Site & Location	One YMCA 90 Peartree Lane, Welwyn Garden City, Hertfordshire AL7 3UL	Report No: 10637/AOC

Site photographs

Photo No 13

Description:

View of Bin area adjacent to building

Direction:
Looking W

Date:
June 2021

Photo No 14

Description:

Transformer adjacent to NW corner of site boundary within light industrial area

Direction:
Looking W

Date:
June 2021

Site & Location	One YMCA 90 Peartree Lane, Welwyn Garden City, Hertfordshire AL7 3UL	Report No: 10637/AOC

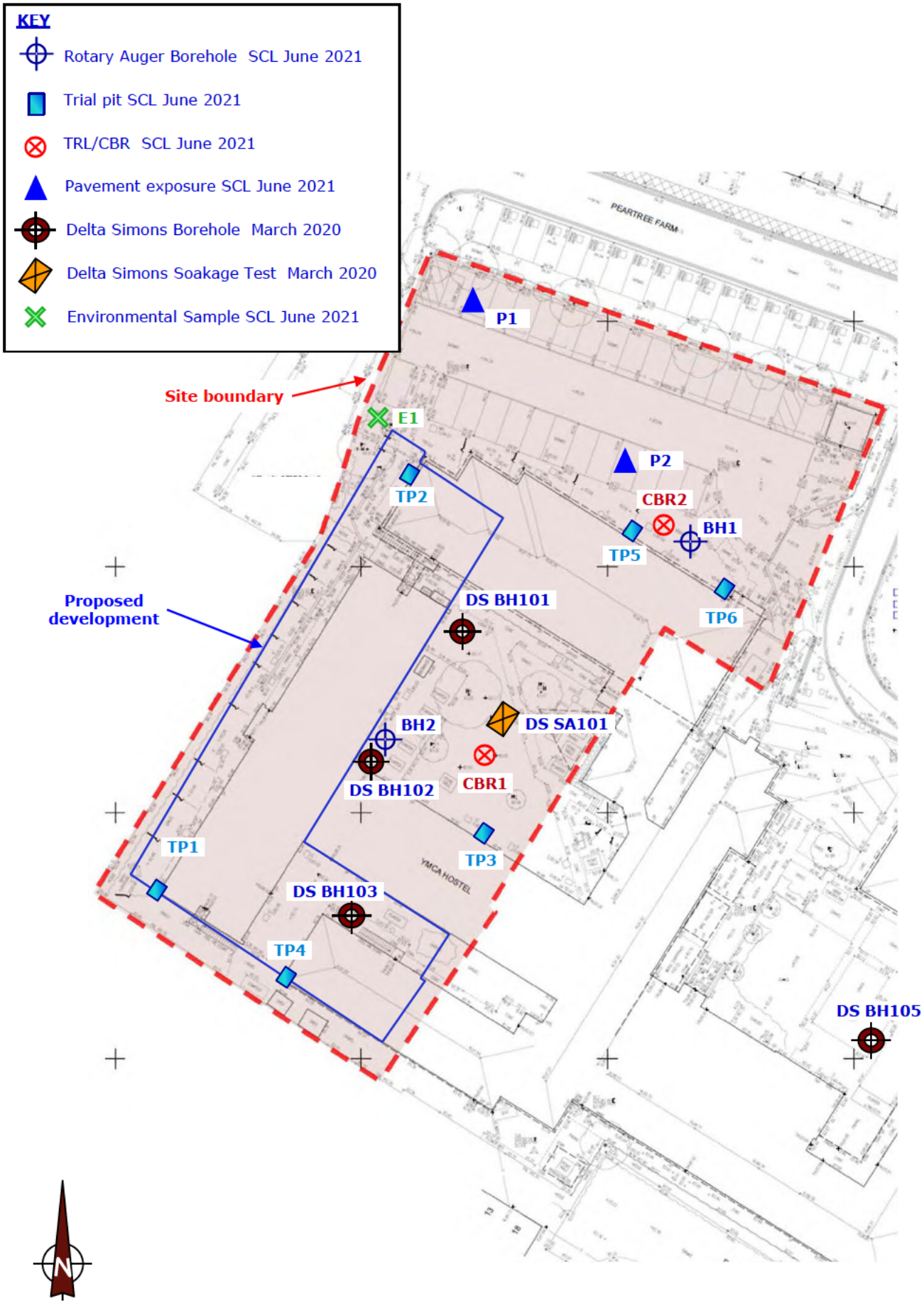
Aerial Photograph showing Photograph Locations

Site & Location	**One YMCA** **90 Peartree Lane, Welwyn Garden City, Hertfordshire AL7 3UL**	Report No: **10637/AOC**

Aerial Photograph showing key features

Site & Location	Report No:
One YMCA **90 Peartree Lane, Welwyn Garden City, Hertfordshire AL7 3UL**	10637/AOC

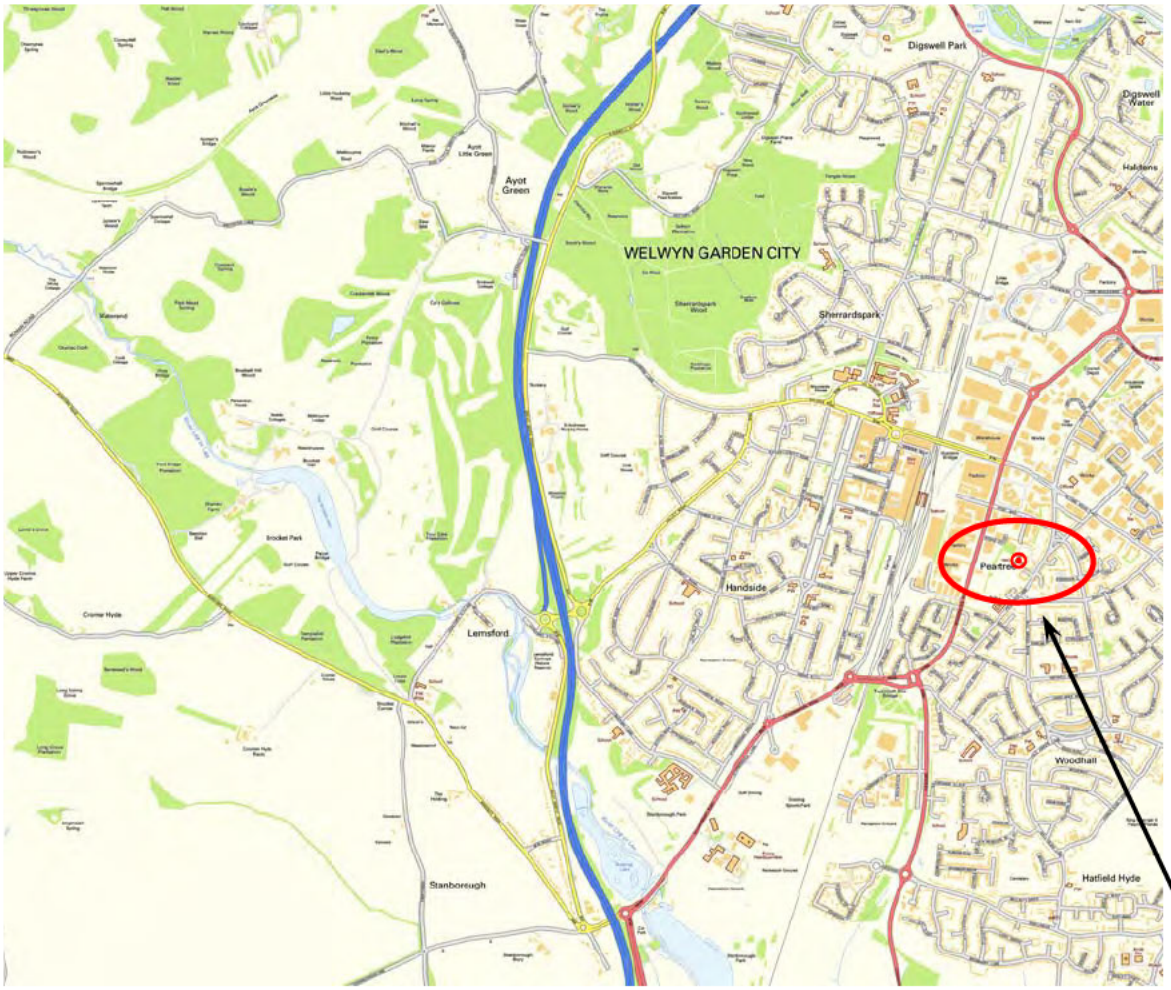
Site Plan



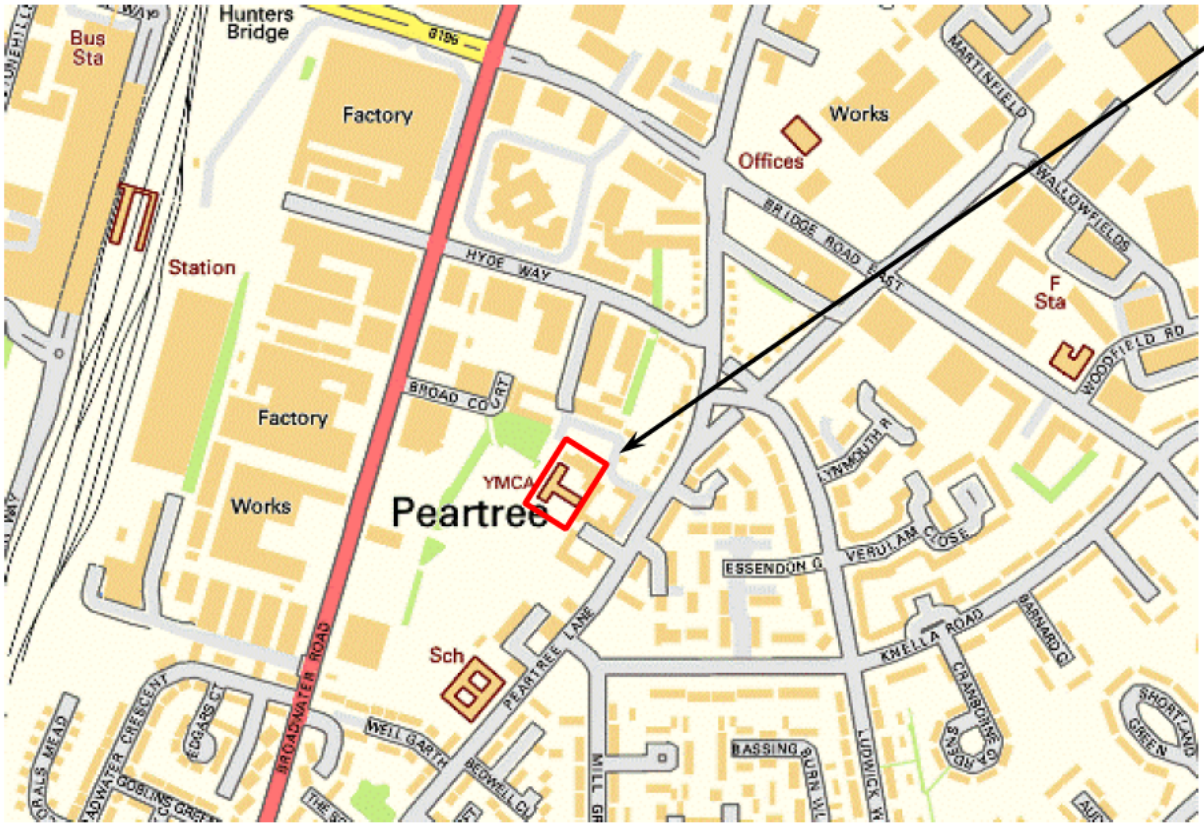
Soil Consultants

S te & Locat on	**One YMCA, 90 Peartree Lane, Welwyn Garden City, Hertfordshire AL7 3UL**	Report No: **10637/AOC**

Location Plan



SITE LOCATION



APPENDIX B

- Argyll Environmental Desk Study Report (Ref AEL-04460TSC-959119, Dated 7th December 2018)

SiteSolutions Combined

Contaminated Land
PASSED ✔

Flooding
PASSED ✔

Argyll's Overview

Contaminated Land : No significant contaminant linkage has been identified. Accordingly soil and groundwater liabilities are unlikely to occur. No further action with respect to contaminated land Liability is required.

Flood Risk : The Site is not considered to be at a significant risk of flooding and buildings and contents insurance should be available and affordable.

Environmental Hazards : No other Environmental Hazards have been identified in the immediate vicinity of the Site.

Operational Permits : No authorisations, licences, consents or enforcements have been identified at or within 25m of the Site.

Report on:

Central Herts YMCA 90, Peartree Lane, Welwyn Garden City, Hertfordshire, AL7 3UL

Report prepared for:
Bates Wells & Braithwaite

Client Reference:
211511/0035/RRcs

Report Reference:
AEL-0446-TSC-959119

National Grid Reference:
524407,212599

Report date:
7th December 2018

Site Location

Report prepared on

Central Herts YMCA 90, Peartree Lane, Welwyn Garden City, Hertfordshire, AL7 3UL

Site Area (m^2)

6773.22

Current Use

Residential/Commercial

Proposed Use

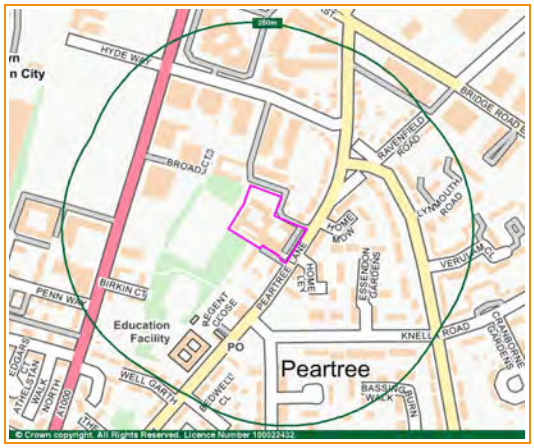
Residential/Commercial

Report Author

Tom Leckey BSc (Hons) FRGS
Telephone: 0845 458 5250
E-mail: orders@argyllenviro.com

Additional Information Provided

-



Executive Summary

Risk	Evaluation
Contaminated Land	Passed

Liability Assessment

Within the scope of this assessment no Liabilities have been identified. No further action is required.

What is the overall on-site risk?	Low to Moderate
What is the overall off-site risk?	Moderate
What is the environmental sensitivity rating?	Moderate to High

Recommendations

None required.

Risk	Evaluation
Flooding	Passed

Consultant's Comment

The site is not considered to be at significant risk of flooding. No further action is considered necessary. However, it would be prudent to consider the measures outlined in the Recommendations section.

1	If development is proposed would a detailed Flood Risk Assessment be required?	No
2	What is the overall risk of flooding, assuming defences fail or are absent or over-topped?	Low to Moderate
3	Are there existing flood defences that might benefit the Site?	No

Insurance

The flood risk identified is unlikely to affect obtaining buildings and contents insurance.

Recommendations

1. You should speak to the seller to confirm whether the property or the surrounding area has flooded before. If it has, please contact us for advice.
2. Prior to exchanging contracts, establish the terms of buildings and contents insurance for the property.

Contaminated Land Risk Analysis

Investigation	Commentary
On-site sources	A review of historical maps indicates the Site formed part of Peartree Farm in the first map edition, dated 1878, with associated farmyard buildings noted in the north. The Site remained in this use until c.1938, when a Youth Hostel and club had been constructed in the south. Alterations to the layout of the farmyard were noted c.1985, with no significant changes observed until c.1999, when the farmyard buildings were cleared and the entire Site was in use as a youth hostel. No significant further changes were noted. We have been informed by the client that the Site is currently in residential/commercial use and that it will continue in this use without redevelopment.
Argyll's Comment	As a result of the historical and current use of the Site, there is a **low to moderate risk** of contaminants being present.
Off-site sources	A review of historical maps has revealed a number of historical or current potentially contaminative uses within a 100m radius from c.1938. These include: numerous factories and works, most notably a chemical works 30m north, a garage, warehouse, and a corporation yard. According to trade directories, current or recent operations in proximity to the Site include tyre repairs and retreading (23m north), garage services (24m north), car body repairs (24m north), domestic appliances - servicing, repairs and parts (24m north), precision engineers (24m north), garage services (24m north), and precision engineers (47m north west). In addition the following licences, consents and authorisations of note were identified: . a Registered Waste Treatment or Disposal Site (160m west). Furthermore, the following waste sites were identified which may be able to impact upon the Site: a Registered Landfill Site (196m north west) accepting and aqueous effluent waste, industrial effluent treatment sludge operational on 19th June 1979.
Argyll's Comment	The historical and current use of the surrounding area is therefore considered to present a **moderate risk** of affecting the Site.
Pathways and receptors	With reference to Environment Agency data, the superficial hydrogeology underlying the Site is classified as a Secondary (A) Aquifer (deposits with moderate permeability), and a Secondary (Undifferentiated) Aquifer (deposits with variable/limited permeability) and the bedrock hydrogeology is classified as a Principal Aquifer (highly permeable formations). In terms of the overlying soils, these are given a U (class U) vulnerability classification. According to the Environment Agency the Site lies within a Zone III Source Protection Zone (SPZ). An SPZ is a protection zone placed around a well or borehole that supplies groundwater of potable quality. There are five abstraction licences located within 1000m. The closest of these are a groundwater abstraction (361m west) for chemicals: process water use. The nearest water feature is located 242m south west. The general area appears to be largely in commercial use. No designated eco-receptors were identified within a 1000m radius of the Site.
Argyll's Comment	Overall, the Site is therefore considered to have a **moderate to high environmental sensitivity**.
Additional Sources of Information	No additional materials have been used in this assessment.

Argyll's Conclusion

Considering the information reviewed during this assessment, no significant contaminant linkages have been identified. Accordingly soil and groundwater liabilities are unlikely to occur.

Please refer to risk analysis methodology section for further guidance and definition of terms.

Current Operations

Environmental Damage Regulations 2009 (EDR)

Potential for owner/operation to incur a Liability under the EDR

Argyll's Comment

The Site is in close proximity to a potentially sensitive receptor as set out in the EDR. It would therefore be prudent to ensure that operations on the site are audited on a regular basis to minimise the risk of causing environmental damage that could result in liability under the EDR. In addition, the presence of such receptors should be considered as part of any future development or activity.

Please refer to the risk analysis methodology section for further guidance and definition of terms.

Additional Considerations

Item	Summary	Suggested Action
Asbestos	If the buildings at the Site were constructed or renovated during the period between 1950 and 1999, then the fabric of these buildings may contain asbestos in a variety of forms.	Check the Asbestos Register and Management Plan
Energy Performance Certificate	Under the Energy Performance of Buildings (England and Wales) Regulations 2012 and the Energy Performance of Buildings (Scotland) Regulations 2008, there is a requirement for all buildings to have an Energy Performance Certificate (EPC) upon their construction, sale or lease (and in some cases when the building is modified).	Check for EPC or conduct energy assessment
Air Conditioning/ Refrigeration Equipment	Air conditioning and refrigeration equipment contains heat transfer fluid. This fluid may be an ozone depleting substance (ODS). Any fluid in a halon fire-extinguishing system is also a ODS.	Inspect maintenance records
Change of Use Redevelopment	Proposed changes in land use require permission from the Local Authority and are subject to conditions as part of the statutory planning process.	Contact local planning authority or speak with planning consultant

Argyll's Comment

Whilst this assessment is primarily a desktop assessment of potential soil and groundwater liabilities, the above potential liability considerations that fall outside the scope of the Contaminated Land Risk Analysis Methodology have been identified.

Additional sources of information may be available for the Site. These sources could include previous environmental reports (including audits, contaminated land investigation and remediation reports), valuation reports (including property observation checklists), a Land Quality Record, and property deeds. Argyll Environmental would be pleased to review any reports that are available and revise this report accordingly. This may entail additional fees depending upon the volume and complexity of information available. Please contact us for further information.

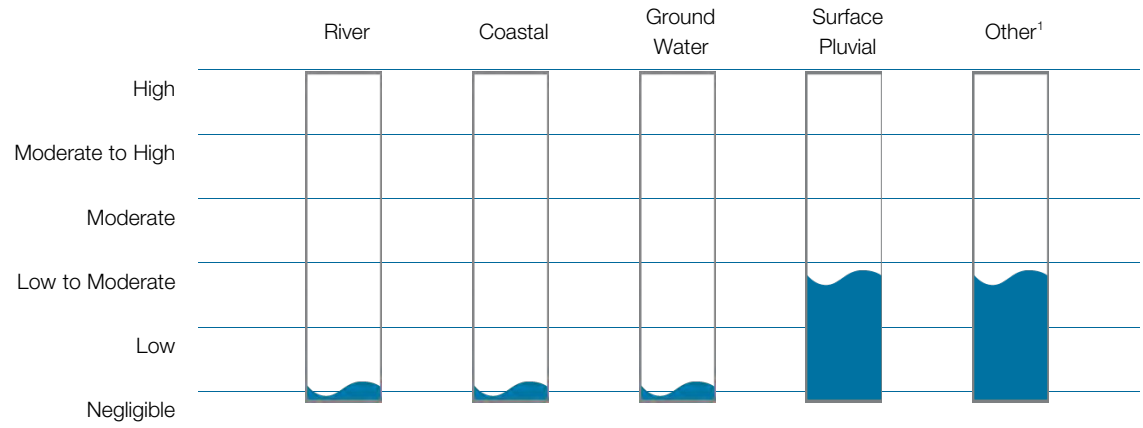
Flood Risk Screening

	Risk	Issue	Evaluation
1	**Development**	If development is proposed would a detailed Flood Risk Assessment be required?	**No**
2	**Flooding**	What is the overall risk of flooding, assuming defences fail or are absent or over-topped?	**Low to Moderate**
3	**Flood Defences**	Are there existing flood defences that might benefit the Site?	**No**

Insurance

The flood risk identified is unlikely to affect obtaining buildings and contents insurance.

