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22 Kemplay Road, Hampstead Village, NW3 1SY

Sustainable Drainage Strategy

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		Remarks:	Issued for Planning				
Revision	P1	Prepared by:	Harry Hunter BEng (Hons)	Checked by:	Keri Trimmer BEng (Hons) MSc CEng MICE	Approved by:	Keri Trimmer BEng (Hons) MSc CEng MICE
Date:	18/11/2022	Signature		Signature		Signature	

Contents

Appendices

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One

Executive Summary

Elliott Wood Partnership Ltd have been appointed to produce a Sustainable Drainage Strategy in support of the proposed redevelopment of the site at 22 Kemplay Road, Hampstead Village, NW3 1SY in the London Borough of Camden.

The national grid reference for the site is 526761E: 185703N and the total site boundary is approximately 0.015ha.

The existing site is located within Flood Zone 1 in an area designated as 'critical drainage area'. As such, a site-specific Flood Risk Assessment is required for the development site, see report 2220303-EWP-ZZ-XX-RP-C-0001.

Thames Water sewer records show that the offsite sewer network is a combined water network. Records show a 305mm combined water sewer within Kemplay Road. A CCTV drainage survey undertaken on site identified that the development drains to Kemplay Road via a 150mm outfall pipe.

Surface water runoff from the proposed development will be managed through the use of permeable paving, with the peak discharge rate restricted to 2.2 l/s.

All foul water drainage from above ground floor will offset at high-level within the building, as designed by the M&E engineer, and drop to the below ground drainage network. All ground floor drainage will be connected to this network. To protect the building from flooding due to sewer surcharge all foul drainage below ground floor level will drain via a Kessel Backwater Pumping Station which is to be located on the outfall pipe to the public sewer, preventing flooding to the existing property.

It is proposed that foul and surface water will outfall from the site via the existing 150mm diameter combined outfall to Kemplay Road.

Two

Introduction

Elliott Wood Partnership Ltd have been appointed to provide a Sustainable Drainage Strategy to support the planning application for the proposed redevelopment of 22 Kemplay Road.

The purpose of this report is to explain the approach taken with regards to the below ground drainage strategy. It evaluates the selection of SuDS devices and highlights how the drainage disposal hierarchy has been followed.

This report has been prepared in accordance with the GOV.UK *Sustainable Drainage Systems: Non-statutory Technical Standards, London Local Plan 2021, Camden Local Plan 2017.*

Three

Existing Site Conditions

Site Location

The site is located in Hampstead Town within the London Borough of Camden. The site is bounded by Kemplay Road to the south and private residential developments to the north, east and west. The closest stations to the site are Hampstead Underground Station, which is approximately 375m to the west and Hampstead Heath Overground Station which is located 520m to the east. The site is located within the Hampstead Conservation Area.

The site centred OS grid reference is 526761E: 185703N and the total site boundary is approximately 145m^2 (0.015ha). Approximately 100m^2 of the site is considered impermeable.

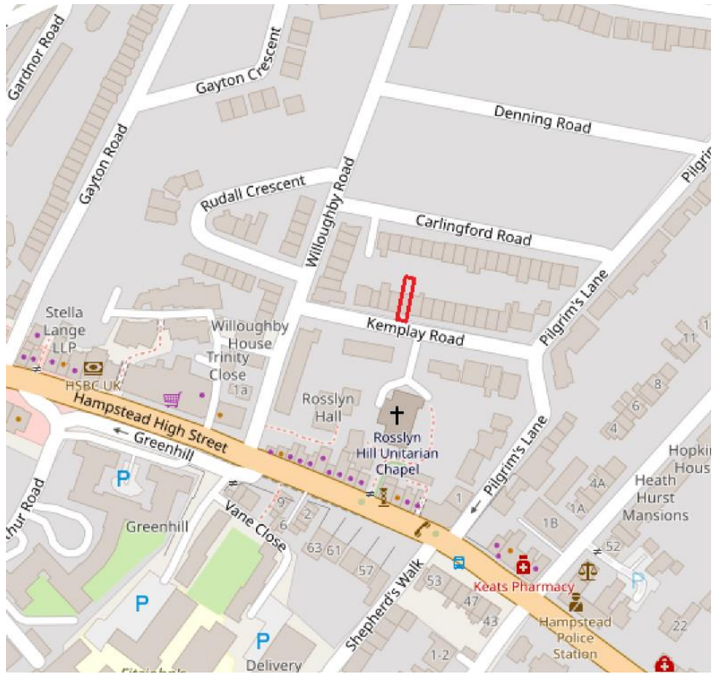

Figure 1: Site Location

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Existing Development

The building is a two-storey high terraced residential building, oriented east to west. The site includes a paved front courtyard and a landscaped rear garden.

