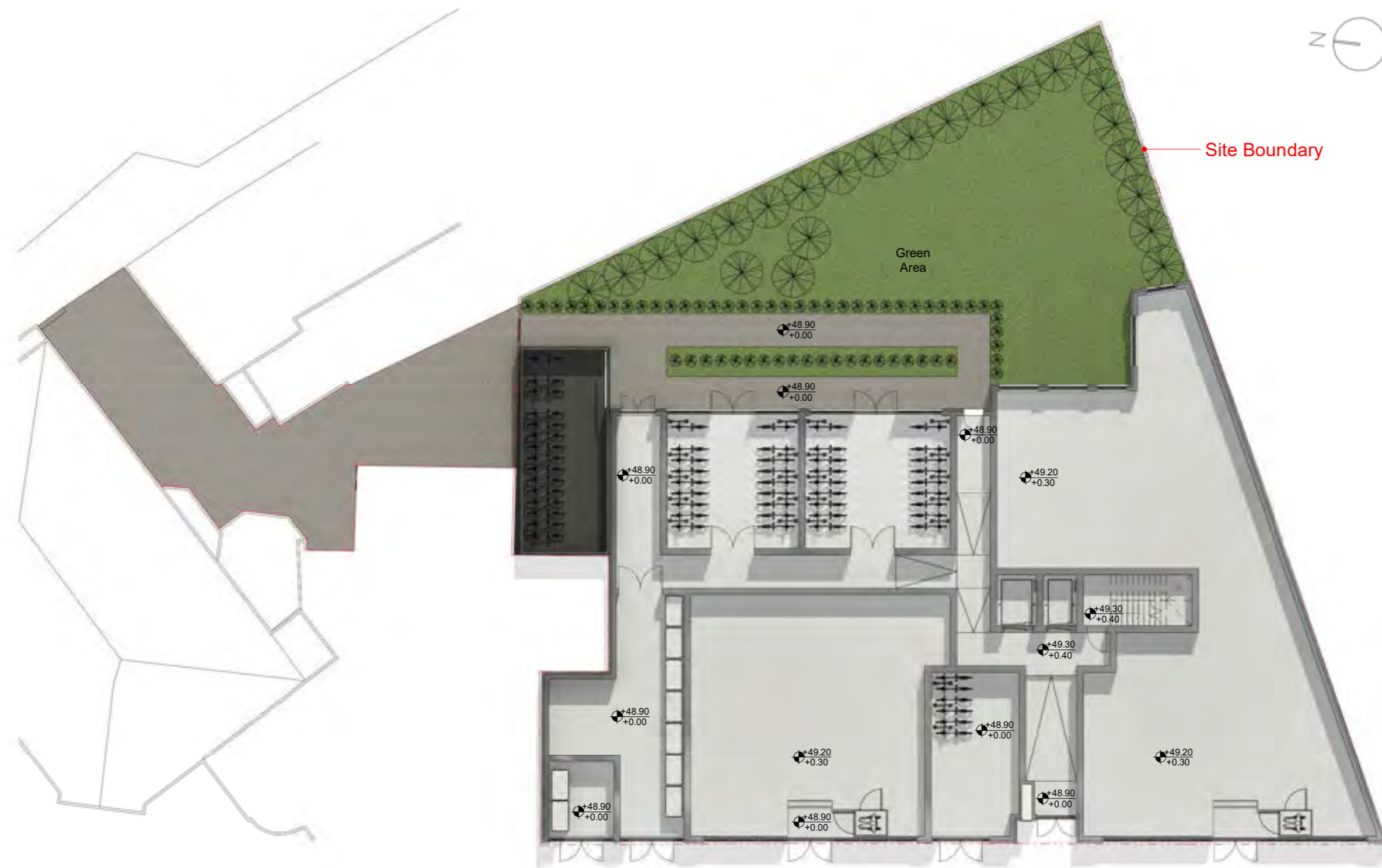


1 Existing Site Plan  
1 : 200

<b>PROJECT TITLE</b> 1A Brighton Road	<b>OPTION #</b> 4	<b>SCALE</b> 1 : 200	<b>DRAWING TITLE</b> Existing Site Plan	<b>REV.</b> A	<b>DATE</b> 12.02.2024	<b>DETAIL</b> New version of the 2022 Scheme	<b>LINE SCALE</b> 0 1 m 5 m
		<b>SHEET SIZE</b> A2		<b>DATE</b> 28.02.2024	<b>REV.</b> B	<b>DATE</b> 28.02.2024	
<b>LOCATION</b> 1A Brighton Rd, South Croydon CR2 6EA, UK	<b>OPTION DETAIL</b> 5 Storey Scheme with same footprint as 2022 scheme	<b>DATE</b> 28.02.2024	<b>SHEET NO.</b> A101	<b>REV.</b> C	<b>DATE</b>	<b>DETAIL</b>	<b>NOTES:</b> All critical dimensions must be checked on site prior to commencement of any works.
<b>REV.</b> D	<b>DATE</b>	<b>DETAIL</b>					

