ELMSLEIGH ROAD
STAINES

FLOOD RISK ASSESSMENT

SEPTEMBER 2020

Document Control Sheet

Project name:	Elmsleigh Road, Staines
Project ref:	INL/E4445
Report Title	Flood Risk Assessment & Drainage Strategy
Doc. ref:	TRS/INL/E4445/17736
Date:	21st September 2020

	Name	Position	Signature	Date
Prepared by:	Terry Seymour	Director		21.09.2020
Approved by:	Terry Seymour	Director		21.09.2020

Revision	Date	Description	Prepared	Approved
1	24/09/2020	Planning Issue	TRS	TRS
2	29/09/2020	Appendix J included	TRS	TRS

Contents

Appendices

1.0 Executive Summary

Rogers Cory Partnership Limited has prepared this Flood Risk Assessment (FRA) in accordance with the guidance set out in the Department for Communities and Local Government National Planning Policy Framework (NPPF).

This report summarises the methodology and results of the FRA in relation to the proposed residential development at Elmsleigh Road in Staines, Surrey. The report also assess potential flood risk and details the drainage strategy for implementation on the scheme.

According to data supplied by the Environment Agency (EA), the site lies mainly within Flood Zone 2 and 3 considered medium and high risk of flooding from fluvial sources respectively This report therefore focuses on the site-specific flood risk assessment and surface water management in line with the requirements set out in the Spelthorne Borough Council Strategic Flood Risk Assessment (SFRA) and the NPPF.

The study will also examine the effects of the development on adjacent parcels of land.

A surface water drainage strategy has been developed and hydraulically modelled incorporating sustainable urban drainage systems (SuDS) in line with the NPPF and EA standing advice. The strategy is based on a reduction in the surface water run-off rates thus ensuring that the development does not increase the risk of flooding from the site during peak storm events.

The report assesses potential flood risk sources to and from the site and detail the drainage strategy for implementation on the scheme.

2.0 Introduction

Rogers Cory Partnership Limited have been instructed on behalf of Inland Ltd to prepare a Flood Risk Assessment (FRA) and surface water drainage strategy in support of a planning application for the proposed re- development of land at Elmsleigh Road, Staines

The development site seeks planning permission from Spelthorne Borough Council for the residential development with associated access roads, parking and landscaping.

The National Planning Policy Framework (NPPF) was published in February 2019 by the Department of Communities and Local Government and replaced all planning policy statements including Planning Policy Statement 25 (PPS 25): Development and Flood Risk. The NPPF set out the Government's planning policy for England and how these are expected to be applied. The Planning Practice Guidance (PPG), published in March 2014, provides additional guidance and retains key elements of the now superseded PPS 25.

The DEFRA website has identified the development site to be located mainly within a flood zone 2 and 3, considered to be at medium to high risk of flooding from rivers or sea. In this respect requirements in the NPPF (foot note 20) states the following:

'"site-specific flood risk assessment is required for proposals of 1 hectare or greater in Flood Zone 1; all proposals for new development (including minor development and change of use) in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the Environment Agency); and where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding."

The EA Guidance Note 3 (April 2012) highlights that a FRA is required to ensure flood risk to the proposed development is considered as well as the impact the development will have elsewhere on people and property. In addition the FRA should consider the risk of flooding from other sources (groundwater, overland flow, sewers).

The PPG sets out the objectives of a site specific FRA as to establish the following:

- *"Whether the proposed development is likely to be affected by current or future flooding from any source;*
- *Whether it will increase flood risk elsewhere;*
- *Whether the measures proposed to deal with these effects and risks are appropriate;*
- *The evidence for the local planning authority to apply (if necessary) the Sequential Test, and;*

- *Whether the development will be safe and pass the Exception Test, if applicable."*

As such this report has been prepared in accordance with the requirements of the NPPF, PPG and EA Guidance.

3.0 Proposed Development Site

3.1 Site Location

The site comprises of the former Telephone Exchange (now demolished) and the Staines Masonic Hall with open parking areas. The existing site is considered Brownfield.

The site is located off Elmsleigh Road, east of the A308. The River Thames is approximately 200m west of the site. The site is surrounded by the Elmsleigh Shopping Centre on the south and eastern sides and further retail units to the north.

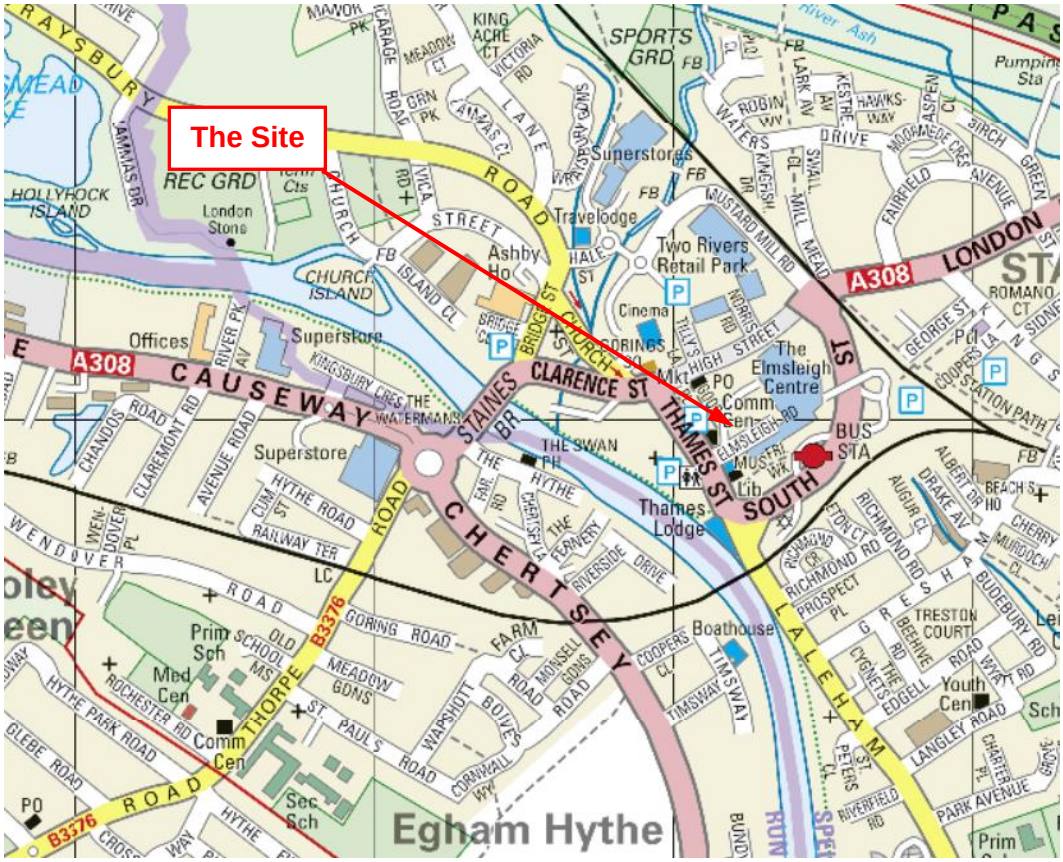


Figure 1: Site Location Plan

3.2 Existing Topography

A topographical survey was carried out by Alan Rhodes Associates in March 2014 and is related to Ordinance Survey Datum. The survey generally shows the site to be relatively flat with a gentle fall from north east to south west with levels ranging from 15.61mAOD to 14.63mAOD **Appendix B**).

3.3 Development Proposals

This report has been prepared to accompany a full planning application for the residential development with associated access roads, parking and landscaping.

3.4 Existing Geological Information

According to existing British Geological Survey (BGS) maps the site is located over the London Clay Formation with a Shepperton Gravel Member superficial deposit. The site lies within a Zone 3 Total Catchment source protection Zone. The site is not located over any designated Bedrock Aquifer but is located over a designated Principle Superficial Drift Aquifer, reflective of the Shepperton Gravel Member. The Ground Water Vulnerability Mapping indicates this area as a Major Aquifer High.

3.5 National Policy Context

National policy regarding flood risk is contained within the National Planning Policy Framework (NPPF) which was published in February 2019 by the Department of Communities and Local Government and replaced all planning policy statements including Planning Policy Statement 25 (PPS 25): Development and Flood Risk. The NPPF set out the Government's planning policy for England and how these are expected to be applied. The Planning Practice Guidance (PPG), published in March 2014, provides additional guidance and retains key elements of the now superseded PPS 25.