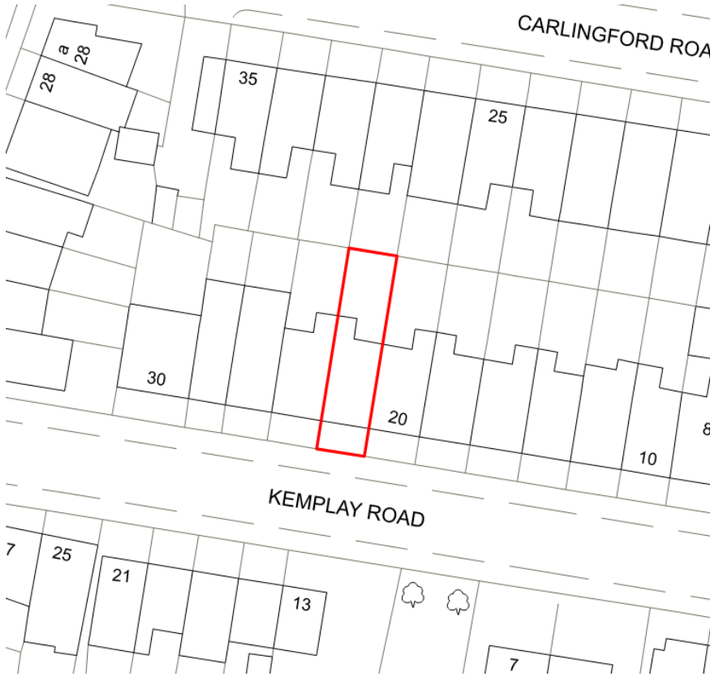

Figure 2: Existing Site Plan

Topography

A Measured Building Survey was undertaken by SDP Surveys in June 2022.

External levels show that the site is largely flat with levels at lower ground floor between 88.00 and 88.20m AOD. Levels within the rear garden rise to the north from 88.20m at the rear terrace to 89.95m AOD on the rear boundary.

The measured building survey can be found in **Appendix A.**

Four

Underlying Geology

The underlying geology of the area is recorded by the British Geological Survey (BGS) maps. These indicate that the ground conditions on the site should consist of bedrock deposits of claygate member comprising Clay, Silt and Sand, with no superficial deposits recorded. In the absence of a site-specific investigation, nearby borehole data indicates that similar ground conditions to those shown in **Table 1** can be reasonably be expected on site.

Table 1 Anticipated Ground Conditions

Soil Type	Depth BGL (m)
Made Ground	0-2
London Clay	2-110
Woolwich and Reading Beds	110-126
Thanet Sand	126-135
Upper Chalk	135-180

Five

Existing Drainage

Public sewer records have been obtained from Thames Water. An extract of the asset plan is shown in **Figure 3** below.

The records show that the area is served by a network of combined water sewers. The records show a 305mm diameter combined sewer located under Kemplay Road headed eastwards.

The front of the dwelling is over 6.0m away from the Thames Water sewer on plan, and as such there is no need for a sewer build near or build over agreement.

Refer to **Appendix B** for Thames Water asset records.

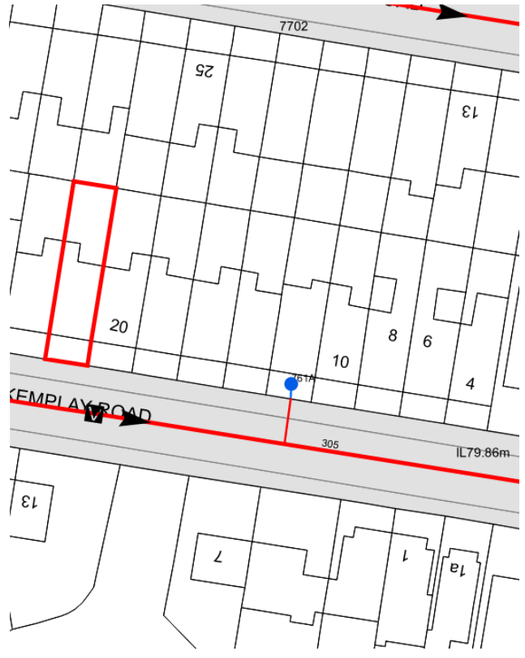

Figure 3: Extract from Thames Water Sewer Records

A CCTV survey of the existing private drainage network was undertaken by G.O. Drainage in November 2022. The survey shows the site to be served by a 150mm combined water network which features an interceptor on the outfall chamber. This network discharges into the combined water sewer beneath Kemplay Road via a lateral connection. The existing outfall is in good condition and is suitable for re-use for the proposed re-development.

The CCTV Survey is included in **Appendix C.**

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Existing Surface Water Run-off Rate

The surface water runoff rates for the existing site have been calculated using MicroDrainage software to mimic the existing drainage network.

