

SURFACE WATER DRAINAGE STRATEGY (SWDS)

**MORRISONS CHIPPENHAM,
STAINERS WAY
WILTSHIRE
SN14 6RR**

MARKS HEELEY LTD

June 2026 – Rev 'A'

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MARKS HEELEY

Surface Water Drainage Strategy (SWDS)

Morrisons Chippenham, Stainers Way, Wiltshire, SN14 6RR

June 2026

Marks Heeley Ltd

The Stables

Cannons Mill Lane

Bishop's Stortford

Hertfordshire

CM23 2BN

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1.0 SUMMARY

- 1.1 Marks Heeley Ltd has been appointed by the client to undertake a Surface Water Drainage Strategy for the proposed development at Morrisons Chippenham, Stainers Way, Wiltshire, SN14 6RR
- 1.2 Following the SuDS hierarchy, it is proposed that discharge will be to the on site surface water drain at a reduced outflow.
- 1.3 A drainage channel along the leading edge of the proposed EV bays is to be installed.
- 1.4 Outflow from these 'Medium Risk' areas will pass through the SPEL ESR Bypass separator onto attenuation crates, with a controlled outfall of 1 L/s via a hydrobrake acting as the flow device before draining to the existing on site drain.
- 1.5 This provides over a 50% betterment to the existing arrangement.
- 1.6 This study has been undertaken in alignment with the principles set out in the National Planning Policy Framework (NPPF) and Wiltshire Council's design guidance on sustainable drainage systems (SuDS) for new developments as the Lead Local Flood Authority.
- 1.7 We can conclude that, providing the development adheres to the conditions advised in the conclusions of this report, the development can be accommodated without increasing flood risk within the locality in accordance with objectives set within the NPPF and published guidance.
- 1.8 The findings and recommendations of this report are for the use of the client who commissioned the assessment, and no responsibility or liability can be accepted for the use of the report or its findings by any other person or for any other purpose.

2.0 INTRODUCTION

- 2.1 Marks Heeley Ltd has been appointed by the client to undertake a Surface Water Drainage Strategy for the proposed development at Morrisons Chippenham, Stainers Way, Wiltshire, SN14 6RR.
- 2.2 The purpose of this report is to review and meet the requirements as set out by the local planning authority in terms of surface water drainage and to include a surface water drainage strategy that will consider the use of SuDS where possible.
- 2.3 This report is intended to accompany planning and address received comments, as seen below:

- **Drainage and Surface Water Management:**
- The application does not include sufficient information regarding drainage. Please provide:
 - *“Details of site levels and gradients;”*
 - *“How surface water runoff will be managed across the site; and”*
 - *“Confirmation of any measures proposed to intercept and manage potentially contaminated runoff (including in the unlikely event of an EV battery fire).”*

Planning Policy

- 2.4 For this development, Wiltshire Council are the Local Planning Authority with set out requirements in relation to SuDS and drainage strategy, which are to be considered.
- 2.5 Wiltshire Council's development plan, including the Wiltshire Core Strategy and emerging Local Plan policies, sets out requirements for how new developments should manage surface water and flood risk.
- 2.6 In particular, Core Policy 67: Flood Risk requires development proposals to incorporate measures to manage surface water runoff and reduce flood risk.
- 2.7 The policy states that:
- *All new development should include measures to reduce the rate of rainwater runoff and improve infiltration to the soil and ground, unless site or environmental conditions make these measure unsuitable.*
 - *Sustainable Drainage Systems (SuDS) should be incorporated wherever possible to manage surface water runoff.*
 - *Development should seek to maintain or reduce existing runoff rates and ensure that flood risk is not increased elsewhere.*
 - *SuDS should be integrated into the landscaping and green infrastructure of the development, contribute to the design quality of the scheme, and provide water quality and aquatic biodiversity benefits wherever possible.*
 - *Surface water should be managed in accordance with the SuDS hierarchy and discharged as high up the drainage hierarchy as practicable. Connections to the foul water system should be avoided and connections to combined or surface water systems should only be made in exceptional circumstances where no feasible alternatives exist.*
- 2.8 The LLFA for this development is Wiltshire Council.
- 2.9 In accordance with the Wiltshire Council (the Lead Local Flood Authority) and their local SuDS design, all developments are encouraged to follow their SuDS design standards to ensure that SuDS are utilised to reduce flood risk and improve water quality consistent with existing national guidance (CIRIA) and local planning policy.

Existing Development and Location

- 2.10 Refer to Appendix 'A' for Existing Site Plan.
- 2.11 The site relates the northeast section of the Morrisons Chippenham car park.
- 2.12 The site is currently a used section of the Morrisons car park and is classified as previously developed "brownfield site", located in the town of Chippenham, Wiltshire, SN14 6RR.
- 2.13 The application site consists of existing hardstanding ground and two small sections of landscaping.
- 2.14 Refer to Fig. 1 below for an aerial view of the site.

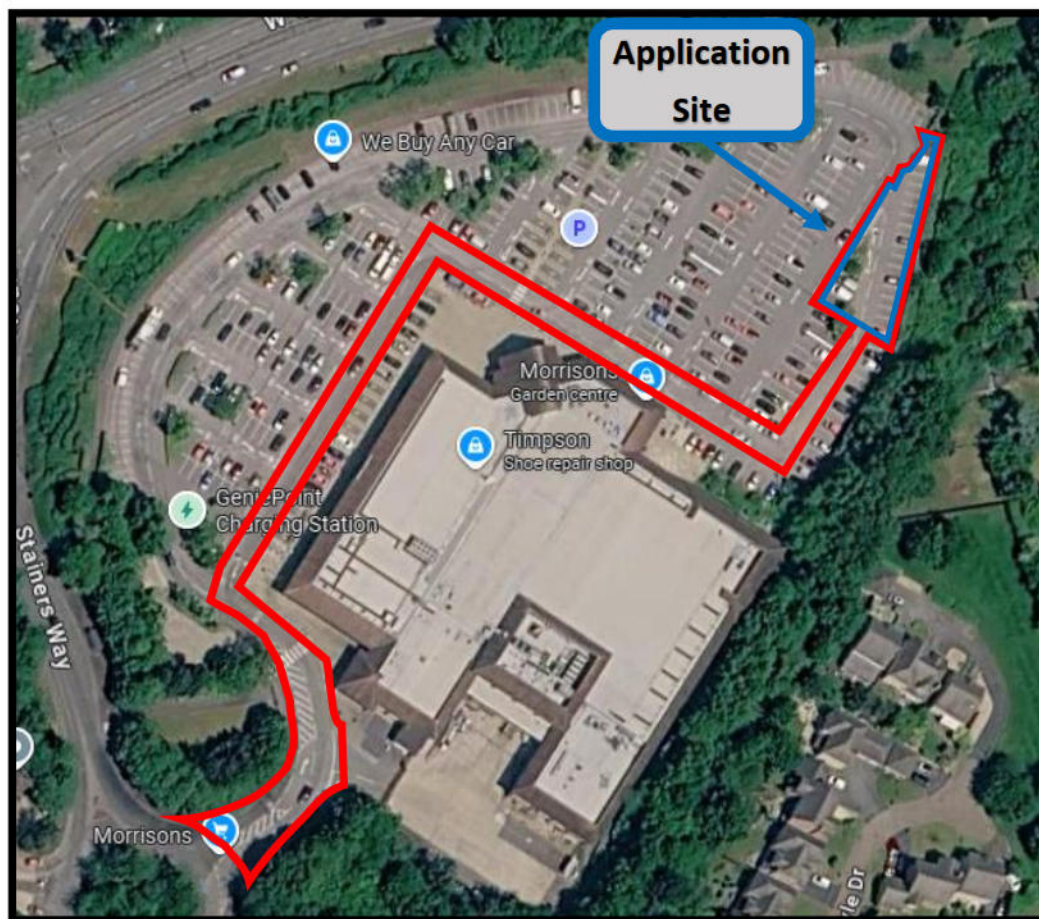


Figure 1: Aerial View of The Site (Source: Google Maps)

- 2.15 The area of the application site (in RED) equates to 3017m² (0.3017 ha).
- 2.16 The existing impermeable area of the application site equates to 2974m² (0.2979 ha).
- 2.17 The area of the applicant's land ownership (in BLUE) equates to 655m² (0.0655 ha).

Proposed Development

- 2.18 It is understood that the proposed development is for the creation of an EV charging zone of 8 EV bays, sub-station enclosure, LV panel, meter cabinet and associated works.
- 2.19 The proposed impermeable area is 2998m².
- 2.20 Refer to Appendix 'B' for the Proposed Site Plan.
- 2.21 Refer to Fig. 2 for the block plan and proposed site layout.

