



Drainage Strategy Report

C200810-PIN-XX-XX-RP-C-02

Havant, 32 New Lane

9 February 2021

Prepared for:

Havant Property Investment LLP

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Number	By	Date	Context
1.0	Iran Limbu	21.01.2021	First issue
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1 INTRODUCTION

Pinnacle Consulting Engineers Ltd have been commissioned by Havant Property Investment LLP to carry out a Drainage Strategy (DS) for a proposed development of a site at 32 New Lane, PO9 2NG. A site location plan is enclosed in Appendix A.

The purpose of this report is to demonstrate that a viable and sustainable strategy for the management and disposal of surface water runoff with climate change allowances and foul water discharge for the development can be achieved.

1.1 Site description

The proposed development is located at 32 New Lane, Havant, Hampshire, PO9 2NG (National Grid Reference SU 72466 07236). The site is a brownfield site and lies within an Industrial Estate on the east side of New Lane with a total developable area of approximately 6.78ha.

The site is bounded to the north by Havant industrial area, to the east by railway line, to the south by industrial and commercial premises and to the west by New Lane road (see Figure 2.1 below). A watercourse is located approximately 60m from the site.



Figure 1: Aerial View of the existing development site (approximate site boundary edged red)

1.2 Topography

The development site falls generally from north east to south west direction, with ground levels across the site varying between approximately 16.20m and 13.03m Above Ordnance Datum (AOD) (see Appendix B).

1.3 Geology

Geological conditions at the site are detailed below in Table 1.1 and are based on a British Geological Survey (BGS) maps found online.

Formation	Description
Artificial Ground (Made Ground)	No artificial deposits have been delineated within the site on the BGS site maps. However, given the site is brownfield, the likelihood is that Made Ground will be present.
Superficial Deposits (Drift Deposits)	River Terrace Deposits (Undifferentiated- Sand, Silt and Clay) Superficial Deposits formed up to 3 million years ago in the Quaternary Period. Local environment previously dominated by rivers. These sedimentary deposits are fluvial in origin. They are detrital, ranging from coarse- to fine-grained and form beds and lenses of deposits reflecting the channels, floodplains and levees of a river or estuary (if in a coastal setting). Head– Clay and Gravel. Superficial Deposits formed up to 3 million years ago in the Quaternary Period. Local environment previously dominated by subaerial slopes. These sedimentary deposits are subaerial in origin. They are detrital, comprising coarse- to fine- grained materials, forming down-slope layers and fans of accumulated material.
Bedrock	London Clay formation- Clay, Silt and Sand. Sedimentary Bedrock formed approximately 48 to 56 million years ago in the Palaeogene Period. Local environment previously dominated by deep seas. These sedimentary rocks are marine in origin. They are detrital and comprise coarse to fine grained slurries of debris from the continental shelf flowing into a deep-sea environment, forming distinctively graded beds.

Table 1.1 – Geological Ground Conditions

1.4 Proposed Development

The development proposes to redevelop the site and use it as a storage and distribution facility, where parcels are delivered via small vans to customers in the local area. The proposal includes a centrally located warehouse building and a decked storage area which will house the fleet of commercial vehicles overnight while drivers are not on deliveries (see Appendix C).

2 EXISTING SITE DRAINAGE

The drainage survey enclosed in Appendix D delineates all observed surface water and foul networks within the site. The surface water runoff from the existing site discharges off site via 4 different connections into the public surface water sewer located in New Lane. Similarly, the existing foul water network is shown to discharge into the public foul water sewer in New Lane.

The existing surface water runoff is collected using an assortment of various devices including road gullies, rainwater downpipes and channels. Moreover, two surface water attenuation tanks can be observed within the existing drainage networks. One of the existing surface water networks utilises a pump chamber to convey the surface water runoff from the site. It is noted that no existing Sustainable Drainage Systems (SUDS) have been identified within the site, indicating the site discharges freely to the public sewer network.