Table 2 Existing Surface Water Run-off rates

Return Period	Rainfall Intensity (mm/hr)	Existing run-off (l/s)
1yr	31.9	1.7
30yr	78.4	4.5
100yr	101.9	5.9

Note that the rainfall intensities used in the above calculations have been based on rainfall intensities for a 15-minute storm. The calculations will be included in Appendix D.

Six

Proposed Development

It is proposed that the site will undergo an internal and external refurbishment with a new infill extension at lower ground floor being added to the building with an external terrace over to provide approximately 17m^2 additional floor area in total.

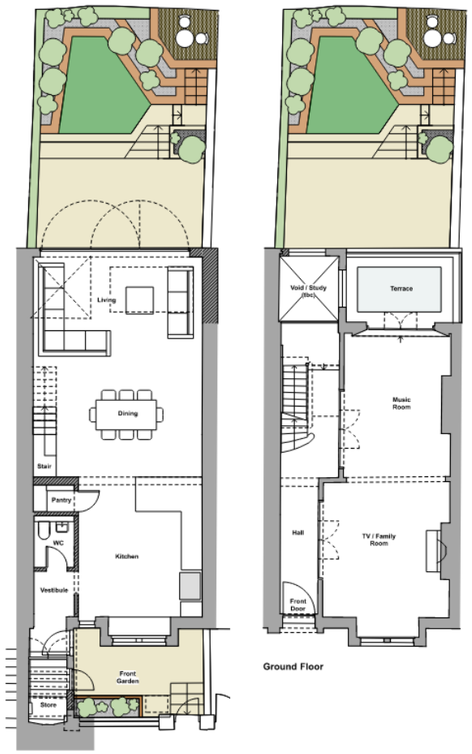

Figure 4: Proposed Development

Seven

Proposed Drainage

The surface water drainage system has been designed in accordance with the requirements of Planning Practice Guidance (PPG) and the London Borough of Camden Plan. The following drainage hierarchy has therefore been considered:

1) Rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)
2) Rainwater infiltration to ground at or close to source.
3) Rainwater attenuation in green infrastructure features for gradual release (for example blue/green roofs, rain gardens).
4) Rainwater discharge direct to a watercourse (unless not appropriate)
5) Controlled rainwater discharge to a surface water sewer or drain.
6) Controlled rainwater discharge to a combined sewer.

The Camden Local Plan and London Plan guidance documents state that developments should aim to achieve greenfield runoff rates wherever possible. The greenfield runoff for the site has been calculated using HR MicroDrainage hydraulic modelling software and are shown in Table 3. Refer to Appendix E for calculations.

Table 3 Greenfield Runoff Rates (from MicroDrainage)

Return Period	Greenfield Runoff Rate (l/s)
1 in 1 year	0.10
1 in 30 years	0.10
1 in 100 years	0.20

Appraising the use of Rainwater Harvesting

It is not proposed to implement rainwater harvesting and instead low flow appliances will be installed to reduce the building's demand on potable water.

Appraising the use of Infiltration Techniques

In order to comply with building regulations, infiltration techniques such as soakaways must not be installed within 5m of a building or highway. Due to the nature of the building taking up so much of the site there is not sufficient space for infiltration techniques to be practicable.

The underlying geology also comprises clay and silty gravels, with made ground above which does not lend itself to effective infiltration techniques.

Based on the above, infiltration has not been deemed feasible for this site.

Appraising the use of Open Water Features

There is little external area on site available and space for open water features is limited. Open water features are deemed not to be feasible due to the proposed usage of the site.

Appraising the use of above and below ground attenuation

A blue roof system restricts surface water at the rainwater outlets and provides temporary attenuation at roof level through the use of a layer of geocellular crate. As the proposed development has a pitched roof, there is insufficient flat space throughout to incorporate a blue roof for water attenuation. A below ground geocellular tank has not been proposed as the increase depth of construction required for the installation of the tank would require the surface water network to be pumped, which would increase the flood risk to the development.

Appraising the use of permeable surfaces

The proposed development includes approximately 20m^2 of open, external hardstanding areas, comprising patio areas to the front and rear of the site. Permeable paving with a lined porous sub-base will be utilised in this area to provide attenuation storage for run-off from the roof and paved areas. The permeable paving will help control surface water runoff at source, providing attenuation and filtration of runoff in these areas.

The evaluation of SuDS is demonstrated in **Table 4** below.

Table 4 Evaluation of SuDS techniques

SuDS Technique	Y/N	Comment
Rainwater reuse	N	Rainwater reuse is not proposed for the development due to the works comprising a minor extension to the rear of the building.
Open Water features	N	The confined nature of the development makes open water features unfeasible.
Infiltration devices (i.e. Soakaways)	N	Soakaways are not deemed feasible for this site due to restricted space on site. The underlying ground conditions are also not conducive to infiltration
Blue Roofs	N	Blue roofs are not proposed for the site as there is insufficient flat roof space.
Green Roofs	N	A green roof is not proposed for this development.
Permeable Surfaces	**Y**	**The proposed development has sufficient external hardstanding area to the front and rear of the building to introduce permeable surfaces.**
Tanked systems	N	Attenuation is provided through the use of permeable pavements which offers a more sustainable solution than a tanked attenuation system.