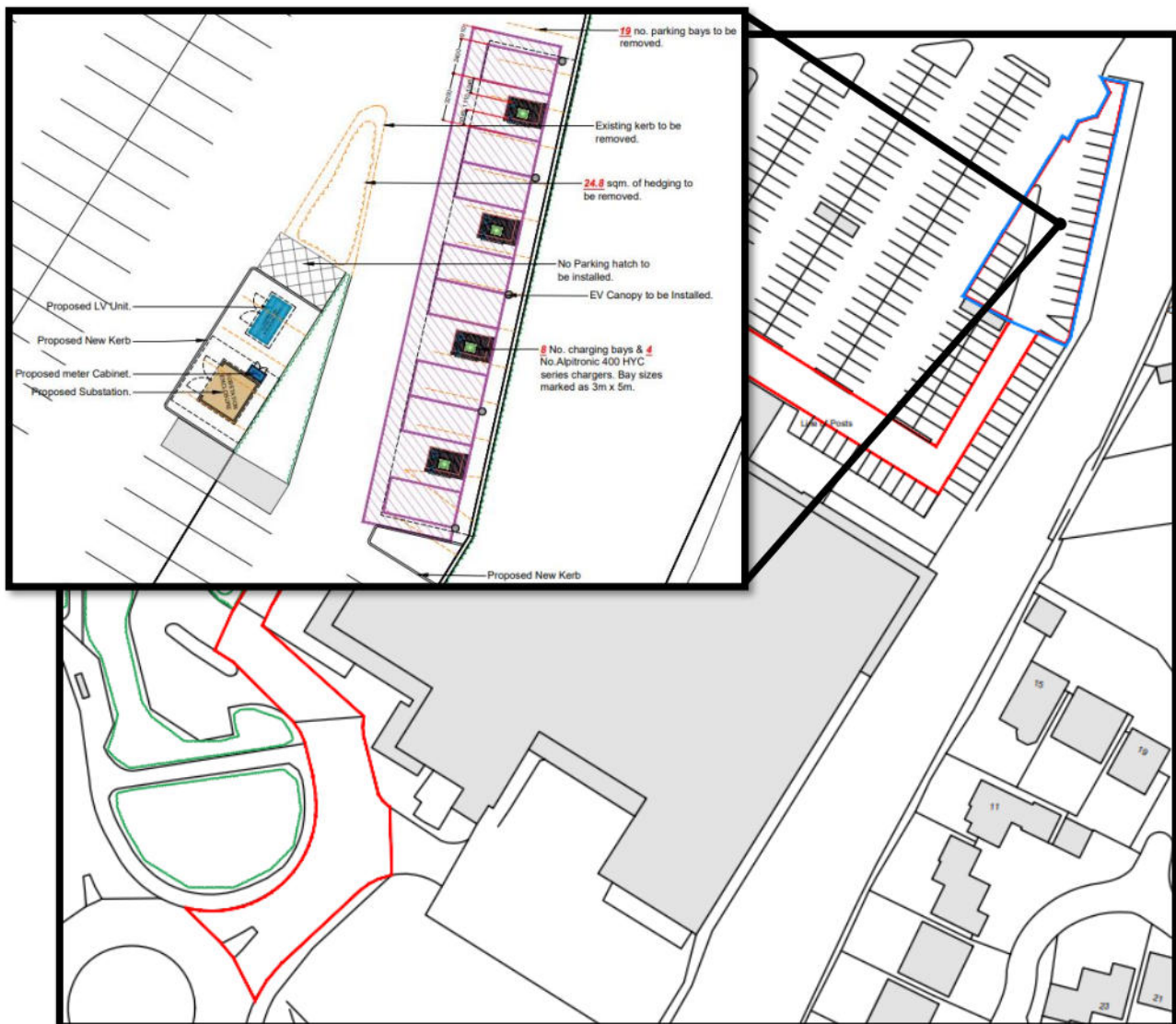
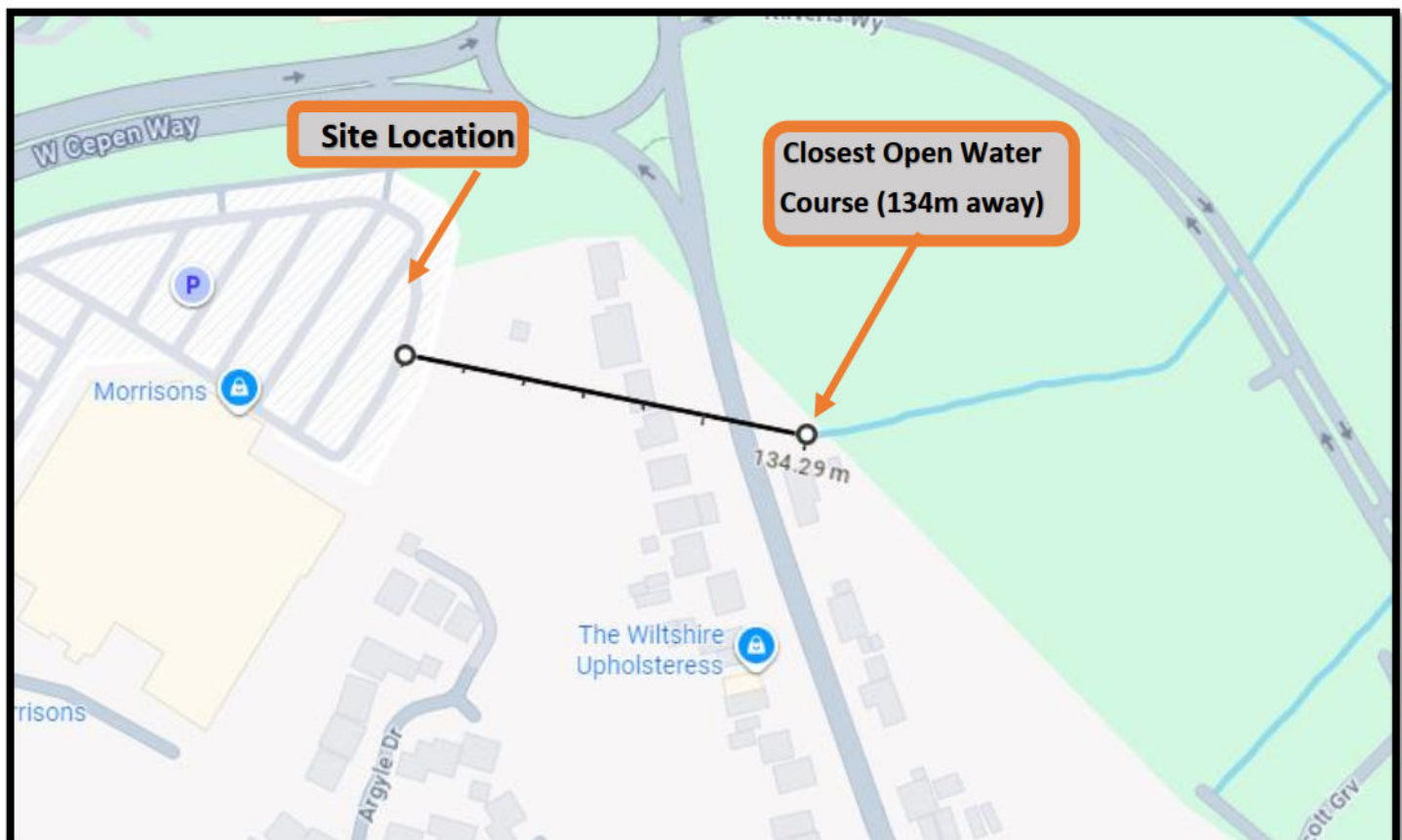


Figure 2: Block Plan and Proposed Site Layout

Existing Drainage Infrastructure

- 2.22 The existing carpark is served with linear drainage channels. These being located along the Northern boundary.

Nearby Watercourses



- 2.23 There is an open watercourse located within the surrounding area of the site.
- 2.24 After reviewing relevant maps of the area around the site, the closest known open watercourse was found to be an unnamed stream, located 134m east of the site (as seen in Fig. 4 below).
- 2.25 Discharge to the nearest watercourse is considered impractical due to the significant distance required to establish a connection, as well as the need to cross private third-party land.
- 2.26 In addition, such a connection would require landowner consent and would result in increased costs and delays to the development.

3.0 GEOLOGY AND INFILTRATION POTENTIAL

- 3.1 With reference to the BGS (British Geological Survey) online geology mapping, it is indicated that the geology underlying the site comprises geology of the Kellaways Clay Member-Mudstone.
- 3.2 Refer to Fig. 5 for the 1:50,000 scale bedrock geology of the site location below.



Bedrock geology

Kellaways Clay Member-Mudstone. These sedimentary rocks are shallow-marine in origin. They are detrital, ranging from coarse- to fine-grained (locally with some carbonate content) forming interbedded sequences.

Minimum Age (Years):	163,500,000
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Minimum Period:	Jurassic
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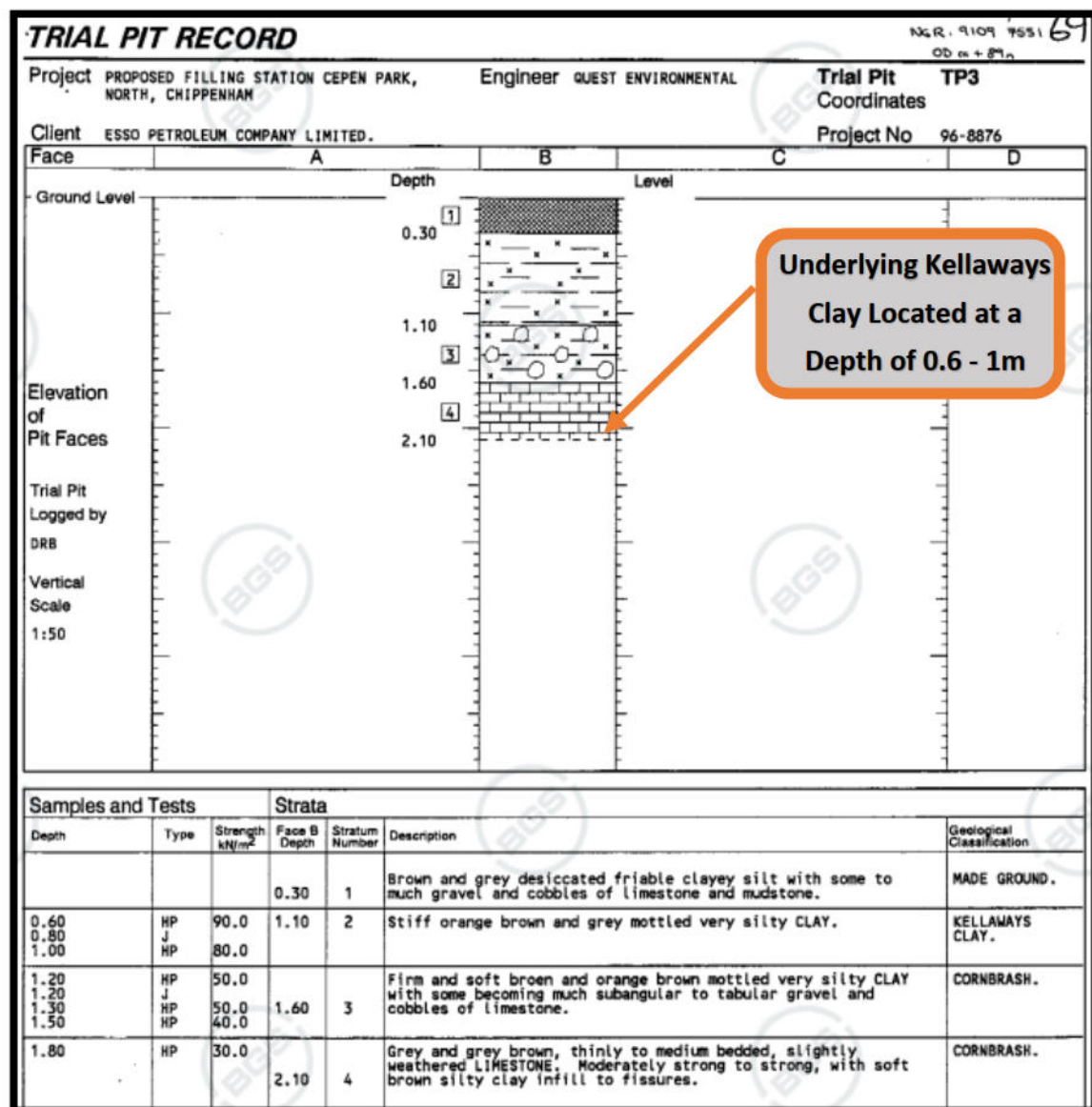
Maximum Age (Years):	166,100,000
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Maximum Period:	Jurassic
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BGS Maps Portal Link:	View
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Ground Investigation

- 3.3 No recent site-specific ground investigation is available for the application site.
- 3.4 However, a BGS historical trial pit record from 1996, located approx. 122m north of the site (Ref: ST97NW69), has been reviewed to provide further indication of the underlying ground conditions.