3 PROPOSED SITE DRAINAGE

3.1 Surface Water Discharge Location

Traditional approaches to urban drainage have comprised of underground tanks and pipe networks. More recently, the benefits and opportunities to use Sustainable Drainage Systems (SuDS) have been realised and encouragement to use such systems is promoted throughout Flood Risk Management policy at all levels. SuDS is a term which encompasses a variety of approaches to managing surface water in a way which is more sympathetic to the natural and human environment than conventional piped drainage systems. Management of surface water is an essential element for reducing flood risk and SuDS techniques are often designed to achieve this in a way that mimics the natural environment.

The Building Regulations (H3) states the priority for discharging surface water runoff from a development is as follows:

1. Infiltration into the ground;
2. Discharge into a watercourse;
3. Discharge into a sewer.

In conjunction with Building Regulations H3, the primary approach to the drainage of surface water runoff must be subject to the results of an infiltration test (conducted in accordance with BRE365 guidance) commissioned on the development site, winter ground water level monitoring and the availability of good infiltration media at the proposed soakaway locations. A site-specific infiltration test (conducted in accordance with BRE365 guidance) will be commissioned on the development site to establish the suitability of the infiltration approach. However, the site is located within 'Zone 1-Subsurface Activity' Ground Water Source Protection Zone (refer to section 2.4 of the FRA report produced by Pinnacle Consulting Engineers), which is designated as most at risk from contamination and development activities. Moreover, based on the geological profile in Table 1.1 and the existing drainage network on site, infiltration is not proposed to be a suitable solution for this site, and therefore alternative discharge methods will be required.

The next method of discharge in conjunction to Building Regulation H3 would be to discharge into the nearest watercourse. No opportunity exists to discharge into watercourse as the nearest watercourse is located at approximately 60m away from the north west site boundary; beyond New Lane road and residential properties.

This report therefore proposes to discharge the surface water runoff from a development into the existing public surface water network. Discharge into the existing network is deemed more practical, in this case, as the existing site has existing connections to the nearby public sewer under New Lane road.

3.2 Local Policy

The Local Plan (Core Strategy) was adopted by the Havant Borough Council in March 2011. An extract of the flood risk management policy is included below.

Policy CS15 Flood and Coastal Erosion Risk

Development in areas at risk of flooding now and in the future as identified on the latest Environment Agency flood risk maps and Strategic Flood Risk Assessment climate change maps will only be permitted where:

1. *It meets the sequential and exception test (where required) in relation to PPS25.*
2. *The site is located in a low hazard area as defined in the Strategic Flood Risk Assessment.*

3. *A site-specific flood risk assessment demonstrates that the development will be safe, including the access, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.*
4. *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.*
5. *Appropriate flood warning and evacuation plans are in place.*
6. *New site drainage systems are designed taking account of events which exceed the normal design standard.*

All development will be required to ensure that there is no net increase in surface water run off. Priority should be given to incorporating Sustainable Drainage Systems (SuDS) to manage surface water drainage, unless it is proven that SuDS are not appropriate. Where SuDS are provided arrangements must be put in place for their whole life management and maintenance.

The council will work with partners to implement the Coastal Policy Zones in the North Solent Shoreline Management Plan to ensure that development avoids areas at risk from coastal erosion and coastal flooding and that areas required to offset coastal squeeze and prevent habitat fragmentation, to allow species to adapt to climate change, are identified and protected from development.

A pre- submission version of the Havant Borough Local Plan with changes was published in September 2020 and is expected to be submitted to the Secretary of State after consultation. Extracts of all relevant drainage and flood risk management policies are included below.