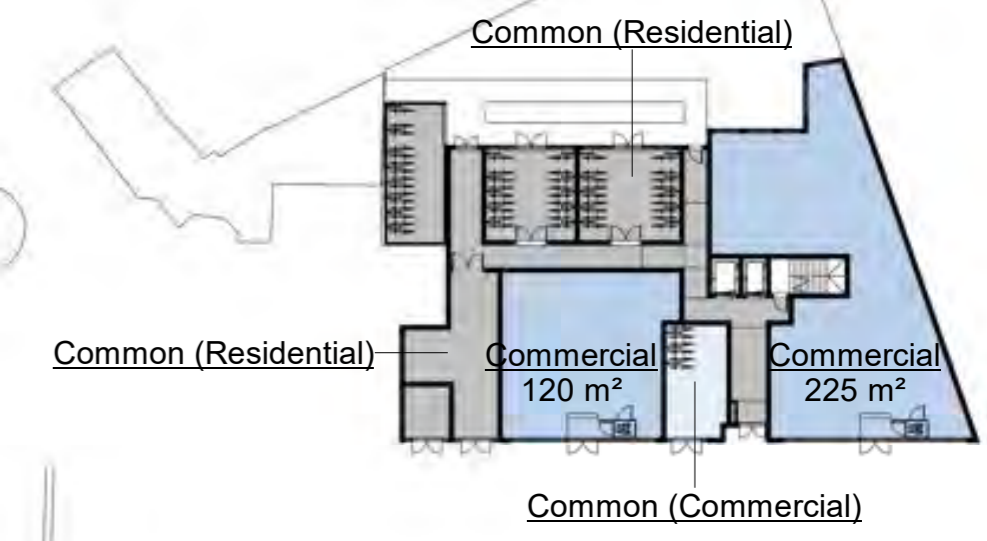
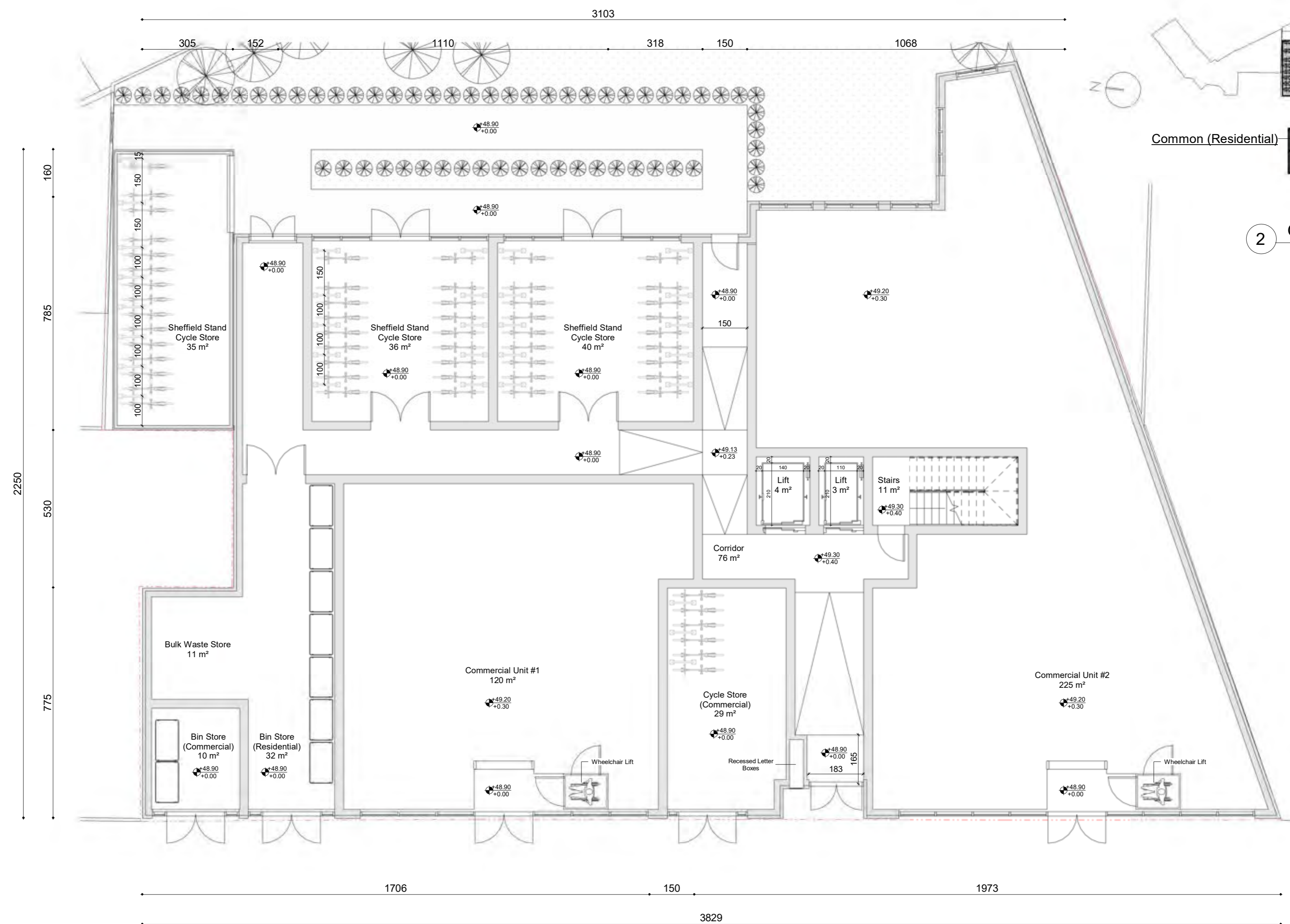


<b>PROJECT TITLE</b> 1A Brighton Road	<b>OPTION #</b> 4	<b>SCALE</b>	1 : 200	<b>DRAWING TITLE</b> Proposed Site Plan	<b>REV.</b>	<b>DATE</b>	<b>DETAIL</b>	<b>LINE SCALE</b> 0 1 m 5 m
		<b>SHEET SIZE</b>	A2		<b>SHEET NO.</b>	A	12.02.2024	
<b>LOCATION</b> 1A Brighton Rd, South Croydon CR2 6EA, UK	<b>OPTION DETAIL</b> 5 Storey Scheme with same footprint as 2022 scheme	<b>DATE</b>	28.02.2024	A102	B	28.02.2024	Ground Floor and Elevation Revisions	<b>NOTES:</b> All critical dimensions must be checked on site prior to commencement of any works.
					C			
					D			



1 Proposed Site Block Plan  
1 : 200

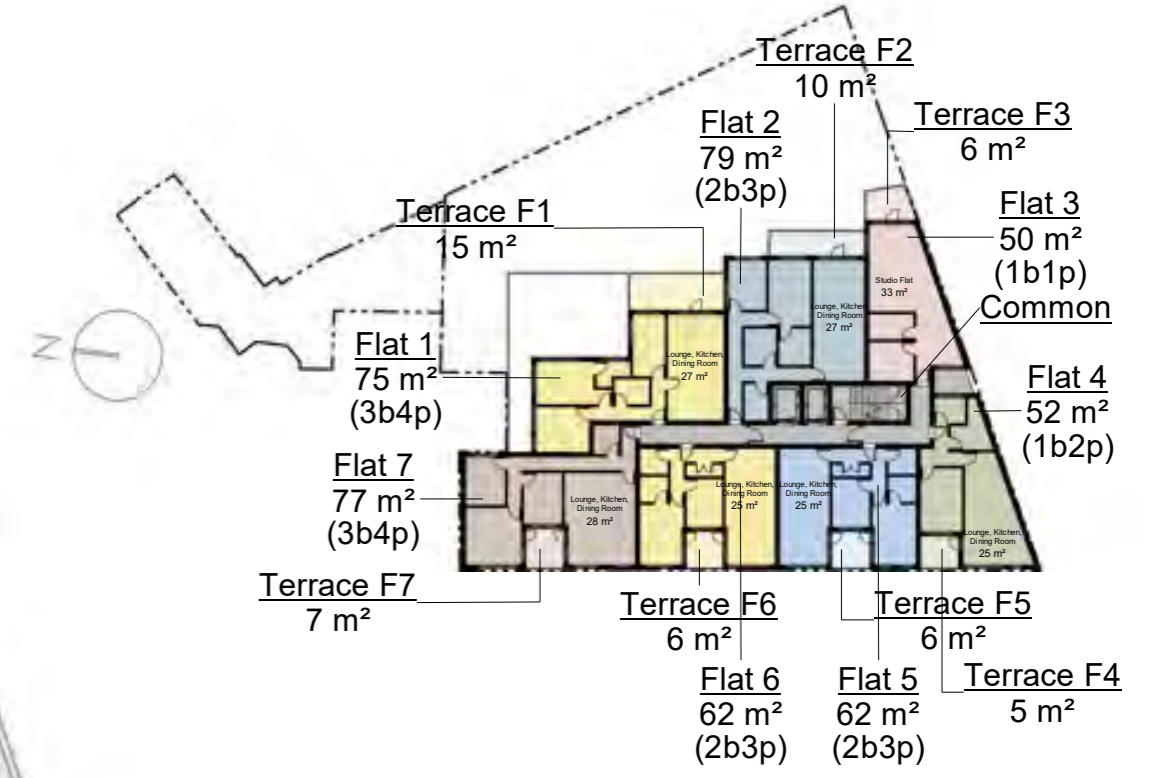
PROJECT TITLE	OPTION #	SCALE	1 : 200	DRAWING TITLE	REV.	DATE	DETAIL	LINE SCALE
1A Brighton Road	4	SHEET SIZE	A2	Proposed Site Block Plan	A	12.02.2024	New version of the 2022 Scheme	0 1 m 5 m
LOCATION	OPTION DETAIL	DATE	28.02.2024	SHEET NO.	B	28.02.2024	Ground Floor and Elevation Revisions	
1A Brighton Rd, South Croydon CR2 6EA, UK	5 Storey Scheme with same footprint as 2022 scheme			A103	C			NOTES: All critical dimensions must be checked on site prior to commencement of any works.
					D			