- 3.5 See above for historic trial pit record.

- 3.6 The historical trial pit suggests that the underlying ground conditions comprised of stiff mottled very silty clay (Kellaways Clay) and firm and soft very silty clay, which may limit the infiltration potential.

DEFRA Source Protection Zones

- 3.7 According to DEFRA's current Magic map, the site is located within Source Protection Zone 2 (SPZ 2).
- 3.8 SPZ 3 or the Outer Protection Zone, protects groundwater used for public drinking water.

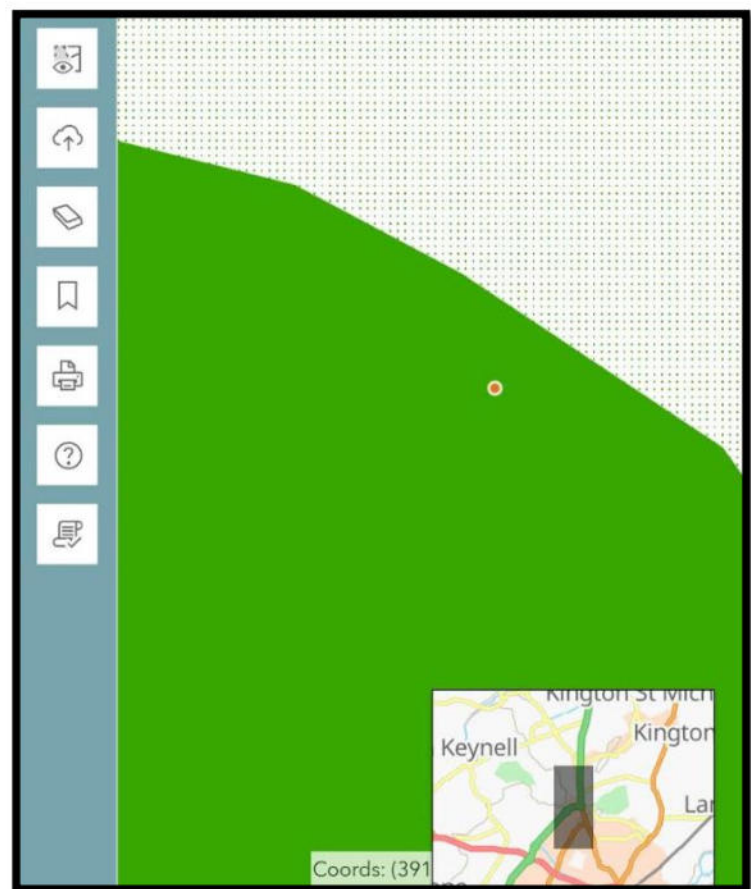
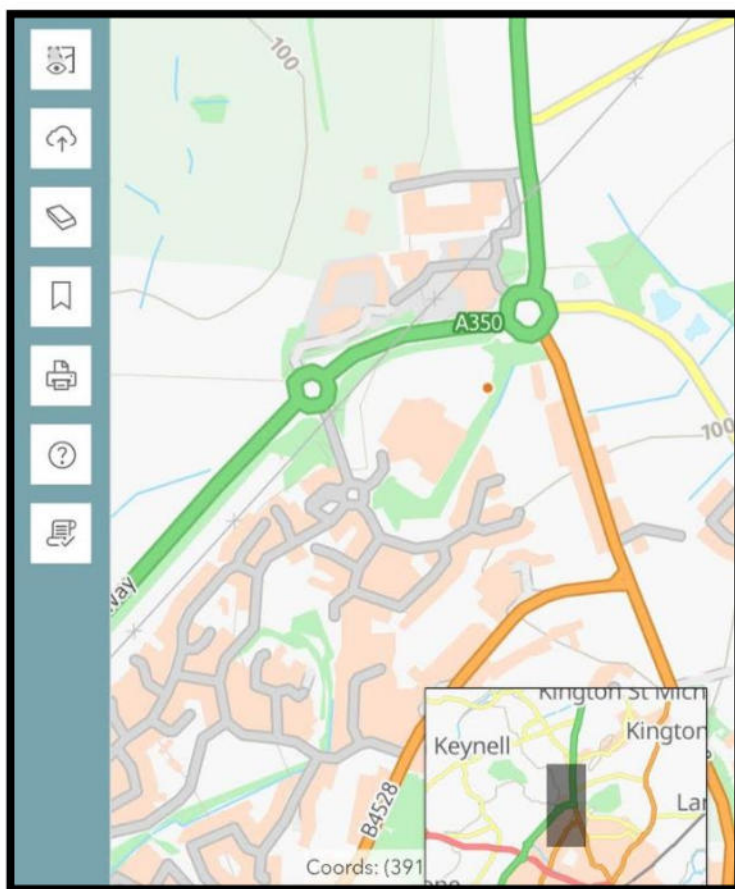


Figure 7: Source Protection Zones (Source: DEFRA Magic Maps))

Infiltration Potential

- 3.9 The site's underlying geology, indicated by the historic trial pit record and underlying Kellaways Clay Formation, is seen to have a 'very poor' level of infiltration media, as seen within an extract from Table 25.1, 'Typical Infiltration Coefficients based on Soil Texture' of the CIRIA SuDS Manual C753, below:

TABLE 25.1	Typical infiltration coefficients based on soil texture (after Bettess, 1996)		
	Soil type/texture	ISO 14688-1 description (after Blake, 2010)	Typical infiltration coefficients (m/s)
Good infiltration media			
	• gravel	Sandy GRAVEL	$3 \times 10^{-4} - 3 \times 10^{-2}$
	• sand	Slightly silty slightly clayey SAND	$1 \times 10^{-5} - 5 \times 10^{-5}$
	• loamy sand	Silty slightly clayey SAND	$1 \times 10^{-4} - 3 \times 10^{-5}$
	• sandy loam	Silty clayey SAND	$1 \times 10^{-7} - 1 \times 10^{-5}$
Poor infiltration media			
	• loam	Very silty clayey SAND	$1 \times 10^{-7} - 5 \times 10^{-6}$
	• silt loam	Very sandy clayey SILT	$1 \times 10^{-7} - 1 \times 10^{-5}$
	• chalk (structureless)	N/A	$3 \times 10^{-8} - 3 \times 10^{-6}$
	• sandy clay loam	Very clayey silty SAND	$3 \times 10^{-10} - 3 \times 10^{-7}$
Very poor infiltration media		–	
	• silty clay loam	–	$1 \times 10^{-8} - 1 \times 10^{-6}$
	• clay	Can be any texture of soil	$< 3 \times 10^{-8}$
	• till	described above	$3 \times 10^{-9} - 3 \times 10^{-5}$
Other			
	• rock* (note mass infiltration capacity will depend on the type of rock and the extent and nature of discontinuities and any infill)	N/A	$3 \times 10^{-9} - 3 \times 10^{-5}$

- 3.10 In addition to the poor infiltration potential of the site's underlying geology, the site is located within DEFRA Source Protection Zone 2 (SPZ2) which protects groundwater, making the use of infiltration devices unsuitable for the site.
- 3.11 On this basis, infiltration is not considered to be a suitable or effective primary SuDS mechanism for the management of surface water runoff from the proposed development site.

4.0 SUSTAINABLE URBAN DRAINAGE SYSTEM (SUDS) ASSESSMENT

- 4.1 Consideration of SuDS is a planning requirement for new developments. SuDS are designed to replicate the natural course of drainage as closely as possible with a view to reducing the impact of flooding, removing pollutants at source combining water management with green space where possible.
- 4.2 In accordance with the SuDS management train approach, the use of various SuDS measures to reduce and control surface water flows have been considered in detail for the development.
- 4.3 The management of surface water has been considered in respect to the SuDS hierarchy (within Table 1 below) (as detailed in Building Regulations Part H and within the CIRIA SuDS Manual C753, Section 3.2.3):

Table 1: SuDS Hierarchy

SuDS Drainage Hierarchy				
			Suitability	Comment
	1.	Infiltration	x	Not feasible due to the limited infiltration potential of the underlying clay conditions and the presence of SPZ 2.
	2.	Discharge to Surface Water	x	Closest open watercourse is located 134m from the application site.
	3.	Discharge to Surface Water Sewer, Highway Drain or another Drainage System	✓	Surface water will be discharged to on site surface water drain
	4.	Discharge to Combined Sewer	-	
	5.	Discharge to a Foul Sewer (should not be considered as a possible option)	-	

SuDS Hierarchy Considerations

Infiltration:

- 4.4 The use of infiltration has been considered as a potential solution; however, it is deemed an unsuitable SuDS method due to the site's low infiltration potential of the underlying clayey ground conditions and location within SPZ 2.

Discharge to Surface Water:

- 4.5 Discharge to surface water body has been deemed implausible due to the location of the nearest watercourse, located 134m east of the site.
- 4.6 A location which would prove to be costly and time consuming to discharge to.

Discharge to Surface Water Sewer:

- 4.7 Public surface and foul water are located within Cepen Way North of the site.
- 4.8 It is suggested that discharge to the on site surface water sewers is the most suitable of the SuDS methods in accordance with the CIRIA SuDS Manual (C753) drainage hierarchy.
- 4.9 A drainage channel running along the front of the proposed EV Bays to be implemented to direct discharge through a SPEL ESR Bypass engineered solution, before attenuation within wrapped crates.

Discharge to Combined Sewer:

- 4.10 Not considered necessary for the development.

Discharge to Foul Sewer:

- 4.11 Not considered necessary for the development.
- 4.12 The suitability of SuDS components has been assessed (based on Table 2 below) and deemed appropriate to be used in the following SuDS management train.