The development will use permeable surfacing with orifice plate flow controls to provide sufficient attenuation to achieve the peak surface water discharge rate of 2.2 l/s for all storms up to and including the 1 in 100 year return + 40% climate change allowance. While the greenfield runoff rates are lower for the 1 in 1, 1 in 30 and 1 in 100-year return periods, the greenfield rates are deemed to be prohibitively low and therefore it is not feasible to achieve. The permeable surfacing with porous subbase adheres to the CIRIA guidelines, providing improvements water quality via filtration through the gravels and permeable materials while also increasing the time of entry into the accepting sewer.

In order to achieve the proposed discharge rates a volume of approximately 1.8m^3 of attenuation is to be required which will be provided within the permeable pavement subbase.

Refer to **Appendix F** for Microdrainage Network results

The post-development runoff improvement against the existing runoff has been provided in **Table 5.**

Table 5 Post Development Runoff Improvement

Return Period	Existing Runoff Rate (l/s)	Proposed Runoff Rate (l/s)	Percentage Betterment
1 in 1 year	1.7	0.8	53.0
1 in 30 years	4.5	1.5	66.7
1 in 100 years	5.9	1.8	69.5
1 in 100 years + 40% Climate Change	>5.9	2.2	>69.5

As can be seen in the table above, although it is not possible to achieve greenfield runoff rates a significant betterment can be achieved over the existing runoff rates. The proposed SuDS strategy reduces surface water runoff by a minimum of 3% for all storm events, increasing to 69% in the 1 in 100-year + 40% CC return event. It is proposed for the existing combined water outfall to be re-used for the discharge of surface and foul water. Refer to **Appendix G** for the London Borough of Camden SuDS proforma.

Refer to **Appendix H** for the proposed below ground drainage layout.

Proposed Foul Water Strategy

All foul water drainage from the development site will drain via the existing 150mm combined water network. It is proposed to install a Kessel backwater pumping station on the outfall pipe to the public combined sewer. This system permits the discharge of water via a traditional gravity method during normal operation. During intense rainfall events where the combined sewer in Kemplay Road may be surcharged, the pump will close a valve preventing the backflow of water into the site, and will pump surface and foul water from the site, bypassing the valve, to the public sewer.

Eight

Maintenance Requirements

All SuDS will be maintained by the building management company for the lifetime of the development in accordance with the SuDS Manual as summarised below. Maintenance requirements for the blue roof will be supplied by the specialist manufacturer.

Permeable Paving

Regular inspection and maintenance is important for the effective operation of pervious pavements. Maintenance responsibility for a pervious pavement and its surrounding area should be placed with an appropriate responsible organisation. The facility should be inspected regularly, preferably during and after heavy rainfall to check effective operation and to identify any areas of ponding.

Pervious surfaces need to be regularly cleaned of silt and other sediments to preserve their infiltration capability. Experience in the UK is limited, but advice issued with permeable precast concrete paving has suggested a minimum of three surface sweepings per year. Manufacturers' recommendations should always be followed.

A brush and suction cleaner, which can be a lorry-mounted device or a smaller precinct sweeper, should be used and the sweeping regime should be as follows:

- End of winter (April) – to collect winter debris.
- Mid-summer (July/August) – to collect dust, flower and grass-type deposits.
- After autumn leaf fall (November).

Care should be taken in adjusting vacuuming equipment to avoid removal of jointing material. Any lost material should be replaced.

Operation and maintenance requirements for permeable paving are described below.

Table 6 Permeable Paving Maintenance Requirements

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Brushing and vacuuming.	Three times/year at end of winter, mid-summer, after autumn leaf fall, or as required based on site-specific observations of clogging or manufacturers' recommendations.
Occasional maintenance	Stabilise and mow contributing and adjacent areas.	As required.
	Removal of weed.	As required.
Remedial actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving.	As required.
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users.	As required.
	Rehabilitation of surface and upper sub-structure.	As required (if infiltration performance is reduced as a result of significant clogging).
Monitoring	Initial inspection.	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth. If required take remedial action.	3-monthly, 48 h after large storms.
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually.
	Monitor inspection chambers.	Annually.

Gullies / Linear channels

Inspection and removal of debris from silt trap once a year; preferably after leaf fall in the autumn.

Drainage pipes, manholes and silt traps

Inspect manholes & silt traps for build-up of silt and general debris once a year; preferably after leaf fall in the autumn. If silt/debris is building up, then clean with jetting lorry / gully sucker and inspect pipe – repeat cleaning if required. If the pipes to be jetted are plastic then a high flow, low pressure setting should be used so that the pipes are not damaged.