The DEFRA website has identified the development site to be located mainly within a flood zone 2 and 3, considered to be at medium to high risk of flooding from rivers or sea. In this respect requirements in the NPPF (foot note 20) states the following:

'"site-specific flood risk assessment is required for proposals of 1 hectare or greater in Flood Zone 1; all proposals for new development (including minor development and change of use) in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the Environment Agency); and where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding."

The Environment Agency's latest revision of their Flood Risk Standing Advised (FRSA) (version 3.1) was released in April 2012.

The Department for Environment, Food and Rural Affairs (DEFRA) released the Non-statutory technical standards for sustainable drainage systems in March 2015. The document sets out non-statutory technical standards for SuDS to be read in conjunction with the NPPF and PPG.

As of the 15th April 2015 the Lead Local Flood Authority (LLFA) has now become a statutory consultee on all major planning applications and as such will assess planning applications in respect of surface water drainage and sustainable drainage systems which was previously the responsibility of the Environment Agency. The

LLFA's primary duties will be to ensure that flood risks from surface water run-off, groundwater and ordinary watercourses are identified and managed properly. The use of SuDS will be a material consideration in planning conditions and as such the proposed use of SuDS will need to be demonstrated on all major developments unless it can be demonstrated otherwise.

3.6 Local Planning Policies

The Spelthorne Borough Council Core Strategy was adopted in February 2009. However, it should be noted that the development and flood mitigation proposals will be brought forward in accordance with the current emerging Spelthorne Borough Council Policy with respects to flooding.

However, as set out above, planning policy on flooding has changed since the Local Plan was adopted. As such, the development proposals have been assessed having regard to the most recent flood data and more recent policy set out in the NPPF and NPPG. Current policy on flooding is also reflected in the policy of the emerging Local Plan which states that

"New development will be guided to areas of lowest flood risk from all sources of flooding through the application of the sequential test. The exception test will continue to be applied where national planning policy advises that this is necessary. Where individual sites contain different flood zones, the layout of the site will also be expected to minimise flood risk.

Development in Flood Zones 2 and 3a will be permitted provided that:
a) the vulnerability of the proposed use is appropriate for the level of flood risk on the site;
b) the proposal passes the sequential and exception test (where required) as outlined in the NPPF and Government guidance;
c) a site-specific flood risk assessment demonstrates that the development, including the access and egress, will be safe for its lifetime (taking into account climate change) without increasing flooding elsewhere, and will (where possible) reduce flood risk overall;
d) the scheme incorporates flood protection, flood resilience and resistance measures appropriate to the character and biodiversity of the area and the specific requirements of the site;
e) applications include appropriate flood warning and evacuation plans and have been approved, and
f) site drainage systems are appropriately designed, taking account of storm events and flood risk of up to 1 in 100-year event with an appropriate allowance for climate change".

3.7 Existing Flood Defences

The site does not benefit from any flood defences.

3.8 NPPF Flood Zone and Vulnerability

The National Planning Policy Framework Table 1 confirms the flood zone Classification based upon the probability of flooding. The site is shown to lie mainly within Flood Zone 2 and 3.

Table 2 of the National Planning Policy Framework confirms the 'Flood Risk Vulnerability Classification' of a site, depending on its proposed use. The classification is then applied to Table 3 to determine whether:

- The proposed development is suitable for the flood zone in which it is located
- An Exception Test is required for the proposed development.

The proposed development is classified as 'More Vulnerable' according to the NPPF and suited for the flood zone in which it is located.

4.0 Flood Risk to the Site

The degree of detail appropriate to an FRA depends upon the scale and potential impact of the proposed development to and from the surrounding boundaries. In this case, the applicant has the intention of re-developing an area of land which is located within land which lies in Flood Zone 2 and 3.

4.1 Strategic Flood Risk Assessment

The National Planning Policy Framework confirms that Regional Planning Bodies (RPBs) or local planning authorities (LPAs) should prepare strategic Flood Risk Assessments (SFRAs) in consultation with the EA. The SFRA is then used to refine information on areas liable to flooding by taking into account other sources of flooding and the impacts associated with climate change in addition to the EA flood map data.

The document informs the Council's policies in the emerging Local Development framework and a strategic approach to the allocation of sites for development and the future management of flood risk, in line with the National Planning Policy Framework.

Spelthorne Borough Council completed a Strategic Flood Risk Assessment (SFRA) in December 2006. The SFRA reviews the flood risk issues across the District to inform the options for the strategic development sites. The SFRA is based on EA information on the areas that might flood. It takes account of the risk of flooding from rivers, the sea, and other sources of flooding and climate change.

4.2 Existing Information on Flooding

Fluvial Flood Risk

Searches of the EA Flood Map (See **Appendix D**) confirm the site to be located mainly within Flood Zone 2 and 3 considered medium to high risk of flooding from fluvial sources.

Figure 2- Extract from Environment Agency Flood Map

The EA modelled flood information was obtained in 2016 and indicated that the 1 in 100 year + 20% (climate change) fluvial flood level was approximately 15.92mAOD.

Updated EA modelling flood information has been obtained and the based on the updated model the 1 in 100-year level (Flood Zone 3) is determined as **15.421mAOD**. The 1 in 100 year plus 35% level is determined as **15.753mAOD**. which accounts for the new Climate Change factors and supersedes the previous modelling fluvial levels from 2016.

The minimum FFL for any habitable dwelling within the new development should be set at 300mm above the 1 in 100 year plus 35% fluvial flood level which is **16.053mAOD.**

The current proposals include for setting the residential dwellings at 1st floor and above which is significantly higher that the 1 in 100 year plus 35% level.

Ground floor areas will have flood mitigation measures such as discrete flood barriers at the doorways and raised electrical points, non-return valves in the foul drainage system, self-closing air bricks etc.…

Any under-croft parking at ground floor level will need to have provisions to stop cars from “floating” away. These can generally be accommodated through the use of fold down bollards and connecting chains which can be put in place by Management Company.

In order to ensure that residents are kept safe during the lifetime of the scheme an emergency evacuation plan will be produced to support the development. This plan will tell the future residents what to do in the event of a flood and enable them to prepare accordingly. As part of the emergency plan, residents and members of

public are urged to evacuate as a first point of call rather than to stay on site, this will be as explained in detail in the flood emergency plan with information on registering with the EA flood warning services as well as evacuation routes and recommended procedures in the event of a flood.

Details of the flood mitigation proposals to ensure that the new proposals do not increase the risk of flooding elsewhere by displacing flood volumes is presented in **Appendix E**. This comprises of a level for level, volume for volume flood compensation assessment and demonstrates that the new development provides a betterment in terms of flood volume storage compared to the previous development.

Sewer Flood Risk

There are no recorded instances of sewer flooding within the immediate vicinity of the site.

Surface Water Flood Risk

Searches of the EA Risk of Flooding from Surface Water flood map confirms that there are a few areas within the site which could have a medium to high areas potential risk of surface water flooding. This correlates with localised low points within the site and the residual risk to future development is considered low, through the implementation of a surface water drainage system to accommodate these “low spots”.