Table 2: Suitability of SuDS Components

Suitability of SuDS Components		
Component	Description	Suitability
Infiltrating SuDS	Infiltration can contribute to reducing runoff rates and volumes while supporting baseflow and groundwater recharge processes. The suitability and infiltration rate depend on the permeability of the surrounding soils.	x
Permeable Pavement	Pervious surfaces can be used in combination with aggregate sub-base and/or geocellular/modular storage to attenuate and/or infiltrate runoff from surrounding surfaces and roofs. Liners can be used where ground conditions are not suitable for infiltration.	x
Green Roofs	Green Roofs provide areas of visual benefit, ecological value, enhanced building performance and the reduction of surface water runoff. If afforded may provide many long-term benefits and reduce the on-site storage volumes. However, they are generally considered more costly to install and maintain than conventional roofs.	x
Rainwater Harvesting	Rainwater Harvesting is the collection of rainwater runoff for use. It can be collected from roofs or other impermeable area, stored, treated (where required) and then used as a supply of water for domestic, commercial and industrial properties.	x
Swales	Swales are designed to convey, treat and attenuate surface water runoff and provide aesthetic and biodiversity benefits. They can replace conventional pipework as a means of conveying runoff; however, space constraints of some sites can make it difficult incorporating them into the design.	x
Rills and Channels	Rills and Channels keep runoff on the surface and convey runoff along the surface to downstream SuDS components. They can be incorporated into the design to provide a visually appealing method of conveyance; they also provide effectiveness in pre-treatment removal of silts.	x
Bioretention Systems	Bioretention systems can reduce runoff rates and volumes and treat pollution through the use of engineer soils and vegetation. They are particularly effective in delivering interception but can also be an attractive landscape feature whilst providing habitat and biodiversity.	x
Retention Ponds and Wetlands	Ponds and Wetlands are features with a permanent pool of water that provide both attenuation and treatment of surface water runoff. They enhance treatment processes and have great amenity and biodiversity benefits. Often a flow control system at the outfall controls the rates of discharge for a range of water levels during storm events.	x
Detention Basins	Detention Basins are landscaped depressions that are usually dry except during and immediately following storm events and can be used as a recreational or other amenity facility. They generally appropriate to manage high volumes of surface water from larger sites such as a neighbourhoods.	x
Geocellular Systems	Attenuation storage tanks are used to create a below-ground void space for the temporary storage of surface water before infiltration, controlled release or use. The inherent flexibility in size and shape means they can be tailored to suit the specific characteristics and requirements of any site.	✓
Proprietary Treatment Systems	Proprietary treatment systems are manufactured products that remove specific pollutants from surface water runoff. They are especially useful where site constraints preclude the use of other methods and can be useful in reducing the maintenance requirements of downstream SuDS.	✓
Filter Drains and Filter Strips	Filter drains are shallow trenches filled with stone, gravel that create temporary subsurface storage for the attenuation, conveyance and filtration of surface water runoff. Filter strips are uniformly graded and gently sloping strips of grass or dense vegetation, designed to treat runoff from adjacent impermeable areas by promoting sedimentation, filtration and infiltration.	x

5.0 WATER QUALITY (CONTAMINATION)

5.1 Adequate treatment must be delivered to the water runoff to remove pollutants through SuDS devices, which are able to provide pollution mitigation. Pollution Hazards and the SuDS Mitigation have been indexed in the CIRIA 753 'The SuDS Manual'.

5.2 The Pollution Hazard Indices are identified in Tables 3 – Summary of Pollution Hazard Indices for different Land Use below (reference: Table 26.2. CIRIA SuDS Manual 2015).

Table 3: Pollution Hazard Indices

POLLUTION HAZARD INDICES FOR DIFFERENT LAND USE CLASSIFICATIONS				
Landuse	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Commercial/Industrial Roofs	Low	0.3	0.2	0.05
Non-residential car parks	Medium	0.7	0.6	0.7

5.3 The contamination risk associated with this site is considered to be 'Medium'.

5.4 To manage the contamination risk, an engineered solution in the form of a SPEL ESR Bypass Treatment System is to be installed to manage discharge before passing into wrapped attenuation crates to be discharged via a Hydrobrake flow control device at a rate of L/s.

Management of Potentially Contaminated Runoff (EV Bays)

SPEL ESR Bypass Treatment System (Model: 210C1/ESR)

- 5.5 A SPEL ESR Bypass Treatment System (Model: 210C1/ESR) engineered solution is has been proposed for the mitigation of the 'medium' level contamination risk for the areas of proposed works (as seen in Table 4 below).

Table 4: Pollution Hazard Indices (EV Bays)

POLLUTION HAZARD INDICES FOR DIFFERENT LAND USE CLASSIFICATIONS				
Landuse	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Non-residential car parks	Medium	0.7	0.6	0.7

- The mitigation indices of the proposed SPEL ESR Bypass Treatment System (Model: 210C1/ESR) are summarised in Fig. 8 below.

SPEL ESR Bypass	
Certified Mitigation Index	
TSS	0.8
Metals	0.6
Hydrocarbons	0.9*
<i>*HR Wallingford test results to BS EN 858</i>	

- 5.6 The mitigation provided by the SPEL Treatment System is sufficient to mitigate the contamination risk at the site of the proposed development before discharge to surface water sewers as proven below.

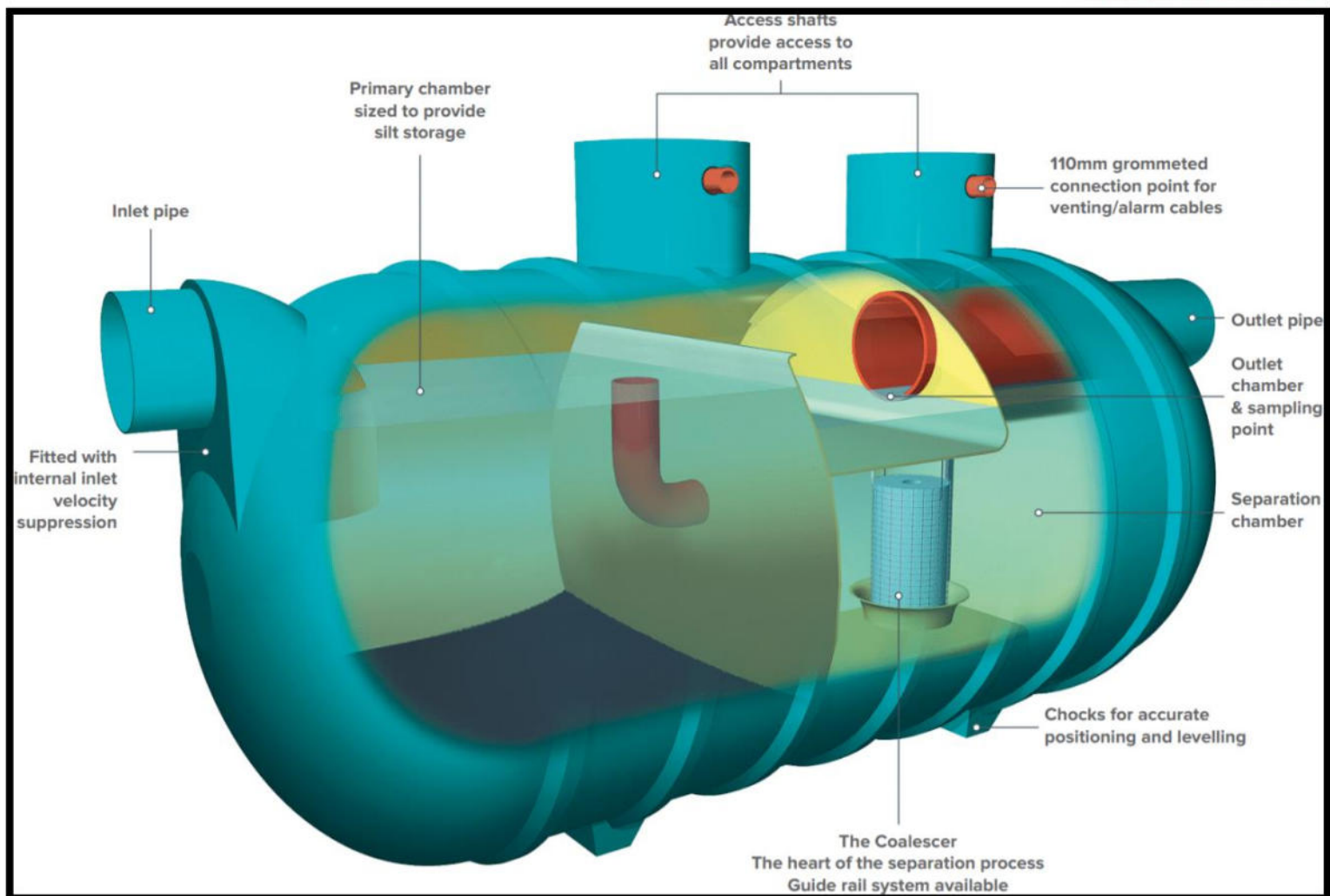


Figure 9: ESR Treatment System Diagram

5.7 All tank shells carry the SPEL 25 Year Warranty and life expectancy in excess of 50 years.

5.8 SPEL specifies the applications in the product details of their ESR Bypass:

The ESR Bypass will treat up to the 1 in 1-year storm event for surface water runoff to a Pollution Hazard Index of 'Medium'. This covers surfaces such as:

- Roofs Private and public car parks
- Residential roads and drives
- Low and medium use roads
- Commercial yards and delivery areas

5.9 See Appendix 'C' for SPEL ESR Bypass certification.

5.10 See Appendix 'D' for SPEL ESR Bypass details drawing.

Risks and Management of Contamination in the Event of an EV Fire

- 5.11 In the unlikely event of an EV fire, appropriate measures should be in place to manage the associated risks and mitigate the potential environmental impacts arising from contaminated firewater runoff.
- 5.12 Lithium-ion batteries used in EVs can undergo thermal runaway when exposed to extreme heat or damage, causing them to melt. This may result in the release of hazardous substances containing metals and a mixture of toxic chemicals from the battery components.
- 5.13 Due to the watertight nature of lithium-ion batteries used in EVs, relatively large amounts of water may be required to eventually cool and extinguish.
- 5.14 Consequently, firefighting water has the potential to become contaminated and, if uncontrolled, may enter the surface water drainage network and pose a risk to receiving watercourses and groundwater.
- 5.15 To intercept, contain and manage potentially contaminated runoff generated during an unlikely fire event, the following measures are proposed:

6.0 SURFACE WATER DRAINAGE STRATEGY

- 6.1 In order to mitigate any flood risk posed by the development, appropriate control measures are required to be considered. These measures will ensure that surface water runoff is dealt with at source and the flood risk on/off site is not increased over the lifetime of the development.

Runoff Rates

- 6.2 It is proposed to attenuate the EV parking areas. This area equates to 200m². The most common method of hardstanding run off is the Wallingford Procedure which is detailed below:

$$QP = 2.76 \times Ap \times I$$

Where:

QP = Peak discharge (litres/sec)

Ap = Impermeable Area (hectares)

I = Rainfall intensity (mm/hr)

$$2.76 \times 0.0200 \times 50 = 2.76 \text{ L/s}$$

Table 5: Runoff Summary

Scenario	Runoff Rate (L/s)
Existing Brownfield (Impermeable Area)	2.76 L/s
Proposed Runoff	1 L/s

Climate Change

6.3 The Department for Environment Food and Rural Affairs climate change allowance mapping has been reviewed for the area of Chippenham and a climate change allowance of 45% has been adopted for this plan.

