

SuDSmart Plus



Sustainable Drainage Assessment

Site Address

Oxford Road
Reading
RG30 1AQ

Date

2020-09-28

Report Status

FINAL

Grid Reference

E 469716 N 173672

Site Area

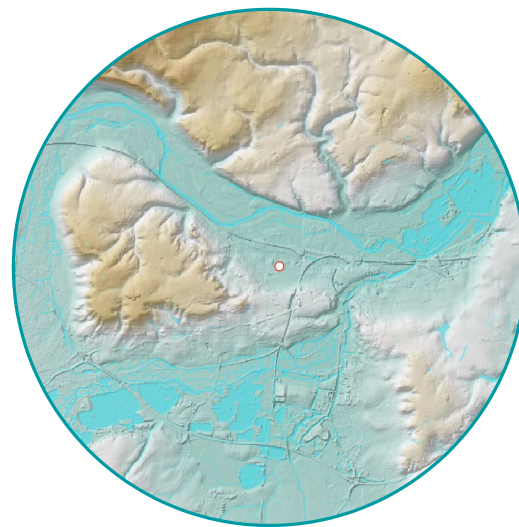
0.13 ha

Report Prepared for

Stonegate Homes (Reading) Limited
Oak Green House
250-256 High Street
Dorking
RH4 1QT

Report Reference

73227R1



Discharge to Sewer

The proposed Sustainable Drainage Scheme (SuDS) strategy is comprised of a green roof and lined permeable paving to attenuate surface water runoff prior to discharging to the public sewer network at 2 l/s. The suitability of the proposed SuDS strategy is subject to confirmation from Thames Water that the proposed discharge rate of 2 l/s is acceptable.

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1 Executive summary



This report assesses the feasibility of a range of Sustainable Drainage Scheme (SuDS) options in support of the Site development process. A SuDS strategy is proposed to ensure surface water runoff can be managed effectively over the lifetime of the development.

SuDS suitability

Risk	Issue	Result
Discharge Location	What is the infiltration potential at the Site?	Moderate
	What is the potential to discharge to surface water features?	Low
	What is the potential to discharge to sewers?	Medium
Flooding	What is the fluvial flood risk at the Site?	Negligible
	What is the pluvial flood risk at the Site?	Low
	What is the groundwater flood risk at the Site?	High
Pollution	Is the groundwater a protected resource?	No
	Is the surface water feature a protected resource?	N/A

Summary of existing and proposed development

The Site is currently undeveloped, at present there are foundations of a disused structure on-Site. Development proposals include the construction of a mixed-use development comprised of commercial units at ground floor level and residential from first to fifth floors, including associated access from Curzon Street, parking and landscaping.

Summary of discharge routes

GeoSmart's SuDS Infiltration Potential (SD50) map indicates the Site has a Moderate potential for infiltration, primarily due to the high permeability of the underlying geology (gravel and chalk). The British Geological Survey (BGS) online borehole records indicate a shallow water table linked to the productive chalk aquifer and permeable superficial deposits, which results in a modelled high risk of groundwater emergence above the Site surface.

Focused infiltration features such as soakaways are not proposed, due to the anticipated high groundwater table identified at the Site which could potentially lead to groundwater ingress into drainage systems at the Site, where these systems are used. The spatial requirements for focused infiltration features above the chalk aquifer are also defined by their potential for infiltrated runoff to lead to the new formation and increased susceptibility of existing solution

features. As such, the size and nature of the spatial layout of the proposed development would not be conducive to infiltration for the reasons described above.

Ordnance Survey (OS) mapping confirms there are no surface water features within 500 m of the Site. The regulated drainage and water search included in Appendix C confirms the public sewer network is located within 50 m of the Site, in the highway of Oxford Road. Due to the short distance to nearby sewers discharging surface water runoff to the sewer is the most practical solution. It should be noted the topographic gradient of the site falls to the north west away from the existing drainage network along the main road. The depth of the public sewer network should be confirmed to ensure it would be possible to drain the Site via gravity to the existing sewer network.

Runoff rate and attenuation requirements

Discharging off-Site to the public sewer requires 69.9 m³ of attenuation to be provided to ensure there is no flooding within the development in all storm events up to and including the 1 in 100 year including a 40 % allowance for climate change. This volume is subject to the discharge rate being restricted to 2 l/s.

Any surface water and SuDS drainage system which attenuate runoff and discharge off-site into the public sewer network, will be designed to prevent groundwater ingress into the surface water attenuation features, ultimately to prevent additional groundwater loading into the on-Site and sewer drainage network.

Proposed SuDS strategy

SuDS features comprised of a green roof and lined permeable surfacing are proposed to attenuate a minimum of 69.9 m³ of surface water runoff. The SuDS features would provide some water quality benefits (interception and filtration) before discharging off-Site to sewer.

Surface infiltration is not proposed currently, but could potentially be considered in the access and parking areas in the form of permeable paving, to increase the permeable coverage and ensure the Site drains as close to greenfield as possible.

The proposed SuDS strategy would ensure surface water runoff is stored on Site in SuDS features for the 1 in 100 year event including a 40% allowance for climate change and will not cause flooding to the proposed development in accordance with DEFRA's non-statutory technical standards (DEFRA, 2015).

SuDS & drainage network maintenance

The management and maintenance of the SuDS features, in line with the details and schedules outlined in Section 11 of this report, will be undertaken by contractors appointed by the owners and occupiers of the new residential building, where payments for the works will form part of the property deeds and / or rental agreements.

Recommendations / Next steps

It is recommended a Thames Water Pre-Development Enquiry is undertaken to confirm the public surface water sewer has sufficient capacity to accept runoff from the proposed development.

2 Proposed SuDS strategy



The most suitable SuDS options are outlined below and a SuDS strategy schematic is shown overleaf. Supporting information is provided in subsequent sections.