2 Ground Floor Area Plan  
1 : 500

1 Proposed Ground Floor Plan  
1 : 100

PROJECT TITLE 1A Brighton Road	OPTION # 4	SCALE	1 : 100	DRAWING TITLE Proposed Ground Floor Plan	REV.	DATE	DETAIL	LINE SCALE 0 1 m 5 m
		SHEET SIZE	A2		A	12.02.2024	New version of the 2022 Scheme	
LOCATION 1A Brighton Rd, South Croydon CR2 6EA, UK	OPTION DETAIL 5 Storey Scheme with same footprint as 2022 scheme	DATE	28.02.2024	SHEET NO. A104	B	28.02.2024	Ground Floor and Elevation Revisions	NOTES: All critical dimensions must be checked on site prior to commencement of any works.
					C			
					D			



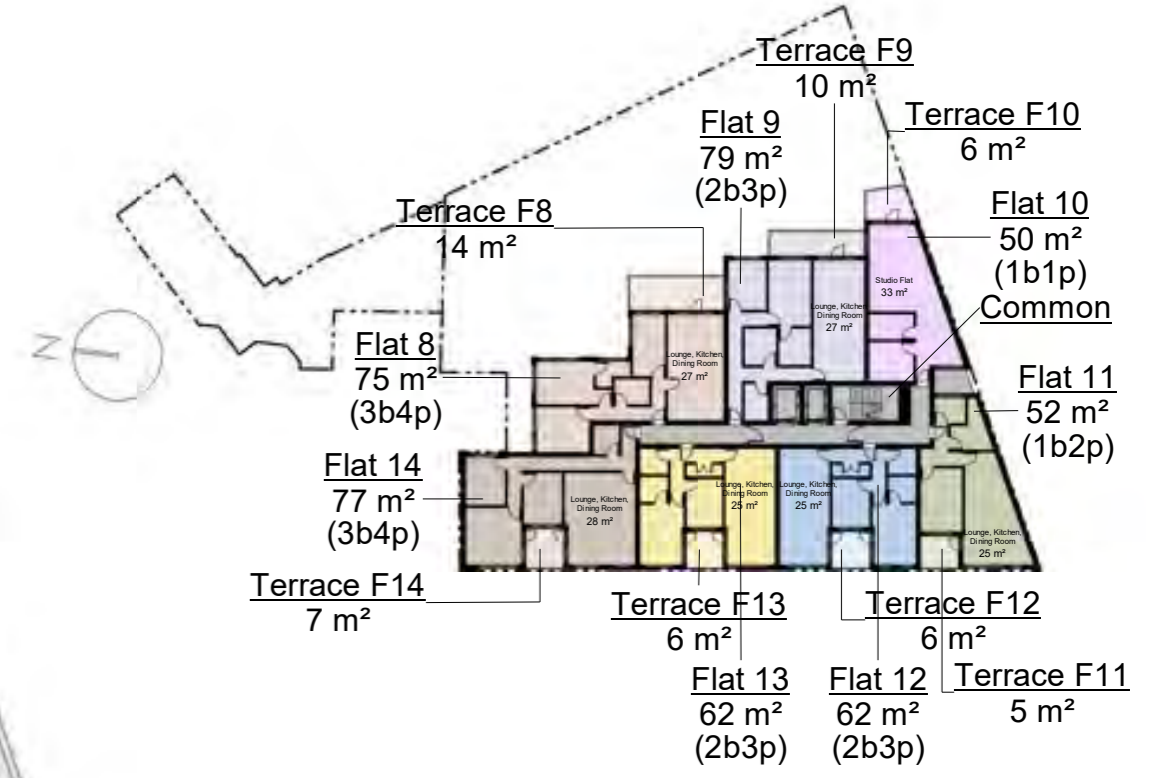
2 First Floor Area Plan  
1 : 500

1 Proposed First Floor Plan  
1 : 100

PROJECT TITLE 1A Brighton Road	OPTION # 4	SCALE	1 : 100	DRAWING TITLE Proposed First Floor Plan	REV.	DATE	DETAIL	LINE SCALE 0 1 m 5 m
		SHEET SIZE	A2		A	12.02.2024	New version of the 2022 Scheme	
LOCATION 1A Brighton Rd, South Croydon CR2 6EA, UK	OPTION DETAIL 5 Storey Scheme with same footprint as 2022 scheme	DATE	28.02.2024	SHEET NO. A105	B	28.02.2024	Ground Floor and Elevation Revisions	NOTES: All critical dimensions must be checked on site prior to commencement of any works.
					C			
					D			