6.4 See Fig. 11 below for the DEFRA Climate Change Allowances map.

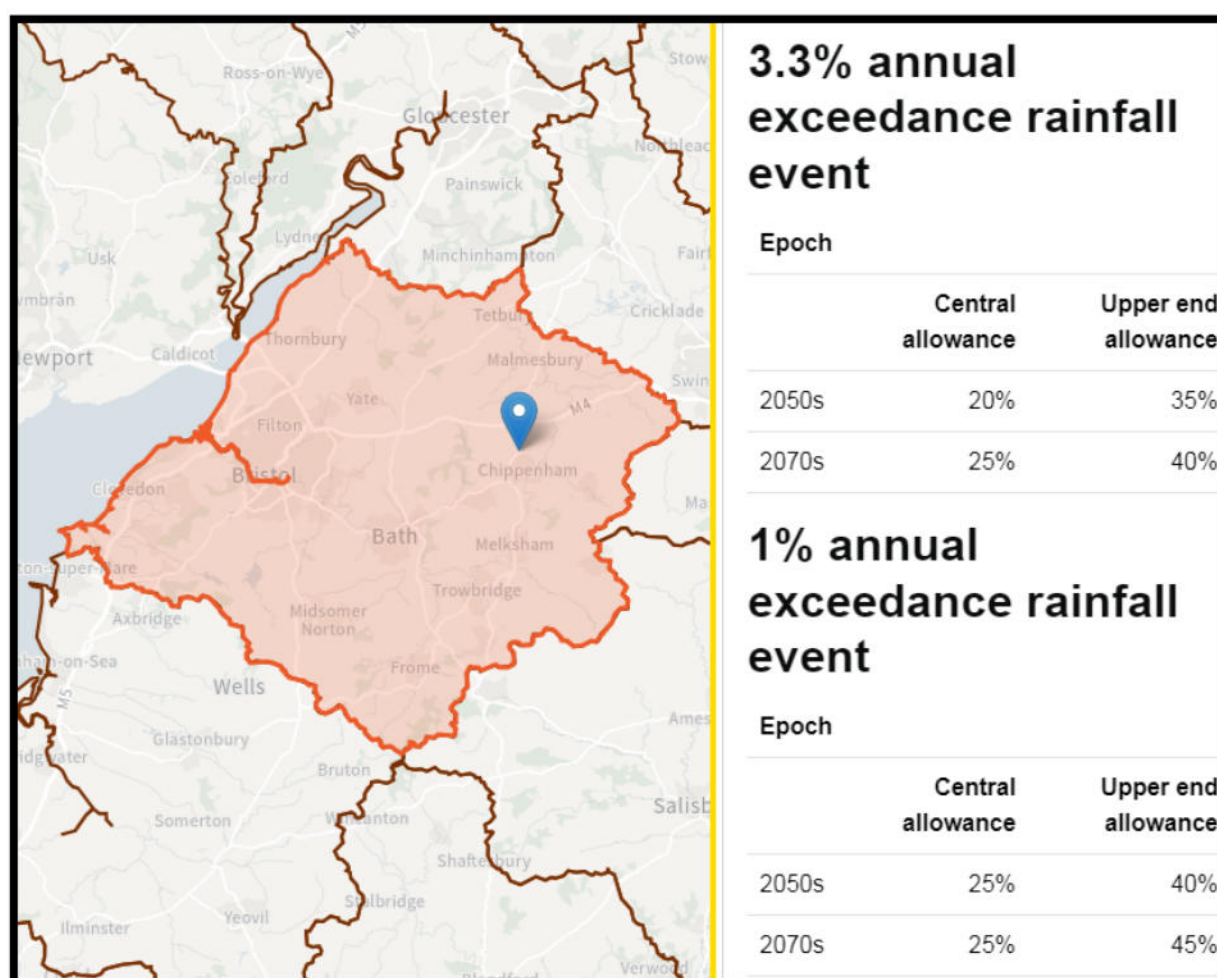


Figure 11: Climate Change (Source: Department for Environment Food and Rural Affairs)

6.5 The SuDS system proposed for the new development will consist of below ground attenuation, which is required to manage the additional runoff generated from the proposals, and to provide a betterment over existing in line with the Long Plan 2015.

6.6 The final proposed design runoff rate may vary depending on the size and capacity of the existing surface water drainage network and final hard surface area.

Attenuation Storage

- 6.7 Attenuation storage is needed to temporarily store water during periods when the runoff rates from the development site exceed allowable/feasible discharge rates.
- 6.8 The attenuation will be designed to accommodate Rainfall for the 1 in 100 years Return Period plus 45% climate change allowance
- 6.9 The SuDs train is as follows.
- *Drainage channel*
 - *SPEL ESR Bypass Treatment System*
 - *Wrapped attenuation crates*
 - *Hydro-brake at 1L/s*

Design Exceedance

- 6.10 In the event of drainage system failure under extreme rainfall events or blockage, flooding may occur within the site. In the event of the development's drainage system failure, the runoff flow should be dictated by topography on site.

Adoption and Maintenance

- 6.11 An Outline maintenance regime for below ground drainage on site is included in. See Table 6.
- 6.12 Refer to Appendix 'E' for the proposed drainage strategy / details.

Table 6: Schedule of Maintenance for Drainage

Item	Visual Inspection	Cleanse / De-sludge	CCTV Survey	Comments
Surface Water Drainage System (pipework, chambers etc.)	5 years	10 years	10 years	Cleansing to be carried as necessary.
Gullies/Channels	1 year	1 year	N/A	Cleansing to be carried as necessary.
Flow Control Devices Orifice Plate or Similar flow control	Six Monthly	As required	N/A	Inspect and remove blockage, hose down as required, check flow.
Storm Crates	Six Monthly	2 years	5 years	Sediment and debris to be removed, if required flush with jetting.

- 6.13 All onsite SuDS and drainage systems will remain private and are to be privately maintained.
- 6.14 A long-term maintenance regime should be arranged by the site owners with a managing agent for all common areas before implementation.
- 6.15 In addition to a long-term maintenance regime, it is recommended that all drainage elements implemented on site should be inspected following the first rainfall event post construction and monthly for the first quarter following construction.

Catchpit Manholes and Gullies

- 6.16 Catchpit manholes and gullies need to be inspected on a monthly basis except during the autumn leaf fall when they may require inspections to be increased to fortnightly.
- 6.17 Equipment required for inspection includes moveable barriers and cones to guard openings, manhole keys, gloves and a torch. A minimum of two people is required.
- 6.18 Catchpit manholes and gullies need to be emptied once the sump becomes half full. Emptying should be performed using a gulley emptying vacuum truck or similar device which does not require man entry.

Foul Water Manholes and Inspection Chambers

- 6.19 Foul water manholes and inspection chambers need to be inspected on a monthly basis or immediately if foul odours are present or there is a suspected blockage.
- 6.20 Equipment required for inspection includes moveable barriers and cones to guard openings, manhole keys, gloves and a torch. A minimum of two people is required.
- 6.21 If manholes show any signs of blockage, specialist contractors should be called for clearance work, without delay.

Drainage Channel Outlets

- 6.22 Drainage channel outlets need to be inspected on a monthly basis except during the autumn when leaf fall, may require inspections to be increased to fortnightly.
- 6.23 Equipment required for inspection includes moveable barriers and cones to guard openings, lifting tools, gloves, and a torch. A minimum of two people is required.
- 6.24 Silt, leaves, and debris should be cleared from the channel outlets during each inspection.

SPEL ESR Bypass/Attenuation Crates/Hydro-Brake

- 6.25 These are specialist engineering solutions.
- 6.26 In accordance with the SuDS hierarchy, infiltration was considered as the preferred drainage option. However, due to the site's underlying ground conditions, infiltration is not considered feasible.
- 6.27 It is proposed that an engineered treatment and attenuation system with controlled discharge is proposed.
- 6.28 The maintenance regime will be carried out in accordance with Appendix 'F'.

Drainage Inspection and Maintenance Records

- 6.29 Appendix 'G' includes the annual drainage record log sheet. Copies should be taken of the log sheet for use for each year's records. Each inspection should be recorded on the log sheet for that year by site owner. The log sheet shall be kept with this maintenance plan in the site owner's office for inspection.

7.0 CONCLUSION

- 7.1 Marks Heeley Ltd has been appointed by the client to undertake a Surface Water Drainage Strategy for the proposed development at Morrisons Chippenham, Stainers Way, Wiltshire, SN14 6RR
- 7.2 Following the SuDS hierarchy, it is proposed that discharge will be to the on site surface water drain at a reduced outflow.
- 7.3 A drainage channel along the leading edge of the proposed EV bays is to be installed.
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Author:	Co-Author/Checked:
	
Mark Newman <i>BSc (Hons) (Eng.)</i>	Adam Flack <i>BSc (Eng.)</i>

APPENDIX A – EXISTING SITE PLAN



DRAWING NOTES

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This drawing has been produced for the project listed below, is submitted in support of this application application to the Local Planning Authority and is not intended for use by any other person or for any other purpose.

Every effort has been made to ensure the accuracy of these drawings, however MBH Design Studio Ltd. accept no responsibility for any discrepancies arising from the reuse of survey information and preliminary drawings commissioned by the Applicant from others.

This drawing is an initial feasibility scheme and is subject to technical review and internal approvals. DNO application process may affect feasibility, provide additional information and require further review of scheme. Feasibility may be affected by other factors as the scheme progresses to working drawing stage and may also be compromised by unforeseen elements encountered on site during installation of works

Scheme Based on OS Map Dated 23.01.2024

GENERAL NOTES

- This drawing has been prepared for the sole purpose of obtaining planning permission.
- This drawing is to be read in conjunction with drawings numbered:

14313-2348-LP	Location Plan
14313-2348-BP	Block Plan
14313-2348-20	Existing Site Plan
14313-2348-21	Proposed Site Plan
14313-2348-26	EV Charger Details
14313-2348-27	Substation Enclosure Details
14313-2348-28	LV Enclosure Details
14313-2348-29	Meter Cabinet Details
- Any advertisements are indicative and are subject to a separate advertisement application
- Any neighbouring buildings shown on the elevations are diagrammatic and have been extrapolated from site photographs. They have not been measured.