Unusual / unresolved problems

If the drainage system is still holding water following cleaning with a jetter, or the jetting of the system removes excessive amounts of debris this may indicate greater issues within the system. A CCTV survey is likely to be required and further advice should be sought from a drainage engineer.

NOTE: Manhole covers can be heavy and suitable lifting equipment / procedures should be used. Where possible, personnel should not enter manholes to carry out maintenance.

Nine

Conclusion

In summary, following the advice and guidance provided by the London Borough of Camden, a SuDS strategy has been produced for the planning application associated with 22 Kemplay Road, Camden.

The SuDS Hierarchy has been followed in order to employ the most suitable and practicable SuDS techniques to improve surface water run off management within the site. Areas of permeable paving have been proposed, which will have a positive impact on water quality and contribute to the attenuation strategy for the site.

The proposed development will restrict surface water run off to the public sewer to a peak discharge of 2.2l/s for the red line boundary. This provides a betterment on existing of over 69% for the 1 in 100-year event + 40% climate change event.

It is proposed that foul and surface water will outfall from the site via the existing 150mm diameter combined outfall to Kemplay Road. A new Kessel Backwater pumping station is to be constructed on the outfall to prevent the backflow of water and to ensure that foul and surface water will be discharged from site in the event that the public sewer is surcharged.

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Appendices

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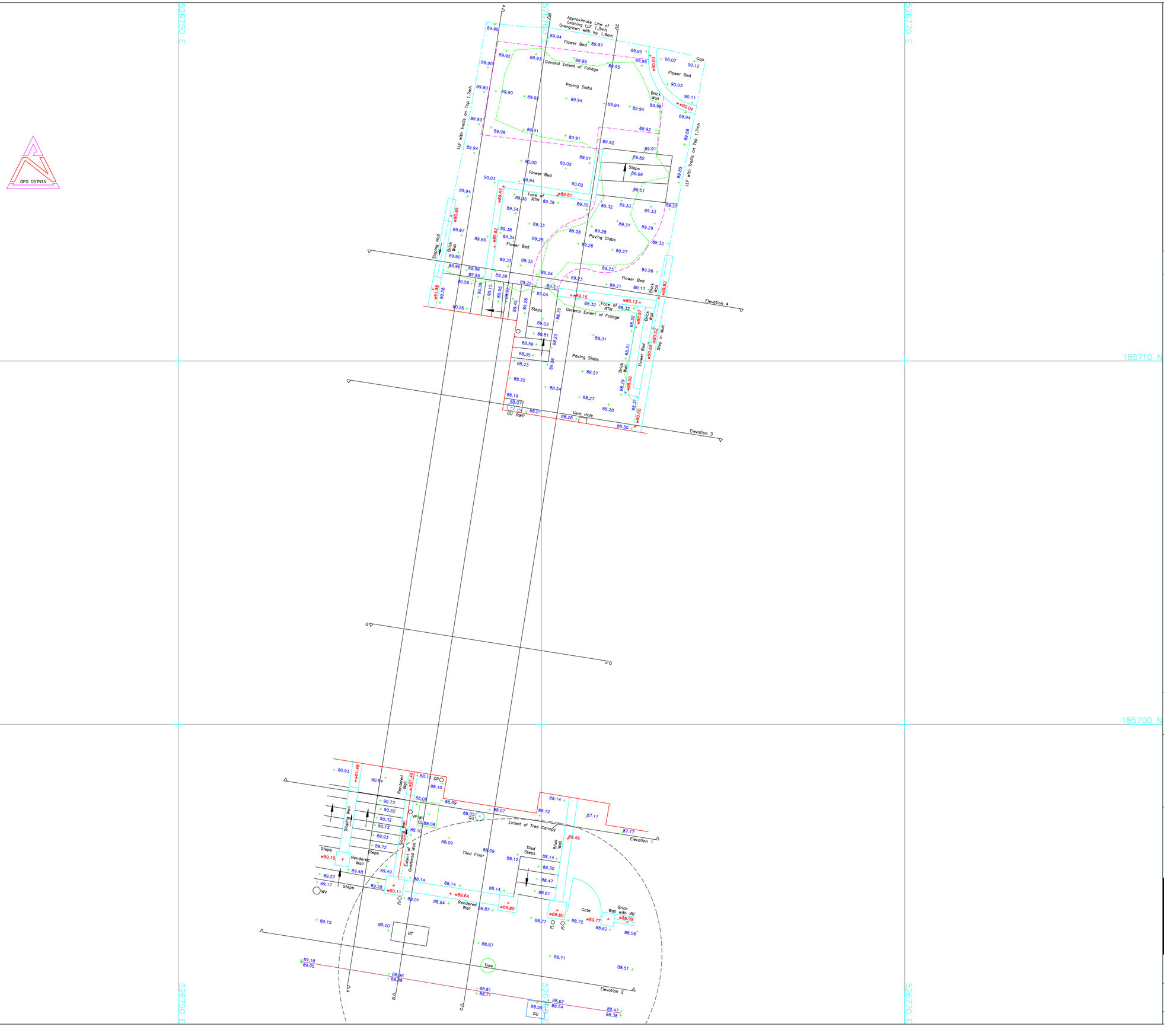
A Topographic Survey



