Bartlett House Ludgershall

Flood Risk Assessment & Drainage Strategy

26th April 2024

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1. Introduction

CALM Engineering have been appointed by Wiltshire Council to prepare a staged Flood Risk Assessment (FRA) and Surface Water Drainage Strategy (SWDS) to support a planning application for the redevelopment of the Bartlett House site to affordable housing.

This FRA has been prepared based on the guidelines within the National Planning Policy Framework (NPPF) and associated guidance documents. It seeks to identify the flood risks for the site, the potential impact of the proposed development and outline our approach to mitigating those risks, considering the key constraints of the site.

This is defined as a Level 3 Flood Risk Assessment (FRA) and should be read in conjunction with all associated documents and drawings submitted as part of the planning application submission:

Drawings	Description
GHY-CALM-09-DRG-20d	Drainage areas
GHY-CALM-09-DRG-21d	Drainage Layout
GHY-CALM-09-DRG-22c	Drainage Schedules
GHY-CALM-09-DRG-23c	Foul Drainage Sections
GHY-CALM-09-DRG-24c	Storm Drainage Sections
GHY-CALM-09-DRG-25b	Drainage details 1 of 3
GHY-CALM-09-DRG-26b	Drainage details 2 of 3
GHY-CALM-09-DRG-27c	Drainage details 3 of 3
GHY-CALM-09-DRG-28b	Drainage details Swale construction
GHY-CALM-09-DRG-29b	Exceedance flows
WCBHlU-050-00-00-DR-A-0002	Site Survey

2. Location

The site is located to the north of the A342, in Ludgershall, as referenced in **Table 1** and the Site Location Plan in ***Figure 1***. The site is bounded to north and west by public highway, the Castle Practice Health Centre to the south and residential gardens to dwellings in Lady Diana Court to the east.

Table 1: Site Referencing Information

Site Address	Bartlett House, Old Common Way, Ludgershall, Andover SP11 9SA
Grid Ref	SU 268509



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Figure 1: Location Plan

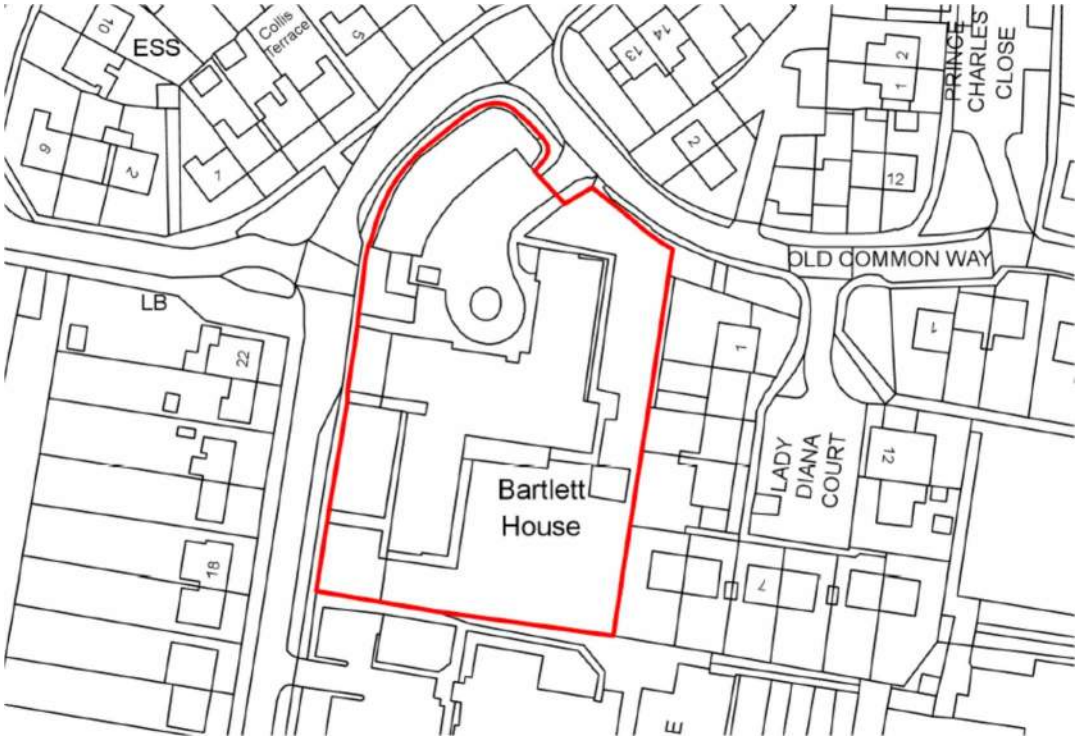


Figure 2: Existing Site Plan

The site was occupied by a care home which was demolished in early 2023.

The site sits within the northern settlement boundary of Ludgershall, approximately 420m from the centre of the town. The site is bounded by residential development to the north, east and west, with agricultural land to the north, beyond the existing dwellings along Crawlboys Lane. Immediately south of the site is The Castle Practice GP surgery and Hedge Pharmacy. The primary connection between Tidworth and Andover, the A342 / Andover Road, is south of the site at the end of Central Street. Current vehicular access to the site is from Old Common Way, as shown in ***Figure 2***. The site is relatively flat, varying in level from 133.3mAOD to 132.5mAOD.

3. Proposed Development

The site, which is owned by Wiltshire Council, was formerly Bartlett House Care Home, prior to its demolition in February 2023. Bartlett House comprised the existing care home building, originally constructed in the late 1970s, minor outbuildings, parking areas and gardens. The care home closed at the end of 2020. The demolition of the existing building also included clearing the site of former parking areas and gardens and the removal of redundant services and drainage infrastructure.

Wiltshire Council are proposing to develop the site with 18no. 100% affordable homes, with a split of 60% social rent, and 40% shared ownership. It has been developed through an iterative process with the Wiltshire Council design team and engagement with statutory authorities, to embed good practice principles, from both regional policy, as well as the National Design Guide and Building for Healthy Lives frameworks.

4. Flood Risk Assessment Process

4.1 Overview

The NPPF sets out Government policy on development and flood risk. It aims to ensure that flood risk is taken into account at all stages of 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 considered necessary in areas of flood risk, NPPF aims to make it safe, without increasing flood risk elsewhere, and, where possible, reduce flood risk overall.

Local Planning Authorities have the overall responsibility for ensuring that development proposals are informed by an appropriate flood risk assessment and that development is appropriately flood resistant and resilient.

As detailed in Paragraph 20 of the supporting guidance to the NPPF, an FRA will be required to identify the risk of flooding to the development and to others from all sources of flooding and demonstrate how flood risk will be managed now and over the development's lifetime, taking climate change into account, and with regard to the vulnerability of its user.

CIRIA publication *C624 Development and Flood Risk – Guidance for the Construction Industry* defines three levels for an FRA:

a) **Screening Study (Level 1)** – to identify whether there are any flooding or surface water management issues related to a development site that may warrant further consideration;

b) **Scoping Study (Level 2)** – to be undertaken if the Level 1 FRA indicates that the site may lie within an area that is at risk of flooding or that the site may increase flood risk due to increased run-off and;

c) **Detailed Study (Level 3)** – to be undertaken if the Level 2 FRA concludes that further quantitative analysis is required to assess flood risk issues related to the development of the site.

Each of these levels should be explored concurrently until flood risk to the proposed development has been mitigated. This report constitutes a **Level 3 FRA – Detailed Study**.

We prepared a separate **Groundwater Flood Risk Technical Report** in February 2023 to submit to planning to address the issues relating to the perceived groundwater flood risk and the need for a sequential test. The key outputs from this report have also been included within this Detailed Study for completeness and to enable a full review of the risk posed to the site (refer **Section 6** and **4.2.1** below).

4.2 Planning Policy

4.2.1 Sequential Testing

NPPF promotes a sequential risk-based approach to determine the suitability of land for development in flood risk areas. The sequential risk-based approach aims to steer new developments to areas at the lowest risk of flooding and to avoid inappropriate development in areas at risk of flooding.

Following some initial pre-application advice that was provided in June 2022, we have been reviewing the site and the sequential test requirements outlined within this response (refer **Appendix A**). Our understanding is that the primary focus for triggering the need for the sequential test was the inclusion of the site within the SFRA groundwater flood risk mapping under the category of *'groundwater levels are between 0.025m and 0.5m below the ground surface'*.

We subsequently undertook a **Groundwater Flood Risk Technical Report** which looked in more detail at the site-specific groundwater flood risk. We examined over 50 years of borehole data within 500m of the site and compared this with various other groundwater and hydrogeology data sources. Our assessment shows that the site should be reclassified as within the green zone *'groundwater levels are at least 5m below the ground surface'* which is the 2nd lowest risk category.

We submitted these details to Wiltshire Council on 9th February 2023 and they responded on the 3rd May 2023 that we would need to get the EA to accept the challenge to the SFRA

groundwater flood mapping (refer correspondence in **Appendix A**). However, this mapping is not directly supported by any public sector organisation and cannot be used in the same way as the fluvial flood risk mapping provided by the Environment Agency. It is not possible to interrogate it, or to make any 'challenges' to it to enable it to be changed.

The mapping is produced at a broad scale level and is not considered suitable for plot scale assessments and is generally shown to provide an overly conservative approach to groundwater flood risk. Indeed Wiltshire Council's SFRA has the following quote in Section 3.4.3.

The JBA Groundwater Flood Map should be used in combination with other information, such as local data or historic data. It should not be used as sole evidence for any specific flood risk management, land use planning or other decisions at any scale. The data can however help to identify areas for further assessment at a local scale, where finer resolution datasets may exist or more data could be gathered.

In our view we have undertaken the necessary 'site-specific assessment' and therefore believe that the sequential test is not applicable at this site as it is already at a low risk of flooding from all sources, including groundwater. Refer to **Section 6** for a summary of our site-specific groundwater flood risk assessment.

4.2.2 Flood Risk Classification

The Flood Zones are defined within Table 1 of the Flood Risk and Coastal Change guidance that supports the NPPF. This table is repeated below in **Table 2** of this report.

Subject	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in **light blue** on the Flood Map for Planning)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in **dark blue** on the Flood Map for Planning)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map for Planning)

Table 2: NPPF Flood Zones

4.2.3 Vulnerability Classification

NPPF defines the different vulnerability classifications within Table 2 of the Flood Risk and Coastal Change guidance that supports the NPPF. Table 3 of the guidance compares the Flood Zoning and Vulnerability to consider whether the proposed development can be considered 'compatible' with its level of risk. These details are repeated in the **Table 3** of this report below.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	**Highly vulnerable**	**More vulnerable**	**Less vulnerable**	**Water compatible**
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a	Exception Test required	✗	Exception Test required	✓	✓
Zone 3b	Exception Test required	✗	✗	✗	✓

Table 3: Flood Risk Vulnerability Classification

Classification	Definition
Highly Vulnerable	Basement dwellings
More Vulnerable	Residential institutions (care homes/ children's homes/social services/ hostels) Dwelling houses/ student halls of residence/ drinking establishments/nightclubs/ hotels Non-residential uses for health services/ nurseries/ educational establishments
Less Vulnerable	Buildings used for shops/ financial/ professional and other services/restaurants and cafes/ hot food takeaways/ offices/ general industry/ storage and distribution/ non-residential not included in 'more vulnerable'/ assembly and leisure

Table 4: Flood Risk Vulnerability Definition

The site is within Flood Zone 1 and so all classifications of uses are appropriate, dwellings are classed as a more vulnerable use. In this Flood Zone local authorities would seek opportunities to reduce the overall level of risk in the area through the layout and form of the development and the appropriate application of sustainable drainage systems.

4.2.4 Flood Risk Management Authorities / Stakeholders

The Environment Agency (EA) used to have primary statutory responsibility for flood management and defence in England. They have now delegated some of these powers to Lead Local Flood Authorities (usually at County Council Level). The EA will be consulted by Local Planning Authorities (LPAs) on all applications for development in flood risk areas in Flood Zone 3 and those in areas with critical drainage problems. The LLFA's are consulted

on all other applications over 1ha in Flood Zones 1 and 2. The final decision to grant consent lies with the LPA, however these statutory bodies are consulted during the review process.

The following Flood Risk Management Authorities are considered integral to flood risk management in this area and will usually be consulted as part of any planning application.

- Wiltshire Council as the Local Planning Authority
- Wiltshire Council as the Lead Local Flood Authority
- Water Authorities – Wessex Water and Southern Water
- Highway Authorities – Wiltshire Council, Highways England

4.3 Local Planning Policies and Guidance

The NPPF states that local planning authorities should adopt strategies to mitigate and adapt to climate change taking full account of flood risk. Local plans should be supported by a strategic flood risk assessment and develop policies to manage flood risk from all sources.

There are a number of policy documents that have been published under this framework for the area of Wiltshire, within which the site is located:

- Wiltshire Council Preliminary Flood Risk Assessment (PFRA) –2011
- Wiltshire Council Preliminary Flood Risk Assessment Addendum (PFRA) –2017
- Wiltshire Council Local Flood and Water Management Strategy (LFWMS) – April 2015
- Wiltshire Council Groundwater Management Strategy – 2016
- Wiltshire Council Strategic Flood Risk Assessment (SFRA) – 2013
- Wiltshire Core Strategy – January 2015

These documents have been reviewed as part of this assessment and incorporated within this report where appropriate. The original reports are available online through the Wiltshire Council Website.

Ludgershall is close to the boundary with Hampshire therefore the following policy documents have also been reviewed to inform this assessment.

- Hampshire County Council Draft Catchment Management Plans (CMPs), Test (Upper) Catchment Management Plan – May 2022

The **Test (Upper) CMP** does not identify the Hampshire boundary area close to the site to be within a priority area and it is therefore not subject to any additional policies for the management of flood risk.

The Wiltshire Core Strategy Development Plan Document was formally adopted on 20 January 2015. The plan provides a positive and flexible overarching planning policy framework for Wiltshire for the period up to 2026. The Core Strategy policies relevant to flood and water management:

Core Policy 67 (Flood Risk) – *'Development proposed in Flood Zones 2 and 3 as identified within the SFRA will need to refer to the Strategic Housing Land Availability Assessment when providing evidence to the local planning authority in order to apply the Sequential Test in line with the requirements of national policy and established best practice.*
All new development will include measures to reduce the rate of rainwater run-off and improve rainwater infiltration to soil and ground (sustainable urban drainage) unless site or environmental conditions make these measures unsuitable'.

Core Policy 68 (Water Resources) – *'Development must not prejudice the delivery of the actions and targets of the relevant River Basin or Catchment Management Plan and should contribute towards their delivery where possible.*
Non-residential development will be required to incorporate water efficiency measures. Developers will be expected to submit details of how water efficiency has been taken into account during the design of proposals'.
Development proposals within a Source Protection Zone, Safeguard Zone or Water Protection Zone must assess any risk to groundwater resources and demonstrate that these would be protected throughout the construction and operational phases of development'.

5. Defining Flood Risk

5.1 Flood Risk Mechanisms

In accordance with the NPPF and the NPPF technical guidance, all forms of flooding including fluvial, tidal, groundwater, surface water and flooding from artificial sources have been addressed below.

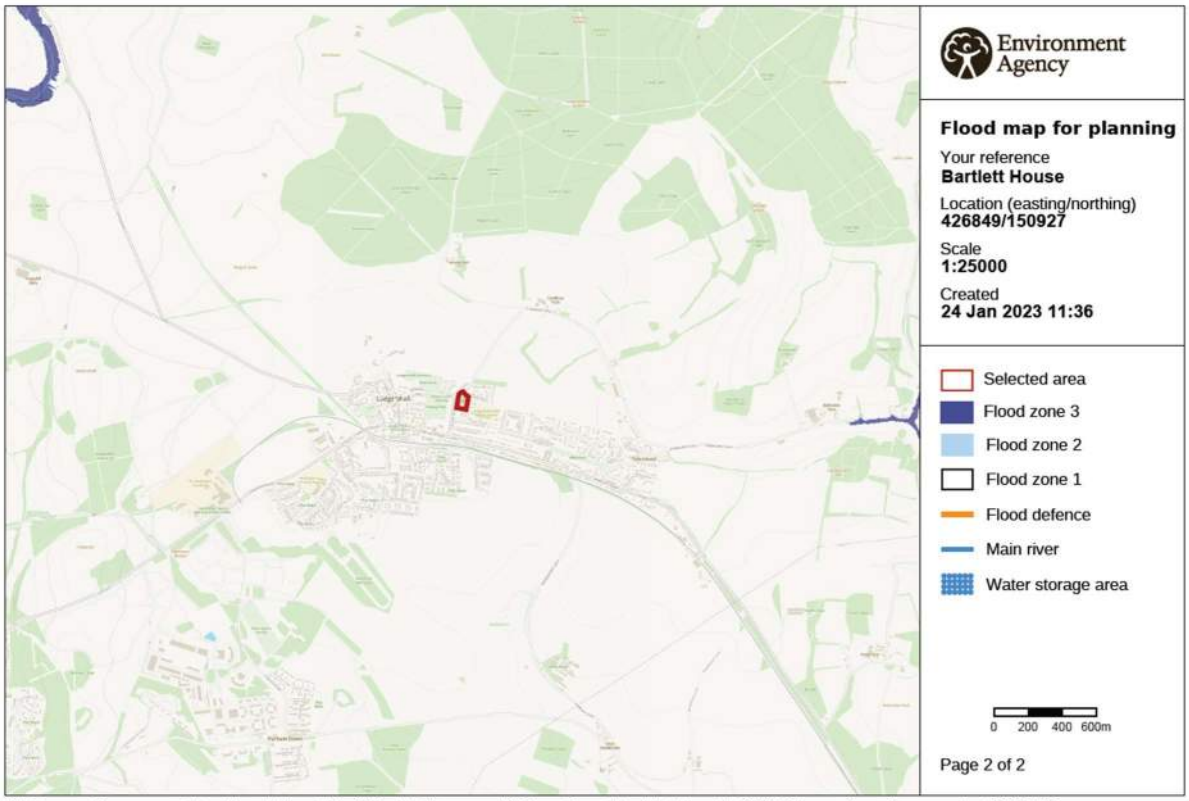
5.1.1 Fluvial Flood Risk

The site is within the catchment of the Pillhill Brook which forms parts of the Upper Test catchment. In the chalk areas of the Upper Test catchment, apart from the River Test, Pillhill Brook, Bourne Rivulet and River Dever, there are a limited number of smaller permanent watercourse features. Chalk is a major aquifer capable of absorbing large amounts of rainfall and releasing it slowly over a long period. This buffering effect, together with the mainly rural nature of the chalk area, means that the Upper Test catchment has relatively narrow ranges of flow in a normal year and generally floods within a very limited geographical extent from short to medium duration heavy rainfall. However, after prolonged rainfall the water table in the chalk aquifer can rise to the surface causing springs to erupt in the valley floors and the creation of temporary watercourses. This will be considered in more detail later in this report.

Figure 3 shows the Fluvial/Tidal Flood Risk Map published by the Environment Agency. Flood Zone 1 (low risk) is identified on the map by no shading whilst Flood Zone 2 (medium risk) is identified by light blue shading and Flood Zone 3 (high risk) by dark blue shading. The flood map is derived by assuming no formal protection from flood defences, the standard EA procedure for defining flood zones. This indicates the site (shown by the red boundary) is within Flood Zone 1 (low risk).

5.1.2 Surface Water Flood Risk

Surface water flooding occurs when soils are saturated so their natural capacity to absorb rainfall is prevented leading to overland flow, or when rain falls upon paved surfaces with low absorption causing water to run-off. During periods of intense rainfall this inevitably overwhelms drainage systems. Unlike flooding from rivers, surface water flooding can happen many miles from a river, often in places that people wouldn't expect because it's a long way from a river or stream – it happens simply because there is nowhere else for the rainwater to go.



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Figure 3: Flood Mapping from Environment Agency (January 2023)

In 2013 a national map showing the risk of flooding from surface water was published online. **Figure 4** shows the risk of flooding from surface water map produced by the Environment Agency on behalf of the government, using information and input from Lead Local Flood Authorities. This shows that there is very low risk of surface water flooding to the site itself but identifies a medium risk surface water flow route on Central Street to the south of the site which joins a high risk surface water flow route along the A342 Andover Road. Effectively managing surface water runoff from the site will prevent runoff from the site contributing to identified surface water flood risk in the surrounding area.



Figure 4: Environment Agency Surface Water Flood Map (September 2022)

5.1.3 Tidal Flood Risk

Given the location, site elevation, and distance from the coastline this site is not considered to be at risk from tidal sources of flooding.

5.1.4 Groundwater Flood Risk

The Wiltshire Council Strategic Flood Risk Assessment, has indicated that the site is located within Flood Zone 1, but groundwater levels may be between 0.025m and 0.5m below the ground surface (as shown in **Figure 5**) and within this zone there is a risk of groundwater flooding to both surface and subsurface assets. The SFRA concludes that there is the possibility of groundwater emerging at the surface locally.

However, the groundwater levels contained in the SFRA are indicative and to make a proper assessment of the groundwater flood risk for the site an assessment of the underlying geology borehole and groundwater monitoring data and historic flood records is required. Section 6 of this report considers existing groundwater flood risk in greater detail.

Groundwater flooding occurs from water rising from the underlying aquifer or from water flowing from springs. This tends to occur after long periods of sustained high rainfall, and the areas at most risk are often low-lying where the water table is more likely to be at shallow depth. Groundwater flooding usually occurs in areas underlain by major aquifers but can be associated with more localised floodplain sands and gravels.

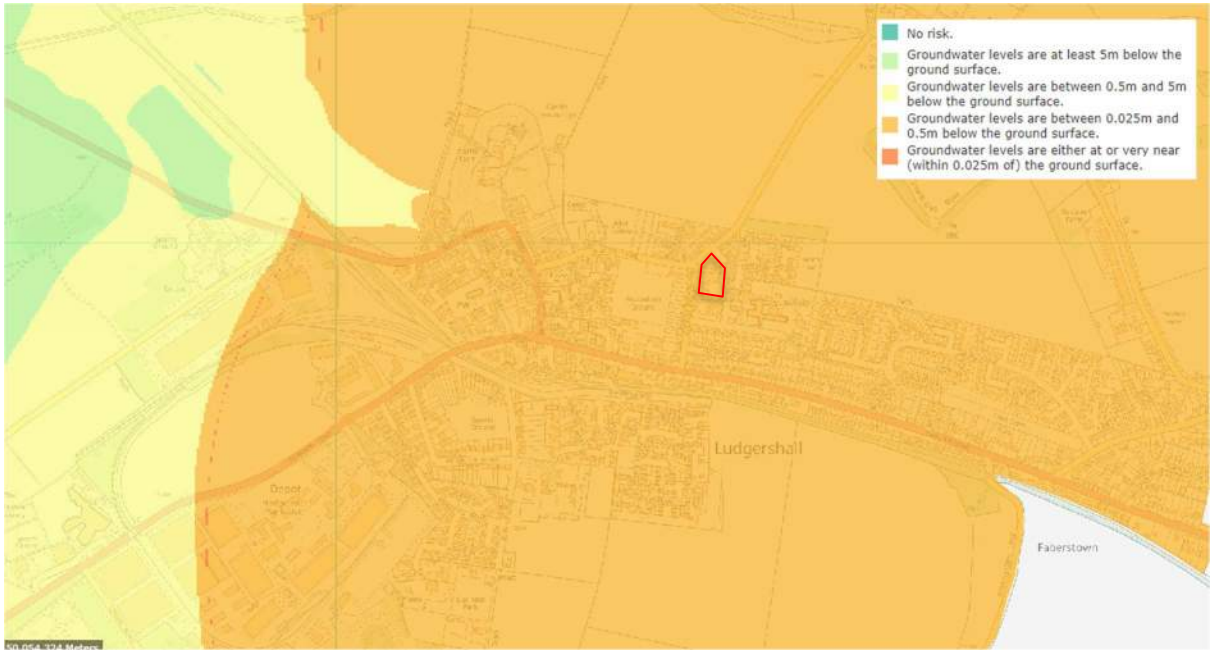


Figure 5: SFRA Data Explorer Appendix G Risk of Groundwater Flooding

5.1.5 Other Sources of Flood Risk

The potential risk from flooding from the sewer system in this area is considered low. There are no recorded incidents of flooding within 2km of this site.

There are no natural or manmade lakes, ponds, or other water bodies near the site so the flood risk from artificial sources is considered low.

5.1.6 Flood Risk Summary

The flood risk to the site is considered low from all sources, except groundwater which is considered in greater detail in the following section.

Mitigation measures will need to be designed to ensure that the surface water runoff from the site is appropriately managed, that there is no increase in surface water runoff, flow pathways are maintained or managed appropriately and that improvements to biodiversity and water quality can be incorporated.

The current requirement in national policy is that all new developments should give priority to the use of multifunctional sustainable drainage systems. There is a lot of potential for this on the site and this will be a key focus of the emerging drainage strategy for the site (refer Section 7).

6. Groundwater Flood Risk

6.1 Geology

The BGS mapping indicates that the entire site is underlain by the Seaford Chalk Formation. This comprises soft white chalk with flint nodules which the BGS estimate to be up to 80m thick and overlying the Lewes Nodular Chalk Formation. These rocks were formed in warm shallow 'Chalk' shelf seas with little sediment input from land. The BGS mapping coverage indicates that there are no superficial deposits underlying the site. Superficial head deposits are identified to the south and east of the site as shown in **Figure 6**.



Figure 6: BGS Combined Geology Map
Contains British Geological Survey materials © UKRI 2023

6.1.1 Site Investigation

Ground investigation works were undertaken on 17th February 2022 consisted of:

- Four concrete core holes (HP01-HP04),
- Eight machine excavated trial pits (TP01-TP08), and
- Two in-situ soakaway tests (TP01 and TP07)

The ground conditions encountered in the trial pits were variable across the site and can in general be summarised as shown in **Table 5**.

Table 5: Summary of Ground Conditions					
Depth (mBGL)		**Thickness (m)**		**Stratum**	
Min	**Max**	**Min**	**Max**		
0.00	0.10/0.30	0.10	0.30	Dark brown slightly silty slightly sandy CLAY. Frequent roots and rootlets.	Topsoil
0.10/0.30	0.50/0.80	0.20	0.50	Firm dark brown slightly silty slightly sandy slightly gravelly CLAY.	Residual Soils
0.50/0.80	>2.50	Unproven		Structureless (Grade Dc) over structured CHALK recovered as medium dense white with occasional light brown marling slightly silty slightly sandy GRAVEL.	Seaford Chalk Formation

Additional Continuous Percussion Boreholes at the locations shown in **Figure 7** were undertaken to depths of 4.00mBGL and 6.00mBGL on the 17th January 2023, and have been monitored for a period of 6 months (up to the date of this report).



Figure 7: Borehole Location Plan

Monitoring was undertaken in accordance with agreed timescales set out in consultation with the Wiltshire Council Drainage Engineer (refer correspondence in Appendix A). It was agreed that monitoring until the end of June as a minimum would be sufficient for development of the design and to satisfy the requirements of planning. We agreed that the regularity of monitoring would be 'following any significant rainfall' over this period to

confirm no water within the top 4 to 6m. The results of this monitoring are provided in Section 6.8.

6.2 Hydrogeology

The Seaford Chalk Formation is classified by the Environment Agency (EA) as a Principal Aquifer, which is regionally important for water supply. Groundwater flow within the chalk is principally within fissures. Most flow occurs in the top 30 to 50m of the chalk, and hard fractured bands, such as the chalk rock, are particularly important flow horizons.

The water table in the Chalk aquifer generally follows, in a subdued manner, the surface expression of topography: the unsaturated zone is thicker under hills and thinner in the valley areas. Given the variation in topography over the Wessex Basin, the thickness of the unsaturated zone can therefore vary considerably. In addition, annual variations in water level can be significant.

The Wessex and Hampshire and the Isle of Wight hydrogeological maps cover the Chalk of the Wessex Basin and were compiled at a scale of 1:100 000 by the Institute of Geological Sciences with Wessex Water Authority and Southern Water Authority respectively. They include contours for the Chalk piezometric surface for September 1975 (Wessex) and October 1973 (Hampshire).The full map covering the Ludgershall area can be viewed here https://largeimages.bgs.ac.uk/iip/hydromaps.html?id=hampshire-iow.jp2 an extract of the piezometric surface contours are in the area around Ludgershall is reproduced in **Figure *8***.

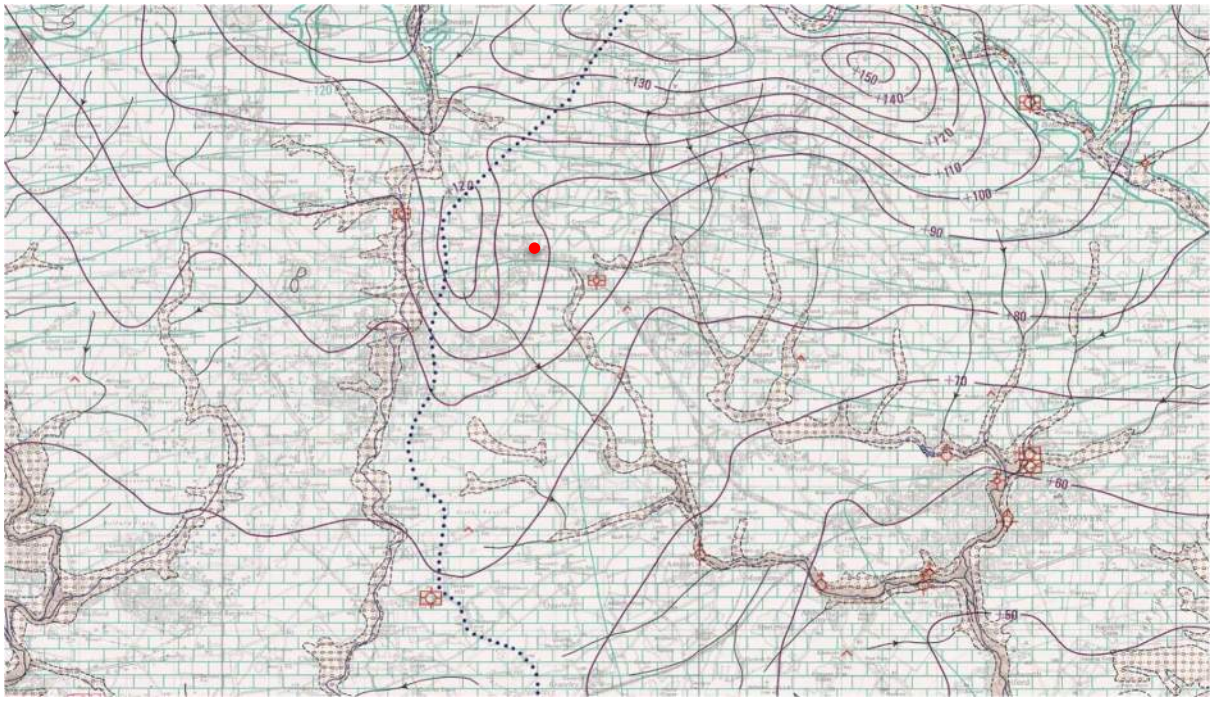


Figure 8: Extract from Hampshire and the Isle of Wight hydrogeological map

In general, the contours show that the direction of regional flow is from the edges of the basin towards the coast, with the contours generally reflecting the topography in a subdued form. On a regional scale, the contours generally indicate the expected discharge

of groundwater to the main river systems. The groundwater divide between the River Bourne and River Test is clear in the lower reaches however the contours for the upper parts of the catchment to the North of Ludgershall are more ambiguous.

The site falls within the 100mAOD to 110mAOD hydrogeological contour which puts groundwater levels in October 1973 at approximately 104mAOD which is 28m below the existing ground levels on site.

The site is not located within a Groundwater Source Protection Zone, the closest Source Protection Zone to the site is located 350m to the east and is Source Protection Zone 3 - Total Catchment.

6.3 Hydrology

The hydrology of the chalk streams within the local area is intrinsically linked with the underlying geology and hydrogeology. The site is within the catchment draining to the Pillhill Brook which is located to the south. The other local watercourses are a tributary of the River Anton at Biddesden 2.5km to the east and the River Bourne which flows in a southerly direction some 3km to the west of the site.

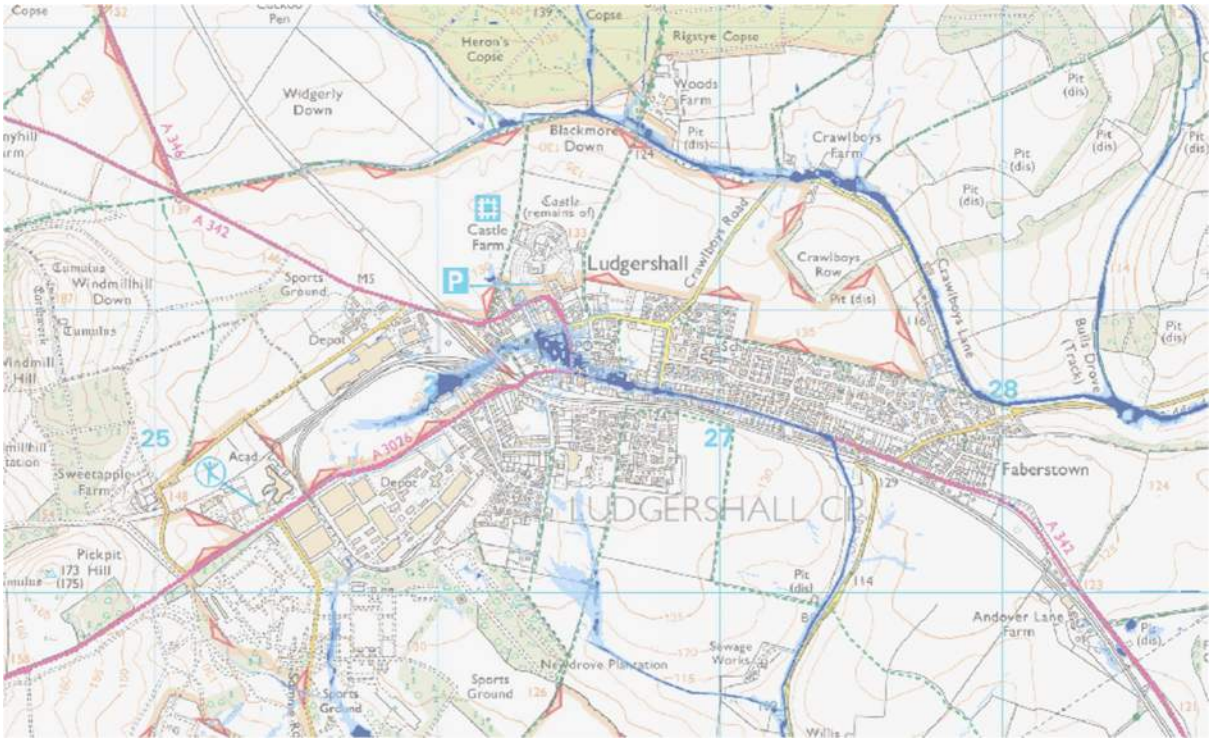


Figure 9: EA Flood Map for Surface Water

The headwaters of these streams are naturally ephemeral (flowing intermittently) and are often named 'winterbournes', flowing in the winter months when groundwater is highest. The EA Flood Maps for Surface Water in **Figure 9** give a good indication of the location of these watercourses which are not covered by conventional fluvial flood mapping. The location of overland flows in the surface water flood maps shows good correlation with the

location of superficial Head deposits shown on the geological and hydrogeological mapping.

The site is in a location shown to be at very low risk of surface water flooding. The mapping identifies a medium risk surface water flow route on Central Street to the south of the site which joins a high-risk surface water flow route along the A342 Andover Road. This flow route corresponds with the location of superficial Head deposits as shown in ***Figure 6***. The elevation of the A342 Andover Road at the junction with Central Street is approximately 124mAOD compared to levels on the site which are 133.3mAOD to 132.5mAOD. This data indicates the hydrology and underlying geology at the site would not lead to the presence of groundwater at or near the surface.

6.4 Historic Flooding

Groundwater flooding, is a natural phenomenon that occurs when the natural storage capacity of an aquifer is exceeded. It can arise in two main ways. One of the most common forms is associated with river floodplains and occurs when river gravels become fully saturated and groundwater is forced out into the floodplain. The second type of groundwater flooding occurs when the water level in consolidated rock aquifers, such as the Chalk, is so high that the water emerges at the surface as springs and seepages. This second type is the cause of most groundwater flooding events in Wessex associated with the Chalk aquifer, especially in the upper reaches of tributary streams. A significant difference from surface water flooding is that the events last for weeks or months, rather than days, as the groundwater in storage is slowly released.

The winterbourne tributary streams of the Test are often areas where Chalk groundwater flooding occurs, due to the source of the watercourse moving in response to groundwater level fluctuations. In the winters of 1993/94, 1994/95, 2000/01, and 2002/03 groundwater levels were exceptionally high, and many winterbournes rose much further up their valleys than normal, causing local flooding. In contrast, low winter rainfall in 1991/92 and 1996 caused very low groundwater levels and river flows in the following drought summers.

6.4.1 Local Recorded Flood Incidents

The SFRA data explorer contains 1 recorded flood incident in Ludgershall, this is associated with external property flooding on Pretoria Road associated with a highway drain.

6.4.2 Flood Alert Areas

Ludgershall is located outside of the EA Flood Alert Areas for groundwater flooding. **Figure *10*** shows the closest Flood Alert Areas to the site which are detailed in **Table 6**.

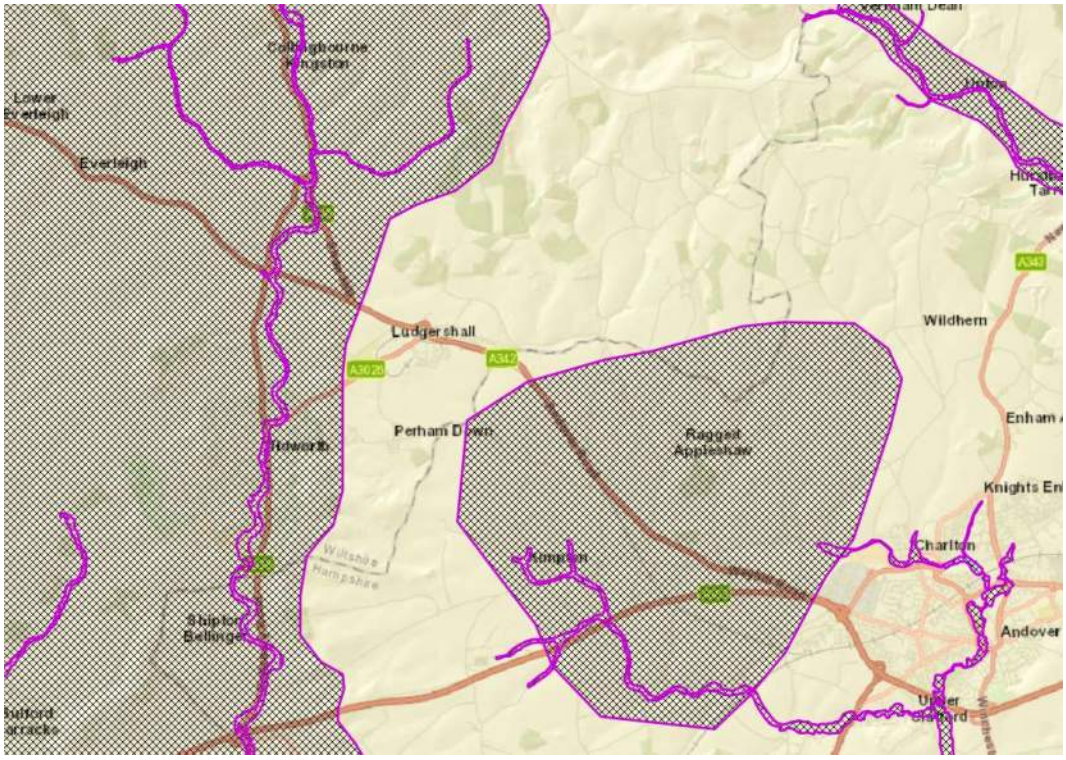


Figure 10: EA Flood Alert Areas

Table 6: Flood Alert Area Information		
Code	065FAG003	111FAGSPGW
Name	Groundwater flooding in villages surrounding Andover	Groundwater flooding in the Salisbury Plain area
Description	Communities at risk of groundwater flooding surrounding Andover, including Appleshaw, Hatherden, Penton Mewsey, Redenham, Weyhill Bottom, Kimpton, Amport and Monxton	Boscombe, Cholderton, Collingbourne Ducis, Hanging Langford, Hindon, Hurdcott, Idmiston, Newton Tony, Orcheston, Porton, Salisbury, Shipton Bellinger, Shrewton, Stratford Sub Castle, Tidworth, Tilshead, Tisbury, Wilton, Winterbourne Stoke and Woodford

6.4.3 Groundwater Recorded Flood Incidents

Ludgershall is close to the boundary with Hampshire, therefore when looking for Groundwater flood incidents both the Wiltshire SFRA and the Test Valley SFRA have been consulted. The groundwater flood incidents recorded in the Wiltshire SFRA are detailed in **Table 8**. The EA Recorded Flood Outlines in the vicinity of Ludgershall associated with these events are shown in **Figure *11***. The groundwater flood incidents recorded in the Test Valley SFRA are detailed in **Table 7** and are shown in **Figure *12***.

Table 7: Wiltshire SFRA Recorded Groundwater Flood Incidents*			
Event Date	**Mechanism**	**Areas worst affected**	**Source of Information**
January 1995	Groundwater / high water table (Ephemeral watercourses)	River Dun (Middle Winterslow, West Grimstead, River Blackwater (Whiteparish) River Anton, (Ludgershall)	EA Recorded Flood Outline
March 1995	Groundwater / high water table (Ephemeral watercourses)	River Dun (West Winterslow)	EA Recorded Flood Outline
December 2000	Groundwater / high water table (Ephemeral watercourses)	River Dun (Pitton)	EA Recorded Flood Outline

* Further incidents may have occurred since this data was published.