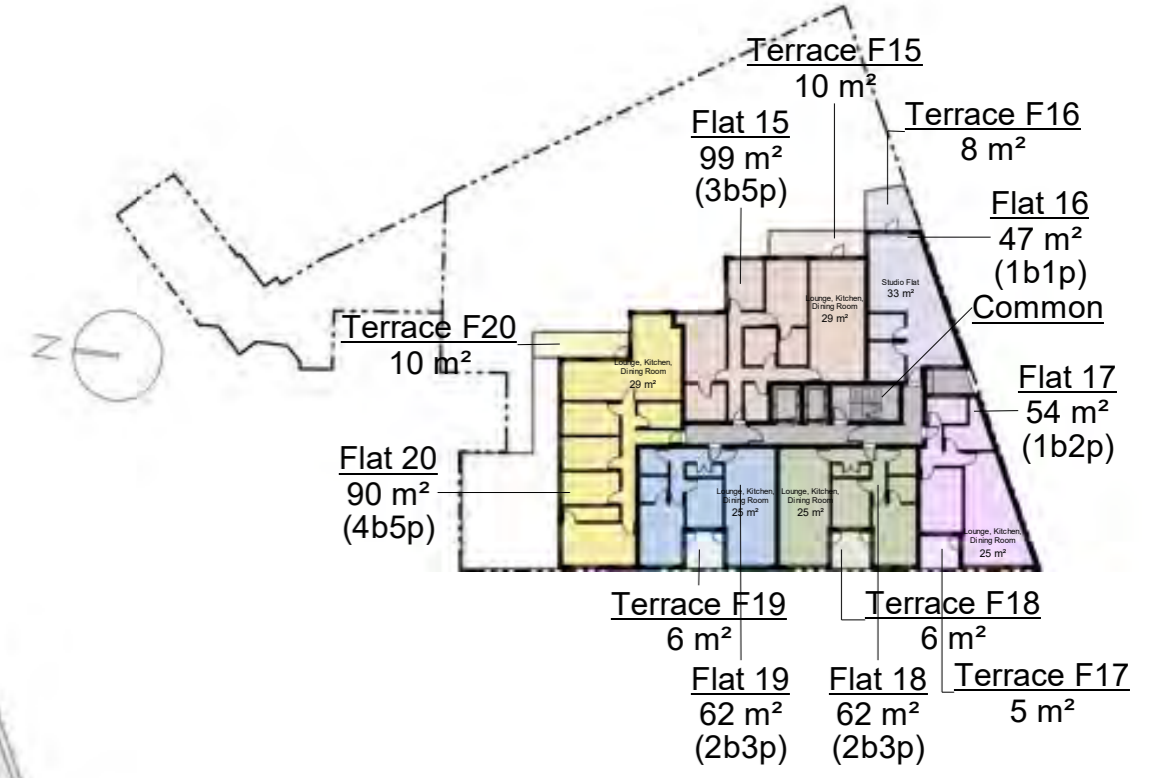
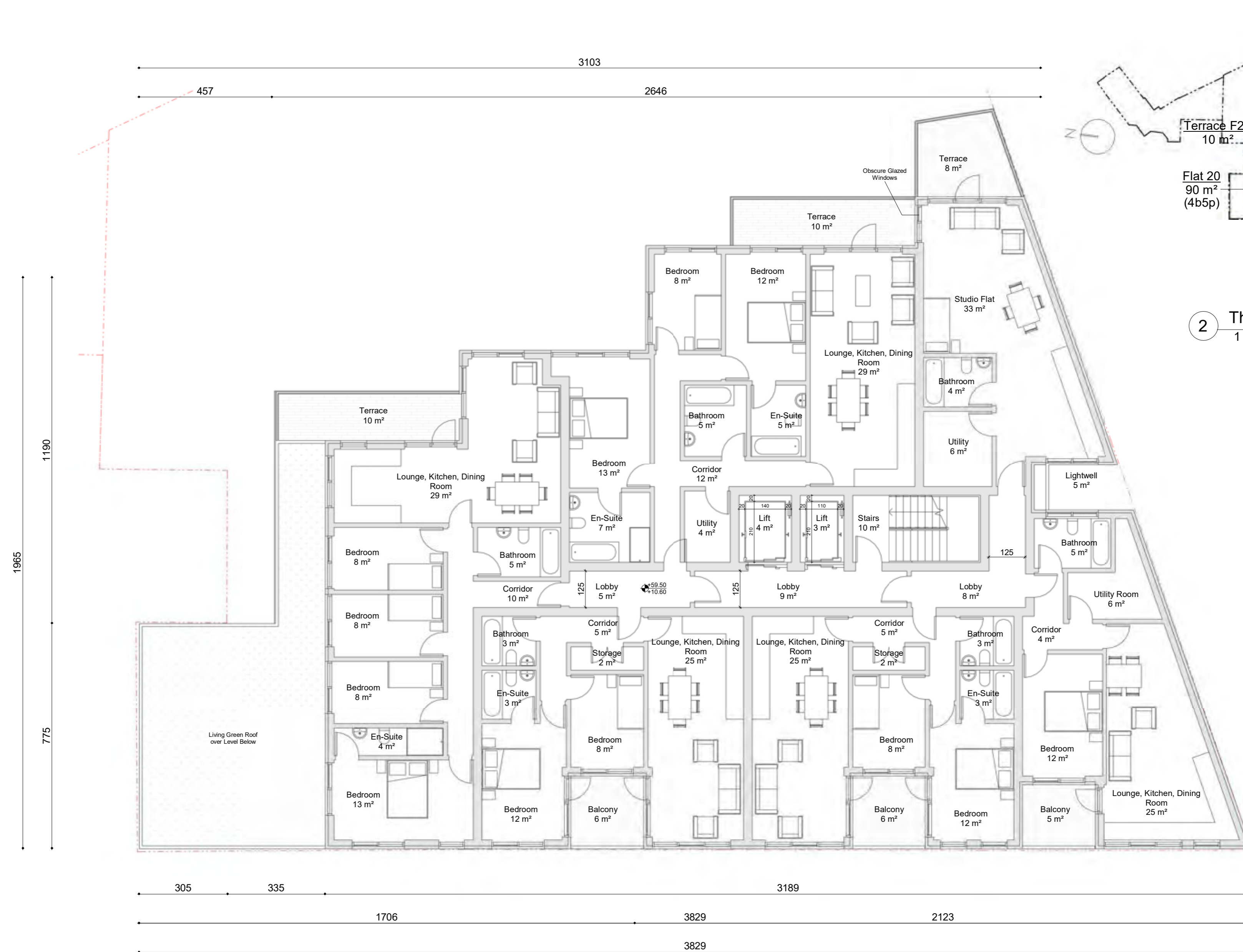


2 Second Floor Area Plan  
1 : 500

1 Proposed Second Floor Plan  
1 : 100

PROJECT TITLE	OPTION #	SCALE	1 : 100	DRAWING TITLE	REV.	DATE	DETAIL	LINE SCALE
1A Brighton Road	4	SHEET SIZE	A2	Proposed Second Floor Plan	A	12.02.2024	New version of the 2022 Scheme	0 1 m 5 m
LOCATION 1A Brighton Rd, South Croydon CR2 6EA, UK	OPTION DETAIL 5 Storey Scheme with same footprint as 2022 scheme	DATE	28.02.2024	SHEET NO. A106	B	28.02.2024	Ground Floor and Elevation Revisions	
								NOTES: All critical dimensions must be checked on site prior to commencement of any works.
					C			
					D			





2 Third Floor Area Plan  
 1 : 500

1 Proposed Third Floor Plan  
 1 : 100

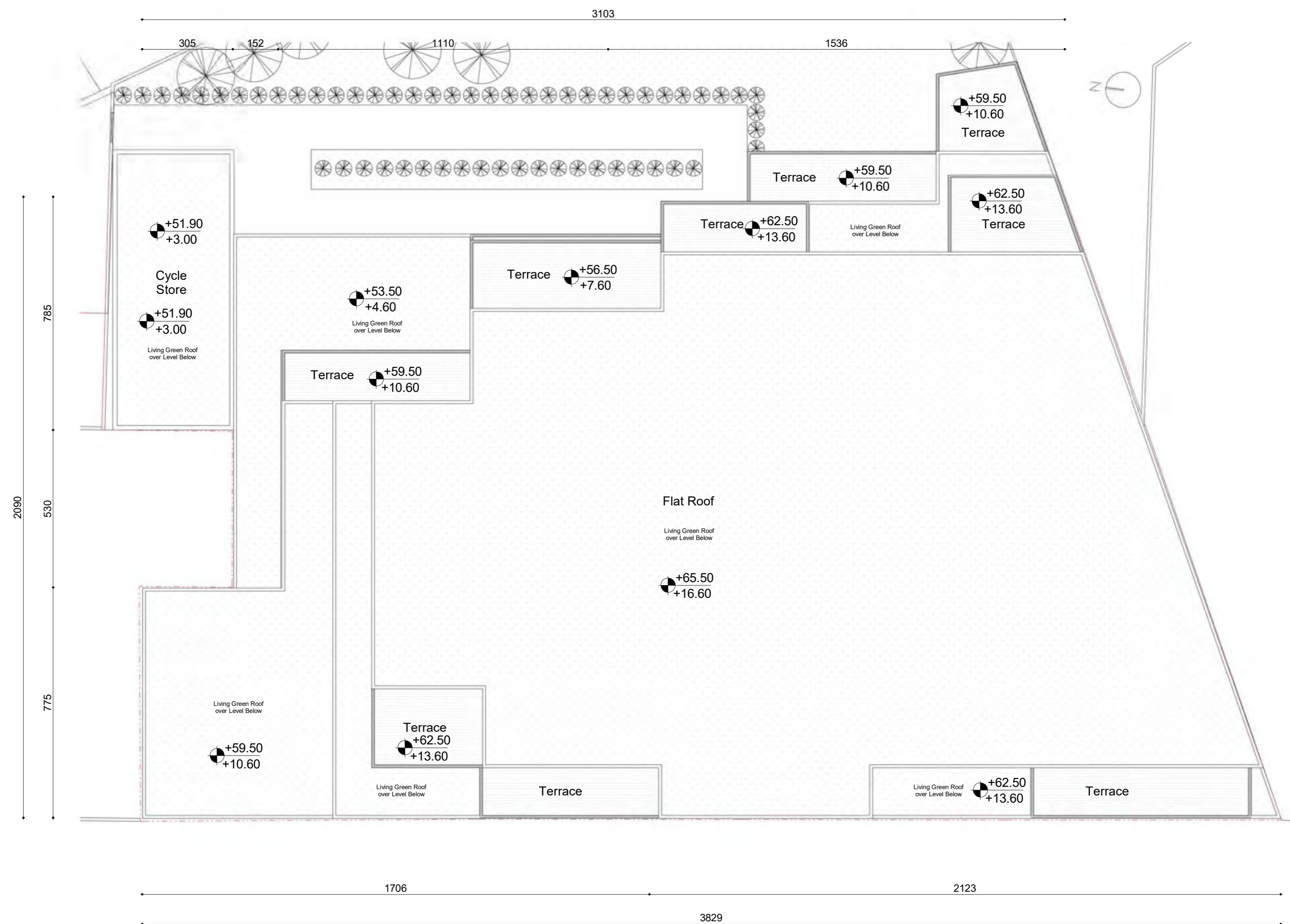
PROJECT TITLE	OPTION #	SCALE	1 : 100	DRAWING TITLE	REV.	DATE	DETAIL	LINE SCALE
1A Brighton Road	4	SHEET SIZE	A2	Proposed Third Floor Plan	A	12.02.2024	New version of the 2022 Scheme	0 1 m 5 m
1A Brighton Rd, South Croydon CR2 6EA, UK	5 Storey Scheme with same footprint as 2022 scheme	DATE	28.02.2024	SHEET NO. A107	B	28.02.2024	Ground Floor and Elevation Revisions	
								NOTES: All critical dimensions must be checked on site prior to commencement of any works.



