



**Civil/Structural Engineers
Development Consultants
Project Managers**

SURFACE AND FOUL WATER MANAGEMENT

MANOR ROAD, HATFIELD

FOR

CARING HOMES, ATKAR CORPORATION

OCTOBER 2016

REPORT REF: 2277/SW01



Head Office: Unit 7 Calder Close, Calder Park, Wakefield WF4 3BA

Tel: +44 (0) 845 023 0323 Fax: +44 (0) 207 297 2100

Email: mail@bjbconsult.co.uk www.bjbconsult.co.uk

London – Birmingham – Wakefield

ACCOUNTS & REGISTERED OFFICE | Wentworth House, 2 Wentworth Street, St Johns, Wakefield, WF1 2RX
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1.0 INTRODUCTION

BJB Consulting has been commissioned by Atkar Corporation to undertake a surface and foul water management strategy of the redevelopment of the site at Manor Road, Hatfield, Hertfordshire, AL10 9UA.

2.0 SITE LOCATION AND DESCRIPTION

The subject site is brownfield in nature and is currently occupied by a hardstanding car park. The site area is approximately 0.46 hectares. An existing site plan is contained within Appendix A.

3.0 DEVELOPMENT PROPOSALS

The development proposal is for the construction of a multi-storey residential block with associated car parking. A proposed site plan is contained within Appendix B.

4.0 STAKEHOLDER CONSULTATION

The Environment Agency, as a local stakeholder, was consulted to obtain information on existing sources of flooding on the proposed development site.

4.1 Environment Agency

The Environment Agency (EA) has available on their web site indicative flood plain maps for much of England and Wales. The online mapping confirms that the site is within flood zone 1 - land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).

The online EA mapping also confirms that the site is within a Groundwater Source Protection Zone (SPZ) - Total Catchment. The site is also within both a groundwater and surface water Nitrate Vulnerable Zone (NVZ) area.

A total catchment (or Zone 3) SPZ is defined by the EA as “the area around a source within which all groundwater recharge is presumed to be discharged at the source”.

5.0 SURFACE WATER MANAGEMENT

5.1 Existing Surface Water Drainage Infrastructure

The existing site is 4592m² and approximately 2396m² of this is impermeable, consisting of hard standing used for car parking, which is assumed to currently discharge surface water into an existing below ground trunk sewer. The site is currently made up of 52% impermeable area.

5.2 Existing Surface Water Runoff Regime

The site is brownfield in nature and therefore existing run-off rates should be assessed accordingly. In respect of Brownfield sites, the Interim Code of Practice for Sustainable Drainage Systems (July 2004) states that 'drainage proposals will be measured against the existing performance of the site'. The design of any future drainage system should therefore be based upon an assessment of the existing rate of runoff, taking account of the existing extent of impermeable surfaces and the capacity of the pipe system serving the impermeable catchment and drainage to the receiving system. The existing rate would then be taken forward and used as the basis for defining the 'limiting flow' for the purposes of designing any future storm water drainage and balancing system.

5.3 Assessment of Discharge Rate

The existing site discharge rate based on $Q=2.78 \times 50 A_{imp}$ (0.24ha) has been calculated as being 33.4 l/s.

As the site is brownfield the Environment Agency would expect to see a reduction of 30% in peak discharge from the proposed development; this would give an allowable discharge rate of 23.4 l/s.

5.4 Consideration of SuDS Suitability

The Environment Agency require Sustainable Drainage (SuDS) techniques to be incorporated within new developments where possible.

Consideration should therefore be given to the use of the Sustainable Urban Drainage Systems. The following table gives commentary in relation to the suitability of sustainable Urban Drainage techniques for the proposed development.

As the site is within a Total Catchment SPZ, the EA may not accept the use of infiltration based SuDS techniques for this site; this potential restriction is intended to minimise the risk of contaminated surface water entering the underlying aquifer.