Figure 11: EA Recorded Flood Outlines

Table 8: Test Valley SFRA Recorded Groundwater Flood Incidents			
Reference	**Mechanism**	**Occurrence of Flooding in Years**	**Source of Information**
TV024	Ground	5	Shapefile provided by council 12/01/2007
TV025	Ground	5	Shapefile provided by council 12/01/2007
TV027	Ground	5	Shapefile provided by council 12/01/2007
TV028	Ground	5	Shapefile provided by council 12/01/2007
TV029	Ground	5	Shapefile provided by council 12/01/2007

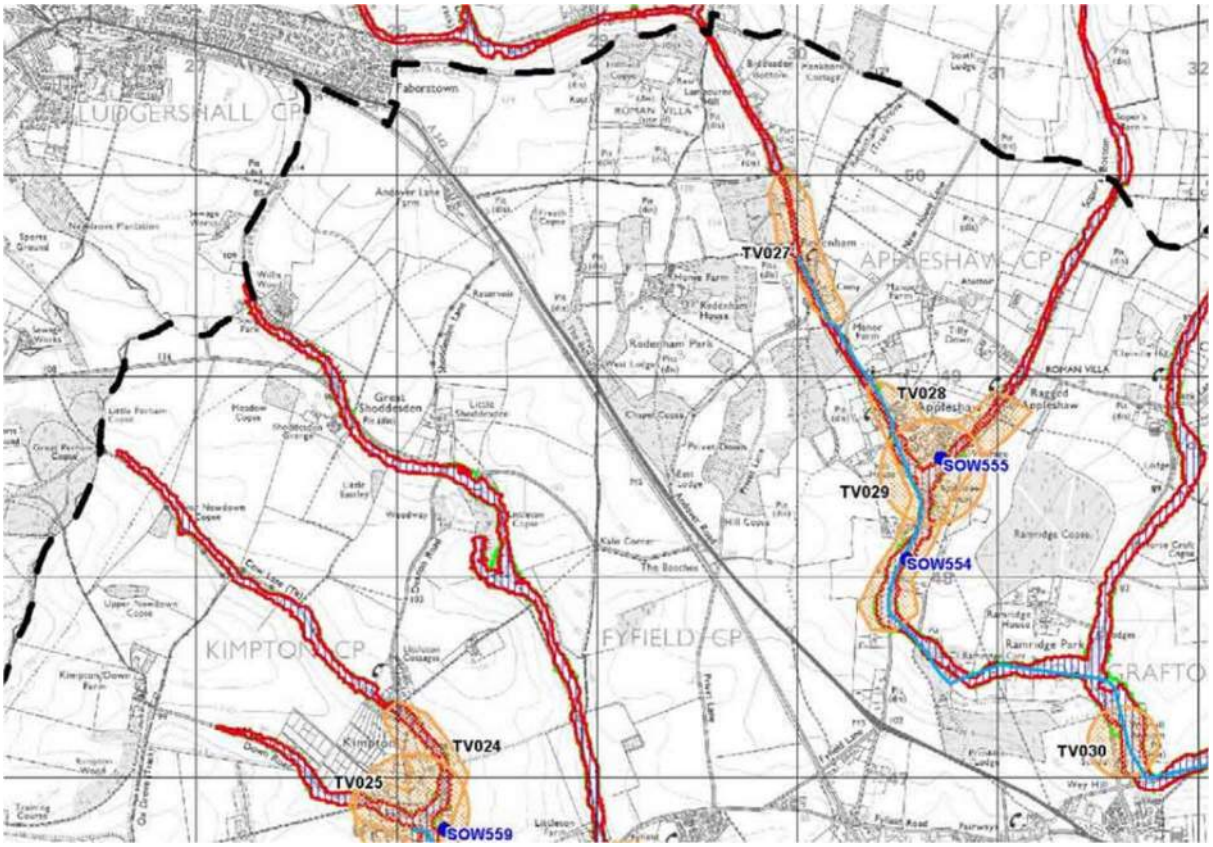


Figure 12: Test Valley SFRA Recorded Flood Incidents (Orange)

The above data shows that the locations of historic groundwater flooding have a strong correlation with areas of high risk on the surface water flood maps and the location of superficial Head deposits shown on the geological and hydrogeological mapping (***Figure 6***, **Figure *8*** and **Figure *9***).

The above assessment of the data therefore indicates that there is no known history of groundwater flooding at or near the site. The site is therefore considered to be at low risk of groundwater flooding.

6.5 Ground Water Monitoring Network

The EA regularly monitors groundwater levels in boreholes across the Chalk aquifer of Wessex at a variety of depths depending on the planned use of the data. A subset of these boreholes, termed index wells, which are considered to be representative of the aquifer, are selected to contribute to the National Hydrological Monitoring Programme, which provides information on the state of the nation's water resources on a monthly basis. Many index wells have been used to record water level variations in the aquifer for over 50 years.

Generally, groundwater levels rise throughout the winter, with the highest levels commonly occurring in February and March, and fall over the summer, reaching lows in August or September. Often multiple maximum levels are observed during the winter due to an uneven rainfall distribution, with several prolonged periods of rain resulting in discrete recharge events.

6.5.1 Locations

The locations of EA monitoring sites within the vicinity of Ludgershall are shown in **Figure 13** and details are given in **Table 9** Observed Peak Groundwater levels at the closest site and the EA Index well at Clanville Gate are given in **Table 10.**



Figure 13: EA Groundwater Monitoring Locations

Table 9: EA Groundwater Monitoring Locations					
Location	**Site Number**	**Period of Record**	**Ground Level (mAOD)**	**Highest Recorded Level (mAOD)**	**Data Frequency**
Hazelberry Plantation	G432410	1999 - Present	≈150	129.44	Daily
Everleigh	90115400	2003 - Present	≈160	135.48	Daily
Clanville Gate	141806746	1960's - Present	101.64	92.60	Daily from October 2003, weekly 1986-2003
Blackmore Farm, Ludgershall	141806377	1964 - Present	133.84	119.41	Twice a year, Oct/Nov and Mar/Apr
Scouts Hall, Ludgershall	141806172	1966 - Present	127.13	116.67	Monthly from 1992 Pre 1992 twice a year, Oct/Nov and Mar/Apr
Biddesden Park, Ludgershall	141806385	1967 - Present	104.55	102.52	Twice a year, Oct/Nov and Mar/Apr

6.6 Observations

The closest three monitoring locations to the site are Ludgershall Scouts Hall (500m), Blackmore Farm (1km) and Biddesden Park (2.5km). The monitoring site at Biddesden Park falls within the superficial Head deposits and the EA Risk of Surface Water Flooding mapping. It is therefore not representative of the site conditions at Bartlett House.

	Table 10: Observed Peak Ground Water Levels						
	Ludgershall Scouts Hall			**Clanville Gate**			
Water Year	**Peak Level (mAOD)**	**Distance below surface (m)**	**Date**	**Level (mAOD)**	**Peak Date**	**Peak Level (mAOD)**	**Difference (m)**
1989/90	115.0	12.1	11/04/90	86.5	21/3/90	87.1	0.6
1994/95	113.6	13.5	15/03/95	91.7	15/03/95	91.7	-
2000/01	114.4	12.8	11/12/00	90.1	20/12/00	91.2	1.1
2002/03	115.1	12.0	13/11/02	-	-	-	-
2013/14	116.7	10.5	17/02/14	92.1	07/03/14	92.6	0.5

As the closest monitoring location to the site data from Ludgershall, Scouts Hall has been used to examine groundwater levels in relation to the site. Since the data is recorded monthly it may not have recorded the true highest values, a possible adjustment range can be considered by utilising a nearby gauge that records more frequently where the peaks occur at similar times. The site at Clanville Gate has currently been utilised for this purpose, whilst it is at a lower elevation than the gauge at Ludgershall Scouts Hall it is within the same catchment and is an index site for the National Hydrological Monitoring Programme.

6.6.1 Comparison to Site Levels

The site is relatively flat, varying in level from 133.3mAOD to 132.5mAOD, topographic survey of the site is included in Appendix A. Ground Levels at the Ludgershall Scouts Hall monitoring well are 127.13mAOD. This is a difference of approximately 6m.

The peak recorded groundwater level was observed at Ludgershall Scouts Hall in February 2014, the level was 116.7mAOD which is 10.5mBGL. Considering the timing of peak levels at Clanville Gate this could potentially be adjusted upwards by 0.5m, so a peak level of 117.2mAOD which is 10.0mBGL. The minimum recorded groundwater level at Ludgershall Scouts Hall is 101.7mAOD which is 25.4mBGL.

Given the available data it is difficult to correlate this to an estimated maximum historic ground water level for the site, however two approaches could be adopted:

1. Consider that groundwater levels at both locations are at equal distance below ground level. This would give a peak groundwater level at the site of between 123.3mAOD and 122.5mAOD; or
2. Raise the peak groundwater level by the difference in ground levels between the two sites of 6m giving a peak level of 123.2mAOD.

In either case, this estimates that the maximum groundwater levels at the site are a minimum of 9.3m below ground level. This would put the site within the green zone of the SFRA groundwater flood risk map 'Groundwater Levels are at least 5m below the ground surface', (***Figure 5***) which is the 2nd to lowest category within the SFRA classification.

Following the above review of the existing groundwater levels, it is considered unlikely that there would be any future increase in groundwater level of such a magnitude to put this site at any increase in groundwater flood risk. The groundwater would have to rise by 9m to be within the risk classification indicated within the SFRA.

6.7 Monitoring on Other Development Sites

A review of recent planning applications (E/2013/0234/OUT, 18/04346/REM and 19/11699/DOC) which relate to land adjacent to Empress Way in Ludgershall seems to support the view that there is low risk from groundwater in this area. The site investigation report details some 25 trial pits undertaken at depths of between 1.1m and 2.9m in January 2017 during which no groundwater was encountered.

It is not clear whether any additional groundwater monitoring was undertaken on the site but this would seem to suggest that this whole area has been misclassified as high risk (*groundwater between 0.025 and 0.5m below the surface*).

6.8 Site Specific Monitoring

On 17th January 2023 two groundwater monitoring boreholes were installed on the site at total depths below ground of 6.10m and 4.05m respectively. These were first dipped on 25th January 2023 and found to be dry. Further monitoring of groundwater levels were undertaken on the 13th and 31st March (13.8mm[1]), 8th May (13.7mm[1]) and 19th June (14.22mm[1]) following significant rainfall, and found to be dry. The monitoring stations are still in-situ and can continue to be tested periodically if required.

6.9 Groundwater Flood Risk Summary

This section has examined the site-specific groundwater flood risk to the Bartlett House site in Ludgershall from a variety of data sources. There were over 50 years of borehole data within 500m of the site to enable meaningful review of the risk.

In accordance with NPPF, paragraph 162, *'the sequential approach should be used in areas known to be at risk now or in the future from any form of flooding'*. This review has concluded that the Bartlett House site is considered at **low risk** of groundwater flooding. The site is already recognised as being at low risk from other sources of flooding and is classified within Flood Zone 1. We therefore believe that the sequential approach is not applicable to this site.

The evidence presented to support this can be summarised as follows:

- There are no historic records of groundwater flooding in Ludgershall.
- Recorded incidents within the catchment correlate well with the predicted ephemeral streams indicated on the hydrogeological maps.
- The geological and hydrogeological context of the site does not indicate the presence of ephemeral streams within the application site.
- The site is relatively flat, varying in level from 133.3mAOD to 132.5mAOD.
- Recent planning applications within proximity to the site have not indicated any groundwater flood risk issues within 2.9m BGL (monitored across 25 trial pits).
- The peak groundwater level at Ludgershall Scouts Hall was recorded at 10.5m below ground level in February 2014.
- Longer term borehole records (monitored for 57 years) indicate a depth to peak groundwater level (as recorded in 2014) of 9.3m at the Bartlett House site.

Given the above, the site should be reclassified within the green zone of the SFRA groundwater flood risk map 'Groundwater Levels are at least 5m below the ground surface' (***Figure 5)*** which is the 2nd to lowest risk category within the SFRA classification.

[1] Daily rainfall totals for the South of England

This is a brownfield site and proposals for redevelopment will change its use from a care home to housing and will provide betterment to surface water management as well as improvements to water quality, biodiversity and amenity.

7. Residual Flood Risk

This section outlines our approach to the surface water management of the site and has been prepared based on the guidelines within the National Planning Policy Framework (NPPF) and associated guidance documents and policies. The purpose of this section is to demonstrate that a suitable strategy will be provided for the disposal of surface water runoff from the development. In addition, the client is committed to providing betterment wherever possible and so the brief for the drainage design development was to improve and diversify the existing condition of the site in terms of surface water management, biodiversity, amenity and water quality.

The assessment carried out within this section provides an overview of how the detailed design of the drainage system was developed and should be read in conjunction with the detailed design drawings submitted with the application (as detailed in Section 1 of this report).

7.1 Existing Drainage

The drainage system serving the former care home site discharges to the ground via underground infiltration structures. A survey drawing dated December 1984 illustrates 10 small soak-aways that discharge the roof water and water from parking areas to the ground. These structures are located all around the old building, but no details of the size or formation of these structures was available.

Pre-Development Impermeable Areas	**Area (m^2)**
Bartlett House Care Home	1100
Entrance and Parking	680
TOTAL	**1780**

7.2 Overall Approach To Drainage

Sustainable Urban Drainage Systems (SuDs) aim to manage surface water runoff at the source to reduce the overall volume, flow and rate of surface water entering the stormwater system/ watercourse.

The drainage strategy has been developed in accordance with Building Regulations H3 and the advice and recommendations presented in CIRIA C753 SuDS Manual. The SuDS Manual requires that consideration be given to appropriate treatment components, or stages, through the provision of SuDS solutions. To achieve this, emphasis must be drawn towards incorporating a SuDS management train which aims to mimic natural catchment processes. This management train comprises a hierarchical (sequential) series of measures comprising:

Measures	Definition
Prevention	These measures include rainwater reuse and harvesting and pollution prevention - e.g the use of water butts and other rainfall storage
Source Control	These measures attenuate runoff at source – including green roofs, local soakaways and pervious paving
Site Control	Where greater attenuation volumes are required (in addition to source control measures), site or area drainage may be routed to site controls, - e.g. filter strips, swales, pervious paving, attenuation crates, infiltration basins and devices, detention basins, ponds and wetlands
Region Control	These measures include the management of run-off from several sites integrated into a regional system- typical controls are as for site controls above

The selection of SuDS to be implemented within the development will be specific to the site conditions, required attenuation volumes, permitted outflow and allowable techniques. These were reviewed and developed in conjunction with the wider design team to ensure compliance with highways adoption requirements, street design, parking and social housing needs.

7.3 Summary of SUDS Techniques

7.3.1 Infiltration Devices

In-situ infiltration tests were undertaken in February 2022 within trial pits TP01 and TP07 shown in **Figure *14*** to provide a soil infiltration rate for use in soakaway design. The in-situ permeability tests were undertaken within general accordance of BRE Digest 365. The appropriate calculation sheets are included in the Ground Investigation Report in **Appendix D** and the results given in the **Table 11** below. Due to time constraints only two infiltration tests were undertaken in TP07.

Table 11: Infiltration Test Results

Location	Depth (m)	Strata	Infiltration Rate (m/s)
TP01	2.50	Chalk	Chalk 9.64 x 10^{-5}
		Chalk	Chalk 9.42 x 10^{-5}
		Chalk	Chalk 9.08 x 10^{-5}
TP07	2.50	Chalk	Chalk 9.74 x 10^{-5}
		Chalk	Chalk 9.52 x 10^{-5}

It should be noted chalk bedrock is susceptible to solution features. Therefore, it would be prudent to investigate areas proposed for soakaways to determine the presence of such

features and the potential to exacerbate them through concentrated water flows from proposed soakaways.

The chalk encountered during the ground investigation was low to medium density. However, the low-density chalk was only found to be in the northeast of the site, the rest of the trial pits uncovered chalk of medium densities. Through discussions with the ground investigation company who undertook the exploratory works on site, it was agreed that infiltration features in the low-density chalks should be positioned 10m away from structures, but it would be appropriate to use the standard 5m allowance in medium dense chalk.

The use of infiltration devices will therefore be a key feature of the design for the surface water management of the site, with all features discharging to ground in full accordance with the discharge hierarchy. Individual plot soakaways will be used in conjunction with site-wide infiltration features.

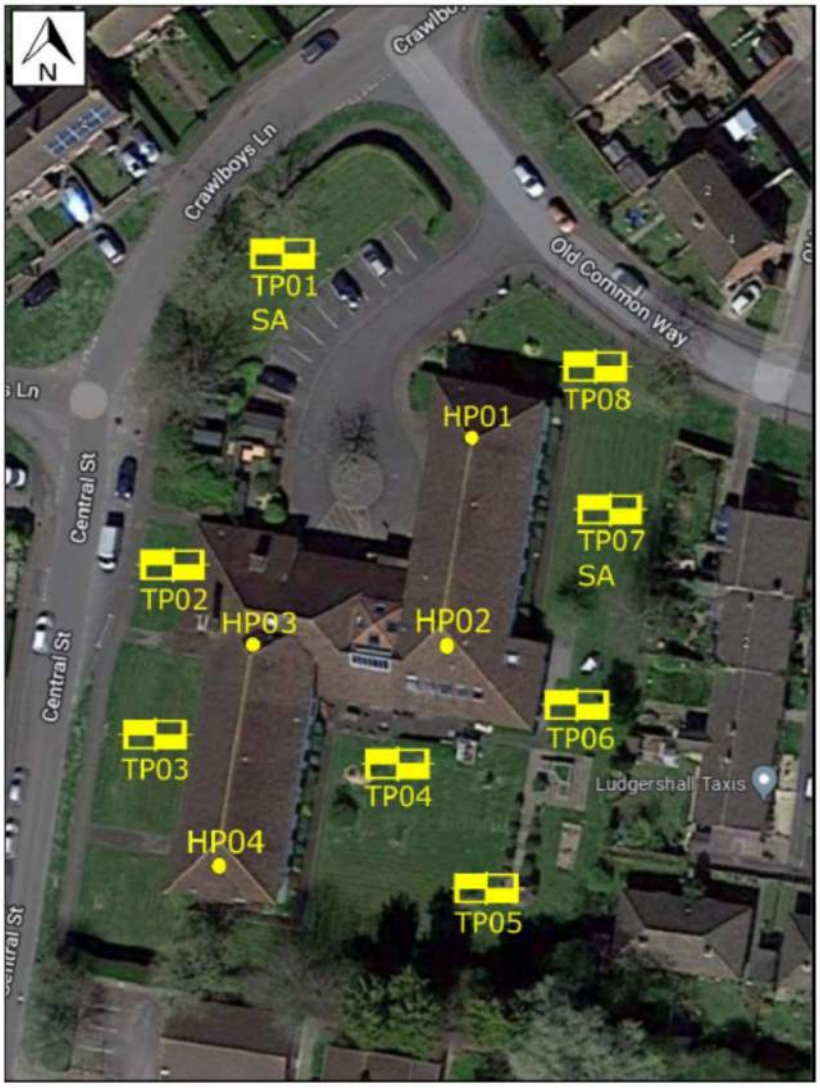


Figure 14: Exploratory Hole Location Plan

7.3.2 Green and Blue-Green Roofs

Green roofs comprise a multi-layered system that covers the roof of a building with vegetation cover/landscaping. The roof is likely to consist of an impermeable layer, a substrate or growing medium and a drainage layer. Green roofs are designed to intercept and retain precipitation.

A blue roof incorporates a sustainable drainage system (SuDS), which retains water on the roof following a downpour and manages how the water is dispersed to prevent concentrated run off. Commonly a green roof is installed above the blue roof – sometimes called a blue-green roof. This meets the dual development targets of increasing SuDS and providing green roofs.

A flat roof is not proposed on any of the buildings which would make this unsuitable as an option for the site. The proposed redevelopment of the site is to create additional social and affordable housing. Flat roofs were not considered to be appropriate for this type of development and would not be in keeping with the surrounding development.

7.3.3 Rainwater Harvesting

Rainwater Harvesting is increasingly important in urban water management strategies in the UK. Whilst it reduces the overall runoff from the site it cannot be used as the main source of attenuation as it is designed to store the water for reuse, but it does work well as part of an overall SUDS system. Typically, rainwater is collected from roofs as it is generally 'clean' and can then be used for non-potable purposes.

Rainwater harvesting was considered for use on this site, however the focus for the surface water strategy was for the transportation and disposal of water through surface level features e.g. Swales, permeable paving and infiltration basins. To include rainwater harvesting, the storage tanks would need to sit above ground to enable connection into these surface level features or pumped from beneath the ground which would be unsustainable long term and too costly for this type of development.

The layout of the site does not lend itself to use of such features.

7.3.4 Bio-Retention

Bioretention is the process in which contaminants and sedimentation are removed from stormwater runoff. Stormwater is collected into the treatment area, which usually consists of a grass buffer strip, sand bed, ponding area, organic layer or mulch layer, planting soil, and plants.

It is well suited in highly impervious areas and is very effective in removing urban pollutants, however, due to their shallow nature, they are not as effective at runoff attenuation as other techniques. We have therefore designed the drainage features with extensive planting to ensure bio-retention within the design features.

Planting will be used throughout the conveyance swales that then discharge into the infiltration basin. Denser vegetation will be used in key areas to provide additional

evapotranspiration potential and the permeable paving in the parking bays will filter out the road contaminants prior to any discharge to ground. Any overflow will get intercepted by the swales prior to discharge to the infiltration basin.

7.3.5 Permeable Paving

Permeable Paving consists of an 'open' paving system where stormwater can drain through the gaps between any paving elements. Below the paving is a granular sub layer. Permeable paving can either be true infiltration to ground or drain to impermeable lined storage underneath with no infiltration (depending on the ground conditions). Alternatively, a composite system could be installed with some soakage and outflow to the rest of the drainage system during heavier storms.

Permeable pavements will provide some treatment of pollutants however, they do need to be cleaned regularly to avoid weed growth, and they also need to be avoided where there could be high silt loads in the runoff.

Permeable paving is being used within this development to collect and dispose of surface water incidental to the parking areas. These parking areas will remain in private ownership and be maintained through a management company. By utilising permeable paving in this way we create a more diffuse discharge to the rainwater collected on site.

7.3.6 Filter Drains

These are normally used adjacent to areas of car parking or roads and convey runoff via flow through an engineered substrate.

It is the intention of the development to gain adoption of the highway elements. The private parking areas are located between the highway and the areas being used for swales, which would necessitate discharge of highway water across a private surface which would be unacceptable for adoption. We have therefore not used filter drains on this site.

The layout of the site does not lend itself to use of such features.

7.3.7 Swales (Infiltration trench)

The land take of swales is significant, although these SUDS components are very effective. They require a slope of no more than 4 to 10% and can act as a substitute for soakaways where groundwater is shallow, or ground conditions do not allow adequate infiltration.

Despite the issue of land take and adoption difficulties, the use of these SUDS units is very desirable due to their effectiveness in addressing both hydraulic and water quality issues.

We have chosen to design a swale/ infiltration trench extensively throughout this proposed redevelopment to convey water to the infiltration basin, provide bio-retention and create a feature for the estate. Whilst it does not strictly follow the minimum design requirements in terms of the base width (0.5m), it does adhere to the requirements for slope (1 in 3), gradient (1 in 180) and maximum depth (428mm) with flows rates of less than 0.5m/s in the more extreme events. This will enable ample infiltration through the conveyance of water

through these features. With velocities less that 1m/s there is not any need for erosion protection measures and so a very naturalised landscape has been created for this scheme.

7.3.8 Rainwater Gardens

These are areas in the site in natural or manmade depressions in the ground which are vegetated, often over a granular base. These can either take the runoff from neighbouring impermeable areas or can be directly connected to the downpipes from buildings. They can also provide an amenity and biodiversity benefit.

With the inclusion of linear swales (as described above) and a large amenity infiltration basin, we have chosen not to utilise rainwater gardens within this development.

7.3.9 Basins & Ponds

Balancing ponds are permanent ponds that provide storage above the resting water level in the pond. Regular maintenance will be important to ensure the required capacity of storage and to prevent blockage of the system.

The detention basin provides both Treatment Storage and Attenuation Storage. Treatment Storage comprises a permanently retained volume of water, which provides preliminary treatment of the 'first flush' of runoff during a rainfall event. Attenuation Storage is provided in a bunded area that is normally dry, but which is designed to fill during a heavy rainfall event.

A large infiltration basin is included as the location of final outfall of the swales. This will receive surface water collected from roof areas and the highway areas, discharging the collected water to ground.

7.3.10 Linear Wetland

Wetlands provide both stormwater attenuation and treatment. They comprise shallow ponds and marshy areas, covered almost entirely in aquatic vegetation. Wetlands detain flows for an extended period to allow sediments to settle, and to remove contaminates by facilitating adhesion to vegetation and aerobic decomposition. They also provide significant ecological benefits.

The ground conditions on site (chalk substrate) would make the inclusion of a wetland very difficult and ecologically not the greatest benefit. This has therefore been discounted from the design.

8. Proposed Drainage Approach

The utilisation of infiltration SuDS techniques following the management train is the preferred method for drainage of the site. As discussed in the section above, the site will be divided into several different sub catchments as noted in **Table 12**

Table 12 Sub-catchment SuDS Approaches

Sub catchment	Drained area within Sub Catchment	Plus 10% for urban creep	SuDS Considered for sub-catchment runoff
Plot 8 Soakaway	50m²	55m²	Private soak away using "Crates" 1.0x2.0mx0.4m deep
Plot 9 Soakaway	61m²	68 m²	Private soak away using "Crates" 2.0x1.5m 0.8m deep
Plot 10 Soakaway	77.5m²	86 m²	Private soak away using "Crates" 3.0x2.5m 0.4m deep
Network S2 Soakaway	130m²	144 m²	Manhole soakaway with granular surround. 1.2m Diameter manhole ring, Pit dimension 2.5x1.4m 1.80m deep
Network S1 Infiltration basin (main network)	676m²	744 m²	Large infiltration basin, Providing over 40m³ of storage
Roads (Discharging to S1)	654m²	N/A	
Total Impermeable areas	***1648.5m²***	***N/A***	***This is a reduction of 131.5m² in impermeable areas from the pre-developed site***
Parking (Self Contained/ Permeable)	478m²	N/A	Only drains incidental area, stone sub-base 250mm deep for storage.

8.1 Proposed Design Criteria

- SuDS design will be based on the **1 in 100 year event** + **45%** climate change allowance.
- There will also be a **+10%** allowance on plot / roof areas for **urban creep**.
- A **design life** for the development of **100 years** will form the starting point for assessment and climate change allowances will be considered in line with latest guidance.
- SuDS Features will be designed in accordance with the SuDS Manual, BRE365 and Building Regulations Part H.

- Discharge from the site will be in accordance with the drainage hierarchy with preference given to reuse where possible.
- Infiltration structures will be designed individually (soak-aways and infiltration pond) assuming no losses within the swales.
- The permeable parking areas will be assessed based on depth of stone for the temporary storage of incidental rainwater received during extreme events.

8.2 Infiltration Rates

The Storm drainage system was designed using proposed site levels and Causeways' "Flow" drainage design program. The infiltration rates are based upon site infiltration tests undertaken by Terrafirma during March 2022.

5 infiltration tests were undertaken in 2 pits with results ranging from **9.08x10-5 m/s** to **9.74x10-5 m/s**. We have taken the lowest figure as a conservative approach to the drainage design.

8.3 Design Approach

As described in Section 8, we are proposing a SuDS design upon ground level conveyance where possible. This provides a natural flow route for the water and keeps the collected surface water at a shallow level. It should be noted that during the design, it has been assumed that these shallow conveyance swales do not exhibit any infiltration, but only act as conveyance. This makes the design conservative as the gradients proposed for these features and the suitable infiltration rates will provide plenty of infiltration potential through these features.

The drainage design is detailed within drawings **GHY-CALM-09-20** to **29** inclusive. The maximum surface water levels from the "Flow" drainage model are displayed within the drainage sections included within drawing 24, 27 & 28. The output model files are also provided in **Appendix C**.

Additional consideration has been given to the highest water levels (100 year + 45% climate change) and the finished floor levels (FFL) of plots 17- 18 (FFL 133.175). These plots are located nearest the infiltration basin and therefore could be at higher risk of flooding. However, as demonstrated above, the design approach has been conservative. The highest water level adjacent to plots 17-18 is some 297mm below the FFL. Considering there is still 40m^3 of storage available within this freeboard and that levels are unlikely to reach this given the infiltration losses through the preceding features, we believe this to be ample protection to these properties.

A low point in the system exists at the end of the channel drain along the highway surface nearest the infiltration basin. It is shown that in the worst-case storm this may lead to localised flooding (flood volume 3.39m^3). This could result in some very local flooding of the highway surface (indicated on the exceedance flows drawing – **GHY-CALM-09-DRG-29**). However, the surface pooling of water will quickly flow into the permeable parking bay within this area (which is shown to have greater storage potential than required) or pass over the footway and return into the swale network adjacent to the infiltration basin (leading to a flood depth of less than 100mm in this location). It should be noted that this

node is directly connected to the infiltration basin, which at the level of 132.894 has a surface area of 110m^2. This amount of flooding spread out amongst the car park and infiltration would correspond to a flood depth of ~30mm.

Finally, the worst-case storm events returning the greatest water levels are for 240minute storms. These storms still exhibit a half drain time of 5 hours so the water will not be stored for long periods of time nor create an inconvenience for long periods should small areas of surface water pool on the highway.

8.4 Exceedance

Exceedance flows have been considered within drawing **GHY-CALM-09-DRG-29**, where the site has been designed such that surface water will find its way back into the swale system and flow down to the infiltration pond, especially in the case of the pipe under the highway blocking.

8.5 Foul Drainage

The previous development on this site (Bartlett house – former care home) discharged foul water to a system of foul drainage exiting site to the south and combining with the discharge from the neighbouring doctor's practise before continuing onto the public sewerage network. This foul water connection was not conveniently placed to provide an adoptable solution and provide the greatest potential for the site layout. Re-use of the sewer would have also created potential issues with adoption of the existing drain as the route it took to the public sewer was not known.

It was therefore decided to design a new connection to the public sewer in Deweys Lane, across from the site. This allowed for a more flexible site design to be created and an adoptable sewer to be designed on site which avoided existing trees, building footprints and SuDS features. All foul drains discharging to the front of the properties allow for maintenance of the system and all parts of the system taking flows from more than one property are to be offered for adoption.

Where there is no interface between the permeable parking areas and the foul drainage, it is proposed that the permeable parking be tanked to prevent infiltration into the foul water system. This arrangement of the proposed foul sewer and interfaces with permeable parking is shown on drawing **GHY-CALM-09-DRG-21**.

8.6 Maintenance & Inspection

The proposed management and maintenance regime will be based on guidance provided in the CIRIA C753 SuDS Manual. Inspections will be carried out 4 times a year for the first 2 years (refer Appendix B) and maintenance will be carried out by the Contractor for this time period to ensure that the vegetation is well established and the SuDS are functioning well prior to handover to Wiltshire Council.

9. Summary

This Flood Risk Assessment and Drainage Strategy Report identifies that the site is within Flood Zone 1 with a low risk of flooding from all sources and that the proposed development is acceptable on this site.

We have assessed the site-specific groundwater flood risk and have proven that the site is at low risk and therefore the sequential test is not required.

The development will reduce the overall impermeable areas by 130m^2. The creation of enhanced surface water drainage features and amenity spaces across the development will provide further betterment as the flow is distributed throughout the site and allowed to filter to ground more gradually. In addition, amenity, water quality and biodiversity will be improved through this design.

The drainage strategy ensures that:

- Infiltration is used as the form of discharge from the site in accordance with the discharge hierarchy;
- Surface level drainage features have been used throughout;
- Impermeable areas have been minimised;
- A variety of SuDS features have been used to convey and discharge water from the site;
- Planting throughout the drainage features adds a bio-retention step to improve water quality prior to discharge;
- Flow velocities are kept low to maximise infiltration throughout the site;
- All parking areas (non-adoptable areas) will use permeable surfacing allowing surface water to percolate into the underlying subsoil.

It is considered that with these design measures we have demonstrated that the proposed development of this site represents a betterment to the existing site in terms of surface water management, water quality and amenity. Accordingly, no objections should be raised to the proposed development on the grounds of flood risk, drainage or water quality.

Appendix A: Correspondence

Wiltshire Council

Mr S Marton
Via email: simon.marton@wiltshire.gov.uk

Development Services
Wiltshire Council

Tel: 0300 456 0114

Email:developmentmanagement@wiltshire.gov.uk
www.wiltshire.gov.uk

Dear Mr Marton,

Date: 8th June 2022

Location: Bartlett House, Old Common Way, Ludgershall, Andover, SP11 9SA
Proposal: Proposed redevelopment of this brownfield site on Old Common Way, Ludgershall from vacant care home to 18 affordable housing units (MMC), owned and managed by Wiltshire Council: Bartlett House is to be demolished in April/ May 2022 (under a separate demolition planning application). The purpose of this pre-app is to check the principle of development is acceptable to W/C planning department. The architect's site layout is indicative. 18 MMC units allows the best use of the land whilst retaining some green space provision. All internal consultees to note all their advice will be heeded on a full planning application.
Reference: ENQ/2022/00130

Thank you for your request for pre-application advice.

In response to your enquiry, I hope that you will find the following information helpful.

Please note that this advice represents officers' informal opinion based upon the information you have provided. It is given without prejudice to any decision the Council may make on any subsequent formal planning application. A planning application will be the subject of publicity and consultation in accordance with the Council's procedures. These and other matters which may subsequently come to light may result in additional issues being raised that are pertinent to the determination of the application.

Summary of Officer View

The proposal is considered to have some merit, but in order to receive potentially favourable consideration, outstanding issues identified in this response need to be addressed (including that a sequential test will need to first demonstrate that there are no reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding).

If it is not possible to meet the sequential test, then the proposals would be unacceptable as they would conflict with the policies of the development plan and submission of a planning application would not be recommended.

Constraints

The site is situated in the Tidworth Community Area and the Limits of Development for Ludgershall.

The site is located within Flood Zone 1, but the Strategic Flood Risk Assessment has indicated that groundwater levels are between 0.025m and 0.5m below the ground surface

and within this zone there is a risk of groundwater flooding to both surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.

The site is bounded to north (Collis Terrace and Old Common Way) and west (Central Street) by public highway, The Castle Practice health centre and Hedge Pharmacy to the south and residential gardens to dwellings in Lady Diana Court to the east boundary.

There do not appear to be mature trees within the site, but along the north boundary of the adjacent health centre.

Planning considerations:

Relevant planning policies:

The National Planning Policy Framework (NPPF) (2021) confirms that planning law requires that applications for planning permission be determined in accordance with the development plan, unless material considerations indicate otherwise (Section 38(6) of the Planning and Compulsory Purchase Act 2004 and section 70(2) of the Town and Country Planning Act 1990); that the NPPF is a material consideration in planning decisions and planning policies and decisions must also reflect relevant international obligations and statutory requirements.

The proposals are therefore to be considered in the context of the National Planning Policy Framework (NPPF) which sets out Central Government's planning policies, the adopted Wiltshire Core Strategy (WCS) and the Wiltshire Local Transport Plan.

The following policies are considered the most relevant to proposals:

Wiltshire Core Strategy:
Core Policy 1 (Settlement Strategy)
Core Policy 2 (Delivery Strategy)
Core Policy 3 (Infrastructure Requirements)
Core Policy 26 (Spatial Strategy for the Tidworth Community Area)
Core Policy 41 (Energy Strategy)
Core Policy 43 (Providing Affordable Homes)
Core Policy 45 (Meeting Wiltshire's housing needs)
Core Policy 46 (Meeting the needs of Wiltshire's vulnerable and older people)
Core Policy 50 (Biodiversity and Geodiversity)
Core Policy 52 (Green Infrastructure)
Core Policy 57 (Ensuring high Quality Design and Place Shaping)
Core Policy 58 (Ensuring conservation of the historic environment)
Core Policy 60 (Sustainable Transport)
Core Policy 61 (Transport and New Development)
Core Policy 62 (Development Impacts on the Transport Network)
Core Policy 63 (Transport Strategies)
Core Policy 64 (Demand Management)
Core Policy 66 (Strategic Transport Network)
Core Policy 67 (Flood risk)
Core Policy 68 (Water Resources)

Wiltshire Housing Site Allocations Plan - Wiltshire Council:
Wiltshire Housing Site Allocations Plan (February 2020) (WHSAP)

Wiltshire Local Transport Plan 2011-2026:
Car Parking Strategy (Policy PS6 - Residential parking standards)
Cycling Strategy

Waste Core Strategy 2006-2026

Wiltshire Green Blue Infrastructure (GBI) Strategy 2022

Government Guidance:
National Planning Policy Framework (NPPF) July 2021
Planning Practice Guidance (PPG)
National Design Guide (NDG)

Supplementary Planning Guidance:

Waste storage and collection: Guidance for developers 2017

Community Infrastructure Levy - Wiltshire Council:

- Wiltshire Community Infrastructure Levy Revised Wiltshire Planning Obligations SPD October 2016
- Infrastructure Funding Statement 2020

Nitrogen mitigation

Salisbury Plain SPA - HRA and Mitigation Strategy

Statutes:

Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019

Conservation of Habitats and Species Regulations 2017 (the 'Habitats Regulations')

Environment Act 2021

Ancient Monuments and Archaeological Areas Act (1979) amended by the National Heritage Act (1983) and the National Heritage Act (2002)

Environmental Protection Act 1990

Relevant Planning History:

Application reference	Description	Decision
PL/2022/03661	Prior notification: Demolition - for Demolish detached two storey block of flats and former bin store at Bartlett House	Prior Approval Not Required 07/6/2022
K/79/0616/DP	To construct a home for the elderly and day centre in accordance with drawing Nos. 1819/4B and 1819/5	Deemed Consent 05/11/1979
K/79/0071	Home for the elderly and day centre	Approve with Conditions 30/04/1979

Main issues:

The main issues to consider in an application will be:

- Principle
  - Settlement boundary
  - Loss of existing care home
  - Affordable Housing
- Flooding and Drainage
  - Sequential test
  - Flood Risk Assessment
- Scale, design, and impact character and appearance of the area and the impact on the living conditions of both proposed and nearby properties
- Highway considerations
- Potential archaeology
- Ecological considerations:
  - Protected species and Biodiversity enhancement
  - River Test Nitrates
  - Salisbury Plain SPA
- Sustainable construction
- S106 obligations towards infrastructure/facilities & CIL

Principle:

At the heart of the NPPF is a presumption in favour of sustainable development and the Adopted Wiltshire Core Strategy seeks to build resilient communities and support rural communities but this must not be at the expense of sustainable development principles. The Settlement and Delivery Strategies of the Core Strategy are designed to ensure new development fulfils the fundamental principles of sustainability.

This means focusing growth around settlements with a range of facilities, where local housing, service and employment needs can be met in a sustainable manner. A hierarchy has been identified based on the size and function of settlements, which is the basis for setting out how the Spatial Strategy will deliver the levels of growth.

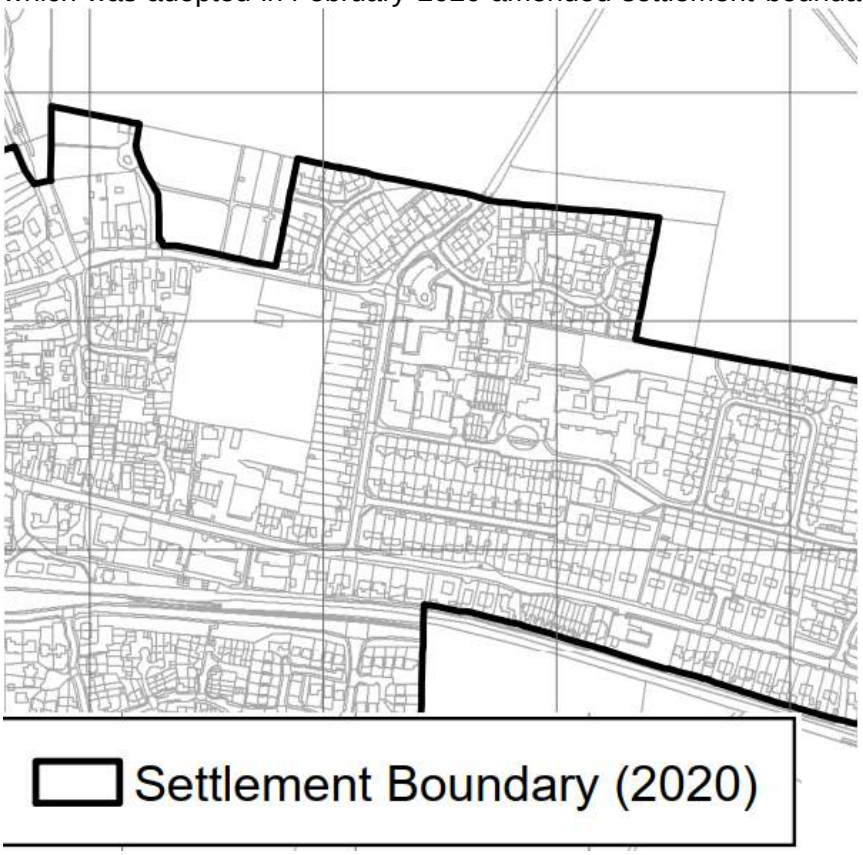
Settlement boundary:

The site is within the Tidworth Community Area and Core Policy 26 (Tidworth Community Area) confirms that '*Development in the Tidworth Community Area should be in accordance with the Settlement Strategy set out in Core Policy 1.*'

Core Policy 1 of the Wiltshire Core Strategy sets out the 'Settlement Strategy' for the county, and identifies four tiers of settlement - Principal Settlements, Market Towns, Local Service Centres, and Large and Small Villages. Only the Principal Settlements, Market Towns, Local Service Centres and Large Villages have defined limits of development/settlement boundaries.

Core Policy 2 of the Wiltshire Core Strategy sets out the 'Delivery Strategy'. It identifies the scale of growth appropriate within each settlement tier, stating that within the limits of development, as defined on the policies map, there is a presumption in favour of sustainable development at the Principal Settlements, Market Towns, Local Service Centres and Large Villages.

The Council has undertaken a comprehensive review of the limits of development/settlement boundaries to ensure they are up-to-date and adequately reflect changes which have happened since they were first established. The Wiltshire Housing Site Allocations Plan which was adopted in February 2020 amended settlement boundaries where necessary.