<b>PROJECT TITLE</b> 1A Brighton Road	<b>OPTION #</b> 4	<b>SCALE</b> 1 : 200	<b>DRAWING TITLE</b> Proposed Third Floor Plan with Site Context	<b>REV.</b> A	<b>DATE</b> 12.02.2024	<b>DETAIL</b> New version of the 2022 Scheme	<b>LINE SCALE</b> 0 1 m 5 m
		<b>SHEET SIZE</b> A2		<b>DATE</b> 28.02.2024	<b>REV.</b> B	<b>DATE</b> 28.02.2024	
<b>LOCATION</b> 1A Brighton Rd, South Croydon CR2 6EA, UK	<b>OPTION DETAIL</b> 5 Storey Scheme with same footprint as 2022 scheme	<b>SHEET NO.</b> A107 -S		<b>REV.</b> C	<b>DATE</b>	<b>DETAIL</b>	<b>NOTES:</b> All critical dimensions must be checked on site prior to commencement of any works.
				<b>REV.</b> D	<b>DATE</b>	<b>DETAIL</b>	







1 Proposed Roof Plan  
1 : 100

PROJECT TITLE	OPTION #	SCALE	1 : 100	DRAWING TITLE	REV.	DATE	DETAIL	LINE SCALE
1A Brighton Road	4	SHEET SIZE	A2	Proposed Roof Plan	A	12.02.2024	New version of the 2022 Scheme	0 1 m 5 m
LOCATION	OPTION DETAIL	DATE	28.02.2024	SHEET NO.	B	28.02.2024	Ground Floor and Elevation Revisions	
1A Brighton Rd, South Croydon CR2 6EA, UK	5 Storey Scheme with same footprint as 2022 scheme			A109	C			<b>NOTES:</b> All critical dimensions must be checked on site prior to commencement of any works.
					D			



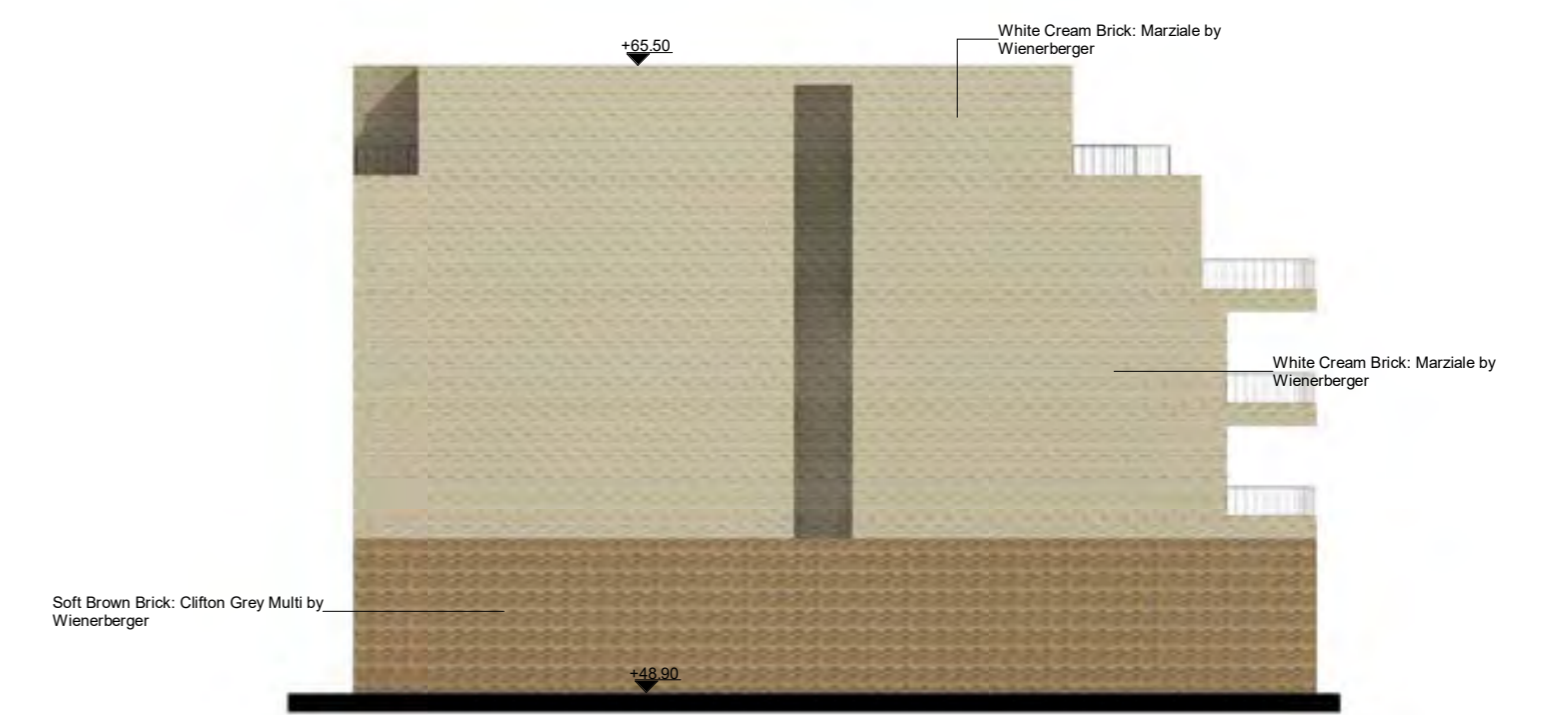
1 Front Elevation  
1 : 200



2 Left Side Elevation  
1 : 200



3 Back Elevation  
1 : 200



4 Right Side Elevation  
1 : 200

Image	Manufacturer	Model	Type
	Wienerberger	Marziale	White Cream Brick
	Wienerberger	Clifton Grey Multi	Soft Brown Brick

PROJECT TITLE 1A Brighton Road	OPTION # 4	SCALE	1 : 200	DRAWING TITLE Proposed Building Elevations	REV.	DATE	DETAIL	LINE SCALE 0 1 m 5 m
		SHEET SIZE	A2		A	12.02.2024	New version of the 2022 Scheme	
LOCATION 1A Brighton Rd, South Croydon CR2 6EA, UK	OPTION DETAIL 5 Storey Scheme with same footprint as 2022 scheme	DATE	28.02.2024	SHEET NO. A110	B	28.02.2024	Ground Floor and Elevation Revisions	NOTES: All critical dimensions must be checked on site prior to commencement of any works.
					C			
				D				