REV	DATE	DESCRIPTION	DRAWN/CHECKED
REVISION NOTES			

PLANNING



MBH Design Studio Ltd.
Brook House, Apex Court, Camphill Rd, West Byfleet, KT14 6SQ
www.mbhstd.com t: 01932 352 727 f: 01932 351 545

CLIENT



PROJECT

FS2348 - CHIPPENHAM
STAINERS WAY,
CHIPPENHAM,
SN14 6RR

DRAWING TITLE

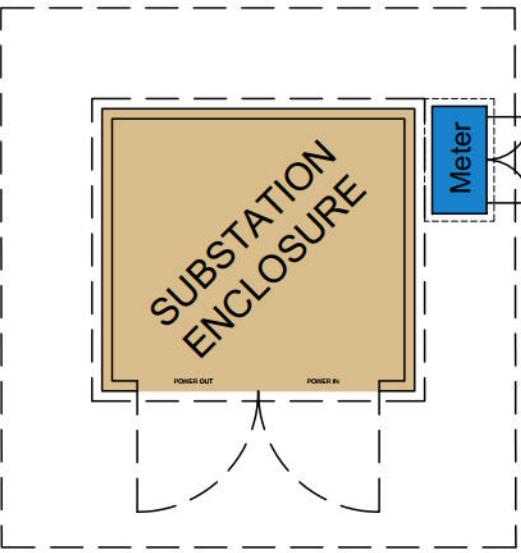
EXISTING SITE PLAN

DRAWN BY	DATE	SCALE	PAPER SIZE
KL	14.04.2026	1:200	A1
CHECKED BY	DRAWING NUMBER	REV.	
RRB	14313-2348-20	-	

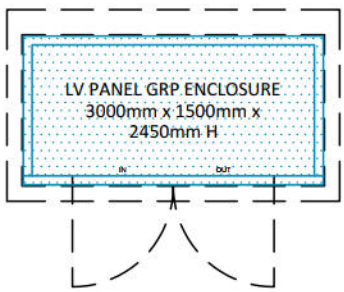
APPENDIX B – PROPOSED SITE PLAN



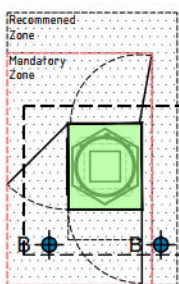
EV INFRASTRUCTURE LEGEND



DENOTES DNO HV/LV SUBSTATION
Typical GRP Enclosure 2.8m x 2.8m
All to service provider standard details
TO ICP DETAILS



DENOTES ENVICO TYPE O METERING CABINET
1065mm x 540mm x 1273mm H
GRP Housing set 300mm clear from GRP Enclosure



DENOTES BESPOKE LV PANEL GRP ENCLOSURE
TO BE SPECIFIED BY ELECTRICIAN
Unit Size 3000mm x 2600mm x 2450mm H GRP unit allowed for currently

DENOTES CHARGING POST
ALPITRONICS HYC 400

DRAWING LEGEND

- EXISTING KERB
- PROPOSED KERB
- PROPOSED DROPPED KERB
- DEMOLISHED
- EXISTING LINE WORK
- PROPOSED LINE WORKS
- PROPOSED EV BOLLARD - RAL 5015
- EXISTING FLOOD LIGHT
- PROPOSED FLOOD LIGHT
- EXISTING FENCE LINE
- PROPOSED FENCE LINE
- EXISTING GRASS
- PROPOSED GRASS
- EXISTING HEDGE
- PROPOSED HEDGE
- EXISTNG TREE
- PROPOSED TREE

DRAWING NOTES

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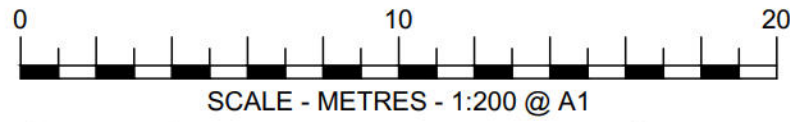
Every effort has been made to ensure the accuracy of these drawings, however MBH Design Studio Ltd. accept no responsibility for any discrepancies arising from the reuse of survey information and preliminary drawings commissioned by the Applicant from others.

This drawing is an initial feasibility scheme and is subject to technical review and internal approvals. DNO application process may affect feasibility, provide additional information and require further review of scheme. Feasibility may be affected by other factors as the scheme progresses to working drawing stage and may also be compromised by unforeseen elements encountered on site during installation of works

Scheme Based on OS Map Dated 23.01.2024

GENERAL NOTES

- This drawing has been prepared for the sole purpose of obtaining planning permission.
- This drawing is to be read in conjunction with drawings numbered:
 - 14313-2348-LP Location Plan
 - 14313-2348-BP Block Plan
 - 14313-2348-20 Existing Site Plan
 - 14313-2348-21 Proposed Site Plan
 - 14313-2348-26 EV Charger Details
 - 14313-2348-27 Substation Enclosure Details
 - 14313-2348-28 LV Enclosure Details
 - 14313-2348-29 Meter Cabinet Details
- Any advertisements are indicative and are subject to a separate advertisement application
- Any neighbouring buildings shown on the elevations are diagrammatic and have been extrapolated from site photographs. They have not been measured.



REV	DATE	DESCRIPTION	DRAWN/CHECKED
C	16.06.2026	SCHEME CHANGES	KL/RRB
B	02.06.2026	DIMS ADDED	KL/RRB/RRB
A	28.04.2026	CANOPY ADDED	KL/RRB

PLANNING



PROJECT
FS2348 - CHIPPENHAM
STAINERS WAY,
CHIPPENHAM,
SN14 6RR

DRAWING TITLE
PROPOSED SITE PLAN

DRAWN BY KL	DATE 14.04.2026	SCALE 1:200	PAPER SIZE A1
CHECKED BY RRB	DRAWING NUMBER 14313-2348-21	REV. C	

APPENDIX C – SPEL BYPASS CERTIFICATION



Surface Water Treatment Device Performance Declaration

Product Details	Description
Manufacturer	SPEL Products
Treatment Device Name/Model	Stormceptor Type 210 C1/SC
General description	Class 1 By-pass Separator with Silt Capacity
Envisaged application	Treatment of Surface Water Run-off
Pollutant(s) captured	Suspended Solids

Test	Value	Unit
Treatment device capacity	3200	litres
Sediment Storage capacity	1000	litres
Treatment Flow rate	10	l/s
Connected Area	1,333	m ²
Pollution retention flow rate	10	l/s

Parameter	Value	Unit
Maximum capacity flow rate	100	l/s
Device head loss (at treatment flowrate)	0.15	m
Device head loss (at maximum capacity treatment flowrate)	—	m
TSS capture and retention efficiency (Milisil W4 test sediment)	82	%
Zinc capture efficiency (if tested)	Not tested for dissolved metals	%
Zinc retention efficiency (if tested)	Not tested for dissolved metals	%
Copper capture efficiency (if tested)	Not tested for dissolved metals	%
Copper retention efficiency (if tested)	Not tested for dissolved metals	%
Dissolved Metals reduction	0.0	%
Particulate metals reduction*	61.5*	%
Total Metals reduction*	61.5*	%
Total Metals Mitigation Index	0.615*	—

* Extrapolated value in accordance with British Water How to Guide: Applying the CIRIA The SuDS Manual (C753) Simple Index Approach to Proprietary / Manufactured Stormwater Treatment Devices. Version 7, Section 4.3, (2021- under pre-publication review).

CERTIFICATE

LIGHT LIQUID SEPARATOR TEST PERFORMANCE CERTIFICATE

Compliance with Clause 8.3.3 of BS EN 858

Separator make and model number: SPEL STORMCEPTOR 330C1/SC NSB30
As detailed in SPEL Drawing SSP 9076

The separator tested complied with the drawing provided by the manufacturer and no additional features were noticed

Test date: 12 October 2006

Designated/nominal flow rate, Qw (litres/second): 30 litres/s

Net capacity of separator (excluding any allowance for silt storage), Vk (litres): 5050 litres

Total duration of test (minutes): 20 min

Running-in period (≥ 15 minutes): 15 min

Sampling period (minutes): 5 minutes common to all tests

Oil flow rate (based on 0.5% of water flowrate, litres/second): 0.15 litres/s

Temperature of oil ($^{\circ}\text{C}$): 16.2

Temperature of water ($^{\circ}\text{C}$): 15.6

Temperature of air ($^{\circ}\text{C}$): 16.8

Analysis of samples by IR spectroscopy carried out by: Intertek Caleb Brett Testing Services*

Date of results: 16 October 2006

Sample	Oil concentration (mg/l)**
--------	----------------------------

1	0.1
---	-----

2	0.5
---	-----

3	<0.1
---	------

4	0.6
---	-----

5	0.2
---	-----

Resulting average:	0.3mg/l
--------------------	---------

Name

Date

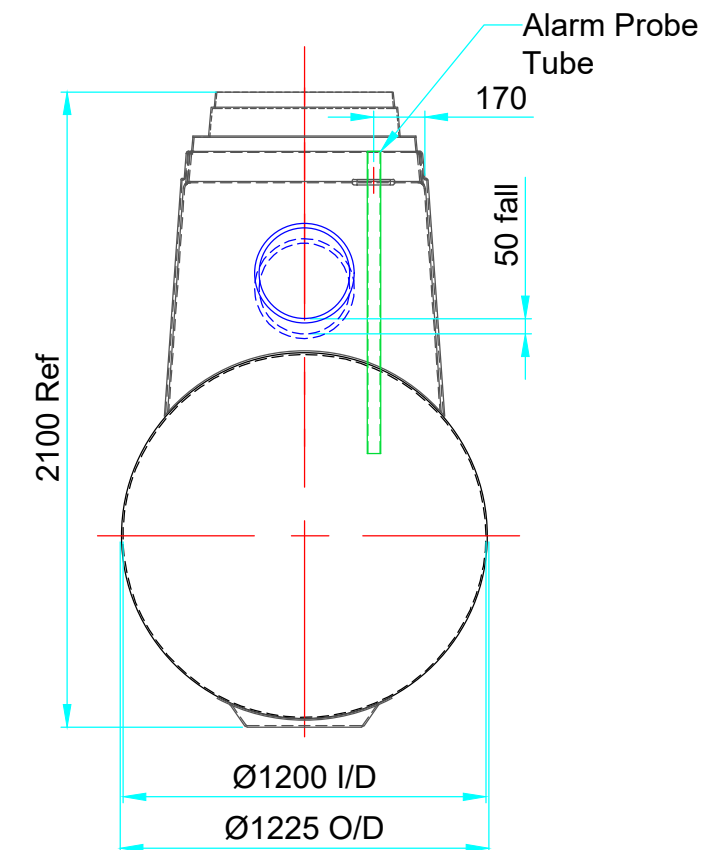
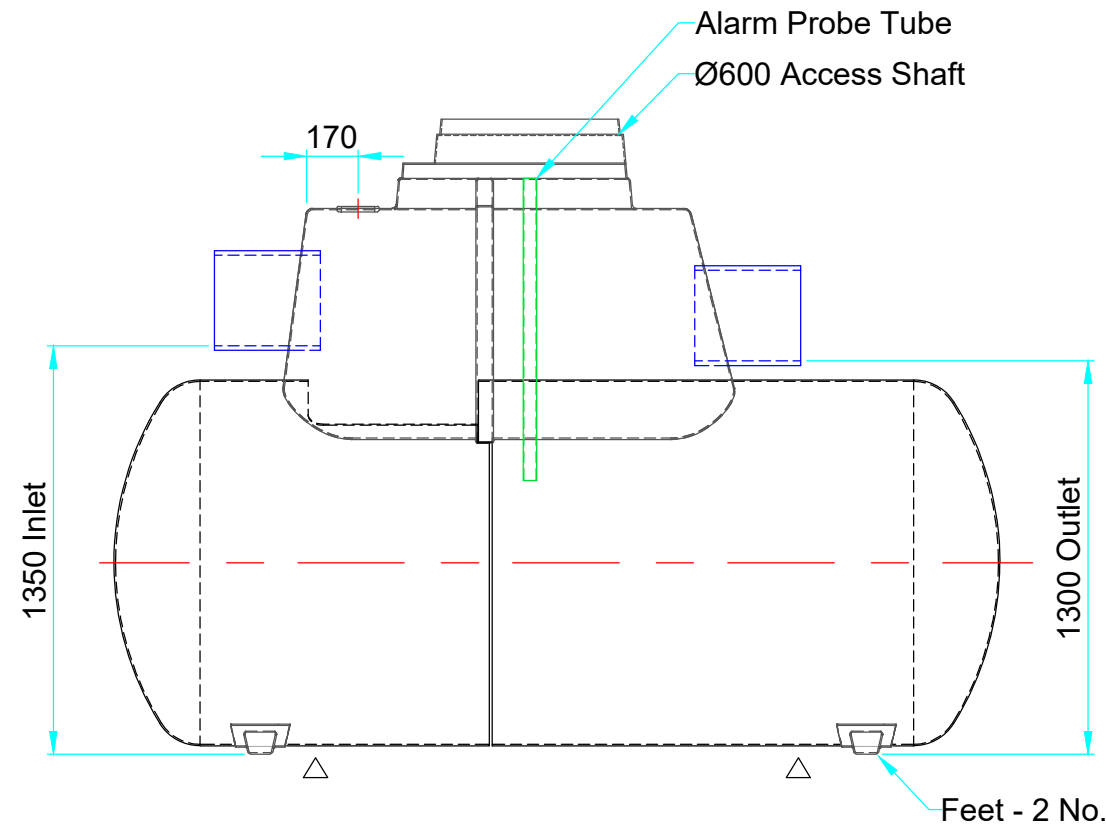
Manuela Escameira 17/10/06