Tidworth and Ludgershall together are defined as a Market Town and the site is within the defined limits of development for Ludgershall. Residential development within the defined settlement boundary is acceptable *in principle* under Core Policies 1 and 2 of the Wiltshire Core Strategy, although this is also subject to consideration against other relevant planning policies (see below in relation to flood risk in particular).

Loss of existing care home:

Core Policy 46 seeks to address the issue of an ageing population, which is particularly important in Wiltshire, by ensuring that there is adequate provision of specialist accommodation, such as extra-care housing and the core strategy supports the provision of accommodation for dependent persons, although there is not a policy requiring the retention of existing facilities.

Affordable Housing:

The proposals are also for affordable housing and the Housing Enabling Team have provided the following advice:

The proposed development sits within the Settlement Boundary. If the site is supported for development, our comments and observations in respect of Affordable Housing would be as follows;

Policy Requirements:

Core Policy 43 of the Wiltshire Core Strategy, as currently amended by the National Planning Policy Framework, sets out a requirement for 30% on-site affordable housing provision: on all sites of 10 or more dwellings; or on sites of between 5 - 9 dwellings if the development site is 0.5ha or greater. Ludgershall falls within the 30% Affordable Housing Zone. There would be a policy requirement to provide 5 affordable units with subsidy, within a scheme of 18 dwellings.

I note however that the proposal is for a 100% Affordable Housing Scheme with subsidy. If this site is supported as a 100% Affordable Housing scheme, the S106 would need to secure the policy requirement of 30% Affordable Housing at nil subsidy. There would however be flexibility in the S106 to allow for 100% Affordable Housing with subsidy.

Data obtained from the Council's housing register and the Help to Buy Register suggests there is a need for 1-4 bedroom affordable housing units in Tidworth Community Area. To meet currently demonstrable need the Affordable Housing units should be provided with a tenure mix of 60% Affordable Rented and 40% Shared Ownership.

Unit Size Mix:

Core Policy 45 of the Wiltshire Core Strategy states that housing size and type will be expected to reflect that of the demonstrable need for the community within which a site is located. An indicative unit size mix (based on the current demonstrable need) would be as follows - but this would need to be reviewed again at the time of the actual planning application to ensure it still correctly reflects need as policy requires:

Scenario 1. Requirement for 30% on-site Affordable Housing – total of 5 units

Affordable Rented 60% (3 units):
70% (2 units) – 2 bed/4 person houses
30% (1 units) – 3 bed /min 5 person houses

Shared Ownership 40% (2 units):
50% (1 unit) - 2 bed/4 person houses
50% (1 units) – 3 bed / min 5 person houses

Scenario 2. 100% on- site Affordable Housing – total of 18 units

Affordable Rented 60% (11 units):
*35% (4 units) – 1 bed/ 2 person units**
35% (4 units) – 2 bed/4 person houses
20% (2 units) – 3 bed /min 5 person houses
10% (1 unit) - 4 bed/ min 6 person house

Shared Ownership 40% (7 units):
60% (4 units) - 2 bed/4 person houses
40% (3 units) – 3 bed / min 5 person houses

NB: The Shared Ownership homes should be provided in semi-detached pairs with in-curtilage side parking bays to aid marketing / sales of this tenure and not directly connected to the Affordable Rented units in pairs or terraces rows.

Adapted units:

Based on current demonstrable need and reflecting Core Policy 46, we can advise that as well as general needs affordable homes there is also demonstrable need for at least 10% of

the affordable rented homes (2 units would be sought based on the scheme proposals of 100% Affordable Housing) to be built to meet the adapted needs of older people or those with disabilities (built to meet Building Regulations M4(2) Category 2: Accessible and adaptable dwellings standards). These units to be provided as a 2 x one bed houses, built to the required standards. I note from the submitted house type portfolio that the one bed houses comply with M4(2) regulations. Our preference would be for a level access shower to be installed rather than a bath (or at least the provision for this to be installed at a later date). Please can this be requested.*

Minimum Size and Design Standards:

Affordable Housing in Wiltshire is expected to meet high standards of design and quality. A site layout plan showing the units by tenure mix would be required.

Please note that 2 bedroom flats above ground floor level, and flats over commercial units or garages, as well as courtyard entrances are considered unsuitable for affordable housing units.

All affordable homes would need to be built to, at least, meet minimum size standards of the Homes & Communities Agency's published guidance relevant to the dwelling type (or any subsequent design guidance which may supersede it), as well as to meet required minimum person eligibility criteria. To ensure that the affordable housing units are eligible for inclusion in Homes England's Affordable Housing programme, we would advise that all affordable homes are built to meet at least 85% of the Nationally Described Space Standard (NDSS) relevant to the dwelling type and minimum person criteria.

I note that the each of the proposed house types exceeds the full NDSS criteria.

NDSS and 85% NDSS are shown in the table below:

Number of bedrooms	***Number of bed spaces***	***NDSS***			***Minimum 85% NDSS***		
		1 storey (sqm)	*2 storey (sqm)*	*3 storey (sqm)*	*1 storey (sqm)*	*2 storey (sqm)*	*3 storey (sqm)*
Studio	*1p*	*39 (37)**			*34 (32)**		
1b	*2p*	*50*	*58*		*43*	*50*	
2b	*3p*	*61*	*70*		*52*	*60*	
	4p	*70*	*79*		*60(B)*	*68(H)*	
3b	*4p*	*74*	*84*	*90*	*63*	*72*	*77*
	5p	*86*	*93*	*99*	*74*	*80*	*85*
	6p	*95*	*102*	*108*	*81*	*87*	*92*
4b	*5p*	*90*	*97*	*103*	*77*	*83*	*88*
	6p	*99*	*106*	*112*	*85*	*91*	*96*
	7p	*108*	*115*	*121*	*92*	*98*	*103*
	8p	*117*	*124*	*130*	*100*	*106*	*111*
5b	*6p*	*103*	*110*	*116*	*88*	*94*	*99*

	7p	*112*	*119*	*125*	*96*	*102*	*107*
	8p	*121*	*128*	*134*	*103*	*109*	*114*
6b	*7p*	*116*	*123*	*129*	*99*	*105*	*110*
	8p	*125*	*132*	*138*	*107*	*113*	*118*

The affordable homes do not require garages but do require sufficient parking bays as per current policy guidance – i.e.: 1 x parking bay for each 1 bed, 2 x parking bays to be provided for each 2 or 3 bed house, 3 parking bays for each 4 bed house. Small parking courts are accepted for flats only and in curtilage/designated parking bays should be provided for the affordable houses (not bays in solid rows or blocks of shared use parking bays). Parking bays should be provided preferably in curtilage (to the side or immediately in front of their relevant plot) wherever possible.

The proposed site layout shows the correct number of parking spaces for each unit, however it would be preferable for the parking bays for Plots 8 and 9 to be moved to the side, or directly in-front of each respective plot, should the amended site layout retain the position of these units. The adapted units should preferably have parking bays directly in-front or to the side of their plots.

Nominations: The Local Authority would have nomination rights to the affordable dwellings, secured through a S106 Agreement (a draft to be supplied by the Council to its current format).

The principle of development is also subject to compliance with other relevant planning policies and the normal range of material considerations that have to be taken into account when determining a planning application and a judgement is necessary in terms of all the development impacts considered below.

Particular constraints in developing this site are flood risk (including in relation to the principle of development discussed further below), and amenity considerations:

Flooding and Drainage:

The Wiltshire Council Strategic Flood Risk Assessment, SFRA Data Explorer, has indicated that the site is located within Flood Zone 1, but groundwater levels are between 0.025m and 0.5m below the ground surface and within this zone there is a risk of groundwater flooding to both surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.

Sequential test:

Paragraph 162 of the NPPF is clear that development should be restricted in areas at risk of flooding from any source:

162. The aim of the sequential test is to steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.

The Planning Practice Guidance (PPG) explains that development should not be permitted if there are reasonably available sites appropriate for the proposed development in areas with

a lower probability of flooding and that the NPPF sets these strict tests to protect people and property from flooding which all local planning authorities are expected to follow and where these tests are not met, national policy is clear that new development should not be allowed.

The sequential test is the first stage in addressing flood risk and any development proposals for new build residential development require a sequential test.

The only exclusions (taken from Planning Practice Guidance- PPG) - are as follows:

You also don't need to do a sequential test if either of the following apply:
 your development is a minor development – <u>but</u> see below for definition of Minor in context of flooding:

 your development involves a change of use (e.g. from commercial to residential) unless your development is a caravan, camping chalet, mobile home or park home site

Minor development in the context of flood risk is:
 minor non-residential extensions: industrial/commercial/leisure etc. extensions with a footprint less than 250 square metres.

 alterations: development that does not increase the size of buildings e.g. alterations to external appearance.

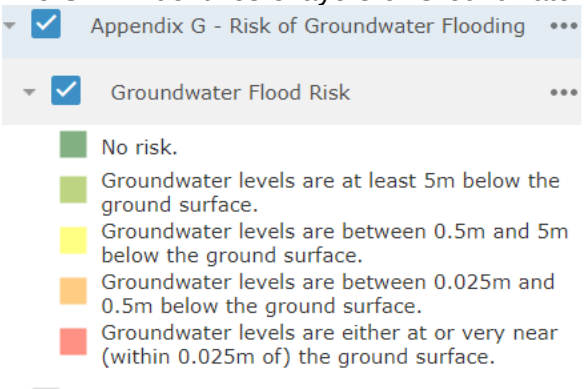
 householder development: For example; sheds, garages, games rooms etc. within the curtilage of the existing dwelling, in addition to physical extensions to the existing dwelling itself. This definition excludes any proposed development that would create a separate dwelling within the curtilage of the existing dwelling e.g. subdivision of houses into flats

Any proposals which include new build development (as proposed) are not exempt from needing to first pass a sequential test and are otherwise unacceptable in principle on flood risk grounds (regardless of any FRA/drainage strategy).

In terms of acceptability of the principle of development in flood risk terms; the sequential test will apply first. Unless it can be demonstrated by the developer/applicant via the sequential test that there are no alternative sites of lower flood risk; the proposals to develop the site with new build dwellings would not meet the sequential test and as such would be unacceptable on flood risk grounds.

The sequential test compares the site a developer is proposing to develop with other sites to find out if there are other sites with lower flood risk. The EA have provided guidance on undertaking the sequential test for developers:
Flood risk assessment: the sequential test for applicants - GOV.UK (www.gov.uk)

The SFRA identifies 5 layers of Groundwater flood risk:



The site is identified to be located within the 2nd highest level of groundwater flooding risk.

Groundwater flooding is a particular issue in the River Avon catchment as the Avon catchment is a slow response one (because it's groundwater fed and groundwater flooding tends to be slow onset but long duration) and can be worse than river/surface water flooding because groundwater levels rise slowly but can stay elevated for months or more so the damage can be considerable.

Please note however, that the groundwater levels in the SFRA are indicative and in order to make a proper assessment of the groundwater flood risk for the site as part of the sequential test an assessment of historic borehole data, groundwater monitoring and recorded flood incidents would be necessary – I consider this would need to be undertaken by a suitably qualified flood/environmental consultant.

It is for local planning authorities, taking advice from the Environment Agency as appropriate, to consider the extent to which sequential test considerations have been satisfied.

Planning Practice Guidance explains the developer should justify with evidence to the local planning authority what area of search has been used when making the application and that the area to apply the Sequential Test across will be defined by local circumstances relating to the catchment area for the type of development proposed. The Southern Housing Market Area (SHMA) for Wiltshire would normally be the minimum area of search for sequentially preferable sites when considering proposals for open market dwellings, and generally as there are undoubtedly sites elsewhere within the SHMA at lower risk of groundwater flood risk and in flood zone 1 where additional dwelling units could be provided; such proposals could not meet the sequential test and the site would then be considered to be an unacceptable location in principle for the creation of additional residential units on sequential test flood risk grounds.

Any departure from the 'HMA' approach to considering alternative sites/applying a reduced geographical area in the search for alternative sites must be clearly and rigorously justified.

It is noted that the proposals are for affordable housing units. This may have a bearing on the area of search over which a sequential test would be required depending on whether there is a specific identified local need for the number of units proposed.

I note that the pre-application refers to the Housing Register for the Ludgershall Community Area identifying a housing need of 59 in December 2021.

As there is an identified local need for the dwelling units proposed within the Ludgershall Community Area; then this area of identified local need is considered to be a reasonable area of search for alternative sites over which to conduct a sequential test for sites at lower risk of flooding from all sources. Please note however that a sequential test may still identify alternative sites within the community area with less flood risk and under these circumstances this site would be considered unsuitable for development on flood risk grounds.

Flood Risk Assessment:

If it were possible to meet the sequential test (there are no alternative sites at lower risk of flooding from all sources), then a Flood Risk Assessment would then be required.

A site-specific FRA is carried out by (or on behalf of) a developer to assess the flood risk to and from a development site and should accompany a planning application submitted to the local planning authority. The assessment should demonstrate to the decision-maker how

flood risk will be managed now and over the development's lifetime, taking climate change into account, and with regard to the vulnerability of its users (which in the case of buildings used for dwellings is a 'More vulnerable' use).

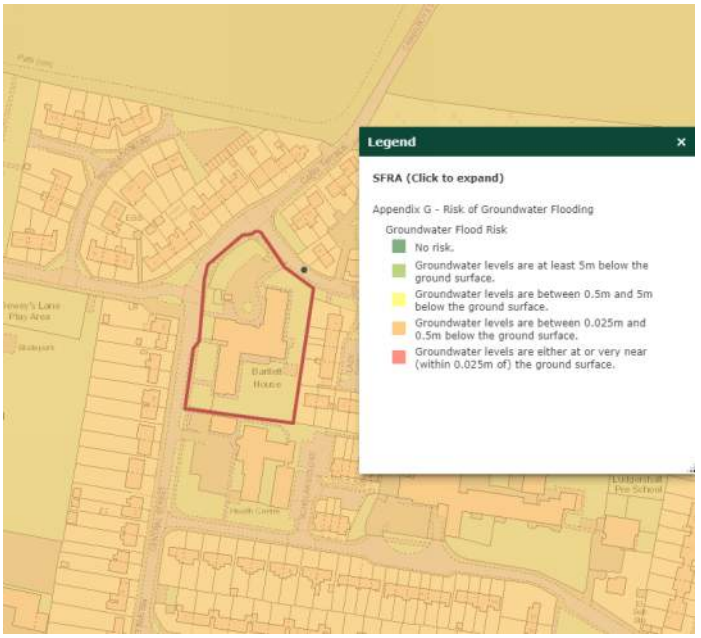
There is no single body responsible for managing flood risk. Responsibility is joint among a number of bodies. National policies (lead by DEFRA) are delivered by Risk Assessment Management Authorities (RMAs) which include:

- Environment Agency
- Lead Local Flood Authorities
- Water and sewerage companies
- Internal Drainage Boards
- Highways authorities

The Lead Local Flood Authority (LLFA) includes unitary authorities including Wiltshire Council. They lead in managing local flood risks (i.e. risks of flooding from surface water, ground water and ordinary (smaller non main rivers) watercourses). The LLFA have provided the following guidance on the requirements of a FRA, drainage strategy and design which would also need to be addressed:

The Wiltshire Council Strategic Flood Risk Assessment, SFRA Data Explorer, has indicated that the site is located within Flood Zone 1, and is likely to not be at risk from pluvial flooding, or flooding from artificial sources. No historic flooding incidents related to the site have been identified.

The SFRA has indicated that groundwater is likely to be between 0.025m and 0.5m below ground level, indicating that the site may be at risk of groundwater flooding.



A site-specific Flood Risk Assessment (FRA) is required for this application. The site-specific FRA should demonstrate that the site is not adversely affected by flood risk from different sources, and how the flood risk from ***all sources*** *will be managed without increasing flood*

risk to the development itself or elsewhere. It should also outline the proposed drainage strategy for the site. The applicant is referred to the Environment Agency's advice on how to prepare an FRA, as well as their standing advice for vulnerable developments.

Pre-Application Advice: Drainage Strategy / Drainage Design

Based on BGS Mapping / Cranfield University Soilscapes mapping, the site is indicated to be underlain by freely draining soil bedded on chalk; this indicates that subject to confirmation through soakaway testing in accordance with BRE 365, the site may be suitable to discharge of surface water via infiltration. The suitability of infiltration to dispose of surface water will need to be assessed by the applicant.

In chalk, or any other fill material prone to instability, soakaways should be sited at least 10 m away from any building, road or structure foundations, in line with CIRIA C574 Engineering in Chalk.

Based on DEFRA Magic Maps the site has been shown to not be in a Source Protection Zone.

The applicant should note that in all instances the preference should be to utilise blue-green SuDS which provide multi-faceted benefits to the site (in terms of water quantity, quality, amenity and biodiversity); for example, for attenuation features preference should be given to use of swales / ponds / detention basins (if technically feasible) instead of attenuation tanks. The applicant should adopt a holistic approach to planning the site, and sufficient space for SuDS features should be provided at an early stage in order to fulfil the requirements of NPPF Paragraph 169; the LLFA will not accept statements that there is insufficient space for SuDS or that SuDS have not been utilised due to cost.

Any proposals should be designed in accordance with the Non-statutory Technical Standards for Sustainable Drainage Systems and the latest SuDS Manual (C753).

The developer should provide the following information as part of future planning applications:

Drainage Strategy

- *Evidence that SuDS have been selected, wherever possible, to provide a wide range of benefits including amenity, biodiversity and maintaining water quality.*
- *Evidence that SuDS source control measures to manage water quantity and maintain water quality have been implemented wherever possible and throughout the management train so the development is not reliant upon large attenuation features close to the points of discharge.*
- *Existing greenfield runoff rates for the site.*
- *Post development runoff rates in accordance with Wiltshire Council's betterment policy:*
    - *For brownfield sites, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event.*
- *Evidence demonstrating how the surface water disposal hierarchy has been applied and how all other options have been exhausted. The hierarchy is set out below (as per the Sewerage Sector Guidance, paragraph C.3.12):*
    - *Surface water runoff is collected for use.*
    - *Discharge into the ground via infiltration.*
    - *Discharge to a watercourse or other surface water body.*

    - *Discharge to surface water sewer or other drainage system, discharging to a watercourse or other surface water body.*
    - *Discharge to a combined sewer.*
- *A detailed plan showing the existing drainage features on the site and how the proposed drainage strategy will be implemented.*
- *If infiltration is proposed, it is implemented in manner that does not create an offsite impact, particularly if there are reports of groundwater flooding in the area.*
- *Surface water can be safely managed within the proposed development, up to and including a 1 in 100 year plus climate change event.*
- *Existing flood flow routes through the site have been maintained or where they will be affected, adequate measures to intercept and safely control flows through the site have been provided to ensure flood risk is not increased elsewhere.*
- *All proposed drainage features are outside flood zones 2 and 3 and where they are adjacent to an ordinary watercourse, they are not located within the EA surface water flood maps. Where drainage features are located adjacent to flood zones 2 and 3, they must be above the 1 in 100 year plus climate change flood level. This information can be provided by the EA.*
- *The strategy mimics the existing drainage characteristics of the site by retaining and utilising any existing drainage features.*
- *Measures to prevent pollution of the receiving groundwater and/or surface waters.*
- *A clearly labelled drainage layout plan showing the pipe networks and any attenuation ponds. The plan should show any pipe node numbers referred to within the drainage calculations.*

Ground Investigations

- *Geotechnical factual and interpretive reports, including infiltration tests in accordance with British Research Establishment (BRE) Digest 365 – Soakaway Design.*
- *The site is located in an area susceptible to groundwater flooding. Therefore, in line with Wiltshire Council's Groundwater Management Strategy, the applicant is required to carry out a site-specific groundwater flood risk assessment that includes all available information and data from local sources such as historical records, parish councils, flood action groups and borehole records. In areas susceptible to groundwater flooding infiltration SuDS is not permitted unless it can be demonstrated to be appropriate. The groundwater assessment must include/consider the following:*
    - *Groundwater level monitoring (taking into account seasonal variations).*
    - *The interaction between different sources of flooding.*
    - *How groundwater will impact on the proposed drainage system.*
    - *The interaction between groundwater, groundwater recharge and aquifers.*
    - *The applicant is referred to Wiltshire Council's Surface Water Soakaway Guidance for the standards that must be met for planning approval and adoption.*

Detailed Drainage calculations

- *Calculations and drawings for the drainage system design showing designated holding areas and conveyance routes based on no flooding on site for a 1 in 30 year rainfall event.*
- *Calculations and drawings for the drainage system design showing designated holding areas and conveyance routes based on no flooding on site for a 1 in 100 year plus 40% climate change rainfall event in respect to a building (including basement) or utility plant susceptible to water within the development.*

- *Calculations should include an allowance for increased surface water runoff, as a result of urban creep, in accordance with LASOO guidance.*
- *Hydraulic Models should set the MADD factor / additional storage volume factor to 0m^3 / ha in order to prevent an overestimation of storage capacity in the proposed drainage network.*

Design Drawings

- *A plan showing the cross sections and design of any attenuation pond and its components.*
- *Drawings showing conveyance routes for flows exceeding the 1 in 100 year plus climate change rainfall event that minimise the risk to people and property.*

Third party consent

- *Consent for any outfalls from the proposed drainage systems into a public sewer or other drainage system not owned by the applicant.*

Ownership and Management

- *Details of how the proposed and existing drainage features on the site will be maintained and managed after completion with confirmation from the relevant authority that they will adopt any systems that are being offered for adoption.*

Construction

- *Adequate measures during construction to control pollution to existing watercourses and groundwater.*
- *A construction management plan.*

Informatives:

The table below stipulates the information typically required at each application stage. Provision of the correct information will expedite the processing of applications by the drainage team.

Pre-app	Outline	Full	Reserved matters	Discharge of conditions	Document to be submitted
✓	✓	✓			Flood Risk Assessment / Statement
✓	✓	✓			Drainage Strategy / Statement & sketch layout plan
	✓				Preliminary layout drawings
	✓				Preliminary “Outline” hydraulic calculations
	✓				Preliminary landscape proposals
	✓				Ground investigation report (for infiltration)
	✓	✓			Evidence of third party agreement for discharge to their system (in principle/ consent to discharge)

Pre-app	Outline	Full	Reserved matters	Discharge of conditions	Document to be submitted
		✓		✓	Maintenance program and on-going maintenance responsibilities
		✓	✓		Detailed development layout
		✓	✓	✓	Detailed flood & drainage design drawings
		✓	✓	✓	Full Structural, hydraulic & ground investigations
		✓	✓	✓	Geotechnical factual and interpretive reports, including infiltration results
		✓	✓	✓	Evidence of measures to prevent pollution of the receiving groundwater and/or surface waters
		✓	✓	✓	Drawings showing conveyance routes for flows exceeding the 1 in 100 year plus climate change
		✓	✓	✓	Detailed landscaping details
		✓	✓	✓	Discharge agreements (temporary and permanent)
		✓	✓	✓	Development Management & Construction Phasing Plan

Scale, design, impact to the character and appearance of the area and residential amenity:

The NPPF states that *'The creation of high quality, beautiful and sustainable buildings and places is fundamental to what the planning and development process should achieve.... Good design is a key aspect of sustainable development, creates better places in which to live and work and helps make development acceptable to communities.'*

Core Policy 57 requires a high standard of design in all new development which is expected to create a strong sense of place through drawing on the local context and being complementary to the locality. Criteria (i), (iii) and (vi) specifically refer to development making a positive contribution to the character of Wiltshire through:

i. 'Enhancing local distinctiveness by responding to the value of the natural and historic environment, relating positively to its landscape setting and the exiting pattern of development and responding to local topography by ensuring that important views into, within and out of the site are to be retained and enhanced.'

iii 'Responding positively to the existing townscape and landscape features in terms of building layouts, built form, height, mass, scale, building line, plot size, elevational design, materials streetscape and rooflines to effectively integrate the building into its setting.'

vi. 'Making efficient use of land whilst taking account of the characteristics of the site and the local context to deliver an appropriate development which relates effectively to the immediate setting and to the wider character of the area.

The existing building is a large 2 storey unit with rendered elevations under a concrete tiled roof set back from Central Street with open plan grassed area. It its set centrally within the stie with areas of lawn/garden between the built development and the nearest dwellings to the east in Lady Diana Way.



The dwellings in Lady Diana Way are predominantly single storey, with the exception of No 1 which is 2 storey.

Existing dwellings opposite the site to the east in Central Street comprise two storey semi-detached units of rendered elevations with brick detailed window surrounds under slate roofs and those to the northeast (Collis Terrace) comprise terraces of two storey red brick under concrete tiled roofs arranged in blocks of 4 with front gardens/majority having hedging to the back edge of pavement and some with off-street parking

The dwellings to the north in Old Common Way comprise a mixture of two storey and blocks of 4 terraced red brick dwellings under concrete tiled roofs also with front gardens with low picket fencing/walls to the back edge of pavement and some with off-street parking and areas of open grassed amenity spaces at road junctions such that the area has a sense of spaciousness.

The Council's urban designer has provided the following comments on the proposal:

Policy and guidance:
Wiltshire Core Strategy Core Policy 57 'Ensuring high quality design and place shaping'
National Design Guide (Ministry of Housing, Communities & Local Government September 2019), Building for a Healthy Life (Homes England June 2020) identified in the NPPF.

Observations on the Capacity Study (Indicative Site Layout) and House Type Portfolio

For quality of appearance:

The communal green shown to the side and front of houses 1 and 18 with the proposed removal of hardstanding /car bays and the retention of the trees would appropriately enhance and maintain this setting and would be characteristic of the pockets of open space permeating the residential neighbourhood.

Houses 1, 5 and 18 (House Portfolio types 'Holly' and 'Chestnut') each appropriately provide a significant sized ground and first floor 'habitable' room windows (i.e., bedroom and living

room space windows) in their front and return faces to the communal green and street (i.e., Holly and Chestnut house types as perspectives in House Portfolio).

Houses 1 and 18 should front directly onto this green and not be separated from it by a high boundary and sideway. A planting margin and/or mid height railings could provide defensible space separation forward of the ground floor windows onto this open space.

Hedgerows are a pleasing characteristic of the neighbouring area notably existing front plot Boundaries along both Old Common Way and Central Street /Crawlboys Lane - the existing hedge along the boundary should be maintained down the rear of plot 1, a hedge continued from this down the side of plot 2 with the garden set back to allow an adequate planting margin for this alongside the pavement as opposed to a high timber fence directly along this edge which would appear not suitably robust and of poor lasting appearance in this setting.

In this context a hedge should also be shown to the rear boundary of 18 visible viewed along the road forward of the building line of no 1 Old Common Way.

No side boundary is shown on the indicative layout to the rear garden of plot 18. This should be contained on the house 18 building line and not project forward of this. The boundaries to plots 1 and 18 may need to be set back into the garden to avoid the tree trunk and tree root zones and the side boundary of plots 1 and 18 should ideally be tapered off to leave the tree outside of their private rear gardens and that of 18 taper to continue as near as possible the angled front boundary line of no 1 Old Common Way.

Masonry boundary walls should be shown for the garden boundaries of plots 4 and 15 fronting the cul de sac including the rear plot boundary of plot 14 and 15 down the side the adjacent car bays and visible in the street scene. This boundary to 14 should be neatly set back to align with 15 and the building line of 16.

Plots 5 and 6 as shown would appear appropriate with plot no 5 house type having windows in its side façade. If plots 5 and 6 were possibly reorientated with their driveways coming off the cul de sac then significant sized return façade 'habitable room' windows should front Central Street and a hedge strip with masonry wall set back from this continued down this side boundary of the plot at the back of pavement as opposed to a fence.

I question the need for chimneys shown in the House Portfolio perspectives. The gable end side façade of houses 4 and 15 directly opposite would appear from the House Portfolio to be blank facades which would appear austere in the street scene and which 'Building for a Healthy Life' 54 /55 identifies should be avoided. Significant sized habitable room windows i.e., to a bedroom and living room should be incorporated in these facades as for houses 1 and 18.

'Red' brick and render is the consistent facing materials in the vicinity. A simple palette of grey roof tiles as conveyed by the House portfolio with red brick facades but with some dispersed use of render facings and grey brick detailing as indicated in the House Portfolio perspectives would be beneficial to add variety and interest.

Core Policy 57 also requires that development should ensure the impact on the amenities of existing occupants is acceptable and ensuring that appropriate levels of amenity are achievable within the development itself, confirmed by the NPPF (paragraph 130) which states that planning decisions should ensure that developments:

'f) create places that are safe, inclusive and accessible and which promote health and wellbeing, with a high standard of amenity for existing and future users49; and where crime

and disorder, and the fear of crime, do not undermine the quality of life or community cohesion and resilience.'

49 Planning policies for housing should make use of the Government's optional technical standards for accessible and adaptable housing, where this would address an identified need for such properties. Policies may also make use of the nationally described space standard, where the need for an internal space standard can be justified.

Residential amenity is affected by significant changes to the environment including privacy, outlook, daylighting and sunlight inside the house, living areas and within private garden spaces (which should be regarded as extensions to the living space of a house). The extent to which potential problems may arise is usually dependent upon the separation distance, height, depth, mass (the physical volume), bulk (magnitude in three dimensions) and location of a development proposal in relation to neighbouring properties, gardens and window positions.

The provision of adequate space between dwellings is an important element in achieving a high standard of design/layout to provide adequate daylight and sunlight to rooms and rear gardens; privacy for proposed and existing dwellings; a satisfactory level of outlook to new and existing development, and a reasonable area of private amenity space. To ensure no undue overlooking between dwellings, it is generally considered that there should be at least 20m between two storey dwellings which have windows and openings in habitable rooms that face each other.

In addition to the comments made by the urban designer on the layout of the proposals including reorientating plots 5 and 6; it is considered that some of the units would be likely to have an adverse impact on adjacent dwellings.

The dwellings in Lady Diana Close comprise single storey terraced and semi-detached bungalows and the proximity of the two-storey height dwelling/side elevation of plot 11 to the rear boundaries of 2 and 3 Lady Diana Court is likely to result in an adverse overbearing impact.



The Housing enabling team have also identified that '*Parking bays should be provided preferably in curtilage (to the side or immediately in front of their relevant plot) wherever possible'* and have noted that this is not achieved for plots 8/9.

The rear wall to Plot 16 is approximately 18.5m from the rear elevation of No 1 Diana Court, and I note that two first floor bedroom windows are shown in the 'Heather' House Type Portfolio (although the preapplication also advises that building facades and appearances can be tailored according to Urban Design and Planning observations).

I consider that the layout/number of units needs to be revised in the south and east sections of the site in order to:

- Avoid an unacceptable overbearing impact ensure that no two-storey height development is closer to the rear wall/s of Nos 2-4 Lady Diana Court than the rear walls of plots 16-18;
- Avoid an unacceptable overlooking impact between plots 16 and No 1 Lady Diana Court plot 16 should be resited/design revised such that there are no first floor windows to habitable rooms on the rear elevation. A single storey unit may be more appropriate here.
- Address the parking requirements for the Housing enabling team and the urban designer's recommendation for units 5 and 6 to be reorientated (which would also address the highways authority's comments below in respect of units 5,6, 8 & 9).

We also consult the occupiers of dwellings adjoining the site as part of the planning application process and would need to consider any comments received in forming a recommendation on the scheme. It is generally sound advice to let immediate neighbours know in advance about what is being planned. This normally means showing them any plans that have been drawn up to establish and try to address any concerns early in the process. Experience shows that early consultation or discussion by an applicant with neighbours often smoothes the passage of any subsequent planning application. Please also note that our Statement of Community Involvement also encourages engagement with the local community prior to submission of an application.

Highway considerations:

The supporting text to Core Policy 64 refers to a parking study, commissioned by the council in January 2010, which included a comprehensive review of parking standards, charges and policy within both the plan area and neighbouring areas. The reviewed LTP3 Car Parking Strategy was adopted by the council in March 2015 and includes policy PS6 – Residential parking standards.

The parking standards for new dwellings are set out in the Wiltshire Local Transport Plan 2011-2026 – car parking strategy:

Table 7.1 Minimum parking standards (allocated parking)

Bedrooms	Minimum spaces
1	1 space
2 to 3	2 spaces
4+	3 spaces
Visitor parking	0.2 spaces per dwelling (unallocated)

7.4 Garages will only count as part of the allocated parking provision where they meet the minimum size requirement of 6m x 3m (internal dimensions). This is to ensure that there is sufficient room for an average sized family car, a cycle and some storage provision. Where these minimum size requirements are not met, the council will require design statements and/or transport assessments to demonstrate the need for such provision and/or to set-out the role of alternatives (e.g. car ports which are unlikely to be used for storage and could therefore count towards allocated parking provision).

The minimum cycle parking standards will also apply and are included at appendix 4 of the Cycling Strategy and are as follows:
1 covered space per bedroom for up to 3 bedroom dwellings.
3 covered spaces per unit for 4 bedroom dwellings.
4 covered spaces per unit for 5 + bedroom dwellings
+ 1 visitor space per 20 bedrooms.

The highways authority has commented thus:

I note the redevelopment of the existing/former care home site, for the provision of 18 affordable dwellings. I also note that this submission is essentially seeking an in-principle view, with the layout shown being indicative only.

The existing site access appears to be relatively well formed and whilst positioned relatively close to the junction, adequate visibility appears to be available. Any future submission should ensure that a plan is provided showing visibility splays at the site access, to points on the nearside carriageway edge to the junction to the North and 43m to the South. The access road itself should generally be of a minimum width of 4.8m, with two, 2m wide footways around both junction radii. Within the site, a shared surface type arrangement may be preferred and this would be considered acceptable for this number of units. The site access and internal layout/turning head should be guided by swept path analysis for an 11m long refuse vehicle.

The majority of units shown on the indicative layout are served by the main site access, however, units 5 and 6 have direct access from Central Street. It would generally be preferred if all units were accessed from the main site access due to the relatively limited number of properties having frontage access currently in this area. Notwithstanding this, if direct access was required for these two units, visibility splays of 2.4m x 43m will be essential. Additionally, adequate vehicle-pedestrian visibility splays would be required to the back edge of the footway. Careful consideration should be given to pedestrian visibility here, as I presume footfall is relatively high due to the close proximity of the GP surgery and pharmacy.

In terms of car parking, this generally seems to accord with Wiltshire's Car Parking Standards, including unallocated visitor provision. I would generally advise against parallel spaces such as those shown for plots 8 and 9, but this could be considered acceptable

depending upon the design and whether the internal road was offered for adoption as public highway. Private car parking cannot be located within the adoptable highway area and so if the roads are to be adopted, the design of these spaces should be considered carefully. A 0.5m buffer strip should also be provided between parking spaces and the edge of the road where no footway exists.

As such, subject to details, I would not foresee a Highway objection to these proposals.

The highways authority has identified visibility being an issue that would need to be addressed and in particular for plots 5 and 6. Any required visibility splays will need to be included in the red line of the application site.

Potential Archaeology:

Paragraph 194 of the National Planning Policy Framework states that *'where a site on which development is proposed includes, or has the potential to include, heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation.'*

The council's archaeologist has provided the following advice:

Thank you for consulting Wiltshire Council's Archaeology Service regarding this pre-application enquiry. I have previously been contacted by the applicant, Simon Marton, and so I will repeat my advice to him as follows.

Wiltshire's Historic Environment Record (HER) notes no known archaeological monuments within the Bartlett House site or in close proximity to it. Ludgershall is an historic settlement with a fine medieval castle, which is protected as a Scheduled Monument, but Bartlett House lies outside of the presumed extent of the medieval settlement. Assuming that the proposed affordable housing is no greater in height than the current Bartlett House, there will not be any impact on the setting of the Scheduled castle.

There is a possibility that as yet unknown buried archaeological remains survive within the Bartlett House site that might be disturbed by the construction of the new residential development. The total site area is probably a little less than 0.5ha so it is a fair-sized development site. However, the construction of Bartlett House and associated hard landscaping will have disturbed a large proportion of the site and historic mapping indicates that there were previous buildings on the site from the former Ludgershall County Primary School. On this basis, it seems unlikely that any buried remains might survive that have not already been disturbed although there are some areas of green space to the south and east of Bartlett House, which, prior to around the mid-20th-century, was in open, agricultural land.

In summary, demolition of the existing building to ground level will not be of archaeological concern. I do not consider that an archaeological desk-based assessment would be required in support of any future planning application for the site and it is unlikely that any form of archaeological investigation will be required either before or during construction of the new residential development on the site. However, the need for any archaeological response can be determined once finalised plans for the proposed development are put forward in due course.

Ecology considerations:

The National Planning Policy Framework requires that the planning authority ensures protection of important habitats and species in relation to development and seeks enhancement for the benefit of biodiversity through the planning system.

Protected species & Biodiversity enhancement:

Core Policy 50 of the Wiltshire Core Strategy and the National Planning Policy Framework requires that the planning authority ensures protection of important habitats and species in relation to development and seeks enhancement for the benefit of biodiversity through the planning system.

The council's ecologist has provided the following advice:

• *CP50 and CP52 of the Wiltshire Core Strategy and the National Planning Policy Framework require that the planning authority ensures protection of important habitats and species in relation to development and seeks enhancement for the benefit of biodiversity through the planning system. It will therefore be necessary to assess the site for its potential to support habitats and species of importance to nature conservation. This should be undertaken by a suitably qualified and competent consultant ecologist. The submitted ecology report (Ethos, January 2022) is sufficient in support of any future application to address on site ecological constraints. The site and building is of limited value to biodiversity.*

The applicant and developer should be aware that it is a criminal offence to disturb or harm protected species, or to damage or destroy their places of rest or shelter, should they subsequently be found during the development.

The following ecological information is recommended to support any future planning application submission:

• *The Council has a policy requiring major applications to demonstrate a net gain for biodiversity and developers are now advised to follow the government's guidance and to use the Natural England Biodiversity Metric to demonstrate unequivocally that a net gain will be achieved through their application. Advice can be found here: Planning Advice Service, BNG. An unlocked version of the metric should be submitted in support of any future application.*

River Test SAC:

• *The site falls within the catchment of the River Test SAC; nitrogen loading on wastewater may be a constraint. Please see additional information below.*

• *Nitrogen loading: Solent Maritime Special Area of Conservation (SAC), Chichester and Langstone Harbours Special Protection Area (SPA) and Ramsar site, Portsmouth Harbour SPA and Ramsar site, Solent and Southampton Water SPA and Ramsar site.*

WCS policy CP50 (Biodiversity and Geodiversity) and the NPPF requires the Local Planning Authority to ensure protection of important habitats and species in relation to development and seeks enhancement for the benefit of biodiversity through the planning system. Whilst the application site is not adjacent to any rivers or in any respective flood zones, it is situated within the River Test catchment which drains into the Solent. This region is protected by a number of international designations including the Solent Maritime Special Area of Conservation (SAC), Chichester and Langstone Harbours Special Protection Area (SPA)and Ramsar site, Portsmouth Harbour SPA and Ramsar site, Solent and Southampton Water SPA and Ramsar site; as well as the nationally designated Sites of Special Scientific Interest (SSSIs) that underpin these international designations.

The Solent water environment is one of the most important for wildlife in the United Kingdom. It is protected under the Water Environment Regulations and the Conservation of Habitats

and Species Regulations 2017 (as amended) as well as through national legislation for many parts of the coastline and adjacent maritime areas. Natural England has confirmed high levels of nitrogen and phosphorus are entering this water environment and that there is sound evidence that this eutrophication is causing excessive growth of plants and algae which reduces oxygen and light levels and is leading to negative effects on the special features for which the European sites are designated. These nutrient inputs mostly come either from agricultural sources or from waste water from existing housing and other development.

Under the Habitat Regulations, any development with the potential to affect a SAC and its designated species must be subject to strict scrutiny by the decision maker, in this case the Local Planning Authority (LPA). The Authority should not permit any development, which would have an adverse effect on the integrity of the SAC, alone or in combination with other developments, unless certain rigorous tests are met.

Natural England currently advises that every permission for new dwellings in the River Test Catchment Area could result in increased nutrients entering the Solent area (Guidance dated June 2020) from the increase in waste water and land use change. Accordingly, the Local Planning Authority considers this proposal is likely to lead to significant effects on the European Sites and an Appropriate Assessment (AA) is required. In line with Natural England's Advice on Nutrient Neutrality, a calculation of the nitrogen burdens of the proposal must be submitted with any planning application.

A strategic nitrogen mitigation scheme is now available to applicants/developers located in the River Test catchment in Wiltshire. Applicants can join the scheme by purchasing nitrogen 'credits'. A nitrogen 'credit' is equivalent to 1 kg of Nitrogen. The purchase of the nitrogen credits will be secured through planning obligations pursuant to Section 106 of the Town and Country Planning Act 1990.

The Council has prepared a unilateral undertaking that can be used for this process. This will need to be signed by the applicant before planning permission is granted, with payment prior to commencement of works. The price for nitrogen offsetting credits has been set at £2,500 for 1kg of nitrogen (plus legal and admin fees).

More details are available from our website:
Phosphorus and nitrogen mitigation - Wiltshire Council

Bespoke mitigation and alternative strategic mitigation schemes can also be used; these will need sign off from Natural England and the legal arrangements secured.

Salisbury Plain Special Protection Area:

This application site lies within the 6.4km buffer zone of the Salisbury Plain SPA and in light of the HRA for the Wiltshire Core Strategy and the HRA for the Wiltshire Housing Site Allocations Plan, the application is screened into appropriate assessment due to the potential impact of recreational pressure on stone curlew in-combination with other plans and projects.

The qualifying features for Salisbury Plain SPA are non-breeding hen harrier and breeding populations Eurasian hobby, common quail and stone-curlew. Conservation objectives for the SPA and supplementary advice for implementing them have been published by Natural England (NE)[1],[2]. Development coming forward under the Wiltshire Core Strategy is only anticipated to impact one of these species, the stone-curlew. This is a ground nesting bird species which research shows is particularly sensitive to disturbance by people and people with dogs. The unique character of the Plain attracts many visitors and a recent study has demonstrated 75% of these live within 6.4 km[3]. Within this zone housing allocations from the

Core Strategy, Housing Site Allocations Plan, Army Basing Programme and Neighbourhood Plans have the potential to lead to significant effects through their combined recreational pressure.