Flood Analysis



Argyll's Comment

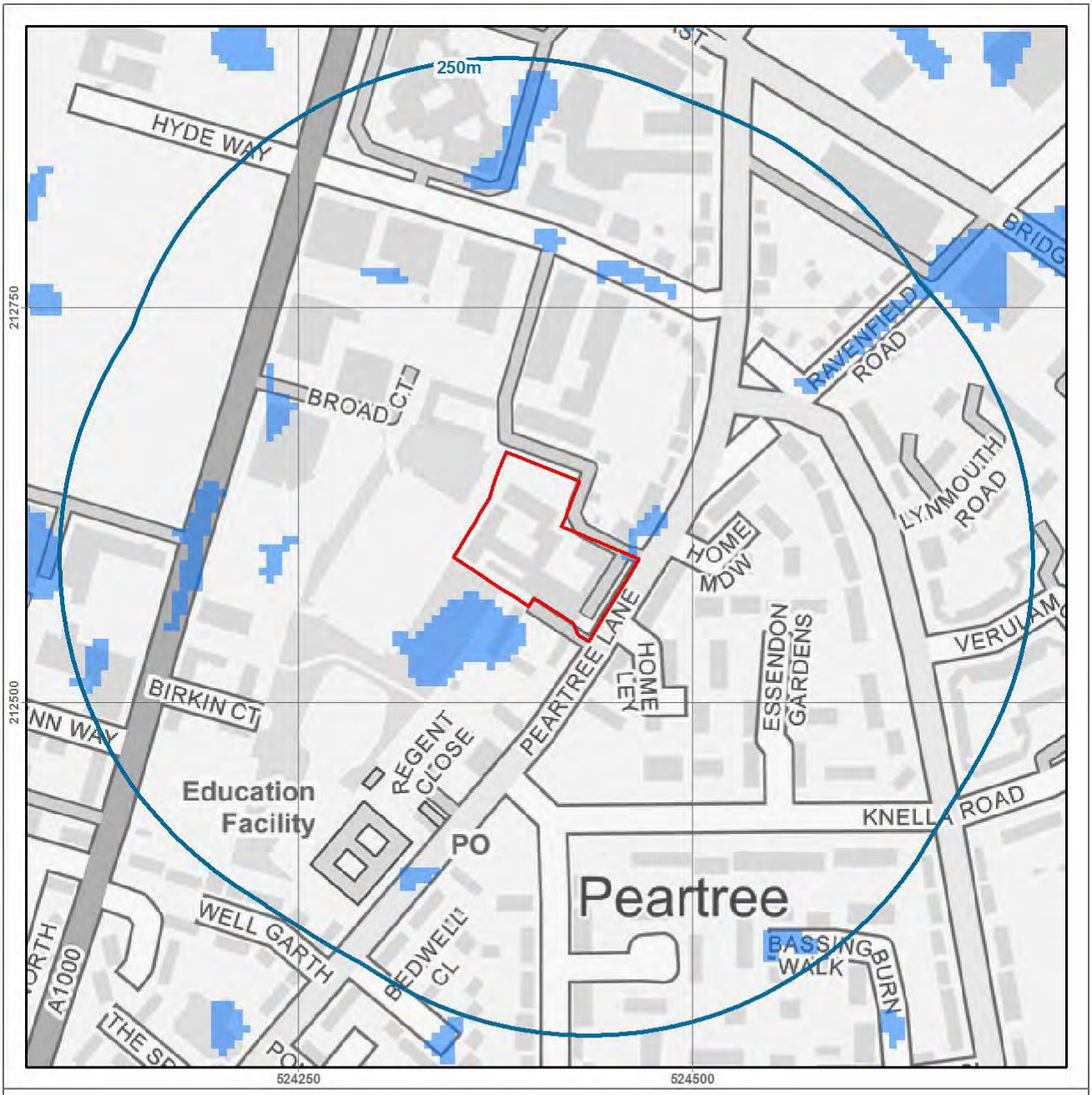
No commentary required.

Recommendations

1. You should speak to the seller to confirm whether the property or the surrounding area has flooded before. If it has, please contact us for advice.
2. Prior to exchanging contracts, establish the terms of buildings and contents insurance for the property.

[1]Other factors influencing flood risk include historic flood events, geological indicators of flooding, proximate surface water features and elevation above sea level.

Current Flood Risk



Flood and Groundwater Risk

Client Site

Area at risk of flooding from one source

Area at risk of flooding from more than one source

Area at risk of groundwater flooding

metres

0 50 100 200

* - Not all features in legend may be present in above map

Nominal scale at A4 paper size - 1:4,000

Additional Flooding Considerations

Riparian Ownership	Is there a water feature located within or adjacent to the Site? **No**
Argyll's Comment	A riparian owner describes anyone who owns a property where there is a watercourse within or adjacent to the boundaries of their property. Under common law, a riparian owner has rights and responsibilities relating to the stretch of watercourse that falls within or beside the boundaries of their land. Their primary responsibility is to keep the watercourse free of any obstructions that could hinder normal water flow. If the riparian owner fails to carry out their responsibilities, this could result in civil action. A riparian owner should also check before carrying out any works near to the edge of a river, as such works may be subject to byelaws. If infringed, this could lead to enforcement action by the Environment Agency. There is a presumption that the boundary between properties abutting a watercourse is the centre line of that watercourse. To confirm whether this is the case, a solicitor should check the deeds or the Index Map. The Environment Agency has published useful guidance "Living on the edge" for owners of land or property alongside a watercourse. Sometimes, the Environment Agency or other organisations managing flood risk, may have statutory rights of access to properties which adjoin a watercourse. This may be for maintenance, repair or rebuilding of any part of the watercourse or for access to or repair of monitoring equipment.
Development Control	Is there a water feature located within 250m of the Site? **Yes**
Argyll's Comment	Sites which lie close to (but do not adjoin) a watercourse, may be subject to planning controls should redevelopment be considered. The Environment Agency are normally consulted regarding any development within 20m of a Main River and Internal Drainage Boards should be similarly contacted regarding developments close to drainage channels. Navigation authorities are normally consulted regarding any development within 250m of a canal, although this varies on a site by site basis. Please see The Environment Agency website to check if there is a Main River within 20m of your property. The Environment Agency should also be contacted with regards to development (other than minor development) in Flood Zones 2 and 3.
Sewer Flooding	In times of extreme rainfall events sewers can overflow and cause local flooding. Ofwat's 'DG5 - At Risk Registers' record properties that have flooded from sewers and are at risk of flooding again, with separate registers for internal and external flooding. The At Risk Registers are maintained by each of the ten water and sewerage companies in England and Wales and details of properties subject to sewer flooding are normally kept for between two and five years. These registers are not necessarily complete as not all episodes of past flooding may be recorded.
Dam and Reservoir Failure	Could the Site be affected by dam or reservoir failure? **No**
Argyll's Comment	The answer is based on detailed models provided by JBA Risk Management. These predict the areas liable to flood around approximately 1700 key dams and reservoirs across England and Wales (if that dam or reservoir were to fail).

Flood Risk Management Options

Flooding can usually be managed by the installation of flood protection measures either on/within the building(s) or across the Site. Flood protection measures can be divided into two categories; flood resistance and flood resilience.

Both flood resistance and flood resilience solutions can be integrated with design proposals for new build properties or retro-fitted to existing properties. Specific flood protection packages can often include both resistance and resilience measures. What is suitable will depend on a number of factors including flood source, likely flood depths, property design and age.

Research conducted by CLG Sustainable Buildings Division and The Environment Agency revealed that installing flood resistance measures may be inappropriate where likely flooding will be deep. Certain types of building construction are unable to resist the pressure load placed on the exterior skin of the building by retained flood waters. Generally a flood depth between 0.6m and 1.0m above ground level is used as a benchmark to decide whether to consider flood resilience measures rather than rely on flood resistance measures. This is dependent on the age and construction of the property.

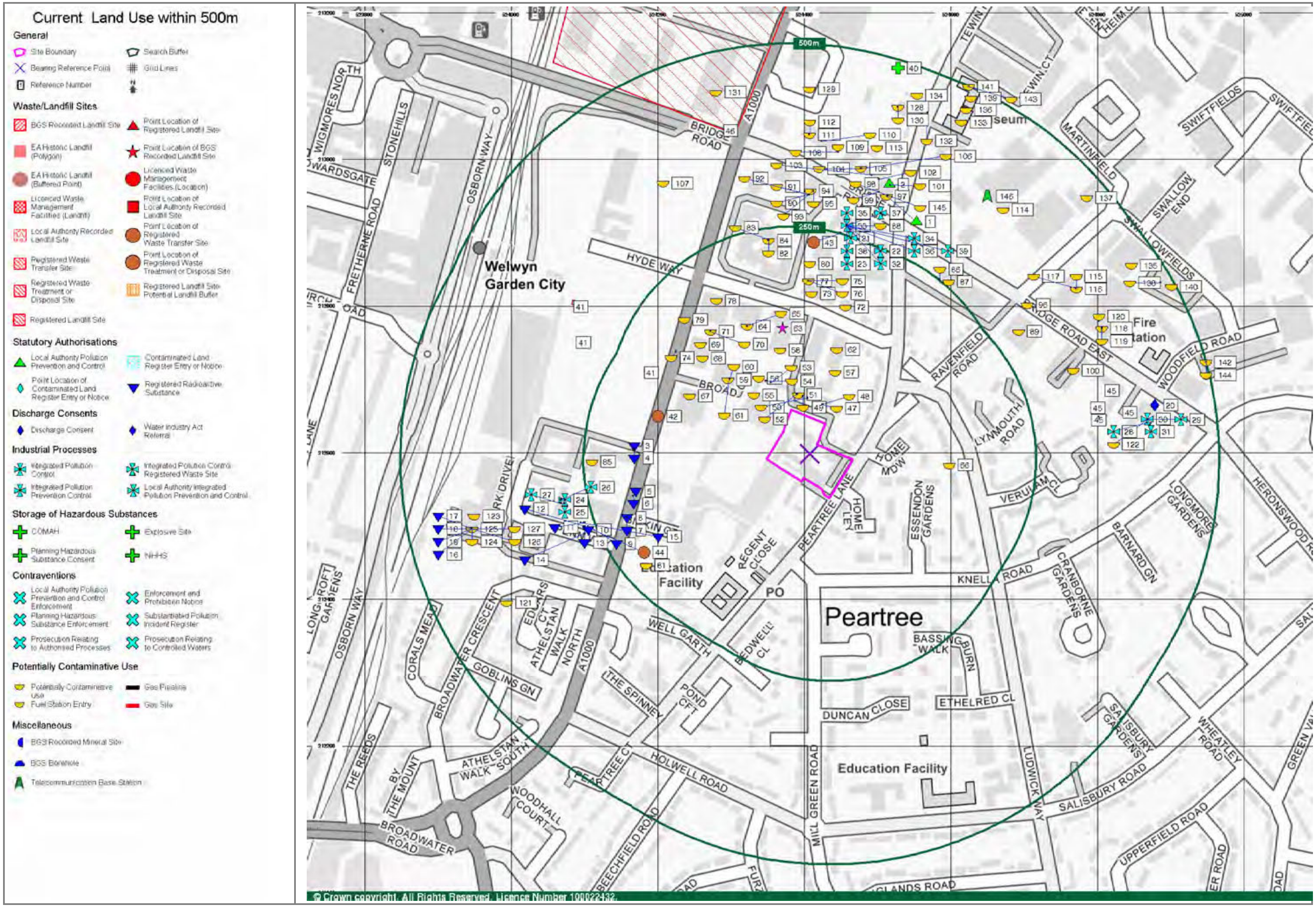
Guideline Costs for Resistance Measure

Building Feature	Cost Estimate for Baffles (+ VAT)
Standard (900mm) single door	£750
Standard (1800mm) double entrance door	£950
Large roller shutter door (up to 2,745mm span)	£1,420 (inc channel)
Standard garage door	£1,400 - £1,575
Standard window (up to 1,240mm span)	£750
Large window (1,240mm to 2,150mm span)	£550 - £700
Single air brick	£60 / £90
Double air brick	£80 - £230
Building Feature	**Cost Estimate for Tanking (+ VAT)**
Tanking (of basement, walls or floors)	£25 - £50 per metre^2
System Component	**Cost Estimate for Plumbing (+ VAT)**
Simple non-return valve	£35 / £170
Sophisticated non-return valve	£670 / £900

The costs above are for indicative budget purposes only. They are based on installing components of a standard design and colour. If the Site requires bespoke products, these are likely to cost more (for example, if the Site is in a conservation area, different colours may be required).

If you require a property specific assessment of which measures are suitable, and a more accurate cost appraisal, Argyll will need to complete a FLOODSOLUTIONS Consult Report. Using the highest detail topographical data available and Environment Agency flood levels, the report will specify the expected flood depths at the property. This can be used to increase your understanding of the risk and the potential significance of a flood event, and to inform a flood survey. This report can usually be prepared within 10-20 working days, although may take up to 25 depending upon regulatory response times. Please contact us on 0845 458 5250 if you would like further assistance.


Current Land Use within 250m
General
Site Boundary
Search Buffer
Bearing Reference Point
Grid Lines
Reference Number
Waste/Landfill Sites
BGS Recorded Landfill Site
Point Location of Registered Landfill Site
EA Historic Landfill (Polygon)
Point Location of BGS Recorded Landfill Site
EA Historic Landfill (Buffered Point)
Licenced Waste Management Facilities (Location)
Licenced Waste Management Facilities (Landfill)
Point Location of Local Authority Recorded Landfill Site
Local Authority Recorded Landfill Site
Point Location of Registered Waste Transfer Site
Registered Waste Transfer Site
Point Location of Registered Waste Treatment or Disposal Site
Registered Waste Treatment or Disposal Site
Registered Landfill Buffer
Registered Landfill Site
Statutory Authorisations
Local Authority Pollution Prevention and Control
Contaminated Land Register Entry or Notice
Point Location of Contaminated Land Register Entry or Notice
Registered Radioactive Substance
Discharge Consents
Discharge Consent
Water Industry Act Referral
Industrial Processes
Integrated Pollution Control
Integrated Pollution Control Registered Waste Site
Integrated Pollution Prevention Control
Local Authority Integrated Pollution Prevention and Control
Storage of Hazardous Substances
COMAH
Explosive Site
Planning Hazardous Substance Consent
NIHHS
Contraventions
Local Authority Pollution Prevention and Control Enforcement
Enforcement and Prohibition Notice
Planning Hazardous Substance Enforcement
Substantiated Pollution Incident Register
Prosecution Relating to Authorised Processes
Prosecution Relating to Controlled Waters
Potentially Contaminative Use
Potentially Contaminative Use
Gas Pipeline
Fuel Station Entry
Gas Site
Miscellaneous
BGS Recorded Mineral Site
BGS Borehole
Telecommunication Base Station
Peartree
City
Education Facility
HYDE WAY
BROAD CT
PERKIN CT
PENMAN WAY
WELL GARTH
A1000
NORTH WALK
PEARTREE LANE
HOME LEY
HOME MDW
ESSENDON GARDENS
RAVENFIELD ROAD
LYMMOUTH ROAD
VERULAM CL
KNELLER ROAD
CRANBORNE GARDENS
BASSINGBURN WALK
REGENT CLOSE
BEDWELL CL
THE S
PO
250m



Current Land Use within 500m
General
Site Boundary
Search Buffer
Bearing Reference Point
Grid Lines
Reference Number
Waste/Landfill Sites
BGS Recorded Landfill Site
Point Location of Registered Landfill Site
EA Historic Landfill (Polygon)
Point Location of BGS Recorded Landfill Site
EA Historic Landfill (Buffered Point)
Licenced Waste Management Facilities (Location)
Licenced Waste Management Facilities (Landfill)
Point Location of Local Authority Recorded Landfill Site
Local Authority Recorded Landfill Site
Point Location of Registered Waste Transfer Site
Registered Waste Transfer Site
Point Location of Registered Waste Treatment or Disposal Site
Registered Waste Treatment or Disposal Site
Registered Landfill Site Potential Landfill Buffer
Registered Landfill Site
Statutory Authorisations
Local Authority Pollution Prevention and Control
Contaminated Land Register Entry or Notice
Point Location of Contaminated Land Register Entry or Notice
Registered Radioactive Substance
Discharge Consents
Discharge Consent
Water Industry Act Referral
Industrial Processes
Integrated Pollution Control
Integrated Pollution Control Registered Waste Site
Integrated Pollution Prevention Control
Local Authority Integrated Pollution Prevention and Control
Storage of Hazardous Substances
COMAH
Explosive Site
Planning Hazardous Substance Consent
NIHHS
Contraventions
Local Authority Pollution Prevention and Control Enforcement
Enforcement and Prohibition Notice
Planning Hazardous Substance Enforcement
Substantiated Pollution Incident Register
Prosecution Relating to Authorised Processes
Prosecution Relating to Controlled Waters
Potentially Contaminative Use
Potentially Contaminative Use
Gas Pipeline
Fuel Station Entry
Gas Site
Miscellaneous
BGS Recorded Mineral Site
BGS Borehole
Telecommunication Base Station
500m
250m
Welwyn Garden City
Peartree
Education Facility
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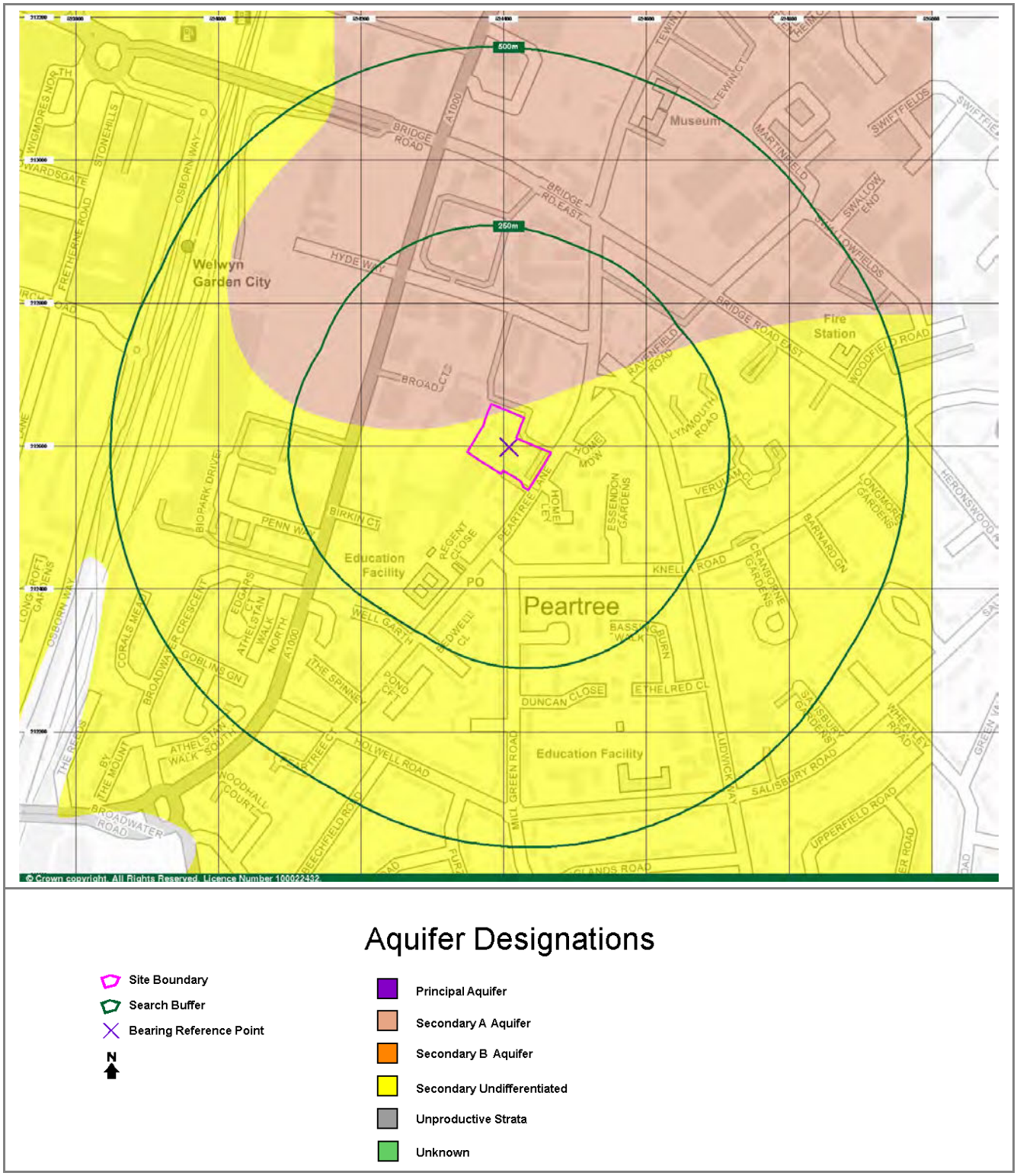
Aquifer Designation (Superficial)

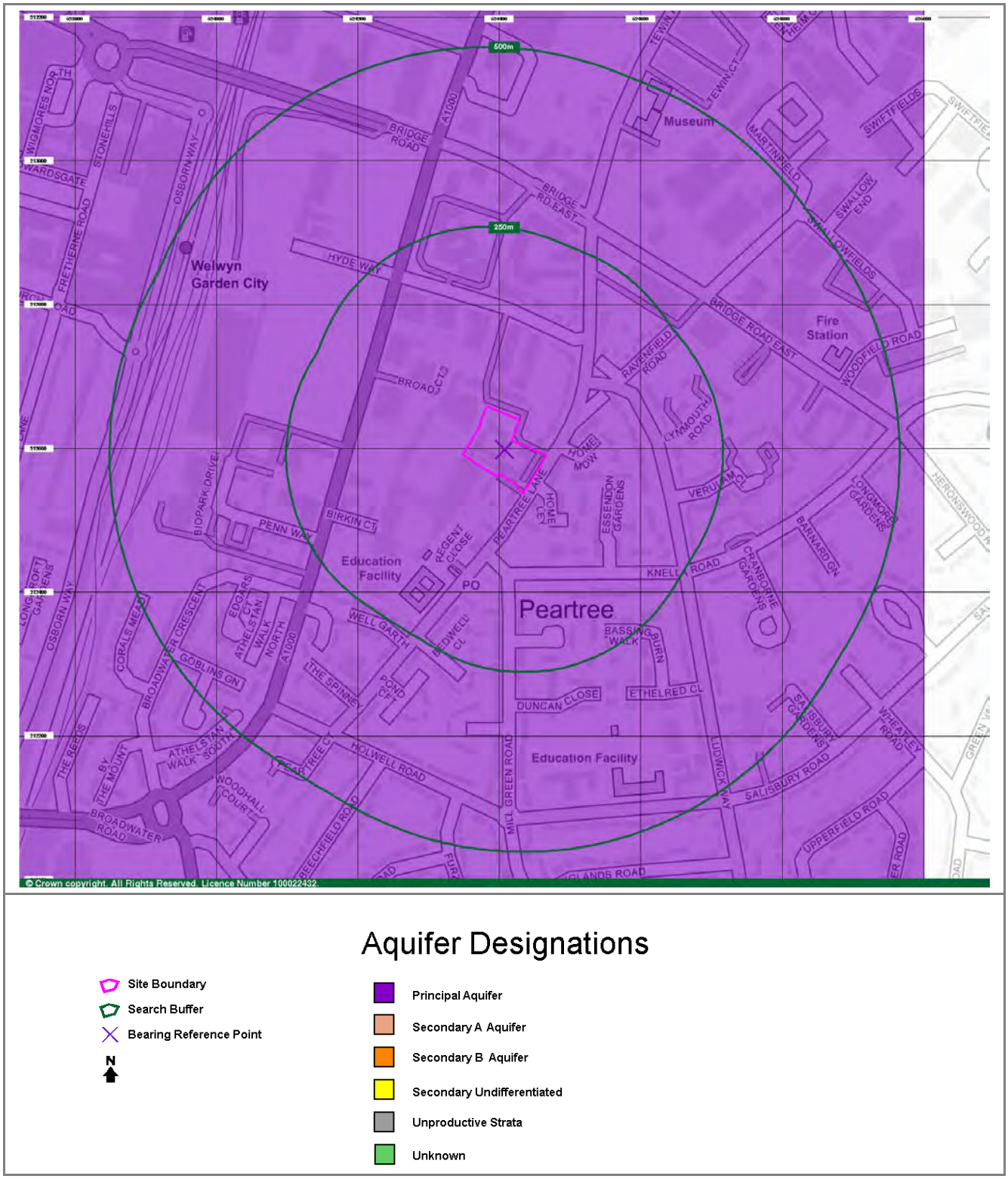


Aquifer Designations

- Site Boundary
- Search Buffer
- Bearing Reference Point
- N

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown

Aquifer Designation (Bedrock)