For and on behalf of HR Wallingford Ltd.

* NAMAS accredited laboratory

** Value of baseline concentration deducted

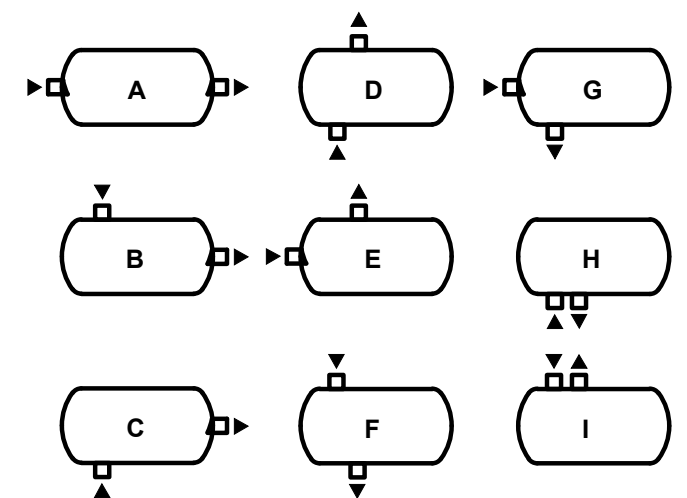
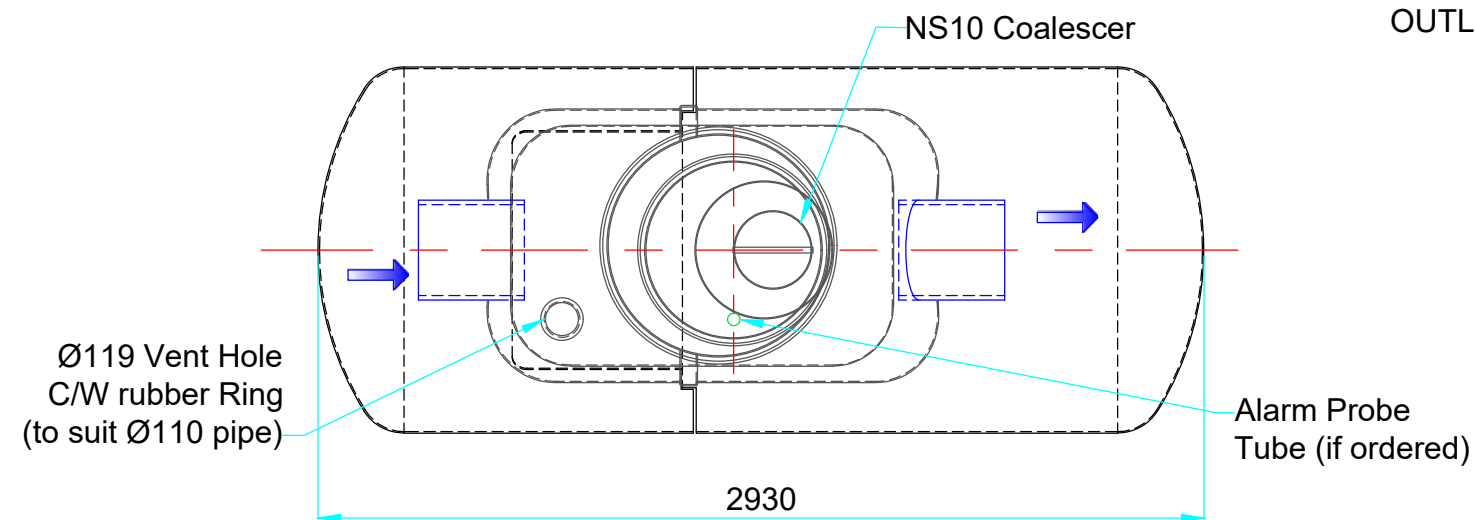
APPENDIX D – SPEL DRAWING



Orientation - A

INLET - Ø300 Quantum Plain Spigot

OUTLET - Ø300 Quantum Plain Spigot



Nine Inlet/Outlet options are available to assist with design and installation

Key to Symbols: Lifting Point

Hold-down strap rib locations where mechanical anchoring is required

Manufacturing Joint

BoQ's reference no.

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SPEL PRODUCTS

DIMENSIONS ARE SUBJECT TO DIMENSIONAL TOLERANCES. If critical, check physically prior to installation

Water table & Burial Depth:
The customer must check tank specification is compatible with ground water table level (in winter) and burial depth. If in doubt refer to SPEL Data Manual Section 7 or contact SPEL Products Sales or Technical Department

Title: **SPEL 200 Series ESR Bypass Treatment System 210C1/ESR Orientation (A-I)**

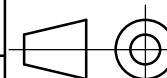
Contract:

Capacity

--

Tank Specification

Laminate Specification



All sizes in mm
If in doubt ASK!



Lancaster Road, Shrewsbury
Shropshire, SY1 3NQ, England
Telephone: +44 (0)1743 445200
www.spelproducts.co.uk

Drawn

Checked

Date

Scale 1:25 Sheet A3

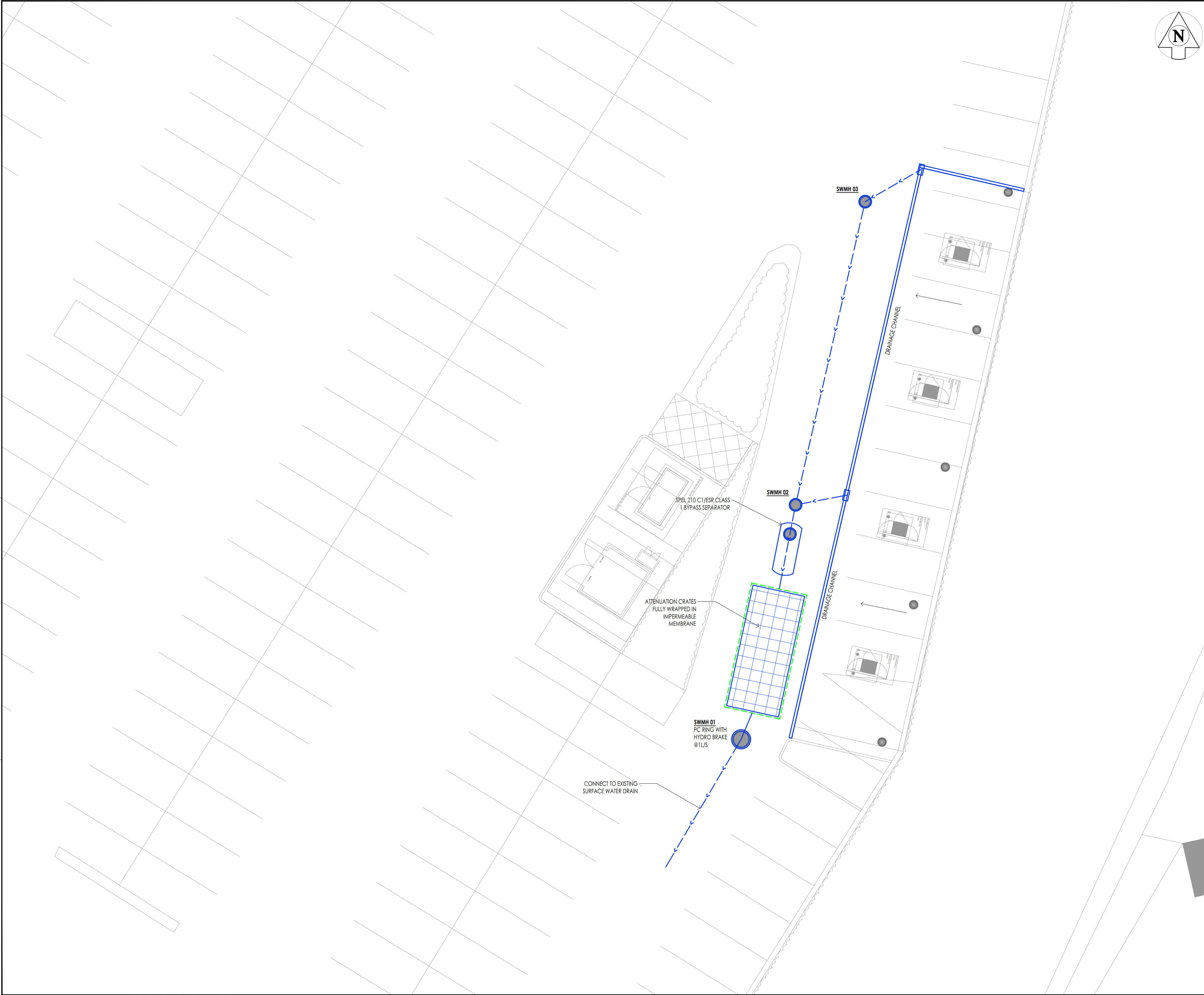
TANK SERIAL No.