The Council's housing plans are mitigated through a project funded by the Community Infrastructure Levy (CIL) which records where stone-curlews breed and works with farm managers to maximise breeding success. The project was agreed with Natural England in 2012[4] and reviewed in 2018[5] and continues to provide an effective, timely and reliable means of mitigating any additional effects arising from new residential development.

The quintennial visitor survey next due for August 2020, has been postponed until August 2021 due to COVID 19 restrictions as, in order to repeat the surveys in a consistent way, there would be unacceptable degree of face to face contact between surveyors and a large number of visitors. In addition, these restrictions mean that monitoring of stone curlew nesting and liaison with land managers which usually starts in April has been delayed until survey personnel are able to resume working safely. In a worst-case scenario there would be the loss of a season's breeding data and plot management would be uninformed by the latest survey data. Visitor patterns are likely to be atypical this year as people are being advised to reduce unessential travel while on the other hand having more time than usual to walk their dogs while on furlough leave. Birds will also be experiencing atypical plot management with implications for the chances of failed breeding and second broods.

The consequences of the project not running for 2020 on the conservation objectives relating to stone curlew are expected to be insignificant if it is a temporary dip in delivery that can be compensated for in remaining years. Survey results from the exceptional year of 2019, show there is considerable headroom in terms of numbers of breeding pairs and productivity to withstand any foreseeable down turn in 2020 due to the COVID 19 situation even if this was to be combined with a period of poor weather. A further review of the project will be undertaken in the lead up to the next season in order to take account of the post COVID 19 situation; make every effort to ensure the project resumes in 2021, and; assess opportunities to recover lost ground on delivery.

It is recognised that the pressures at Salisbury Plain are changing and in the future further mitigation for this species may be necessary. Experience has demonstrated landowners are willing to take up conservation measures and that interventions can be effective at sustaining the population. Where such measures may be insufficient, future housing plans may need to refocus housing delivery. For the time being the current strategy, in combination with mitigation implemented for the Army Basing Programme, appears to be adequate to support housing numbers up until 2026 even if these are above figures in the Wiltshire Core Strategy and Housing Site Allocations Plan.

The Council is therefore able to conclude beyond reasonable scientific doubt, that the proposed residential development would not lead to adverse effects on the integrity of the Salisbury Plain SPA.

The council's ecologist has confirmed:

• *The site falls within the 6.4km recreational impact buffer of the Salisbury Plain SPA. The council's standard generic mitigation strategy should be applicable and financial contributions should be made via CIL.*

Sustainable Construction:

The WCS' key strategic objective is to address climate change. It requires developers to meet this objective under Core Policy 41- Sustainable Construction which specifies sustainable construction standards required for new development.

Core Policy 41 identifies how sustainable construction and low-carbon energy will be integral to all new development in Wiltshire. The policy requires:

86. For residential development post-construction Code for Sustainable Homes assessments will be required which must be undertaken by an accredited assessor. For conversions and for non-residential development an appropriate post-construction BREEAM assessment will be required which must also be undertaken by an accredited assessor. Replacements for the BREEAM standards are being developed and this policy will apply the equivalent replacement standards. The policy will also apply to any future replacements to the Code for Sustainable Homes.

From February 2018 the LPA has not been applying CP41 to residential development (given it has effectively been superseded by the current government direction of travel favouring Building Regulations for these matters), although Carbon reduction is a key theme in the council's recovery from COVID-19 and the LPA encourages the incorporation of sustainable construction techniques and low carbon energy in development schemes.

Planning Obligations and Community Infrastructure Levy (CIL):

Core Policy 3 requires all new development to provide for the necessary on-site and, where appropriate, off-site infrastructure requirements arising from proposals. For example, new housing development, will result in more people living in an area and more people using local facilities and services and may require additional off-site infrastructure.

I draw your attention to the 'Wiltshire Community Infrastructure Levy Revised Wiltshire Planning Obligations Supplementary Planning Document October 2016' which explains that there are several mechanisms used to ensure the necessary infrastructure is put in place and can include:

- Planning conditions
- Section 278 agreements (under the Highways Act 1980 and made between a highway authority and a person who agrees to pay all or part of the cost of highways works)
- Planning obligations
- Community Infrastructure Levy (CIL)

Planning obligations (also commonly referred to as 'section 106', 's106', as well as 'developer contributions') are legal obligations entered into to mitigate the impacts of a development proposal. Planning obligations run with the land, are legally binding and enforceable and can be financial obligations requiring monetary contributions to the local authority to fund works or services.

In addition to the affordable housing requirements outlined in the Housing Enabling Team's consultation response above; the proposed development generates the following on-site and off-site infrastructure:

Waste & Recycling:

The Waste Technical team have referred to the Wiltshire guidance for new developers (attached at Appendix A) and have advised that the initial evaluation of the proposals the only issues raised would be storage and collection points of waste containers:

The council requests s106 contributions towards the provision of waste and recycling containers for each residential unit, under policies CP3 and WCS6. The following estimated contribution is required for the proposed development:

Property type category	***Contribution per house/per category***	***Quantity***	***Total***
Individual house	*£91*	*18*	*£ 1,638*
Bin store for block of 6-10 flats	*£581*	*0*	*£*
Bin store for block of 11-14 flats	*£1,038*	*0*	*£*
Bin store for block of 15-18 flats	*£1,474*		*£ 0*
		Total	***£1,638***

Access to waste collection services:

I attach a guidance document setting out the council's technical requirements to ensure that residents will be able to use the standard waste collection service. For information, this document is a draft SPD that will be issued for consultation later this year. In general terms, following the attached guidance will allow the service to operate as intended and generally will mean that plans are acceptable to the waste management services team. The following paragraphs highlight some areas that would need to be addressed at the next stage of an application.

Vehicle access

Vehicle tracking is required to demonstrate that refuse collection vehicles (RCVs) can move through the development and turn at the ends of roads, especially taking account of cars parked in allocated spaces and at the roadside. Adequate turning room should be provided to take account of the restrictions on carry distances for residents set out in Part H of Building Regulations (25m), the limitations on carry distances for waste collection crews, where the vehicle should be able to stop within 10m of a collection point (see section 4.4 of the attached guidance) and due to the requirement to minimise reversing to meet the requirements of BS 5906:2005. Tracking on plans in future submissions should demonstrate the sufficiency of vehicle access.

The council requires an indemnity in order to operate on any roads that are not adopted, including during any period where the council needs to deliver waste collection services prior to adoption. The required arrangements are set out in section 5.8 of the attached guidance with a sample indemnity provided in Appendix C of the guidance document.

Collection points

Each dwelling should have a collection point that is on level hardstanding off any roadway or footway at the curtilage of the property, as further described in section 5.2 of the draft waste SPD. Plans should identify these areas for each dwelling and demonstrate that they do not impact on space available on driveways and that soft landscaping won't prevent or encumber the collection crew when emptying bins

Storage points

In accordance with the guidance in section 5.4 of the draft waste SPD, plans in future submissions should demonstrate that each property has suitable storage space that takes account of the guidance. Showing containers to scale in situ will help to demonstrate compliance.

Routes between storage and collection points

As noted in the 'Vehicle access' section above, residents should not have to carry their waste containers more than 25m from the storage point to the collection point. Plans should demonstrate that this is achievable for each dwelling, preferably with a supplementary table listing the carry distances per dwelling, for ease of reference. Section 5.3 of the draft waste SPD provides further details on matters to consider when designating these routes.

Education:

The Education & Skills team have provided the following advice on S106 requirements:
ASSESSMENT OF: 18 units – all affordable housing (AH), no size mix supplied.

EXCLUSIONS/DISCOUNTS APPLIED: standard AH discount of 30% applied to 18 units = a reduction by 5 units.

NUMBER OF PROPERTIES QUALIFYING FOR ASSESSMENT: 13

SCHOOL PLACES NEEDED BY DVLPT: PRIMARY = 4 SECONDARY = 3

DESIGNATED AREA PRIMARY/IES:

- *Castle Primary School.*
- *Wellington Eagles Primary is also within 2 miles walking distance of this development site.*

DESIGNATED AREA SECONDARY/IES:

- *Wellington Secondary Academy, Tidworth.*

EARLY YEARS ASSESSMENT DETAILS:

- *There are currently 2 preschools and 5 childminders within a two-mile safe walking route of this proposed development.*
- *This provision is operating at full capacity.*
- *The Local Authority has a duty to provide sufficient childcare for working parents under Section 6 of the Childcare Act 2006.*
- *Therefore, any increase in population as a result of this development will require additional childcare provision.*
- *Based on the 13 qualifying properties:*

Number of units	***2-year-olds and below 4 places per 100 dwellings***	***3- & 4-year-olds 9 places per 100 dwellings***	***Total No of places***	***Total required:***
13	*1*	*1*	*2*	*£17,522 x 2 = £35,044*

*INDICATIVE EARLY YEARS CONTRIBUTIONS REQUIREMENTS: Current pupil products: 0.04 per dwelling for 0-2-year olds (4 per 100 dwellings) and 0.09 per dwelling for 3-4-year olds (9 per 100 dwellings). Current cost multiplier = £17,522 per place. *(Please note however, that the cost multiplier quoted is due to be updated shortly for the 2021/22 financial year, and the new figure will apply to S106s signed in that financial year as per our S106 Methodology).*

- *Were we assessing this pre-app enquiry as an application registered today, the total S106 contribution required would be as per calculations above =* ***£35,044*** *towards the development of Early Years provision in this area.*

- *This contribution would be subject to indexation and secured via a Section 106 Agreement, to which the Council's standard terms will apply.*

PRIMARY ASSESSMENT DETAILS:

Aggregated data for all schools within 2 miles safe walking distance of the development site:

- *Capacity = 840 places.*
- *Oct 21 NOR = 479 pupils.*
- *Current forecasts peak at 526 by September 2026 (includes in area housing already completed/underway).*
- *In addition, the total number of places required by housing already registered/approved but not yet built out in the town currently = 238 places.*
- *So, there a number of places still available across the town.*

*INDICATIVE PRIMARY S106 CONTRIBUTION REQUIREMENTS: Current Primary cost multiplier = £18,758 per place. *(Please note however, that the cost multiplier quoted is due to be updated shortly for the 2021/22 financial year, and the new figure will apply to S106s signed in that financial year as per our S106 Methodology).*

- *The local schools can accommodate the pupil product of the proposed development within existing capacity without the need for expansion.*

- *As a result, were we assessing this pre-app enquiry as an application registered today, we would have no requirement for a S106 contribution towards the 4 places that this development generates a need for.*

- *However, we must stress that this is an indicative response only. It's always possible that new registered applications could take up the surplus places that currently exist before an application comes forward relating to this site. A copy of our S106 Methodology is therefore attached for your reference (please see appendix B).*

SECONDARY ASSESSMENT DETAILS:

- *Current PAN Years 7 – 11 capacity = 1447 places.*
- *Oct 21 number on roll = 921 pupils.*
- *Current forecasts peak at 1233 by September 2029, (includes new in area housing already completed/underway).*

- *Additional places currently needed by new in area housing which is not yet completed and so not yet in our forecasts = 194.*
- *So, there are spare places currently available at Wellington Secondary Academy.*

*INDICATIVE SECONDARY S106 CONTRIBUTION REQUIREMENTS: Current Secondary cost multiplier = £22,940 per place. *(Please note however, that the cost multiplier quoted is due to be updated shortly for the 2021/22 financial year, and the new figure will apply to S106s signed in that financial year as per our S106 Methodology).*

- *Wellington Secondary Academy has sufficient capacity to accommodate the pupil product of this proposed development.*

- *Therefore, were we assessing this pre-app enquiry as an application registered today, we would have no requirement for a developer contribution towards the 3 places that this development generates a need for.*

- *However, we must stress that this is an indicative response only. It's always possible that new registered applications could take up the surplus places that currently exist before an application comes forward relating to this site. A copy of our S106 Methodology is therefore attached for your reference.*

CAVEATS :(see attachment at appendix B)

Public Open Space:

The Wiltshire Core Strategy defines Open Space and Green Infrastructure as place-shaping infrastructure.

Core Policy 52 states that development shall make provision for the retention and enhancement of Wiltshire's Green Infrastructure network, and shall ensure that suitable links to the network are provided and maintained. Where development is permitted developers will be required to:

- Retain and enhance existing on-site green infrastructure
- Make provision for accessible open spaces in accordance with the requirements of the adopted Wiltshire Open Space Standards*
- Put measures in place to ensure appropriate long-term management of any green infrastructure directly related to the development
- Provide appropriate contributions towards the delivery of the Wiltshire Green Infrastructure Strategy and
- Identify and provide opportunities to enhance and improve linkages between the natural and historic landscapes of Wiltshire.

Fire hydrants:

The Planning Obligations SPD explains:

10.3 Development may require the provision of fire hydrants and water supplied for firefighting. Where a direct need arising from the development is identified by the Fire Authority, the Council will seek this through a planning condition or, if this is not possible, a planning obligation. The developer is responsible for the cost of the hydrants and water supplies for firefighting. Consultation should be undertaken with the Fire Authority to ensure that the site is provided with adequate water supplies for use by the fire and rescue service

in the event of a fire. Arrangements may include a water supply infrastructure, suitable sitting of hydrants and/ or access to an appropriate water supply. Consideration should also be given to ensure access to the site, for the purpose of firefighting, is adequate for the size and nature of the development. CIL may be used to fund other emergency services infrastructure projects

We often require the following planning condition on new housing schemes:

Development shall not commence until details for the provision of a water supply and fire hydrants necessary to meet the fire-fighting needs of the development (including the installation arrangements and the timing of such an installation) have been submitted to and approved in writing by the Local Planning Authority. The approved measures shall be implemented in full accordance with the agreed details.
Reason: To ensure that adequate measures for fire-fighting can be incorporated into the development, including the construction phase.

Suggested Additional Consultees

Advice regarding Building Regulations: It is likely that your proposal will require separate approval under the Building Regulations. The Council's Building Control Team can be contacted on 0300 456 0113. They will be happy to provide you with Building Regulation advice on this proposal and discuss this project further. This will help to ensure that the final decisions are compliant with the Building Regulations and may help save you time and money.

Please note that the uplift to Part L (Conservation of Fuel and Power) and F (Ventilation) of the Building Regulations and the new Parts O (Overheating) and S (Infrastructure for charging electric vehicles) come into effect on 15 June 2022. The changes to Part L are a steppingstone to the introduction of the Future Homes Standard in 2025, which is an important contribution to the Government's target to meet net zero emissions by 2050.

The following new and updated regulations which may require changes to building design:
• The new overheating requirement (Part O) will necessitate shading and change the amount of glazing in some building designs.
• Part O also requires openable windows that pose a risk falling from height to have a minimum guarding height of 1100mm. This may introduce windows with higher sill heights that are wider, or guarding measures that will be visible externally.
• To pass the new Part L Target Emission Rate, most new homes will need either heat pumps or gas boilers paired with renewable energy generation such as solar panels.
• To pass the new Part L Target Fabric Energy Efficiency rate, some new homes will need to have more insulation in their walls, which will make them thicker. This may result in some replanning of plots on sites and occasionally result in a reduction of the number of units. This target fabric energy efficiency rate may also require a redesign of new homes with room-in-roofs.
• The new infrastructure for charging electric vehicles (Part S) standards will require electric vehicle charge points.

The full set of approved documents can be found here.

Natural England
If you were to seek advice direct from Natural England regarding bespoke nitrate mitigation proposals, they have their own pre-application processes:

Natural England Developers: get environmental advice on your planning proposals - GOV.UK (www.gov.uk)

Community Infrastructure Levy (CIL)

The Community Infrastructure Levy (CIL) came into effect on the 18th May 2015; and is a fixed, non-negotiable charge on new development. The amount is based upon the size of a development and is charged in pounds per square metre. It varies according to the type of development (e.g., residential, retail or employment uses) and in which area of Wiltshire the development takes place. The Wiltshire CIL Charging Schedule sets out the CIL rates that apply to different types of development in different parts of the county.

CIL will contribute towards the "funding gap" between the total cost of infrastructure necessary to deliver new development and the amount of funding available from other sources.

CIL is charged on commencement of development and is separate from the planning decision process, being administered by a separate department. Further information is available on the following website:
Community Infrastructure Levy - Wiltshire Council

Advice regarding provision of Broadband

Wiltshire Council recommends that all developers work with a telecommunication partner or subcontractor in the early stages of planning for any new development to make sure that Next Generation Access Broadband is a fundamental part of the project. Access to superfast broadband should be thought of as an essential utility for all new homes and businesses and given the same importance as water or power in any development design. Please liaise with a telecom provider to decide the appropriate solution for this development and the availability of the nearest connection point to high-speed broadband.

Application requirements

As outlined in detail above, a number of reports and supporting information will be required to support an application, also generally outlined below.

- Sequential Test
- Flood Risk Assessment
- Ecology assessment *(although please note that the council's ecologist has opined that 'the submitted ecology report (Ethos, January 2022) is sufficient in support of any future application to address on site ecological constraints')*
- BNG assessment
- Nitrate calculator/confirmation to use the council's mitigation strategy
- The Wiltshire Council Waste Collection Guidance for Developers requires the following to be submitted with an application:

Table 6

All developments
Vehicle tracking to show that access and turning room for a RCV is acceptable, with reversing minimised
Individual residential properties and flats grouped in blocks of five or fewer
Indication of the external waste storage area per property
Identification of the collection point per property
Identification of the route from the storage area to the collection point, including the distance and the width (minimum 1m) of all such routes (may be tabulated separately for ease of reference)

You would also need to meet the requirements of the Council's validation list, which is contained with the application form information on the Council's webpages: Submit planning application - Wiltshire Council

Please also note the planning notice/guidance on submitting applications during the Covid-19 pandemic Planning notice - Wiltshire Council

I draw your attention in particular to the need for a Statement of Community Involvement for Major applications of 10 dwellings or more and reference to the Wiltshire Council Statement of Community involvement (SCI) in the checklist. Although public engagement may still be limited by the COVID-19 pandemic, it is recommended that the Parish Council, nearest neighbours and locally elected councillor are at least advised in advance of the submission of any Major planning application, and this confirmed in any supporting statement. I note that the preapplication advises that Stakeholder Engagement has been carried out with Ludgershall Town Council (via the town clerk to the councillors) and the local elected member of W/C (Cllr Mike Williams- Tidworth/ Ludgershall) and four affected businesses within the locality have been contacted to forewarn them of intended demolition.

Please also note that under the terms of the Council's Constitution *'Part 3 Responsibility for Functions'*, and *'Section D3 Scheme Of Delegation Specific To Planning'* that in addition to the normal call-in arrangements by which locally elected councillors can request an application to be determined by the relevant planning committee, as a Wiltshire Council application if an objection raising material planning considerations is received by consultees/third parties it will also need to be determined at committee (which in this case would be the Eastern Area Planning Committee):
1.1 Applications submitted by Wiltshire Council will not be dealt with under delegated powers where an objection has been received raising material planning considerations.

Summary and conclusion:

As explained above, the principle of the development could be acceptable, however a particular constraint in developing this site is the groundwater flood risk status and the proximity of the site to existing dwellings/gardens and the impact to residential amenity.

A sequential test will need to first identify that there are no alternative sites (and as explained above it is considered that the area of search could be restricted to the area identifying a particular affordable housing need). If this can be passed, a detailed flood risk assessment and drainage strategy would also need to be provided, but if it is not possible to meet the sequential test, then the proposals would be unacceptable as they would conflict with the policies of the development plan and submission of a planning application would not be recommended.

Suggestions have been made in respect of revising the layout to cover highways, urban design and housing enabling team comments and it is also considered that the layout/number of units needs to be reconsidered in order to address the identified overbearing impact to existing dwellings.

We could provide advice on a revised pre-application/detailed layout as per our FAQs:

Will I get the opportunity to amend the proposal following your initial response?
amendments submitted within 3 months of the date the original response will be free of charge provided that:

- *the enquiry is made by the same person as the previous enquiry*
- *the enquiry relates to the same site or part of the same site as the previous enquiry*

- *the development is of the same character or description as the development to which the earlier enquiry related.*

Please note the above is also an opinion of an officer of this Council and is without prejudice to any formal decision taken in respect of development of the above site.

Yours faithfully
Andrew Guest
Head of Development Management

Officer's Name: Lucy Minting
Officer's Title: Senior Planning Officer
Email: lucy.minting@wiltshire.gov.uk

Appendix A: Waste storage and collection: guidance for developers

Waste storage and collection: guidance for developers

Supplementary Planning Document



Wiltshire Council

Where everybody matters

Waste storage and collection: Supplementary Planning Document

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0.1 Version history

Table A

Version number	Status	Summary of changes	Date published
1.0	First published version	N/A	March 2011
2.0	Revised draft circulated internally to enhance the technical content	• Structure amended. Further details added to sections 2 to 8 to reference the updated waste strategy and to relate Wiltshire's requirements to documents published by ADEPT and DfT (as referenced in the body of the guidance below).	October 2012
2.1	Draft circulated internally prior to submission to waste management services strategic management team	• Significant revisions to section 5.7 and section 9 to reflect current operational practices and HSE advice and minor amendments to other sections.	February 2013
2.2	Updated draft (post waste strategic management team email approval to proceed)	• Amendment to the size of containers provided to flats for certain materials to reflect Hills' approach (Table 3) and to the associated contributions requested.	April 2013
2.3	Draft updated to accommodate some further lessons learned from applying this guidance to planning applications and to incorporate service changes which take effect in 2015	• Additional references to Defra's Quality Action Plan added. • Changes to the description of the garden waste service and how s106 contributions would deal with this change.	May 2015
2.3.1	Draft updated after first round of internal consultation responses to update the policy context	• References to policies updated • Further minor amendments to clarify requirements • Addition of Figure 1 to illustrate effect of poor bin storage arrangements	June 2015
2.3.2	Draft updated after further round of internal consultation responses	• Sketches added throughout the document to illustrate design requirements • Clarification added to sections 1.1, 2.3, 10.1, 10.2 and 10.4 regarding the criteria for seeking s106 contributions. Addition of a new section 10.3 to outline infrastructure requirements for major developments, with an associated estimation of costs added to section 10.4 • Updated reference to relevant regulations in section 6.1.2 and in	January 2016

		new paragraph 5.6.9.6 • A new paragraph 5.7 is added to provide specific guidance on care homes and sheltered accommodation • Comments from urban design colleagues have been accommodated in sections 4.2, 4.6, 5.2.1, 5.4.5, 5.6, 6 (to clarify information on distances and space requirements, to replace cross references with text and to increase information on security of bin stores) • Updates to Table 4 to include more building types • Further cross references to council policies and strategies and to HSE guidance • Other minor proof reading amendments, updates of the bibliography and enhanced cross-references within the document. • Front and rear cover added	
2.3.2	Final draft post consultation to be considered for adoption	• Information about the external consultation added to paragraph 0.2 • Paragraph 0.3 clarified so that the limited extent of the potential for the document to be updated but not consulted upon is explained further • Update to paragraph 1.1 to further explain the purpose of the document • Further information on the policy basis for the need for the SPD in paragraph 1.3 • Addition of paragraph 3.10 to account for consultees' concerns about the lack of flexibility in relation to the measurements listed in the guidance. • The distance between that a resident can be expected to carry their waste containers has been increased to 30m as a result of feedback (in paragraph 4.1, 5.3.1, 6.3.2 and in Figure 4 to Figure 11. • Amendment to paragraph 4.2 to align with the specific wording in *Manual for Streets* • Removal of reference to the minimum garden footprint in paragraph 5.4.3 • Guidance in relation to internal storage in paragraph 5.5 has been changed to say developers "could"	

		rather than “should” adopt the guidance suggested, as there is no policy basis to require internal storage. • Paragraph 5.8.4 has been amended and Table 4 removed, as its inclusion was not understood by consultees. • Paragraph 8.3 has been updated to make clear why we seek further contact from developers and to confirm that this is not seeking to revisit planning permissions. • Appendix A has been updated to clarify why larger vehicles are used and to show how much of a total vehicle width is as a result of ancillary equipment, such as wing mirrors and lifting equipment. • Inclusion of detail for Appendix B, Appendix D and Appendix E	

0.2 Consultation process

An internal consultation took place in May and June 2015. In response, the document was amended as indicated in Table A above.

A consultation with planning professionals was run for four weeks between 15 June and 13 July 2016. This was the first formal engagement with developers and agents on the document. Once the requirement to consult was identified, the consultation itself was delayed until adoption of Community Infrastructure Levy and the Planning Obligations Supplementary Planning Document (SPD) came into effect. These policies had the potential to affect the drafting of the SPD, so it was decided to await the outcome before finalising the draft SPD.

The document was updated to take account of consultation feedback and was presented to Cabinet in [November 2016]. Full Council considered the matter in [January 2016] and [detail the outcome].

While the general public had the opportunity to engage in the external consultation, their views have been captured over a number of years and have directly led to the development of this document. The council has worked with residents at new developments who have struggled to access services due to layouts of new developments not facilitating access to waste services.

0.3 Updates to this document

In the guidance below there are a number of signposts to potential changes to this document to take account of projects currently being undertaken by the council.

Where such changes are brought into effect, the council will publish an updated version of the guidance on its website. Any such revised version can be issued to any consultees listed in section **Error! Reference source not found.** above at the time and will be available to any new applicants at such time on the website.

A further consultation would not be required in the circumstances set out above, as such changes would simply affect what materials are presented in each bin but would not necessitate a change to the quantity of bins required, and so there would be no material impact on the space required for storage of bins, for example. The document would only be issued for further consultation where substantial changes were made to the planning policies that underpin this document or where a change in collection system altered the amount of space developers would have to allow for the storage of containers, for example.

Where more substantial changes are made that would affect the amount of space given up for waste infrastructure, the council would seek to consult with developers and agents.

1. Introduction

1.1. The aims of this document are to:

- support the interests of the council's Waste Management Service and delivery of the principles of the Wiltshire Council Waste Management Strategy[1] by offering guidance to developers on how to ensure space for waste management is integrated into the designs of all developments and that vehicular access is suitable for Wiltshire Council's fleet, thereby enabling services to be delivered safely, efficiently and in compliance with regulations
- embed the consideration of the issues associated with the management of waste in accordance with the adopted policies of the Council's local development plan
- to outline the requirements of Wiltshire Council in its capacity as the waste collection authority and within the scope of its powers and duties under Sections 46 and 47 of the Environmental Protection Act 1990, in accordance with paragraph 0.2 of Approved Document H6
- provide developers with advice on how to meet local plan policy requirements relating to the need to ensure that waste generation is minimised and appropriately addressed prior to the construction and occupation phases in line with the planning process, thus avoiding problems for residents and the council post-construction and helping developers make successful applications
- address, and propose solutions for, problems identified by residents of new developments by offering guidance that designs out the causes of these problems
- provide an appropriate means of calculating section 106 contributions for each new development where the requirements of the Waste Management Service are considered to be directly related to development proposals and where the development meets the criterion in section 10.2, which will support infrastructure delivery
- enable the council to demonstrate that it is actively putting control measures in place to mitigate the risks of operating at new developments, in order to meet its statutory duty to protect the health and safety of employees and members of the public.

1.2. As part of the ongoing process of delivering a planned approach to sustainable development in the county, the council is required to detail, where it is considered lawful[2] to do so, the waste and recycling collection contributions required as part of the section 106 provision for all new developments (see section 10 below). This requirement sits alongside the council's other legal obligations, such as how we

[1] Updated and approved by Cabinet in November 2012 (decision published here). Principle 2.6 of the strategy states that the council will "promote provision for collections to take place safely and efficiently in the design of areas of new development". See section 2.1 below for further information.
[2] Community Infrastructure Levy Regulations, 2010 [as amended]; Regulations 122 / 123; and paragraph 204 of the National Planning Policy Framework

manage waste in order to increase the rate of recycling that our residents achieve and to reduce the reliance on the unsustainable option of landfill.

1.3. The Wiltshire Core Strategy identifies sustainable waste management facilities as "essential components of daily life and therefore critical to delivering our strategic goal of building more resilient communities"[3]. Closely aligned to this policy is the principle that waste management in new developments should not adversely affect the quality of life for residents and other users of the space, which supports the council's vision of creating resilient communities.

1.4. The Association of Directors of Environment, Economy, Planning and Transport (ADEPT) publication 'Making Space for Waste: Designing Waste Management in New Developments' summarises this point by stressing that "it is important not to underestimate how [...] poor planning and design can have a detrimental effect on the quality, character and function"[4] of a development. While the council's experience at some developments bears out the point made by ADEPT, there is great potential to improve residents' quality of life through the design process if waste collection services function seamlessly. The work of developers has – and will continue to have – a significant impact on delivery of the council's business plan aim to "ensure everyone lives sustainably in a high-quality environment"[5].

1.5. Waste management should not adversely impact upon users of developments if developers use the guidance in this document. Adopting the principles of this guidance at the earliest stage of the design process will avoid circumstances which the waste department sometimes encounters where a development is constructed with inadequate waste storage solutions, unsuitable collection points, insufficient access to vehicles or a combination of the three. In these circumstances the quality of life for residents suffers, the cost to the council of delivering waste services increases and it is far more difficult to encourage participation in established recycling schemes. An example of an area which has caused complaints from residents about the impact of waste storage arrangements is shown in Figure 1. The guidance here aims to assist developers to integrate waste collection services into the design process.

[3] Wiltshire Core Strategy, CP3, paragraph 4.41
[4] Making Space for Waste: Designing Waste Management in New Developments, ADEPT, p.16
[5] Wiltshire Council Business Plan 2013-2017, p.6.

Figure 1 - example of unsightly bin storage arrangements that impact on residents

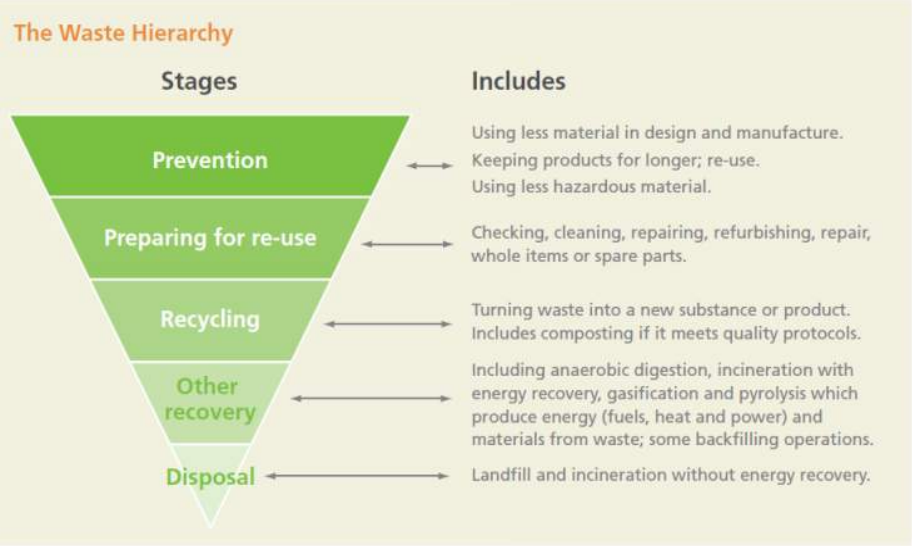


1.6. All references to Wiltshire Council in this document should be taken to include any contractors delivering services on its behalf where relevant operational issues are being discussed.

2. Wiltshire Council's waste strategy and service delivery

2.1. Wiltshire Council's waste strategy seeks the significant reduction of waste to landfill, with greater emphasis upon reducing household waste and increasing the proportion that is either recycled or composted. The strategy was updated and approved by the council's cabinet on 6 November 2012. It continues to be based upon the key principles of the waste hierarchy (shown in Figure 2), which seek to optimise the use of the most beneficial methods of landfill reduction. The waste hierarchy gives the highest priority to preventing waste in the first place. When waste is generated, it gives priority (in order) to preparing it for re-use, then recycling, then other recovery (e.g. energy recovery), and last of all disposal (e.g. landfill).

Figure 2: the waste hierarchy (source: 'Government Review of Waste Policy in England 2011', Defra)



2.2. The separate collection of recyclable and compostable waste materials from the kerbside is a key component of the implementation of the strategy. Wiltshire is already well provided for in respect of household recycling centres. The kerbside collection service has been the priority for service development since Wiltshire Council was formed in April 2009.

2.3. Among the initial objectives of the new council was the provision of the same waste and recycling collection service in all areas. Wiltshire Council's Cabinet approved these service changes in October 2010 and it also decided that section 106 contributions should be sought where, in the light of the Community Infrastructure Levy Regulations it is considered lawful to do so, to cover the cost of providing waste containers at new residential developments (details on the threshold at which section 106 contributions are sought is set out in section 10.2). Policy support for seeking developer contributions towards the provision of waste management facilities is provided by the adopted Wiltshire Core Strategy, Wiltshire and Swindon Waste Core Strategy and the Wiltshire Planning Obligations Supplementary Planning Document (see paragraph 10.1 for further details).

2.4. The service changes referenced in section 2.3 were implemented during 2011-12 to create a harmonised kerbside collection scheme, which included additional recycling services alternating with a fortnightly collection of residual (general) waste. In agreeing this service, the council has brought forward its target for recycling. In addition, the provision of bins, and the services required to support waste collection, is a burden on the council that can often be directly related to new developments and hence firmly within scope for financial contributions to be made through s106 agreements.

2.5. In 2014, the council closed many of its remaining local recycling sites (i.e. bring facilities often located at locations such as supermarkets) due to the

comprehensive kerbside collection service offered to residents, leaving 14 operational sites.

2.6. The detailed specifications associated with the collection of waste from residential developments set out in Section 5 reflect the harmonised kerbside collection services. These services will help to deliver the objectives of the council's waste strategy and provide a mechanism for supporting the implementation of adopted local development plan policies.

2.7. The provision of alternating weekly collections of residual waste and kerbside collections of multiple recyclable materials, in addition to the option for residents to use the chargeable garden waste collection service, are intended to enable the council and residents to reach the targets for recycling and diversion from landfill. The withdrawal of the local recycling sites has further increased the importance of the new kerbside collection services for achieving these targets.

2.8. In order to ensure that these objectives continue to be attainable, it is vital that new buildings are designed and constructed to enable waste to be segregated for recycling and composting, and to be stored and collected in a way that is practicable for all parties involved. Further to the publication of the Council's waste strategy, the focus on improvement at both EU and national level for waste management concerns an improvement in the quality of recyclable material captured. By following the guidance in this document, developers will embed the capture of high quality recyclable material into the design process. Following this guidance is therefore essential to ensure that the Council is able to meet the requirements of the EU revised Waste Framework Directive, any regulations transposing this into UK law and any guidance documents, such as Defra's Quality Action Plan.

2.9. In September 2013 the council published an OJEU notice that commenced a procurement process to invite tenders to deliver its waste management and collection services from August 2017 onwards. As part of the process, the council will amend its collection model to further enhance the quality of recyclable materials captured. At such time minor changes to this document may be required to update tables listing the type and quantity of containers to be used by residents. However, much of the technical content of this document will not require amendment as it will be unaffected. For example, large vehicles will still need to access properties in the same way and residents will still generate broadly similar amounts of waste and will require adequate storage space as set out in this document. The level of contributions set out in section 10 may adjust slightly to take account of any change to the type and quantity of containers issued to residents.

2.10. The council would also like to see non-residential buildings designed, constructed and managed in a way that better facilitates the recycling of waste, to assist with reducing the reliance on landfill and to improve sustainability in the county. Many of these aspirations can and will be delivered through the execution of local development plan policies relating to good design. On these matters, this

document intends to assist the development management process by assisting pre-application/planning application processes in a pro-active manner.

3. How to use this guidance

3.1. This document will help all those involved in the design and management of buildings (and wider development sites) to produce waste management strategies that best facilitate the storage/movement of waste; and maximise the amount which can be sent for recycling, thereby diverting it from landfill.

3.2. It is a material planning consideration that developers are aware of the waste that will be generated by their developments once occupied, a point that is made clear in Policy WCS6 of the council's adopted Waste Core Strategy[6]. Policy WCS6 also requires new development to have regard of the council's municipal waste strategy. To demonstrate that due consideration has been given to the council's waste strategy – specifically, consideration of waste generation and of the feasibility of delivering safe and efficient services – developers' proposals should satisfy all of the requirements of this document.

3.3. The guidance intends to help developers produce successful waste management strategies at an early stage. The content reflects the guidance and requirements of a number of sources, such as the Approved Document to Part H of Building Regulations (as amended from time to time) and BS 5906:2005 (see the Bibliography for further information), so following the guidance should allow developers to comply with a number of regulatory requirements. It also aims to translate the lessons learned through operational delivery into practical suggestions for how to improve access to waste collection services through the design process, which helps to contribute to successful delivery of the council's business plan aim referenced in section 1.4.

3.4. As previously outlined, this document also serves to ensure that developments enable collection vehicles and crews to access collection points in accordance with Wiltshire Council's development plan policies and to provide sufficient internal and external storage for waste and waste containers in line with the council's application of its powers under sections 45, 46 and 47 of the Environmental Protection Act 1990. Paragraph 4.38 of the Wiltshire Council Core Strategy[7] states that "It will be important that all new development proposals build safeguards into schemes to protect and enhance appropriate services and facilities, including […] waste management services." These safeguards come in the form of designing waste services in from the outset of the application process, taking account of the information in this document to ensure sufficient space is available.

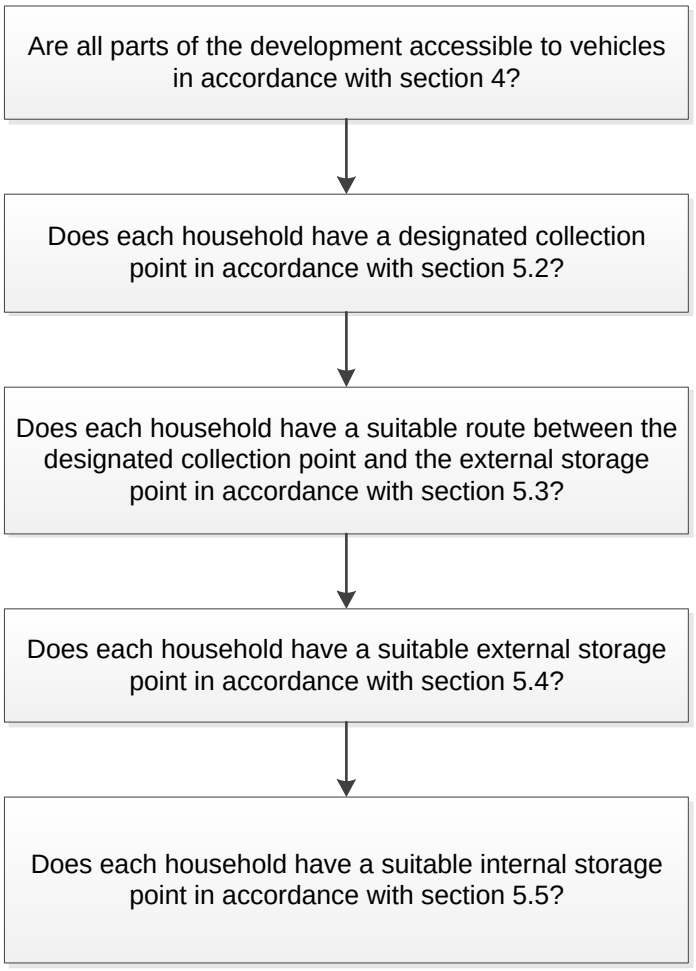
3.5. Sections 5 to 7 below outline separate guidance on storage and collection arrangements for residential developments, commercial developments and mixed-use developments respectively. The requirements for vehicle access set out in

[6] Wiltshire and Swindon Waste Core Strategy, July 2009 (available here)
[7] Wiltshire Core Strategy, January 2015 (available here)

section 4 apply to all types of development. For residential developments, this document differentiates the arrangements for houses and apartments, as the requirements for communal facilities for apartments differ from the approach taken for individual houses (see section 5.6 for further information on the service for apartments).

3.6. The structure of the following sections aims to set out the steps required to allow successful delivery of waste collection services to be built into the design process, from considering vehicle access through to allocating storage space within a property for waste and recycling. As an example, the process that should be followed for an individual household (as distinct from apartments) is shown in Figure 3.

Figure 3



3.7. While this guidance primarily focuses on new developments, it is also applicable to developments at existing properties where waste and recycling storage will be affected, such as extensions or alterations to existing properties.

3.8. This document is part of an evolving process to develop best practice guidance for the design and management of buildings in Wiltshire and should be read within the context of other Wiltshire Council policies, guidance and legislation.

3.9. It has been developed in accordance with the list of contributors and consultees stated in section **Error! Reference source not found. Error! Reference source not found.** and in line with the process set out in section 0.2.

3.10. In responding to planning application consultations, the council will use the guidance here to establish whether waste services can be delivered sustainably. In the majority of applications, the council expects that submitted plans will adhere to the guidance set out in this document. However, officers will use discretion where specific circumstances at a site require minor deviation from the guidance in order to make a proposal feasible. Where alterations to listed buildings are proposed, the council will accept divergence from the guidance but recommends that applicants engage with the council as early in the design process as possible so that each party can understand the limitations that affect the application.

4. Vehicle access

4.1. One of the main barriers to the integration of waste management facilities into new developments is insufficient vehicle access for refuse collection vehicles (RCVs). Where vehicles cannot access collection points, there is an adverse impact on the streetscene because waste containers have to be presented at locations that are not designated as waste collection points (see Figure 1 for an example). In addition to detracting from the attractiveness of an area, such inadequate arrangements may also require residents to carry their waste in excess of the 30m stated in Part H of the Building Regulations, as detailed in section 5.3.1 below. In addition, vehicle movements generate health and safety risks which need to be minimised through the design process. Health and Safety Executive guidance states that "Containers for waste and recyclables should be placed in locations that minimise the need for difficult vehicle manoeuvres"[8]. Developers need to help the council manage its health and safety performance by ensuring that vehicle access meets the requirements set out in this document.