Policy E19 Managing flood risk in new development

Planning permission will only be granted where:

- a. *The proposal meets the sequential and exception tests as set out in the NPPF and relevant local guidance;*
- b. *The development will be safe over its lifetime without increasing flood risk elsewhere;*
- c. *Any proposed flood protection, resilience and resistance measures address the specific requirements of the site, and are appropriate to the character and biodiversity of the area;*
- d. *Opportunities have been explored to reduce flood risk;*
- e. *Where necessary, appropriate flood warning and evacuation plans are in place; and*
- f. *Where necessary, a contribution has been made towards any identified flood alleviation scheme(s).*

Policy E20 Drainage infrastructure in new development

Planning permission will only be granted where:

- a. *Run-off rates have been reduced to below the pre-development rate, or, if this is not possible, there is no net increase in surface water run-off compared with the pre-development rate;*
- b. *Drainage systems meet the drainage needs of the development in full over the lifetime of the development and do not increase flood risk elsewhere;*
- c. *The drainage strategy incorporates SuDS, unless there is clear evidence that this would be inappropriate;*
- d. *Arrangements have been made between the applicant and the service provider for the timely delivery of sewerage network reinforcement; and*

- e. *Any existing sewerage infrastructure is taken into account in site layout, to safeguard future access for maintenance and upsizing purposes.*

3.3 Proposed Development Runoff Rate

The brownfield runoff rate calculated using the Modified Rational Method was 790l/s. As part of our proposal, a rate of 395l/s (a 50% betterment) has been proposed to discharge into the existing network. This is subject to approval from Southern Water.

3.4 Proposed Development Surface Water Drainage Strategy

The proposed development plan necessitates demolition of existing structures and construction of new development. The surface water runoff from the proposed impermeable areas in catchment A, B, C, D, E and F (total impermeable area of 56,960m²) will be collected into three separate networks (see Appendix E). The surface water runoff from the existing footpath along the western site boundary will flow into the surrounding landscaping. It is also noteworthy to mention there is a significant increase in permeable areas from 4,897m² to 10,105m² (over 106%) (see Appendix F).

Due to the nature of the development, most of the site is impermeably surfaced and opportunities for SuDS features are limited. Car parking bays are to be permeable block paving. The surface water runoff from van parking areas, loading docks and the access road will pass through linear drainage channels, gullies and filtered through the petrol interceptor before they enter the designated cellular storage tanks. Petrol interceptor will prevent potential contaminants that are present in the form of hydrocarbons from oil spillages from reaching into the underground storage tanks. Flows will then be restricted to prescribed discharge rates by using flow control devices (hydrobrakes) before conveyed through the proprietary ACO Quadrceptor, providing a level of treatment to surface water flows before discharging into the two outfall points within New Lane. A Pump chamber will be required for the proposed surface water network collecting runoff from catchment A, whereas rest of the surface water runoff will be conveyed through a gravity piped network. See Appendix G for the proposed drainage plan.

The attenuation volume required for the proposed development has been modelled in MicroDrainage using the 'Source Control' programme (see Appendix H). Based on calculations designed to meet the storage demand for all events up to and including a 1 in 100 years + climate change event (20%), a total attenuation storage capacity of 2031m³ (including storages from permeable paving, 427.50m³ and existing attenuation tank located at south with assumed storage volume, 10.10m³) will be required for the total site. At this stage, our design assumes that this southern tank is suitable to be reused as part of the proposed design; however, this will need verification through on-site investigation. The existing northern tank is not currently considered suitable for reuse at this stage, however, if through further site investigation it becomes possible to incorporate in the design then this will be attempted.

3.5 Proposed Development Foul Water Drainage Strategy

The foul flows generated from the proposed site will be discharged into the public foul water sewer located under New Lane. A pre-development enquiry to Southern Water has been submitted to confirm whether their foul water sewers have sufficient capacity to accommodate the increased intake from the proposed additional sanitary appliances.

3.6 Pre- application submission

A formal pre- application for the proposed development was submitted to the Environmental agency, Portsmouth Water and Southern Water. All responses received are enclosed in Appendix I.

3.7 Maintenance Requirements

It is anticipated that a private management company will be employed to maintain the completed drainage network for the development incorporating the following activities and frequency for each SUDS component.