Aquifer Designations

- Site Boundary
- Search Buffer
- Bearing Reference Point
- N

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown

Groundwater Vulnerability

Hydrogeology

Superficial Aquifer Designations

Map ID	Details	Distance	Direction
	Secondary Aquifer - A These aquifers are formed of moderately permeable layers capable of supporting water supplies at a local scale, and in some cases forming an important source of base flow to rivers.	On Site	N
	Secondary Aquifer - Undifferentiated These aquifers have a variable permeability, yielding varying amounts of groundwater at different locations but not capable of supporting water supplies at a more than a local scale.	On Site	-

Bedrock Aquifer Designations

Map ID	Details	Distance	Direction
	Principal Aquifer These aquifers are typically formed of layers of rock or drift deposits that have a high permeability and provide a high level of water storage. They may support water supply and/or base river flow on a strategic scale.	On Site	-

Groundwater Vulnerability

Map ID	Details	Distance	Direction
	Soil Classification: Soils of High Leaching Potential (U) - Soil information for restored mineral workings and urban areas is based on fewer observations than elsewhere. A worst case vulnerability classification (H) assumed, until proved otherwise, Map Scale: 1:100,000, Map Name: Sheet 39 West London.	On Site	-

Geology

Low Permeability Drift Deposits

Map ID	Details	Distance	Direction
	Low permeability drift deposits occuring at the surface and overlying Major and Minor Aquifers are head, clay-with-flints, brickearth, peat, river terrace deposits and marine and estuarine alluvium, Map Sheet: Sheet 39 West London, Scale: 1:100,000.	On Site	-

BGS 1:50,000 Bedrock Geology

Map ID	Details	Distance	Direction
	LEX Code: LESE, Rock Name: Lewes Nodular Chalk Formation and Seaford Chalk Formation (Undifferentiated), Rock Type: Chalk, Min Age: Not Supplied, Max Age: Turonian.	On Site	-

BGS 1:50,000 Superficial Deposits

Map ID	Details	Distance	Direction
	LEX Code: KGCA, Rock Name: Kesgrave Catchment Subgroup, Rock Type: Sand and Gravel, Min Age: Not Supplied, Max Age: Pleistocene.	On Site	N
	LEX Code: LOFT, Rock Name: Lowestoft Formation, Rock Type: Diamicton, Min Age: Not Supplied, Max Age: Anglian.	On Site	-

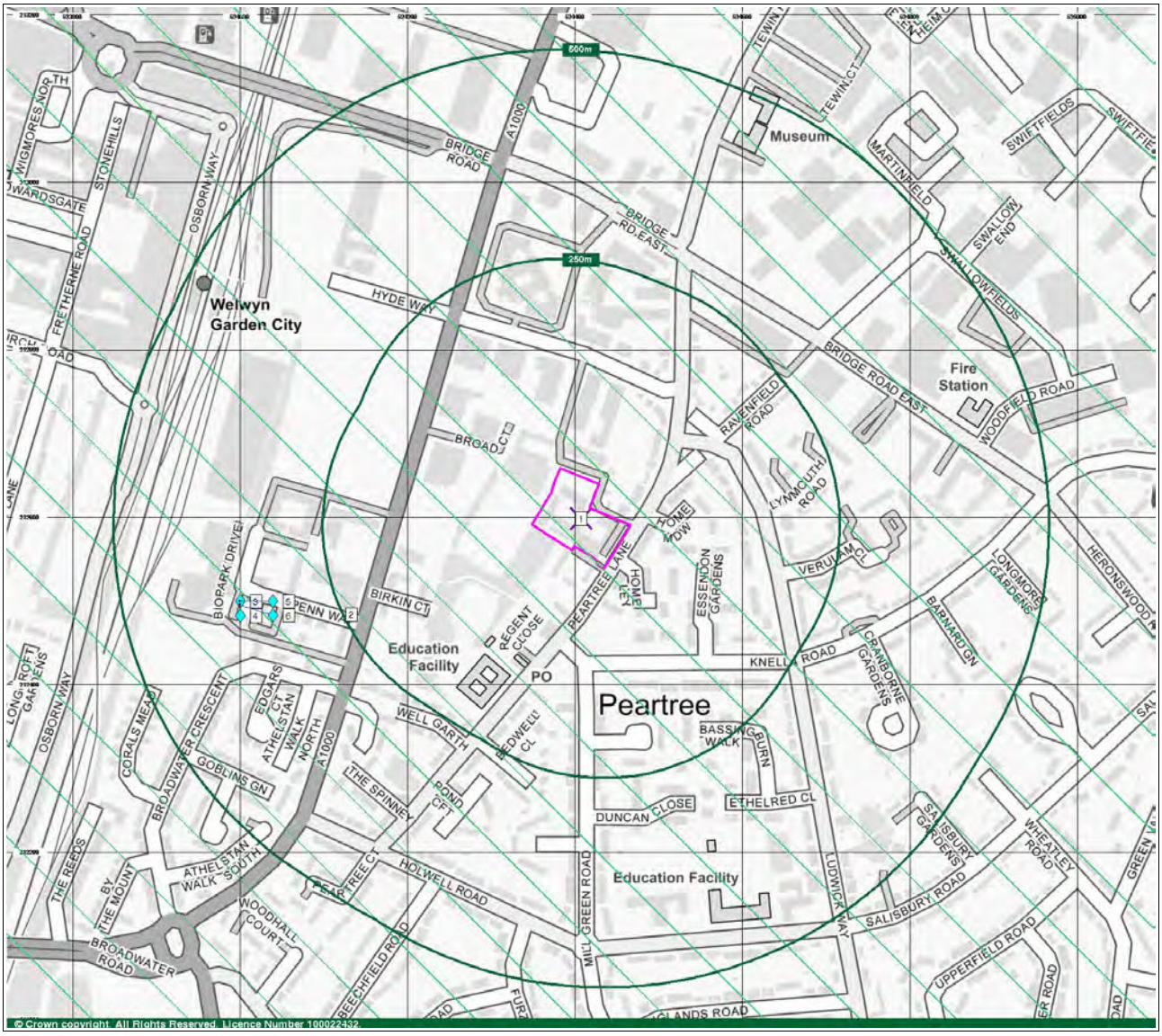
BGS 1:50,000 Geological Mapping Coverage

Map ID	Details	Distance	Direction
	Map Sheet No: 239, Map Name: Hertford, Map Date: 1923, Bedrock Geology: Available, Superficial Geology: Available, Artificial Geology: Available, Faults: Not Supplied, Landslip: Not Available, Rock Segments: Not Supplied.	On Site	-

BGS 1:625,000 Solid Geology

Map ID	Details	Distance	Direction
	White Chalk Subgroup.	On Site	-

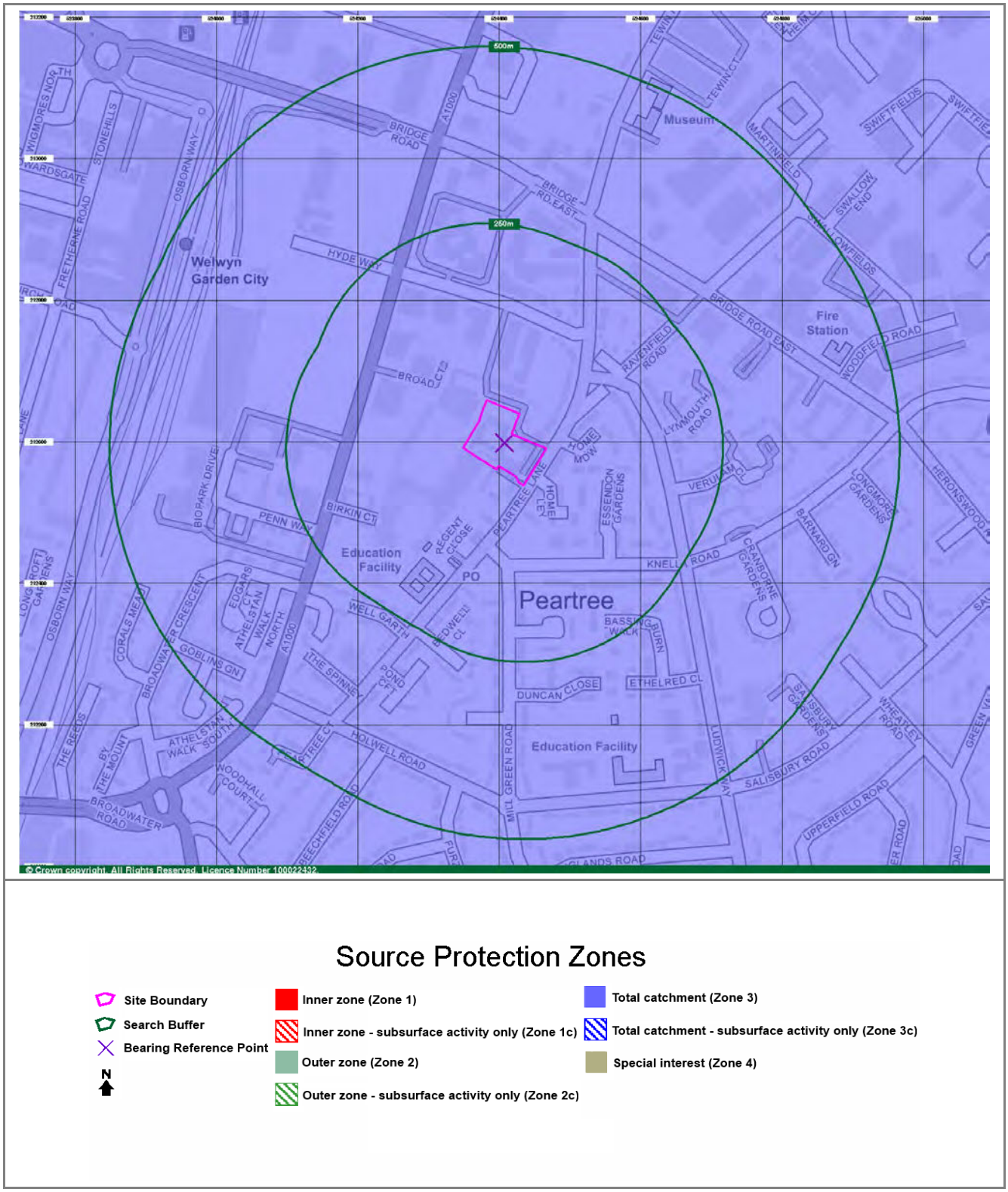
Environmentally Sensitive Features



Sensitive Land Uses

- Site Boundary
- Search Buffer
- Bearing Reference Point
- N
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- National Scenic Area
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Nearest Surface Water Feature
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area
- Water Abstraction
- Historical Flood Liability

Source Protection Zones



Source Protection Zones

- Site Boundary
- Search Buffer
- Bearing Reference Point
- N
- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)

Environmentally Sensitive Features

Nitrate Vulnerable Zones

Map ID	Details	Distance	Direction
1	Name: Lee Nvz, Description: Surface Water, Source: Environment Agency, Head Office.	On Site	-

Nearest Surface Water Feature

Map ID	Details	Distance	Direction
2	Surface water feature identified in proximity.	242m	SW

Water Abstractions

Map ID	Details	Distance	Direction
3	Operator: Roche Products Limited, Licence Number: 29/38/02/0007, Permit Version: 101, Location: Broadwater Road, Welwyn Garden City - 2 Boreholes Grouped, Authority: Environment Agency, Thames Region, Abstraction: Chemicals: Process Water, Abstraction Type: Water may be abstracted from a single point, Source: Groundwater, Daily Rate(m^3): Not Supplied, Yearly Rate (m^3): Not Supplied, Broadwater Road, Welwyn Garden City, Herts, Authorised Start: 01 January, Authorised End: 31 December, Permit Start Date: 26th August 2005, Permit End Date: Not Supplied, Positional Accuracy: Located by supplier to within 100m.	361m	W
4	Operator: Roche Products Limited, Licence Number: 29/38/02/0007, Permit Version: 100, Location: Broadwater Road, Welwyn Garden City - 2 Boreholes Grouped, Authority: Environment Agency, Thames Region, Abstraction: Chemicals: Process Water, Abstraction Type: Water may be abstracted from a single point, Source: Groundwater, Daily Rate(m^3): 1364, Yearly Rate (m^3): 318220, Broadwater Road, Welwyn Garden City, Herts, Authorised Start: 01 January, Authorised End: 31 December, Permit Start Date: 9th August 1996, Permit End Date: Not Supplied, Positional Accuracy: Located by supplier to within 100m.	361m	W
5	Operator: George Wimpey Uk Limited, Licence Number: 29/38/02/0007, Permit Version: 102, Location: Broadwater Road, Welwyn Garden City - 2 Boreholes Grouped, Authority: Environment Agency, Thames Region, Abstraction: Chemicals: Process Water, Abstraction Type: Water may be abstracted from a single point, Source: Groundwater, Daily Rate(m^3): Not Supplied, Yearly Rate (m^3): Not Supplied, Broadwater Road, Welwyn Garden City, Herts, Authorised Start: 01 January, Authorised End: 31 December, Permit Start Date: 7th February 2007, Permit End Date: Not Supplied, Positional Accuracy: Located by supplier to within 100m.	361m	W
6	Operator: Roche Products Ltd, Licence Number: 29/38/02/0001, Permit Version: Not Supplied, Location: Broadwater Road - No 2 Borehole, Authority: Environment Agency, Thames Region, Abstraction: Cooling, Abstraction Type: Not Supplied, Source: Groundwater, Daily Rate(m^3): Not Supplied, Yearly Rate (m^3): 340950, Chalk (Undifferentiated); Licence Status: Revoked; Lapsed Or Cancelled, Authorised Start: Not Supplied, Authorised End: Not Supplied, Permit Start Date: Not Supplied, Permit End Date: Not Supplied, Positional Accuracy: Located by supplier to within 100m.	362m	W
	Operator: Rank Xerox Ltd, Licence Number: 29/38/02/0074, Permit Version: Not Supplied, Location: Bessemer Road, Authority: Environment Agency, Thames Region, Abstraction: Industrial Processing (Miscellaneous), Abstraction Type: Not Supplied, Source: Groundwater, Daily Rate(m^3): 2991, Yearly Rate (m^3): 0, Chalk (Undifferentiated); Status: Revoked; Lapsed Or Cancelled, Authorised Start: Not Supplied, Authorised End: Not Supplied, Permit Start Date: Not Supplied, Permit End Date: Not Supplied, Positional Accuracy: Located by supplier to within 100m.	764m	N

Source Protection Zones

Map ID	Details	Distance	Direction
	Name: , Source: Environment Agency, Head Office, Reference: Not Supplied, Type: Zone III (Total Catchment): The total area needed to support the discharge from the protected groundwater source.	On Site	-

Natural and Mining Related Hazards

Subsidence

Collapsible Ground Stability Hazards

Map ID	Details	Distance	Direction
	Risk: Very Low, Source: British Geological Survey, National Geoscience Information Service.	On Site	-

Compressible Ground Stability Hazards

Map ID	Details	Distance	Direction
	Risk: No Hazard, Source: British Geological Survey, National Geoscience Information Service.	On Site	-

Ground Dissolution Stability Hazards

Map ID	Details	Distance	Direction
	Risk: Very Low, Source: British Geological Survey, National Geoscience Information Service.	On Site	-
	Risk: No Hazard, Source: British Geological Survey, National Geoscience Information Service.	134m	SE

Landslide Ground Stability Hazards

Map ID	Details	Distance	Direction
	Risk: Very Low, Source: British Geological Survey, National Geoscience Information Service.	On Site	-

Running Sand Ground Stability Hazards

Map ID	Details	Distance	Direction
	Risk: Very Low, Source: British Geological Survey, National Geoscience Information Service.	On Site	-

Shrinking or Swelling Clay Subsidence Hazards

Map ID	Details	Distance	Direction
	Risk: Low, Source: British Geological Survey, National Geoscience Information Service.	On Site	-

Non-Coal Mining Hazards

Map ID	Details	Distance	Direction
	Risk: Rare, Source: British Geological Survey, National Geoscience Information Service.	On Site	-

Radon

Radon Potential

Map ID	Details	Distance	Direction
	The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level)., Source: British Geological Survey, National Geoscience Information Service.	On Site	-

Radon Protective Measures

Map ID	Details	Distance	Direction
	None, Source: British Geological Survey, National Geoscience Information Service.	On Site	-

Mining

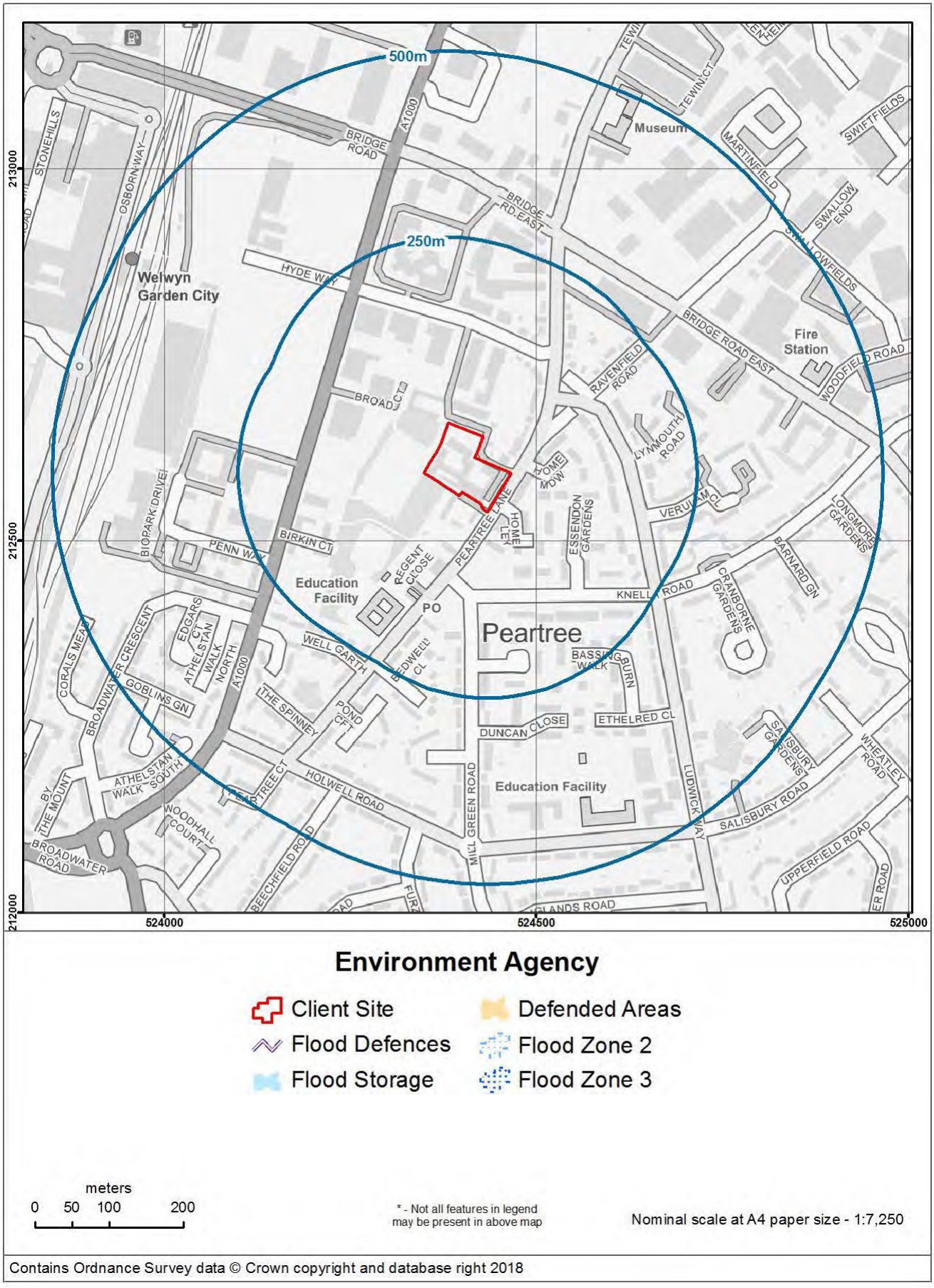
Natural and Mining Cavities

Map ID	Details	Distance	Direction
	Cavity Type: Sinkhole x 1, Origin: , Cavity Number: , Commodity: , Positional Accuracy: .	70m	W
	Cavity Type: Sinkhole x 1, Origin: , Cavity Number: , Commodity: , Positional Accuracy: .	129m	W

Natural and Mining Cavities

Map ID	Details	Distance	Direction
	Cavity Type: Sinkhole x 1, Origin: , Cavity Number: , Commodity: , Positional Accuracy: .	139m	W
	Cavity Type: Sinkhole x 1, Origin: , Cavity Number: , Commodity: , Positional Accuracy: .	153m	NW
	Cavity Type: Sinkhole x 1, Origin: , Cavity Number: , Commodity: , Positional Accuracy: .	209m	NW
	Cavity Type: Sinkhole x 1, Origin: , Cavity Number: , Commodity: , Positional Accuracy: .	308m	N
	Cavity Type: Sinkhole x 1, Origin: , Cavity Number: , Commodity: , Positional Accuracy: .	462m	NE
	Cavity Type: Sinkhole x 1, Origin: , Cavity Number: , Commodity: , Positional Accuracy: .	495m	W

Flooding from Rivers or Sea



Current Flood Risk

Flooding from River or Sea (Flood Zone 3)

Details	Distance	Reply or Direction
Are there any flood plains within 500m?	<501m	NO

Flooding from River or Sea in an Extreme Flood (Flood Zone 2)

Details	Distance	Reply or Direction
Are there any flood plains (extreme floods) within 500m?	<501m	NO

The Site is at a low risk of flooding from rivers or the sea, as defined by the regulatory body's Flood Map. If the Site area is greater than one hectare, any planning application for development would need to be accompanied by a Flood Risk Assessment in accordance with NPPF.

Flood Defences

Details	Distance	Reply or Direction
Are there any flood defences within 500m?	<501m	NO

There are no flood defences within 500m of the Site. There may be a small residual risk of flooding from overtopping or failure of defences more distant from the Site. Reference should be made to the assessment of 'Areas Benefiting from Flood Defences' to ascertain whether the Site could potentially be at risk.