1 Colored Front Elevation - Brighton Road Street Scene  
1 : 200



2 Colored Back Elevation  
1 : 200

Wall Cladding Material Palette	Image	Manufacturer	Model	Type
		Wienerberger	Marziale	White Cream Brick
		Wienerberger	Clifton Grey Multi	Soft Brown Brick

PROJECT TITLE 1A Brighton Road	OPTION # 4	SCALE	1 : 200	DRAWING TITLE Proposed Street Elevations	REV.	DATE	DETAIL	LINE SCALE 0 1 m 5 m
		SHEET SIZE	A2		A	12.02.2024	New version of the 2022 Scheme	
LOCATION 1A Brighton Rd, South Croydon CR2 6EA, UK	OPTION DETAIL 5 Storey Scheme with same footprint as 2022 scheme	DATE	28.02.2024	SHEET NO. A111	B	28.02.2024	Ground Floor and Elevation Revisions	NOTES: All critical dimensions must be checked on site prior to commencement of any works.
					C			
				D				

## Appendix C

Calculated by:	George Locke
Site name:	1a Brighton Road, CR2 6EA
Site location:	1a Brighton Road, CR2 6EA

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

## Site Details

Latitude:	51.36320° N
Longitude:	0.0981° W
Reference:	990568630
Date:	Mar 25 2024 09:31

## Site characteristics

Total site area (ha):	0.091
Significant public open space (ha):	0
Area positively drained (ha):	0.091
Impermeable area (ha):	0.059
Percentage of drained area that is impermeable (%):	65
Impervious area drained via infiltration (ha):	0
Return period for infiltration system design (year):	10
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	10
Compliance factor for rainwater harvesting system (%):	66
Net site area for storage volume design (ha):	0.09
Net impermeable area for storage volume design (ha):	0.06
Pervious area contribution to runoff (%):	30

## Methodology

esti	IH124
Q <sub>BAR</sub> estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

## Soil characteristics

	Default	Edited
SOIL type:	2	2
SPR:	0.3	0.3

## Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	63
Rainfall 100 yrs 12 hrs:	--	94.71
FEH / FSR conversion factor	1.23	1.23
SAAR (mm):	689	689
M5-60 Rainfall Depth (mm):	20	20
'r' Ratio M5-60/M5-2 day	0.4	0.4
Hydrological region:	6	6
Growth curve factor 1 year	0.85	0.85
Growth curve factor 10 year	1.62	1.62
Growth curve factor 30 year	2.3	2.3

\* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q<sub>BAR</sub> and other flow rates will have been reduced accordingly.

## Design criteria

Climate change allowance factor	1.4	Growth curve factor 100 years:	3.19	3.19
Urban creep allowance factor	1.1	Q <sub>BAR</sub> for total site area (l/s):	0.16	0.16
Volume control approach	Use long term storage	Q <sub>BAR</sub> for net site area (l/s):	0.16	0.16
Interception rainfall depth (mm):	5			
Minimum flow rate (l/s):	2			

Site discharge rates	Estimated storage volumes		Default	Edited
	Default	Edited		
1 in 1 year (l/s):	2	2	30	30
1 in 30 years (l/s):	2	2	0	0
1 in 100 year (l/s):	2	2	30	30

This report was produced using the storage estimation tool developed by HRWallingford and available at [www.uksuds.com](http://www.uksuds.com). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at <http://uksuds.com/terms-and-conditions.htm>. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

## Appendix D

**Porous and permeable areas maximised  
SUDS source control**

**Surface SUDS**

Access area and communal space: porous and permeable landscaped areas maximised

Private Garden areas: maximized porous and permeable areas

**Solid Blue Line Boxes: SUDS Formal Storage**

**Lined Cellular Storage below permeable parking area:** storage and source control to address SUDS hierarchy.

Not infiltration / Not soakaway as not feasible.

Oversized storage to meet London Plan. Refer to report for calculations and dimensions.

**Green Filled Circles**

Rainwater diverters to discharge RWP direct to rain garden planters / over permeable areas

**Orange Dashed Outline: SUDS Formal Storage**

**Rain Garden Storage: direct connection from RWP:** storage and source control to address SUDS hierarchy.

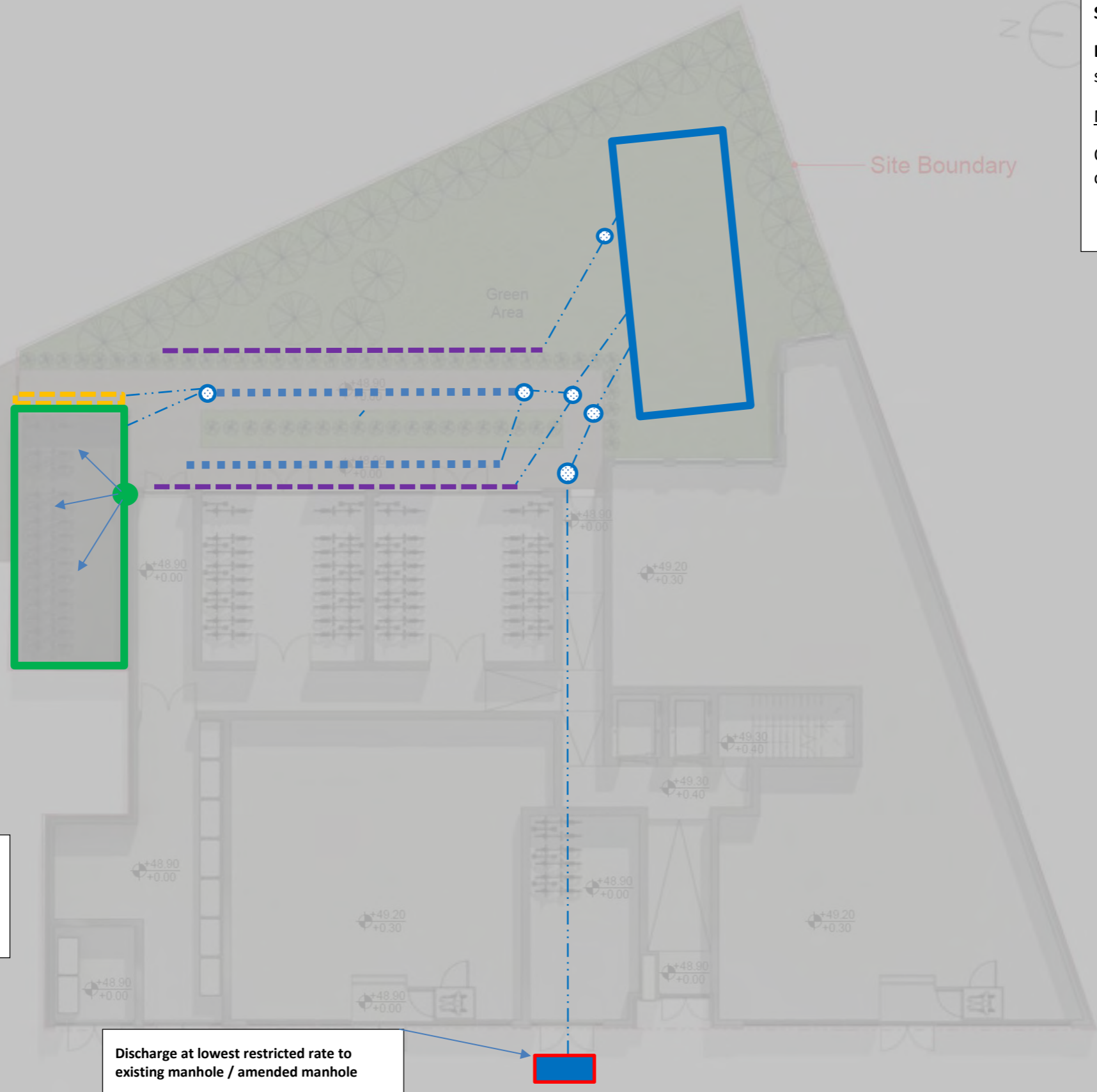
Designed in collaboration with Project Ecologist and Landscape Architect