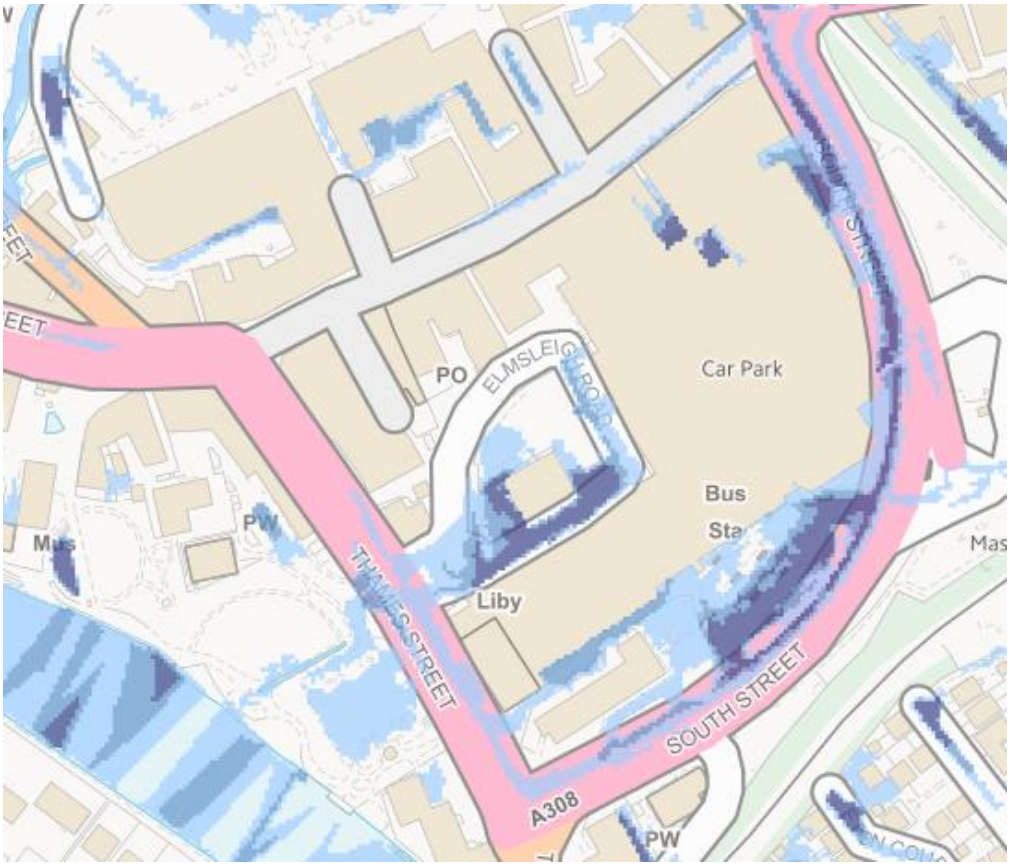


Figure 3- Extract from Environment Agency Risk of Surface Water Flooding

Groundwater Flood Risk

Any potential risk to the new development will be mitigated through the detailed design of the finished ground levels which will seek to have building floor levels above the existing ground levels and ensure adequate falls away from the building to protect both building and people.

Risk of Flooding from Reservoirs

Searches of the EA map for the risks of flooding from reservoirs indicates that this site is at risk from the Staines North, King George VI, Queen Mary and Staines South reservoirs. The risk designation is yet to be determined by the EA.

Whilst flooding from reservoirs as a result of failure in general are considered high risk, these reservoirs form part of strategic infrastructure which are regularly maintained by Thames Water and therefore the likelihood of failure is considered to be low.

The Spelthorne Borough Council Supplementary Planning Document "Flooding" (July 2012) notes:

"*Reservoir flooding – the Borough has five major reservoirs. A failure of the embankments of any one could cause widespread flooding across the Borough. However, the risk of this happening is sufficiently low so that no limitation on development as a result of this form of flood risk is justified.*".

4.3 Climate Change

As of the 19th February 2016, the EA has updated guidance on the application of climate changes allowances for the following:

- peak river flow by river basin district
- peak rainfall intensity
- sea level rise
- offshore wind speed and extreme wave height

Peak river flow allowances are now to be based on River Basin areas thus making them more geographically relevant, based on the range of predicted allowances.

Rainfall – increases in peak rainfall over time is to be assessed on two scenarios to assess the sensitivity of the areas as per table 1 below

Applies across all of England	Total potential change anticipated for 2010 to 2039	Total potential change anticipated for 2040 to 2059	Total potential change anticipated for 2060 to 2115
Upper end	+10%	+20%	+40%
Central	+5%	+10%	+20%

Table 1: Extract from www.gov.uk website- Table 2 – peak rainfall intensity allowance in small and urban catchments (use 1961 to 1990 baseline)

As a conservative approach, a lifetime of the development should be considered of up to 100 years (i.e. up to 2117) when assessing flood risk for residential developments. According to Table 1 above, an increase of 20% to 40% on the peak rainfall intensity should be expected. To mitigate any residual risk at the site as a result of climate change, an appropriate climate change allowance (i.e. 40% increase in rainfall intensity) will therefore be considered and accommodated within the design strategy for managing surface water run-off.

4.4 The Sequential Test

The sequential test approach is aimed to steer new development to areas of lowest probability of flooding. In this regard to determine the suitability and classification of the development, as a check of the proposed scheme, consultation has been made to tables 2 and 3 of the NPPF.

Table 2 of the NPPF technical guidance determines that the proposed development is considered to be a ‘more vulnerable’ land class usage, in terms of flood risk, as illustrated in Figure 3.

More vulnerable

- Hospitals.
- Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.
- Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels.
- Non–residential uses for health services, nurseries and educational establishments.
- Landfill and sites used for waste management facilities for hazardous waste[6].
- Sites used for holiday or short-let caravans and camping, *subject to a specific warning and evacuation plan.*[7]

Figure 3: Extract of Table 2: Flood Risk Vulnerability Classification

Table 3 of the NPPF considers sites providing a 'more vulnerable' land-class usage in a Flood Risk Zone 1 area to being appropriate for development, (see Figure 4):

Table 3: Flood risk vulnerability and flood zone 'compatibility'

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	×	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	×	×	×

Key: ✓ Development is appropriate.
× Development should not be permitted.

Figure 4: Table 3 - Flood Risk Vulnerability and Flood Zone 'Compatibility'

As the development lies within Flood Zone 2 and 3 and based on the proposed development's vulnerability it will need to pass the Exception Test in order to satisfy the requirements of the PPG.

For the Exception Test to be passed a development proposal:

- Must demonstrate that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA;
- The development should be on developable brownfield land or, if not, it must be demonstrated that there is no such alternative land available; and

- A FRA must demonstrate that the development will be safe for its lifetime taking into account the vulnerability of its users, without increasing flood risk elsewhere, and where possible, reducing flood risk overall.

5.0 Surface Water Management

Surrey County Council (SCC) are the Lead Local Flood Authority (LLFA) and statutory consultee on surface water management on all planning applications within the County.

The surface water management section should ensure that there is no adverse impact on flood risk elsewhere as a result of a change in the surface water runoff regime from the re-development.

Existing Surface Water Drainage Regime

An assessment of the existing surface water drainage on site has been carried following a review of the drainage and topographic survey information. The existing surface water on site discharges to soakaways as well as a proportion of the run-off discharges to the existing Thames Water surface network within Elmsleigh Road. The results of the drainage investigations carried out on the site are presented within **Appendix F**.

Pre-Development Run Off

An assessment of the pre-development Brownfield run-off from the site has been carried out, by creating hydraulic simulation networks using MicroDrainage to assess the discharge from the site for a variety of storm events up to the peak 1 in 100 year event.

The following parameters were used for the initial assessment and findings tabled below.

M5-60 (mm): 20.

Ratio: 0.4

Time of Entry: 4 minutes

Area: split into three separate catchments to reflect the drainage survey results

Return Period: 1, 30, 100 Year

The historic Brownfield run-off rates have been summarised in Table 2 below:

Impermeable Area (m^2)	Q1 Year (L/Sec)	Q30 Year (L/Sec)	Q100 Year (L/Sec)
1690	21.1	31.6	31.7

Table 2: Summary of Brownfield runoff rates and volumes

Design Principles

Key design principles in the following guidance documents steer the approach to managing surface water runoff at sites:

- Building Regulations hierarchy of drainage (H3);
- Interim Code of Practice for SuDS; and
- CIRIA best practice guidance, including the use of the 'SUDS management train'

Building Regulations hierarchy of drainage outlines the preferred methods for the disposal of surface water with infiltration methods being the preferred option. If this is not possible the next favoured option is to drain to an existing watercourse. If neither of these options are feasible, the regulations state that rainwater discharge should be directed to a sewer.

The Interim Code of Practice for SUDS provides guidance about the hydraulic design criteria for Sustainable drainage systems. This in general refers to both peak rate of runoff and the volume of runoff, post development. Prior to mitigation measures such as the use of SuDS attenuation features, both the volume and peak rate of runoff may increase post development.

The design principles for surface water management extend beyond simple hydraulic criteria. CIRIA guidance promotes the use of the SUDS management train, a concept where SUDS techniques are used to treat, convey and store surface water runoff. This approach is considered as part of the SUDS selection methodology.

Sustainable Drainage Systems

To drain the development in a sustainable manner whilst complying with the requirements of the NPPF, the scheme should seek to adopt an appropriate form(s) of sustainable urban drainage systems (SUDS).