3.7.1 Gullies/Channels/Pipes/Manholes

All components are to be periodically cleaned of foreign particles and silt accumulation, on a quarterly basis. Components located in unadopted areas will be maintained by the landowner. Those located in adopted areas will be maintained by the adopting authority.

3.7.2 Oil Separators/ Petrol Interceptors

Units are to be inspected at least every six months in accordance with the manufacturer's recommendations. A log should be kept detailing the depth of oil found, any oil volume and silt removed, or cleaning carried out. Alarm probes should be removed and cleaned at each inspection.

3.7.3 Attenuation Tank

The proposed attenuation tank includes a perforated/ slotted distribution pipe surrounded by granular material providing filtration and treatment for surface water flows. This in conjunction with the proposed catchpit manhole (silt trap) is considered appropriate for the scale and nature of the development.

TABLE 21.3 Operation and maintenance requirements for attenuation storage tanks

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

3.7.4 Pervious pavements

Many of the specific maintenance activities for pervious pavements can be undertaken as part of a general site cleaning contract. A guidance on the type of operational and maintenance requirements is detailed below in table 20.15 from the CIRIA SuDS manual.

TABLE 20.15 Operation and maintenance requirements for pervious pavements

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
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, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to 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	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

3.7.5 Proprietary Systems

Proprietary systems will require routine maintenance by the owner to ensure continuing operation to design performance standards. A typical maintenance schedule is detailed below in table 14.2 from the CIRIA SuDS manual.

TABLE 14.2 An example of operation and maintenance requirements for a proprietary treatment system

Maintenance schedule	Required action	Typical frequency
Routine maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect filter media and establish appropriate replacement frequencies	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months

4 CONCLUSION

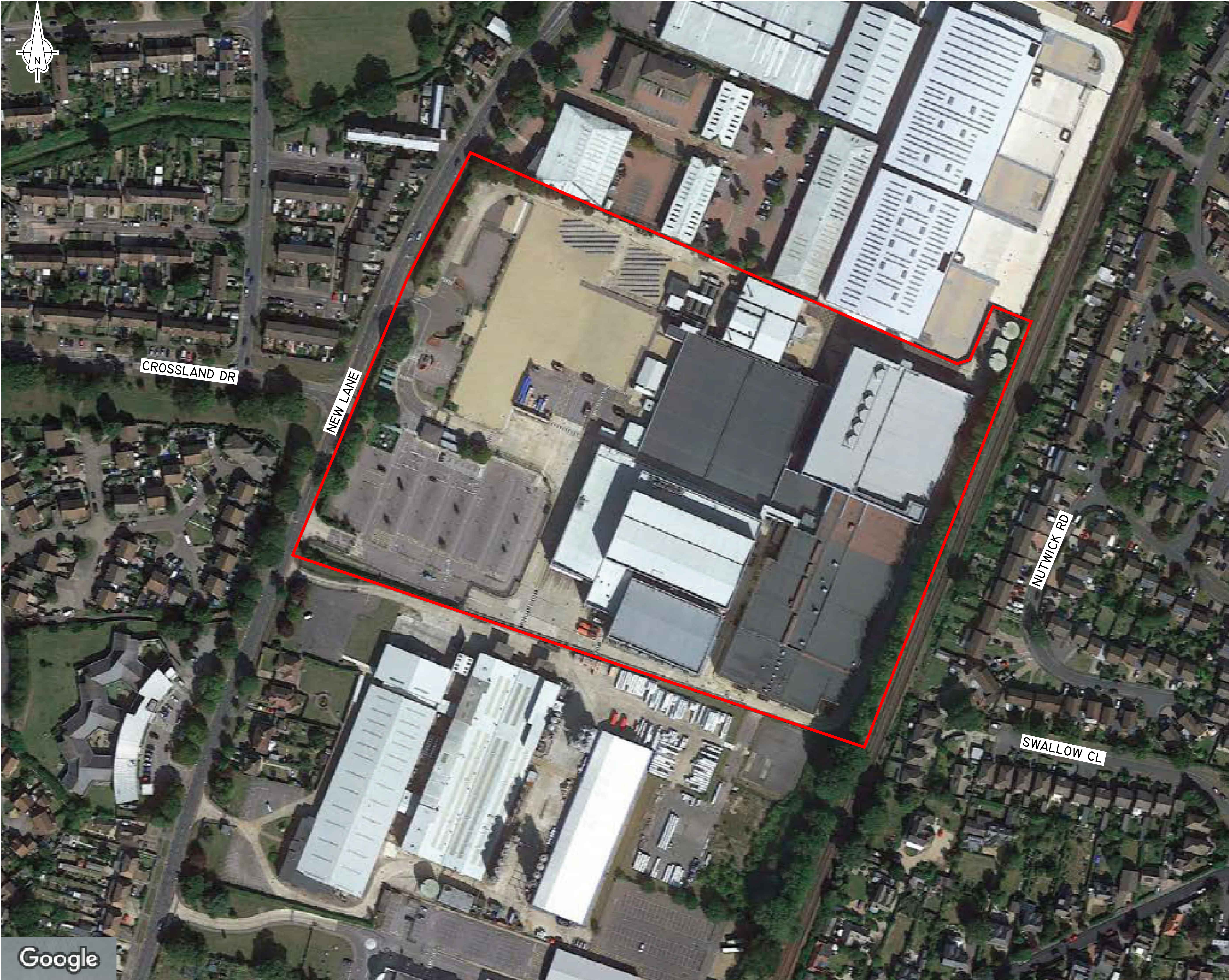
In summary:

- The proposed development is located at 32 New Lane, Havant, Hampshire, PO9 2NG (National Grid Reference SU 72466 07236).
- The site is a brownfield site and lies within an Industrial Estate on the east side of New Lane with a total developable area of approximately 6.78ha.
- The development site falls generally from north east to south west direction, with ground levels across the site varying between approximately 16.20m and 13.03m Above Ordnance Datum (AOD).
- The proposed development proposes to redevelop the site and use it as a storage and distribution facility, where parcels are delivered via small vans to customers in the local area. The proposal includes a centrally located warehouse building and a decked storage area which will house the fleet of commercial vehicles overnight while drivers are not on deliveries.
- The drainage survey in Appendix D delineates all observed surface water and foul networks within the site. The surface water runoff from the existing site discharges off site via 4 different connections into the public surface water sewer located in New Lane. Similarly, the existing foul water network is shown to discharge into the public foul water sewer in New Lane. It is of note that no existing Sustainable Drainage Systems (SUDS) have been identified within the site, indicating the site discharges freely to the public sewer network.
- A site-specific infiltration test (conducted in accordance with BRE365 guidance) will be commissioned on the development site to establish the suitability of the infiltration approach.
- The site is located within 'Zone 1- Subsurface Activity' Ground Water Source Protection Zone (refer to section 2.4 of the FRA report produced by Pinnacle Consulting Engineers), which is designated as most at risk from contamination and development activities. Moreover, based on the geological profile in Table 1.1 and the existing drainage network on site, infiltration will not be suitable for this site, and therefore alternative discharge methods will be required.
- No opportunity exists to discharge into watercourse as the nearest watercourse is located at approximately 60m away from the north west site boundary; beyond New Lane road and residential properties.
- This report therefore proposes to discharge the surface water runoff from a development into the existing public surface water network. Discharge into the existing network is deemed more practical, in this case, as the existing site has existing connections to the nearby public sewer under New Lane road.
- The brownfield runoff rate calculated using the Modified Rational Method was 790l/s. As part of our proposal, a rate of 395l/s (a 50% betterment) has been proposed to discharge into the existing network. This is subject to approval from Southern Water.
- The surface water runoff from the proposed impermeable areas in catchment A, B, C, D, E and F (total impermeable area of 56,960m²) will be collected into three separate networks.
- Due to the nature of the development, most of the site is impermeably surfaced and options for SuDS features are limited. Car parking bays are to be permeable block paving. The surface water runoff from van parking areas, loading docks and the access road will pass through linear drainage