Areas Benefiting from Flood Defences

Details	Distance	Reply or Direction
Does the Site or any areas within 500m benefit from flood defences?	<501m	NO

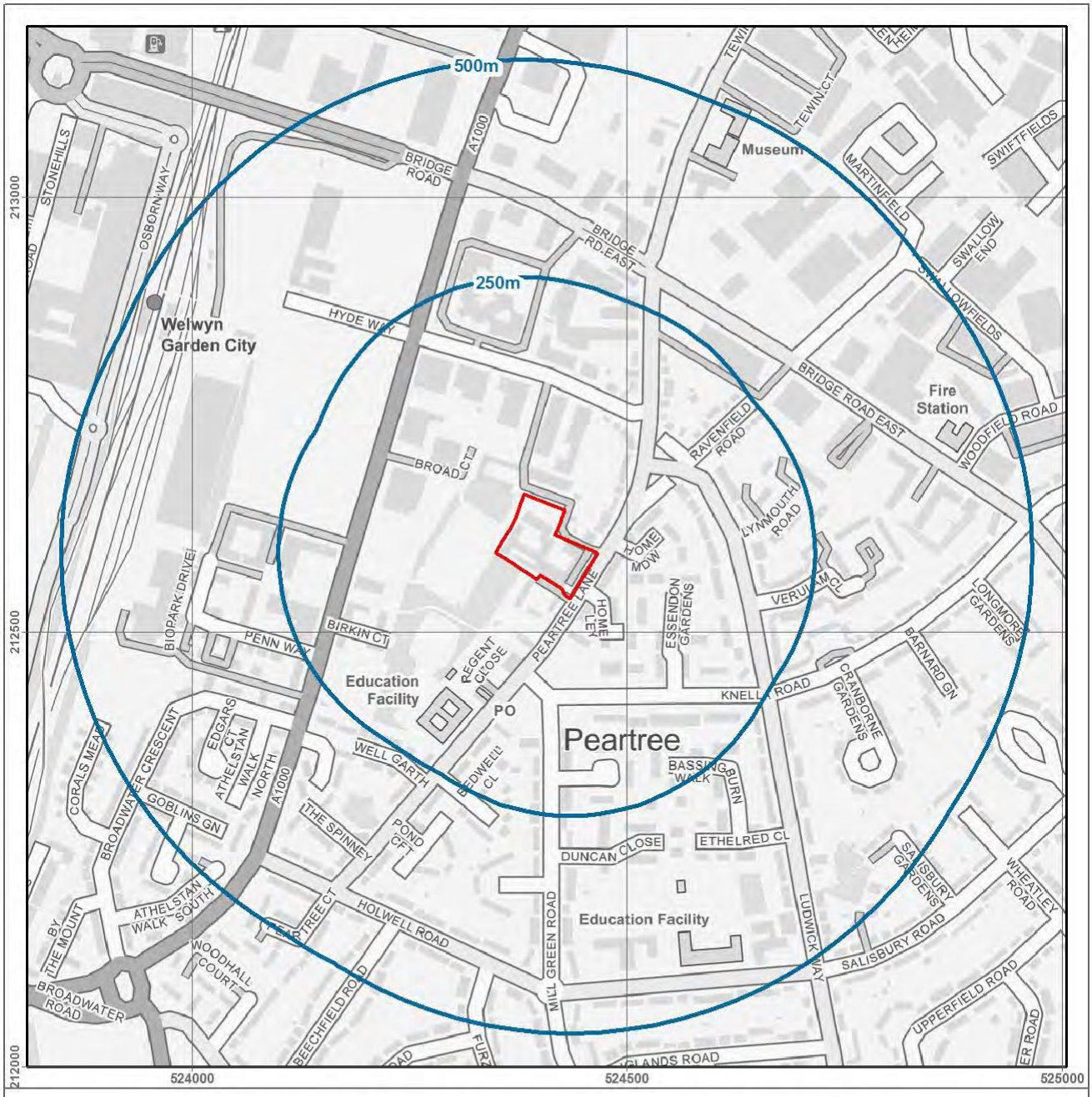
The Site is over 500m from an Area Benefiting from a Flood Defence, as defined by the regulatory body. The residual risk that the Site may flood if the protection standard of any flood defences is exceeded, or if the defences fail, is insignificant.

Flood Storage Areas

Details	Distance	Reply or Direction
Are there any flood storage areas within 500m?	<501m	NO

The Site is over 500m from a Flood Storage Area (FSA) as defined by the regulatory body. These areas store flood water during flood events. It is unlikely that any FSA presents any associated flood risk to the Site.

The Environment Agency Risk of Flooding from Rivers and Sea



Risk of Flooding from Rivers and Sea (RoFRS)

Client Site

High

Medium

Low

Very Low

metres

0 50 100 200

* - Not all features in legend may be present in above map

Nominal scale at A4 paper size - 1:7,250

Risk of Flooding from Rivers and Sea

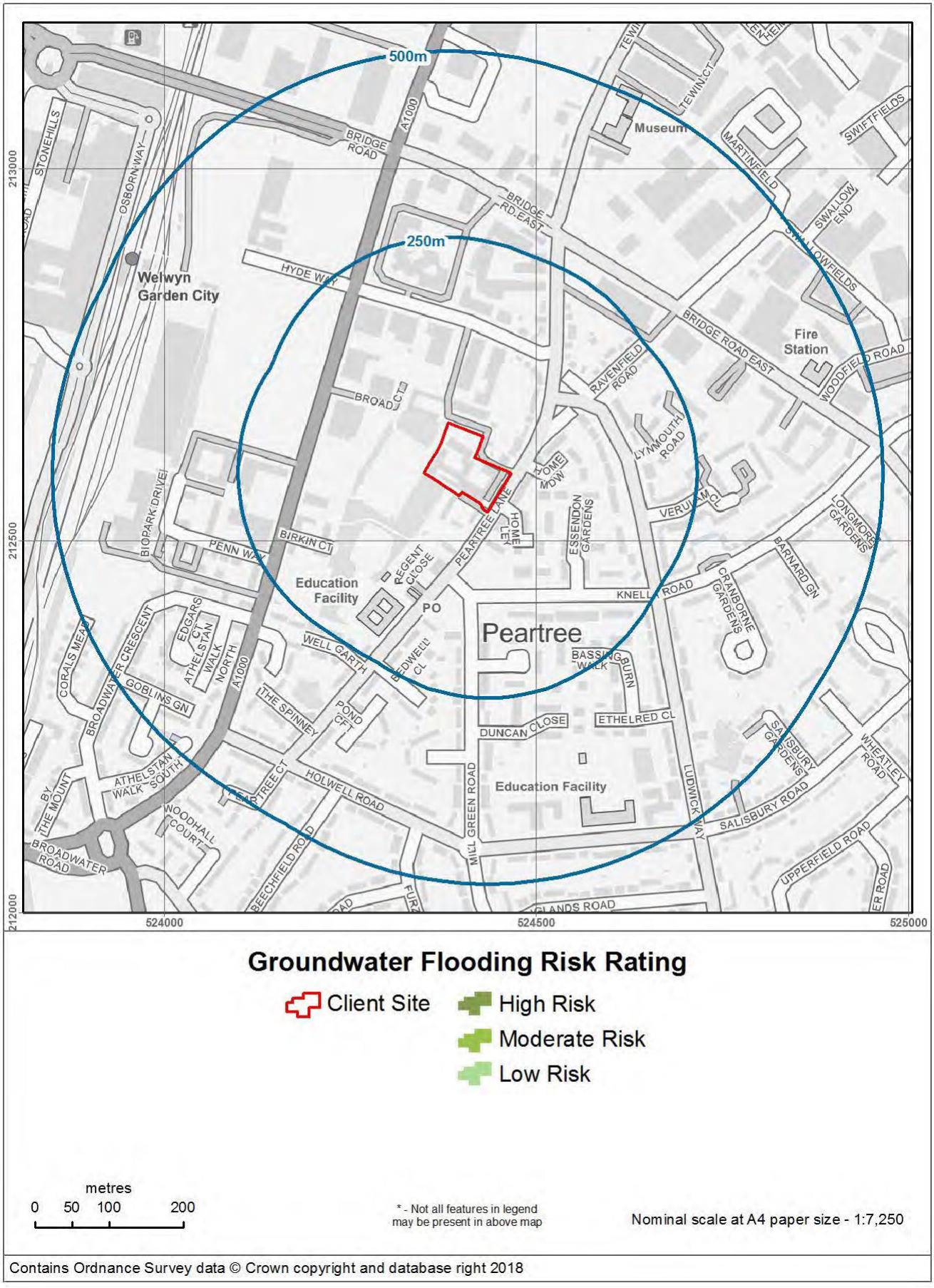
Details	Distance	Reply or Direction
What is the flood likelihood category for the Site?	On Site	-

Some areas may be classified as having no result. This occurs where there is no output data from the regulatory body's risk assessment, but the area falls within the extreme flood outline (with a 0.1% or 1 in 1000 chance of flooding in any year).

The Environment Agency Data

The data in the Property Flood Likelihood Database is sourced from The Environment Agency's National Receptor Dataset (NRD). The information provided includes the flood likelihood category low, moderate, or significant according to the flood likelihood analysis. Some areas may be classified as having no result. This occurs where there is no output data from the analysis, but the area falls within the extreme flood outline (with a 0.1% or 1 in 1000 chance of flooding in any year).

Groundwater Flooding Risk



Groundwater Flooding Risk Rating

- Client Site
- High Risk
- Moderate Risk
- Low Risk

metres
0 50 100 200

* - Not all features in legend may be present in above map

Nominal scale at A4 paper size - 1:7,250

Groundwater Flooding Risk

	Details	Distance	Reply or Direction
	What is the risk of groundwater flooding at the Site?	On Site	-

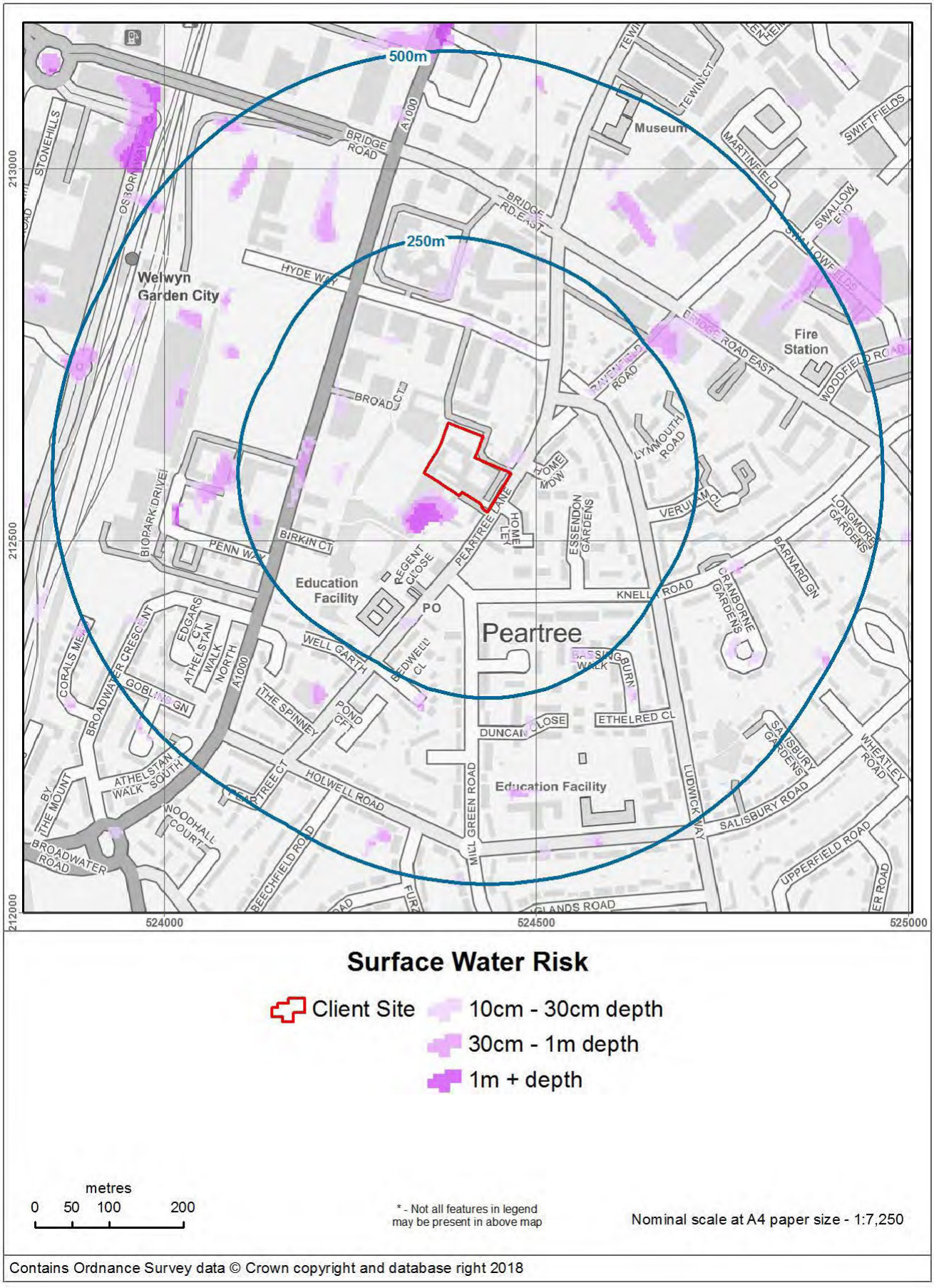
Information from GeoSmart Information Ltd indicates that there is a negligible risk of groundwater flooding in this area and any groundwater flooding incidence will be less frequent than 1 in 100 years return period.No further investigation of risk is deemed necessary unless the proposed site use is unusually sensitive. However, data may be lacking in some areas, so assessment as 'negligible risk' on the basis of the map does not rule out local flooding due to features not currently represented in the national datasets used to generate this version of the map.

GeoSmart Information Ltd Data

GeoSmart Information Ltd provides data to Argyll in relation to groundwater flooding. Through research and development, building on their expertise in addressing groundwater flooding issues for The Environment Agency and other clients in the UK, GeoSmart Information Ltd has developed algorithms and calibrated predictions of the risk of groundwater flooding occurring in England and Wales. This differs from other suppliers of data regarding groundwater flooding which only report on the susceptibility of groundwater flooding. Susceptibility merely has to be identified, whereas risk must be quantified. The resulting map is a 5x5m classification of groundwater flooding risk into four categories (Negligible, Low, Moderate and High). GeoSmart Information Ltd's classifications are based on the level of risk, combining severity and uncertainty that a site will suffer groundwater flooding within a return period of about 100 years.

The map is a general purpose indicative screening tool, and is intended to provide a useful initial view for a wide variety of applications. However, it does not provide an alternative to a site specific assessment, and a detailed risk assessment should be used for any site where the impact of groundwater flooding would have significant adverse consequences.

Surface Water Flooding (1:200 year rainfall event)



Surface Water Risk

- Client Site
- 10cm - 30cm depth
- 30cm - 1m depth
- 1m + depth

metres
0 50 100 200

* - Not all features in legend may be present in above map

Nominal scale at A4 paper size - 1:7,250

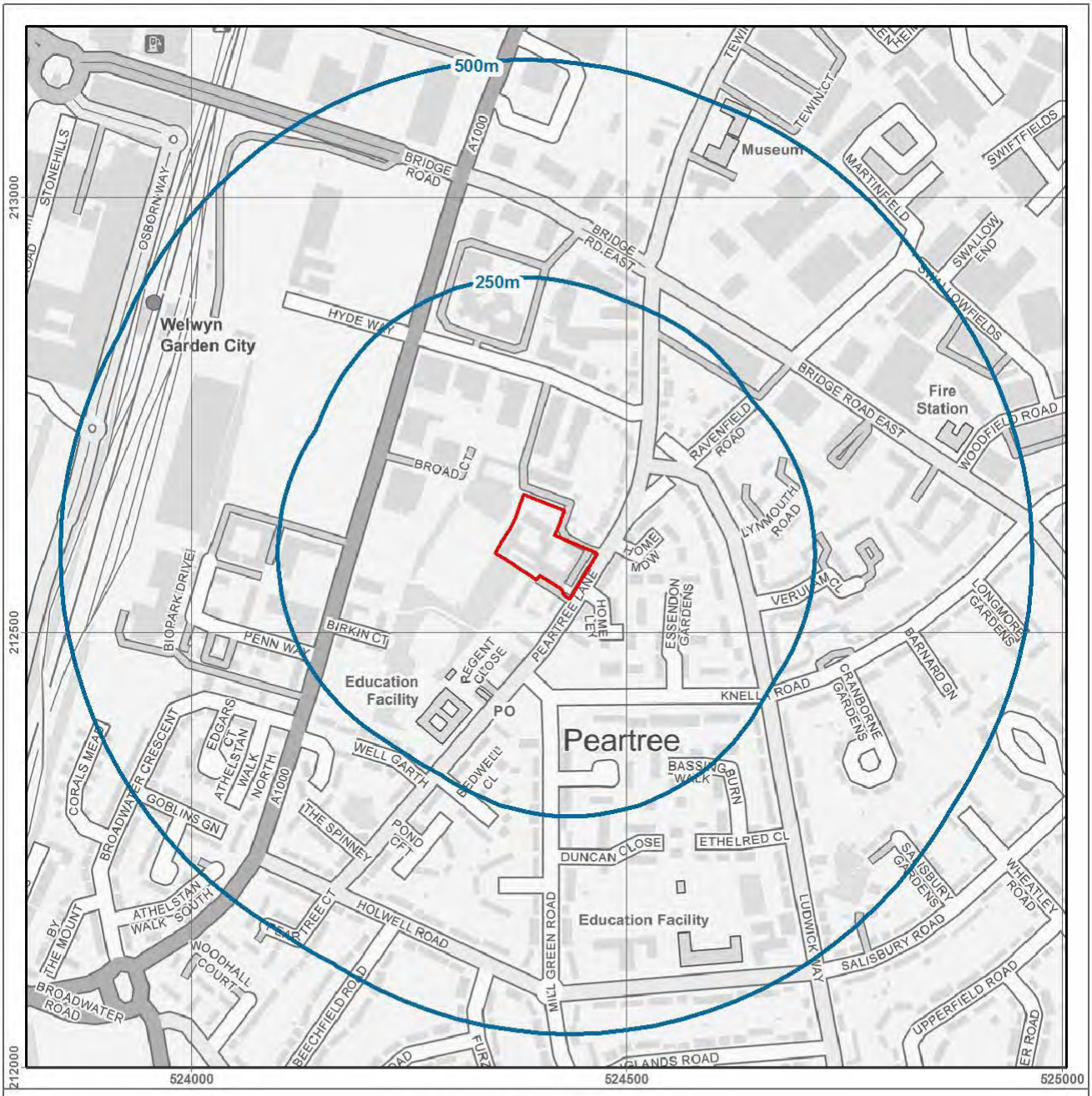
Surface Water Flooding

	Details	Distance	Reply or Direction
	What is the risk of surface water flooding at the Site following a 1 in 75 year rainfall event?	On Site	low
	What is the risk of surface water flooding at the Site following a 1 in 200 year rainfall event?	On Site	low
	What is the risk of surface water flooding at the Site following a 1 in 1,000 year rainfall event?	On Site	low

JBA Risk Management Data

Surface Water Flooding - Information regarding the risk of natural surface water or pluvial flooding. The risk is classified by JBA into four categories, low (equal to 10cm), low to medium (more than 10cm), medium (more than 30cm) and high (more than 1m) which reflect varying depths of potential surface water flooding during a range of rainfall events including 1:75 year, 1:200 year, and 1:1000 year.

Historical Flooding



Historical Flooding

Client Site
Historic Floods
Geo Indicators

metres
0 50 100 200

* - Not all features in legend may be present in above map

Nominal scale at A4 paper size - 1:7,250

Historical Flood Events

	Details	Distance	Reply or Direction
	Have any historic flood events occurred at the Site or within 500m?	<501m	NO

The regulatory body's records have no indication of past flooding within 500m of the Site. As these records are not comprehensive, it may still be prudent to ask the relevant authorities and the Site owner whether they are aware of any previous flooding at the Site or in the surrounding area.

The Environment Agency Data

The Environment Agency has collated extensive records (including outlines) of flooding from rivers, the sea, or groundwater which have occurred in England and Wales since c.1950. This information comes from various sources including maps, aerial photographs, and private records. It is not necessarily comprehensive.

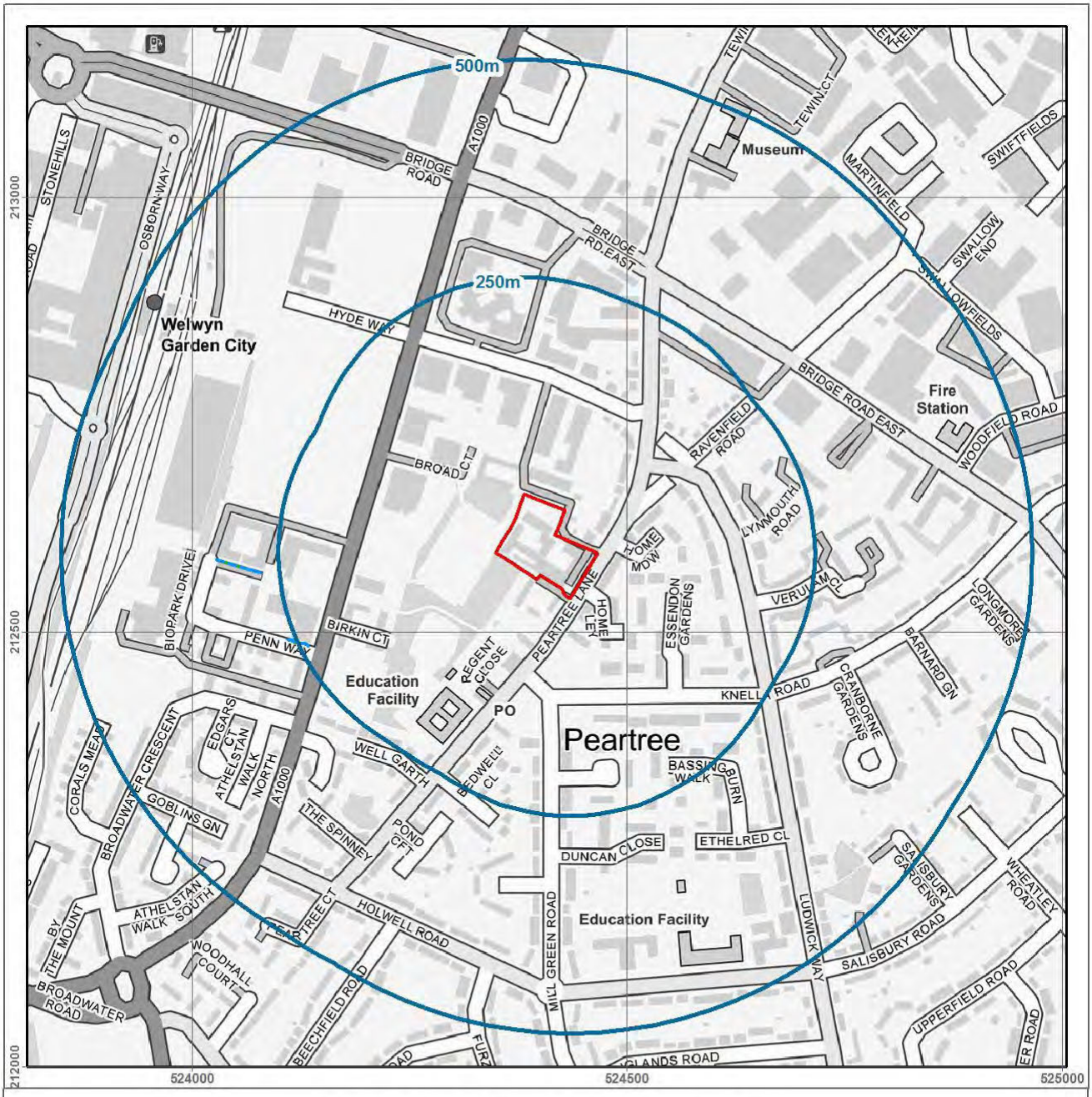
Geological Indicators of Flooding

	Details	Distance	Reply or Direction
	Are there any geological deposits which indicate the Site may have been flooded in the past?	<26m	NO

British Geological Survey Data

Geological Indicators of Flooding – The BGS Geological Indicators of Flooding (GIF) data set is a digital map based on the BGS Digital Geological Map of Great Britain at the 1:50,000 scale (DiGMapGB-50). It was produced by characterising Superficial (Drift) Deposits on DiGMapGB-50 in terms of their likely vulnerability to flooding, either from coastal or inland water flow and reflects areas which may have flooded in the recent geological past. This normally relates to flooding which happened many thousands of years ago.