SUDS techniques comprise of implementation of infiltration drainage devices to discharge surface water to the underlying soil stratum (where ground conditions permit). These may be in the form of conventional soakaways, infiltration basins and ponds, filter strips, swales, permeable surfaces, green roofs, over-sized pipes/tanks geo-cellular attenuation units.

An additional storage provision should be provided as an allowance for any potential climate change impact.

Infiltration Drainage

BGS geological information as well as the results of the intrusive ground investigations indicates that the site is underlain by the London Clay Formation and groundwater recorded at shallow depths on this site. As such infiltration techniques are not proposed on this site.

Post Development Run Off

Using the Micro drainage simulation suite, an assessment of the proposed peak discharge rates prior to mitigation measures has been made. A 360min storm duration was then applied to ascertain the discharge volume.

The following parameters were used for the initial assessment and findings tabled below.

M5-60 (mm): 20.

Ratio: 0.4

Time of Entry: 4 minutes

Impermeable Development Area (Ha)	Q1 Year (L/sec)	Q30 Year (L/Sec)	Q100 Year Plus Climate (L/Sec)
0.2885	11.8	21.0	21.1

Table 3: Summary of Post Development Runoff

Surface Water Drainage Strategy

In view of the requirements of the NPPF, PPG, SBC the design parameters and constraints associated with redeveloping this site, a surface water drainage strategy design has been devised and hydraulically modeled to demonstrate that the scheme can be suitably implemented without increasing the level of flood risk, when the surface water drainage system experiences a 1:100 year rainfall event (including climate change).

The surface water drainage scheme has been designed to ensure:

- A reduction in the pre development site discharge for peak storm events.
- Sustainable Urban Drainage systems are wholly incorporated within the scheme.
- Consideration is given for the improvement of water quality within the design.

Having taken into consideration the above points, a scheme has been devised and hydraulically modelled based on attenuation techniques and seeking to discharge all run-off from the proposed re-developed areas to the existing Thames Water surface water sewer

The SuDS strategy for the site has sought to follow a hierarchy approach. This is tabulated below with comments and reasons where certain SuDS features have been included or excluded at this stage of the outline design strategy.

SuDS Technique	Included	Comments
Living Roofs (greenroofs)	Included	Green roofs have been included in the scheme where possible on the podium levels over the under croft car parking areas.
Basin and ponds	Excluded	Basins and ponds have been excluded from the scheme due to the lack of available space to accommodate these features in light of the usable open space requirements and areas designated for fluvial flood volume compensation storage.
Raingardens/Bio retention areas	Included	Bio-retention area and rain gardens are promoted through the scheme in areas adjacent to new roads and parking areas.
Filter Strips and Swales	Excluded	Basins and ponds have been excluded from the scheme due to the lack of available space to accommodate these features in light of the usable open space requirements and areas designated for fluvial flood volume compensation storage.
Infiltration Devices	Excluded	Excluded due to low permeability of the existing soils and high groundwater levels
Permeable surfaces	Excluded	Excluded due to low permeability of the existing soils and high groundwater levels.

Tanked systems	Included	Cellular attenuation tanks have been proposed through the scheme to accommodate the additional volume of required attenuation in aims to achieve the one year brownfield run-off restrictions from the new development parcels.

Table 2: Summary of SuDS Hierarchy Approach

A copy of the proposed surface water strategy can be found in **Appendix G**.

Flow Control

The proposed discharge rate does however represent a betterment to the calculated 1 in 30 Year and 1 in 100 Year Brownfield run-off rates.

The hydraulic calculations have been simulated under various scenarios up to and included the critical 1 in 100 Year storm event with additional 40% allowance for climate change. As the development consists of a fixed area for the new apartment buildings, there is no opportunity or risk of further urban creep, as such the calculations have excluded for the provisions of any additional further urban creep allowance. The simulations confirm that the storm can be managed and maintained within the site.

The hydraulic models of the proposed surface water SuDS systems can be found in **Appendix H**.

Water Quality

It is important to address issues with regards to quality when considering surface water management. As the surface water is proposed to discharge to the existing Thames Water sewer the required level of treatment is proposed as part of a SuDS Management Train in accordance with the recommendations of the SuDS Manual (Ciria 753) and as required by the LLFA.

The levels of treatment have been proposed through the provision of the infiltration

Long Term Maintenance

Consideration has been given to the long term maintenance of the proposed drainage structures. SuDS permeable pavements and all associated external pipework, chambers and manholes will be the responsibility of a management company. The development proposals will seek to offer the upstream surface water network within the main access roads for adoption to the Local Sewer Authority.

A detailed maintenance schedule will be provided by the designers during the detailed design stage of the surface water proposals.

Exceedance

Whilst the drainage system has been designed to a very high standard (1 in 100 Year storm event including climate change), it is possible that a more extreme event will occur and that the design standard for the system will be exceeded. It is best practice to design the drainage system to shed water, primarily into landscaped and other areas, therefore reducing the risk of flooding areas of built development during extreme events.

A strategy for directing overland flows for the site will be confirmed using overland flow modeling as part of the detailed design once key ground levels or development levels across the site have been finalized.

Safe means of access and egress.

A safe means of emergency dry access and egress is proposed from the development site through to the High Street. Reference should be made to the Flood Plan in Appendix I.

6.0 Foul Water Drainage Strategy

Thames Water Utility Services Limited are the Local Sewerage Authority in this area. The development proposals will seek to discharge to the existing Thames Water public sewer network located within Elmsleigh Road.

The proposed connection to the existing foul water network will be carried out under a Section 106 Agreement with Thames Water.

All domestic foul drainage should be designed in accordance with Part H of the Building Regulations

7.0 Conclusion

A preliminary design surface water drainage strategy has been prepared and hydraulically modelled which demonstrates that the redevelopment proposals can be successfully implemented and designed to withstand the impact of a 1:100 year rainfall event (including climate change), in accordance with the NPPF. PPG and SBC requirements

The development's surface water discharge is proposed to be discharged into the existing Thames Water sewer at the one-year brownfield rate and thus represents a betterment to the site's existing 1 in 30 Year and 1 in 100 Year run-off rates through the use of SuDS techniques and re-use of existing resources.

In view of this assessment, the report concludes that:

i. The Development is situated mainly within the Flood Risk Zone 2&3 area;

ii. The Development is located on a brownfield site

iii. The Development has included for flood mitigation measures to ensure the safety of its residents

iv. The Development does not increase the risk of flooding elsewhere;

v. The Development can be drained in a sustainable manner utilizing SuDS techniques;