LEGEND

BB	Belisha Beacon	OBF	Open Board Fence
BC	Brick Column	o/h	Overhead
BL	Base Level	PI	Petrol Interceptor
Bol	Bollard	PO	Post
BP	Block Paving	P&RF	Post & Rail Fence
BT	British Telecom	P&WF	Post & Wire Fence
BU	Bus Stop	PS	Paving Slabs
BWF	Barbed Wire Fence	RE	Rodding Eye
CATV	Cable TV	RG	Rough Ground
CBF	Closed Board Fence	RN	Road Name
CBX	Control Box	RS	Road Sign
CC	Concrete Column	RTW	Retaining Wall
CL	Cover Level	RWP	Rain Water Pipe
CLF	Chain Link Fence	SA	Soakaway
CO	Controller	SP	Sign Post
Conc	Concrete	SV	Stop Valve
CPF	Chestnut Paling Fence	SW	Surface Water
DC	Drainage Channel	SY	Stay Wire
DK	Drop Kerb	Tac	Tactile Paving
DP	Down Pipe	Tarm	Tarmac
EIC	Electricity IC	TFL	Transport For London IC
EP	Electricity Pole	TL	Traffic Light
ER	Earthing Rod	TOW	Top Of Water Level
FB	Flower Bed	TP	Telegraph Pole
FH	Fire Hydrant	TS	Tree Stump
FP	Fence Post	TV	Cable TV
FW	Foul Water	UTL	Unable to Lift
GP	Gate Post	u/s	Underside
GU	Gully	VP	Vent Pipe
GV	Gas Valve	WL	Water Level
HR	Hand Rail	WM	Water Meter
IC	Inspection Cover	WV	Water Valve
IL	Invert Level	+50.00	Spot Level
IRF	Iron Railing Fence	+(50.00)	General Soffit Level
KG	Kerb Gully	+e50.00	Eaves Level
KI	Kerb Inlet	+pa50.00	Parapet Level
LLF	Larch Lap Fence	+r50.00	Ridge Level
LP	Lamp Post	+rf50.00	Roof Level
MH	Manhole	+w50.00	Wall Level
MK	Marker		

STATUS

FINAL

NOTES

The survey grid has been derived from GPS observations and related to Ordnance Survey National Grid (OSTN15). All levels relate to Ordnance Survey datum (GPS).

This drawing should be read in conjunction with the following SDP Surveys drawings:

S22-233-100	–	Land Survey
S22-233-200	–	Lower Ground Floor Plan
S22-233-201	–	Ground Floor Plan
S22-233-202	–	First Floor Plan
S22-233-203	–	Second Floor Plan
S22-233-204	–	Third Floor Plan
S22-233-205	–	Roof Plan
S22-233-300	–	Elevations
S22-233-400	–	Sections