OS MasterMap Water Network



OS MasterMap Water Network

- Client Site
- Primary Flow (named)
- Primary Flow (un-named)
- Secondary Flow
- Tidal River
- Lake or Reservoir
- Foreshore and Sea
- Underground River
- Marsh
- Canal, Lock or Transfer

metres
0 50 100 200

* - Not all features in legend may be present in above map

Nominal scale at A4 paper size - 1:7,250

Other Information

OS MasterMap Water Network

Details	Distance	Reply or Direction
Is there any information from the OS's MasterMap Water Network within 500m?	<501m	YES
Watercourse Type: Primary Flow (un-named)	241.1m	SW
Watercourse Type: Underground River	246.6m	SW
Watercourse Type: Primary Flow (un-named)	254.0m	SW
Watercourse Type: Primary Flow (un-named)	271.1m	W
Watercourse Type: Underground River	293.6m	W
Watercourse Type: Primary Flow (un-named)	297.0m	W
Watercourse Type: Underground River	310.2m	W
Watercourse Type: Primary Flow (un-named)	312.7m	W

There is a water feature within 250m of the Site. This does not represent a flood risk in itself, but its presence has been taken into account in the overall risk assessment in this Report.

OS Data

OS MasterMap Water Network is a three-dimensional digital representation of the watercourses in Great Britain. It includes rivers, streams, lakes, lochs and canals as a series of watercourse network lines. The network lines (links) are attributed to provide a range of information about the section of watercourse they depict. The OS MasterMap Water Network will significantly enhance systems used to manage waterways, river and the flood risk they pose.

Height Above Sea Level

Details	Distance	Reply or Direction
Maximum height of the Site above sea level	On Site	86.00m
Minimum height of the Site above sea level	On Site	83.30m
Average height of the Site above sea level	On Site	84.34m

The Site is at a relatively high elevation above sea level. However, this is not in itself indicative of the absence of flood risk and reference should be made to other assessments within this report.

Distance to Water Features

Details	Distance	Reply or Direction
Are there any water features within 500m?	<501m	NO

There are no water features shown on the Ordnance Survey maps within 500m of the Site.

Dam or Reservoir Failure

Details	Distance	Reply or Direction
Is there a risk of the Site being affected by the failure of a nearby dam or reservoir?	On Site	NO

Neither the Site nor areas near to it will be likely to flood if a dam or reservoir in the surrounding area failed.

JBA Risk Management Data

Dam or Reservoir Failure – JBA has modelled approximately 1700 dams and reservoirs across the UK which are considered to pose the greatest risks to people and property. These models are able to predict the areas likely to flood on all sides of a feature, should an element of it fail e.g. a wall, dam or earth bund.

Useful Contacts

Name and Address	Telephone/Fax/Email
Argyll Environmental Limited 1st Floor 98 – 99 Queens Road Brighton BN1 3XF www.argyllenvironmental.com	General enquiries 0845 458 5250 orders@argyllenviro.com
Ensura Limited (for Environmental Insurance) 1st Floor 98 – 99 Queens Road Brighton BN1 3XF www.ensura.co.uk	Telephone 0845 652 8585 Fax 0845 652 8686 info@ensura.co.uk
Welwyn Hatfield District Council Environmental Health Department Council Offices www.welhat.gov.uk	Telephone 01707 357000 Fax: 01707 375490
Environment Agency National Customer Contact Centre (NCCC) PO Box 544	Telephone 03708 506 506
Welwyn Hatfield District Council Council Offices www.welhat.gov.uk	Telephone 01707 357000 Fax: 01707 375490
Hertfordshire County Council Spatial Planning and Economy Unit County Hall www.hertsdirect.org	Telephone 01992 556266 Fax: 01992 556015 spatialplanning@hertfordshire.gov.uk
Environment Agency Head Office Rio House	Telephone 01454 624400 Fax: 01454 624409
British Geological Survey Enquiry Service British Geological Survey www.bgs.ac.uk	Telephone 0115 936 3143 Fax: 0115 936 3276 enquiries@bgs.ac.uk
Peter Brett Associates Caversham Bridge House www.pba.co.uk	Telephone 0118 950 0761 Fax: 0118 959 7498 reading@pba.co.uk
Environment Agency National Customer Contact Centre (NCCC) PO Box 544 Templeborough Rotherham S60 1BY www.environment-agency.gov.uk	General enquiries 08708 506 506 Floodline 0845 988 1188 enquiries@environment-agency.gov.uk
British Geological Survey Enquiry Service British Geological Survey Kingsley Dunham Centre Keyworth Nottingham NG12 5GG www.bgs.ac.uk	General enquiries 0115 936 3143 Fax 0115 936 3276
(For advice on flood insurance) British Insurance Brokers' Association 8th Floor John Stow House 8 Bevis Marks London EC3A 7JB	Consumer helpline 0870 950 1790

Name and Address	Telephone/Fax/Email
JBA Risk Management - Head Office South Barn Broughton Hall Skipton North Yorkshire BD23 3AE	General enquiries 01756 799 919 Fax 01756 799 449 info@jbarisk.com

Please note that the Environment Agency / SEPA have a charging policy in place for enquiries. When contacting these agencies please mention that this data has been received from the Landmark database, alternatively Argyll Environmental Limited would be pleased to assist with consultation to the above bodies. Please contact us for a quotation.

Contamination Land Risk Analysis Methodology

The SITESOLUTIONS reports have been designed to assist in making informed decisions during property transactions. This section of the Report is a desktop assessment of direct liabilities (Liabilities) which could affect the owner /occupier of the Site and arise under Part 2A of the Environmental Protection Act 1990 and/or equivalent requirements under the planning regime and/or the Water Resources Act 1991[4]. (Relevant Legislation). If a risk is identified, then a number of options for finding out more about the risk, managing it or transferring it are proposed.

The assessment of environmental liability under the Relevant Legislation is based upon the principle of determining the presence of a plausible contaminant-pathway-receptor relationship (a contaminant linkage). A 'contaminant' is a source of contamination, a 'pathway' is a medium through which the contamination can mobilise and 'a receptor' is a person or entity that could be detrimentally affected by the contamination. If all three are identified, then a 'plausible contaminant-pathway-receptor relationship' may be present. By definition, this is one which Argyll believes could result in significant harm, a significant possibility of significant harm or significant pollution or the possibility of significant pollution to Controlled Waters.

In our assessment we use the following test to decide if there is a potential liability affecting the Site. For the purpose of this assessment a site where a potential Liability has been identified is defined as follows:

A Site which, from the information assessed by Argyll, is considered to have the potential of being affected by contaminative substances present in or under the Site (but excluding potential sources of contamination on or above the land) such that, on the basis of its current or proposed use, there is a reasonable likelihood of a UK regulatory authority, acting in accordance with Relevant Legislation, requiring that remedial measures are taken in order to remedy or mitigate the contaminative substances that are present in or under the land that forms all or part of the Site.

The term Liabilities is defined within the scope of this assessment to mean, remedial works under Part 2A of the Environmental Protection Act 1990 (or where appropriate, equivalent requirements under the planning regime) and/or the Water Resources Act 1991 which may result in direct liability for the site owner/occupier.

The assessment within this section of the Report has been produced and quality checked by a team of qualified environmental professionals. The assessment is based upon a manual review of the data contained within the Data Section of this Report and of 1:2500 and 1:1250 (where available) scale historical mapping.

Ecological Risk Assessment

The evaluation of ecological risk is becoming an increasingly important input when making risk management decisions. In the Site Solutions Commercial report, Argyll assesses two different drivers for risks and liabilities driven by ecological receptors;

1. The Contaminated Land Regime; and
2. The Environmental Damage Regulations 2009, as amended (EDR).

The Environment Agency has designed a generic framework for conducting ecological risk assessment (see Assessing Risk to Ecosystems from Land Contamination, R&D Technical Report P299, EA 2002). This recommends a tiered approach in line with best practice for human health and controlled water risk assessment and defines Relevant Ecological Receptors as any of the Relevant Types of Receptor as set out in Table 1 of Defra Statutory Guidance on Contaminated Land dated April 2012.

Argyll assesses Relevant Ecological Receptors as part of its assessment process. To do so it uses the Argyll EcoRisk model which was developed and tested in consultation with leading experts and is based on the Environment Agency framework.

The Environmental Damage (Prevention and Remediation) Regulations 2009, as amended, were introduced on 1 March 2009 to implement the provisions of the European Union's Environmental Liability Directive into law in England[5]. The aim of EDR is to prevent and remedy damage to protected species or natural habitats or a site of special scientific interest, surface water, groundwater, coastal water or to land. 'Environmental damage' has a specific meaning in the Regulations, and must meet key criteria. Existing legislation with provisions for environmental

[4] Water Environment (Controlled Activities)(Scotland) Regulations 2005 where appropriate.
[5]Environmental Damage (Prevention and Remediation) (Wales) Regulations 2009 or Environmental Liability (Scotland) Regulations 2009 where appropriate.

liability remains in place. The Regulations apply on land in England and on the seabed around the UK up to the limits set out in the Continental Shelf Act 1964, and to waters out to the Renewable Energy Zone, which extends approximately 200 miles out to sea.

Argyll will apply due consideration to the nature of any activities likely to be occurring on Site and review EDR Receptors surrounding the Site. However, Argyll are unable to consider the standard of current operations or instances where environmental damage arises either intentionally or as a result of negligence on behalf of the Site operator.

The assessment excludes the identification of potential liabilities arising as a result of genetically modified organisms and the transportation or delivery of polluting goods which may occur at locations off Site. In addition, not all EDR Receptors can be identified in this assessment including protected species/natural habitats such as nesting bats, nesting birds or migratory bird routes which are not officially designated.

When conducting either assessment, Argyll will primarily assess information provided in the Data section of the Report. However, in some cases Argyll may choose to supplement this with freely available public information such as that provided by Natural England and/or information provided by the Argyll Europa System.

Liability Assessment

In this section Argyll will report on any potential soil and groundwater liabilities which it considers are associated with the Site. Our assessment of Liability is based upon the proposed and current use of the Site (as supplied by the client) in line with current Government guidance.

There will be one of the following three responses:

Assessment	Liability Statement & explanation	Defra Category*
PASSED 	**Within the scope of this assessment no Liabilities have been identified. No further action is required.** This statement indicates that within the scope of this assessment, no issues have been identified that are likely to result in significant cost liabilities under Relevant Legislation.	3 or 4
PASSED 	**Within the scope of this assessment no Liabilities have been identified. However, your attention is drawn to the prudent enquiries suggested below.** This statement indicates that within the scope of this assessment, no issues have been identified that are likely to result in significant cost liabilities under Relevant Legislation. However, a client may wish to obtain further information about other issues disclosed in the Report, which could be material.	3 or 4
FURTHER ACTION 	**Potential Liabilities have been identified under Part 2A of the Environmental Protection Act 1990 (or where appropriate, equivalent requirements under the planning regime) and/or the Water Resources Act 1991[6]. To quantify these you may decide to undertake a more detailed assessment through the recommendation(s) set out below.** This statement indicates that within the scope of this assessment, an issue or a number of issues have been identified that are likely to result in significant cost liabilities under Relevant Legislation. In this event, recommendations are made, in order that additional information is collected so that the liabilities may be more accurately assessed.	Potentially 1 or 2

* According to Defra's updated Statutory Guidance on Contaminated Land, Regulators have a four-stage test to decide when land is and is not contaminated. Category 1 and Category 2 sites would encompass land which is capable of being determined as contaminated land, whereas Category 3 and Category 4 sites would encompass land which is not capable of being determined as contaminated land.

[6]Water Environment (Controlled Activities)(Scotland) Regulations 2005 where appropriate.

Limitations of the Report

The **SITE**SOLUTIONS reports have been designed to satisfy standard environmental due-diligence enquiries, as recommended by the Law Society's contaminated land warning card. It is a 'remote' investigation and reviews only information provided by the client and from the databases of publicly available information that have been chosen to enable a desk based environmental assessment of the Site. The Report does not include a site investigation, nor does Argyll make specific information requests of the regulatory authorities for any relevant information they may hold. Therefore, Argyll cannot guarantee that all land uses or factors of concern will have been identified by the Report.

The information in the Data Section of the Report is derived from a number of statutory and non-statutory sources. While every effort is made to ensure accuracy, Argyll cannot guarantee the accuracy or completeness of such information or data. Argyll will not accept responsibility for inaccurate data provided by external data providers.

Further information regarding our risk assessment methodology is provided in the Products and Services User Manual which is available free of charge from the client area of our website www.argyllenvironmental.com. For further information regarding the datasets reviewed within our assessment, please contact one of our technical team on 0845 458 5250. This report is provided under The Argyll Environmental Limited Conditions of Contract for **SITE**SOLUTIONS and **FLOOD**SOLUTIONS Reports (May 2011), a copy of which is available on our website.

Flood Risk Screening Methodology

This section of the report is a desktop flood risk screening report, designed to enable property professionals to assess the risk of flooding at commercial sites. It examines three areas; how flood risk affects the availability of insurance for a site; how flood risk affects the potential to redevelop a site; and the overall risk of flooding at a site (taking into account any flood defences present). The report considers current Government guidance including the National Planning Policy Framework (NPPF). The report has been produced and quality-checked by a qualified consultant using the data contained in this report.

Executive Summary and Consultants Comment

In this section Argyll will summarise in a statement whether any significant flood risks have been identified and whether insurance is likely to be available at Standard Terms.

There will be one of the following three responses:

Assessment	Risk Statement
PASSED	Low and Low to Moderate - The site is not considered to be at significant risk of flooding. No further action is considered necessary.
PASSED	Moderate - Data suggest that there are features which may present a flood risk to the site and its occupants during an extreme flood event. However, buildings and contents insurance should easily be available in most cases.
FURTHER ACTION	Moderate to High and High - This report reveals significant flood risk issues which should be addressed. Further assessment is recommended in order to clarify the risk of flooding at the site and to determine appropriate flood protection measures.

Insurance Availability

Argyll provides an indication of whether the Site is likely to be insurable for flood risk at standard terms. The answer to Question1 (on page 3) is based on consideration of Risk of Flooding from Rivers and Sea data supplied by The Environment Agency and surface water flooding data supplied by JBA Risk Management. This data is used by a significant proportion of the insurance industry to help determine the suitability of a Site for insurance, although they may access additional information which could affect their assessment.

Under the Association of British Insurers' Revised Statement of Principles on the Provision of Flooding Insurance (July 2008), the general policy of member companies is that flood insurance for domestic properties and small businesses should continue to be available for as many customers as possible until 1st July 2013, by which time a longer term solution should be implemented. The premiums charged and other terms will reflect the risk of flooding but insurance will be available:

1. for properties where the flood risk is not significant (generally defined as no worse than 1.33% or 1–in-75 years annual probability of flooding); and
2. to existing domestic property and small business customers at significant risk, providing the Environment Agency has announced plans to reduce that risk within five years, such as improving flood defences. (The commitment to offer cover will extend to the new owner of any applicable property subject to satisfactory information about the new owner).

However, for significant risk areas where no improvements in flood defences are planned, and in all cases other than domestic properties and small businesses, insurers cannot guarantee to provide cover, but will examine the risks on a case-by-case basis. The implementation of the revised Statement of Principles depends on action from the Government and is continually reviewed by insurers. In addition, the revised Statement of Principles does not apply to properties built after 1st January 2009. Different guidance applies to these (see Climate Change – Guidance on Insurance Issues for New Developments from www.abi.org.uk).

The responses to the question 'Is the Site likely to be insurable at standard terms?' assume the Site is an existing domestic property or small business and makes no allowance for previous claims arising from any type of flooding, nor for non-flood related risks such as subsidence.

Response	Meaning
Yes	The Site is likely to be considered acceptable by insurance companies at standard terms and flood insurance should not be difficult to obtain. No further action required.
No	The Site is not likely to be considered acceptable by insurance companies at standard terms, on the basis of current information. Further work may be required in order to obtain acceptable insurance terms for the flood risk. This could include a more detailed risk assessment or the use of accredited products, flood resilient materials and temporary defences to defend the property.

Development Risk

Argyll comments on whether a full or partial Flood Risk Assessment (FRA) would be required in accordance with National Planning Policy Framework (NPPF). The answer to Question 1 is indicative only and is based on the size of the Site (as supplied by the client) and the information in the data section of this report.

NPPF sets out Government policy on development and flood risk. Its aims are to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas of highest risk. Where new development is exceptionally necessary, NPPF aims to make it safe, without increasing flood risk elsewhere, and, where possible, reducing flood risk overall.

A separate Drainage Impact Assessment may be required in addition to an FRA to demonstrate that development of the Site will not adversely affect flood risk elsewhere.

Response	Meaning
Yes (Full)	If the Site was redeveloped, a full Flood Risk Assessment is likely to be required which should include a Drainage Impact Assessment.
Yes (Drainage)	If the Site was redeveloped, a full Flood Risk Assessment may not be required however, given the size of the Site, a Drainage Impact Assessment may be necessary.
No	If the Site was to be redeveloped, no further flood assessment is likely to be required.

Flood Risk Rating

Argyll provides an overall flood risk rating based on an assessment of the data provided within this report. It does so by asking two questions:

2. What is the overall risk of flooding, assuming flood defence fail or are absent or overtopped?

The answer to Question 2 provides a worst case scenario assuming there are either no defences in the area, that any defences in the area could fail, primarily as a result of river or coastal flooding, or are overtopped by excessive flood volumes.

3. Are there existing flood defences which might benefit the Site?

The answer to Question 3 is based on the presence of any flood defences in the dataset provided by the Environment Agency within 500m of the Site. It should be noted that a residual risk of flooding may be present if such defences failed. Flood defences do not generally protect the Site against groundwater and surface water flooding.

If defences are present within 250m, a further question is asked:

4. What is the risk of flooding when these defences are operational?

This assesses the risk from flooding, assuming these defences work as intended and neither fail nor are overtopped.

Questions 2 and 3 are answered by one of six standard responses:

Response	Meaning
Negligible	The overall flood risk rating for the Site is assessed to be 'Negligible'. Existing datasets do not indicate any risk at the Site itself, or any feature within the locality of the Site, which would be expected to pose a threat of flooding. It is not considered that any further investigations are necessary in regard to flood risk.
Low	The overall flood risk rating for the Site is assessed to be 'Low'. Although large sites (over 1 ha) would require a Drainage Impact Assessment to accompany any planning application, it is not considered necessary to undertake any other further investigations into the flood risk to the Site.
Low to Moderate	The overall flood risk rating for the Site is assessed to be 'Low to Moderate'. The presence of such features as flood defences, flood storage areas and watercourses within the locality of the Site suggests that there may be a risk of flooding to the Site itself. Further investigations could be undertaken to further assess this risk.
Moderate	The overall flood risk rating for the Site is assessed to be 'Moderate'. Information from existing datasets suggests that there are certain features which may present a risk to the Site and its occupants. Further assessment would normally be suggested as a prudent measure to clarify the risk of flooding at the Site.
Moderate to High	The overall flood risk rating for Site is assessed to be 'Moderate to High'. Information from existing datasets suggests that there are certain features which may present a significant risk to the Site and its occupants. Further assessment is usually recommended in order to clarify the risk of flooding at the Site.
High	The overall flood risk rating for Site is assessed to be 'High', with a consequent risk to life and property. This means that existing datasets reveal significant flood risk issues which need to be addressed. Further assessment is usually recommended in order to clarify the risk of flooding at the Site.

Flood Analysis

The flood risk gauges provide a more detailed analysis of the risk from each of the four main types of flooding – river, coastal, groundwater and surface water. In addition, a fifth gauge provides an analysis of other factors (i.e. historic flood events, geological deposits which are indicative of past flooding, proximity to surface water features and elevation above sea level) that may affect the overall flood risk. For surface water flooding, only the risk rating generated from the 1:200 year rainfall event data is included in the overall risk assessment. The data on 1:75 year and 1:1,000 year rainfall events is provided for information only. For further information on each of these types of flooding, please refer to the Argyll FloodSolutions User Guide.

This analysis takes into account any existing flood defences that are intended to protect the Site and assumes that these work as designed. The analysis also takes into account the other information contained in those data sections of the report which are relevant to that particular type of flooding. The assessment of the risk as shown in the flood gauge should therefore take priority over the information in the individual data sections of the report.

Limitations of the Report

The report has been designed to satisfy basic flood-related environmental due-diligence enquiries for commercial properties. It is a desktop review of information provided by the client and from selected private and public databases. It does not include a site investigation, nor are specific information requests made of the regulatory authorities for any relevant information (other than local water and sewerage providers). Therefore, Argyll cannot guarantee that all issues of concern will be identified by this report, or that the data and information supplied to it by third parties is accurate and complete.

This report includes an assessment of surface water flooding which examines the risk of the general drainage network overflowing during periods of extreme rainfall. This report does not make a detailed site-specific assessment of the suitability of the existing drainage on the Site. If this is required, then a site survey should be considered. The assessment of pluvial flooding does not take into account particular local or temporary factors that may cause surface water flooding such as the blockage or failure of structures on or within watercourses, drains,

foul sewers, water mains, canals and other water infrastructure; and any history of drains flooding at the Site or in the locality. Surface water flooding can occur before surface water reaches the general drainage network, for example on hills and inclines.

The Risk of Flooding from Rivers and Sea dataset provided by The Environment Agency does take account of failure of flood defences but does not take into account particular local or temporary factors such as blockage. Environment Agency data does not include flood risk from very small catchments as models of such small scale catchments are not considered to be reliable for UK-wide flood risk assessments. The potential impact of climate change on flood risk to the Site would require further study.

When answering any questions within this report, current applicable legislation is taken into account.

The data used in this report may have inherent limitations and qualifications. Further details are set out in the FloodSolutions User Guide which is available free of charge from our website www.argyllenvironmental.com , or by calling one of our technical team on 0845 458 5250.