channels, gullies and filtered through the petrol interceptor before they enter the designated cellular storage tanks. Petrol interceptor will prevent potential contaminants that are present in the form of hydrocarbons from oil spillages from reaching into the underground storage tanks. Flows will then be restricted to prescribed discharge rates by using flow control devices (hydrobrakes) before conveyed through the proprietary ACO Quadrceptor, providing a level of treatment to surface water flows before discharging into the two outfall points within New Lane. A Pump chamber will be required for the proposed surface water network collecting runoff from catchment A, whereas rest of the surface water runoff will be conveyed through a gravity piped network.

- Our assessment is that a total attenuation storage capacity of 2031m³ is required for the proposed design. This will be provided through e.g., permeable paving, existing southern attenuation tank and other proposed storage tanks. At this stage, the existing northern tank is not proposed for reuse.
- The foul flows generated from the proposed site will be discharged into the public foul water sewer located under New Lane. A pre-development enquiry to Southern Water has been submitted to confirm whether their foul water sewers have sufficient capacity to accommodate the increased intake from the proposed additional sanitary appliances.

Appendix A – Site Location Plan



CROSSLAND DR

NEW LANE

NUTWICK RD

SWALLOW CL

GENERAL NOTES

- DO NOT SCALE THIS DRAWING. WORK ONLY TO FIGURED DIMENSIONS.
- FOR ALL RELEVANT NOTES, REFER TO STRUCTURAL AND CIVIL ENGINEERING PERFORMANCE SPECIFICATION.
- ANY DISCREPANCIES ARE TO BE REPORTED TO PINNACLE CONSULTING ENGINEERS IMMEDIATELY.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS, ARCHITECTS AND SUB-CONTRACTORS DRAWINGS AND DETAILS.

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P03	UPDATED SITE BOUNDARY	SC	SG	09.02.21
P02	UPDATED GOOGLE MAP	IL	SG	22.01.21
P01	FOR INFORMATION	SC	SG	12.01.21
REV	DESCRIPTION	BY	CHK	DATE