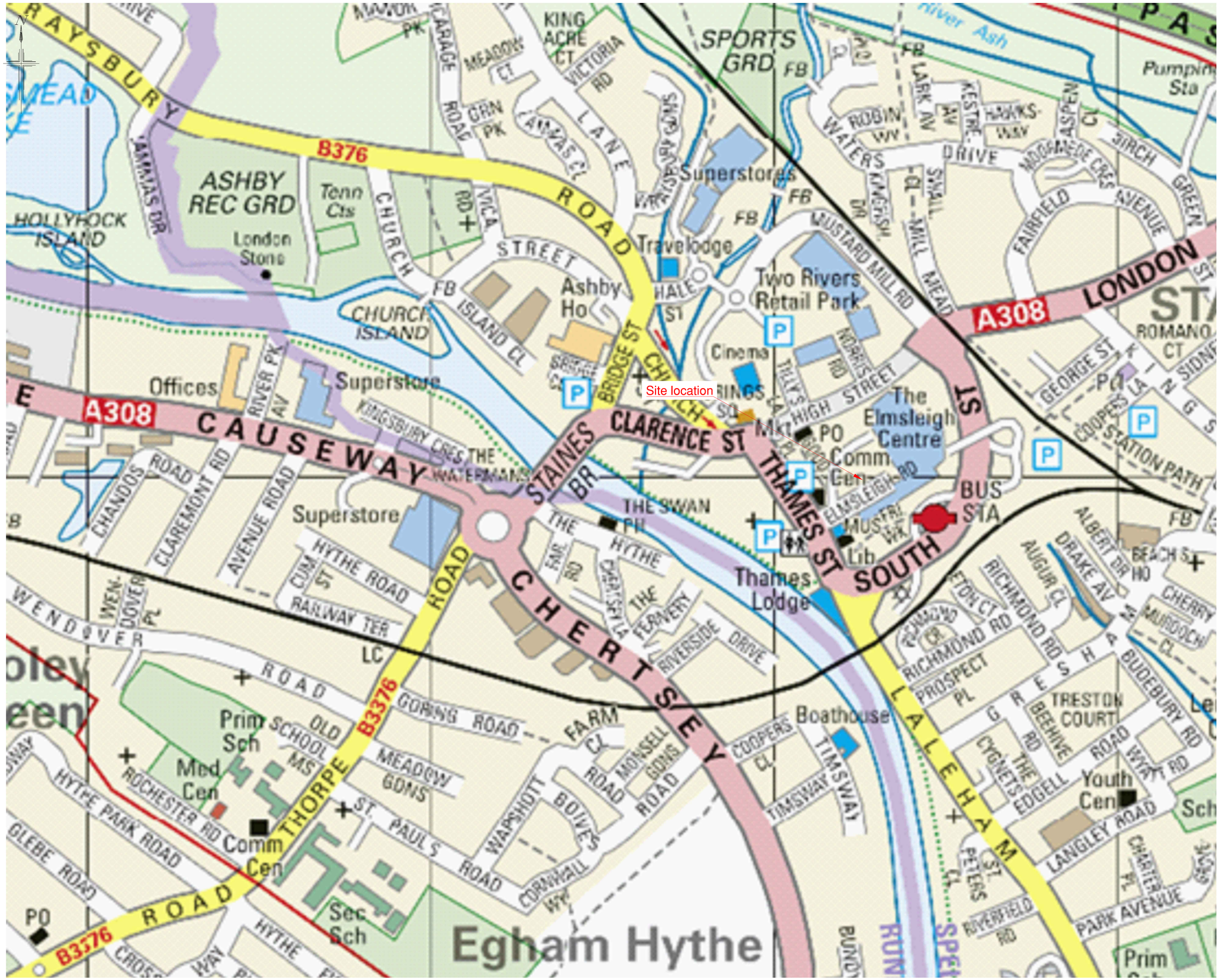
vi. The Development will satisfactorily manage and maintain a 1 in 100 Year storm event with allowance for climate change

The findings of this report identify the opportunity to promote the sustainable re-use of existing resources and potential to implement an appropriate SUDS strategy.

In conclusions the FRA demonstrates that the site be brought forward in accordance with the requirements of the NPPF in terms of flood risk and mitigation and passes the Exception Test.

Appendix (A)

Site Location Plan



NOTES

Rev.	Date	Details	By	Chkd	Appd

Client:- Inland homes

Site:- Elmsleigh Road, Staines

Drawing Title:- Location Plan

Date: September 2020 | Scales: NTS

Drawn: TS | Checked: TS | Approved: TRS

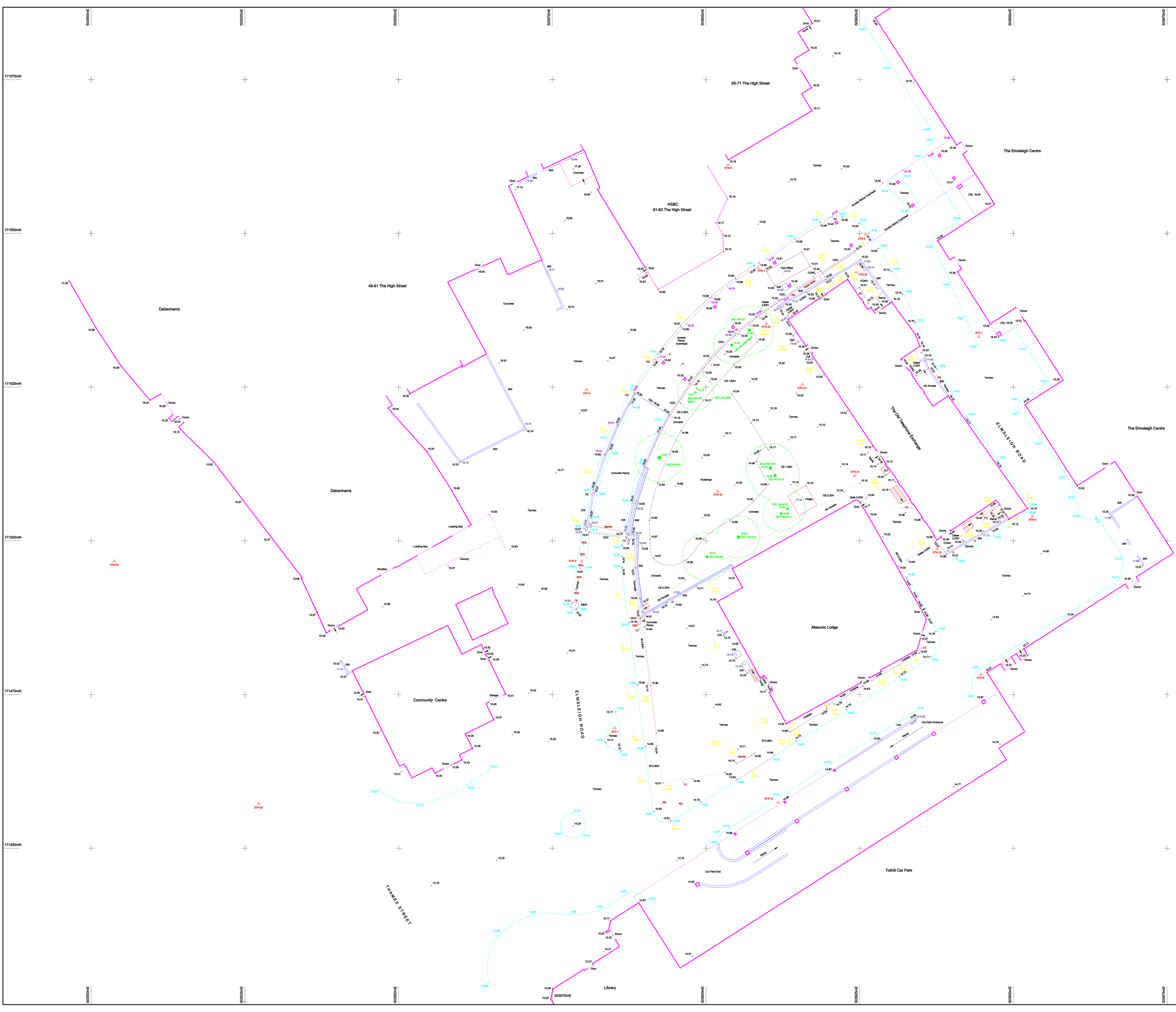
Drawing No. INL/E4445/009

FOR INFORMATION ONLY

RCP ARCHITECTURE & CIVIL ENGINEERING
Rogers Cory Partnership
Architectural and Civil Consultants
The Old School Old School Road
Hook Hampshire RG27 9NJ
T: 01256 769269 E: mail@rcpconsultants.co.uk W: rcpconsultants.co.uk

Appendix (B)

Topographical Survey



LEGEND :

BEL	Bellsha Beacon	RWP	Rainwater Pipe
BOL	Bollard	SB	Shrub Bed
BRS	Brick Setts	SG	Strip Gully
BS	Bus Stop	SP	Sign Post
BSH	Bus Shelter	SPS	Stone Paving Slabs
CBX	Control Box	SRL	Single Red Line
CDC	CONC Drainage Channel	STN	Survey Station
CEL	Ceiling Level	SWL	Single White Line
CH	Cellar Hatch	SYL	Single Yellow Line
CL	Cover Level	TCB	Telephone Call Box
CONC	Concrete	TL	Top Level
CPS	Concrete Paving Slabs	TP	Telegraph Pole
CTV	Cable TV Valve	TPS	Tactile Paving Slabs
DRL	Double Red Line	TS	Traffic Signal
DWB	Dog Waste Bin	UN	Unmade
DYL	Double Yellow Line	UTL	Unable To Lift
ER	Earthing Rod	VP	Vent Pipe
FB	Flower Bed	WL	Water Level
FH	Fire Hydrant	WV	Water Valve
FL	Floor Level		
G	Gully		
GRS	Granite Setts		
GV	Gas Valve		
H	High		
IC	Inspection Cover		
ICE	IC Electric		
ICG	IC Gas		
ICT	IC Telecom		
ICTC	IC Traffic Control		
ICTV	IC Cable TV		
ICW	IC Water		
IL	Invert Level		
KO	Kerb Outlet		
LB	Litter Bin		
LC	Lighting Column		
MG	Metal Grille		
O/H	Overhead		
P	Post		
PB	Post Box		
PDM	Pay & Display Machine		
PL	Pavement Light		
PM	Parking Meter		
PP	Pedestrian Push-point		
RE	Rodding Eye		
RS	Road Sign		