This report is provided under The Argyll Environmental Limited Conditions of Contract for SITESOLUTIONS and FLOODSOLUTIONS Reports (July 2013), a copy of which is available on our website, www.argyllenvironmental.com or by calling one of our technical team on 0845 458 5250

Flood Glossary

Business Continuity Plan
A business continuity plan is a strategic plan of action for a business to implement in an emergency (i.e. flood event). This plan ensures a business can continue to operate during emergency situations and reduces the risk of suffering avoidable losses. For example, it may cover such items as emergency accommodation and computer back up off site.

Flood Evacuation Plan
A flood evacuation plan sets out clear steps to ensure the safe evacuation of staff during a flood. It will form part of the Business Continuity Plan.

Coastal Flooding
Coastal flooding is the inundation of land areas along the coast caused by sea water rising above normal tidal conditions. Coastal flooding can arise from a combination of high tides, wind induced tidal surge, storm surge created by low pressure and wave action.

Flood Resistance Measures
These measures are designed to prevent flood water from entering the buildings on Site.

Flood Resilience Measures
These measures are intended to make buildings more resilient to flood damage so that they recover more quickly from flooding. They are not designed to prevent flood water entering the property.

Flood Risk Assessment
A full Flood Risk Assessment (FRA) Report is a bespoke report required under NPPF for any development site within Environment Agency Flood Zones 2 or 3 and/or any development site larger than 1 hectare. These reports are generally prepared following liaison with the Local Planning Authority and the application of the sequential test.

Flood Zone 1
An area of low probability of flooding as defined by the Environment Agency – a flood return period of 1 in 1,000 or more.

Flood Zone 2
An area of medium probability of flooding as defined by the Environment Agency – a flood return period between 1 in 100 to 1 in 1,000 for river flooding and 1 in 200 to 1 in 1,000 for coastal flooding.

Flood Zone 3a
An area of high probability of flooding as defined by the Environment Agency – a flood return period between 1 in 20 to 1 in 100 for river flooding and 1 in 200 for coastal flooding.

Flood Zone 3b
This area is a functional floodplain as defined by the Environment Agency. It is an area which is designed to flood – a flood return period of 1 in 20 or less.

Groundwater Flooding
Groundwater flooding occurs when ground water levels increase sufficiently for the water table to intersect the ground surface. Groundwater flooding can occur in a variety of geological settings including valleys and in areas underlain by chalk, and in river valleys with thick deposits of alluvium and river gravels.

NPPF
This relates to the National Planning Policy Framework and the associated Technical Guidance.

Pluvial (Surface Water) Flooding
Pluvial flooding results from rainfall running over ground before entering a watercourse or sewer. It is usually associated with high intensity rainfall events (typically greater than 30mm per hour) but can also occur with lower intensity rainfall or melting snow where the ground is already saturated, frozen, developed (for example in an urban setting) or otherwise has low permeability.

Return Period
Return periods are a measure of how likely flooding is to occur. They are commonly expressed as a ratio (for example 1 in 75 or 1:75). This means that this level of flooding is expected once in every 75 years.

River Flooding
River flooding mainly happens when the river catchment (that is the area of land that feeds water into the river and the streams that flow into the main river) receives greater than usual amounts of water (for example through rainfall or melting of snow). The amount of runoff depends on the soil type, catchment steepness, drainage characteristics, agriculture and urbanisation as well as the saturation of the catchment. The extra water causes the level of the water in the river to rise above its banks or retaining structures.

Important Consumer Protection Information

This search has been produced by Argyll Environmental Ltd, 1st Floor, 98 – 99 Queens Road, Brighton, BN1 3XF. Telephone: 0845 458 5250, e-mail: orders@argyllenviro.com which is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom
- sets out minimum standards which firms compiling and selling search reports have to meet
- promotes the best practice and quality standards within the industry for the benefit of consumers and property professionals
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.

By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports
- act with integrity and carry out work with due skill, care and diligence
- at all times maintain adequate and appropriate insurance to protect consumers
- conduct business in an honest, fair and professional manner
- handle complaints speedily and fairly
- ensure that products and services comply with industry registration rules and standards and relevant laws
- monitor their compliance with the Code

Complaints

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award up to £5,000 to you if the Ombudsman finds that you have suffered actual financial loss and/or aggravation, distress or inconvenience as a result of your search provider failing to keep to the Code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

TPOs Contact Details:

The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
Web site: www.tpos.co.uk
Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk.

PLEASE ASK YOUR SEARCH PROVIDER IF YOU WOULD LIKE A COPY OF THE SEARCH CODE

Complaints procedure

If you want to make a complaint, we will:

- Acknowledge it within 5 working days of receipt.
- Normally deal with it fully and provide a final response, in writing, within 20 working days of receipt.
- Keep you informed by letter, telephone or e-mail, as you prefer, if we need more time.
- Provide a final response, in writing, at the latest within 40 working days of receipt.
- Liaise, at your request, with anyone acting formally on your behalf.

Complaints should be sent to:

Legal Director
Argyll Environmental Ltd
1st Floor
98 - 99 Queens Road
Brighton
BN1 3XF

Telephone: 0845 458 5250
Email: orders@argyllenviro.com

If you are not satisfied with our final response, or if we exceed the response timescales, you may refer the complaint to The Property Ombudsman scheme (TPOs): Tel: 01722 333306, E-mail: admin@tpos.co.uk

We will co-operate fully with the Ombudsman during an investigation and comply with his final decision.

APPENDIX C

- Delta Simons Environmental Report (Ref 20-0093.01, Dated April 2020)

Environmental Report

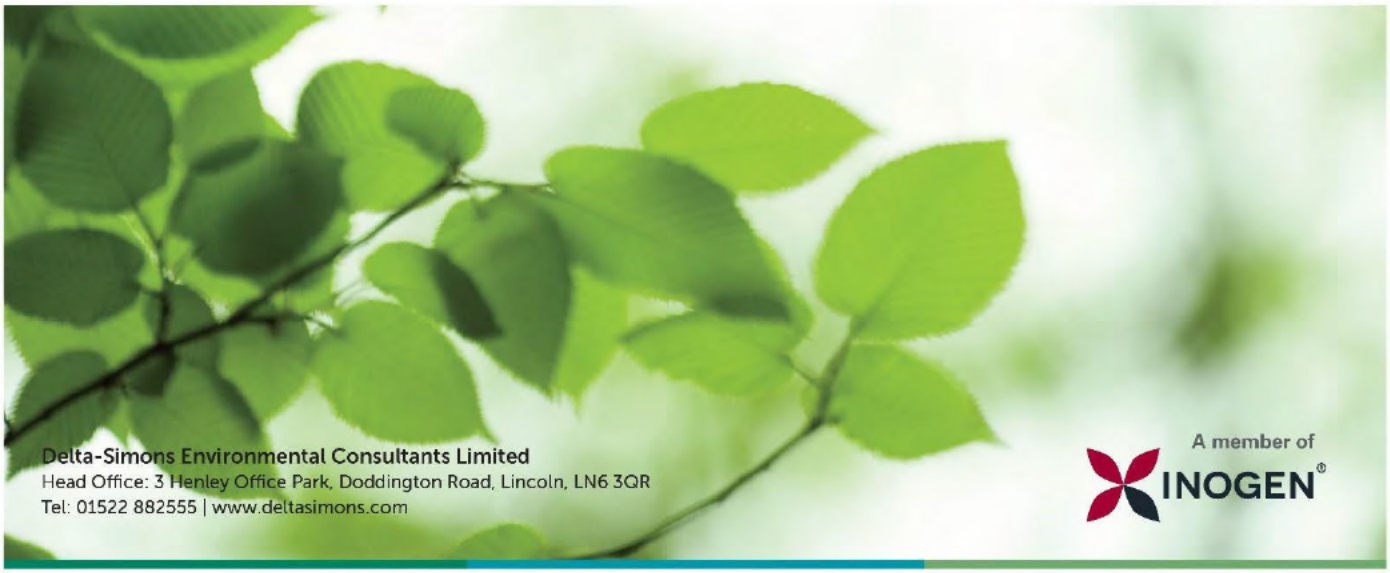
WGC-One YMCA, Peartree Lane, Welwyn Garden City

Presented to **Pinnacle Consulting Engineers**

Issued: April 2020

Delta-Simons Project No. 20-0093.01

deltasimons



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Report Details

Client	Pinnacle Consulting Engineers
Report Title	Environmental Report
Site Address	YMCA, 90 Peartree Lane, Welwyn Garden City, AL7 3UL
Project No.	20-0093.01
Report Date	1st April 2020
Delta-Simons Contact	Redmond Parker-Dunn ([redacted])

Quality Assurance

Issue No.	Status	Issue Date	Comments	Author	Technical Review	Authorised
1	Final	1st April 2020				
				Jessica Rowe Consultant	Redmond Parker-Dunn Principal	Paul Huteson Associate

About us

Delta-Simons is a trusted, multidisciplinary environmental consultancy, focused on delivering the best possible project outcomes for customers.

Specialising in Environment, Health & Safety and Sustainability, Delta-Simons provide support and advice within the property development, asset management, corporate and industrial markets. Operating from ten locations - Lincoln, Birmingham, Bristol, Dublin, Leeds, London, Manchester, Newcastle, Norwich and Nottingham - we employ over 100 environmental professionals, bringing experience from across the private consultancy and public sector markets.

Delta-Simons is proud to be a founder member of the Inogen® Environmental Alliance, a global corporation providing multinational organisations with consistent, high quality and cost effective environmental, health, safety, energy and sustainability solutions. Inogen assists multinational clients by resolving liabilities from the past, addressing today's requirements and delivering solutions for the future. With more than 200 offices located on every continent, more than 6,430 staff worldwide, and projects completed in more than 120 countries, Inogen provides a single point of contact for diverse markets as Automotive, Chemical, Consumer Products & Retail, Financial, Food & Beverage, Healthcare, Insurance, Manufacturing, Non Profit Organisations, Oil & Gas, Real Estate, Services Firms, Technology and Transportation, among others.

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1.0 Introduction

1.1 Authorisation

Delta-Simons Environmental Consultants Limited ("Delta-Simons") was instructed by Pinnacle Consulting Engineers (the "Client") to prepare anEnvironmental Assessment for YMCA, 90 Peartree Lane, Welwyn Garden City, AL7 3UL (the "Site"). A Site Location Map is included as Figure 1.

1.2 Context & Purpose

It is understood that the proposed development comprises the demolition of all structures at the Site and the construction of a four-storey 100 bed YMCA Hostel and a 2, 3 and 4 storey building providing up to 43 residential apartments as detailed in Welwyn Hatfield Borough Council Planning Application 6/2019/2714/OUTLINE. The Proposed Site Layout is included as Drawing 1.

Correspondence with the Local Planning Authority has been provided by the Client, indicating the requirement of a ground investigation to assess the potential presence and associated mobilisation of contamination beneath the Site as part of the proposed surface water drainage strategy for the Site. This investigation does not represent a Geotechnical investigation.

The following Third-Party information has been made available to Delta-Simons for review:

- Argyle Environmental, Site Solutions Combined, Ref. AEL-0046-TSC-959119, dated December 2018.

In addition, Delta-Simons has produced a factual BRE365 infiltration report , dated 1st April 2020, which is reported under a separate cover.

The scope of the investigation and layout of this report has been designed with consideration of guidance on Land Contamination: Risk Management pages of the GOV.UK web pages, the relevant requirements of the National Planning Policy Framework 2019 (NPPF) (paragraphs 170 & 178-180)[1] and the Planning Practice Guidance (Land Affected by Contamination)[2].

The project was carried out to an agreed brief as set out in Delta-Simons' proposal dated January 2020 (Ref. 20-0093.01).

This Report has been based on a review of a previous Third-Party report together with fieldworks comprising soil sampling. Selected soil samples were scheduled for laboratory chemical analysis. Monitoring was carried out on the Site for water levels and concentrations of hazardous ground gas.

The results of the sampling, with the relevant laboratory work, have been presented in the Appendices.

The methods of desk study and fieldworks have been described in Section 2.

The interpretation of the results has been presented as a table in Section 3 with desk study, a conceptual site model (CSM) and initial risk assessment based on the source-pathway-receptor principle and recommendations for aspects of planning design and construction.

1.3 Scope

The scope of works performed for this Report comprised the following:

- Review of previous Third-Party report;
- Soil sampling;
- In-situ penetration testing;
- Laboratory testing;
- Ground gas monitoring; and

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/779764/NPPF_Feb_2019_web.pdf
[2] https://www.gov.uk/guidance/land-affected-by-contamination

- Contamination assessment.

1.4 Limitations

The assessment is limited to the issues agreed within the proposal for the works. Notes on limitations associated with this assessment are provided in Appendix A.

Due to the presence of buildings, associated infrastructure and pedestrian access intrusive locations were limed to accessible areas of the Site to not disrupt the overall operation of the facility.

2.0 Investigation Methodology

2.1 Desk Study

The following third-party information has been provided to Delta-Simons, which should be read in conjunction with this Report:

- Argyle Environmental, SiteSolutions Combined, Ref. AEL-0046-TSC-959119, dated December 2018.

2.2 Conceptual Site Model

A Conceptual Site Model (CSM) represents the relationships between contaminant sources, pathways and receptors. Where all three components may be present on a risk basis an identification and assessment of Possible Pollutant Linkages (PPL) is achieved. Assessing risk in land contamination underpins the "suitable for use" approach adopted for Part 2A of the EPA 1990 regulatory regime and government guidance on land affected by contamination (published 12 June 2014 on gov.uk web site).

Risk is based on the assessor's judgement and a Delta-Simons standard approach. The standard approach is derived from government guidance and uses definitions and a matrix system derived from government guidance and CIRIA document C552 (Contaminated land risk assessment. A Guide to Good Practice).

Sources are listed as part of hazard identification and for this report typically comprise soil and groundwater contaminants on-Site, or off-site where potentially mobile across property boundaries. Ground gas hazards are always considered mobile and subject to ground conditions. Waste items including asbestos are also considered, as are; soil stockpiles, chemical stores and obviously presented invasive weeds.

Relevant potential receptors are considered to include:

- R1 - Construction workers.
- R2 - Third parties during construction (adjacent site users and adjacent residents).
- R3 - Future residents.
- R4 - The underlying Aquifer / Controlled waters.
- R5 - The Built Environment (new buildings and infrastructure).
- R6 – Plants/ vegetable/ livestock in any proposed landscaped areas.

Relevant potential pathways are considered to include:

- P1 - Direct contact, ingestion or inhalation of soil bound contaminants / dust during redevelopment.
- P2 - Inhalation of vapours associated with contamination.
- P3 - Migration of ground gas into on-site buildings causing asphyxiation or risk of explosion.
- P4 - Leaching of contamination into groundwater followed by migration to the wider environment or surface waters.
- P5 - Direct contact between aggressive ground conditions and new infrastructure.
- P6 – Plant and animal uptake.

Where hazards are identified, a Preliminary Risk Assessment (PRA) is undertaken to assess the PPL, and to apply a justified risk ranking (very low - high). Where the PPL is sufficient to result in land being considered as 'contaminated land' under the terms of Part 2A of the Environmental Protection Act (EPA) 1990, a Significant Pollutant Linkage (SPL) may be defined.

A revised CSM is presented which takes into account the relevant findings of the field and laboratory outcomes.

Appendix B also contains the applied risk definitions and matrices.

2.3 Planning, Health & Safety (CDM), Setting Out & Services

Unless otherwise stated, the investigation has been planned on a scope of works agreed with the Client which is typically based on multiples of one day on-Site with various drilling and sampling equipment, or a measured amount of drilling and testing.

For most projects Delta-Simons adopts a role equivalent to principal contractor (PC) where none exists for the project and complies a construction phase plan (CPP) The CPP is incorporated into a comprehensive Health and Safety Plan with relevant information, risk assessments and method statements where applicable intended to keep the field staff safe.

Clients are requested to provide all service plans in original form from suppliers so a service avoidance risk assessment (SARA) can be undertaken as part of a formal Site-specific Health and Safety Plan. The SARA is based on guidance provided in HSG47 Avoiding danger from underground services.

Exploratory hole and subsequent sample locations are selected to provide suitable coverage of the Site, having regard for the likely presence of services and any other constraints such as existing structures and sub-structures. Where applicable, suspected emissions locations, or geological variations may have been targeted.

The locations of the investigations are shown on Figure 3 and the field records are provided in Appendix C.

2.4 Dynamic Sampler Boreholes

Dynamic sampler borehole systems are not explicitly described in Eurocodes, or in the relevant British Standard BSENISO 22475-1:2006 Geotechnical investigation and testing – Sampling methods and groundwater measurements – Part 1: Technical principles for execution.

The dynamic sampler system comprises a series of varying diameter metal tubes of 1 m or 2 m length, which allows a liner to be inserted. The tubes are driven into the ground using a percussive weight falling through a standard drop onto an anvil attached to solid rods, and withdrawn by use of a hydraulic jack. The soil is pushed into the tube/liner during the driving, and samples are recovered from the tube once it has been split for description. Alternatively, liners are omitted and the metal tubes have slots or windows cut into the sides where samples can be taken directly by hand. The liner method potentially offers a lower degree of sample disturbance.

The system can achieve typical depths of around 3 m to 5 m in favourable soil conditions. The system is limited by coarse gravel or other large fragments, and also in wet sands where the hole collapses. Some casing systems exist. The details of the ground conditions encountered are presented on the relevant field record sheets, which also detail the type and depths of samples taken and the results of any in-situ tests. Other relevant information may also be recorded including groundwater levels and details of any standpipe installations.

2.5 Standpipe Installations

Three of the dynamic sampler boreholes has been fitted with a gas/water monitoring standpipe of 50 mm internal diameter UPVC slotted and plain casing to the required depth as appropriate, capped by a gas tap bung and cover generally in accordance with BSENISO 22475-1:2006 for an open standpipe. The locations of the monitoring installations are shown on Figure 3.

2.6 Standard Penetration Tests

Standard penetration testing is undertaken generally in accordance with BS EN ISO 22476-2:2005+A1:2011 *Geotechnical investigation and testing. Field testing. Standard probing*

2.7 Monitoring Groundwater & Ground Gas

Groundwater monitoring is undertaken using an electronic dip meter, which records the depth to water in a standpipe. Ground gas composition and flow monitoring is undertaken where standpipes have been installed. Both flow (litres per hour) and composition (%) are measured using an infra-red gas monitor, calibrated for methane, carbon dioxide & oxygen. Records are also taken of atmospheric pressure. The monitoring field records are presented in Appendix D.

2.8 Chemical Analysis

The results of the chemical analysis are presented in Appendix E.

2.9 Generic Quantitative Risk Assessment (GQRA)

Human Health

In the absence of a statutory contamination thresholds in the UK a set of Generic Assessment Criteria (GAC derived principally using the Contaminated Land Exposure Assessment (CLEA) Framework have been adopted to assess the significance of the contamination encountered. The values adopted are for a residential without plant uptake end-use.

The Delta-Simons methodology for GQRA comprises comparison of limited chemical analysis results with the criteria for the most sensitive plausible end-use scenario in the proposed scheme.

Exceedance of criteria indicates that risk above “minimal” level may exist in a worst-case scenario across the whole Site. The precautionary principle is applied with respect to protection of human health recommending; further risk assessment (increased characterisation including extents/zones), or site-wide remediation.

If no criteria exceedance is observed, recommendations for further risk assessment, or remediation due to uncertainty over full characterisation of the Site.

Post-report action should be Site-specific and based on a Client’s resource/risk profile in undertaking developments in accordance with any regulator requirements. Under the planning control, the responsibility for a safe development remains with the Developer.

Controlled Waters

For the purposes of assessment of risks to controlled waters, where water samples have been obtained these have been compared to appropriate water quality standards.

Ground Gas

Two rounds of ground gas monitoring have been undertaken as part of this assessment, the results of which are provided in Appendix D.

Figure 1 – Site Location Map

Scale: 1 / 500,000 @ A4

LEGEND

Site Boundary

Scale: 1 / 10,000 @ A4

deltasimons
Environment - Health & Safety - Sustainability

TITLE:
Site Location Map
WCG- One YMCA
Peartree Lane, Welwyn Garden City

DRAWN BY:	SCALE:	PROJECT NO:
JR	To Scale@A4	20-0093
CHECKED BY:	REVISION:	FIGURE NO:
AH	1	1
DATE: 13th March 2020		

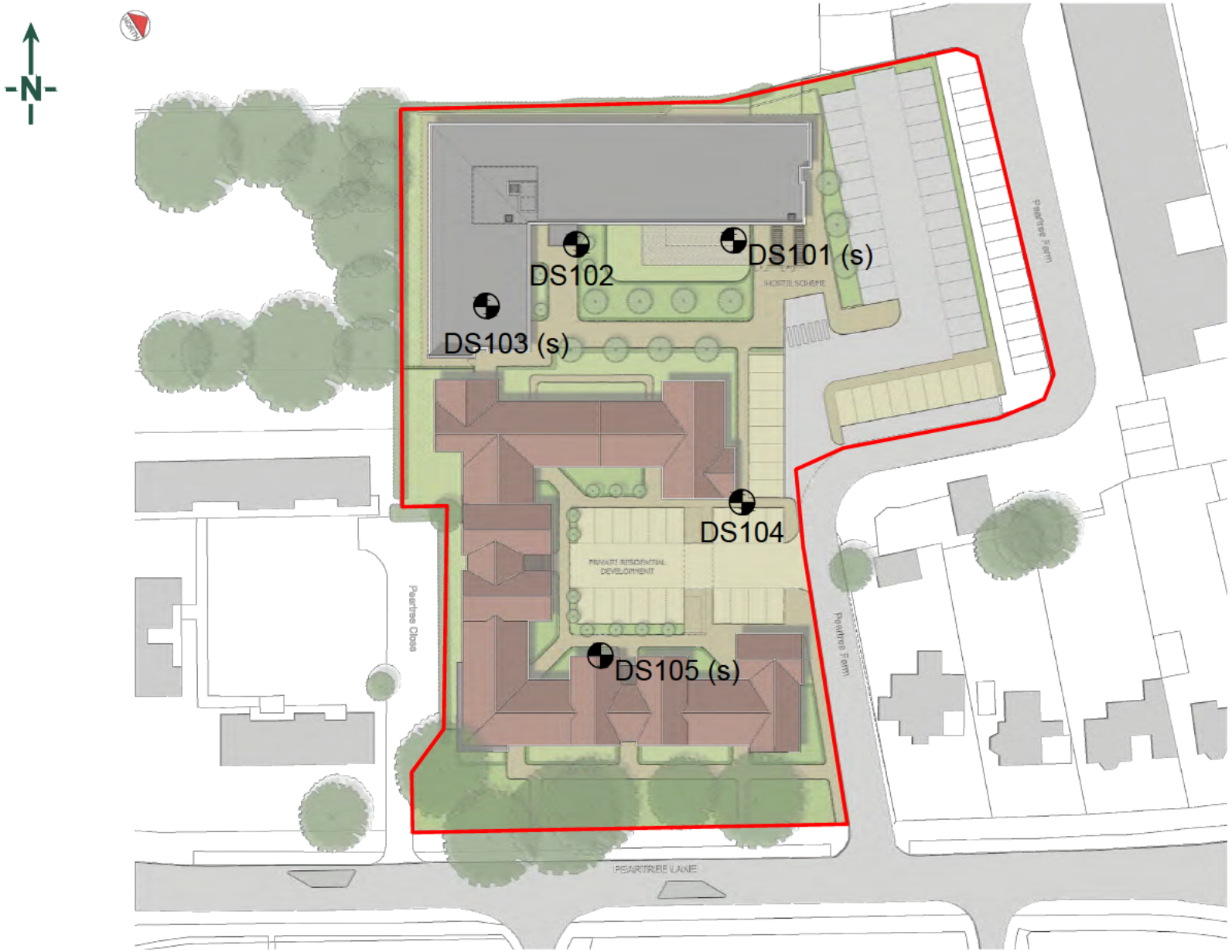
Figure 2 – Site Layout Plan

deltasimons
Environment - Health & Safety - Sustainability

TITLE:
Site Layout Plan
WCG-One YMCA
PeartreeLane, Welwyn Garden City

DRAWN BY: JR	SCALE: Not to Scale	PROJECT NO: 20-0093.01
CHECKED BY: RPD	REVISION: 1	FIGURE NO: 2
DATE: 24th March 2020		

Figure 3 – Approximate Intrusive Location Plan



LEGEND

- Site Boundary
- DSx Dynamic Sampler Borehole
- (s) Standpipe Installation

FOR PLANNING

REV	DATE	NOTE	IN

Project
YMCA
PEARTREE LANE
WELWYN GARDEN CITY

Title
PROPOSED SITE LAYOUT

Scale 1:500 @A3 | Date SEPT 2019
Drawn SD | Checked AL
Drawing Number 8057 / P101 | Revision --

Saunders
Architecture + Urban Design

Site Plan provided by Client

deltasimons
Environment - Health & Safety - Sustainability

TITLE:
Approximate Intrusive Location Plan
WCG-One YMCA
PeartreeLane, Welwyn Garden City

DRAWN BY:	SCALE:	PROJECT NO:
JR	Not to Scale	20-0093.01
CHECKED BY:	REVISION:	FIGURE NO:
AH	1	3
DATE:		
13th March 2020		

Drawing 1 – Proposed Development Plan

NOTES ©

This drawing to be read in accordance with the specification/Bills of Quantities and related drawings. No Dimensions to be scaled from this drawing. All stated dimensions to be verified on site and the Architect notified of any discrepancies.