Table 1. Proposed SuDS type, features, discharge location and rate restriction

SuDS type	Source control (interception) and attenuation SuDS.
SuDS features	Green roof, rainwater harvesting butts, and lined permeable surfacing underlain by Type 3 aggregate material.
Discharge location	Surface water sewer network
Discharge rate	2 l/s

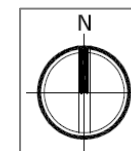
Table 2. Proposed SuDS sizing (dimensions) and attenuation volumes

Rainwater Harvesting	A rainwater harvesting butt should be established for each proposed development. In terms of attenuation storage within this SuDS scheme, volume of run-off which could be attenuated by Rainwater Harvesting has not been considered within the Preliminary SuDS schematic.
Green Roof	A green roof covering a total area of 297 m ² (cover area of all roof spaces) with a green roof mix example volume of 41.6 m ² (0.2m depth) and Geo-composite example volume of 3.12 m ² (0.005m depth) would attenuate up to 9.6 m ³ of surface water runoff.
Lined permeable paving	A 259 m ² area of permeable paving (underlain with a Type 3 aggregate material) within the proposed driveway areas to a depth of 0.8 m, with a 30% porosity would result in c. 62.2 m ³ attenuation.
Total Attenuation Provided	71.8 m ³
Total Attenuation Required	69.9 m ³
Freeboard Storage Provided	1.9 m ³

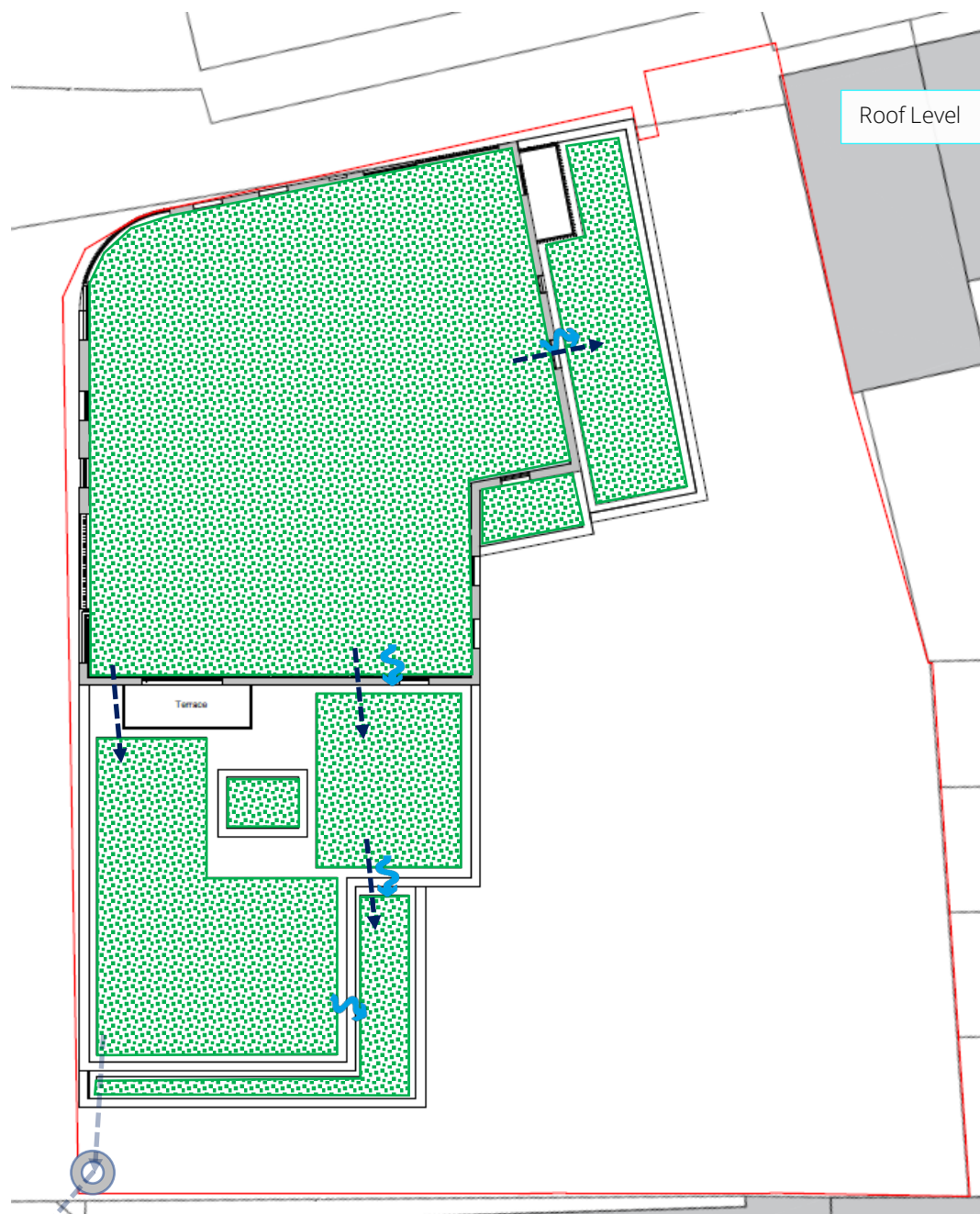
2. Proposed SuDS scheme layout

Ground Floor

-  Green roof
-  Rainwater harvesting butt
-  Underground pipe network
-  Hydro-brake
-  Public surface water sewer (indicative)
-  Exceedance flow routes
-  Site boundary
-  Lined permeable surfacing
-  ACO Drain



Schematic is not to scale



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3 Site analysis



Site location

Figure 1. Aerial Imagery (Bluesky, 2020)