CLIENT
HAVANT PROPERTY
INVESTMENT LLP

PROJECT
HAVANT
32 NEW LANE

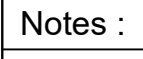
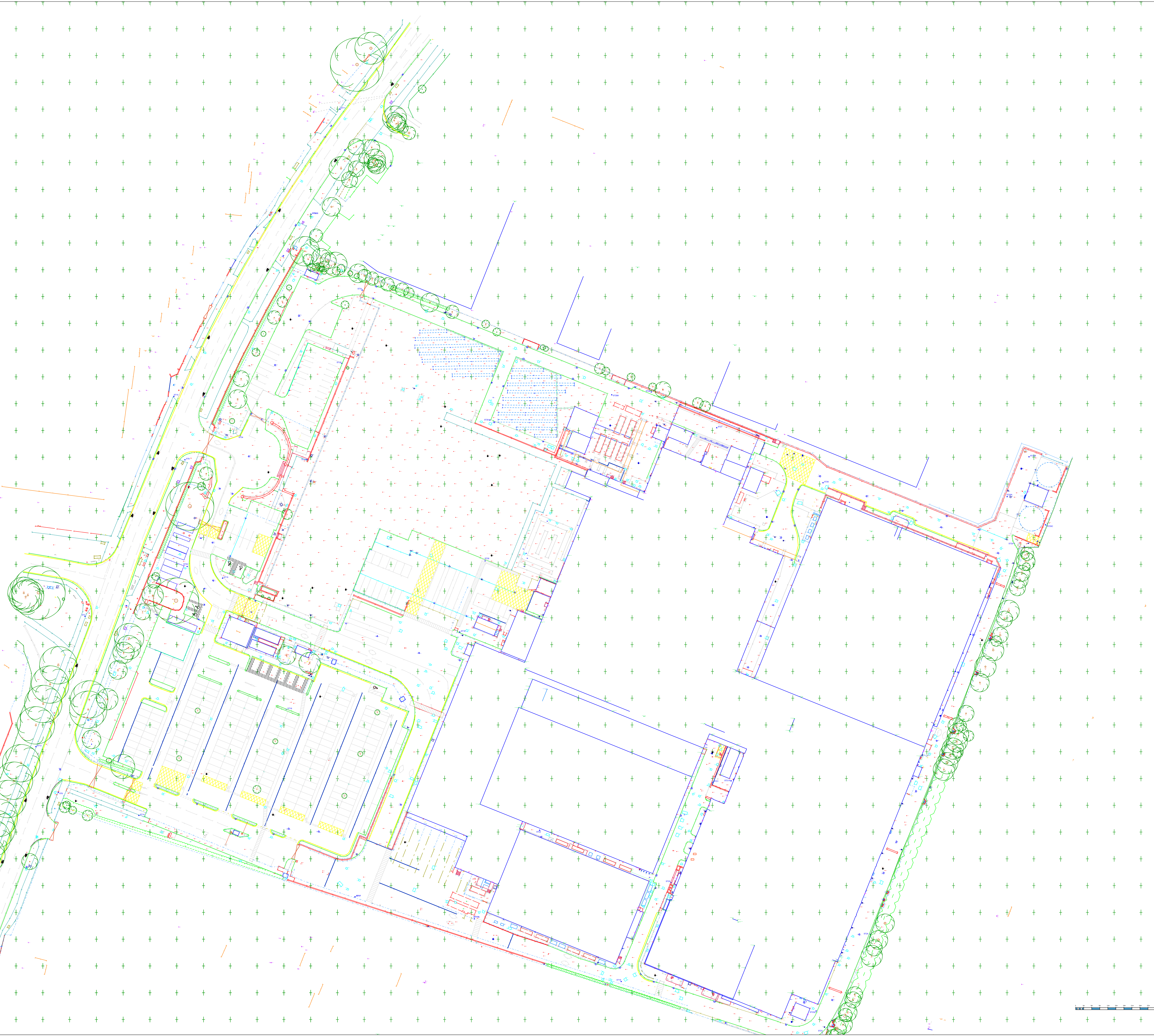
DRAWING TITLE
SITE LOCATION PLAN

PINNACLE
CONSULTING ENGINEERS

ALCHEMY,
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AL7 1HE. TELEPHONE: 01707 527 630
NORWICH LONDON DUBLIN THE HAGUE

DRAWING STATUS			
FOR INFORMATION			
SCALE @ A1	DATE	DRAWN BY	CHECKED
NTS	JAN' 21	SC	SG
DRG NO.	REVISION		
C200810-PIN-XX-XX-DR-C-201	P03		

Appendix B – Topographical Survey



All Stations are marked with a MAG Survey Nail or Hilli Nail.

ON FENCES/WALLS/DIVISIONS
B/W Barbed Wire Fence

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[illegible]

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Bath: 01225 314370 - London: 02039 066892

32 New Lane,
Havant, Hampshire, PO29 2NG.

File Name:
SB5421-TOPO

Drawing Title :
Topographical Survey Of New Lane
Sheet (SITE NORTH)

Client:
Kingsbridge Estates

Date	26/01/2021
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Scale
A0 @ 1:500

Grid Orientation:	Site Level Datum
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Grid Orientation:	Site Level
North GPS	OS GPS

OS GPS

All dimensions are to be checked on site where applicable. This drawing must not be scaled, and only written dimensions should be respected.



Tree species and sizes on this drawing are not guaranteed, and if critical should be verified by an arboriculturist. Tree spreads are average about the bole, and heights are approximate at the time of the survey.

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