0 50

Scale bar 50mm at 1:1

FOR PLANNING

REV	DATE	NOTE	IN

Project

YMCA
PEARTREE LANE
WELWYN GARDEN CITY

Title

PROPOSED SITE LAYOUT

Scale	Date
1:500 @A3	SEPT 2019
Drawn	**Checked**
SD	AL

Drawing Number: 8057 / P101

Revision: -

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Appendix A - Limitations

Limitations

The recommendations contained in this Report represent Delta-Simons professional opinions, based upon the information listed in the Report, exercising the duty of care required of an experienced Environmental Consultant. Delta-Simons does not warrant or guarantee that the Site is free of hazardous or potentially hazardous materials or conditions.

Delta-Simons obtained, reviewed and evaluated information in preparing this Report from the Client and others. Delta-Simons conclusions, opinions and recommendations has been determined using this information. Delta-Simons does not warrant the accuracy of the information provided to it and will not be responsible for any opinions which Delta-Simons has expressed, or conclusions which it has reached in reliance upon information which is subsequently proven to be inaccurate.

This Report was prepared by Delta-Simons for the sole and exclusive use of the Client and for the specific purpose for which Delta-Simons was instructed. Nothing contained in this Report shall be construed to give any rights or benefits to anyone other than the Client and Delta-Simons, and all duties and responsibilities undertaken are for the sole and exclusive benefit of the Client and not for the benefit of any other party. In particular, Delta-Simons does not intend, without its written consent, for this Report to be disseminated to anyone other than the Client or to be used or relied upon by anyone other than the Client. Use of the Report by any other person is unauthorised and such use is at the sole risk of the user. Anyone using or relying upon this Report, other than the Client, agrees by virtue of its use to indemnify and hold harmless Delta-Simons from and against all claims, losses and damages (of whatsoever nature and howsoever or whensoever arising), arising out of or resulting from the performance of the work by the Consultant.

Appendix B - Risk Definitions

Contaminated Land Risk Definitions

The following methodology is based on the methodology presented in CIRIA C552 Contaminated Land Risk Assessment: A Guide to Good Practice 2001. It requires the classification of the:

- Magnitude of the potential consequence (severity) of the Risk occurring: and
- Magnitude of the Probability (likelihood) of the Risk occurring.

The classifications are then compared to indicate the risk presented by each pollutant linkage.

Consequence to Receptor Definition Matrix

	Human Health	Controlled Waters	Buildings/Services
Severe Consequence	Acute or chronic permanent impact on human health.	Sensitive controlled water pollution ongoing, or just about to occur.	Catastrophic collapse
Medium Consequence	Chronic permanent impact on human health	Gradual pollution of sensitive controlled water	Degradation of materials
Mild Consequence	Chronic temporary impact on human health	Gradual pollution of non-sensitive controlled water	Damage to building rendering it unsafe.to occupy (eg foundation damage resulting in instability).
Minor Consequence	Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc).	Slight discoloration of water	Easily repairable effects of damage to buildings, structures and services, i.e discoloration of concrete

Probability Definitions

Probability	Definition in Context
Higher	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution. Positive evidence of source, pathway and receptor.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term. Suspect source, pathway, and receptor
Low Likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term No evidence of hazard, pathway, and receptor

Standard Risk Matrix

		Consequence/Magnitude of impact			
		Severe	Medium	Mild	Minor
Probability	**High**	Very High	High	Moderate	Moderate/Low
	Likely	High	Moderate	Moderate/low	Low
	Low Likelihood	Moderate	Moderate/low	Low	Very Low
	Unlikely	Moderate/low	Low	Very Low	Very Low

Classified risks and likely action

Significance Level	Definition/Comments
Very High Risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required. Demonstrable contaminated land situation, highest threat & liability level, urgent action recommended.
High Risk	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term. Likely contaminated land situation, risk assessment and action recommended.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, if is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term. Plausible contaminated land situation, risk assessment and possible action recommended.
Low Risk	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild. Unlikely contaminated land situation, possible risk assessment and possible action.
Very Low Risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe. Negligible risk, no action recommended except vigilance for changes in conditions.

Geotechnical Risk Classification

The geohazards listed in the report within Section 4 follow guidance presented in Clayton, C.R.I. (2001) *Managing Geotechnical Risk*, Thomas Telford and the Highways Agency document HD22/08 '*Managing Geotechnical Risk*' (2008) which aims to identify and manage the geotechnical risks associated with a scheme throughout its lifespan, from planning to construction to maintenance.

For each geohazard the probability of the hazard occurring (P) has been considered together with the impact it would have (I) if it were to happen to calculate the risk rating between 1 and 25.

Risks that fall within Moderate, Significant and Severe categories below are considered to be ***substantial*** and are therefore listed within the report.

Probability	**(P)**
Very Likely (VLk)	5
Likely (Lk)	4
Plausible (P)	3
Unlikely (U)	2
Very Unlikely (VU)	1

X

Impact	**(I)**
Very High (VH)	5
High (H)	4
Medium (M)	3
Low (L)	2
Very Low (VL)	1

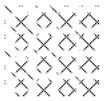
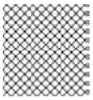
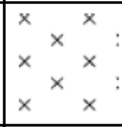
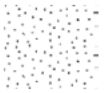
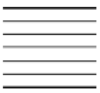
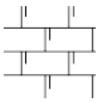
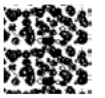
=

(R)	**Risk**
20 – 25	Severe
15 – 19	Substantial
10 – 14	Moderate
5 – 9	Minor
1 – 4	Negligible

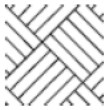
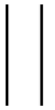
Appendix C - Key to Logs, Field Records & Compliance Certificates

KEY TO BOREHOLE AND TRIAL PIT LOGS

MATERIAL LEGENDS

	Topsoil		Made Ground		Bituminous Material
	Concrete		Clay		Silt
	Sand		Gravel		Peat
	Cobbles		Boulders		Mudstone
	Siltstone		Sandstone		Limestone
	Chalk		Coal		Breccia
	Conglomerate		Igneous		Metamorphic
	Pyroclastic (volcanic ash)		Gypsum		Shale
	Ironstone		Bedrock (Unidentified)		Void

INSTALLATION/BACKFILL LEGENDS

	Sand		Gravel		Bentonite/Grout
	Arisings		Concrete		Plain Pipe
	Slotted Pipe				

Legend symbols in general accordance with BS 5930:1999+A2:2010 and standard industry practice.

KEY TO BOREHOLE AND TRIAL PIT LOGS

SAMPLE TYPES

ACM	Asbestos Containing Material Sample
B	Bulk Disturbed Sample
BLK	Block Sample
C	Core Sample
CBR	Undisturbed Sample for California Bearing Ratio Test – 154mm diameter
D	Disturbed Sample - Tub
ES	Soil Sample for Environmental Testing
EW	Water Sample for Environmental Testing
G	Gas Sample
U	Undisturbed Driven Tube Sample – 70/102mm diameter, 450mm long
W	Water Sample

TEST TYPES

CPT	Cone Penetrometer Test (kN/m^2)
FID	Flame Ionisation Detector Test (ppm)
HV	In-Situ Hand Sheer Vane Test (kN/m^2)
PID	Photoionisation Detector Test (ppm)
SPT (S)	Standard Penetration Test – Split Spoon Sampler
SPT (C)	Standard Penetration Test – Solid 60 Degree Cone

CORE DETAILS

If	Fracture Spacing (mm) – Minimum, Average, Maximum
NI	Non-Intact where >25 fracture spacings per metre
TCR	Total Core Recovery (%)
SCR	Solid Core Recovery (%)
RQD	Rock Quality Designation (%)
AF	Air Flush Return (%)
WF	Water Flush Return (%)

WATER COLUMN DETAILS

	Water Strike
	Water Level

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Project No:	Hole ID:	Page:
20-0093.01	DS101	1 of 1

Project: WGC-One YMCA, Peartree Lane, Welwyn Garden City

Dynamic Sampler Log

Date: 06/03/2020

Client: Pinnacle Consulting Engineers

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details: Depth (m)	Sample Details: Type	Sample Details: Ref	Test Details: Depth (m)	Test Details: Results	Backfill
MADE GROUND: Grass over dark brown slightly gravelly clayey fine to medium SAND. Gravel is fine to medium subangular to subrounded flint and brick fragments. (TOPSOIL).		0.20	(0.20)	82.89			0.15	ES	ES1			
MADE GROUND: Dark brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded flint and occasional brick fragments.		0.60	(0.40)	82.49								
Soft dark brown sligh ly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangualr to subrounded flint. (LOWESTOFT FORMATION)		0.80	(0.20)	82.29								
Soft to firm light orangish brown slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to medium angular to subrounded flint. (LOWESTOFT FORMATION)		1.20	(0.40)	81.89						1.20	SPT(S) N=23 (4,5/5,6,6,6)	
Medium dense light brown slightly clayey gravelly fine to medium SAND. Gravel is fine to coarse angular to rounded flint. (LOWESTOFT FORMATION)		3.00	(1.80)	80.09						2.00	SPT(S) N=17 (4,5/4,5,4,4)	
Firm light brown slightly sandy gravelly CLAY. Gravel is fine to medium subangular to subrounded flint. Sand is fine to medium (LOWESTOFT FORMATION)		3.33	(0.33)	79.76						3.00	SPT(S) N=16 (4,4/4,4,4,4)	
Firm light brown slightly sandy CLAY. Sand is fine to medium. Including rare medium subrounded flints. (LOWESTOFT FORMATION)		4.50	(1.17)	78.59						4.00	SPT(S) N=15 (3,4/4,3,4,4)	
Firm dark brown slighly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded flint and chalk nodules. (LOWESTOFT FORMATION)		5.00	(0.50)	78.09						5.00	SPT(S) 50 (25 for 140mm/50 for 190mm)	
Borehole complete at 5.00 m bgl.												

Remarks
1. Logged in general accordance with BS 5930:2015.2. Borehole installed to 5 m bgl, with 50mm diameter standpipe, gas bung and traffic strength flush cover.3. Borehole remained dry upon completion.

Water Strike			Water Level		Borehole Diameter	
Date	Time	Depth Strike	Duration (min)	Depth Water	Depth Base	Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale:
E524385.37 N212618.12	83.09	Dynamic Sampling	Premier 110	AH	JR	PH	1:30

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Project No: 20-0093.01 | Hole ID: DS102 | Page: 1 of 1

Project: WGC-One YMCA, Peartree Lane, Welwyn Garden City

Dynamic Sampler Log

Date: 06/03/2020 | Client: Pinnacle Consulting Engineers

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details: Depth (m)	Sample Details: Type	Sample Details: Ref	Test Details: Depth (m)	Test Details: Results	Backfill
MADE GROUND: Grass over dark brown slightly gravelly clayey fine to medium SAND. Gravel is fine to medium subangular to subrounded flint and brick fragments. (TOPSOIL).		0 30	(0 30)	82.68								
MADE GROUND: Light brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded flint and brick fragments.		0.68	(0 38)	82.30			0.60	ES	ES1			
Firm brown mottled grey slightly sandy CLAY. Sand is fine to medium. Including occasional fine to medium subangular to subrounded flints. (LOWESTOFT FORMATION)		2 00	(1 32)	80.98								
Dark brown slightly clayey gravelly fine to medium SAND. Gravel is fine to coarse angular to subangular flint. (LOWESTOFT FORMATION)		2 85	(0 85)	80.13								
Firm dark brown slighly sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse angular to subrounded flint. (LOWESTOFT FORMATION)		5 00	(2.15)	77.98								
Borehole complete at 5.00 m bgl.												

Remarks
1. Logged in general accordance with BS 5930:2015.2. Borehole backfilled with arisings.3. Borehole remained dry upon comple ion.

Water Strike			Water Level		Borehole Diameter	
Date	Time	Depth Strike	Duration (min)	Depth Water	Depth Base	Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale:
E524377.53 N212604.54	82.98	Dynamic Sampling	Premier 110	AH	JR	PH	1:30

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Project: WGC-One YMCA, Peartree Lane, Welwyn Garden City

Dynamic Sampler Log

Date: 06/03/2020

Client: Pinnacle Consulting Engineers

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details: Depth (m)	Sample Details: Type Ref	Test Details: Depth (m)	Test Details: Results	Backfill
MADE GROUND: Gravel over dark brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular flint, brick fragments and glass.		0 30	(0 30)	82.84			0.20	ES ES1			
MADE GROUND: Light brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded flint and brick fragments.		0.60	(0 30)	82.54							
Soft light brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded flint. (LOWESTOFT FORMATION)		1 20	(0.60)	81.94					1.20	SPT(S) N=5 (1,1/1,2,1,1)	
Soft light brown slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse angular to subrounded flint. (LOWESTOFT FORMATION)		2.60	(1.40)	80.54					2.00	SPT(S) N=10 (2,3/2,3,2,3)	
Light brown slightly clayey gravelly fine to medium SAND. Gravel is fine to coarse angular to subrounded flint. (LOWESTOFT FORMATION)		3 00	(0.40)	80.14					3.00	SPT(S) N=16 (3,4/4,4,4,4)	
Firm light brown slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse angular to subrounded flint. (LOWESTOFT FORMATION)		3.40	(0.40)	79.74							
Brown sandy subangular to subrounded fine to coarse flint GRAVEL. Sand is fine to coarse. (LOWESTOFT FORMATION)		4 00	(0.60)	79.14					4.00	SPT(S) N=22 (4,4/5,5,6,6)	
Firm to s iff dark brown sligh ly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse angular to subrounded flint and rare chalk nodules. (LOWESTOFT FORMATION)		5 00	(1 00)	78.14					5.00	SPT(S) N=37 (8,8/9,9,9,10)	
Borehole complete at 5.00 m bgl.											

Remarks
1. Logged in general accordance with BS 5930:2015.2. Borehole installed to 5 m bgl, with 50mm diameter standpipe, gas bung and traffic strength flush cover.3. Borehole remained dry upon completion.

Water Strike			Water Level		Borehole Diameter	
Date	Time	Depth Strike	Duration (min)	Depth Water	Depth Base	Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale:
E524382.40 N212584.51	83.14	Dynamic Sampling	Premier 110	AH	JR	PH	1:30

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Project No: 20-0093.01 | Hole ID: DS104 | Page: 1 of 1

Project: WGC-One YMCA, Peartree Lane, Welwyn Garden City

Dynamic Sampler Log

Date: 06/03/2020 | Client: Pinnacle Consulting Engineers

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details: Depth (m)	Sample Details: Type	Sample Details: Ref	Test Details: Depth (m)	Test Details: Results	Backfill
MADE GROUND: Grass over dark brown slightly clayey slightly gravelly fine to medium SAND. Gravel is fine to medium subangular to subrounded flint.(TOPSOIL)		0.15	(0.15)	82.80			0.30	ES	ES1			
MADE GROUND: Dark brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded flint and brick fragments. Sand is fine to coarse.		0 50	(0 35)	82.45								
Soft light brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded flint. (LOWESTOFT FORMATION)		1.12	(0.62)	81.83								
Firm light brown slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse angular to subrounded flint. (LOWESTOFT FORMATION)		3.10	(1 98)	79.85								
Firm light brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded flint. (LOWESTOFT FORMATION)		5 00	(1 90)	77.95								
Borehole complete at 5.00 m bgl.												

Remarks
1. Logged in general accordance with BS 5930:2015.2. Borehole backfilled with arisings.3. Borehole remained dry upon comple ion.

Water Strike			Water Level		Borehole Diameter	
Date	Time	Depth Strike	Duration (min)	Depth Water	Depth Base	Diameter

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale:
E524415.42 N212595.37	82.95	Dynamic Sampling	Premier 110	AH	JR	PH	1:30

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Project No:	Hole ID:	Page:
20-0093.01	DS105	1 of 1

Project: WGC-One YMCA, Peartree Lane, Welwyn Garden City

Dynamic Sampler Log

Date: 06/03/2020

Client: Pinnacle Consulting Engineers

Description of Strata	Legend	Strata Depth (m bgl)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Sample Details: Depth (m)	Sample Details: Type Ref	Test Details: Depth (m)	Test Details: Results	Backfill
MADE GROUND: Grass over dark brown slightly gravelly clayey fine to medium SAND. Gravel is fine to medium subangular flint and brick fragments. (TOPSOIL).		0.15	(0.15)	83.14							
MADE GROUND: Dark brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded flint and brick fragments. Sand is fine to coarse.		0.60	(0.45)	82.69			0.50	ES ES1			
Soft light brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded flint. (LOWESTOFT FORMATION)		1 00	(0.40)	82.29							
Firm light brown slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse angular to subrounded flint. (LOWESTOFT FORMATION)		3 00	(2 00)	80.29					1.20	SPT(S) N=27 (4,5/5,7,7,8)	
									2.00	SPT(S) N=30 (5,6/7,7,8,8)	
Firm light brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to medium subangular to subrounded flint. (LOWESTOFT FORMATION)		5 00	(2 00)	78.29		3.50			3.00	SPT(S) N=30 (5,6/7,7,8,8)	
									4.00	SPT(S) N=11 (3,2/3,2,3,3)	
Borehole complete at 5.00 m bgl.									5.00	SPT(S) N=23 (5,5/5,6,6,6)	

Remarks
1. Logged in general accordance with BS 5930:2015.2. Borehole installed to 5 m bgl, with 50mm diameter standpipe, gas bung and traffic strength flush cover.3. Groundwater was encountered at 3.50 m bgl.

Water Strike			Water Level		Borehole Diameter	
Date	Time	Depth Strike	Duration (min)	Depth Water	Depth Base	Diameter
		3.50 m				

Coordinates:	Elevation (mAOD):	Drilled By:	Plant Used:	Logged:	Checked:	Approved:	Scale:
E524431.20 N212575.46	83.29	Dynamic Sampling	Premier 110	AH	JR	PH	1:30

Appendix D - Monitoring Records

Site Name	WGC-One YMCA, Peartree Lane, Welwyn Garden City				**Job number**		20-0093 01						**WEATHER**	**Start**	**End**				
													Time	10.15	10.45				
Client	Pinnacle Consulting Engineers				**Recorded by**		LD						**Pressure (mb)**	994	994				
													Wind speed (m/s)	11.00	11.00				
Date (DD/MM/YYYY)	10/03/2020												**Wind Dir. (from)**	W	W				
Gas Analyser	GFM435 (Gas Kit 5) - 12233				**Visit Number**		1						**Temperature (°C)**	11.00	11.00				
Readings at start	**CH_4 (% v/v)**	<0.1	**CO_2 (% v/v)**	<0.1	**O_2 (% v/v)**		20 2	**H_2S (ppm)**	0				**Dry/Rain/Snow/Ice**	DRY	DRY				
Instrument used			Dip meter		**Water levels measured to**		Ground Level												
General comments													**Rising/Falling Trend (for the three days before visit)**	STEADY					

Ref	GROUND GAS													GROUNDWATER			Notes
	Flow		CH_4		CO_2		O_2		H_2S	CO	VOC	Differential (Relative) Pressure	Atmos. Pressure	Depth to free product	Depth to water	Depth to base	(e.g. water colour, sheen, odour, damage to well or gas tap, flooded ground etc.) For Depth to Product state Not detected is product looked for but absent Not applicable if the instrument used is not capable of detecting product
	l/hr		% v/v		% v/v		% v/v		ppm								
	Max	Steady	Max	Steady	Max	Steady	Min	Steady	Max	Max	Max	mb	mb	m	m	m	
	The formulae require that only numbers, "<0.1" for ground gas and flow or "DRY" for groundwater are entered in the sheet																
BH101	<0.1	<0.1	<0.1	<0.1	0.8	0.8	18.5	18.5	0 0	0.0	NR	0.0	994	NR	NR	4.92	DRY AT BASE
BH103	0.1	<0.1	<0.1	<0.1	0.8	0.8	18.2	18.2	0 0	0.0	NR	0.0	993	NR	NR	4.90	DRY AT BASE
BH105	<0.1	<0.1	<0.1	<0.1	0.5	0.5	19.4	19.4	0 0	0.0	NR	1.0	993	NR	1 51	4.94	

Site Name	WGC-One YMCA, Peartree Lane, Welwyn Garden City	Job number	20-0093 01	WEATHER	Start	End
				Time	12.10	12.40
Client	Pinnacle Consulting Engineers	Recorded by	LD	Pressure (mb)	1022	1022
				Wind speed (m/s)	6.00	6.00
Date (DD/MM/YYYY)	17/03/2020			Wind Dir. (from)	SW	SW
Gas Analyser	GFM435 (Gas Kit 5) - 12233	Visit Number	2	Temperature (°C)	13.00	13.00
Readings at start	CH_4 (% v/v) <0.1	CO_2 (% v/v) <0.1	O_2 (% v/v) 19 8	H_2S (ppm) 0	Dry/Rain/Snow/Ice	DRY	DRY
Instrument used	Dip meter	Water levels measured to	Ground Level				
General comments				Rising/Falling Trend (for the three days before visit)	RISING	

Ref	GROUND GAS													GROUNDWATER			Notes
	Flow		CH_4		CO_2		O_2		H_2S	CO	VOC	Differential (Relative) Pressure	Atmos. Pressure	Depth to free product	Depth to water	Depth to base	(e.g. water colour, sheen, odour, damage to well or gas tap, flooded ground etc.) For Depth to Product state Not detected is product looked for but absent Not applicable if the instrument used is not capable of detecting product
	l/hr		% v/v		% v/v		% v/v		ppm			mb	mb	m	m	m	
	Max	Steady	Max	Steady	Max	Steady	Min	Steady	Max	Max	Max						
	The formulae require that only numbers, "<0.1" for ground gas and flow or "DRY" for groundwater are entered in the sheet																
BH101	0.1	0.1	<0.1	<0.1	1.4	1.4	17.4	17.4	0 0	0.0	NR	1.0	1018	-	NR	4.93	DRY AT BASE
BH103	<0.1	<0.1	<0.1	<0.1	0.6	0.6	19.7	19.7	0 0	0.0	NR	1.0	1018	-	NR	4.92	DRY AT BASE
BH105	<0.1	<0.1	<0.1	<0.1	0.4	0.4	19.2	19.2	0 0	0.0	NR	1.0	1018	-	1.47	4.94	

Appendix E - Chemical Analysis

APPENDIX D

- Delta Simons Soakaway Infiltration Report (Ref 20-0093.01, Dated April 2020)

Delta-Simons Environmental Consultants
3 Henley Way, Doddington Road, Lincoln LN6 3QR
www.deltasimons.com

Limited Factual Soakaway Infiltration Report

WGC-One YMCA, Peartree Lane, Welwyn Garden City

Presented to **Pinnacle Consulting Engineers**

Issued: April 2020

Delta-Simons Project Number: 20-0093.01

Issue No.	Status	Issue Date	Comments	Author	Technical Review	Authorised
1	Final	1st April 2020				
				Jessica Rowe Consultant	Redmond Parker-Dunn Principal	Paul Huteson Associate

1.0 Context and Purpose

Delta-Simons Environmental Consultants Limited ("Delta-Simons") was instructed by Pinnacle Consulting Engineers (the "Client") to undertake BRE365 Infiltration testing at the existing YMCA Site, 90 Peartree Lane, Welwyn Garden City, AL7 3UL (the "Site"). A Site Location Map is included as Figure 1.