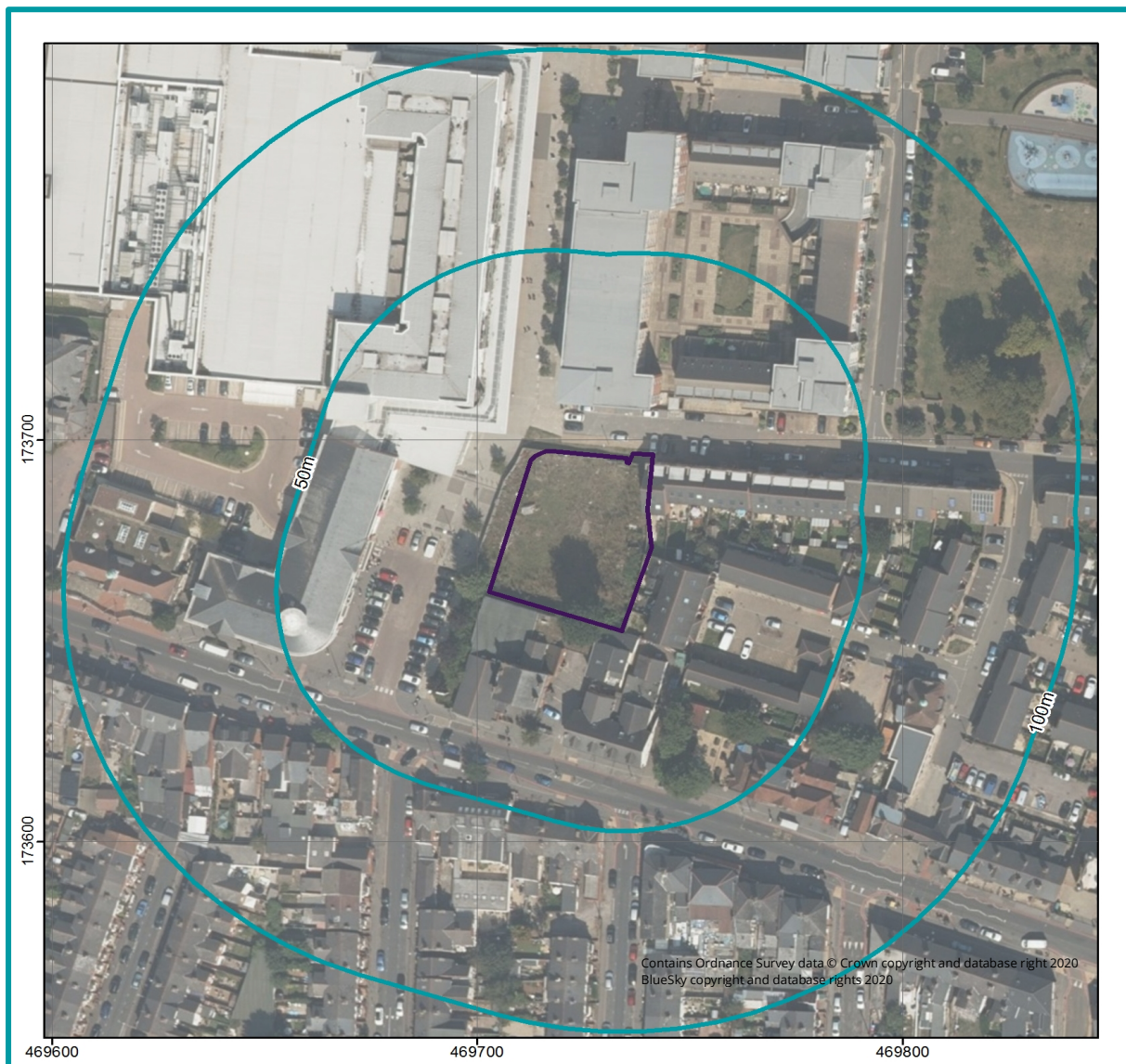
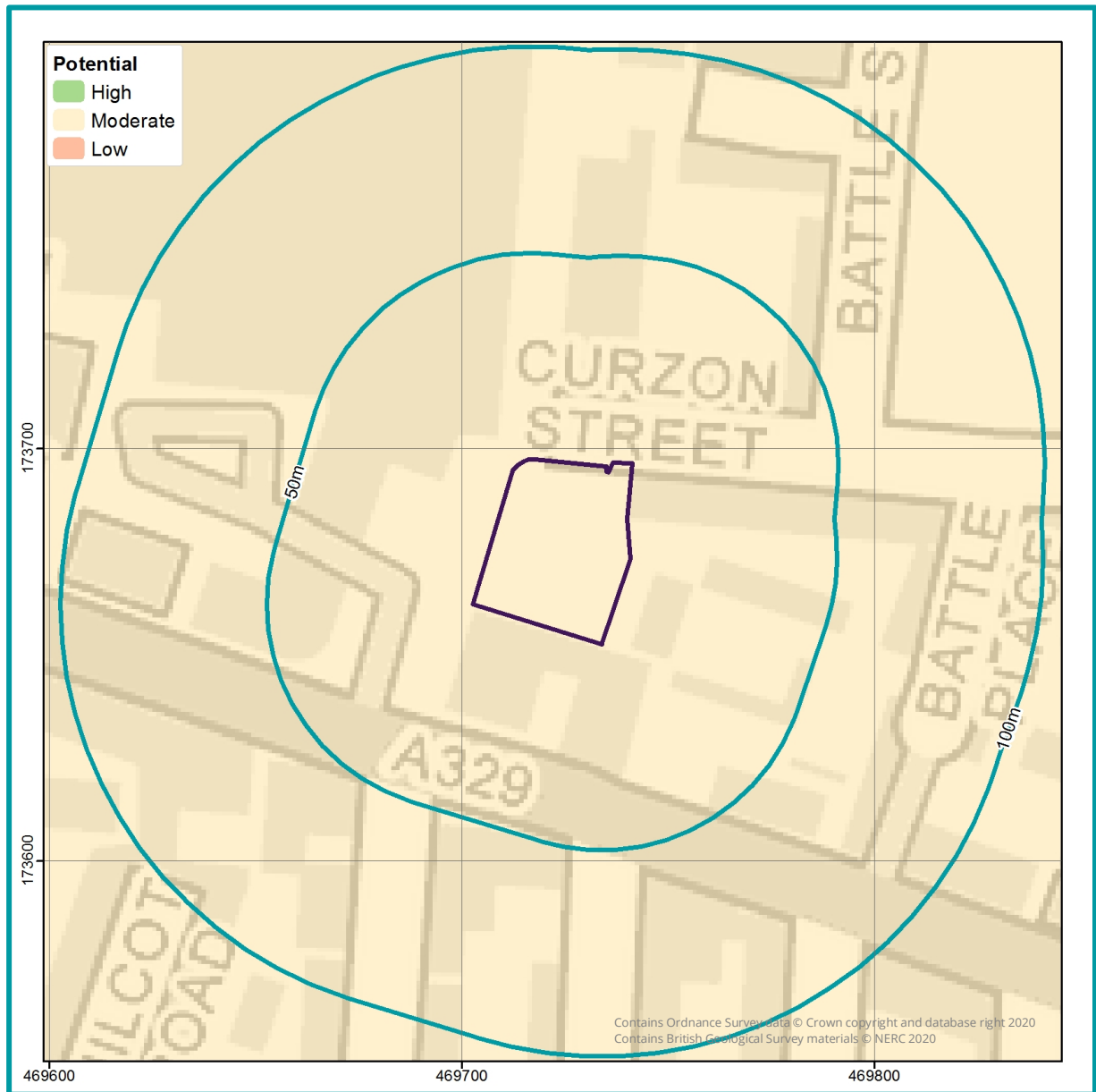