CLIENT

AKARANA BUILDERS LTD

SITE

22 KEMPLAY ROAD
LONDON
NW3 1SY

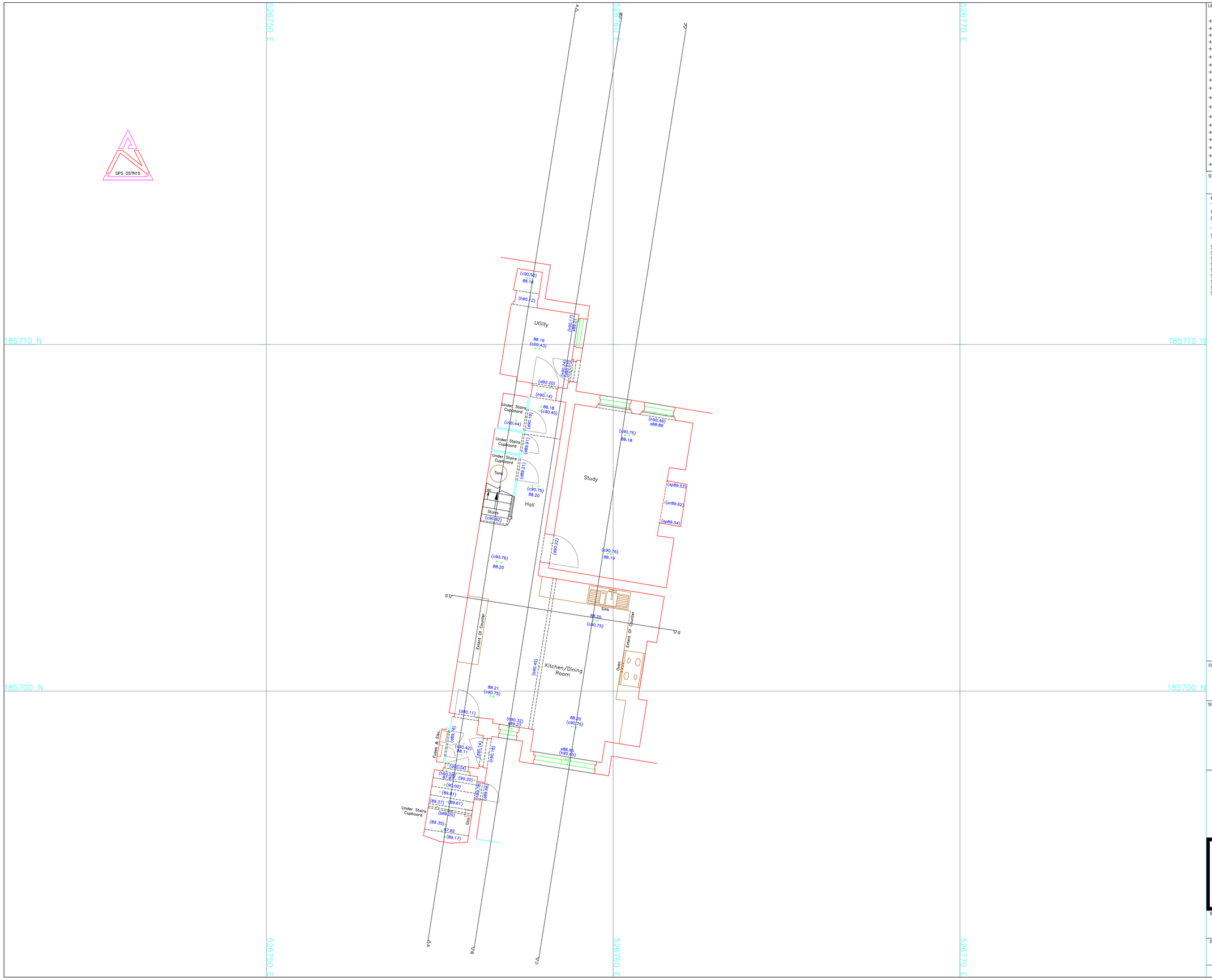
Land Survey

SDP SURVEYS
Suite 3, Salar House
Campfield Road, St.Albans,
Hertfordshire, AL1 5HT
Tel. 01727 844606
surveys@sdpce.co.uk
www.sdpce.co.uk

SCALE	DRAWN	DATE
1:50 @ A1	LSB/GT	June 2022

DRAWING NO. S22-233-100

REV.



LEGEND

+52.76	Floor Level	+(pu55.31)	Underside of Purlin
+b53.44	Level on Beam	+(rb55.31)	Underside of Ridge Board
+e53.44	Eaves Level	+(rft55.31)	Underside of Rafter
+p53.44	Level on Plinth	+(55.31)	Soffit Level
+pa53.44	Parapet Level	+(sp55.31)	Spring Level
+r53.44	Ridge Level	+(tr55.31)	Underside of Truss
+rf53.44	Roof level	CL	Cover Level
+s53.44	Sill Level	DP	Down Pipe
+th53.44	Threshold Level	EM	Electricity Meter
+tr53.44	Level on Top of Truss	FB	Fuse Box
+w53.44	Top Of Wall Level	GM	Gas Meter
+(55.78)	General Soffit Level	o/h	Overhead
+(ar55.78)	Arch Level	RWP	Rain Water Pipe
+(b55.78)	Underside of Beam	SW	Surface Water
+(c55.67)	Ceiling Level	sc	Sloping Ceiling
+(d55.08)	Door Height Level	ur	Urinal
+(fc55.11)	False Ceiling Level	u/s	Underside
+(h55.31)	Head Level	VP	Vent Pipe
+(j55.31)	Underside of Joist	wc	Toilet
		whb	Wash Hand Basin
		WV	Water Valve

STATUS

FINAL

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S22–233–203	–	Second Floor Plan
S22–233–204	–	Third Floor Plan
S22–233–205	–	Roof Plan
S22–233–300	–	Elevations
S22–233–400	–	Sections

CLIENT

AKARANA BUILDERS LTD

SITE

22 KEMPLAY ROAD
LONDON
NW3 1SY

Lower Ground Floor Plan

SDP
SURVEYS

Suite 3, Salar House
Campfield Road, St.Albans,
Hertfordshire, AL1 5HT

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surveys@sdpce.co.uk
www.sdpce.co.uk

SCALE	DRAWN	DATE
1:50 @ A1	LSB/GT	June 2022

DRAWING NO. S22–233–200

REV.