FENCES & WALLS:

BAW	Barbed Wire		
BBW	Breezeblock Wall		
BP	Brick Pillar		
BRTW	Brick Retaining Wall		
BW	Brick Wall		
CB	Close Boarded		
CI	Corrugated Iron		
CLK	Chain Link		
CP	Chestnut Paling		
CRTW	Concrete Retaining Wall		
CW	Concrete Wall		
HDG	Hoarding		
HR	Handrail		
IR	Iron Railings		
MS	Metal Security		
OB	Open Boarded		
PR	Post & Rail		
PW	Post & Wire		
SR	Steel Railings		
SW	Stone Wall		
TR	Trellis		
WM	Wire Mesh		

TREES:

Oak 10/0.4/12
Species Spread/Diameter/Height
MS x 3 Multi-Bole

NOTES :

The accuracy of this survey drawing is dependent upon the scale at which it is produced. Users should not re-scale this drawing without consent.

All level values refer to the following OSBM:-

North Face of Wall, between 51 and 53 The High Street; Value 17.50m.

The coordinate grid shown on this drawing is related to the Ordnance Survey National Grid via multiple Network RTK GPS observations.

SURVEY STATIONS

Station	East	North	Elevation
1	503585.140	171469.568	15.147
2	503579.753	171496.623	15.637
3	503580.570	171524.594	15.947
4	503608.457	171544.395	15.929
5	503603.568	171561.194	16.137
6	503625.923	171549.891	15.186
7	503644.357	171533.198	15.446
8	503653.100	171503.960	14.983
9	503644.757	171478.305	14.979
10	503611.708	171457.472	14.938
20	503637.622	171498.697	14.989
21	503624.168	171510.591	15.115
22	503615.677	171525.406	15.242
23	503609.832	171535.362	15.423
24	503624.434	171543.684	15.217
30	503601.918	171508.071	14.994
52	503527.241	171457.234	15.443
53	503503.770	171496.710	15.978

DRAWING NO :

3499-1

DATE :	17/3/14	DRAWN :	SV
SHEET NO :	1 of 7	CHECKED :	MAW
SCALE :	1:200	SHEET SIZE :	A0

CLIENT :

Paladin Developments Ltd
2nd Floor, Belgravia House
34-44 Circular Road
Douglas
Isle of Man, IM1 1AE
Tel: 01624 692930

PROJECT TITLE:

Topographic Survey
The Old Telephone Exchange
Elmsleigh Road
Staines-Upon-Thames, TW18 4PN

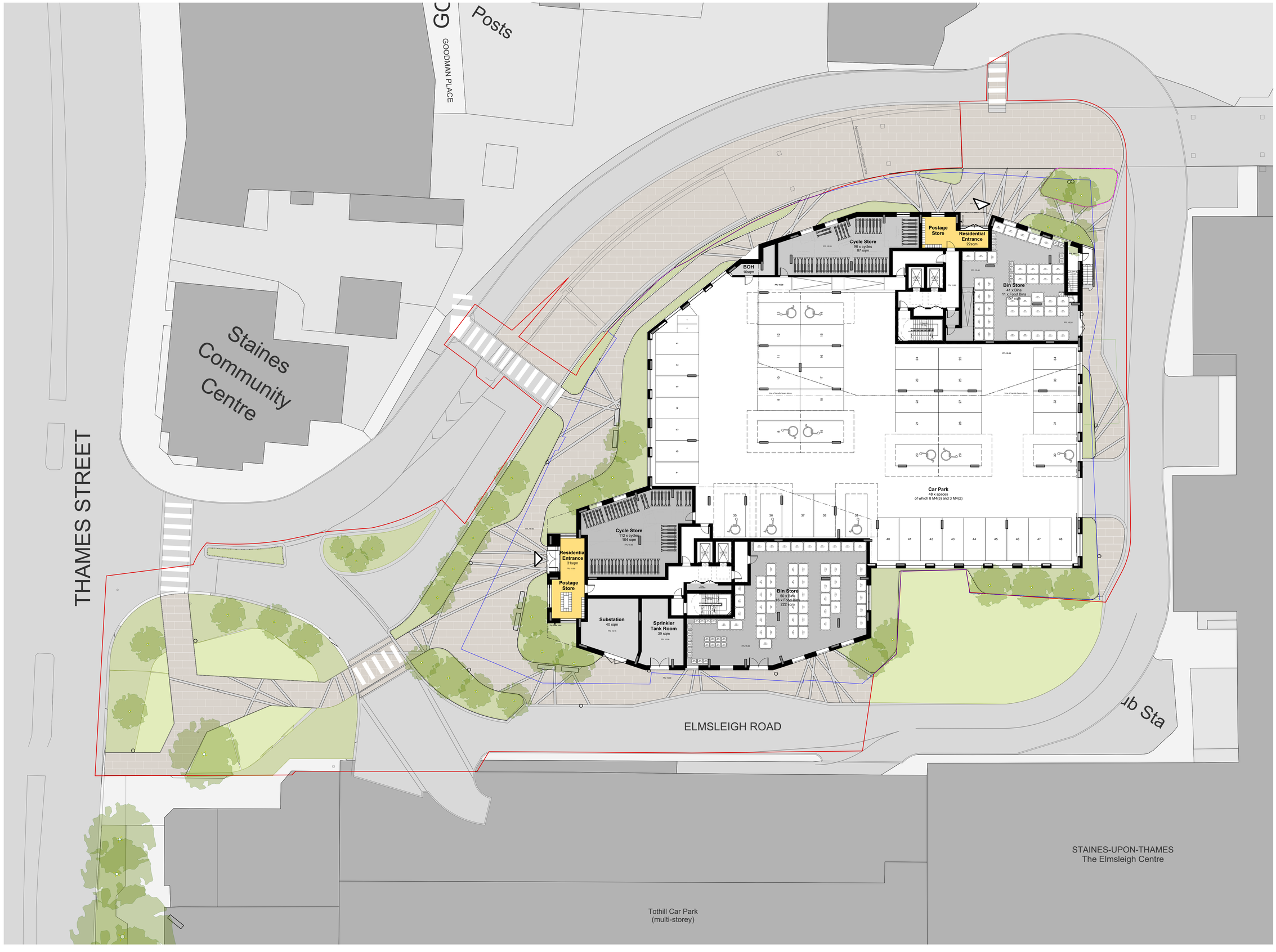
SURVEYED BY :

ALAN RHODES ASSOCIATES
Land & Measured Building Surveyors
8 Hurlingham Studios
Ranelagh Gardens
London SW6 3PA
Tel : 020 7731 0304
Fax: 020 7731 0314
email : office@ara-survey.co.uk

THE SURVEY ASSOCIATION

Appendix (C)

Feasibility Study – Site Layout Plan



0m 1m 5m 10m

N

General notes

All setting out must be checked on site
All levels must be checked on site and refer to Ordnance Datum Newlyn unless alternative Datum given
All fixings and weatherings must be checked on site
All dimensions must be checked on site
This drawing must not be scaled
This drawing must be read in conjunction with all other relevant drawings, specification clauses and current design risk register
This drawing must not be used for land transfer purposes
Calculated areas in accordance with Assael Architecture's Definition of Areas for Schedule of Areas
This drawing must not be used on site unless issued for construction
Subject to survey, consultation and approval from all statutory Authorities

Drawing revision prefix (not applied to sketches):
P =Pre-Contract
C =Contract

Drawing notes

Electronic file reference

AA A3445 200 Plans

Status R:	Revision	Date	DRN	CHK
12	Issued for Planning Submission	24/09/2020	MR	JL

NOTES

- To be read in conjunction with Design and Access Statement and consultant reports.
- Site ownership taken from relevant title deed plans.
- Context taken from OS data.
- All layouts to suit design brief.
- Private and balcony provision as per design brief.
- Spatial requirements to suit relevant nationally described housing standards.
- External landscape design by others.
- All structure, external and internal walls shown in black.
- Refer to compliance plans for furniture and flat layouts. To suit relevant Part M requirements.
- Structure indicative only and subject to change

Application Boundary
Ownership Boundary

Purpose of information

The purpose of the information on this drawing is for:

All information on this drawing is not for construction unless it is marked for construction.