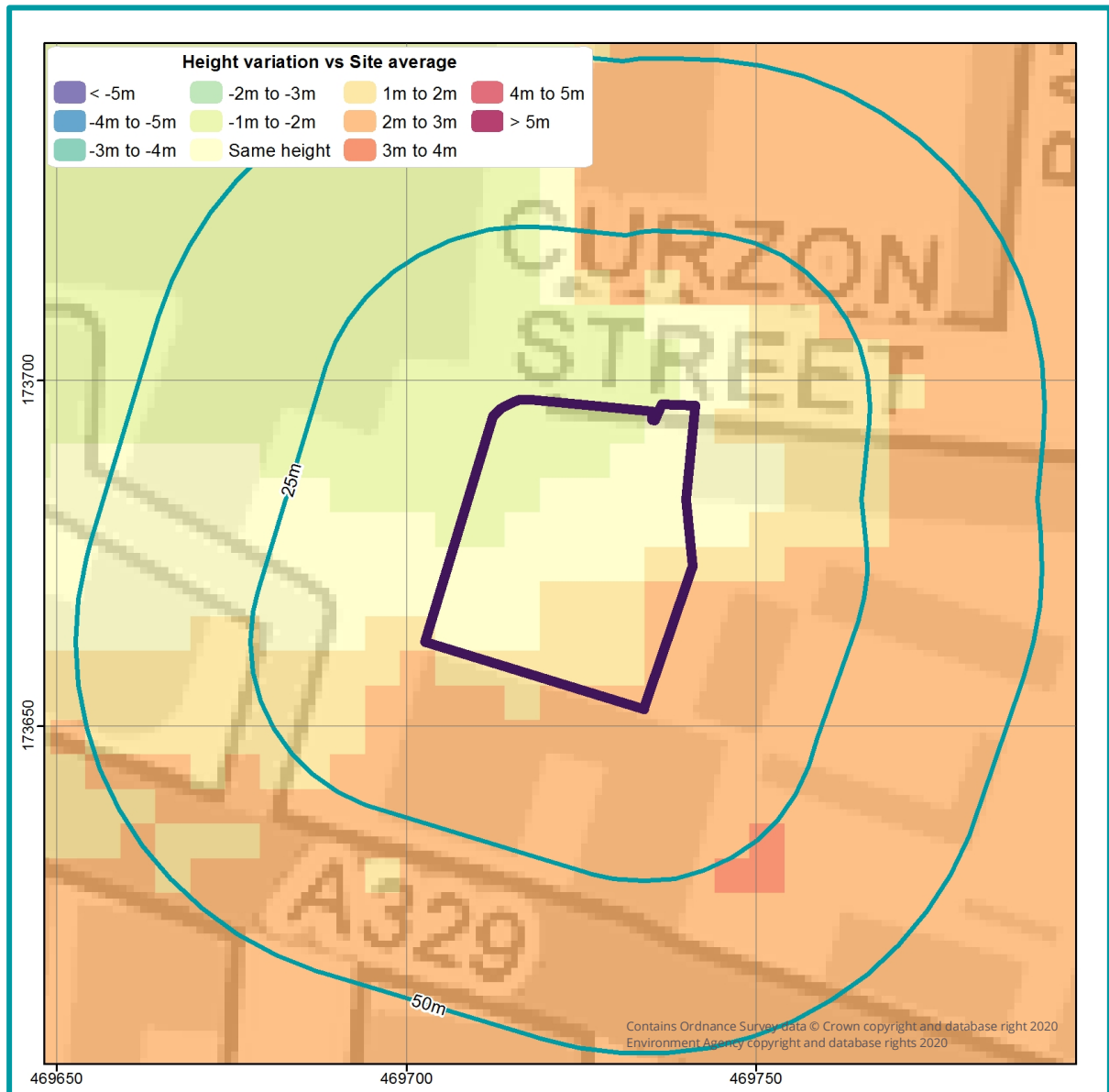
Figure 2. SuDS infiltration suitability (SD50) map (GeoSmart, 2020)



GeoSmart's SuDS Infiltration Suitability (SD50) Map screens the potential for infiltration drainage at the Site and indicates where further assessment is recommended. The map combines information on the thickness and permeability of the underlying material and the depth to the high groundwater table. The Site is anticipated to have a Moderate potential for infiltration.