4.2. Reversing RCVs cause a disproportionately large number of accidents in the waste and recycling industry. These moving-vehicle accidents often cause severe or fatal injuries to workers or members of the public. Plans should aim to eliminate (where possible, or substantially minimise where not) the amount of reversing required by RCVs with collection routes designed to operate in a forward gear. Where reversing is necessary, developers should work within the stipulations of BS 5906:2005, Waste Management in Buildings, which states that, where unavoidable, reversing distances should not exceed 12m. Longer distances may be considered in exceptional circumstances where the route is straight and free from obstructions, as noted in paragraph 6.8.8 of 'Manual for Streets'. The overuse of cul-de-sacs, often in the form of private drives, increases the risks associated with reversing. The council can operate on private land subject to section 5.9 below and where suitable vehicle turning room is provided, where carry distances for collection crews (see section 4.4) and occupiers (see section 5.3.1 below) are

[8] *Waste and recycling vehicles in street collection*, Health and Safety Executive, 2014

minimised, in accordance with the council's duty to safeguard the health and safety of employees and Part H of Building Regulations respectively. Minimising risk in this area should be critical to any consideration of movement and circulation in the development.

4.3. The council requires vehicle tracking to be included in each application to assess layouts for accessibility. This tracking should not be undertaken on the basis that parking on the street is absent, as this would not truly reflect the 'live' accessibility for the street. Instead the tracking should demonstrate how the vehicle can access the development when cars are parked on the street. For the purpose of generating the tracking information, developers should use the information about the council's vehicles used for waste collection (included here in Appendix A). Further, developers should note that BS 5906:2005 recommends a minimum street width of 5m for waste collection vehicles.

4.4. Vehicles should be able to approach collection points so that a waste collection operative can collect containers from a collection point that abuts a footway designated for public use. The greatest distance over which a waste collection operative should move is 10m. Generally waste collection points will be at the curtilage of each property where it meets the highway, as described above and detailed further in section 5.2, so it should be rare that the distance approaches 10m. The waste management service would not support applications where all collection points are at the maximum limit of 10m, as the efficiency of collection operations would be significantly reduced.

4.5. At any collection point, space at the rear of the collection vehicle should be sufficient to allow efficient and safe operation. ADEPT recommends a minimum working area of 3.5m width and 4m length, while sufficient vertical clearance should be allowed at all times, taking account of the information provided in Appendix A.

4.6. As intimated in section 4.1, another major impediment to the successful delivery of waste collection services is parked cars preventing RCVs from accessing collection points. The cars that cause the problems are often parked outside of allocated parking areas by residents who want their cars closer to their front doors. When considering access for RCVs, developers should consider the impact of residents' parking habits to ensure that cars parked outside of allocated areas will not obstruct access to RCVs. To that end, unbroken lines of on-street parking should be avoided on streets where waste collection will take place. The requirement in section 4.4 regarding carry distances for waste collection operatives requires careful consideration in relation to how parking spaces are laid out.

4.7. Road surfaces (including manhole covers) at all parts of a development where RCVs are expected to operate must be able to bear the weight of a fully laden vehicle, which weighs up to approximately 32 tonnes.

5. Waste storage and collection for residential developments

5.1. The collection service for individual houses

5.1.1. Wiltshire Council's harmonised waste collection service is summarised in Table 1.

Table 1

Materials collected	Container type	Size	Quantity	Collection frequency
Residual waste	2-wheel bin	180 litre	1[9]	Fortnightly
Plastic bottles and cardboard (co-mingled)	2-wheel bin	240 litre	1[10]	Fortnightly
Paper, glass, cans, foil and textiles (kerbside sort)	Kerbside box	55 litre	2	Fortnightly
Garden waste (opt-in, chargeable service)	2-wheel bin	180 litre	1[11]	Fortnightly

5.1.2. Any storage areas, both internal and external, must take account of the materials that residents are able to recycle through their kerbside collection scheme, as listed in Table 1.

5.1.3. The sections below detail how waste management should be integrated into the design process working back from the collection point all the way through to internal storage of waste within a property. An example of the process is shown in Figure 3 above.

5.1.4. For new developments only the container types listed in Table 1 can be used for the services. The only exception permitted is where six or more flats are situated together in a block, in which case communal containers may be issued in accordance with section 5.6.

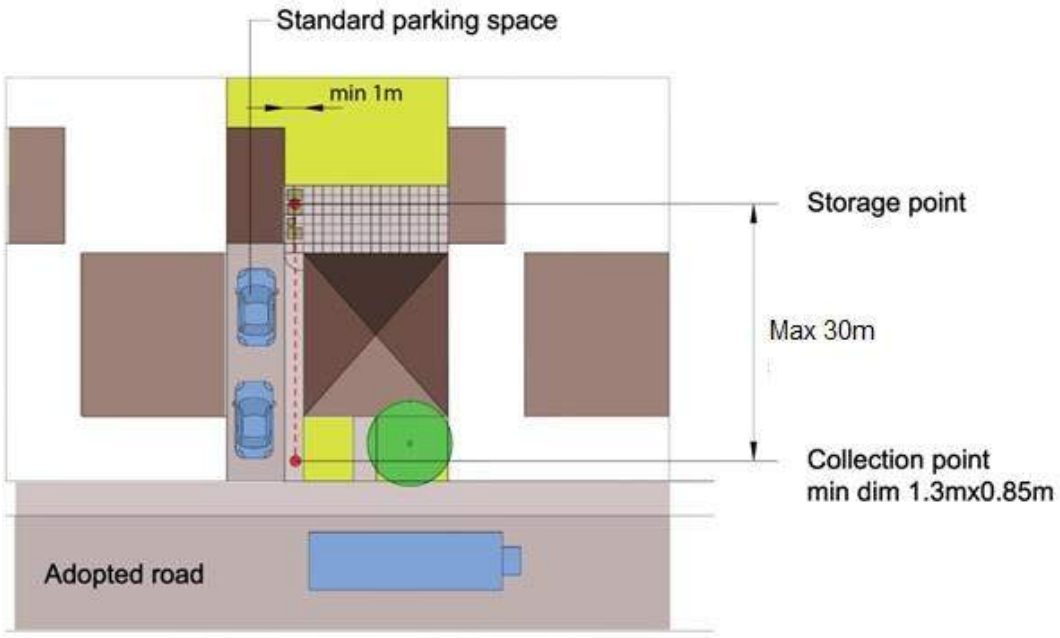
5.2. Collection points

5.2.1. Wiltshire Council collects waste containers from where the boundary of a property meets the public highway (i.e. collection points must not be on the public highway) at a point clearly visible from the road. Collection points must be on hard standings and gradients must not exceed 1:12. Meeting these standards will "Ensure that material for collection is easily accessible, placed at the property boundary where possible"[12], in accordance with Health and Safety Executive guidance on operating safe collections. Generally collection points will be at the front of a property unless otherwise shown on plans (and agreed by the council), in accordance with guidance in section 8 below.

[9] Eligible households may be authorised to use a larger 240-litre wheeled bin or a 360-litre wheeled bin
[10] Second bin available on request
[11] Additional bins available on request, on receipt of an annual service charge per bin
[12] *Safe waste and recycling collection services*, Health and Safety Executive, 2014, p.20.

Developers should ensure that containers can be left out for collection without blocking the footway or presenting hazards to users, as stated in the Department for Transport's 'Manual for Streets', paragraph 6.8.18 (see Figure 4). In addition, collection points should not be on driveways unless they are wide enough to accommodate vehicles and the containers. Floor space of 1.3m width and 0.85m depth should be sufficient to accommodate two wheeled bins side-by-side (the maximum number that ought to be presented for collection on any collection day) with room for manoeuvring. Further guidance on these matters can also be sought through pre-application dialogue with the council's highways development control officers.

Figure 4: collection point at a detached property with garage (not to scale)



5.2.2. Subject to agreement by the council, external storage points (i.e. where residents permanently store their containers between collections) can be used as collection points provided that:

5.2.2.1. they are located in positions that comply with the guidance set out in section 5.2.1;

5.2.2.2. crews are not required to open gates to access containers;

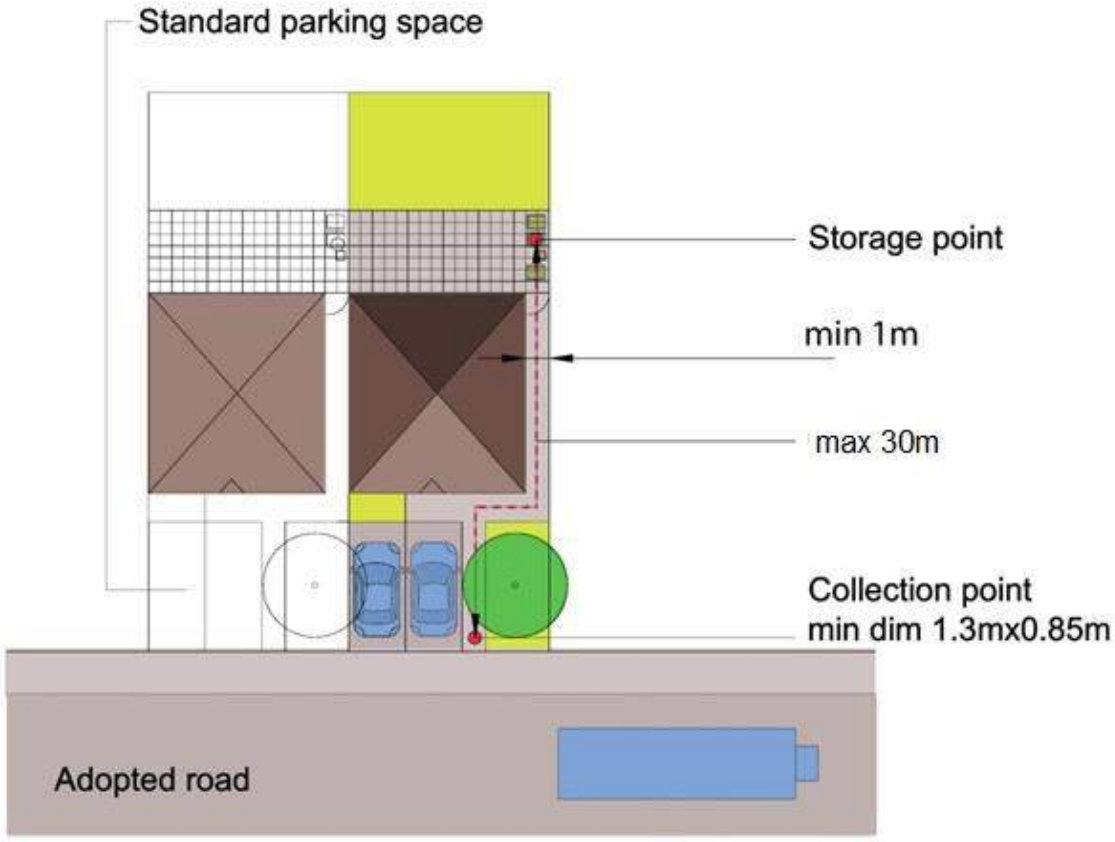
5.2.2.3. residents are not unreasonably required to carry waste through the house from the point of generation (e.g. if garden waste had to be carried through the house to be deposited in the bin or if waste from a kitchen bin, where located at the rear of the property, had to be carried through main living areas within the property);

5.2.2.4. any such storage and collection points do not detract from the streetscene and quality of place in a development, as further described in paragraph 5.4.1.

These requirements are likely to be difficult to satisfy as, by their nature, collection points need to be visible otherwise crews will assume that containers are not out for collection. However, the approach can be considered in exceptional circumstances.

5.2.3. Developers should ensure that collection points are free from obstructions that would prevent waste collection from successfully taking place, such as (but not exclusively) bollards, hedges, shrubs and cars parked in allocated parking spaces. Allocated parking spaces should therefore not interfere with waste collection points. The information in paragraph 4.6 should be taken into account when deciding upon the location of parking spaces. Figure 5 provides an example of how the collection point should be located in relation to parking spaces and soft landscaping.

Figure 5: interface between the collection point and parking spaces/soft landscaping at a detached property with no garage (not to scale)



5.2.4. As noted in 4.4 above, the council's collection crews will not carry/wheel waste containers over distances greater than 10 metres.

5.2.5. Developers should give particular consideration to making collection points accessible to elderly residents. While the council offers an assisted collection service for residents who cannot use the designated collection point due to reasons of illness, physical inability or infirmity, the provision of accessible collection points will help to maintain the independence of elderly residents

until such time that they need the assisted collection service. In delivering the assisted collection service, the council's crews will carry containers from a nominated point at the property to the vehicle and return the containers to the nominated point after emptying. Developers should consider and aim to minimise the carry distances that would be required in such circumstances. Other areas of external storage should comply with the guidance in 5.4 below so that the council can carry out assisted collections safely from such points.

5.3. Routes to collection points from external storage space

5.3.1. Occupiers are responsible for moving containers from storage areas to designated collection points. The Approved Document to Part H of the Building Regulations stipulates the following conditions, which should be met in order for developers to comply with Part H:

- containers should be stored within 30m of the waste collection point defined by Wiltshire Council (see 5.2 above and associated sketches)
- occupiers should not be required to carry or wheel containers from the storage point through a dwelling on collection days
- there should be no steps or other obstructions between the storage area and the collection point
- gradients of routes to collection points should not exceed 1:12.

5.3.2. Where distances exceed those stated in 5.3.1, the council's experience shows that occupants are less likely to participate in recycling schemes because of the inconvenience (perceived or otherwise) of carrying another container to the collection point. This potential outcome would have a negative impact on delivery of the council's waste strategy.

5.3.3. Under no circumstances should a resident be required to carry or wheel containers through their dwelling to facilitate collection.

5.3.4. These requirements can prove challenging for terraced properties. Figure 6 and Figure 7 below give examples of solutions for terraced properties that would meet the requirements of this section. In Figure 6 two properties share each collection point, so each collection point is wider to accommodate up to two wheeled bins per collection per property. In Figure 7 a ginnel is used to avoid lengthy carry distances between the storage point and the collection point. The mid-terrace properties share a collection point, which, like Figure 6, is wide enough to accommodate up to two bins per property per collection day. The end-of-terrace properties each have their own collection point. The principles of Figure 7 can be applied to more than four consecutive terraced properties to ensure that distances between storage and collection points are minimised.

Figure 6: terraced properties where containers are moved to the collection point from the rear of mid-terrace gardens (not to scale)

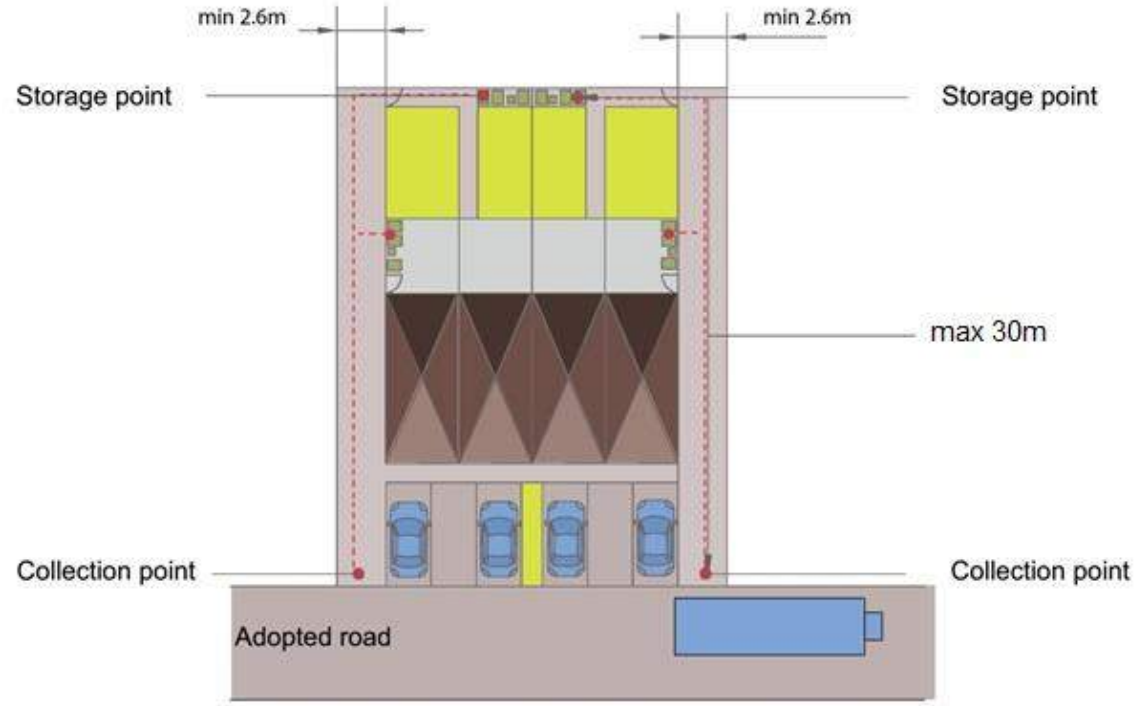
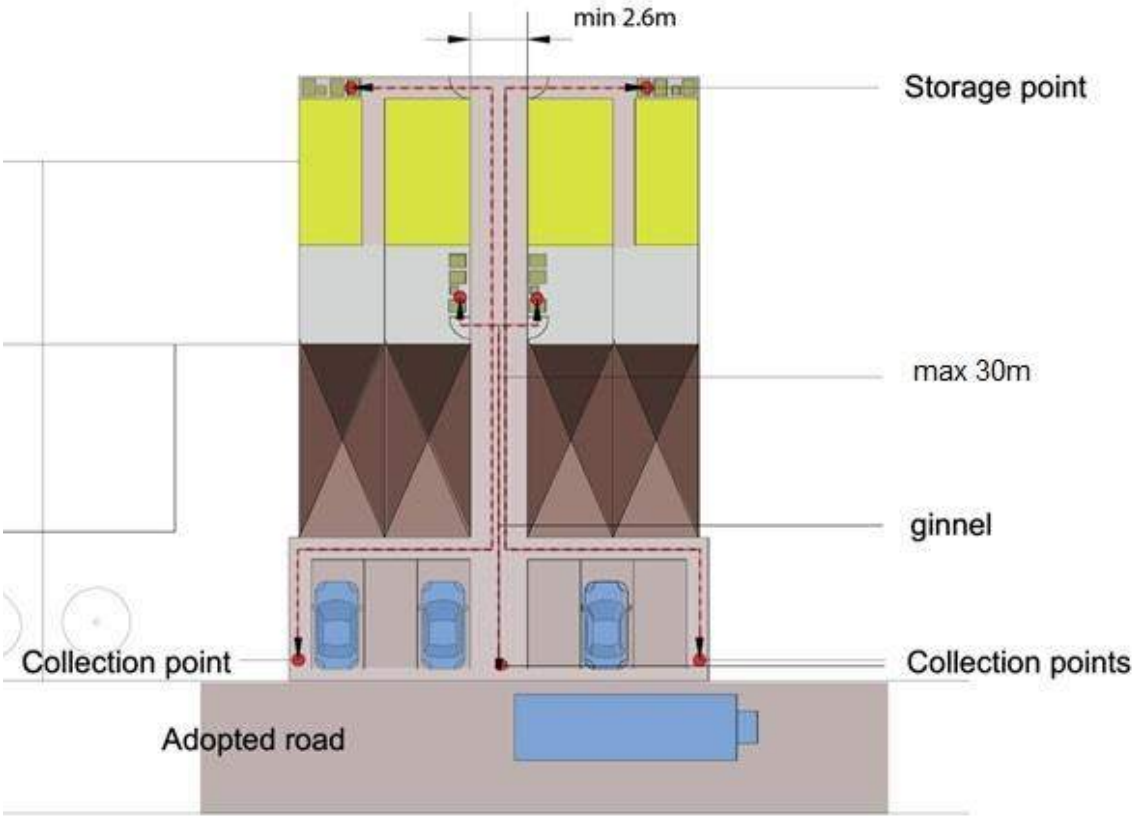


Figure 7: terraced properties using a ginnel to move containers between containers and collection points (not to scale)



5.3.5. Because of the council's assisted collection policy, as described in 5.2.5, collection crews may have to carry limited numbers of containers from storage points to the collection vehicle. Where the stipulations in 5.3.1 are not followed, collection staff would be exposed to manual handling practices that are strongly discouraged by the Health and Safety Executive. It is important therefore that this aspect of design does not compromise the council's health and safety performance.

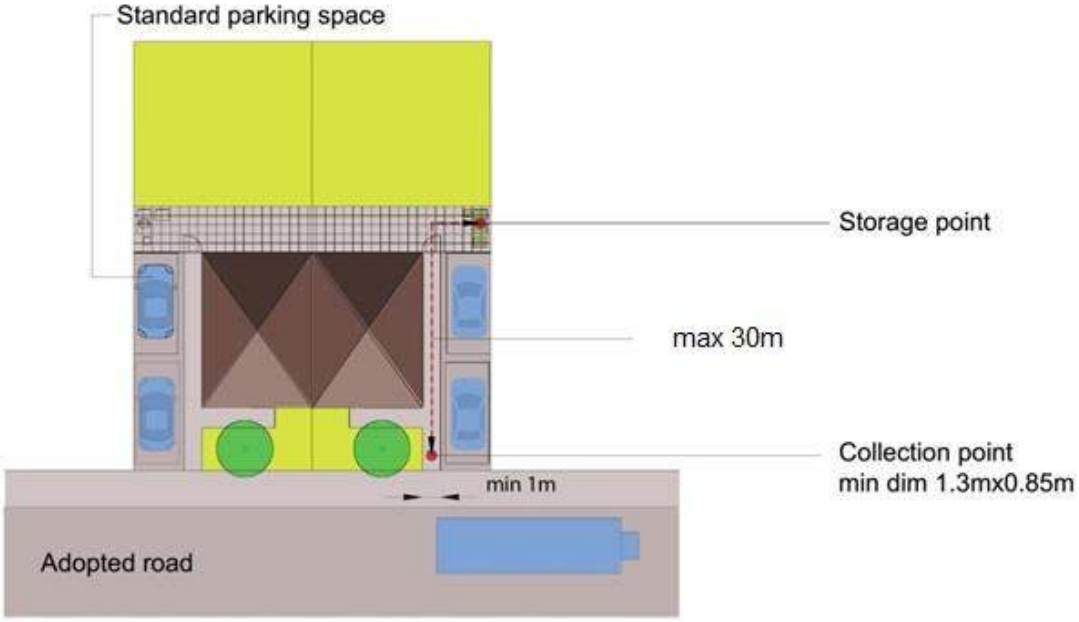
5.4. **External storage of waste**

5.4.1. Waste storage areas should be appropriately located, never on the highway and therefore within the boundary of the property, and designed to minimise visual impact with features that screen containers from public view. These storage facilities should not obstruct sight lines for pedestrians, drivers and cyclists and they should not interfere with pedestrian or vehicular access to buildings.

5.4.2. External storage spaces must be on hard standings and they should be away from windows and ventilators, preferably under shade where possible. All storage areas must be accessible to disabled people and, in particular, wheelchair users. Level storage space is desirable to ensure that containers do not roll of their own accord when full of waste, particularly where larger four-wheeled bins are in use. Where a gradient is unavoidable, it should not exceed 1:12.

5.4.3. Rear-garden storage is preferable where possible provided that there is a suitable route to the collection point that complies with carrying distances stipulated in Building Regulations, as detailed in 5.3.1 above, and any other provisions required under section 5.3. Figure 8 provides an example of rear-garden storage (also see Figure 4, Figure 5, Figure 6 and Figure 7 above for examples). Rear gardens should have adequate space for waste containers. Containers should be stored away from windows and ventilators.

Figure 8: semi-detached property with rear-garden storage (not to scale)



5.4.4. Storage areas should be large enough to accommodate all of the containers listed in Table 1 above at least. It is desirable for capacity for future additions to the kerbside collection service to be accommodated into storage areas as well (e.g. small electrical items, batteries) because the council's waste strategy states that it will seek to achieve continuous improvement of the kerbside collection service. Future legislation may also require the separate collection of further materials in order to comply with bans of certain materials being disposed of in landfill.

5.4.5. External storage areas will require a clear turning circle area to allow containers to be manoeuvred when bins are being moved to and from the collection point. ADEPT recommends a minimum 1.5m diameter turning circle for two-wheeled bins[13] but 1m may be acceptable where necessary.

5.4.6. Table 2 identifies the approximate dimensions for waste containers used for delivering waste collection services.

Table 2

Materials collected	**Container type**	**Size (litres)**	**Quantity**	**Dimensions**[14] (height x width x depth in mm)
Residual waste	2-wheel bin	180	1[15]	1100 x 580 x 755
Plastic bottles and cardboard (co-mingled)	2-wheel bin	240	1[16]	1100 x 590 x 800

[13] *Making Space for Waste: Designing Waste Management in New Developments*, ADEPT, p.26
[14] The dimensions quoted in Table 2 and Table 3 take account of the bins produced by a range of suppliers and assume that a raised aperture is required for the deposit of recyclate into four-wheeled containers. Datasheets from Craemer, ESE, MGB, Spider, Taylor and W Weber were used.
[15] See footnote 9.

Materials collected	Container type	Size (litres)	Quantity	Dimensions[14] (height x width x depth in mm)
Paper, glass, cans, foil and textiles (kerbside sort)	Kerbside box	55	2	585 x 375 x 395
Garden waste (opt-in, chargeable service)	2-wheel bin	180	1[17]	1100 x 580 x 755

5.4.7. Properties with larger gardens are likely to opt to pay for and use more than one garden waste bin, so storage space should account for how much garden waste might be produced based on the size of the garden.

5.4.8. To encourage waste minimisation, ADEPT recommends that room for a home composter is allocated for each plot with a garden[18]. The council's waste strategy also promotes the use of food waste digesters in gardens, as a waste minimisation measure. Principle 1 of the strategy promotes continued focus on the prevention of biodegradable waste, including food waste and garden waste. Developers should consider providing home composters and/or food waste digesters for homes, particularly where developers wish to demonstrate the sustainability performance of a scheme under the Code for Sustainable Homes.

5.4.9. By following the information in this section 5.4, developers should be able to ensure that waste containers are not stored on the public highway and therefore comply with the requirements of the Department for Transport's 'Manual for Streets'.

5.5. **Internal storage of waste**

5.5.1. To encourage occupants to recycle their waste, internal storage areas could be designed into each unit of a new development. This will enable occupants to segregate their waste into residual waste and recyclables, and to store it temporarily until transferring it to the external waste and recycling containers available.

5.5.2. Occupants could be supplied with allocated spaces and, where possible, containers for the internal segregation of their waste for recycling as part of the development process. Wiltshire Council does not provide such containers.

5.5.3. To make the most efficient use of space within properties, storage facilities could be integrated into the design of cabinets and fittings in the kitchen (or point of arising). Integrated solutions for storage are likely to be less obtrusive than requiring householders to acquire free standing bins after they have moved in. Where such containers are convenient to use, it is more likely that residents will separate their waste for recycling. The provision of internal

[16] See footnote 10
[17] See footnote 11
[18] *Making Space for Waste: Designing Waste Management in New Developments*, ADEPT, p.76

storage for waste is an important measure in achieving the targets set out in the council's waste strategy therefore.

5.5.4. Options that developers may wish to consider include kitchen units with pull-out cupboards containing separate receptacles (one for residual waste and others for dry recyclables), under-sink storage solutions or an area of storage available in the kitchen/utility room to enable the separation of waste within the home. When designing storage solutions, consideration should be given to the materials that residents can recycle at the kerbside, as outlined in Table 1 above. ADEPT recommends that at least three containers are provided with a minimum total capacity of 60 litres, where no single container is smaller than 15 litres.

5.6. **The collection service for apartments**

5.6.1. Residents in apartments are able to recycle almost all of the same materials as occupiers of individual households but the service is delivered in a different way, with ground-floor communal collection points used in most cases.

5.6.2. Save for exceptional circumstances, the only material that the council does not routinely collect from apartments is garden waste because very few residents have a garden to tend. Where an apartment does have an allocated garden, external storage space should be allocated for the provision of a garden waste bin in accordance with the information in Table 2. Table 3 below assumes that a garden waste container is not required.

5.6.3. The number of apartments within a block determines the number of containers required, as set out in Table 3. Storage for individual containers per flat, as listed in the first section of Table 3, should be provided for blocks of five or fewer flats. For blocks with 6 or more apartments, the sections in Table 3 set out the number of containers required per block for communal use by residents dependent on the number of apartments sharing the storage area.

Table 3

1-5 apartments per block (see 5.6.3 above)				
The containers listed in this section are to be issued *per apartment*				
Materials collected	**Container type**	**Size (litres)**	**Quantity**	**Dimensions**[19] (height x width x depth in mm)
Residual waste	2-wheel bin	180	1	1100 x 580 x 755
Plastic bottles and cardboard	2-wheel bin	240	1[20]	1100 x 590 x 800
Paper, glass, cans, foil and textiles	Kerbside box	55	2	585 x 375 x 395

[19] See footnote 14
[20] See footnote 11

For each section below, the communal containers listed are to be issued *per block*				
6-10 apartments per block				
Materials collected	**Container type**	**Size (litres)**	**Quantity**	**Dimensions** (height x width x depth in mm)
Residual waste	4-wheel bin	1100	1	1470 x 1375 x 1120
Plastic bottles and cardboard	4-wheel bin	660	1	1330 x 1375 x 785
Cans, foil, aerosols	2-wheel bin	180	1	1100 x 580 x 755
Green glass	2-wheel bin	180	1	1100 x 580 x 755
Brown glass	2-wheel bin	180	1	1100 x 580 x 755
Clear glass	2-wheel bin	180	1	1100 x 580 x 755
Paper	2-wheel bin	180	1	1100 x 580 x 755
11 – 14 apartments per block				
Materials collected	**Container type**	**Size (litres)**	**Quantity**	**Dimensions** (height x width x depth in mm)
Residual waste	4-wheel bin	1100	2	1470 x 1375 x 1120
Plastic bottles and cardboard	4-wheel bin	1100	1	1470 x 1375 x 1120
Cans, foil, aerosols	2-wheel bin	180	1	1100 x 580 x 755
Green glass	2-wheel bin	180	1	1100 x 580 x 755
Brown glass	2-wheel bin	180	1	1100 x 580 x 755
Clear glass	2-wheel bin	180	1	1100 x 580 x 755
Paper	2-wheel bin	180	2	1100 x 580 x 755
15-18 apartments per block				
Materials collected	**Container type**	**Size (litres)**	**Quantity**	**Dimensions** (height x width x depth in mm)
Residual waste	4-wheel bin	1100	3	1470 x 1375 x 1120
Plastic bottles and cardboard	4-wheel bin	1100	1	1470 x 1375 x 1120
Cans, foil, aerosols	2-wheel bin	180	2	1100 x 580 x 755
Green glass	2-wheel bin	180	2	1100 x 580 x 755
Brown glass	2-wheel bin	180	2	1100 x 580 x 755
Clear glass	2-wheel bin	180	2	1100 x 580 x 755
Paper	2-wheel bin	180	3	1100 x 580 x 755
19 or more flats per block				
More than one bin storage area will be required. The number of flats per block will determine which combination of containers from the sections above may be required. For example, a block of 24 flats would require two stores, each of which will accommodate the set of containers listed in the section '11-14 apartments per block'. However, the requirement will depend upon the precise design of the site, so developers should consult the council to identify the precise requirement.				

5.6.4. Any storage areas, both internal and external, must take account of the materials that residents are able to recycle through their kerbside collection scheme.

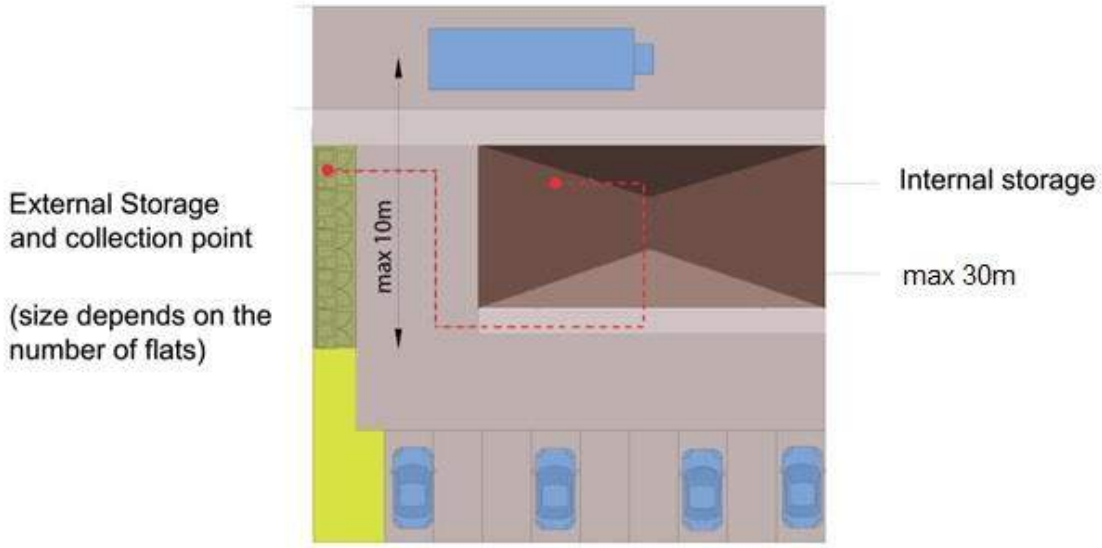
5.6.5. The sections below detail how waste management should be integrated into the design process working back from the collection point all the way through to internal storage of waste within a property.

5.6.6. **Collection points and external storage**

5.6.6.1. Individual storage and collection points

Where apartments are grouped in blocks of five properties or fewer, the storage facilities required for individual households, as referenced in Table 3, should be allocated to each property. The collection points at these properties should comply with section 5.2 above and the external storage should be provided in accordance with 5.4. Figure 9 gives an example of a suitable arrangement for flats in this category.

Figure 9: storage solution for flats which require storage for individual containers

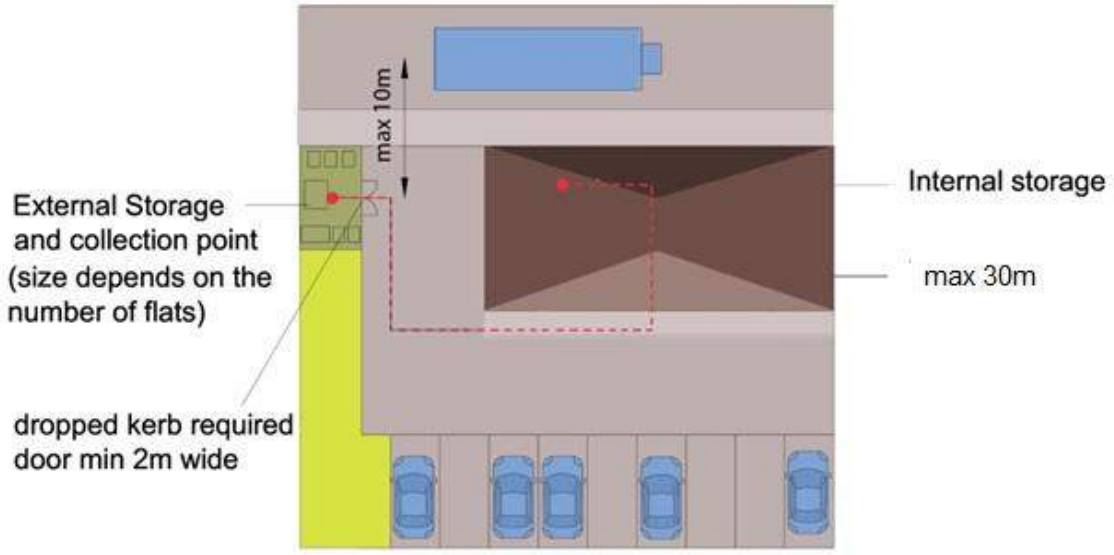


5.6.6.2. Communal storage and collection points

Sections 5.6.6.3 to 5.6.6.17 set out the circumstances in which the provision of communal collection points and communal storage points are acceptable to the council. They also provide guidance on designing such facilities.

5.6.6.3. For blocks of flats with more than five properties, a communal surface-level storage and collection point will usually provide the best solution. Developers should identify on plans which residential units are allocated to use each store. Sections 5.6.6.4 to 5.6.6.17 relate to such communal storage points. An example is shown in Figure 10 for a bin store for a block of 6-10 flats.

Figure 10: storage solution for block of 6-10 flats sharing a bin store



5.6.6.4. A bin store should be sited in a location that does not unreasonably compromise pedestrian routes during collection times, which may be for several minutes. All such storage areas should be screened to some extent and preferably they will be in an enclosed and covered compound. Sufficient space should be provided for each container and there should be sufficient operating room to allow both residents and waste collection operatives to access and use each container without having to move another container. Clear space of 150mm between containers should be allowed as a minimum, in compliance with BS 5906:2005.

5.6.6.5. Walls and roofs of bin stores shall be constructed of non-combustible, robust, secure and impervious material with the appropriate level of fire resistance to meet the requirements of BS 5906:2005. The walls should be suitably constructed or lined to make them suitable to be washed down and should have bump strips placed at bin height to prevent damage.

5.6.6.6. Doors to bin stores must be fitted with a means of being opened from the inside by means of a thumb turn (to avoid accidental lock in) and should be capable of being secured from the outside (see 5.6.6.13.3 for further information). Doors should also include restrictive openers to prevent over extension, scratch plates on the relevant side and a means of keeping them open during the collection process where they open immediately to the outside air[21] (any such doors must not open outwardly onto a street, in accordance with section 153 of the Highways Act 1980). ADEPT recommends that doors should have a minimum width of 2 metres so that

[21] While we would not favour doors that do not open immediately to the outside air, in the unlikely event that a proposal is accepted that would not have doors that meet this description, those doors should be self-closing in order to comply with BS 5906:2005.

the removal and return of containers is manageable without obstructions to the manual handling operation.

5.6.6.7. Any distance between a bin store and the collection vehicle should also have a minimum width of 2 metres to allow the safe removal and return of containers. If the collection point is not also the storage point, where containers are stored between collections, then any distance between the storage point and the collection point should have a minimum width of 2m as well.

5.6.6.8. The floor of a bin store must be constructed of hard impervious material, which also reduces the risk of slips and trips[22], without steps or kerbs. The surface should be one that can easily be cleaned and it should contain adequate drainage (or access to adequate drainage) suitable for receiving a polluted effluent, in accordance with Part H of Building Regulations.

5.6.6.9. If a change of level is required to get bins from the storage area to the back of the RCV, dropped kerbs will be required. Any slope must not exceed a gradient of 1:12 and there should be no steps between a storage area and the collection point.

5.6.6.10. All bin stores should be adequately lit either by artificial or natural lighting. Artificial lighting should be controlled by a switch that prevents lights being left on, preferably fully operated through presence-sensing functionality[23]. In accordance with BS 5906:2005, artificial lighting should be sealed to allow cleaning with hoses and/or to protect against splashing from general washing down of the storage area.

5.6.6.11. Where storage areas are covered or integrated into buildings, adequate, fly-proof and vermin-proof permanent ventilation should be provided to minimise odours. Any such ventilation should be away from windows of dwellings.

5.6.6.12. The bin store should be of adequate height to allow container lids to be opened without the need to move the containers outside of the store.

5.6.6.13. **Safety and anti-social behaviour**

5.6.6.13.1. Poor location and poor design of container stores can either be a source of anti-social behaviour or it can be perceived as an unsafe place for residents, which can lead to a reluctance to use facilities properly.

[22] The HSE provides information to assist architects/developers to select an appropriate flooring material at http://www.hse.gov.uk/slips/flooring.htm.
[23] An acceptable example of presence-sensing lighting, as noted in section 19.7 of Secured by Design's *New Homes 2014* guidance.

5.6.6.13.2. Bin stores should be located in overlooked areas, albeit in positions that do not detract from the quality of place.

5.6.6.13.3. Secure doors with a controlled access (e.g. key pad access) will deter non-residents from misusing the storage area (see 5.6.6.15 and 5.6.6.16 for further information regarding how collection crews can access such stores).[24]

5.6.6.13.4. Consideration of the noise created by residents depositing waste (particularly glass) should be central to deciding upon the location of the bin store, so that it will not create a nuisance for residents. Factoring noise reduction into the design of storage areas may mitigate any such problems.

5.6.6.13.5. The proximity of containers to residents' windows or ventilators should be considered to avoid odours entering premises.

5.6.6.14. Appropriate signage in storage areas is critical to the successful use of recycling containers. The council does not provide these signs, but it can supply graphics templates to allow developers to procure appropriately branded signage.

5.6.6.15. It is the responsibility of caretakers or management companies to allow collection crews to access the containers on collection day and to ensure that vehicle access is not obstructed.

5.6.6.16. Collection crews should not be expected to hold keys, codes or electronic fobs in order to collect waste and recycling. However, where necessary, and subject to agreement, such arrangements may be made. This must be discussed and agreed by the council prior to the submission of plans.

5.6.6.17. To comply with the guidance in this section 5, communal stores should not be located in courtyards to the rear of properties. The waste service has experienced problems on developments where a public pavement runs immediately across the face of a block of flats and vehicle parking and bin storage is proposed at the rear of the building, where vehicles gain access via an archway. In such circumstances the council will not be able to make collections safely (e.g. carry distances are greater than stated in section 5.2.4) as it is highly unlikely that suitable vehicle access and turning room would be provided for in such a restricted area. The council's experience of trying to resolve these situations is that arranging feasible collection arrangements requires a solution that detracts from the streetscene of an area, causes additional manual handling for residents and as a consequence, in some cases, the recycling performance of the area is

[24] See Secured by Design's *New Homes 2014* guidance for further information on appropriate security measures for communal storage areas.

affected. Consideration of access to waste services from the outset will avoid these undesirable outcomes.

5.6.7. **Routes to collection points from external storage**

5.6.7.1. Apartments in blocks of five or fewer properties will require a route to the collection point from the external collection point usually. The guidance in 5.3 applies to flats in that category.

5.6.7.2. Paragraph 5.6.6.7 should also be considered for premises requiring the use of four-wheeled bins if a caretaker has to move the bins to the collection point, where the storage point is not also the collection point (e.g. it is located in excess of 10m from a point that is accessible to a RCV). The principles of section 5.3 apply if the collection point is not also the external storage point.