**All SUDS located and designed to avoid Root Protection Zones in consultation with project arboriculturalist**

Note: there will be catch / silt traps on all connections prior to communication with SUDS underground storage features

Discharge at lowest restricted rate to existing manhole / amended manhole

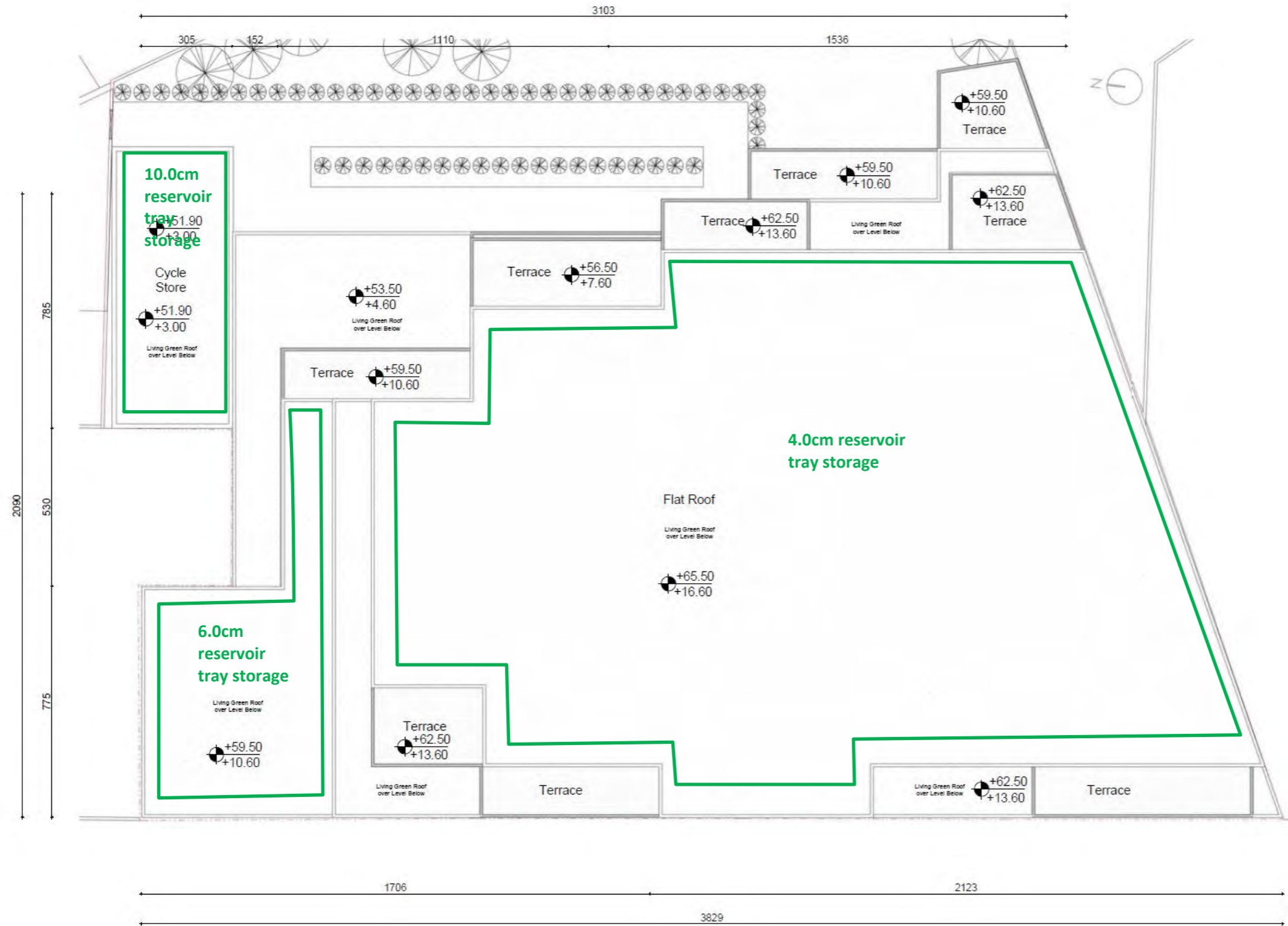
Site Boundary



-  Indicative main pipe connections
-  Indicative Inspection Chambers / Manholes / Silt Traps (Catch Pits)
-  Diverter on RWP to discharge over green roof
-  Perforated pipe through the lined permeable paving
-  Aco drains (off the shelf standard specification as necessary)

Any internal drainage to engineer's detailing, but will communicate to the rear to the Source Control SUDS

**Green / Sedum Roof Areas**



**Terraces are to be retained for 100% amenity space as that is sensible. If SUDS were to be incorporated in to the terrace areas, that would significantly reduce the amenity space and future amenity of users**



**Green / Sedum roof around rooflight detail**

Specification: Bauder (or similar subject to tender returns)

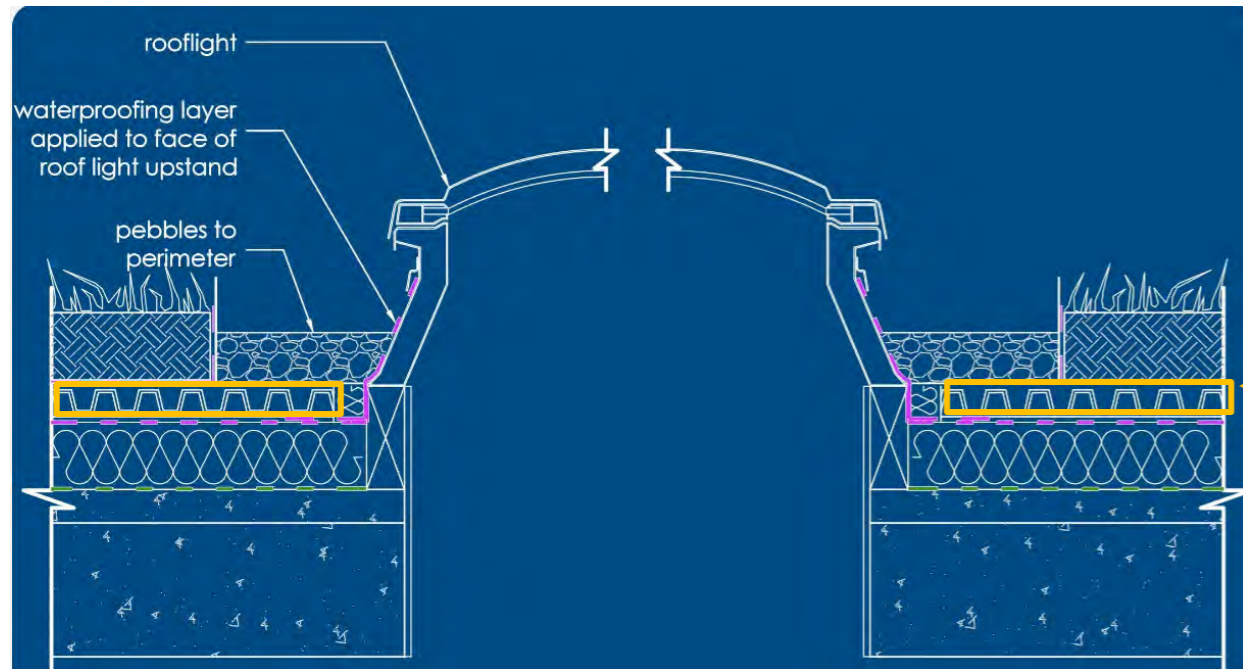
**Reservoir Storage Tray:**

**Top Roof Level:** 4.0cm void height with 85% void ratio

**Lower floor roof levels:** 6cm void height with 85% void ratio

**Bin / Bike Store lowest level:** 10.0cm height 85% void ratio (lower level can take greater weight without additional structural requirements)