Planning	☒
Information	☐
Comment	☐
Client approval	☐
Construction	☐
Final Issue	☐

Client

Inland Homes

Project title

A3445 - Elmsleigh Road Staines-Upon-Thames

Drawing title

Ground Floor Proposed

Scale @ A1 size: **1:200**

Date: **Jan '20**

Drawing N°

ERS-ASA-ALL-00-DR-A-0200

Revision

R12

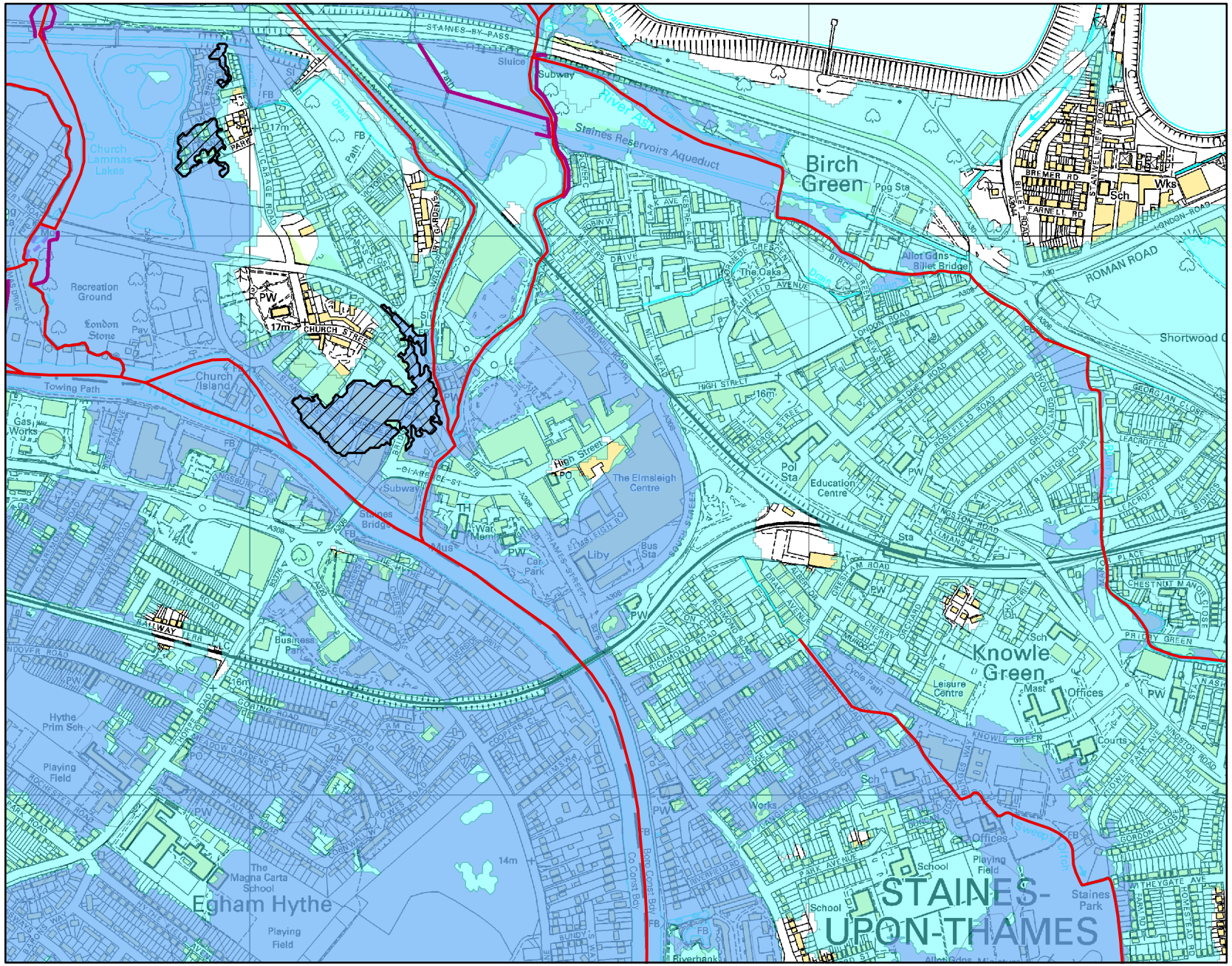
Assael

Assael Architecture Limited
123 Upper Richmond Road
London SW15 2TL
+44 (0)20 7736 7744
info@assael.co.uk
www.assael.co.uk

Appendix (D)

Environment Agency Mapping

Flood Map for Planning (Rivers and Sea) Centred on TW18 4PN
Created on 24 November 2015 REF: WT22431



Environment Agency

Kilometres

0 0.3 0.6

Legend

- Main River
- Flood defences
- Areas benefiting from flood defences
- Flooding from rivers or sea (FZ3)
- Extent of extreme flood (FZ2)
- Flood Map - flood storage areas

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 08708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Appendix (E)

Flood Mitigation Plans

NOTES

1. All dimensions are in metres unless stated otherwise.
2. Do not scale from this drawing. Only written dimensions are to be used.
3. Proposed flood mitigation levels are based on the updated EA fluvial flood model. The 1 in 100 year plus 35% level of 15.753mAOD
4. The Flood Zone 3 level of 15.421mAOD based on update EA flood model

KEY

Ground floor Entrance at 15.80mAOD

Ground Floor Areas Within Flood Zone (i.e. not raised and kept close or below existing ground levels

Ground Floor Areas which can be kept at existing or raised subject to needs of the scheme. Note that if kept below flood level of 15.753mAOD then there will need to be flood resilient measured implemented within these areas

SCALE BAR 1:500 at A1

Rev.	Date	Details	By	Chkd	Appd
C	24.09.20	Planning Issue	TRS	TRS	TRS
B	22.09.20	Site Layout Updated, EA flood level updated	TRS	TRS	TRS
A	23.07.20	Site Layout Updated	PJ	TRS	TRS