5.6.8. **Internal storage**

5.6.8.1. The information on internal storage in section 5.5 applies to apartments. With space often at a premium in apartments, well-designed internal storage solutions will ensure that waste management is integrated into the living space instead of becoming an inconvenient add-on which affects the space available and makes it less likely for an occupier to separate materials for recycling.

5.6.9. **Management arrangements**

5.6.9.1. Under section 46 of the Environmental Protection Act 1990, the council has the power to specify the substances or articles that may be put into designated receptacles. In applying this power, Wiltshire Council only collects waste contained in designated receptacles where the materials within the containers are correctly separated into the appropriate containers (e.g. only paper is in the paper bin).

5.6.9.2. Any materials not presented in accordance with 5.6.9.1 will not be collected by Wiltshire Council. These materials will have to be dealt with by a management company or similar organisation.

5.6.9.3. If incorrectly deposited waste prevents operatives from accessing designated containers, such as waste left on the floor around containers, all waste may be left uncollected. It will be the responsibility of management companies to return the bin store to an acceptable state that will facilitate collection on the next collection day. Additional waste arisings generated before the next collection day may cause a repeat of the problem, so the management company should factor that into any solution that intends to return the bin store to the required state by the next collection day.

5.6.9.4. Where a bin store requires cleaning, a management company will have to carry out this function. Wiltshire Council does not provide a cleaning service.

5.6.9.5. Tenancy agreements and management company terms and conditions for occupiers of flats should include statements which show the course of action that management companies will take when tenants misuse storage areas. Storage areas are almost exclusively on private land, so the council has limited powers to intervene. Well-worded, binding agreements will allow problems related to waste to be resolved quickly and successfully. Appendix B includes sample terms that management companies may wish to incorporate in tenancy agreements and further general guidance on points to consider when deciding the course of action to take where tenants fail to comply.

5.6.9.6. Developers have a key role in allowing management companies and tenants to meet their responsibilities under regulations 9 and 10 of the Management of Houses in Multiple Occupation (England) Regulations respectively by ensuring that adequate facilities and access to services are provided.

5.7. Care homes and sheltered accommodation

5.7.1. The waste arrangements for premises that fall under these categories do not fit neatly into the arrangements set out above in this section 5. The Controlled Waste (England and Wales) Regulations 2012 define which waste producers generate household, commercial and industrial waste and whether charges can be made for waste collection. Based on terms used in these regulations, residential homes are classified as household waste producers but the council can charge for collection and disposal of the waste and nursing homes fall into the same category. While sheltered accommodation is not specifically listed in the regulations, it is treated as household waste where no charge is made for collection or disposal.

5.7.2. Section 106 contributions would not be sought for any residential homes or nursing homes, as these premises would have to pay for their waste collection service (either to the council or a private sector waste collection operator) so the cost of container provision would be included in the charge they would pay for their collections. For sheltered accommodation, section 106 contributions would be sought as the waste would be collected as part of the domestic collection service.

5.7.3. Care homes and nursing homes

5.7.3.1. The information in Table 3 regarding waste capacity for apartments is not likely to be directly applicable to care homes due to the number of units on a site. As an alternative to the capacity allowed in Table 3, ADEPT recommends that a minimum of 180 litres of capacity is allowed per unit

with 2 bedrooms or fewer. This capacity should include provision for recycling and not just residual waste.

5.7.3.2. However, it is likely that these premises will generate clinical and offensive waste (also referred to as hygiene waste or sanitary waste). Any capacity calculation should consider the extent of offensive waste generation (e.g. incontinence pads) and allow sufficient capacity in a bin store. Where the amount of offensive waste exceeds a standard container over a week, a separate offensive waste bin would be required (i.e. general waste should not be disposed of in the same bin). Clinical waste would require separate containment as well and room should be allocated in storage areas for containment.

5.7.3.3. Access requirements and design requirements (e.g. lighting, drainage and ventilation) for bin stores should be provided in accordance with sections 4 and 5.6 above.

5.7.4. **Sheltered accommodation**

5.7.4.1. Sheltered accommodation provided as individual houses or bungalows should be treated like any other domestic household, albeit caretakers may have to undertake the transfer of bins between the storage point and collection point where residents are unable to do so.

5.7.4.2. Where sheltered accommodation is provided as flats or any other arrangement where bins are stored communally, the provisions of section 5.6 regarding waste storage for flats will apply.

5.8. **Collections while developments are under construction**

5.8.1. A number of problems for waste collection can occur while properties are occupied before construction is completed. These include restricted vehicle access due to parked construction traffic, restricted vehicle access due to cordoned off areas of the site and unsuitable collection points where hard standings, pavements etc have not been made to the final, adoptable standard. Other factors that affect access include scaffolding protruding into the road and problems are also experienced where waste operatives cannot access containers on foot due to obstructions.

5.8.2. The council's duty to safeguard the health and safety of members of staff and/or contractors engaged in service delivery means that we will usually require residents or the construction contractor to carry residents' containers to a suitable point on the development where access is clear. The results of the council's risk assessments at each site will determine the suitable interim collection point(s).

5.8.3. This point should be considered by developers and their construction partners because the sequence in which properties are constructed and then released

for the market will have an impact on waste collection if these areas have restricted access while other parts of the development are being built. The scenario outlined in 5.8.2 is inconvenient, and potentially dangerous, for residents but it can be avoided if the release of properties onto the market is organised with residents' access to services in mind. Where problems persist and waste accumulates, the visual impact may affect prospective buyers for plots that are for sale.

5.8.4. The interim arrangements referenced in 5.8.2 may be required over a lengthy period of time, depending on the size of the development. For larger sites, construction continues beyond the point that residents are likely to move in, which poses risks to the safety of collection crews and residents while interim collection arrangements are in place. Exposure to these risks can be over prolonged periods. Developers should therefore seek to manage the risk by carefully considering the sequence of construction and release for sales.

5.8.5. During the period where interim arrangements referenced in 5.8.2 are in effect, developers and their construction partners should liaise with residents over moving their containers to a suitable point. Wiltshire Council will not be responsible for moving containers over distances greater than those stated in 5.2.4 above.

5.8.6. While roads are under construction, and for a considerable period thereafter, they are likely to be unadopted but Wiltshire Council does not collect waste from unadopted roads save for in exceptional circumstances. Section 5.9 details how collections work where unadopted roads are concerned.

5.8.7. The council is developing a protocol for new developments to set out further practical advice on how to manage service delivery from the period prior to occupation, through to the point of occupation and continuing until all building works are completed. The protocol will be appended to a future version of this document as Appendix D.

5.9. **Unadopted roads**

5.9.1. As referenced in 5.8.5, Wiltshire Council will not collect from unadopted roads, save for the exceptional circumstances outlined in 5.9.3.

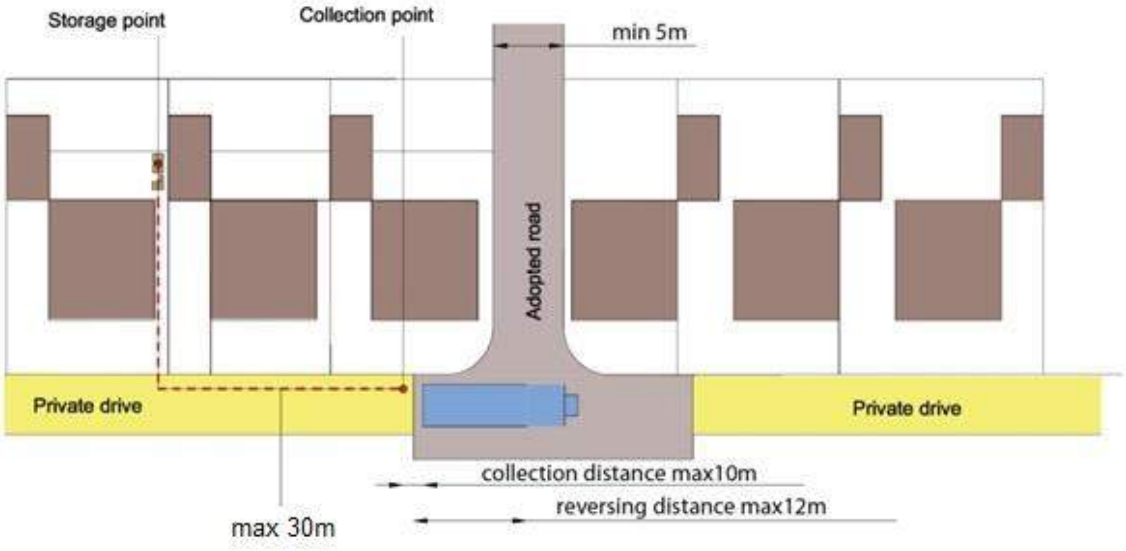
5.9.2. Collection crews encounter unadopted roads either on newly constructed developments before adoption has taken place or where roads or access routes are never formally adopted.

5.9.3. The council will only collect from unadopted roads where the council and its contractors are indemnified against damage to property and where the council assesses that operations can be safely carried out (examples of safety

considerations include whether the surface is suitable for RCVs to manoeuvre safely and/or for manual handling). A sample indemnity is included in Appendix C.

5.9.4. Unless an indemnity is signed by the landowner at new developments, collections would have to be made from a point where the unadopted road meets the public highway. For most new developments, the adoption process will not be concluded until long after (in terms of the number of scheduled waste collections) residents have moved in, so a signed indemnity should be provided for each new development to enable collections to occur from within the development prior to adoption. Figure 11 provides an example of the collection arrangements where an indemnity is not in place for using the private roadways (or where the private drives do not include suitable turning room for the RCV). Clearly, if there were additional properties accessed via the private drivers, the carry distances for residents would be excessive.

Figure 11: collection arrangements at private roads (not to scale)



5.9.5. To facilitate an easy process of continuing the indemnity, any private roads will need to be managed and maintained through a "properly-constituted body with defined legal responsibilities" as set out in paragraph 11.6.2 of 'Manual for Streets'. This measure should avoid protracted investigations to establish the identity of the landowner(s) who would be authorised to sign an indemnity.

5.9.6. A signed indemnity does not guarantee that collections will take place from within the development. Operational problems, as discussed in 5.7, may prevent the council from making collections within the development.

6. Waste storage and collection for commercial developments

6.1. The collection service for commercial properties

6.1.1. Waste generated from commercial premises is less easy to quantify when compared to waste from domestic households. Different businesses generate different types and volumes of waste dependent on the activities and ethos of each one. These differences may require different collection frequencies depending on the nature of the waste.

6.1.2. A further complication is that each business on a single development could have its own waste management contractor, so there could be a range of vehicles wanting to access waste containers at different times of the week. Commercial waste collection service providers are increasingly offering recycling collections in response to the duty placed upon businesses to apply the waste hierarchy to the waste they produce under regulation 12 of the Waste (England and Wales) Regulations 2011 (as amended). In practice, businesses often comply with the regulations by sorting their waste for recycling collections. This may require additional provision of storage space for bins.

6.1.3. All waste from commercial premises must be stored in containers off the public highway. The information in Table 4 and Table 5 below should allow developers to design adequate storage space for waste containment. Table 4 shows the litres of waste capacity required by commercial premises by type, as suggested by ADEPT or by the examples set out in BS 5906:2005. Table 5 shows indicative dimensions for the size of bins that commercial premises may use.

Table 4

Development type	**Litres of waste per 1000m^2 gross floor space[25]**	**Litres of waste per 1000m^2 of *sales* floor space**
Offices*	2,600	
Shopping centre	10,000	
Large supermarket		15,000
Small supermarket		10,000
Department store		10,000
Retail (except where otherwise listed in this table)*	5,000	
Restaurants and fast-food outlets*	10,000	
Hotels*	7,500	
Entertainment complex	5,000	

[25] Except where marked with an asterisk, storage is based on weekly waste arisings. For development types marked with an asterisk, the source doesn't stipulate a collection frequency on which these capacity limits are based, perhaps on the basis that commercial collection frequencies can be tailored to meet the needs of the customer (at the customer's cost). However, assuming weekly collections would seem to be a reasonable approach.

Leisure centre	5,000	
Industrial unit	5,000	

Table 5

Container size (litres)	**Dimensions** (height x width x depth in mm)
180	1100 x 580 x 755
240	1100 x 590 x 800
660	1330 x 1375 x 785
1100	1470 x 1375 x 1120

6.1.4. Where waste storage is shared between premises and where there are both producers of commercial waste and industrial waste on site, separate storage and/or containment for the commercial and industrial elements should be maintained so that waste types are not mixed.

6.2. Collection points

6.2.1. The majority of waste collection contractors will operate in the same way as Wiltshire Council. The Council will collect waste containers from waste storage points provided that there is suitable vehicle access. Collection points must be on hard standings and gradients must not exceed 1:12.

6.2.2. At commercial developments, developers should ensure that waste collection points are free from obstructions that would prevent waste collection from successfully taking place, such as (but not exclusively) bollards, hedges, shrubs and cars parked in allocated parking spaces. Allocated parking spaces should therefore not interfere with waste collection points. The information in paragraph 4.6 should be taken into account when deciding upon the location of parking spaces.

6.2.3. Where it is likely that future occupiers will use four-wheeled bins, dropped kerbs should be installed where relevant to eliminate the need to bump bins down kerbs, which is an unacceptable practice in terms of safeguarding the health and safety of waste collection operatives.

6.3. Routes to collection points from external storage

6.3.1. Where external storage space is not also the collection point, occupiers are responsible for moving containers from storage to the collection point.

6.3.2. Owners or proprietors at commercial premises have a duty to safeguard the health and safety of their employees, so there are limits on the distances that they can carry/wheel waste containers. The guidance relating to carry distances for crews in 5.2.4 (10m) should be applied to commercial premises. Routes from storage points to the collection point should comply with the information in 5.3.1 and not exceed 30 metres for two-wheeled bins therefore. Distances should be considerably less where four-wheeled bins are in use.

6.4. **External storage of waste**

6.4.1. The information in Table 4 and Table 5 should allow developers to account for suitable storage space at each site, where the collection point is not also the storage point. In addition, a clear turning circle of 1.5m diameter should be provided for the purpose of manoeuvring containers in any storage space but 1m may be acceptable where necessary.

6.4.2. Commercial external storage points should be constructed in the same way as residential storage (section 5.4.2), so they must be on hard standings and they should be away from windows and ventilators, preferably under shade where possible. All storage areas must be accessible to disabled people and, in particular, wheelchair users. Level storage space is desirable to ensure that containers do not roll of their own accord when full of waste, particularly where larger four-wheeled bins are in use. Where a gradient is unavoidable, it should not exceed 1:12. The specification for storage and collection points in section 5.6.6 applies to commercial developments where a storage point is also a designated collection point (i.e. where it complies with the carry distances stated in 5.2.4).

6.5. **Internal storage of waste**

6.5.1. Internal waste storage facilities will vary for each development depending on the size of the premises and the activities which take place on site. When considering the amount of room required, developers should include room for recycling containers as well as residual waste containers.

6.6. **Collections while developments are under construction**

6.6.1. The information in section 5.7 applies to commercial developments, where relevant.

7. Waste storage and collection for mixed-use developments

7.1. In mixed-use developments, waste for residential premises and commercial premises should be stored separately. This measure will protect the facilities available to council tax payers, but it will also ensure that businesses which pay for waste collection have dedicated facilities for their exclusive use. Given the potential for regular collections from commercial premises (e.g. restaurants), due consideration of the location of storage and collection points should be given, to avoid nuisance to occupiers of residential dwellings.

7.2. The guidance in sections 5 and 6 applies to mixed-use developments, provided that developers adhere to the principle in 7.1.

7.3. **Collections while developments are under construction**

7.3.1. The information in section 5.7 applies to mixed-use developments.

8. Planning applications

8.1. In order to verify whether a proposed development has suitable access, storage space and collection points, the council requires plans to highlight certain information through the application of its adopted 'Validation Checklist'. By providing this information, developers will assist us in pro-actively making decisions about waste matters quickly, rather than having to engage in lengthy dialogue on details that could be provided at the front end of the process.

8.2. The items that would enable a full assessment of the feasibility of a development, if shown on site layout plans, waste management plans or other relevant application documents, are set out in Table 6.

Table 6

All developments
Vehicle tracking to show that access and turning room for a RCV is acceptable, with reversing minimised
Individual residential properties and flats grouped in blocks of five or fewer
Indication of the external waste storage area per property
Identification of the collection point per property
Identification of the route from the storage area to the collection point, including the distance and the width (minimum 1m) of all such routes (may be tabulated separately for ease of reference)
Residential flats which are grouped in blocks of 6 or more
Plan of the container storage area with containers drawn in situ (all to scale), to show that sufficient room has been allowed (including sufficient space to manoeuvre each container individually without the need to move other containers to facilitate such a manoeuvre) and a statement of the distance from the bin store to the kerbside
List of the flats that are allocated to use each bin store
Identification of the collection point (if the container store is not also the collection point)
Identification of the route between the storage area and collection point, and an indication of the distance between these points (only applicable where the container store is not also the collection point) and the width of the route (minimum 2m)
Indication of lighting, drainage and ventilation provisions (where required) on plans for container storage areas and a list/plan to show materials used to construct the storage area, to demonstrate compliance with paragraph 5.6.6
Commercial developments
Indication of the waste storage area per premises, based on the information supplied in Table 4 and Table 5 above
Identification of the collection point per property
Identification of the route between the storage area and the collection point, and an indication of the distance between these points and the width of the route (minimum 1m for

2-wheel containers and 2m for 4-wheel containers)
Mixed-use developments
All of the information required for the sections above on residential and commercial developments; identification of items for residential and commercial developments should be differentiated by colour coding

8.3. Where there is a significant gap between the granting of planning permission and construction of the development, the developer should contact the waste collection department to ensure that the information about the collection system provided during the application process is still applicable. Further information about communication is detailed in section 9. The intention is to ensure that the council has sufficient time to consider how it will deliver any new collection system at the development. This will fall outside of the planning process, so does not seek to revisit planning permissions, but will enable the council to prepare for operational delivery and agree, for example, how bin stores would be utilised.

8.4. The council will monitor how far applications meet the requirements set out in this document in the coming months. If the level of information submitted in applications does not enable quick decision making about the suitability of the development for waste services, changes to the validation checklist may be made to ensure that the required information is submitted at the first opportunity.

9. Communication with the waste management services department

9.1. A major barrier to the successful delivery of services to new residents, and the associated effect on recycling performance, concerns how the council's waste service receives information about when residents move into their properties.

9.2. In many cases, the first contact the council receives from a new resident is to request delivery of containers and to establish why their waste has not been collected. This situation is clearly unsatisfactory for the resident but it also puts the council at a disadvantage because properties have to be quickly added to rounds, which can introduce imbalances and inefficiencies. Bins also have to be delivered at short notice which may interrupt planned delivery schedules. The council's experience suggests that residents will often contact the sales office to attempt to resolve such problems. Measures to avoid these outcomes would benefit all parties therefore.

9.3. To avoid these outcomes, and to help alleviate the problems identified in 5.7, 6.6 and 7.3, developers and their construction partners should contact the waste management services team as early as possible in the construction phase to outline when they anticipate that residents will move in. Contact details per area are listed in section 11. Developers should provide the council with contact details for a senior site representative.

9.4. Continued contact during construction is advisable to ensure that any movements in projected dates are communicated to the waste service. This will also allow the

council to identify the location of suitable interim collection points, as referenced in 5.8.2, to developers and their construction partners so that all parties have the relevant information about service delivery.

10. Section 106 agreements, including contributions

10.1. Core Policy 3 of the Wiltshire Core Strategy (Adopted January 2015) provides overarching policy support for securing developer contributions towards 'waste management services such as recycling and collection facilities', which is classed as 'essential infrastructure'. In the event of competing demands for infrastructure provision, essential infrastructure will be afforded the highest priority. The Wiltshire Planning Obligations Supplementary Planning Document (SPD) (Adopted May 2015) supports Core Policy 3 and provides further detail on the council's approach to developer contributions. The Planning Obligations SPD lists 'waste and recycling containers' as an example of site-specific infrastructure that would be sought through section 106 contributions (where the criterion in section 10.2 applies) rather than through the Community Infrastructure Levy (CIL). Policy WCS6 of the Wiltshire and Swindon Waste Core Strategy requires developers "to design and provide facilities for occupiers of the development to recycle/compost waste […] and/or facilities within individual groups of properties or premises for the source separation and storage of different types of waste for recycling and/or composting". Wiltshire Council retains control of procuring containers that are issued to occupiers of residential properties. The reasons for this are to ensure that the containers are compatible with lifting equipment and that branding – which is essential for ensuring that residents know what materials are designated for each container – meets the required standard. As a developer cannot directly provide the facilities for the separation and storage of waste, instead the requirement under WCS6 is met by securing a section 106 contribution.

10.2. The council will seek section 106 contributions for residential developments with 11 units or more[26] and these contributions shall be calculated in accordance with paragraph 10.4.

10.3. For major residential developments, where the number of properties can be demonstrated to require the use of a whole additional RCV in order to make all of the required collections, the council will seek contributions towards the cost of providing the vehicle because it will be specifically required for the type and scale of development. Current performance suggests that a whole additional vehicle would be required where approximately 2,000 residential units are included in a single application.

10.4. **Waste and recycling provision costs**

Containers

[26] To comply with the national guidance (Paragraph: 012 Reference ID: 23b-012-20150326) on the 2014 Written Ministerial Statement on small-scale developers.

Table 7 sets out the contribution required per container. Table 8 below uses the costs in Table 7 to calculate the contributions required either for each individual household or for each bin store. The required containers for each scenario are stated in Table 1 and Table 3 above. Please note that the amounts shown in Table 8 only apply where the threshold in section 10.2 is met. For example, if an application was only for construction of 7 flats that shared a single bin store, the council would not seek a contribution towards the provision of containers as fewer than 11 units are proposed. However, if an application was for construction of 7 flats that shared a single bin store and 5 individual houses, then a contribution would be requested – as 12 units are proposed – and calculated in accordance with the categories in Table 8 ((5 x £91) + £581 = £1,036).

Table 7

Containment	**Cost***
180 litre wheeled bin 17p per litre	£30
240 litre wheeled bin 19p per litre	£45
660 litre wheeled bin 22p per litre	£145
1100 litre wheeled bin 26p per litre	£286
55 litre black box 15p per litre	£8

Table 8

Scenario	**Cost per scenario***
Households	£91
Flats 1-5	£91 per apartment
Flats 6 - 10	£ 581 per store
Flats 11 - 14	£1,038 per store
Flats 15 - 18	£1,474 per store
Flats 19+	Calculation will be based on the agreed number of containers, as per the final row in Table 3.

*The prices in Table 7 and Table 8 were set [or reviewed] in 2015. These prices will be increased from 1 April each year in accordance with RPI.

Vehicles

Only where section 10.3 applies, an indicative contribution of £165,000 will be sought for the provision of an additional RCV. This indicative figure is correct in 2015 and will be increased from 1 April each year in accordance with RPI.

Example:

A development of 130 houses and a block of 12 flats with a single bin store is being built. The contribution is worked out as follows (at the current rates stated in Table 7 and Table 8):

- multiply the number of individual houses (130) by the “cost per scenario” for households (£91) = £11,830.
- add the “cost per scenario” for the number of flats in the development. In this case there are 12 flats so the scenario for “Flats 11 – 14” is used - £1,038.
- total section 106 contribution for waste and recycling services is £11,830 + £1,038 = **£12,868**.

Notes

Please note that:

- if the development includes flats which have gardens, then allowances will have to be made to store garden waste bins for the flats in the bin store
- these costs are subject to change depending on what services are in place at the time the development is completed, as noted in section 2.9.

10.5. Section 106 agreements

The council intends to develop template wording for s106 agreements in respect of waste contributions, which will be included in Appendix E once finalised. The council requests that contributions are paid prior to commencement of development (per phase, where applicable).

11. Contacts

[Insert from previous version and revise as necessary]

Bibliography

This bibliography highlights specific external sources referenced within the document above only. The list of sources that informs the contents of this guidance document would be much greater and would take account of Wiltshire Council policies, plans and procedures, waste industry guidance (e.g. from WRAP), legislation and government guidance.

Community Infrastructure Levy: Viability Study, BNP Paribas, 2012

Making Space for Waste: Designing Waste Management in New Developments – A Practical Guide for Developers and Local Authorities, ADEPT, 2010

Manual for Streets, Department for Transport, 2007

Safe waste and recycling collection services, Health and Safety Executive, 2014

Secured by Design: New Homes 2014, Secured by Design, 2014

The Building Regulations 2000 Approved Document: Drainage and Waste Disposal (Part H) (as amended), Office of the Deputy Prime Minister, 2002

Waste Management in Buildings – Code of Practice (BS 5906:2005), BSI, 2005

Waste and Recycling Vehicles in Street Collection, Health and Safety Executive, 2014

Appendices

Appendix A Collection vehicle dimensions

The dimensions included in Table 9 below are based on the vehicles used by Wiltshire Council. Sufficient room should be allowed to enable these vehicles to move around the development. Dimensions are included for a standard RCV and for 'kerbsiders' used for dry recycling collections (all dimensions are in millimetres).

The council uses vehicles of the size set out in Table 9 in order to deliver sustainable services. While smaller vehicles are available, these are broadly at capacity due to the rural nature of Wiltshire and the layout of historic town/city centres. Small vehicles are inefficient due to the smaller payloads and need for regular refuelling, so their use is limited to areas where there is no other solution.

Table 9 - vehicle dimensions (mm)

Vehicle type	RCV (for wheeled bin collections)			Kerbsider (for kerbside box collections)		
	Body	Ancillary equipment	Total	Body	Ancillary equipment	Total
Length	10840	460	11300			8800
Width	2600	300	2900	2600	300	2900
Height (travelling)			3580			3550
Height (operating)			5638			5638
Vertical clearance required when travelling (i.e. when collections are not actively taking place)			4500			4500
Turning circle between kerbs	18500					
Turning circle between walls	20300					

Further points to consider regarding vehicle access include:

- Fully laden collection vehicles weigh approximately 26 tonnes. Service manholes and road surfaces should be constructed with this in mind.
- Overhead service cables, pipes, archways and other potential obstacles must be located at a level that will not prevent the vehicle from operating or travelling safely.
- To allow Waste Management Services to verify the suitability of a proposal in terms of collection vehicle access, accurate technical drawings with swept-path analysis detailing the proposed route of collection vehicles around the development should be included in plans submitted to the council.
- It should be noted that all residual waste and some recycling containers are picked up from the rear of the waste collection vehicles, while some other recycling containers are picked up from the nearside of recycling vehicles. Sufficient room should be allowed at the side of kerbsiders to allow loaders to stand and fill the loading trough. This should also be reflected in the proposed routes of the collection vehicles.
- Collection vehicles should not reverse into the development from a major road, or reverse onto a major road when exiting the development
- Parking on site (including visitors' parking) should be managed to avoid on-street parking that might prevent the collection vehicle accessing collection points.

Appendix B Example tenancy agreement terms

Management arrangements for waste collection – draft terms and guidance

Background

1. Wiltshire Council is the waste collection authority in this area and it is responsible for collecting waste from domestic properties.

2. The council has powers under section 46 of the Environmental Protection Act 1990 to specify the containers that should be used for waste collection and the substances or articles that may be put into those designated containers. In effect, this means that the council designs the collection system that is delivered. In applying this power, the council will only collect waste where it is presented in the correct containers (i.e. only paper is presented in the paper bin, and so on) and where no additional waste is left outside of containers.

3. The council also has powers to state where containers will be collected from and these collection points may be subject to change.

4. The council decides the frequency of collection per container, which may be subject to change at the council's discretion.

5. In relation to paragraph 2 above, the council has the power to take enforcement action where waste is not presented in accordance with the council's instructions. Further, where applicable, the council has the power to take enforcement action where it deems that non-compliance with council instructions constitutes a littering offence under section 87 of the Environmental Protection Act 1990.

6. In relation to paragraphs 2 to 4 above, the council has powers to charge for waste that is in excess of the capacity of containers and waste that has been placed in the wrong bin (e.g. where residual waste is put into a recycling bin).

7. Part 1 of the Housing Act 2004 sets out the council's powers and duties to tackle poor housing conditions.

8. The Housing Health and Safety Rating System (HHSRS) sets out how the powers referenced in paragraph 7 are used by local authorities to assess housing conditions. The HHSRS makes clear what landlords and tenants are required to do in respect of waste management.

9. The Management of Houses in Multiple Occupation (England) Regulations impose a duty on building managers to provide facilities for waste disposal in regulation 9 and a duty on tenants (or any other occupier) to store waste in accordance with any arrangements made by the manager of the building (regulation 10). Compliance with these duties is dependent upon compliance with the council's policies and instructions, as any arrangements put in place by managers must be compatible with the council's collection system.

The council's commitment

10. The council will ensure that an appropriate number of containers for waste and recycling are provided for each site.

11. The council will provide access to information for tenants explaining how the service operates and what the bins should be used for. If a tenant is unsure about which materials to place in their bins, the council has information on its website, www.wiltshire.gov.uk, and it can give advice by email through wasteandrecycling@wiltshire.gov.uk or by phone on 0300 456 0102.

12. The council will work with residents' associations and management companies to provide advice and guidance, attending meetings as required.

Tenants' responsibilities

13. Tenants agree to follow instructions from the council about the types of materials that can be deposited in each container, including any changes to the service that the council might make at any stage

14. Tenants agree to follow instructions from [insert name of management company], provided that these instructions do not contradict any instructions issued by the council.

15. Tenants will only deposit waste in the nominated waste storage area where communal facilities are provided

16. Tenants will only use containers for disposing of/recycling the materials that the council allows to be deposited in each container (i.e. only paper is presented in the paper bin, and so on)

17. Tenants will not deposit waste outside of designated containers and will not overfill any container

18. Tenants will not deposit any bulky items or non-household waste in designated containers or the waste storage area.

Failure to comply with responsibilities

[Management companies should insert appropriate terms and conditions here, taking account of the following paragraphs.

It is up to each management company to decide upon a means of redressing non-compliance with council waste policies. Terms in tenancy agreements should consider that where the council is unable to collect waste due to non-compliance, it will be the management company's responsibility to remove the waste. There is likely to be a cost to the management company for arranging to remove this waste, either directly by paying for someone to remove the waste or indirectly via additional unscheduled work for a company's maintenance operatives.

The terms and conditions should therefore consider how tenants will be affected in the event that the council cannot empty a bin(s) due to non-compliance with policies and the following situations arise:

- A contaminated bin has to be emptied at the management company's cost

- An overfilled bin has to be emptied at the management company's cost
- Excess waste has to be cleared from the floor of a bin store at the management company's cost. If the bins could not be emptied because of excess waste preventing the crew from manoeuvring the bins, the council will not attempt to return to collect until the next scheduled collection day, so the management company may also have to pay to have the bins emptied in the meantime . The council can offer a charged for service on request.
- Waste that is deposited outside of the nominated storage area has to be cleared at the management company's cost. For information, where the waste is litter, the waste collection service does not have the facility to remove it, so an alternative waste carrier would be required to carry out remedial work.

The council is aware of management companies which have recharged these costs to tenants (spread across the total number of tenants). It is often difficult to identify an individual resident who causes the problems, but it would be advisable to include a condition which outlines the consequences for a tenant who can be identified as the person who failed to comply with council policy and/or tenancy-agreement terms.

Where persistent issues with non-compliance are encountered, the council can investigate enforcement action referenced in the 'Background' section above. However, investigations can only take place on private land (i.e. where most bin stores are located) where the landowner gives written permission. Where such permission is not given, the council will not be able to investigate.]

Further reading:

The following sources may be useful to understand the rights and responsibilities of various parties:

- Housing Health and Safety Rating System: Guidance for Landlords and Property Related Professionals (available here on the government's website)
- Housing Health and Safety Rating System: Operating Guidance (available here on the government's website)

Appendix C Sample indemnity letter

Waste Collection
[Depot]
[Street]
[Town]
Wiltshire
[Post code]

Tel: 0300 456 0102

Dear Sirs,

Waste and Recycling Collections

Wiltshire Council, Hills Waste Solutions Ltd and FCC Environment provide waste and recycling collections in Wiltshire.

[Name of Developer] is the owner of the land [description of land] (**the Development**)

In order to access the properties forming part of the Development to collect residents' waste and recycling container(s) it will be necessary for the staff and vehicles of both Wiltshire Council and its contractors to operate within the Development. Therefore, an indemnity is required from [Name of Developer] as landowner with responsibility for the maintenance and upkeep of the Development. If [Name of Developer] is willing to provide such an indemnity, please complete the section below and return this letter to Wiltshire Council.

[Name of Developer] incorporated and registered in England and Wales with company number [Number] whose registered office is at [Address] HEREBY gives permission to Wiltshire Council and its contractors, including all parties' staff and vehicles, to operate within the Development to access the properties within the Development to collect residents' waste and recycling container(s). [Name of Developer] is the landowner of the Development and is responsible for the maintenance and upkeep of the Development.

[Name of Developer] HEREBY agrees to indemnify Wiltshire Council against all costs, claims, damages or expenses incurred by Wiltshire Council arising from Wiltshire Council or its contractors operating within the Development to collect residents' waste and recycling container(s). This indemnity shall not cover Wiltshire Council to the extent that a claim under it results from Wiltshire Council or its contractors' negligence.

Signed by [Name of Director]

for and on behalf of [Name of Developer]:……
Director

Completed letters should be returned to:

FAO: [Waste Technical Officer]

[Depot address]

Please note that completion of this form does not guarantee that a kerbside collection of waste and recycling will be possible from the properties forming part of the Development. A physical assessment of the access, in terms of suitability, road width and available turning space will need to be undertaken before collections can be made.

Yours faithfully

Waste Management Services
Tel: 0300 456 0102
Web: www.wiltshire.gov.uk

Appendix D New development protocol

Wiltshire Council

Waste and Recycling Services

Protocol for New Housing Developments

Purpose

The purpose of this protocol is to assist developers and council officers when introducing waste and recycling collections to new build developments.

Background

The Wiltshire Council housing strategy identifies a need for 2,500 new homes to be built each year. Wiltshire Council has a statutory duty to collect waste and recycling from residents but this duty is limited to collection points nearest to the publicly adopted highway. However, whilst roads within new housing developments will be unadopted, many can be accessed safely in order to undertake collections. Resident expectations are that the council will provide a waste collection service from within the development as soon as they move in.

Current Position and Issues

Currently, the council receives notification that new waste collection services are required from developers, builders, landlords and residents, or a combination of these. These enquiries can also be received through different channels, for example through the council tax team, customer services, on-site development sales offices and direct contact with officers based in operational depots. The reactive and dispersed nature of these individual notifications can cause difficulties for the waste collection teams as they may be unable to respond to these adhoc requests for service within reasonable timeframes. In addition, notifications are often received when a resident makes contract with the council following a service failure as the new collection location had not been formally notified to crews. We therefore wish to deal with collections from new housing developments proactively, and arrange for residents to receive a seamless collection service from the point they move in to their new property.

The waste service has produced a planning guidance document which has been adopted as a supplementary planning document (SPD). This document provides guidance for developers and sets out the Section 106 (s106) contributions required to financially support infrastructure delivery (i.e. provision of wheeled bins) and agreements. The SPD also stipulates the council's requirements relating to as the design and layout of new housing developments. This will be helpful in ensuring that developers adopt the best possible design practice when proposing new housing, and properly consider and provide access for waste collection vehicles and sufficient space for waste and recycling containers. The SPD does not address issues relating to individual site risk assessments and procedures for starting up a new collection service at the appropriate time.

It is expected that s106 agreements shall secure regular contact from developers about when development commences, and when properties are certified as complete by building control officers. However, experience shows that even where s106 agreements include clauses and conditions that require developers to notify the council of commencement of development, the council does not receive notification in every case. Clearly this situation needs to improve in order that the council can properly plan and resource collections for new developments at the appropriate time.

Currently, residents often move into new properties and then individually request a collection service, often at the same time as registering with the council to pay Council Tax. This approach allows little time for the waste service to plan to provide new collections. As this can happen whilst the site is still being developed, with housing construction ongoing, this can present potential safety and access problems that can impact on waste and recycling collections.

When the council operates collection vehicles on private land or an unadopted highway, the landowner may seek to hold the council liable for any damage to property. Until formally adopted by the local authority, these sites remain the property and responsibility of the developer and/or the residents. Some sites will never be publically adopted, and in such cases the council has no statutory duty to collect from these locations.

The condition of site roads can also present a safety hazard for both operatives and collection vehicles, e.g. uneven surfaces, high kerbs and raised ironworks. Collection vehicle access is also often compromised by the presence of building materials, protruding scaffolding and construction vehicles moving around the site. A further consideration is that, as the development continues, the type and locations of hazards may change on a frequent basis.

Processes for managing service requests for housing developments

1. Developers should send notifications of their intention to commence development to the council using this email address: wasteandrecycling@wiltshire.gov.uk, detailing the location, name and number of properties expected to be built.

2. On receipt of the request the council will refer this to the relevant Waste Technical Officer (WTO) who will establish if any further information is required from the developer and compare any information provided with council records to verify that collections have not already commenced elsewhere on the development site.

3. The WTO will contact the developer to arrange a site visit to meet a representative responsible for managing the site. At the site visit the parties should discuss completion dates, collection options and, where possible, agree the arrangements for service delivery once the site is occupied, including any interim arrangements during the construction phase. The council will undertake a risk assessment and will advise the developer's representative of its findings so that the parties can explore and agree any mitigations hat may be required in order to allow safe collections. The developer's representative should provide the council with:
    - Completion schedule
    - Site plan with plot numbers

- Corresponding postal address list for plot numbers

4. Following the site visit, where it is noted that roads are unadopted, the developer will be required to sign an indemnity form; the WTO will send this to the developer for completion. The council will only collect from unadopted roads where the council and its contractors have been indemnified against damage to property, and where the council has assessed that collection operations can be safely carried out (examples of safety considerations include whether the surface is suitable for RCVs to manoeuvre safely and/or for manual handling).

5. Subsequent to the site meeting, the council will allocate a collection day and round for the new addresses and update its systems accordingly.

6. When bins are required, the council will make a further site visit to ensure that there are and secure places to deliver bins and that collection can take place safely in line with what was agreed between the parties at the initial site meeting. The WTO shall complete a site assessment form (to include risk assessment; any agreed collection arrangements; photographs and this should be saved centrally with all other relevant documents for this site.

7. The developer's representative must contact the council at least 20 working days prior to the bins being required by residents to enable the bins to be ordered and delivered to site.

8. Where roads are unadopted, and indemnity has not been received prior to agreement to commence service delivery, the WTO must contact the developer and once again seek an indemnity. Collections from within the site may not commence until this indemnity has been received.

9. The council will issue a letter to confirm collection dates, provide guidance on recycling and specific collection point information. Copies of the letter will be sent to:
    - the developer, so they can include this in the resident's welcome pack when the residents moves in;
    - the resident, should they already occupy the property.

10. The council will arrange the delivery dates for the containers and will inform the developer of these dates prior to deliveries taking place.

11. The council will deliver bins on scheduled date provided that sufficient notification was provided in accordance with paragraph 7**Error! Reference source not found.**.

12. Where temporary collection points have been put in place this should be reviewed at each new phase of the development or on request from developer. This review will be undertaken by the council's waste team or contractor.

13. As stated in the indemnity, the council must be informed of any transfer of ownership of the land.

Appendix E Template wording for section 106 agreements

Definition

The table below gives examples of how we might define the term Waste and recycling contribution based upon how much information is known about an application.

Definition name	**Definition**	**When used**
Waste and recycling contribution	The sum of £[x] for the provision of waste and recycling containers for use on the Development	Where a value is known based on final designs (e.g. where a FULL application has been approved) or where the WTO has confirmed the amount in scope in the planning application consultation response
	The sum of £91 per Residential Unit for the provision of waste and recycling containers for use on the Development	Where the final designs are not confirmed but it is known that there will be no flats (e.g. based on OUT permission).
	The sum calculated using the following formula - ninety one pounds (£91) per Residential Unit (where the Residential Units comprise houses or flats grouped in blocks of five or fewer) five hundred and eighty one pounds (£581) per block of flats where bin storage is shared by between 6 and 10 flats one thousand and thirty eight pounds (£1,038) per block of flats where bin storage is shared between 11 and 14 flats and one thousand four hundred and seventy four pounds (£1,474) per block of flats where bin storage is shared between 15 and 18 flats towards the cost of providing the Residential Units with adequate waste and recycling bins	Where final designs are not confirmed and flats are in scope, but full extent is not known (e.g. based on OUT permission)

Schedule [usually referenced in the definition or waste and recycling contribution or in a general definition of contributions]

The Owners covenant with the Council that it shall:

1. Pay to the Council the Waste and Recycling Contribution prior to Commencement of Development

2. Not to Commence Development without paying to the Council the Waste and Recycling Contribution and payment acknowledged in writing by the Council

3. Prior to Commencement of Development to provide details of their designated contact for liaison regarding the waste and recycling and to provide update of their designated contact following any change of personnel

The Owner hereby undertakes and agrees with the Council that the Indemnity provisions in paragraphs 15 - 15.2 of this Deed shall be applicable to any claim or claims made against the Council and such claim arising in connection with or incidental to or in consequence of the Council carrying out its duties of waste and recycling during the course of the Development on the Land and the Owner will hold the Council fully indemnified from and against each and every said claim

The Owner shall not be liable under this clause to indemnify the Council in respect of any claim only insofar as and to the extent that the said claim is found to have resulted from the negligent act or omission of the Council or its servants or agents save that for the purpose of this clause the Owner or persons acting on behalf of the Owner shall not be regarded as servants or agents of the Council

Appendix B: Education & Skills S106 methodology and caveats

DEVELOPERS CONTRIBUTIONS – Education Infrastructure

Education – Schools and Early Years Places

Policy Approved 2014, Revision 2017

1. Summary

This document sets out Wiltshire Council's policy for requesting infrastructure contributions where the need for extra school and early years (nursery) places arises directly from housing developments. It is consistent with the guidance contained in paragraph 204 of the National Planning Policy Guidance (NPPF) 2012 as given statutory force more recently under Regulation122 of the CIL Regulations 2010 i.e. that it is, in summary: necessary, directly related, fairly and reasonably related in scale and kind to the development. This policy also accords with the NPPF by seeking to promote sustainable and viable communities, encouraging local schools thereby reducing the need to travel by car and encourage where possible walking to school by ensuring local services are able to develop. Specifically, paragraph 72 of the NPPF attaches great importance to ensuring that a sufficient choice of school places is available to meet the needs of existing and new communities. Wiltshire Council will take a proactive, positive and collaborative approach to meeting this requirement, and widen choice in education. Great weight will be placed on the need to create, expand or alter schools.