Infiltration features are not proposed due to the anticipated high groundwater table identified at the Site which could lead to groundwater emergence at the Site.

Figure 3. Site topography (GeoSmart, 2020)

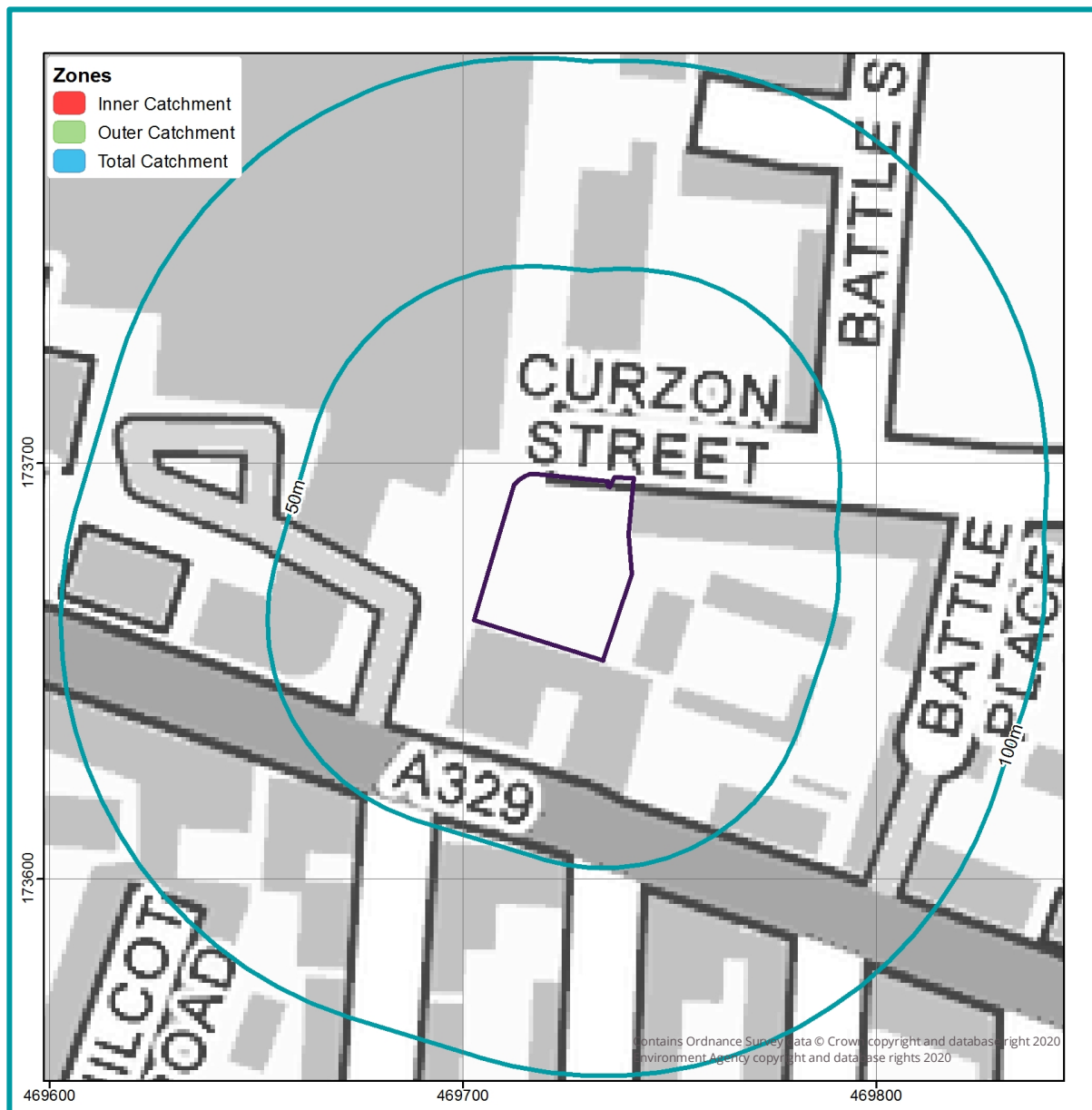


GeoSmart have undertaken an assessment of the topography at the Site and within its vicinity, using LiDAR elevation data obtained from the Environment Agency (EA). The mapping shows a comparison between average ground levels on the Site with ground levels in the surrounding area. This is based on EA elevation data obtained for the Site to a 1 m resolution with a vertical accuracy of ± 150 mm.

A topographical survey was undertaken for the Site by HB Surveys Ltd in May 2020. This confirms the Site is on a very gentle slope, with the land falling to the north west from 42.51 mAOD in the south eastern corner to 39.74 mAOD in the north western corner.

Further analysis could be undertaken by visiting the Site or by collecting additional topographic survey to provide further confirmation of ground levels.