Client:- Inland homes

Site:- Elmsleigh Road, Staines

Drawing Title:- Flood Mitigation Layout

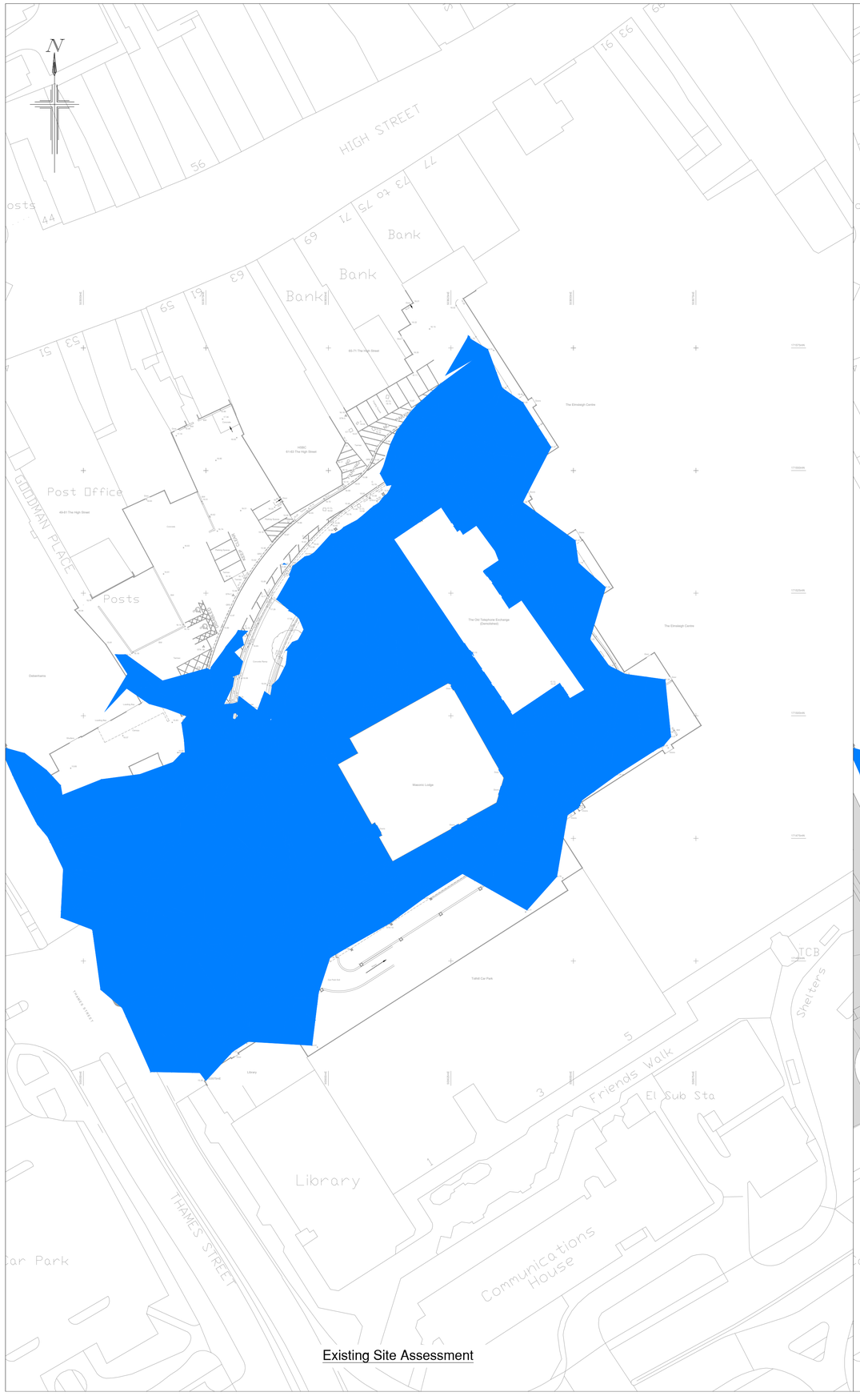
Date: June 2020 | Scales: 1:250 at A1

Drawn: TS | Checked: TS | Approved: TRS

Drawing No. INL/E4445/006 C

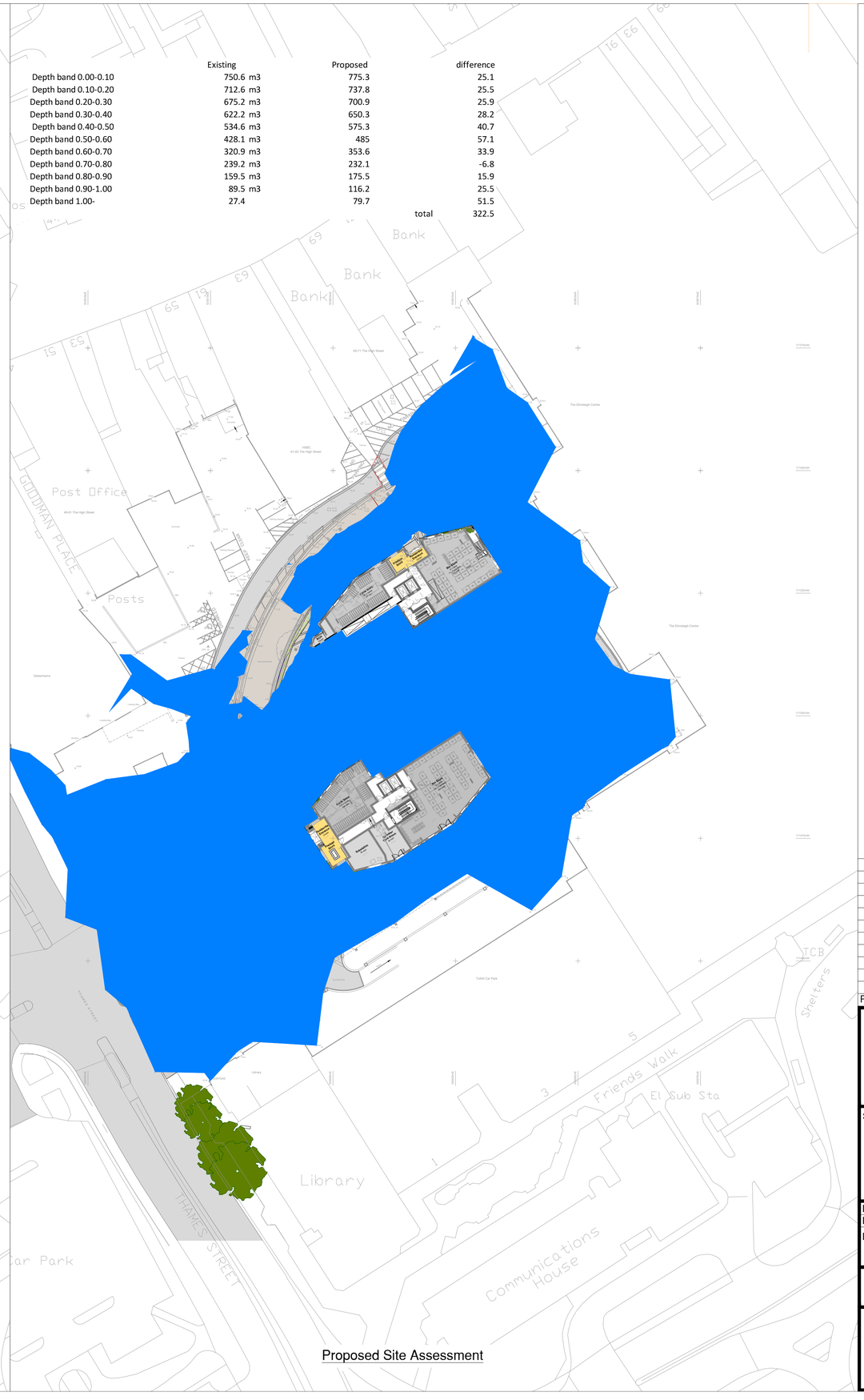
FOR INFORMATION ONLY

Rogers Cory Partnership
Architectural and Civil Consultants
The Old School Old School Road
Hook Hampshire RG27 9NJ
T: 01256 769269 E: mail@rcpconsultants.co.uk W: rcpconsultants.co.uk



Existing Site Assessment

	Existing		Proposed	difference
Depth band 0.00-0.10	750.6	m3	775.3	25.1
Depth band 0.10-0.20	712.6	m3	737.8	25.5
Depth band 0.20-0.30	675.2	m3	700.9	25.9
Depth band 0.30-0.40	622.2	m3	650.3	28.2
Depth band 0.40-0.50	534.6	m3	575.3	40.7
Depth band 0.50-0.60	428.1	m3	485	57.1
Depth band 0.60-0.70	320.9	m3	353.6	33.9
Depth band 0.70-0.80	239.2	m3	232.1	-6.8
Depth band 0.80-0.90	159.5	m3	175.5	15.9
Depth band 0.90-1.00	89.5	m3	116.2	25.5
Depth band 1.00-	27.4		79.7	51.5
			total	322.5



Proposed Site Assessment

NOTES

1. All dimensions are in metres unless stated otherwise.
2. Do not scale from this drawing. Only written dimensions are to be used.
3. Site layout based on Assael Architecture ground floor plan (ERS-ASS-ALL-00-DR-A-0200-P12)
4. Existing ground levels based on Topographic Survey Drawing by Alan Rhodes Associates 3499-1, dated 17/3/2014

KEY

Site Boundary

1 in 100 year plus 35% fluvial flood extent (15.753mAOD)

0m 10m 20m 40m 60m 80m 100m

SCALE BAR 1:500 at A1

Rev.	Date	Details	By	Chkd	Appd
A	24.09.20	Planning Issue	TRS	TRS	TRS

Client:- Inland homes

Site:- Elmsleigh Road, Staines

Drawing Title:- Flood Level Compensation Assessment

Date: September 2020 | Scales: 1:500 at A1

Drawn: TRS | Checked: TRS | Approved: TRS

Drawing No. INL/E4445/007A

FOR INFORMATION ONLY

RCP ARCHITECTURE & CIVIL ENGINEERING
Rogers Cory Partnership
Architectural and Civil Consultants
The Old School Old School Road
Hook Hampshire RG27 9NJ
T: 01256 769269 E: mail@rcpconsultants.co.uk W: rcpconsultants.co.uk