Wiltshire Council aims to provide a good match between pupils and places with an infrastructure of high quality school buildings and facilities where all schools are of sufficient size and standard to deliver the curriculum cost effectively. Wiltshire Council has a "local children going to local schools" policy, which is desirable both in environmental and school travel plan terms, and because local schools make a valuable contribution to the broader sustainable communities agenda. It is also the general and reasonable expectation of parents moving to a new housing development that their children will be able to attend their local school or early years provider. Hence, the Council aims to facilitate this by focusing upon local schools, and in particular, their ability to accommodate the additional children generated by housing development in their locality.

The *School Places Strategy 2015-2020* states that Wiltshire Council will consider new (4 -11) schools for primary phase pupils, new (11 - 16) or (11 - 18) schools for secondary phase pupils and all through (4 -16) schools where appropriate. For primary schools there is a strong preference for schools which take in between one (210 places) and three forms of entry (630 places). There is also a strong preference for early year's provision to be provided as part of a new primary school.

Under the Childcare Act 2006 the Council must provide free early years funding for all 3 and 4 year olds up to 15 hours each week. From 2017 this increases to 30 hours each week and therefore demand for early year's places is expected to increase and additional places will be required.

In general terms, proposals for the development of 600 dwellings or more are likely to require both a new early years facility and a new primary school (preferably integrated) to serve the children generated by that development unless there is considerable surplus capacity in schools within reasonable walking distance of the development. Due to their relatively wide recruitment areas, a new secondary school is only likely to be required to serve a major urban expansion scheme.

2. Assessing the Need for School and Early Years Places

Wiltshire Council has a comprehensive and well-established system for forecasting the future pupil populations of primary and secondary schools in the County. Information is gathered on: children registered with GPs in the County; admission trends (taking into account parental preferences for schools and demographic changes in population) and planned housing developments.

Wiltshire Council publishes a *School Places Strategy* which is reviewed and updated regularly. The next review is planned for later in 2017. This document outlines the strategy for the planning and provision of school places and priority areas of demand for new provision. Education officers also work closely with planning officers and developers to ensure that the most up to date information is obtained prior to consideration of a planning application.

The 2006 Childcare Act (section 11) states that Local Authorities have a statutory obligation to ensure that they have a strategy in place for the provision of childcare sufficient to meet the needs of parents who require childcare. If capacity is exceeded then the Council in its role of market facilitator and commissioner will require resources to stimulate the market and provide additional capacity. When a new school is required, the Council's strong preference is for integrated nursery provision on the new school site. Where this is not possible alternative nursery provision will need to be provided.

A developer contribution will be sought where it can be demonstrated that there is a need to expand education provision for early years, primary and/or secondary schools in the locality of the proposed housing development. Generally, the schools examined will be those serving the designated or catchment area in which the housing development is to be located. For primary need we will consider capacity at all schools within a 2 mile safe walking distance and for secondary within a 3 mile safe walking distance from the development.

It is accepted that it may not be reasonable to seek contributions for a single small development and generally contributions will only be sought in respect of developments of 10 or more dwellings. However where a number of smaller developments are located in rural designated areas and the cumulative impact of these developments may be significant on school place availability in the area, a lower threshold may be considered. Similarly, where there is immense pressure on the availability of school places in a particular area, the Council reserves the right to assess all applications coming forward that generate the need for an additional place or more, and to aggregate these contributions.

It is possible that a housing development may give rise to the need for a new school, either because the number of houses involved is so large (including when all developments in the area are considered) or because existing schools have already reached the limits of their potential to

expand. In these circumstances the Council would seek an appropriate sized site to locate a new school and appropriate financial contributions towards the cost of a new school and early year's facility.

3. Calculating the Demand for Places

The Council has tracked the actual number of children arriving in Early Years settings and Wiltshire schools from a variety of different sized housing developments over 12 years and recently commissioned an update survey to review the number of children arising from new developments in Wiltshire. From this it has calculated pupil product figures which it uses as the basis for estimating the number of nursery, primary and secondary aged children likely to come from future housing developments. These figures are:

- 0.04 per dwelling for Early Years 0-2 year olds (4 per 100 dwellings)
- 0.09 per dwelling for Early Years 3-4 year olds (9 per 100 dwellings)

- 0.31 per dwelling for Primary aged pupils (31 per 100 dwellings) and
- 0.22 per dwelling for Secondary aged pupils (22 per 100 dwellings).

These "pupil products" apply to all sizes/types of dwelling including affordable housing with the exception of 1 bed properties.

When a request for information about the estimated level of Section 106 Education contributions to be sought is made, the developer or landowner will be asked to specify the number of dwellings broken down by type, and specifying where possible, the number of one bed sized units within each category. If the enquiry is preliminary to making or considering an actual planning submission, then an *indicative assessment* for guidance only, will be provided.

Formal assessment will take place as part of the consultation process on a submitted planning application. Assessments will be based upon the most current data available on pupil numbers and forecasts, schools' capacities and details of other known housing applied for/approved within the relevant community area/s. It should be noted that as the situation in schools does not remain static, a time lapse between assessments of a proposal may well result in different outcomes. Any changes to the site location, housing number or mix specified in an application will necessitate a new assessment, as they are material to the basis of the assessment and effectively present a new proposal.

In order to make an assessment of the impact of the new housing upon the existing education infrastructure in the locality, the Council's officers will first deduct any one bed sized units from the accommodation schedule and then apply a standard discount of 30% to the remaining (if any) affordable housing. This discount reflects evidence that families in affordable housing move within the immediate area and so their children will not need to change schools, and is most pertinent at secondary level where designated areas can be wide ranging.
Using the pupil products described at above, the likely number of pupils arising from the development will be calculated and if appropriate, rounded up or down to give a whole number. It

will then be assessed as to whether they can be accommodated within the existing capacity of the school(s) firstly in the designated area and then if appropriate, the appropriate wider area such as across a town, and within the relevant statutory safe walking distances for the age range/s; taking into account other known granted or registered developments in the locality.

The estimated pupil product calculated for a new housing development, plus the forecast numbers on roll at the appropriate school(s) are compared to the relevant school capacities to identify the extent of any deficit that will need to be addressed.

The determination of whether or not there is sufficient early years provision in the area of the development will be done with reference to the current "*Wiltshire Childcare Sufficiency Report*" and an assessment of the impact of the development on existing capacity.

Upon consideration of all the relevant data (as described above), where the proposed housing development would lead to a school and/or early years pupil population forecast in excess of current capacity, or where a school is already full, a contribution will be sought in respect of land and/or finance to enable the Council to meet the shortfall in places. Where insufficient places are available at a local area school to accommodate the full pupil product of a development, then those still available will be "allocated" to individual developments and priority established by the date of registration of the relevant planning application/s and where relevant the date of actual planning approvals. Informal enquiries and requests for preliminary assessments where no application has yet been submitted will not be eligible to benefit from such an allocation.

Please note, when an application has been refused, it remains 'live' and included in any assessments until the 6 months appeal period has elapsed, if no appeal is brought forward or an appeal is not upheld, the applications will be removed from future assessments.

4. Assessing Developer Financial Contributions for School and Early Years Places

The Council will consider the most appropriate mechanism for securing developer contributions on individual applications. It is likely, that where a proposed development will require an additional primary or secondary school or a significant number of additional school and/or early years places, then the contribution will be secured via a S106 agreement, unless identified on the 'Regulation 123 List'. The explanatory notes which accompany the list specifically state that the Council may continue to seek planning obligations through S106 agreements for specific infrastructure projects or types of infrastructure included within the list but only where the requirement is created by five or fewer developments.

Any such site-specific infrastructure requirements will be subject to the three statutory tests set out under Regulation 122 of the Community Infrastructure Levy (CIL) Regulations 2010 (as amended).

5. Financial Contributions

This section defines the school place cost multiplier figure required by Wiltshire Council.

The cost per pupil place calculation for both primary and secondary school places is reviewed and updated annually by an independent firm of quantity surveyors and the new calculation comes into effect on the 1 April each year. The early years calculation is a percentage of the primary cost per place.

- The Primary Cost per Place figure for 2017/18 is £17,545
- The Secondary Cost per Place figure for 2017/18 is £23,316
- The Early Years Cost per Place figure for 2017/18 is £17,019

The index chosen on the basis of objectivity and reliability is the BCIS public sector national cost standards for State Schools.

6. Primary School Place Capital Cost Multiplier

Primary schools are most efficiently organised in classes of 30 pupils (there is a statutory maximum of 30 pupils for pupils aged 4-7 ref *Infant Class Size legislation*). Taking the 30 pupils across the seven years of primary school, this means that primary schools built in Wiltshire are built in blocks of 210 places. This is often known as a 'form of entry' (FE). In terms of viability and financial sustainability the ideal size of primary school is 2FE (420 places). Where a decision is taken to provide a new 1FE school, it is usually on the basis that this will later be expanded to a 2FE (420 places) school, subject to demand, or even 3FE (630 places). Very occasionally half 'form of entry' expansions are considered above 1FE.

Practically, large developments are generally built in phases, starting with 1FE and expanding later to 2FE and beyond. Therefore, for the purposes of the primary cost multiplier in this document it is based on delivering 1FE (210) place schools as these are most likely to be built in the first phase. However, for simplicity the same cost multiplier will be used for all phases of work.

7. Secondary School Place Capital Cost Multiplier

In light of the demography in Wiltshire, the need for new secondary school provision will be limited to areas where there is substantial new housing development proposed and a new school will be viable, size wise. In most towns across Wiltshire additional secondary places will be delivered through the expansion of existing secondary schools and academies.

Financial contributions for expanding secondary schools will be sought via S106 and pooled where appropriate or CIL if area identified on the published CIL 123 List.

The secondary cost per place multiplier is based on the average delivery cost of a number of secondary expansion projects completed in Wiltshire or in the geographical vicinity.

8. Early Years Provision Place Cost Multiplier

The Early Years Provision place cost multiplier is based on a figure of 97% of the primary place cost multiplier.

Early years provision (3 – 4 Years) is most efficiently organised in groups of 13 children or 8 children dependent on the level of the qualifications of staff who are working directly with the

children. This information can be found in the Statutory Framework for the Early Years Foundation Stage. For two year olds regardless of staff qualifications the ratio is 1 adult to every four children. Taking the groups across the age ranges and 40% provision for 0 - 2 year olds, this means that Early Years provision built in Wiltshire is generally in blocks of 40 places.

9. Assessing Developer's Other Contributions

Land if required for a new school / early years provision, or an extension to an existing one should be provided free of charge by the developer to the Council. The size of the site area required should be agreed with the Council (for a primary school the normal minimum 1.8Ha, however if a nursery facility is also to be included on the school site, then 2.0Ha will be required); as should the location, shape and orientation of the land before a master plan is produced for the proposed development.

Where a development is not large enough to require a new school, but is of sufficient size to trigger the need for one because existing schools and/or early years providers cannot satisfactorily accommodate all the pupils from the development, then a site of sufficient size to accommodate up to a 2FE primary school (minimum 1.8Ha or 2.0Ha if nursery to be included) plus a financial contribution towards the construction costs will be required in proportion to the estimated pupils generated. The Council will use its best endeavours to draw together contributions from two or more developments, where appropriate (subject to CIL restrictions), to commission a new school with a strong preference for integrated nursery and primary education.

However developers will be required, as an absolute minimum, to provide the new school site at no cost to the Council. If a site is allocated on the basis that the school will need to be expanded further at some point in the future, then a larger site may be requested. In the event that the extra site is not used within an agreed period of time (usually 10 years) the 'extra' land may be returned to the developer by agreement.

Where a proposed development is located adjacent to an existing school site, then the developer will be expected to acquire and provide any adjacent land required to expand the school, free of charge to the Council and pay the relevant financial contribution towards the construction costs proportionate to the estimated pupils generated.

10. School Sites

The actual site required for a new school will depend on several factors, including location, access, shape, topography and the relationship with adjacent community and other land uses. The minimum useable areas should be as follows:

<u>Primary</u>

1 Form entry primary school (210 places): 1.2 hectares (rural locations only)
2 Form entry primary school (420 places): 1.8 hectares
3 Form entry primary school (630 places): 2.6 hectares

<u>Nursery</u> (as part of school site)

If a Nursery is to be provided as part of the school then an additional 0.2 hectares is required.

Secondary

The areas required for new secondary schools will depend on the size of school proposed but the minimum useable areas should be as follows:

5 Form entry secondary school (750 places):	5.8 hectares
6 Form entry secondary school (900 places):	6.8 hectares
7 Form entry secondary school (1,050 places):	7.7 hectares
8 Form entry secondary school (1,200 places):	8.7 hectares
9 Form entry secondary school (1,350 places):	9.6 hectares

These should be seen as the minimum site area required for a (11-16) school of the size as laid out above. Post 16 facilities will need further assessment if required. Sites should not be seen to be delivering any public open space or community requirements for the developer or the Local Planning Authority.

Where a large development is shared between several developers, it may be appropriate to make provision in the Section 106 agreements so that the burden falls on all those involved. If this is the case, it will be necessary to discuss the exact mechanism that is applicable.

11. Information Available

Figures used to demonstrate pupil population and school capacity shortfalls and any cost estimates will be made available to applicants on request. These will be indicative and the value of the cost multiplier will be accurate at the time of responding to an enquiry. The Council will require that the cost multiplier figures on which the final contribution will be calculated are those applicable on the date of signature of a legal agreement, with appropriate indexation. If an application goes to appeal and a significant time period has elapsed since the original assessment of the application was made, the latest school population forecasts will be used to determine whether there should be any modification to the earlier indicative contribution to allow for changes in the number or mix of dwellings, or to the pupil numbers in the local schools.Once the level of contribution has been determined, and that it will be included within a legal agreement such as a S106, and thereafter that sum of money will be indexed from the date of signature using the BCIS index indicated.

Standard terms will apply to these legal agreements:

- Where the development is for less than 100 units of housing, contribution payment will be required in full, prior to/upon commencement of, development on site.

- Where the development is for more than 100 units, in order to assist the developer with cash flow issues, whilst still allowing the Council sufficient time and funding for implementation of larger school capital schemes (100-400 dwellings), two or occasionally on very large developments (401+ dwellings), three phased payments will be considered. However, the first tranche of payment will always be payable upon or prior to commencement of development. The remaining phased payments will be linked to

occupation of a certain number of dwellings throughout the progress of the development.

- Normal trigger points for two phased payments will be 50% at commencement of development and 50% on occupation of the dwelling representing 50% of the way through the development.

- For applications qualifying for three payment instalments, 30% will be required on or prior to commencement of development, with the remaining 70% required as 35% each at further trigger points agreed, usually at occupation of 200th dwelling and at 400th dwelling dependent on size of development.

- Individual arrangements will apply to situations where a new school is required or being provided/constructed by a developer.

- Where phased payments apply, any sums not payable either prior to or at commencement of development, will require Bonding.

- The Council will require 10 years from date of receipt of the (final) tranche of payment in which to utilise the contribution provided, either by expenditure, or commitment to a developed/planned scheme or project (this will allow the Council to collect contributions from other developments in the locality in order to accumulate sufficient budget to fund an expansion or new school project where necessary).

- Where the housing number/mix of a development has not been finalised prior to the need to complete a legal agreement, then a Council determined formulae can be included within the agreement to allow for a detailed calculation (and/or re-calculation) to be made when this situation has been resolved. However payment triggers will remain as above.

- Where a school site is required to be provided the site will need to be transferred to the Council (fully serviced to the boundary) as soon as possible after commencement ofdevelopment ideally within 6 months and no later than 12 months after commencement of development, to enable the Council to commission the new school.

12. Meeting Additional Demand

Wiltshire Council will identify and decide how best to meet the increased demand for Education provision. The Council will need to take into account both educational and financial considerations when deciding whether it is necessary to build a new school or extend an existing school.

The Council works closely with schools and will need to consult with head teachers, school governing bodies, academy trusts, diocesan education boards, parents and the local community about a new residential development and the impact it is likely to have on existing school provision in the locality. During these consultations the Council will take into account:

- the size of existing schools;
- whether the schools are capable of expansion (in terms of site areas and site constraints) and how easily the existing buildings lend themselves to extension, and

- Whether it is desirable, on education grounds, to extend them.

The Council will also consider the geography of the area, the accessibility of safe walking or travel routes between any existing schools and a new development, and the impact that increased pupil numbers are likely to have on road traffic in the surrounding area.

13. Review

This cost per place multipliers within this policy will be reviewed and updated annually where appropriate.

Contact Details

Clare Medland
Head of School Place Commissioning
Wiltshire Council

STANDARD CAVEATS TO CONSULTATION RESPONSES ON PRE - APP ENQUIRIES

- As this is a preliminary enquiry only, we can only supply an indicative assessment and response at this stage, as it is our policy to make a formal assessment/response as part of the consultation process on a registered planning application.

- The date of registration of a planning application establishes its priority or otherwise for any spare places available at EY settings/school/schools, which are allocated on a "first come, first served" basis.

- Our assessment is specific to the site location, housing number and mix available, and any changes to these will necessitate a new assessment.

- Assessments use the pupil data, forecasts, capacities and details of other known housing in a designated/local area as at the time they are made, so a time lapse between an initial enquiry and a planning submission, can lead to a different response at the later time.

- We must stress that particularly in towns where there is substantial new development planned, pressure on EY and school places will only increase, and the position is expected to change rapidly going forward. As a result, many future applications will be required to make S106 contributions.

- Where contributions are being sought towards school and EY expansion projects/new schools/EY settings, please to refer to Highways colleagues, as they will need to identify any highway, cycleway and footpath works that will be required as a result of the school expansion/new school and request the relevant funds as part of their S106 requirements.

- Capital cost multipliers for EY and school places quoted are subject to review and update on an annual basis for each financial year, and as per the standard S106 Methodology, those in force at the time of completion of an S106, will apply to it. Figures quoted are therefore, valid only for S106s completed by the end of the relevant financial year.

From: Minting, Lucy <lucy.minting@wiltshire.gov.uk>
Sent: Wednesday, May 3, 2023 3:08 PM
To: Caroline Murray
Cc: Guest, Andrew <Andrew.Guest@wiltshire.gov.uk>
Subject: Re: Bartlett House, Ludgershall (ENQ/2022/00130)

Dear Caroline,

Please accept my apologies for the considerable delay in response to your query.

We have been discussing within the authority how to deal with 'challenges' to the SFRA and the LLFA have advised us that this will need to be sent to the Environment Agency as a flood map challenge to the SFRA, and until the EA accept that the site is at low risk of flooding from all sources then we would continue to consider the site to be at high risk of flooding from groundwater and thereby triggering the need for a sequential test.

I am sorry that you have been waiting patiently for this response and that I am unable to agree that the site is at low risk of flooding without the above process being followed.

Kind regards
Lucy Minting

Lucy Minting
Senior Planning Officer (South hub)
Development Management
Wiltshire Council
Tel: 01722 434 377 or 0300 456 0114 (planning admin)
Email: lucy.minting@wiltshire.gov.uk
Web: www.wiltshire.gov.uk
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Please note the above is an opinion of an officer of this Council and is without prejudice to any formal decision taken in respect of development of the above site.

From: Caroline Murray
Sent: 09 February 2023 13:38
To: Guest, Andrew <Andrew.Guest@wiltshire.gov.uk>; Minting, Lucy <lucy.minting@wiltshire.gov.uk>
Cc
Subject: Bartlett House, Ludgershall (ENQ/2022/00130)

Dear Lucy/ Andrew,

We have been appointed by Wiltshire Council to undertake the Flood Risk and Drainage Assessment/ Design for the above site. Following some initial pre-application advice that was provided in June last year, we have been reviewing the site and the sequential test requirements outlined within this response. Our understanding is that the primary focus for triggering the need for the sequential test was the inclusion of the site within the

SFRA groundwater flood risk mapping under the category of '*groundwater levels are between 0.025m and 0.5m below the ground surface*'.

Please find attached a detailed Groundwater Flood Risk Technical Report which looks in more detail at the site specific groundwater flood risk. We have examined over 50 years of borehole data within 500m of the site and compared this with various other groundwater and hydrogeology data sources. Our assessment shows that the site and its surrounds have been mis-classified in the SFRA mapping and should be reclassified as within the green zone '***groundwater levels are at least 5m below the ground surface***' which is the 2nd lowest risk category. We therefore believe that the sequential test is not applicable at this site in that it is already at a low risk of flooding from all sources.

We would welcome your review and comment on the attached assessment. Please do feel free to contact me directly if you wish to discuss or if you require any further information.

I look forward to hearing from you

Best Regards

Caroline

Caroline Murray MEng CEng MICE
CEO/ Project Director
Working days: Mon to Thurs (9 to 2pm)
Calm ENGINEERING

Email:
Tel:
Website: **www.calmengineering.co.uk**

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Hi Caroline,

Yes this is what was discussed. I would advise to liaise with planning as they are best placed to advice on sequential and exception testing and groundwater monitoring.

Best wishes,

Stella Davies
Principal Drainage Engineer (Flood Risk)
Weather and Drainage/ Highways Asset Management and Commissioning
Wiltshire Council

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Web: www. .gov.uk
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From: Caroline Murray
Sent: 01 February 2023 17:15
To: Davies, Stella
Cc: Marton, Simon
Subject: Bartlett House, Ludgershal

Stella,

Thank you for meeting with me last week to discuss the above site. Please find below a link to the interim Ground Water Assessment Report which I mentioned.
Bartlett House Ludgershall Groundwater Flood Risk Technical Note 1.0.docx
This outlines the locality of existing borehole data and provides the evidence needed to put the site at low risk. We will be submitting this to the planning team in due course to challenge the sequential test requirement for the site. You confirmed that this would be a decision to be made by the planners, although they may consult you.

We also discussed the requirements for groundwater monitoring at the site in terms of our drainage strategy submission. I explained that we had two BHs at either end of the site at 6m and 4m depths which had so far been dry. We agreed that monitoring until the end of June as a minimum would be sufficient for development of the design and to satisfy the requirements of planning, given that we have a long historical record of nearby (within 500m) deeper BH data. We discussed the regularity of monitoring over this period and you suggested that logs should be taken following any significant rainfall over this period to confirm no water within the top 4 to 6m.

Please can you confirm, by return, that you are in agreement with the above summary of our meeting so we can progress on this basis?

Many Thanks

Caroline

Caroline Murray MEng CEng MICE
CEO/ Project Director
Working days: Mon to Thurs (9 to 2pm)
Calm ENGINEERING

Email:
Tel:
Website: **www.calmengineering.co.uk**

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Appendix B:
Maintenance Inspection Checklist

Appendix B: Maintenance inspection checklist

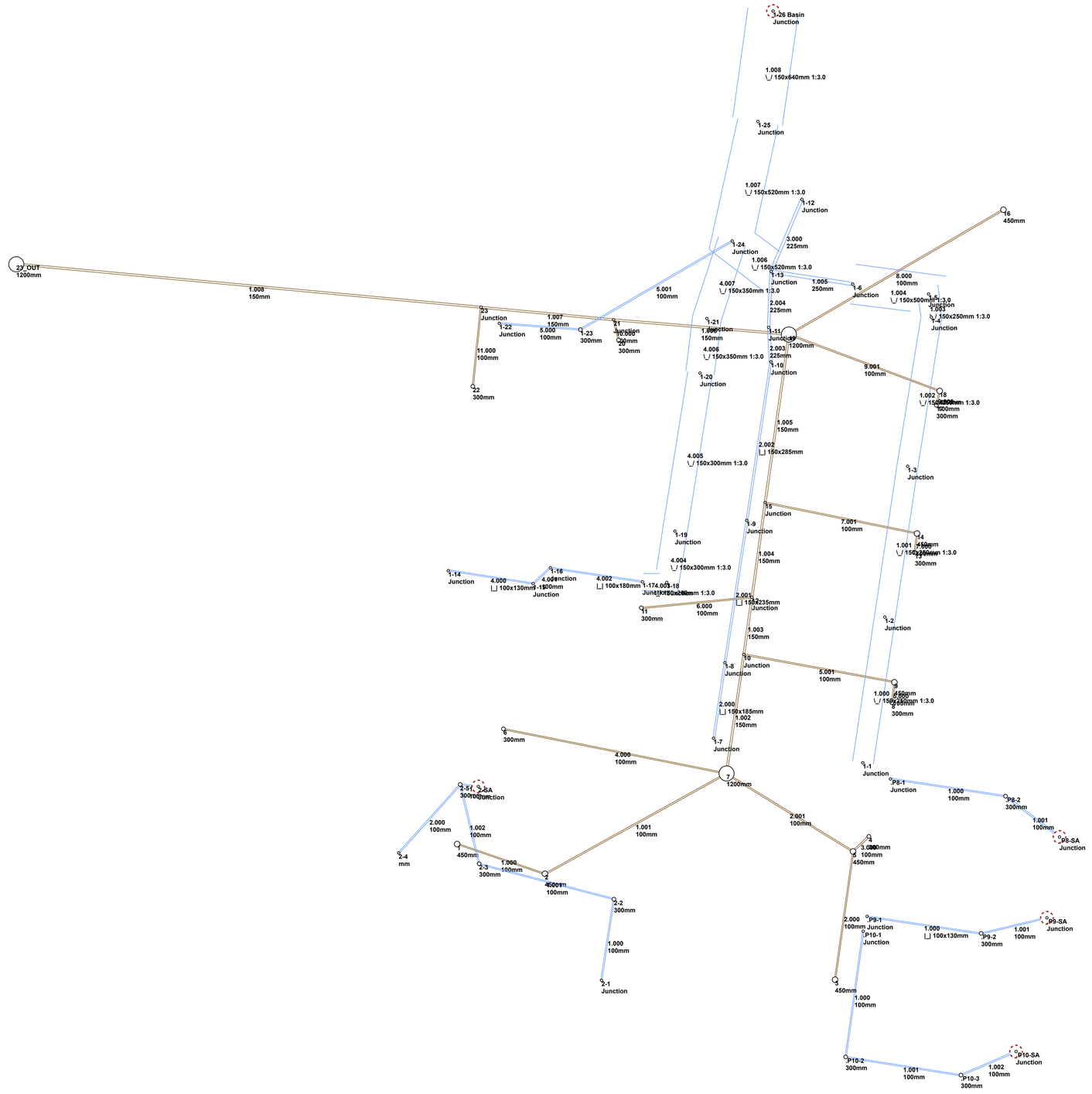
Table B.25 SuDS maintenance inspection checklist			
General information			
Site ID			
Site location and co-ordinates (GIS if appropriate)			
Elements forming the SuDS scheme		Approved drawing reference(s)	
Inspection frequency		Approved specification reference	
Type of development		Specific purpose of any parts of the scheme (eg biodiversity, wildlife and visual aspects)	

Inspection date								
	Details	**Y/N**	**Action required**	**Date completed**	**Details**	**Y/N**	**Action required**	**Date Completed**
General inspection items								
Is there any evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance?								
Is there any evidence of accidental spillages, oils, poor water quality, odours or nuisance insects?								
Have any health and safety risks been identified to either the public or maintenance operatives?								
Is there any deterioration in the surface of permeable or porous surfaces (eg rutting, spreading of blocks or signs of ponding water)?								

Silt/sediment accumulation								
Is there any sediment accumulation at inlets (or other defined accumulation zones such as the surface of filter drains or infiltration basins and within proprietary devices)? If yes, state depth (mm) and extent. Is removal required? If yes, state waste disposal requirements and confirm that all waste management requirements have been complied with (consult environmental regulator)								
Is surface clogging visible (potentially problematic where water has to soak into the underlying construction or ground (eg underdrained swale or infiltration basin)?								
Does permeable or porous surfacing require sweeping to remove silt?								
System blockages and litter build-up								
Is there evidence of litter accumulation in the system? If yes, is this a blockage risk?								
Is there any evidence of any other clogging or blockage of outlets or drainage paths?								
Vegetation								
Is the vegetation condition satisfactory (density, weed growth, coverage etc)? (Check against approved planting regime.)								
Does any part of the system require weeding, pruning or mowing? (Check against maintenance frequency stated in approved design.)								
Is there any evidence of invasive species becoming established? If yes, state action required								
Infrastructure								
Are any check dams or weirs in good condition?								
Is there evidence of any accidental damage to the system (eg wheel ruts?)								

Is there any evidence of cross connections or other unauthorised inflows?								
Is there any evidence of tampering with the flow controls?								
Are there any other matters that could affect the performance of the system in relation to the design objectives for hydraulic, water quality, biodiversity and visual aspects? (Specify.)								
Other observations								
Information appended (eg photos)								
Suitability of current maintenance regime								
Continue as current Increase maintenance Decrease maintenance								
Next inspection								
Proposed date for next inspection								

Appendix C:
Drainage Calculations



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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Inverts
Additional Flow (%)	45	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	0.300
Time of Entry (mins)	1.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1-1	0.006	1.00	133.095		426856.358	150908.514	0.170
1-2	0.011	1.00	133.039		426858.108	150920.092	0.192
1-3	0.011	1.00	132.999		426859.921	150932.083	0.219
1-4	0.006	1.00	133.043		426861.803	150943.932	0.329
1-5	0.006	1.00	133.196		426861.574	150945.775	0.493
1-6			133.330		426855.560	150946.547	0.662
1-7	0.025	1.00	133.052		426844.503	150910.456	0.194
1-8	0.004	1.00	133.018		426845.407	150916.469	0.244
1-9	0.007	1.00	132.955		426847.139	150927.781	0.294
1-10	0.007	1.00	132.894		426849.055	150940.384	0.304
1-11	0.009	1.00	133.050		426848.879	150943.122	0.474
1-12	0.013	1.00	132.929		426851.526	150953.294	0.229
1-13			133.197		426849.080	150947.564	0.691
1-14	0.007	1.00	132.901		426823.437	150923.780	0.131
1-15	0.001	1.00	132.900		426830.177	150922.750	0.160
1-16	0.004	1.00	132.901		426831.548	150924.017	0.181
1-17	0.003	1.00	132.923		426838.865	150922.892	0.233
1-18	0.000	1.00	132.985		426840.789	150922.845	0.309
1-19			132.980		426841.436	150926.925	0.318
1-20	0.003	1.00	133.021		426843.429	150939.485	0.403
1-21			133.029		426843.973	150943.824	0.650
1-22	0.006	1.00	133.050		426827.486	150943.441	0.350
1-23	0.003	1.00	133.059	300	426833.930	150942.941	0.430
1-24			133.060		426845.987	150949.981	0.702
1-25			133.060		426848.031	150959.486	0.751
1-26 Basin			133.127		426849.228	150968.260	0.861

Links (Results)

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	0.637	143.4	1.2	-0.080	-0.071	0.006	0.0	28	0.183
1.001	0.636	143.0	3.3	-0.058	-0.031	0.017	0.0	47	0.243
1.002	0.634	142.7	5.5	-0.031	0.079	0.028	0.0	60	0.277
1.003	0.658	148.1	6.7	0.079	0.243	0.034	0.0	65	0.300
1.004	1.003	827.1	7.9	-0.007	0.162	0.040	0.0	71	0.310
1.005	0.825	40.5	7.9	0.412	0.441	0.040	0.0	75	0.639
2.000	1.229	34.1	5.0	0.009	0.009	0.025	0.0	42	0.784
2.001	1.270	44.8	5.7	0.009	0.009	0.029	0.0	46	0.808
2.002	1.315	56.2	7.1	0.009	0.019	0.036	0.0	55	0.870
2.003	1.210	48.1	8.6	0.079	0.249	0.044	0.0	65	0.921

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Links (Results)

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
2.004	1.190	47.3	10.3	0.249	0.418	0.053	0.0	72	0.958
3.000	0.933	37.1	2.6	0.004	0.304	0.013	0.0	40	0.539
1.006	0.941	837.0	20.8	0.171	0.053	0.106	0.0	114	0.373
4.000	0.834	10.8	1.4	0.001	0.030	0.007	0.0	27	0.508
4.001	1.064	8.4	1.6	0.060	0.081	0.008	0.0	29	0.813
4.002	0.841	15.1	2.4	0.001	0.053	0.012	0.0	40	0.577
4.003	0.511	76.6	2.9	0.033	0.104	0.015	0.0	46	0.222
4.004	0.557	175.5	2.9	0.009	0.018	0.015	0.0	50	0.196
4.005	0.556	175.3	2.9	0.018	0.102	0.015	0.0	50	0.196
4.006	0.596	250.4	3.5	0.053	0.075	0.018	0.0	56	0.202
4.007	0.600	251.9	3.5	0.300	0.352	0.018	0.0	55	0.202
5.000	0.806	6.3	1.2	0.250	0.330	0.006	0.0	29	0.616
5.001	0.826	6.5	1.8	0.330	0.492	0.009	0.0	36	0.702
1.007	0.960	854.1	26.1	0.182	0.231	0.133	0.0	125	0.400
1.008	1.089	1442.9	26.1	0.111	0.221	0.133	0.0	125	0.398

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	11.710	180.1	250	Swale 150mm	133.095	132.925	-0.080	133.039	132.860	-0.071
1.001	12.127	181.0	250	Swale 150mm	133.039	132.847	-0.058	132.999	132.780	-0.031
1.002	11.998	181.8	250	Swale 150mm	132.999	132.780	-0.031	133.043	132.714	0.079
1.003	1.857	168.8	250	Swale 150mm	133.043	132.714	0.079	133.196	132.703	0.243
1.004	6.063	173.2	500	Swale 150mm	133.196	132.703	-0.007	133.330	132.668	0.162
1.005	6.559	40.5	250	Circular	133.330	132.668	0.412	133.197	132.506	0.441
2.000	6.081	178.9	185	Channel Drain	133.052	132.858	0.009	133.018	132.824	0.009
2.001	11.444	181.6	235	Channel Drain	133.018	132.774	0.009	132.955	132.711	0.009
2.002	12.748	179.6	285	Channel Drain	132.955	132.661	0.009	132.894	132.590	0.019
2.003	2.744	196.0	225	Circular	132.894	132.590	0.079	133.050	132.576	0.249
2.004	4.447	202.1	225	Circular	133.050	132.576	0.249	133.197	132.554	0.418
3.000	6.230	194.7	225	Circular	132.929	132.700	0.004	133.197	132.668	0.304
1.006	3.925	206.6	520	Swale 150mm	133.197	132.506	0.171	133.060	132.487	0.053
4.000	6.818	227.3	130	Channel Drain 100	132.901	132.770	0.001	132.900	132.740	0.030

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1-1		Junction		1-2		Junction	
1.001	1-2		Junction		1-3		Junction	
1.002	1-3		Junction		1-4		Junction	
1.003	1-4		Junction		1-5		Junction	
1.004	1-5		Junction		1-6		Junction	
1.005	1-6		Junction		1-13		Junction	
2.000	1-7		Junction		1-8		Junction	
2.001	1-8		Junction		1-9		Junction	
2.002	1-9		Junction		1-10		Junction	
2.003	1-10		Junction		1-11		Junction	
2.004	1-11		Junction		1-13		Junction	
3.000	1-12		Junction		1-13		Junction	
1.006	1-13		Junction		1-24		Junction	
4.000	1-14		Junction		1-15		Junction	

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
4.001	1.867	93.3	100	Circular	132.900	132.740	0.060	132.901	132.720	0.081
4.002	7.403	246.8	180	Channel Drain 100	132.901	132.720	0.001	132.923	132.690	0.053
4.003	1.925	213.8	200	Swale 150mm	132.923	132.690	0.033	132.985	132.681	0.104
4.004	4.131	295.1	300	Swale 150mm	132.985	132.676	0.009	132.980	132.662	0.018
4.005	12.717	295.8	300	Swale 150mm	132.980	132.662	0.018	133.021	132.619	0.102
4.006	4.373	312.3	350	Swale 150mm	133.021	132.618	0.053	133.029	132.604	0.075
4.007	6.478	308.5	350	Swale 150mm	133.029	132.379	0.300	133.060	132.358	0.352
5.000	6.463	91.0	100	Circular	133.050	132.700	0.250	133.059	132.629	0.330
5.001	13.962	86.7	100	Circular	133.059	132.629	0.330	133.060	132.468	0.492
1.007	9.722	198.4	520	Swale 150mm	133.060	132.358	0.182	133.060	132.309	0.231
1.008	8.855	201.3	640	Swale 150mm	133.060	132.309	0.111	133.127	132.265	0.221

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
4.001	1-15		Junction		1-16		Junction	
4.002	1-16		Junction		1-17		Junction	
4.003	1-17		Junction		1-18		Junction	
4.004	1-18		Junction		1-19		Junction	
4.005	1-19		Junction		1-20		Junction	
4.006	1-20		Junction		1-21		Junction	
4.007	1-21		Junction		1-24		Junction	
5.000	1-22		Junction		1-23	300	Manhole	Adoptable
5.001	1-23	300	Manhole	Adoptable	1-24		Junction	
1.007	1-24		Junction		1-25		Junction	
1.008	1-25		Junction		1-26 Basin		Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	Link Type
1-1	426856.358	150908.514	133.095	0.170		0	1.000	132.925	250	Swale 150mm
1-2	426858.108	150920.092	133.039	0.192		1	1.000	132.860	250	Swale 150mm
						0	1.001	132.847	250	Swale 150mm
1-3	426859.921	150932.083	132.999	0.219		1	1.001	132.780	250	Swale 150mm
						0	1.002	132.780	250	Swale 150mm
1-4	426861.803	150943.932	133.043	0.329		1	1.002	132.714	250	Swale 150mm
						0	1.003	132.714	250	Swale 150mm
1-5	426861.574	150945.775	133.196	0.493		1	1.003	132.703	250	Swale 150mm
						0	1.004	132.703	500	Swale 150mm

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	Link Type
1-6	426855.560	150946.547	133.330	0.662		1	1.004	132.668	500	Swale 150mm
						0	1.005	132.668	250	Circular
1-7	426844.503	150910.456	133.052	0.194		0	2.000	132.858	185	Channel Drain
1-8	426845.407	150916.469	133.018	0.244		1	2.000	132.824	185	Channel Drain
						0	2.001	132.774	235	Channel Drain
1-9	426847.139	150927.781	132.955	0.294		1	2.001	132.711	235	Channel Drain
						0	2.002	132.661	285	Channel Drain
1-10	426849.055	150940.384	132.894	0.304		1	2.002	132.590	285	Channel Drain
						0	2.003	132.590	225	Circular
1-11	426848.879	150943.122	133.050	0.474		1	2.003	132.576	225	Circular
						0	2.004	132.576	225	Circular
1-12	426851.526	150953.294	132.929	0.229		0	3.000	132.700	225	Circular
1-13	426849.080	150947.564	133.197	0.691		1	3.000	132.668	225	Circular
						2	2.004	132.554	225	Circular
						3	1.005	132.506	250	Circular
						0	1.006	132.506	520	Swale 150mm
1-14	426823.437	150923.780	132.901	0.131		0	4.000	132.770	130	Channel Drain 100
1-15	426830.177	150922.750	132.900	0.160		1	4.000	132.740	130	Channel Drain 100
						0	4.001	132.740	100	Circular
1-16	426831.548	150924.017	132.901	0.181		1	4.001	132.720	100	Circular
						0	4.002	132.720	180	Channel Drain 100
1-17	426838.865	150922.892	132.923	0.233		1	4.002	132.690	180	Channel Drain 100
						0	4.003	132.690	200	Swale 150mm
1-18	426840.789	150922.845	132.985	0.309		1	4.003	132.681	200	Swale 150mm
						0	4.004	132.676	300	Swale 150mm

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	Link Type
1-19	426841.436	150926.925	132.980	0.318		1	4.004	132.662	300	Swale 150mm
						0	4.005	132.662	300	Swale 150mm
1-20	426843.429	150939.485	133.021	0.403		1	4.005	132.619	300	Swale 150mm
						0	4.006	132.618	350	Swale 150mm
1-21	426843.973	150943.824	133.029	0.650		1	4.006	132.604	350	Swale 150mm
						0	4.007	132.379	350	Swale 150mm
1-22	426827.486	150943.441	133.050	0.350		0	5.000	132.700	100	Circular
1-23	426833.930	150942.941	133.059	0.430	300	1	5.000	132.629	100	Circular
						0	5.001	132.629	100	Circular
1-24	426845.987	150949.981	133.060	0.702		1	5.001	132.468	100	Circular
						2	4.007	132.358	350	Swale 150mm
						3	1.006	132.487	520	Swale 150mm
						0	1.007	132.358	520	Swale 150mm
1-25	426848.031	150959.486	133.060	0.751		1	1.007	132.309	520	Swale 150mm
						0	1.008	132.309	640	Swale 150mm
1-26 Basin	426849.228	150968.260	133.127	0.861		1	1.008	132.265	640	Swale 150mm

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0
Summer CV	0.750	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	0.840	Drain Down Time (mins)	240	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
10	45	10	0
30	45	10	0
100	45	10	0

Safety factor based on minor inconvenience (parking spaces) for area drained >1000m2

Node 1-26 Basin Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.32688	Safety Factor	5.0	Invert Level (m)	132.175
Side Inf Coefficient (m/hr)	0.32688	Porosity	1.00	Time to half empty (mins)	301

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Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	8.4	8.4	0.200	22.0	22.0	0.600	93.0	93.0	0.940	174.8	174.8