Figure 4. Source protection zone map (EA, 2020)

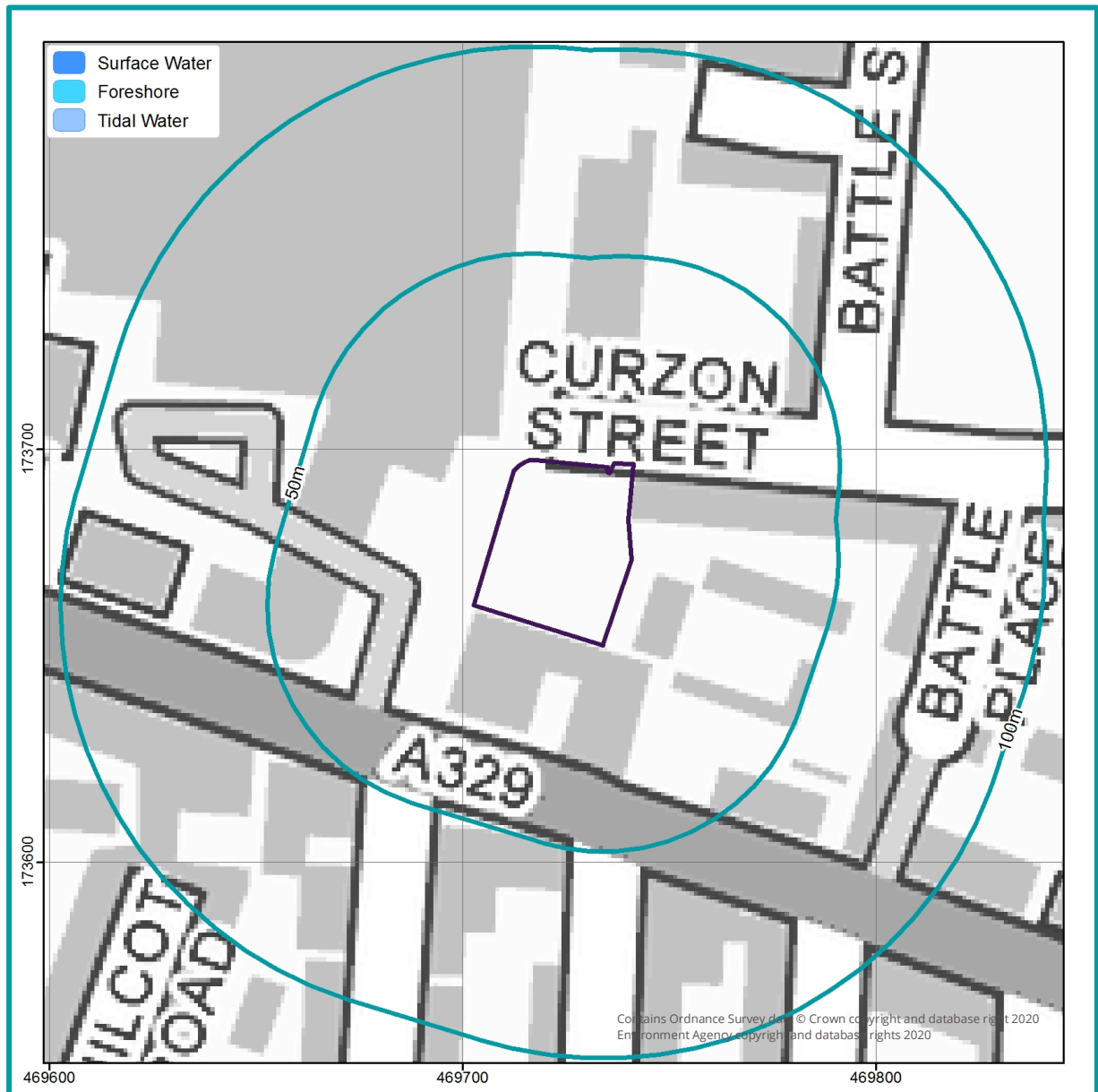


GeoSmart have undertaken an assessment of the EA's groundwater Source Protection Zones (SPZ) within the vicinity of the Site.

The Site is not within a SPZ, infiltration to the ground is likely to be acceptable providing suitable mitigation measures are in place if required to prevent an impact on water quality from the proposed or historical land use and contaminated land.

If hazards are identified, further consideration of the potential for any drainage system to cause pollution of groundwater is recommended. It is also recommended that the Local Authority and the EA are contacted to confirm the susceptibility of controlled water within the wider area.

Figure 5. Surface water features map (EA, 2020)