SUDS Technique	Commentary	Suitability
Green Roof	Green roofs are potentially suitable for the property; this would only be suitable if the roof is of flat construction.	Potential
Infiltration by Soakaway	It is potentially feasible to locate a soakaway a sufficient distance from any new or existing buildings subject to the suitability of ground conditions and EA confirmation.	Potential

Attenuation Tanks	It is potentially feasible to locate an attenuation tank a sufficient distance from any new or existing buildings subject to the suitability of ground conditions.	Potential
Rainwater Harvesting / Water Butt	Storage of roof runoff via the use of rainwater harvesting / water butts is potentially suitable for the properties.	Potential
Filter Strip	There is no suitable area within the site for filter strips.	No
Infiltration Trench / Filter trench	There is limited space to accommodate an infiltration/filter trench on site.	No
Swale	It is not viable or practical to accommodate swales on site as there are no extensive soft landscaped areas to accommodate these.	No
Bio-retention	It is not viable or practical to accommodate bio-retention on site as there are no extensive large open soft landscaped areas to accommodate these.	No
Permeable paving	The use of permeable paving can be considered to the car parking areas to control surface water. This will be subject to the ground investigation, verifying the suitability of the existing bearing strata and the depth to the water table and EA confirmation.	Yes subject to ground conditions
Geocellular / modular system	Potentially the site could accommodate a geocellular/modular system below ground beneath the proposed carpark subject to the ground investigation, verifying the suitability of the existing bearing strata, the depth to the water table and EA confirmation.	Potential
Sand Filter	There is no suitable area within the site for sand filters.	No
Infiltration basin	It is not viable or practical to accommodate infiltration basins on site as there are no extensive large open soft landscaped areas to accommodate these.	No
Detention Basin	It is not viable or practical to accommodate detention basins on site as there are no extensive large open soft landscaped areas to accommodate these.	No
Pond	It is not viable or practical to accommodate a pond on site as there are no extensive large open soft landscaped areas to accommodate this.	No
Stormwater Wetland	It is not viable or practical to accommodate stormwater wetland on site as there are no extensive large open soft landscaped areas to accommodate this.	No

The table above identifies potential for green roofs, soakaways, attenuation tanks, rainwater harvesting/water butts, geo-cellular and permeable paving to be suitable on site, subject to confirmation of ground conditions and EA approval. As previously mentioned, infiltration based techniques may not be suitable for use on this site, and therefore the most appropriate SuDS technique for this site is deemed to be an attenuation tank, discharging to existing surface water sewers.

5.5 Proposed Surface Water Drainage Strategy

The proposed development will provide a small increase in impermeable area of the site of 274m² from that of the existing site. A plan showing the impermeable areas of the proposed development, BJB drawing number SK001, is contained within Appendix C.

The impermeable area of the proposed development is approximately 2670m², resulting in a total surface water discharge rate of 37.1 l/s. In order to achieve the allowable discharge rate of 23.4 l/s, attenuation must be provided on site by the use of tanks.

5.6 Proposed Foul Water Drainage Strategy

The discharge loads for the proposed new residential development are based on the occupancy and use of the development as set out in the British Water Code of Practice: Flows and Loads 4 (BW COP: 18.11/13):

SOURCE OF WASTE						Flow litre / DAY		
Description	No of bedrooms	Occupancy	No	Reduction Factor	Reduced No	Daily Flow	TOTAL	
Care Home	75	1	75	0.8	60	350	21000	
Full-time staff			6			90	540	
Total load(s)							21540	litres/day
							21.5	m ³ /day

Note: Occupancy figures are as set out in BW COP: 18.11/13.

Estimated foul flow based on a peak flow factor of 6 plus 10% (6DWF) =

$$Q_F = (21540 \times 6 \times 1.1) / (24 \times 3600)$$

$$Q_F = 1.6 \text{ l/s}$$

The estimated total foul discharge for the proposed development equates to 1.6 l/s. This represents the maximum peak flow for the new development proposed.