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Results for 10 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 96.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1-1	8	132.974	0.049	4.3	0.0000	0.0000	OK
15 minute summer	1-2	9	132.925	0.078	11.5	0.0000	0.0000	OK
15 minute summer	1-3	9	132.878	0.098	17.2	0.0000	0.0000	OK
15 minute summer	1-4	9	132.825	0.111	18.6	0.0000	0.0000	OK
15 minute summer	1-5	9	132.818	0.115	21.7	0.0000	0.0000	OK
15 minute summer	1-6	9	132.798	0.130	21.7	0.0000	0.0000	OK
15 minute summer	1-7	8	132.942	0.084	18.2	0.0000	0.0000	OK
15 minute summer	1-8	8	132.865	0.091	20.2	0.0000	0.0000	OK
360 minute winter	1-9	248	132.784	0.123	4.2	0.0000	0.0000	OK
240 minute winter	1-10	228	132.781	0.191	3.9	0.0000	0.0000	OK
240 minute winter	1-11	232	132.781	0.205	5.2	0.0000	0.0000	OK
240 minute winter	1-12	232	132.780	0.080	1.2	0.0000	0.0000	OK
240 minute winter	1-13	228	132.780	0.274	10.0	0.0000	0.0000	OK
15 minute summer	1-14	8	132.827	0.057	5.0	0.0000	0.0000	OK
15 minute summer	1-15	8	132.804	0.064	5.4	0.0000	0.0000	OK
15 minute summer	1-16	8	132.797	0.077	7.8	0.0000	0.0000	OK
360 minute winter	1-17	288	132.779	0.089	1.0	0.0000	0.0000	OK
360 minute winter	1-18	288	132.779	0.103	1.0	0.0000	0.0000	OK
240 minute winter	1-19	232	132.778	0.116	1.4	0.0000	0.0000	OK
240 minute winter	1-20	232	132.779	0.161	1.7	0.0000	0.0000	OK
240 minute winter	1-21	228	132.779	0.400	1.8	0.0000	0.0000	FLOOD RISK
240 minute winter	1-22	228	132.778	0.078	0.5	0.0000	0.0000	OK
240 minute winter	1-23	228	132.778	0.149	0.8	0.0106	0.0000	FLOOD RISK
240 minute winter	1-24	228	132.779	0.420	12.1	0.0000	0.0000	OK
240 minute winter	1-25	228	132.779	0.470	11.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	1-1	1.000	1-2	3.7	0.201	0.025	0.2144
15 minute summer	1-2	1.001	1-3	9.6	0.273	0.067	0.4456
15 minute summer	1-3	1.002	1-4	15.8	0.328	0.111	0.5816
15 minute summer	1-4	1.003	1-5	18.9	0.342	0.127	0.1025
15 minute summer	1-5	1.004	1-6	21.7	0.366	0.026	0.3849
15 minute summer	1-6	1.005	1-13	21.5	0.736	0.530	0.1928
15 minute summer	1-7	2.000	1-8	17.5	1.415	0.513	0.0751
15 minute summer	1-8	2.001	1-9	19.0	1.432	0.425	0.1529
360 minute winter	1-9	2.002	1-10	6.1	0.558	0.109	0.2961
240 minute winter	1-10	2.003	1-11	4.5	0.804	0.093	0.1013
240 minute winter	1-11	2.004	1-13	5.5	0.918	0.116	0.1729
240 minute winter	1-12	3.000	1-13	1.2	0.435	0.032	0.0985
240 minute winter	1-13	1.006	1-24	9.3	0.352	0.011	1.1032
15 minute summer	1-14	4.000	1-15	4.6	0.762	0.424	0.0411
15 minute summer	1-15	4.001	1-16	4.9	0.884	0.586	0.0110
15 minute summer	1-16	4.002	1-17	7.3	0.951	0.481	0.0566
360 minute winter	1-17	4.003	1-18	1.0	0.176	0.013	0.0776
360 minute winter	1-18	4.004	1-19	1.0	0.146	0.006	0.2173
240 minute winter	1-19	4.005	1-20	1.4	0.147	0.008	1.0070
240 minute winter	1-20	4.006	1-21	1.6	0.203	0.006	0.4776
240 minute winter	1-21	4.007	1-24	2.7	0.046	0.011	3.6678
240 minute winter	1-22	5.000	1-23	0.5	0.431	0.079	0.0466
240 minute winter	1-23	5.001	1-24	0.8	0.447	0.123	0.1092
240 minute winter	1-24	1.007	1-25	11.4	0.204	0.013	6.4485
240 minute winter	1-25	1.008	1-26 Basin	9.5	0.230	0.007	7.0807

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Results for 10 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 96.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	1-26 Basin	288	132.778	0.513	10.5	26.3305	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
360 minute winter	1-26 Basin	Infiltration		1.7			

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Results for 30 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 96.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1-1	8	132.982	0.057	5.8	0.0000	0.0000	OK
15 minute summer	1-2	9	132.936	0.089	15.6	0.0000	0.0000	OK
15 minute summer	1-3	9	132.892	0.112	23.4	0.0000	0.0000	OK
15 minute summer	1-4	9	132.844	0.130	25.1	0.0000	0.0000	OK
240 minute winter	1-5	232	132.842	0.139	4.5	0.0000	0.0000	OK
240 minute winter	1-6	232	132.841	0.173	4.5	0.0000	0.0000	OK
15 minute summer	1-7	8	132.963	0.105	24.3	0.0000	0.0000	OK
15 minute summer	1-8	8	132.888	0.114	26.9	0.0000	0.0000	OK
360 minute winter	1-9	328	132.848	0.187	5.9	0.0000	0.0000	OK
360 minute winter	1-10	328	132.850	0.260	8.0	0.0000	0.0000	FLOOD RISK
240 minute winter	1-11	224	132.845	0.269	12.1	0.0000	0.0000	FLOOD RISK
240 minute winter	1-12	228	132.842	0.142	1.5	0.0000	0.0000	OK
240 minute winter	1-13	228	132.843	0.337	17.8	0.0000	0.0000	OK
240 minute winter	1-14	192	132.845	0.075	1.2	0.0000	0.0000	OK
240 minute winter	1-15	192	132.846	0.106	2.1	0.0000	0.0000	FLOOD RISK
360 minute winter	1-16	304	132.846	0.126	1.2	0.0000	0.0000	OK
240 minute winter	1-17	192	132.860	0.170	8.9	0.0000	0.0000	OK
360 minute winter	1-18	352	132.853	0.177	5.7	0.0000	0.0000	OK
240 minute winter	1-19	224	132.840	0.178	2.7	0.0000	0.0000	OK
240 minute winter	1-20	232	132.841	0.223	3.4	0.0000	0.0000	OK
240 minute winter	1-21	228	132.841	0.462	4.0	0.0000	0.0000	FLOOD RISK
240 minute winter	1-22	228	132.841	0.141	0.7	0.0000	0.0000	FLOOD RISK
240 minute winter	1-23	228	132.841	0.212	1.0	0.0150	0.0000	FLOOD RISK
240 minute winter	1-24	232	132.841	0.483	19.0	0.0000	0.0000	OK
240 minute winter	1-25	228	132.841	0.532	18.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	1-1	1.000	1-2	5.0	0.214	0.035	0.2765
15 minute summer	1-2	1.001	1-3	12.9	0.295	0.090	0.5553
15 minute summer	1-3	1.002	1-4	21.4	0.352	0.150	0.7496
15 minute summer	1-4	1.003	1-5	25.2	0.358	0.170	0.1360
240 minute winter	1-5	1.004	1-6	4.5	0.258	0.005	0.5906
240 minute winter	1-6	1.005	1-13	4.5	0.319	0.111	0.2791
15 minute summer	1-7	2.000	1-8	23.4	1.515	0.685	0.0939
15 minute summer	1-8	2.001	1-9	25.4	1.532	0.567	0.1912
360 minute winter	1-9	2.002	1-10	7.4	0.570	0.132	0.4264
360 minute winter	1-10	2.003	1-11	11.3	0.743	0.235	0.1091
240 minute winter	1-11	2.004	1-13	12.5	0.945	0.263	0.1769
240 minute winter	1-12	3.000	1-13	1.5	0.454	0.040	0.1853
240 minute winter	1-13	1.006	1-24	17.8	0.352	0.021	1.6058
240 minute winter	1-14	4.000	1-15	1.0	0.478	0.088	0.0618
240 minute winter	1-15	4.001	1-16	-1.0	0.826	-0.121	0.0146
360 minute winter	1-16	4.002	1-17	1.1	0.412	0.074	0.1062
240 minute winter	1-17	4.003	1-18	-6.5	0.197	-0.085	0.1877
360 minute winter	1-18	4.004	1-19	1.6	0.150	0.009	0.4929
240 minute winter	1-19	4.005	1-20	3.1	0.151	0.018	1.9341
240 minute winter	1-20	4.006	1-21	-2.1	0.217	-0.009	0.8435
240 minute winter	1-21	4.007	1-24	3.8	0.048	0.015	4.8030
240 minute winter	1-22	5.000	1-23	0.7	0.443	0.111	0.0506
240 minute winter	1-23	5.001	1-24	0.9	0.422	0.139	0.1092
240 minute winter	1-24	1.007	1-25	18.5	0.219	0.022	8.2716
240 minute winter	1-25	1.008	1-26 Basin	16.1	0.247	0.011	8.8834

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Results for 30 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 96.89%

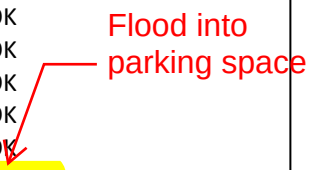
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	1-26 Basin	236	132.841	0.575	16.1	32.6614	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
240 minute winter	1-26 Basin	Infiltration		2.0			

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Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 96.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1-1	8	132.990	0.065	7.4	0.0000	0.0000	OK
15 minute summer	1-2	8	132.947	0.100	19.9	0.0000	0.0000	OK
15 minute summer	1-3	9	132.905	0.125	30.2	0.0000	0.0000	OK
240 minute winter	1-4	200	132.899	0.185	5.6	0.0000	0.0000	OK
180 minute winter	1-5	176	132.896	0.192	7.0	0.0000	0.0000	OK
180 minute winter	1-6	168	132.894	0.226	6.9	0.0000	0.0000	OK
15 minute summer	1-7	8	132.985	0.127	31.0	0.0000	0.0000	OK
15 minute summer	1-8	8	132.913	0.139	34.4	0.0000	0.0000	OK
120 minute winter	1-9	108	132.904	0.243	8.8	0.0000	0.0000	OK
240 minute winter	1-10	192	132.894	0.304	10.0	0.0000	3.3886	FLOOD
180 minute winter	1-11	176	132.899	0.323	10.0	0.0000	0.0000	FLOOD RISK
180 minute winter	1-12	176	132.894	0.194	2.3	0.0000	0.0000	OK
180 minute winter	1-13	176	132.899	0.393	17.9	0.0000	0.0000	OK
360 minute winter	1-14	280	132.898	0.128	0.7	0.0000	0.0000	OK
360 minute winter	1-15	280	132.898	0.158	1.1	0.0000	0.0000	FLOOD RISK
360 minute winter	1-16	280	132.896	0.176	3.5	0.0000	0.0000	OK
240 minute winter	1-17	212	132.896	0.206	3.2	0.0000	0.0000	FLOOD RISK
180 minute winter	1-18	168	132.895	0.219	8.8	0.0000	0.0000	OK
180 minute winter	1-19	168	132.893	0.231	5.7	0.0000	0.0000	OK
180 minute winter	1-20	168	132.892	0.274	8.9	0.0000	0.0000	OK
240 minute winter	1-21	212	132.894	0.515	7.5	0.0000	0.0000	FLOOD RISK
360 minute winter	1-22	280	132.893	0.193	0.6	0.0000	0.0000	FLOOD RISK
360 minute winter	1-23	280	132.893	0.264	0.9	0.0187	0.0000	FLOOD RISK
240 minute winter	1-24	216	132.892	0.534	29.6	0.0000	0.0000	FLOOD RISK
360 minute winter	1-25	280	132.892	0.583	17.6	0.0000	0.0000	OK



Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	1-1	1.000	1-2	6.5	0.225	0.045	0.3415
15 minute summer	1-2	1.001	1-3	16.7	0.314	0.117	0.6677
15 minute summer	1-3	1.002	1-4	27.4	0.372	0.192	0.9488
240 minute winter	1-4	1.003	1-5	6.8	0.247	0.046	0.2462
180 minute winter	1-5	1.004	1-6	6.9	0.284	0.008	0.9926
180 minute winter	1-6	1.005	1-13	6.7	0.341	0.165	0.3131
15 minute summer	1-7	2.000	1-8	30.0	1.598	0.878	0.1140
15 minute summer	1-8	2.001	1-9	32.6	1.616	0.729	0.2331
120 minute winter	1-9	2.002	1-10	8.6	0.887	0.153	0.5230
240 minute winter	1-10	2.003	1-11	10.4	0.826	0.216	0.1091
180 minute winter	1-11	2.004	1-13	9.9	1.028	0.209	0.1769
180 minute winter	1-12	3.000	1-13	2.3	0.511	0.062	0.2372
180 minute winter	1-13	1.006	1-24	17.6	0.391	0.021	2.0964
360 minute winter	1-14	4.000	1-15	1.0	0.449	0.089	0.0975
360 minute winter	1-15	4.001	1-16	3.1	0.799	0.376	0.0146
360 minute winter	1-16	4.002	1-17	1.4	0.429	0.093	0.1406
240 minute winter	1-17	4.003	1-18	4.9	0.203	0.064	0.3116
180 minute winter	1-18	4.004	1-19	5.2	0.186	0.029	0.7632
180 minute winter	1-19	4.005	1-20	8.6	0.157	0.049	2.9317
180 minute winter	1-20	4.006	1-21	3.1	0.232	0.012	1.2263
240 minute winter	1-21	4.007	1-24	11.4	0.051	0.045	5.8257
360 minute winter	1-22	5.000	1-23	0.6	0.393	0.094	0.0506
360 minute winter	1-23	5.001	1-24	0.8	0.413	0.123	0.1092
240 minute winter	1-24	1.007	1-25	25.3	0.229	0.030	9.9228
360 minute winter	1-25	1.008	1-26 Basin	17.6	0.228	0.012	10.5267

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Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 96.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	1-26 Basin	172	132.892	0.626	24.3	38.5200	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
180 minute winter	1-26 Basin	Infiltration		2.2			

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	45	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	0.600
Time of Entry (mins)	1.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
2-1	0.003	1.00	133.143		426835.607	150891.220	0.743
2-2	0.003	1.00	133.142	300	426836.592	150897.666	0.854
2-3	0.004	1.00	132.980	300	426825.888	150900.491	0.877
2-4	0.003	1.00	132.624		426819.503	150901.346	0.514
2-5			133.009	300	426824.384	150906.790	1.031
2-SA			133.074		426825.823	150906.627	1.059

Links (Results)

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	0.998	7.8	0.6	0.643	0.751	0.003	0.0
1.001	0.998	7.8	1.2	0.754	0.777	0.006	0.0
1.002	1.073	8.4	2.0	0.777	0.931	0.010	0.0
2.000	0.864	6.8	0.6	0.414	0.891	0.003	0.0
1.003	0.637	5.0	2.6	0.884	0.959	0.013	0.0

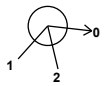
Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	6.521	59.8	100	Circular	133.143	132.400	0.643	133.142	132.291	0.751
1.001	11.071	59.8	100	Circular	133.142	132.288	0.754	132.980	132.103	0.777
1.002	6.476	51.8	100	Circular	132.980	132.103	0.777	133.009	131.978	0.931
2.000	7.312	79.5	100	Circular	132.624	132.110	0.414	133.009	132.018	0.891
1.003	1.448	144.8	100	Circular	133.009	132.025	0.884	133.074	132.015	0.959

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	2-1		Junction		2-2	300	Manhole	Private
1.001	2-2	300	Manhole	Private	2-3	300	Manhole	Adoptable
1.002	2-3	300	Manhole	Adoptable	2-5	300	Manhole	Adoptable
2.000	2-4		Manhole	Private	2-5	300	Manhole	Adoptable
1.003	2-5	300	Manhole	Adoptable	2-SA		Junction	

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
2-1	426835.607	150891.220	133.143	0.743					
						0	1.000	132.400	100
2-2	426836.592	150897.666	133.142	0.854	300		1.000	132.291	100
									
						0	1.001	132.288	100
2-3	426825.888	150900.491	132.980	0.877	300		1.001	132.103	100
									
						0	1.002	132.103	100
2-4	426819.503	150901.346	132.624	0.514					
						0	2.000	132.110	100
2-5	426824.384	150906.790	133.009	1.031	300		2.000	132.018	100
							1.002	131.978	100
									
						0	1.003	132.025	100
2-SA	426825.823	150906.627	133.074	1.059			1.003	132.015	100

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0
Summer CV	0.750	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	0.840	Drain Down Time (mins)	240	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
10	45	10	0
30	45	10	0
100	45	10	0

Node 2-SA Lined Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.32688	Invert Level (m)	130.180	Pit Length (m)	2.500
Side Inf Coefficient (m/hr)	0.32688	Time to half empty (mins)	87	Depth (m)	1.800
Safety Factor	3.0	Ring Diameter (m)	1.200	Inf Depth (m)	1.800
Porosity	0.30	Pit Width (m)	1.400	Number Required	1

Area 130m2 (100<x<1000m2) minor inconvenience anticipated if flooding occurs - footpath only.

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Results for 10 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 98.19%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	2-1	8	132.435	0.035	2.2	0.0000	0.0000	OK
15 minute summer	2-2	8	132.338	0.050	4.2	0.0036	0.0000	OK
15 minute summer	2-3	9	132.211	0.108	6.7	0.0077	0.0000	SURCHARGED
15 minute summer	2-4	8	132.147	0.037	2.2	0.0000	0.0000	OK
15 minute summer	2-5	9	132.138	0.160	7.3	0.0114	0.0000	SURCHARGED
180 minute winter	2-SA	128	132.011	-0.004	1.3	3.3165	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	2-1	1.000	2-2	2.0	0.671	0.260	0.0198
15 minute summer	2-2	1.001	2-3	3.8	0.742	0.491	0.0624
15 minute summer	2-3	1.002	2-5	5.6	0.716	0.665	0.0507
15 minute summer	2-4	2.000	2-5	2.0	0.389	0.297	0.0384
15 minute summer	2-5	1.003	2-SA	7.3	0.937	1.459	0.0109
180 minute winter	2-SA	Infiltration		0.5			

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Results for 30 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 98.19%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	2-1	8	132.441	0.041	2.9	0.0000	0.0000	OK
15 minute summer	2-2	9	132.350	0.062	5.6	0.0044	0.0000	OK
120 minute winter	2-3	92	132.347	0.244	2.0	0.0173	0.0000	SURCHARGED
120 minute winter	2-4	92	132.347	0.237	0.6	0.0000	0.0000	FLOOD RISK
120 minute winter	2-5	92	132.347	0.369	2.6	0.0262	0.0000	SURCHARGED
120 minute winter	2-SA	92	132.347	0.332	2.6	3.3165	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	2-1	1.000	2-2	2.7	0.713	0.345	0.0247
15 minute summer	2-2	1.001	2-3	5.2	0.778	0.660	0.0717
120 minute winter	2-3	1.002	2-5	2.0	0.381	0.237	0.0507
120 minute winter	2-4	2.000	2-5	0.6	0.298	0.088	0.0572
120 minute winter	2-5	1.003	2-SA	2.6	0.623	0.520	0.0113
120 minute winter	2-SA	Infiltration		0.5			

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Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 98.19%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	2-1	58	132.619	0.219	1.3	0.0000	0.0000	SURCHARGED
60 minute winter	2-2	58	132.619	0.331	2.6	0.0235	0.0000	SURCHARGED
60 minute winter	2-3	58	132.619	0.516	4.3	0.0366	0.0000	SURCHARGED
60 minute winter	2-4	58	132.619	0.509	1.3	0.0000	0.0000	FLOOD RISK
60 minute winter	2-5	58	132.619	0.641	5.6	0.0455	0.0000	SURCHARGED
60 minute winter	2-SA	58	132.619	0.604	5.5	3.3165	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
60 minute winter	2-1	1.000	2-2	1.3	0.599	0.166	0.0510
60 minute winter	2-2	1.001	2-3	2.6	0.752	0.332	0.0866
60 minute winter	2-3	1.002	2-5	4.3	0.631	0.506	0.0507
60 minute winter	2-4	2.000	2-5	1.3	0.369	0.192	0.0572
60 minute winter	2-5	1.003	2-SA	5.5	0.806	1.109	0.0113
60 minute winter	2-SA	Infiltration		0.5			

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	45	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
.P8-1	0.005	5.00	133.185		426858.549	150907.229	0.700
.P8-2			133.187	300	426867.692	150905.856	0.856
.P8-SA			133.187		426871.978	150902.616	0.946

Links (Results)

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	0.996	7.8	1.0	0.600	0.756	0.005	0.0	24	0.676
1.001	0.998	7.8	1.0	0.756	0.846	0.005	0.0	24	0.678

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	9.246	60.0	100	Circular	133.185	132.485	0.600	133.187	132.331	0.756
1.001	5.373	59.7	100	Circular	133.187	132.331	0.756	133.187	132.241	0.846

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	.P8-1		Junction		.P8-2	300	Manhole	Private
1.001	.P8-2	300	Manhole	Private	.P8-SA		Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
.P8-1	426858.549	150907.229	133.185	0.700		0	1.000	132.485	100
.P8-2	426867.692	150905.856	133.187	0.856	300	1	1.000	132.331	100
						 0	1.001	132.331	100
.P8-SA	426871.978	150902.616	133.187	0.946		 1	1.001	132.241	100

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Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0
Summer CV	0.750	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	0.840	Drain Down Time (mins)	240	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
10	45	10	0
30	45	10	0
100	45	10	0

Node .P8-SA Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.32688	Invert Level (m)	131.940	Depth (m)	0.400
Side Inf Coefficient (m/hr)	0.32688	Time to half empty (mins)	44	Inf Depth (m)	0.400
Safety Factor	2.0	Pit Width (m)	1.000	Number Required	1
Porosity	0.95	Pit Length (m)	2.000		

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Results for 10 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	.P8-1	10	132.522	0.037	2.2	0.0000	0.0000	OK
60 minute winter	.P8-2	59	132.496	0.165	1.2	0.0117	0.0000	SURCHARGED
60 minute winter	.P8-SA	53	132.496	0.255	1.2	0.7610	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	.P8-1	1.000	.P8-2	2.2	0.835	0.279	0.0242
60 minute winter	.P8-2	1.001	.P8-SA	1.2	0.703	0.157	0.0420
60 minute winter	.P8-SA	Infiltration		0.2			

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Results for 30 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	.P8-1	60	132.674	0.189	1.6	0.0000	0.0000	SURCHARGED
60 minute winter	.P8-2	59	132.674	0.343	1.6	0.0243	0.0000	SURCHARGED
60 minute winter	.P8-SA	59	132.674	0.433	1.5	0.7610	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
60 minute winter	.P8-1	1.000	.P8-2	1.6	0.764	0.205	0.0723
60 minute winter	.P8-2	1.001	.P8-SA	1.5	0.736	0.191	0.0420
60 minute winter	.P8-SA	Infiltration		0.2			

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Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	.P8-1	61	132.890	0.405	2.0	0.0000	0.0000	FLOOD RISK
60 minute winter	.P8-2	60	132.890	0.559	2.0	0.0397	0.0000	FLOOD RISK
60 minute winter	.P8-SA	60	132.890	0.649	1.6	0.7610	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
60 minute winter	.P8-1	1.000	.P8-2	2.0	0.790	0.256	0.0723
60 minute winter	.P8-2	1.001	.P8-SA	1.6	0.736	0.210	0.0420
60 minute winter	.P8-SA	Infiltration		0.2			

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	45	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	0.600
Time of Entry (mins)	1.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
.P9-1	0.005	1.00	133.192		426856.700	150896.306	0.130
.P9-2	0.001	1.00	133.193	300	426865.754	150894.954	0.670
.P9-SA			133.113		426870.978	150896.190	0.670

Links (Results)

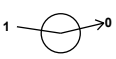
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.138	14.8	1.0	0.000	0.072	0.005	0.0	18	0.569
1.001	1.276	10.0	1.2	0.570	0.570	0.006	0.0	23	0.850

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	9.154	128.9	130	Channel Drain 100	133.192	133.062	0.000	133.193	132.991	0.072
1.001	5.368	66.9	100	Circular	133.193	132.523	0.570	133.113	132.443	0.570

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	.P9-1		Junction		.P9-2	300	Manhole	Private
1.001	.P9-2	300	Manhole	Private	.P9-SA		Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
.P9-1	426856.700	150896.306	133.192	0.130					
						0	1.000	133.062	130
.P9-2	426865.754	150894.954	133.193	0.670	300	1	1.000	132.991	130
									
						0	1.001	132.523	100
.P9-SA	426870.978	150896.190	133.113	0.670		1	1.001	132.443	100
									

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Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0
Summer CV	0.750	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	0.840	Drain Down Time (mins)	240	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
10	45	10	0
30	45	10	0
100	45	10	0

Node .P9-SA Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.32688	Invert Level (m)	131.743	Depth (m)	0.800
Side Inf Coefficient (m/hr)	0.32688	Time to half empty (mins)	72	Inf Depth (m)	0.800
Safety Factor	2.0	Pit Width (m)	2.000	Number Required	1
Porosity	0.95	Pit Length (m)	1.500		

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Results for 10 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	.P9-1	8	133.097	0.035	3.6	0.0000	0.0000	OK
15 minute summer	.P9-2	8	132.563	0.040	4.1	0.0029	0.0000	OK
60 minute winter	.P9-SA	49	132.233	-0.210	1.5	1.3956	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	.P9-1	1.000	.P9-2	3.3	1.001	0.222	0.0300
15 minute summer	.P9-2	1.001	.P9-SA	3.8	1.390	0.382	0.0148
60 minute winter	.P9-SA	Infiltration		0.3			

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Results for 30 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	.P9-1	8	133.105	0.043	4.8	0.0000	0.0000	OK
15 minute summer	.P9-2	8	132.571	0.048	5.5	0.0034	0.0000	OK
60 minute winter	.P9-SA	57	132.440	-0.002	2.0	1.9869	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	.P9-1	1.000	.P9-2	4.4	1.081	0.298	0.0373
15 minute summer	.P9-2	1.001	.P9-SA	5.2	1.496	0.519	0.0187
60 minute winter	.P9-SA	Infiltration		0.4			

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Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	.P9-1	8	133.115	0.053	6.2	0.0000	0.0000	OK
60 minute winter	.P9-2	57	132.728	0.205	2.6	0.0145	0.0000	SURCHARGED
60 minute winter	.P9-SA	57	132.728	0.285	2.6	2.2814	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	.P9-1	1.000	.P9-2	5.7	1.152	0.386	0.0454
60 minute winter	.P9-2	1.001	.P9-SA	2.6	1.277	0.260	0.0420
60 minute winter	.P9-SA	Infiltration		0.4			

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	45	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	0.600
Time of Entry (mins)	1.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
.P10-1	0.004	1.00	133.217		426856.392	150895.125	0.417
.P10-2	0.004	1.00	133.255	300	426854.998	150885.131	0.581
.P10-3	0.000	1.00	133.242	300	426864.149	150883.689	0.778
.P10-SA	0.000		133.114		426868.527	150885.562	0.925

Links (Results)

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	0.860	6.8	0.8	0.317	0.481	0.004	0.0
1.001	1.164	9.1	1.6	0.481	0.678	0.008	0.0
1.002	1.865	14.6	1.6	0.678	0.825	0.008	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	10.091	80.1	100	Circular	133.217	132.800	0.317	133.255	132.674	0.481
1.001	9.264	44.1	100	Circular	133.255	132.674	0.481	133.242	132.464	0.678
1.002	4.762	17.3	100	Circular	133.242	132.464	0.678	133.114	132.189	0.825

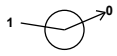
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	.P10-1		Junction		.P10-2	300	Manhole	Private
1.001	.P10-2	300	Manhole	Private	.P10-3	300	Manhole	Private
1.002	.P10-3	300	Manhole	Private	.P10-SA		Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
.P10-1	426856.392	150895.125	133.217	0.417		 0	1.000	132.800	100
.P10-2	426854.998	150885.131	133.255	0.581	300	 1	1.000	132.674	100
						0	1.001	132.674	100

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
.P10-3	426864.149	150883.689	133.242	0.778	300	1	1.001	132.464	100
									
						0	1.002	132.464	100
.P10-SA	426868.527	150885.562	133.114	0.925		1	1.002	132.189	100
									

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0
Summer CV	0.750	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	0.840	Drain Down Time (mins)	240	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
10	45	10	0
30	45	10	0
100	45	10	0

Node .P10-SA Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.32688	Invert Level (m)	131.889	Depth (m)	0.400
Side Inf Coefficient (m/hr)	0.32688	Time to half empty (mins)	54	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	3.000	Number Required	1
Porosity	0.95	Pit Length (m)	2.500		

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Results for 10 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	.P10-1	8	132.844	0.044	2.9	0.0000	0.0000	OK
15 minute summer	.P10-2	8	132.733	0.059	5.6	0.0042	0.0000	OK
15 minute summer	.P10-3	8	132.505	0.041	5.1	0.0029	0.0000	OK
60 minute winter	.P10-SA	47	132.120	-0.069	1.8	1.6485	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	.P10-1	1.000	.P10-2	2.7	0.653	0.393	0.0410
15 minute summer	.P10-2	1.001	.P10-3	5.1	1.290	0.555	0.0364
15 minute summer	.P10-3	1.002	.P10-SA	4.8	1.629	0.326	0.0140
60 minute winter	.P10-SA	Infiltration		0.5			

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Results for 30 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	.P10-1	8	132.852	0.052	3.8	0.0000	0.0000	OK
15 minute summer	.P10-2	8	132.746	0.072	7.3	0.0051	0.0000	OK
15 minute summer	.P10-3	8	132.513	0.048	6.7	0.0034	0.0000	OK
60 minute winter	.P10-SA	49	132.227	0.038	2.6	2.4062	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	.P10-1	1.000	.P10-2	3.5	0.695	0.522	0.0509
15 minute summer	.P10-2	1.001	.P10-3	6.7	1.358	0.729	0.0452
15 minute summer	.P10-3	1.002	.P10-SA	6.3	1.744	0.428	0.0173
60 minute winter	.P10-SA	Infiltration		0.5			

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Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	.P10-1	8	132.860	0.060	4.9	0.0000	0.0000	OK
15 minute summer	.P10-2	8	132.763	0.089	9.5	0.0063	0.0000	OK
60 minute winter	.P10-3	58	132.605	0.141	3.4	0.0100	0.0000	SURCHARGED
60 minute winter	.P10-SA	58	132.604	0.415	3.4	2.8536	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	.P10-1	1.000	.P10-2	4.6	0.728	0.676	0.0621
15 minute summer	.P10-2	1.001	.P10-3	8.4	1.393	0.923	0.0552
60 minute winter	.P10-3	1.002	.P10-SA	3.4	1.483	0.232	0.0373
60 minute winter	.P10-SA	Infiltration		0.5			

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Bartlett House, Luggershall, Wiltshire		Revision	**B**
	Job No: **GHY-CALM-09**	Page:	**CAL-13**
Section: **Car Parking spaces Soak-away**	Prepared By: **AMH**	Date:	**06/07/2023**

ALTERNATIVE SOAKAWAY SIZES			
	trench soakaways		
width of trench *[mm]*:	**450**	**600**	**900**
required trench length *[m]*:	33.10	26.20	18.67
	ring soakaways		
diameter of ring *[mm]*:	1050	1350	1500
required pit diameter *[m]*:	2.04	1.82	1.69

** Based on effective depth and number of pits as in Soakaway Data table*

SUMMARY OF CALCULATIONS		
critical design rainfall duration 't_{crit}' =	15	*min*
required storage volume 'V_{req}' =	0.51	m^3
provided storage volume 'V_{prov}' =	0.60	m^3
utilisation factor =	**0.86**	***.OK***
required time to discharge 50% 't_{50}' =	0.13	*hours*
utilisation factor =	**0.01**	***.OK***

GENERAL DATA	
site location:	**England and Wales**
soakaway type:	**infilled pit or trench**
impermeable area drained to soakaway 'A' $[m^2]$ =	**30**
60 min rainfall depth of 5 year return period 'R' *[mm]* =	**20**
M5-60 to M5-2d rainfall ratio 'r' =	**0.40**
allowance for climate change:	**45%**

SOAKAWAY DATA	
soakaway width 'W' [m] =	**4.15**
soakaway length 'L' [m] =	**4.80**
total depth from ground level 'D_b' *[m]* =	**0.40**
depth to drain invert level 'D_d' *[m]* =	**0.30**
soakaway effective depth 'D_{eff}' *[m]* =	0.10
free volume in infill aggregate *[%]* =	**30**

SOIL INFILTRATION DATA	
allowance for infiltration through soakaway base:	**30%**
available on-site infiltration test results:	○ Yes ◉ No
soil infiltration rate 'f' *[m/s]* =	**9.08E-05**

REQUIRED STORAGE CAPACITY PER RAINFALL DURATION

rainfall duration *[min]*	rainfall factor Z1	**M5-D** rainfalls *[mm]*	**M10-D** Z2	**M10-D** rainfalls *[mm]*	**M10-D** inflow $[m^3]$	**M50-D** Z2	**M50-D** rainfalls *[mm]*	**M50-D** inflow $[m^3]$	**M100-D** Z2	**M100-D** rainfalls *[mm]*	**M100-D** inflow $[m^3]$	outflow from soakaway $[m^3]$	required storage $[m^3]$
5	0.37	7.47	1.20	13.04	0.39	1.60	17.37	0.52	1.85	20.02	0.60	0.19	0.41
10	0.52	10.47	1.22	18.54	0.56	1.65	25.11	0.75	1.92	29.10	0.87	0.37	0.50
15	0.63	12.67	1.23	22.60	0.68	1.68	30.79	0.92	1.95	35.86	1.08	0.56	**0.51**
30	0.80	16.07	1.24	28.89	0.87	1.71	39.75	1.19	2.00	46.56	1.40	1.12	0.27
60	1.00	20.00	1.24	35.96	1.08	1.73	50.17	1.51	2.03	58.87	1.77	2.25	0.00
120	1.21	24.13	1.24	43.39	1.30	1.72	60.25	1.81	2.01	70.46	2.11	4.49	0.00
240	1.45	28.93	1.22	51.36	1.54	1.70	71.50	2.14	1.98	83.01	2.49	8.98	0.00
360	1.60	32.07	1.21	56.44	1.69	1.69	78.47	2.35	1.95	90.83	2.72	13.48	0.00
600	1.79	35.87	1.20	62.53	1.88	1.66	86.58	2.60	1.92	100.01	3.00	22.46	0.00
1440	2.24	44.80	1.18	76.68	2.30	1.61	104.66	3.14	1.85	120.28	3.61	53.90	0.00

** Z2 is growth factor from M5 rainfalls*

Appendix D:
Ground Investigation Extracts

GROUND INVESTIGATION REPORT

Proposed Residential Development
Bartlett House, Old Common Way, Ludgershall, SP11 9SA

Prepared for: Wiltshire Council

Date: March 2022

Report No: PO-22-001/GIR







terrafirma(south)
Consulting Geo-Technical &
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Site Investigation Contractors

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SECTION 3 Field Investigation

3.1 General

The site works were scoped by Terra Firma (South) and comprised the following:

- Four concrete core holes (HP01-HP04),
- Eight machine excavated trial pits (TP01-TP08), and
- Two in-situ soakaway tests (TP01 and TP07)

The site works were carried out at the site on the 17th of February 2022.

Prior to the site works, the following Health and Safety measures were undertaken:

- Risk Assessment & Method Statement (RAMS) was issued and approved beforehand,
- Underground Utility Plans were obtained from the relevant Statutory Undertakers,
- Before any excavation, all exploratory hole locations were scanned using a Cable Avoidance Tool (CAT), and
- Before any drilling, a 1.20m deep inspection pit was excavated at each borehole location.

The exploratory holes were set out at locations provided by Terra Firma (South), and adjusted where necessary to take account of the site constraints detailed in Section 1.1.

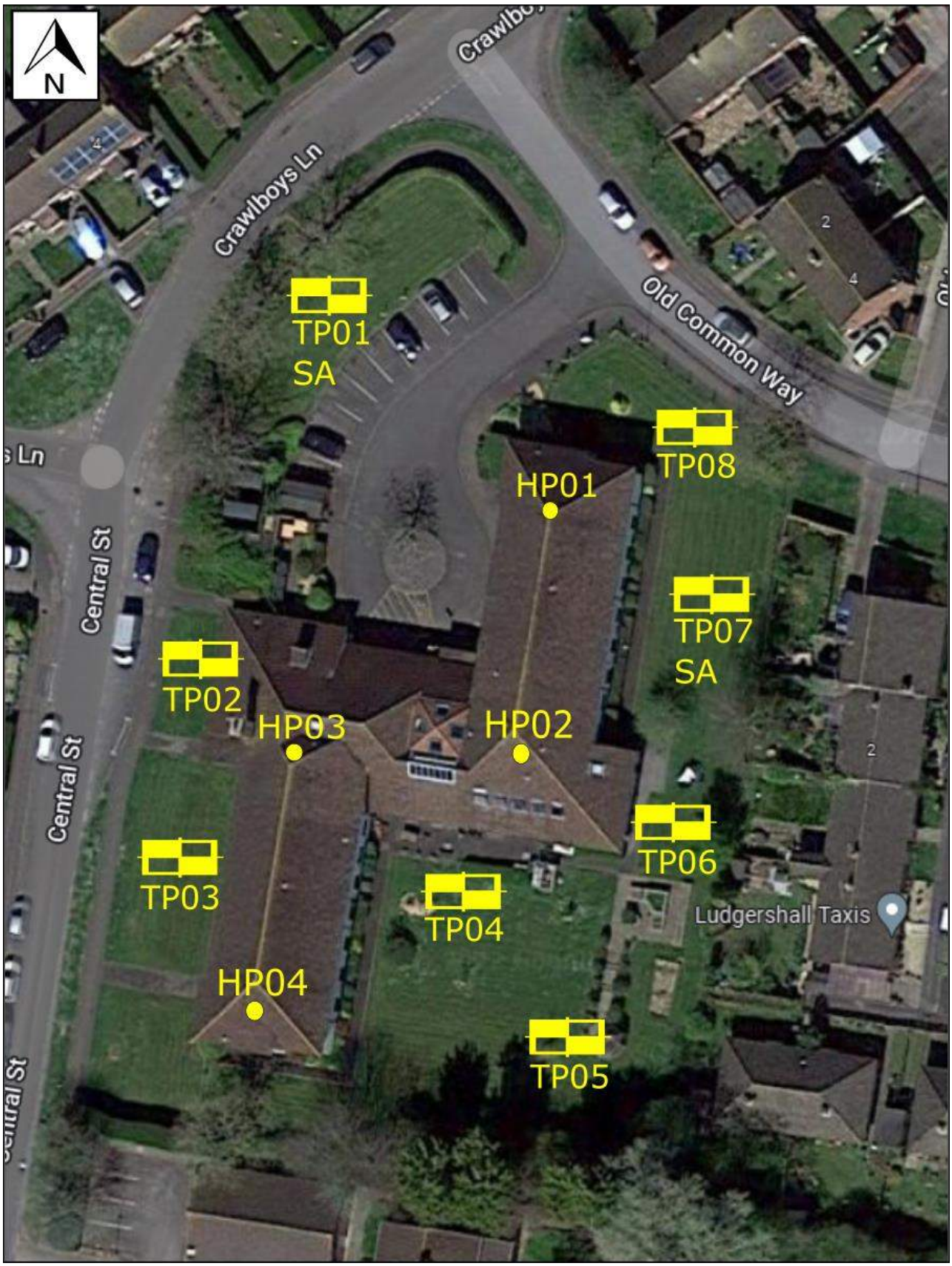
Approximate exploratory hole co-ordinates and levels were picked up post-investigation using a hand-held Global Positioning System (GPS) receiver and presented in the table below:

Table 3.1: Exploratory Hole Co-ordinates

Exploratory Hole	Easting	Northing
TP01	426843	150967
TP02	426827	150930
TP03	426828	150908
TP04	426853	150904
TP05	426864	150897
TP06	426873	150912
TP07	426878	150934
TP08	426875	150952
HP01	426865	150945
HP02	426861	150921
HP03	426839	150924
HP04	426836	150897

The site works were supervised by Terra Firma (South), who also logged the exploratory holes to the requirements of BS5930:2015 + A1:2020.

The exploratory hole logs and in-situ test results are presented in **Annex A** and **Annex B** respectively, and their locations shown on **Drawing 3.1** below.



Drawing 3.1: Exploratory Hole Location Plan

3.2 Exploratory Holes

3.2.1 Diamond Drilled Concrete Cores and Hand Pits

The concrete cores were drilled within the existing building through the floor slab to confirm the thickness of the slab and determine if any asbestos was present. The concrete slab was drilled using a Shibuya diamond drilling rig. In order to minimise surface mess, a wet vacuum was used to clean each location after drilling.

A hand pit was undertaken through the base of the core to obtain shallow soils samples for laboratory testing.

Boreholes HP01, HP02, HP03 and HP04 were backfilled using arisings and reinstated using concrete.

3.2.2 Machine Excavated Trial Pits

The trial pits were excavated using a Hitiachi 8T excavator.

Following completion of soil logging, in-situ testing and sampling, the trial pits were backfilled using arisings and re-compacted as best as practicably possible using the excavator backhoe. If necessary, the trial pit was left slightly proud in order to allow for short-term settlement.

3.3 In-situ Testing

3.3.1 Permeability Testing

The in-situ permeability tests were undertaken within trial pits TP01 and TP07 in order to provide a soil infiltration rate for use in soakaway design. A 2000-gallon tractor-towed bowser was used to rapidly fill the pit with water.

The in-situ permeability tests were undertaken within general accordance within general accordance of BRE Digest 365.

The appropriate calculation sheets are presented in **Annex B** and the results given in the table below.

Table 3.2: Infiltration Test Results

Soak away Test	Depth (m)	Type	Strata	Infiltration Rate (m/s)
TP01	2.50	Storm Drainage	Chalk	9.64×10^{-5}
			Chalk	9.42×10^{-5}
			Chalk	9.08×10^{-5}
TP07	2.50		Chalk	9.74×10^{-5}
			Chalk	9.52×10^{-5}

Due to time constraints only two infiltration tests were undertaken in TP07.

3.3.2 California Bearing Ratio (CBR) Testing

In-situ CBR tests were carried out at trial pit locations TP01, TP02, TP04, TP06, TP07 and TP08 using a TRL Dynamic Cone Penetrometer (DCP) probe. The probes were sunk to a depth of approximately 1.00m below ground level.

The in-situ CBR test results are presented in **Annex C** and should be referred to for specific depth related values.


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