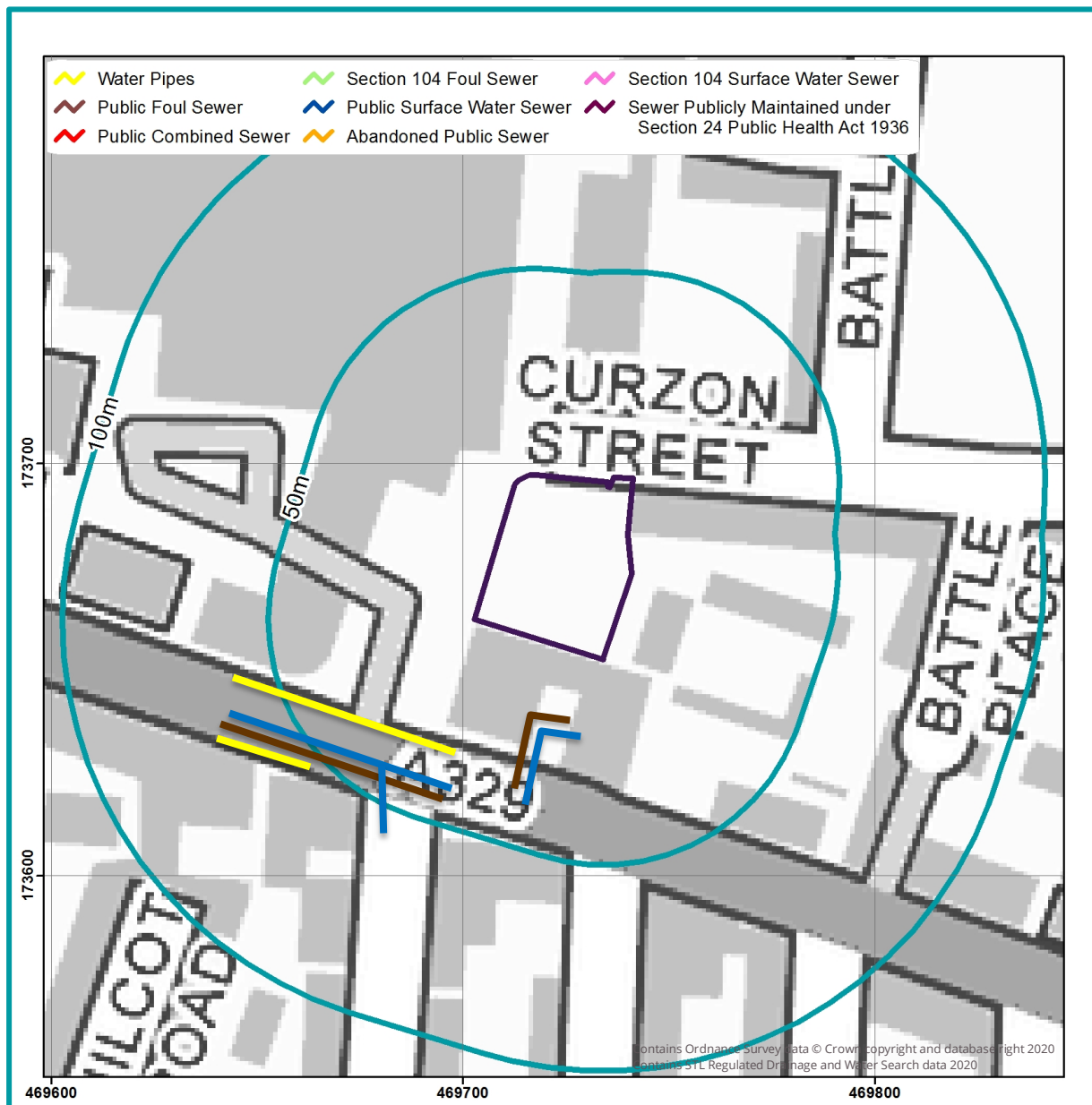


GeoSmart have undertaken an assessment of the location of surface water features within the vicinity of the Site, using Ordnance Survey (OS) mapping.

The Site is further than 100 m from a surface water body, therefore discharge to surface water is unlikely to be appropriate.

DEFRA's MagicMap confirms the Site is not located within 250 m of a SSSI.

Figure 6. Sewer features map (OS & STL, 2020)

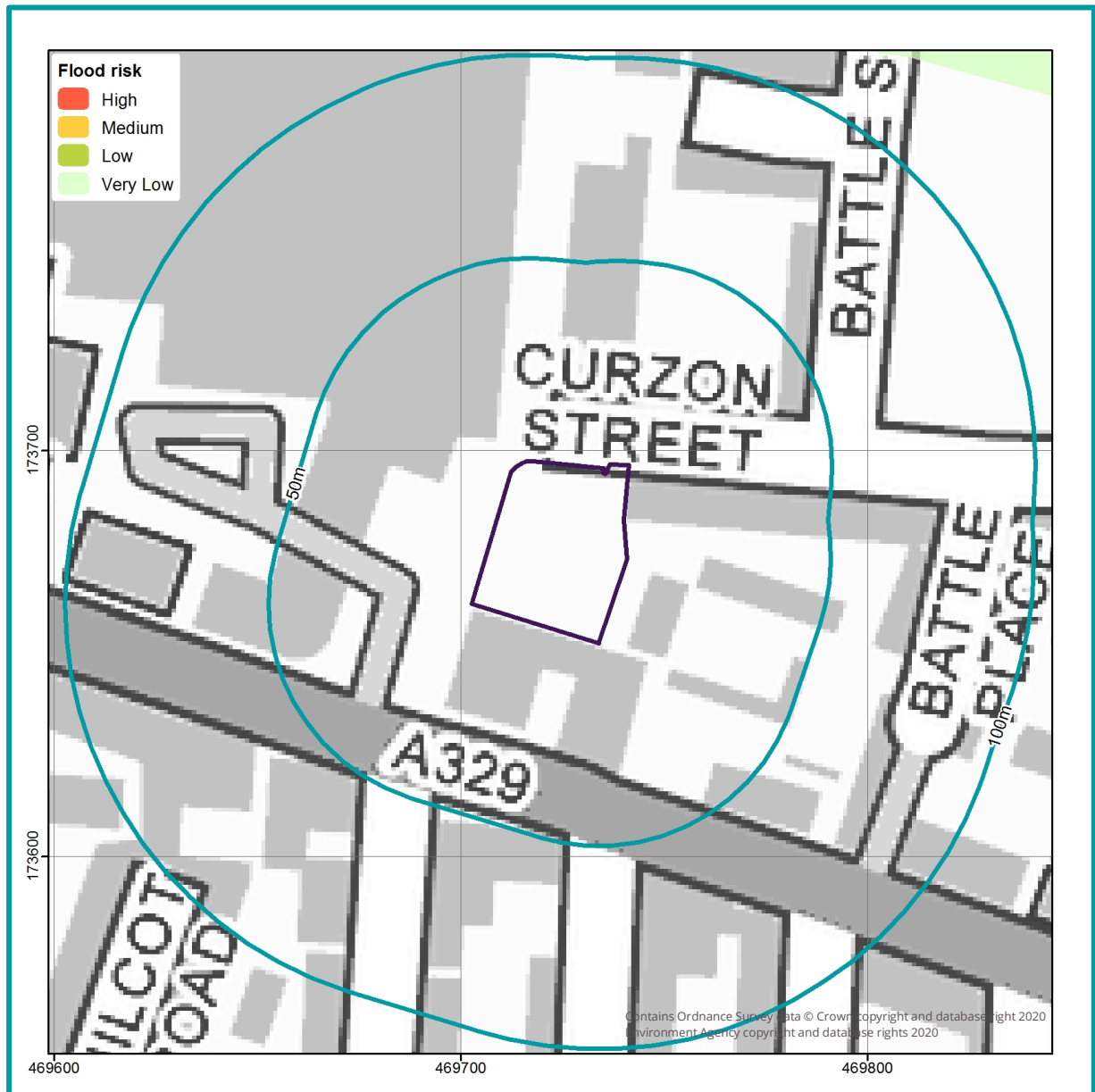


GeoSmart have undertaken an assessment of the location of sewer features within the vicinity of the Site. A public surface water sewer is located within 50 m of the Site. Discharge to sewer is likely to be appropriate, but the depth to the sewer should be confirmed prior to undertaking detailed design, to ensure runoff can be drained from the Site by gravity.