It is assumed that this foul flow can be discharged to an existing trunk sewer that serves the existing site adjacent to the site in question. However, this sewer should be checked and verified to ensure it has the capacity to accommodate this additional load.

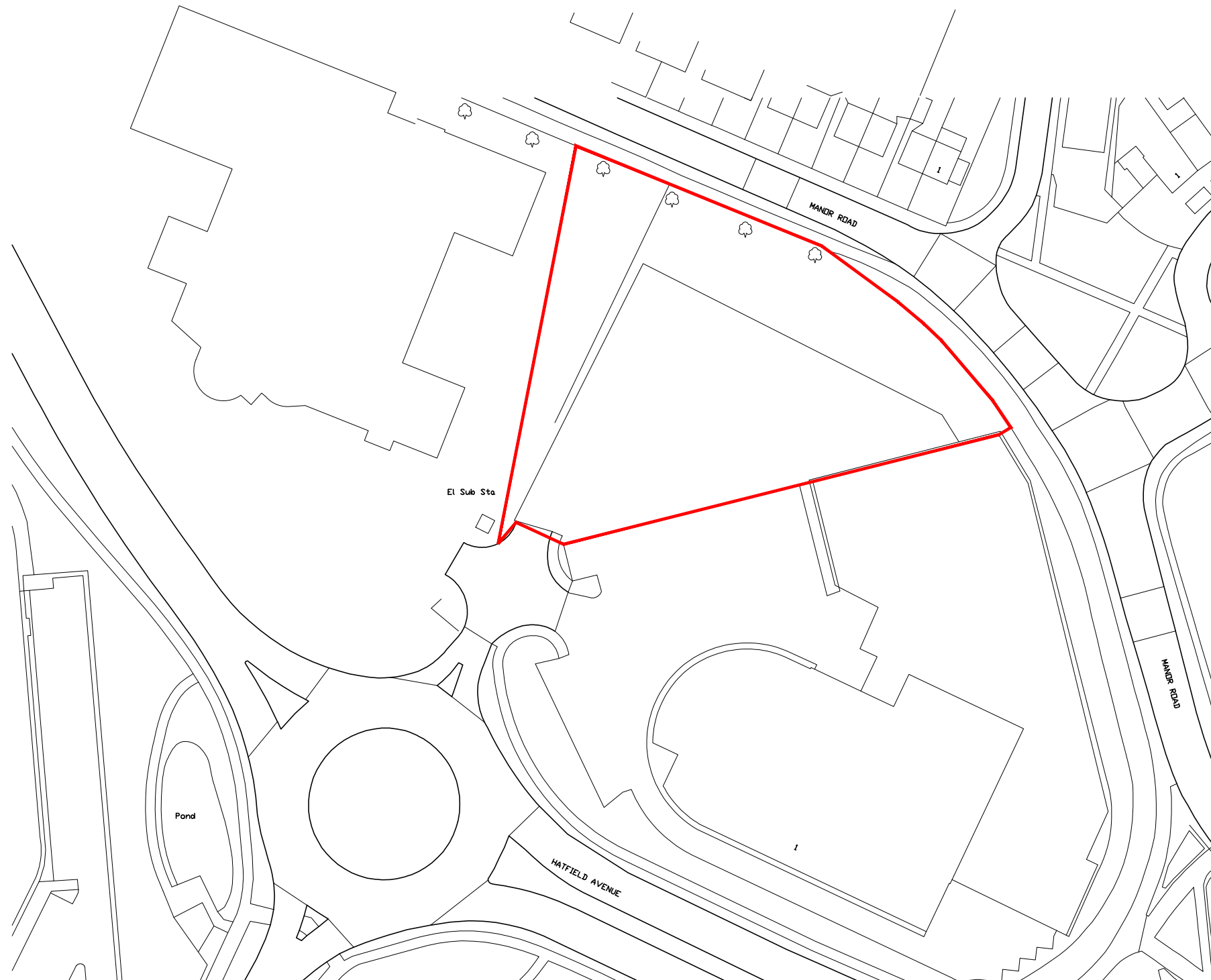
6.0 SUMMARY AND CONCLUSIONS

BJB Consulting has prepared this Surface and Foul Water Management Report for the site off Manor Road, Hatfield. The report can be summarised as follows:

- The site is classified as Flood Zone 1 – land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).
- The site is within a Groundwater Source Protection Zone (Total Catchment). The site is also within both a groundwater and surface water Nitrate Vulnerable Zone (NVZ) area.
- In order to achieve a reduction in surface water discharge rate of 30% from existing conditions, as required by the EA for brownfield sites, and an allowable discharge rate of 23.4 l/s, it is recommended that attenuation is provided on site (utilising tanks) to manage the discharge of surface water from the site.
- The estimated foul discharge from the development has been calculated as 1.6 l/s. It is assumed that this foul flow can be discharged to an existing trunk sewer that serves the site adjacent to the site in question. However, this sewer should be checked and verified to ensure it has the capacity to accommodate this additional load.
- All existing drainage systems, including main sewers, needs to be verified to confirm the type and location of the sewer, along with pipe sizes and outfall into the public sewers.


PREPARED BY	CHECKED BY	DATE	REVISION
Beth Sangster MEng (Hons) Graduate Structural Engineer	Basil Basray BEng (Hons), CEng, MStructE Managing Director	October 2016	-

APPENDIX A



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Rev	Date	Revision Description	Drawn By
-	01/01/13	Original Drawing	JB

		
<small>6 Pioneer Court, Darlington, DL1 4WD t: 01325 464 111 e: studio@adgarchitects.co.uk w: www.adgarchitects.co.uk</small>		
Client		
Maxbase Ltd		
Project Information		
Proposed Care Home Development Hatfield Avenue - Hatfield		
Drawing Title		
Existing Site Location Plan		
A1 Scale	A3 Scale	
1:500	1:1000	
Job Number	Drawing Number	Revision
H.15.35	(9-) 1	-
Drawing Issue		
FEASIBILITY		

APPENDIX B



A	07/01/11	Layout has been revised to show all back of house relocated to the 1st floor	1	B
-	03/01/11	Original Drawing	1	B
Re:	Date	Revision Description	Drawn	Checked

AIG ARCHITECTS
 Pioneer Court, Darlington, DL1 4WD
 t: 01325 414111
 e: studio@aigarchitects.co.uk
 w: www.aigarchitects.co.uk