B Thames Water Asset Records

C CCTV Drainage Survey

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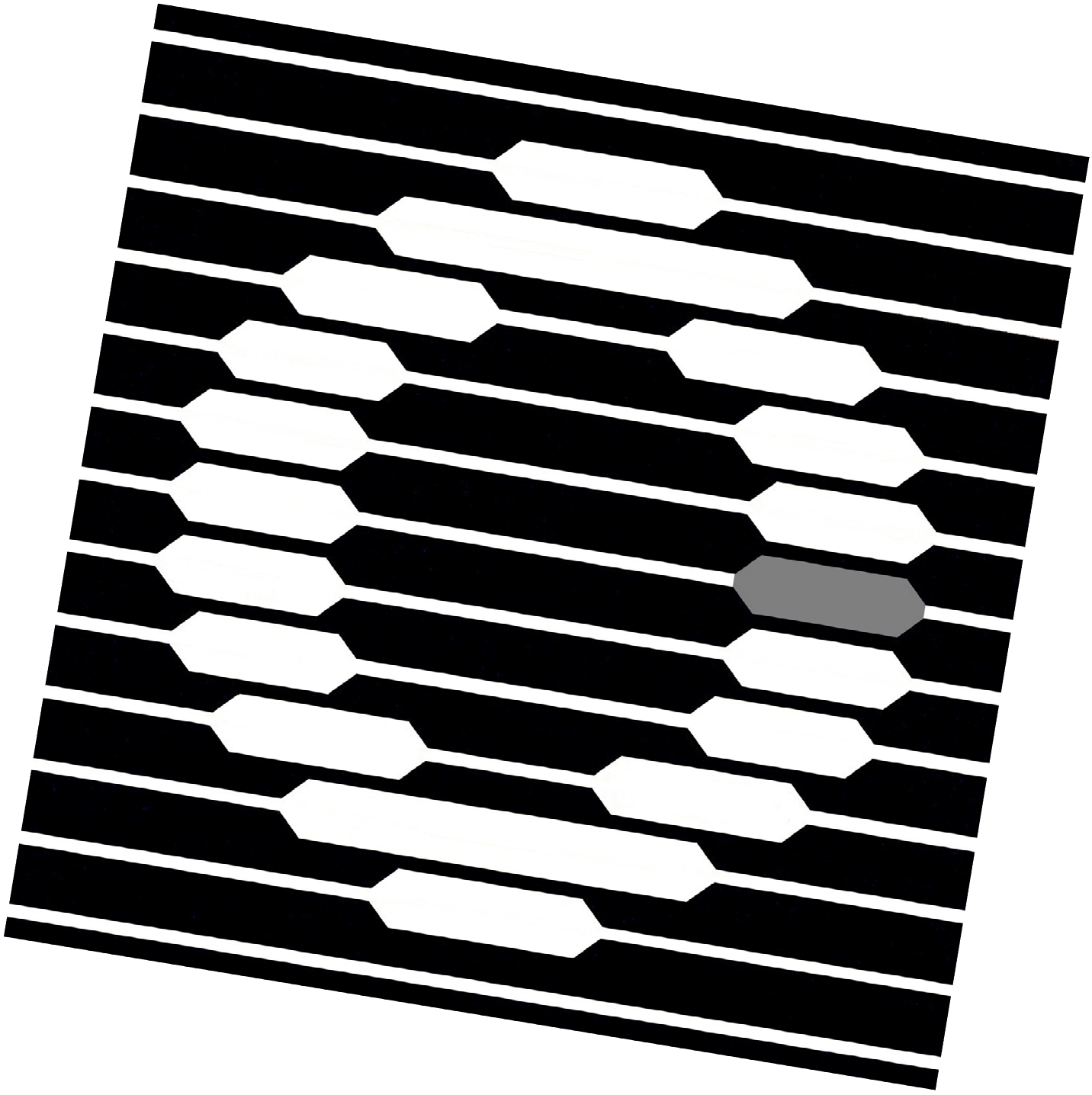

CV.02537 22 KEMPLAY ROAD LONDON NW3 1SY

G.O. DRAINAGE SERVICES LTD

53 PREMIER AVENUE GRAYS RM16 2SJ TEL:01375 373302 MOB:07792 815977 E-MAIL: godrainage@aol.com

CCTV SURVEY HEADER SHEET

CLIENT. ELLIOTTWOOD PARTNERSHIP LLP
CONSULTING STRUCTURAL AND CIVIL ENGINEERS
241 THE BROADWAY
LONDON
SW19 1SD

LOCATION. 22 KEMPLAY ROAD
LONDON
NW3 1SY

JOB NO. CV.02537

SEWER USE. COMBINED DRAINAGE

WEATHER. DRY

DATE. 07/11/22

OPERATOR. GO

CLEANED. YES

ORDER NO. E-MAIL HARRY

TOTAL LENGTH SURVEYED. 34.0 metres