See report for full dimensions



Reservoir Tray storage under sedum specification: exact manufacturer to be confirmed as part of tender process



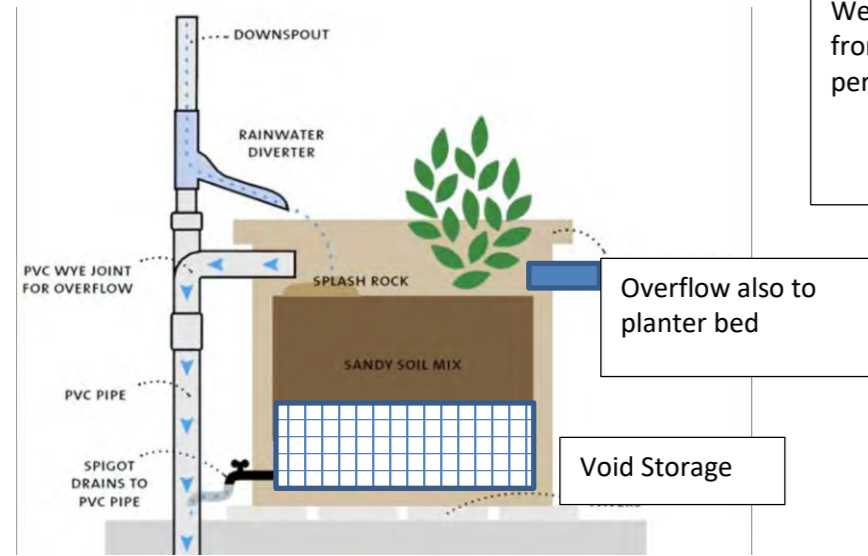




**Example Planters and Mechanisms for Connection**

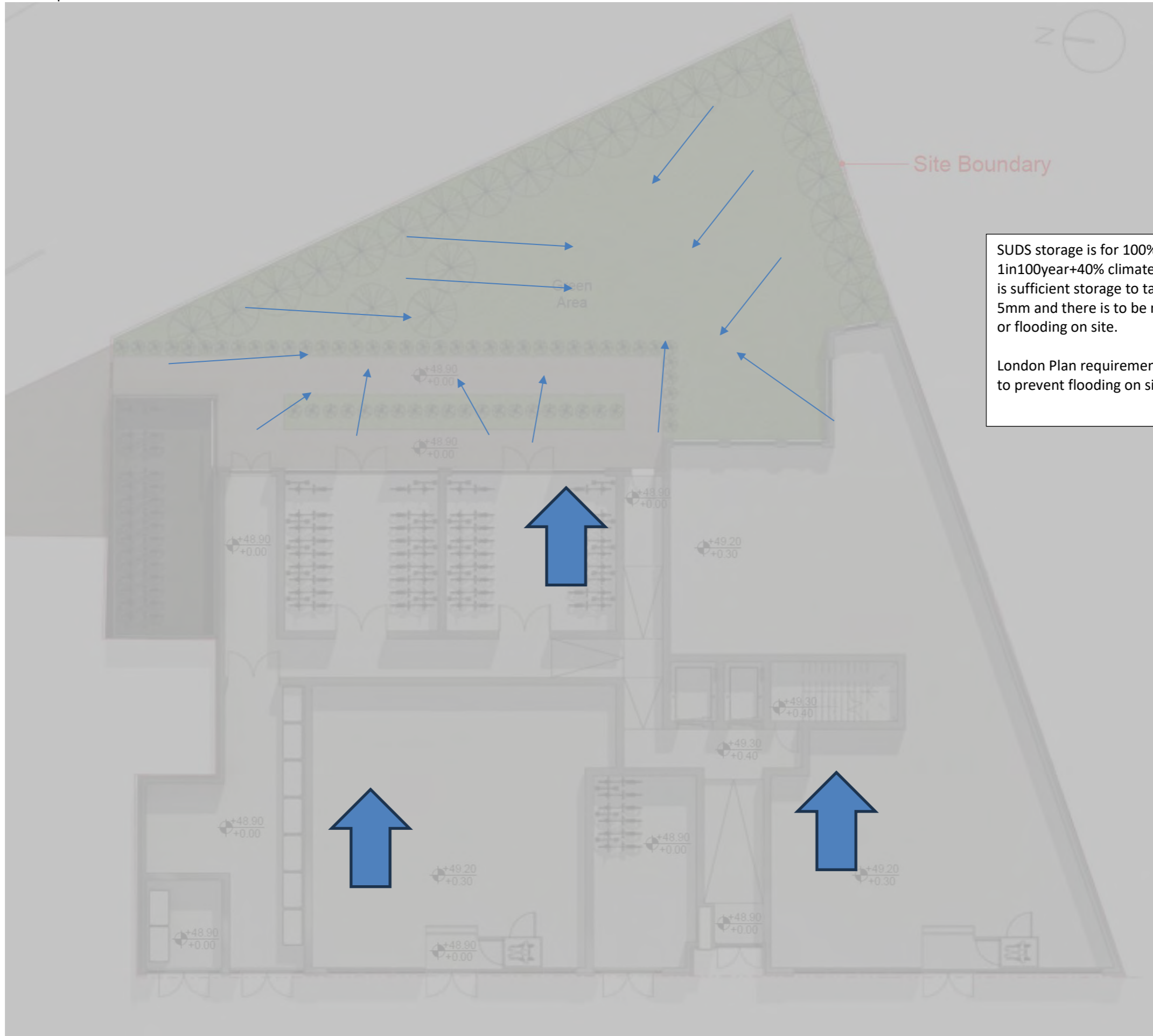
There are many off the shelf versions; client aesthetic requirements can confirm the exact specification; it is not necessary to commit to a type or design.

We include the exact specifications from one company to demonstrate the performance achievable



**Example Diverter**

There are many off the shelf versions; client aesthetic requirements can confirm the exact specification; it is not necessary to commit to a type or design.



SUDS storage is for 100% of the 1in100year+40% climate change hence there is sufficient storage to take 100% of the first 5mm and there is to be no exceedance off site or flooding on site.

London Plan requirements: oversized storage to prevent flooding on site.

## Appendix E

## SUDS Maintenance Schedule

Installation	Maintenance Required	Frequency	Responsibility
Granular Storage (Type 3 No Fines)  (If used rather than geocellular)	n/a	n/a	n/a
Rain Garden Planter & Permeable Paving (Patio and Access / Parking)  Geocellular Storage System: storage not soakaway  Sedum roof collection system if included in final scheme  (incl. associated distribution pipework and sump chambers)	Inspection, debris removal and jetting	Typically, inspection is recommended annually or after a severe or significant storm event, with any jetting/cleaning being carried out as necessary.  Geocellular and associated infrastructure: to manufacturer specifications	Estate/Building Management Company