Further analysis of the connections and condition of the public surface water and foul drainage systems should be undertaken by carrying out a CCTV survey, or by contacting the drainage provider or the Local Council to confirm the presence, location and condition of these sewers.

Consultation with the drainage provider would also be required to determine that sufficient capacity is available to accept the proposed discharge, and to gain permission to connect if required.

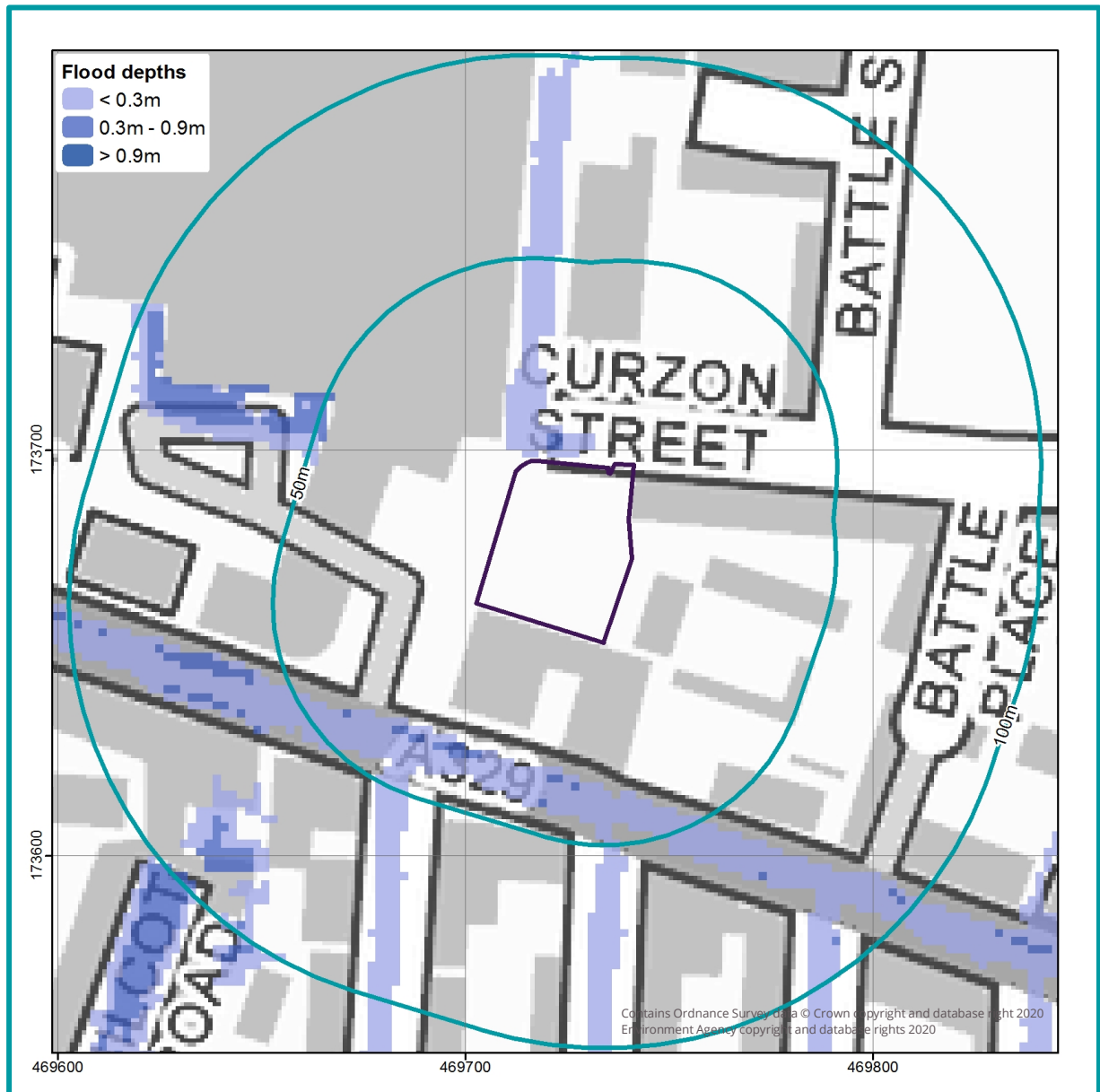
Figure 7. Risk of flooding from rivers & sea map (EA, 2020)



GeoSmart have undertaken an assessment of the risk of flooding from the rivers and the sea within the vicinity of the Site.

The Site has a Negligible risk of fluvial or coastal flooding.

Figure 8. Risk of surface water flooding map (EA,2020)



GeoSmart have undertaken an assessment of the risk of flooding from surface water (pluvial) sources within the vicinity of the Site. Figure 8 confirms the extent and depth of flooding during a 1% AEP (1 in 100 year - Medium risk) event. The Site is at risk of surface water flooding during a Low risk event (1 in 1000 year) in the north western corner, with flood depths of up to 0.3 m anticipated.

Further analysis could be undertaken by visiting the Site or by contacting the Local Council and the EA; to confirm the pluvial flood risk and flood depths and velocities where applicable.