Delta-Simons has concurrently undertaken environmental investigation at the Site which is reported under a separate cover:

- Environmental Report, WCG-One YMCA, Peartree Lane, Welwyn Garden City, Delta-Simons Project No. 20-0093.01, dated March 2020.

It is understood that the proposed development comprises the demolition of all structures at the Site and the construction of a four-storey 100 bed YMCA Hostel and a 2, 3 and 4 storey building providing up to 43 residential apartments as detailed in Welwyn Hatfield Borough Council Planning Application 6/2019/2714/OUTLINE.

The purpose of this Report is to provide information on the soil infiltration rates beneath the Site to support the Client for drainage design. It is proposed at this stage that surface water drainage will be by two soakaways in the central area of the Site, via interceptors. Correspondence with the Local Planning Authority has been provided by the Client, indicating the requirement of a ground investigation to assess the presence of contamination (reported under a separate cover) and provide infiltration data.

The test locations were indicated by the Client, however following a Site walkover, limited access was available to the area of the proposed soakaways, as such the location of the testing was amended and agreed with the Client.

2.0 Limitations

Delta Simons standard limitations are included as Appendix A. In addition, the following specific limitations apply to this assessment:

- Access was limited in the area of the proposed soakaways.

3.0 Mapped Ground Conditions

From the British Geological Survey (BGS) Geology of Britain Viewer the Site is indicated as being underlain by superficial Diamicton deposits of the Lowestoft Formation. In addition, superficial sand and gravel deposits of the Kesgrave Catchment Subgroup may encroach onto Site in the northern area. The underlying bedrock is mapped as the Lewes Nodular Chalk Formation and Seaford Chalk Formation (Undifferentiated).

The ground conditions identified during the investigation generally comprised gravelly sandy Made Ground to a maximum depth of 0.68 m bgl underlain by natural firm sandy gravelly clays.

4.0 Soakage Testing

Soakage testing was undertaken in general accordance with BRE Digest 365: Soakaway Design [Ref. 1].

The soakage testing comprised excavating two trial pits to depths of approximately 0.95 m bgl and 1.0 m bgl. The locations and depths of the tests were provided by the Clients engineer, however, due to access restrictions and utilities, positions had to be amended and agreed with the Client. The geology at each trial pit location was logged. A gravel pack and monitoring pipes were then installed in the trial pits and the remaining void was backfilled with arisings. The remaining spoil was graded back to original ground level.

The gravel pack in each test location was then filled with water and the depth to water from ground level recorded at intervals over a period of up to 24 hours.

The soakage test data was recorded and used to calculate the soil infiltration rate for each location.

Test results are provided in Appendix B and summarised below. The approximate locations of the soakage tests are shown in Figure 2.

Location	Test Depth Range (m bgl)	Geology	Infiltration Rate (m/s)
SA101	0.50 -1.00	Sandy gravel clay	$4.5x10^{-5}$
SA102	0.50 – 1.00	Sandy gravel clay	$7.0x10^{-6}$

5.0 References

Ref 1: BRE Digest 365: Soakaway Design, BRE 2016.

Enclosures:

Figures

Figure 1 Site Location Map

Figure 2 Intrusive Location Plan

Appendices

Appendix A Limitations

Appendix B Soakaway Test Results

Figure 1 – Site Location Map

Scale: 1 / 500,000 @ A4

LEGEND

Site Boundary

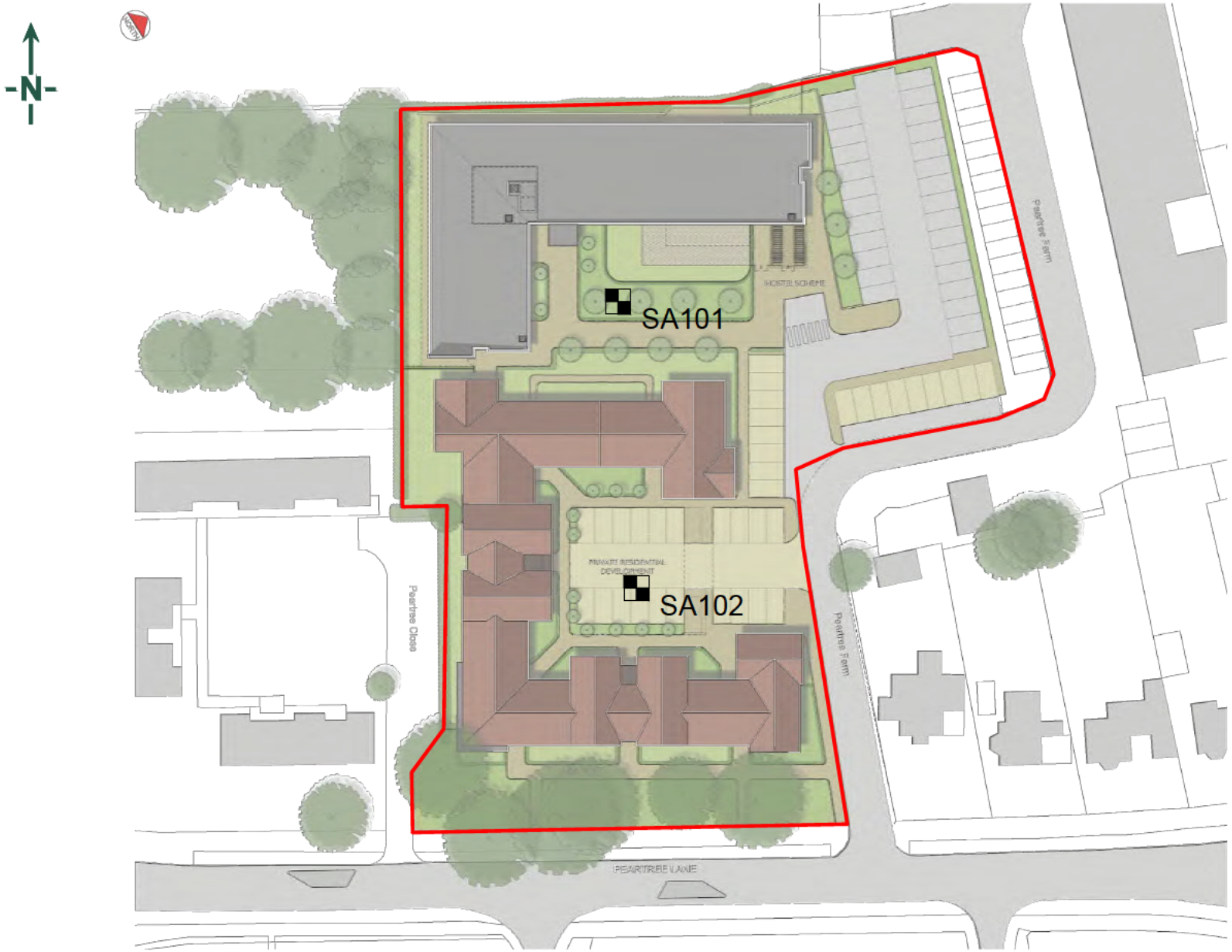
Scale: 1 / 10,000 @ A4

deltasimons
Environment - Health & Safety - Sustainability

TITLE:
Site Location Map
WCG- One YMCA
Peartree Lane, Welwyn Garden City

DRAWN BY:	SCALE:	PROJECT NO:
JR	To Scale@A4	20-0093
CHECKED BY:	REVISION:	FIGURE NO:
AH	1	1
DATE: 13th March 2020		

Figure 2 – Intrusive Location Plan



LEGEND

Site Boundary

SAx BRE365 Infiltration Test

FOR PLANNING

REV	DATE	NOTE	IN

Project

YMCA
PEARTREE LANE
WELWYN GARDEN CITY

Title

PROPOSED SITE LAYOUT

Scale 1:500 @A3 | Date SEPT 2019
Drawn SD | Checked AL
Drawing Number 8057 / P101 | Revision --

Saunders
Architecture + Urban Design

Site Plan provided by Client

deltasimons
Environment - Health & Safety - Sustainability

TITLE:
Approximate Intrusive Location Plan
WCG-One YMCA
PeartreeLane, Welwyn Garden City

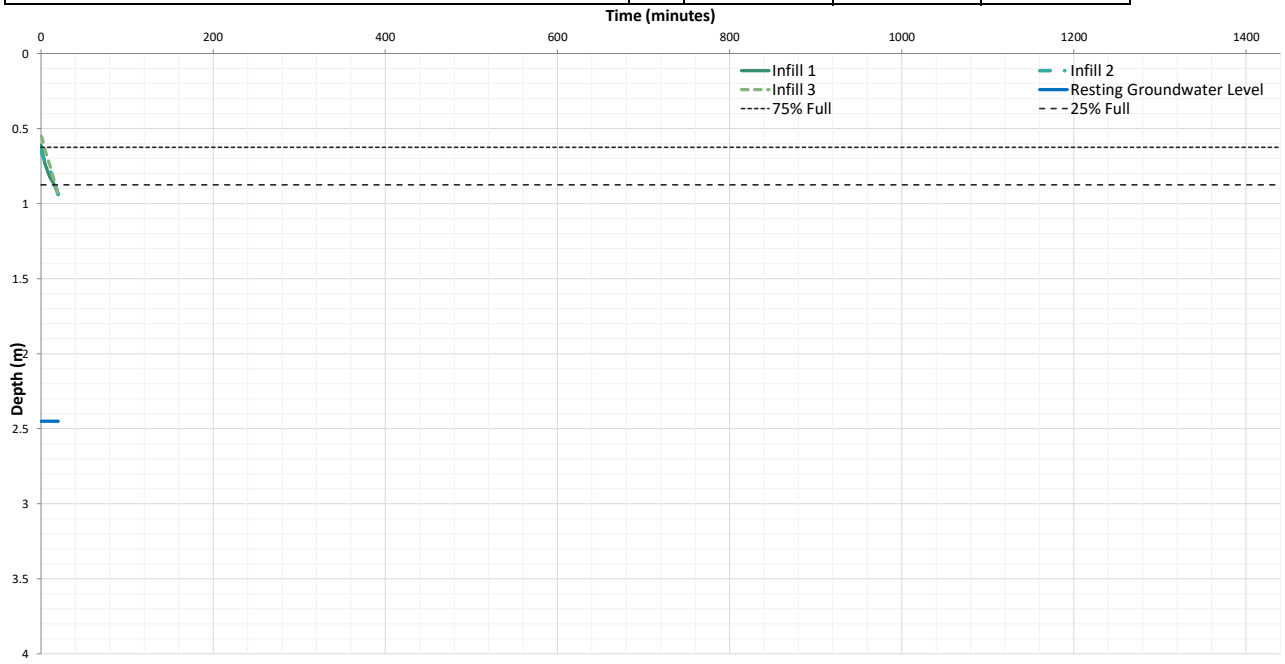
DRAWN BY:	SCALE:	PROJECT NO:
JR	Not to Scale	20-0093.01
CHECKED BY:	REVISION:	FIGURE NO:
RPD	1	2
DATE: 24th March 2020		

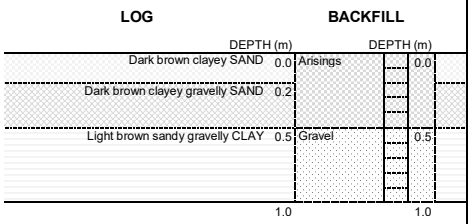
Appendix B – Soakaway Test Results

	units	Infill 1	Infill 2	Infill 3
Length	m		1.70	
Width	m		0.60	
Depth	m		1.00	
Gravel type			Standard	
Voids ratio			0.35	
Resting groundwater level at time of testing	m		2.45	
Depth of first reading	m	0.61	0.64	0.55
Depth of final reading	m	0.94	0.94	0.94
Did soakage test reach 25% of maximum fill depth?		Yes	Yes	Yes
Did soakage test reach near empty?		No	No	No
Depth at 75% full/effective depth	m	0.69	0.72	0.65
Depth at 25% full/effective depth	m	0.86	0.87	0.84
Time at 75% full/effective depth	mins	3.08	4.25	4.92
Time at 25% full/effective depth	mins	13.75	15.83	15.13
Vp75 - 25 (volume outflowing between 75% and 25% full/effective depth)	m^3	0.06	0.05	0.07
Mean surface area for outflow (50% full/effective depth)	m^2	1.78	1.71	1.92
tp75 (time for the water level to fall from 75% to 25% full/effective depth)	mins	10.67	11.58	10.21
Soil infiltration rate, f =	m/s	0.00005174	0.00004506	0.00005929
or	m/s	5.2E-05	4.5E-05	5.9E-05

Recommended soil infiltration rate	
4.5E-05	m/s

Note:
Where water level reaches nearly empty (5% full), soil infiltration based on 'Full' depth. Where water level did not reach nearly empty (5% full), soil infiltration rate is based on 'Effective' drainage achieved only. Where water level did not fall below 25% of the maximum fill level, this is considered to be a 'Failed' test.





deltasimons

TITLE: Soakaway Test Results
YMCA Peartree Lane, Welwyn Garden City
Pinnacle Consulting Engineers

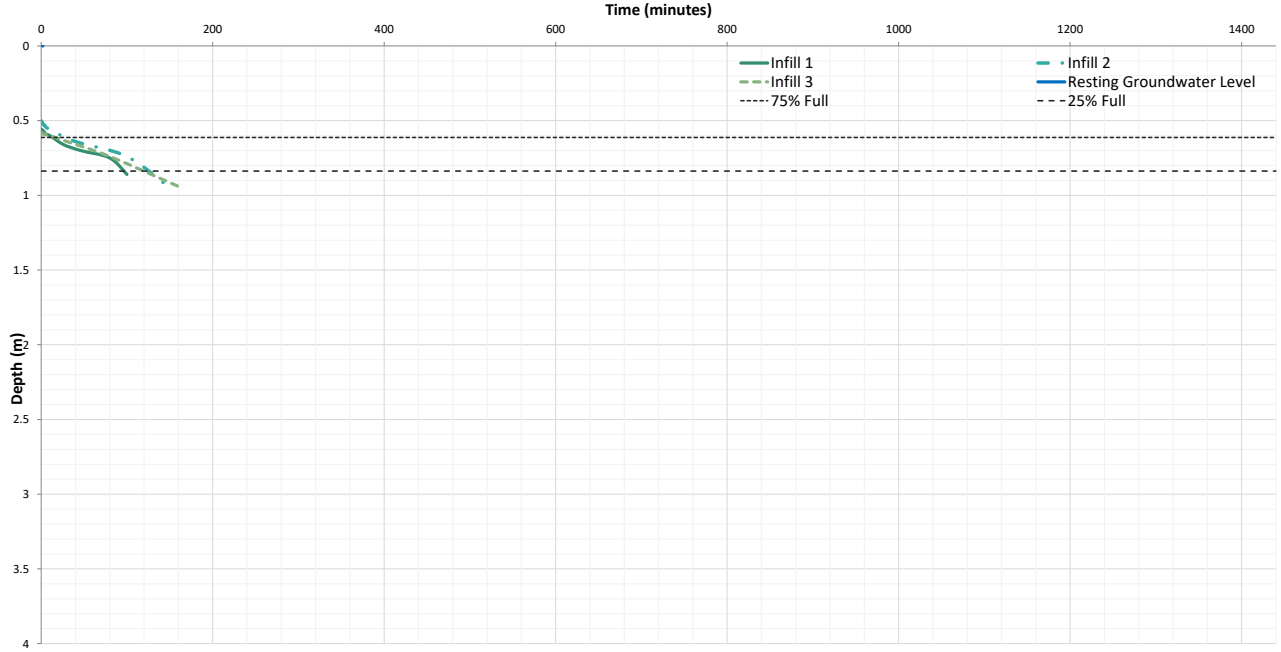
In accordance with BRE Digest 365 (2016)

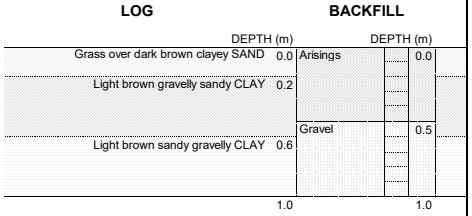
DRAWN BY: CB	SCALE: Not to Scale	PROJECT NUMBER: 20-0093.01	
CHECKED BY: SS	REVISION: 1	SOAKAWAY NUMBER: SA101	
DATE: 06/03/2020			

	units	Infill 1	Infill 2	Infill 3
Length	m		1.70	
Width	m		0.60	
Depth	m		0.95	
Gravel type			Standard	
Voids ratio			0.35	
Resting groundwater level at time of testing	m		0.00	
Depth of first reading	m	0.56	0.50	0.58
Depth of final reading	m	0.86	0.95	0.94
Did soakage test reach 25% of maximum fill depth?		Yes	Yes	Yes
Did soakage test reach near empty?		No	Yes	Yes
Depth at 75% full/effective depth	m	0.64	0.61	0.67
Depth at 25% full/effective depth	m	0.79	0.84	0.86
Time at 75% full/effective depth	mins	19 33	29.69	46.25
Time at 25% full/effective depth	mins	86 36	123.21	127.00
Vp75 - 25 (volume outflowing between 75% and 25% full/effective depth)	m^3	0.05	0.08	0.07
Mean surface area for outflow (50% full/effective depth)	m^2	1.71	2.06	1.87
tp75 (time for the water level to fall from 75% to 25% full/effective depth)	mins	67 03	93.53	80.75
Soil infiltration rate, f =	m/s	0.00000779	0.00000697	0.00000729
or	m/s	7.8E-06	7.0E-06	7.3E-06

Recommended soil infiltration rate	
7.0E-06	m/s

Note:
Where water level reaches nearly empty (5% full), soil infiltration based on 'Full' depth. Where water level did not reach nearly empty (5% full), soil infiltration rate is based on 'Effective' drainage achieved only. Where water level did not fall below 25% of the maximum fill level, this is considered to be a 'Failed' test.





deltasimons

TITLE
Soakaway Test Results
YMCA Peartree Lane, Welwyn Garden City
Pinnacle Consulting Engineers

In accordance with BRE Digest 365 (2016)

DRAWN BY: CB	SCALE: Not to Scale	PROJECT NUMBER	20-0093.01
CHECKED BY: SS	REVISION: 1	SOAKAWAY NUMBER	SA102
DATE: 06/03/2020			

Appendix C

Proposed Contributing Areas Plan

Drainage Plan

Drainage Calculations

CATCHMENTS PLAN LEGEND

Total drainage contributing areas:
0.2392 ha

GENERAL NOTES

1. All setting out to be in accordance with the Architects drawings. Any discrepancies between the Engineers and the Architects drawings to be referred to the Architect before proceeding. Dimensions must not be scaled.
2. All drainage to be installed in accordance with relevant Building Regulations documents and Current Sewers for Adoption where applicable.
3. Connections to Public sewers to be agreed and inspected by Water Authority.
4. Invert level, size and cover levels to existing manholes and sewers to be checked prior to any construction. Any discrepancies to be reported immediately.
5. Invert to base of soil stack bends to be 450mm below lowest branch connection for up to 3 storeys buildings. For buildings up to 5 storeys the invert to base of soil stack bends should be not less than 750mm.
6. All RWP and Foul Water drain point setting out is to be confirmed by Architect.
7. All RWP & SVP sizes & setting out by Architect / M&E Engineer. All below ground connections to match above ground outlet size, Min 100/110mm diameter.
8. Foul drains to project 100mm above finished floor level.
9. All internal Manholes and Inspection Chambers to have double sealed recessed covers to suit floor finishes by Architect.
10. All external covers in footpaths and roads in non tarmac areas to have recessed trays to suit the paving material.
11. Refer to drainage specification for pipe materials.
12. [illegible] connection sizes.
13. All foul and surface water drainage stacks to have above ground rodding access, refer to above ground drainage layout by others.
14. This drawing has been produced in colour and should be reproduced in colour for clarity.
15. A CCTV Survey and report in WINCAN format for all new drainage will be required before the "As Built" drawings will be issued.

Rev.	Amendment	Drn	Chkd	Date
P01	First Issue	TZ	CS	18.10.21

Drg. Status **PRELIMINARY** Suitability **S1**

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Fax: 02380 634294
e-mail: southampton@aksward.com
web: www.aksward.com
☐ London ☐ Hitchin ■ Oxford ☐ Southampton

Client **YMCA**

Project **One YMCA Pear Tree Welwyn Garden City**

Title **Flow Calculations Catchment Area Plan**

Reviewed Scheme	CS	Date	13.08.21
Reviewed Final		Date	
Scales at A1	1:200	Project No.	L211016

Project Ref.	Originator	Zone	Level	Type	Role	Drg No.	Rev.
C190906	AKSW	XX	XX	DR	C	9205	P01