Client:
Caring Homes
Saikatkar

Project Information
Proposed 75 Bed Care Home, Manor Road, Hatfield

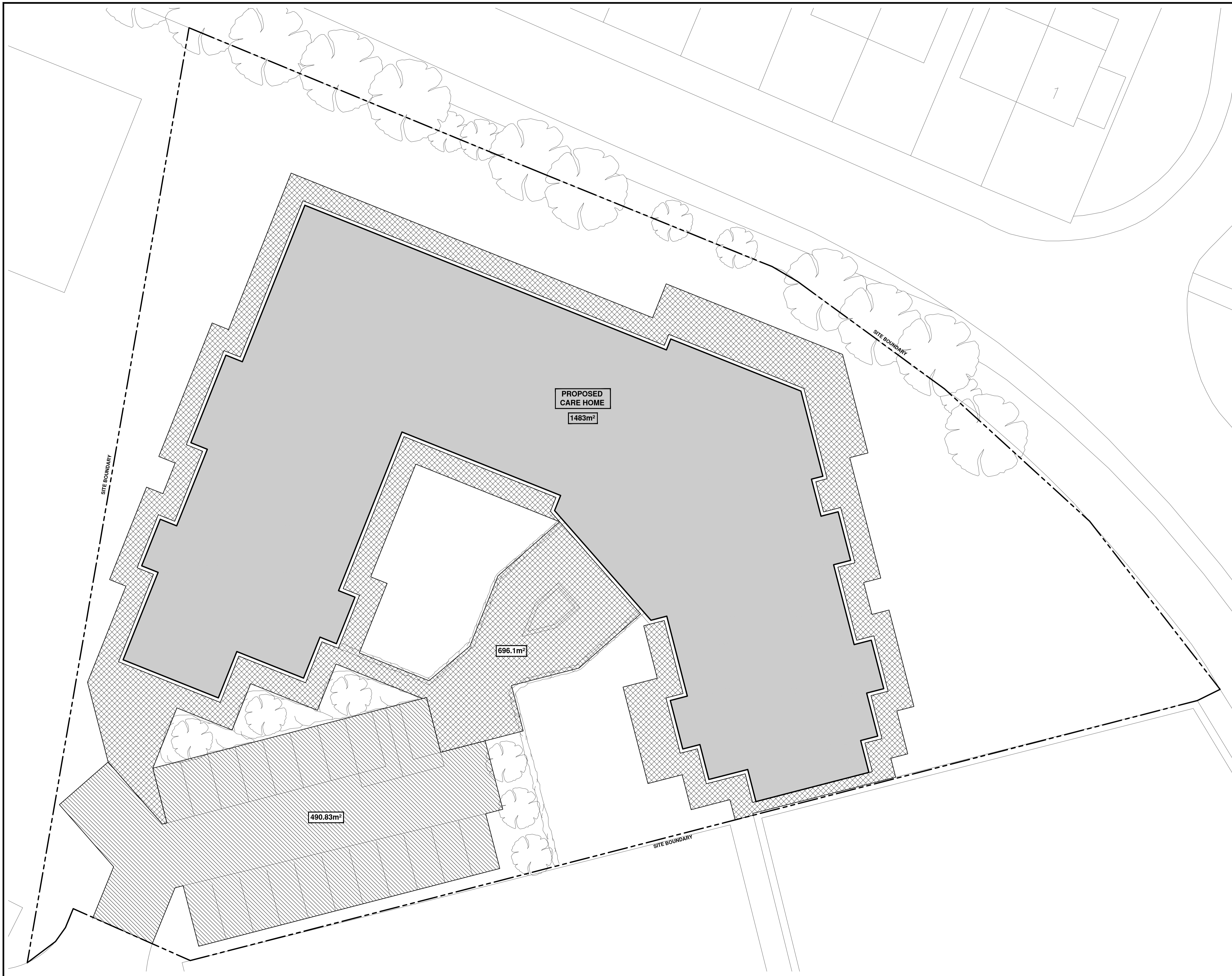
Drawing Title
Proposed Site Plan

A1 Scale: **1:200** A3 Scale:

Job Number: **H.15.35** Drawing Number: **1-02** Revision: **A**

Drawing Issue: **PLA**

APPENDIX C



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TOTAL SITE AREA = 4592.5m²

PROPOSED IMPERMEABLE AREAS:
 BUILDINGS = 1483m²
 HARDSTANDINGS = 1186.93m²
 TOTAL IMPERMEABLE = 2669.93m²

REV	DATE	AMENDMENT	BY

CLIENT:
ATKAR CORPORATION

BJB Consulting
 Civil Structural Engineers, Development Consultants, Project Managers.
 Head Office: 111, T. Garden Close, Calver Park, Wakefield, West Yorkshire, WF4 3BA, Tel: 0845 5230 303, E-mail: mail@bjbconsult.co.uk - www.bjbconsult.co.uk
 Birmingham Office: One Victoria Square, Birmingham, B1 1BD, Tel: 0845 5230 304
 London Office: Liberty House, 222 Regent Street, London, W1B 5TR, Tel: 0845 5230 305

PROJECT:
**FOUL & SURFACE WATER STRATEGY
 MANOR ROAD
 HATFIELD**

TITLE:
PROPOSED IMPERMEABLE AREAS

DATE: **OCTOBER 2015** SCALE: **1:150 @ A1** DRAWN: **MKJW**
 CHECKED: **BJB**

PROJECT No. **2277** DRG. No. **SK001** REVISION: **.**