INTERNAL ORDER No.

Revision

A

APPENDIX E – DRIANAGE PROPSOAL



- GENERAL NOTES:
1. This drawing is copyright (C).
 2. This drawing is to be read in conjunction with all relevant drawings and specifications.
 3. This drawing shall not be scaled: use only figured dimensions. All dimensions are shown in millimetres and levels in metres above OS Datum.
 4. Dimensions and conditions shall be verified on site. Any discrepancies between this drawing and site conditions shall be brought to the attention of the Engineer for resolution prior to placing orders or construction.
 5. All work shall comply with the Building Regulations and the requirements of the Local Authority, current Codes of practice and British Standards.
 6. Dimensions indicated thus:- are to be confirmed on site.
 7. For remainder of notes see drg no.H18140-BV-100.
 8. Our design is based upon the assumptions: Existing blockwork is assumed to be 100mm 3.5N in 1:8 mortar. Existing brickwork to be 20.5N in 1:8 mortar. Existing timbers to be grade C16. Unites assumed to exist over all existing openings. Wall ties assumed to be in good condition. Assumed minimum party wall thickness to be 220mm solid masonry wall construction.
 9. Waterproofing details shown are indicative only. Architect to confirm final details.
 10. Splice requirements to new steel beams to be allowed for by contractor as required. Splice design assumed responsibility of fabricator, unless specifically requested of S.Eng.
 11. All structural steelwork shall be to BS EN 10025 & BS EN 10210, Grade S355 unless noted otherwise. All beams to be CE marked.
 12. High risk of saturation and freezing (masonry most vulnerable is situated 150mm above and 150mm below finished ground level) durability classification to be a MX3.2, F2, S2 or S1*

DRAINAGE KEY

— — — — — PROPOSED SURFACE WATER DRAINAGE

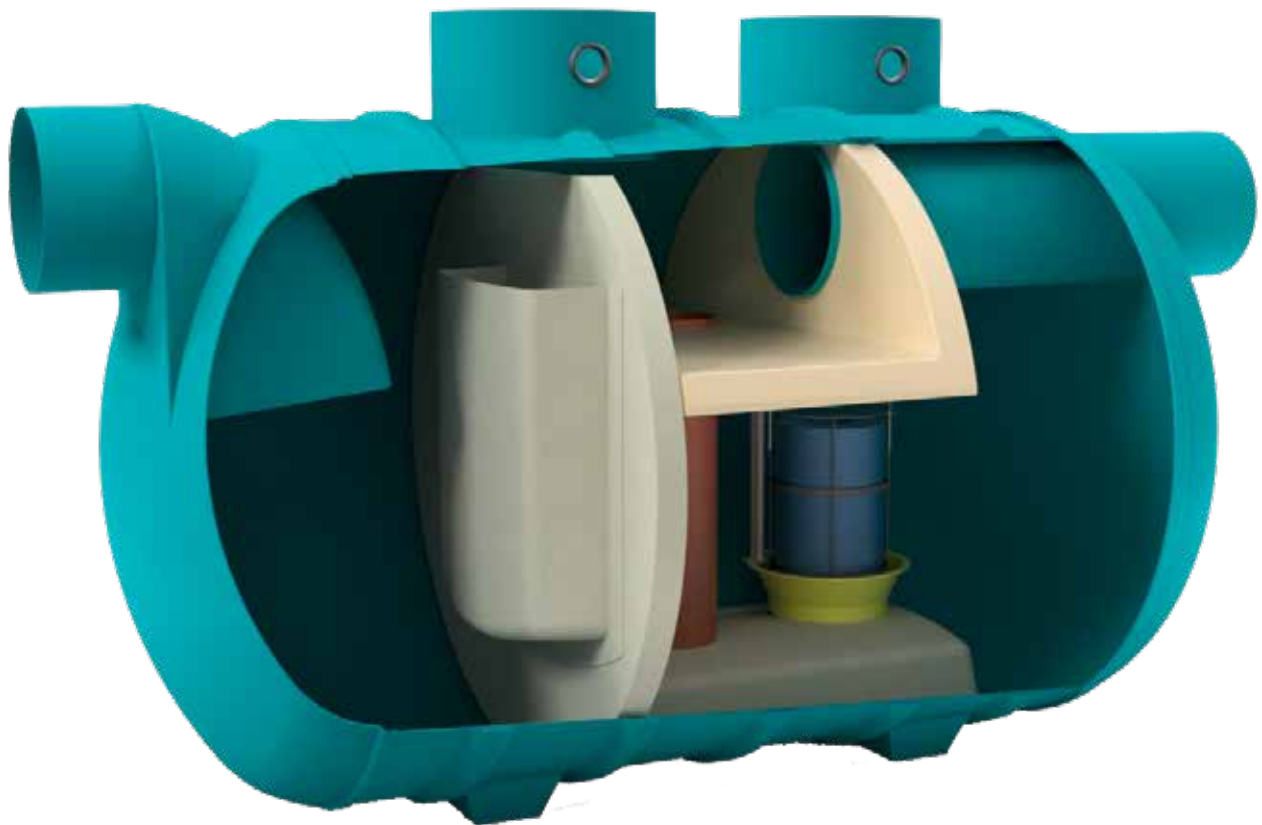
AWAITING UNDER GROUND DRAINAGE SURVEY
INFORMATION TO FINALISE DESIGN

SETTING OUT DIMENSIONS,
WALLS AND LEVELS TO
ARCHITECTS' DRAWINGS

PRELIMINARY

Rev	Description	By	Date	Chk'd	Auth
MARKS HEELEY CONSULTING STRUCTURAL AND CIVIL ENGINEERS					
Client mfg motor fuel group					
Project MORRISONS CHIPPENHAM STAINERS WAY WILTSHIRE, SN14 6RR					
Title PROPOSED DRAINAGE STRATEGY					
Sheet Size A1	Original Scale 1:100	Designed/Drawn JB	Checked MN	Authorised MN	
Status P	Drawing Number H18140-BV-100	Date 30.06.27	Date 30.06.27	Date 30.06.27	Rev -

APPENDIX F – MAINTENANCE



SPEL ESR™ Bypass

SuDS Treatment System

Operation & Maintenance Manual

SPEL ESR™ Bypass Operation & Maintenance

Introduction

With correct and consistent care, and by following a few simple guidelines, your system will give you many years of dependable service.



Installation

For installation guidance, see SPEL Data Manual, Section 7.

All applicable health and safety regulations must be followed.

IMPORTANT

In the unlikely event of the chamber having to be entered ensure absolutely that all Workplace Health & Safety directives and Confined Space Regulations are strictly adhered to.

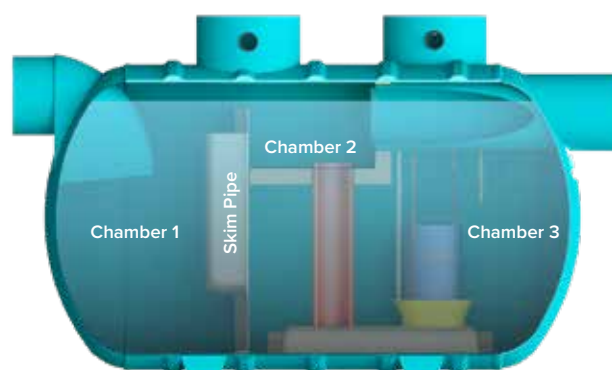
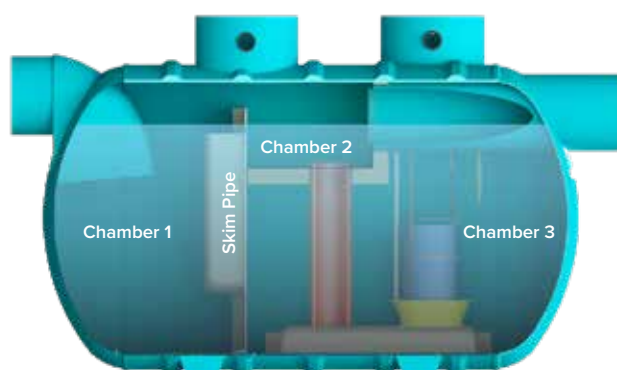


SPEL ESR™ Bypass SuDS Treatment System

Operation

The SPEL ESR™ Bypass system is a SuDS Compliant treatment device designed to treat up to the 1 in 1 year return storm event with the excess flow being allowed to bypass the treatment stage (see diagrams below). Engineers will have specified our ESR Bypass System to cope with and treat the flow from the connected catchment area, with the complete operation being contained within the SPEL system.

The installation of your SPEL ESR™ system should have included commissioning by a qualified person, SPEL can offer a full commissioning service and/or a post-commissioning system check, together with relevant certification.



Flows according to nominal size (NSB)

The polluted surface water first enters the primary chamber where silt settles out and is retained. The fuel, oil and other pollutants lighter than water, rise to the surface and are efficiently skimmed off and transferred to the separation chamber.

In normal conditions all the flow is through the separation chamber, where the quiescent conditions allow the pollutants to separate out efficiently. Water from the cleanest zone in the separation chamber flows through a coalescer unit, to remove smaller globules of oil, up to the junction chamber and thence to the outlet

Storm flows above NSB

During a storm the level in the primary chamber rises and the stormwater passes over the weir into the junction chamber and to the outlet.

The design keeps the turbulence within the separation chamber to a minimum which avoids disturbing the contaminants retained.

Chamber 1

The inlet connects directly into chamber 1 - the primary chamber where silt and other heavy pollutants are deposited and light liquids are skimmed off to be transferred to the main separation chamber, chamber 3.

Maintenance requires the removal of accumulated silt and other heavy pollutants, checking the skim pipe is not blocked and removing floating debris.

Chamber 2

This is the junction chamber where the clean water passing out of the main separation chamber and the storm flow over the weir from the primary chamber meet and pass to the outlet. This chamber is an approved sampling point if samples are required for analysis. As it is mainly clean water passing through the chamber, maintenance is confined to checking the weir plate is free of debris.

Chamber 3

The main separation chamber is where the light liquids are retained and, in the case of ESR Bypass Systems, where the coalescer units are incorporated.

The coalescer units should be removed and cleaned in accordance with the requirements set out on Page 5.

Retained light liquids should be removed from the top and any sediment from the bottom. Smaller Bypass systems generally need to be completely emptied.

SPEL ESR™ Bypass SuDS Treatment System

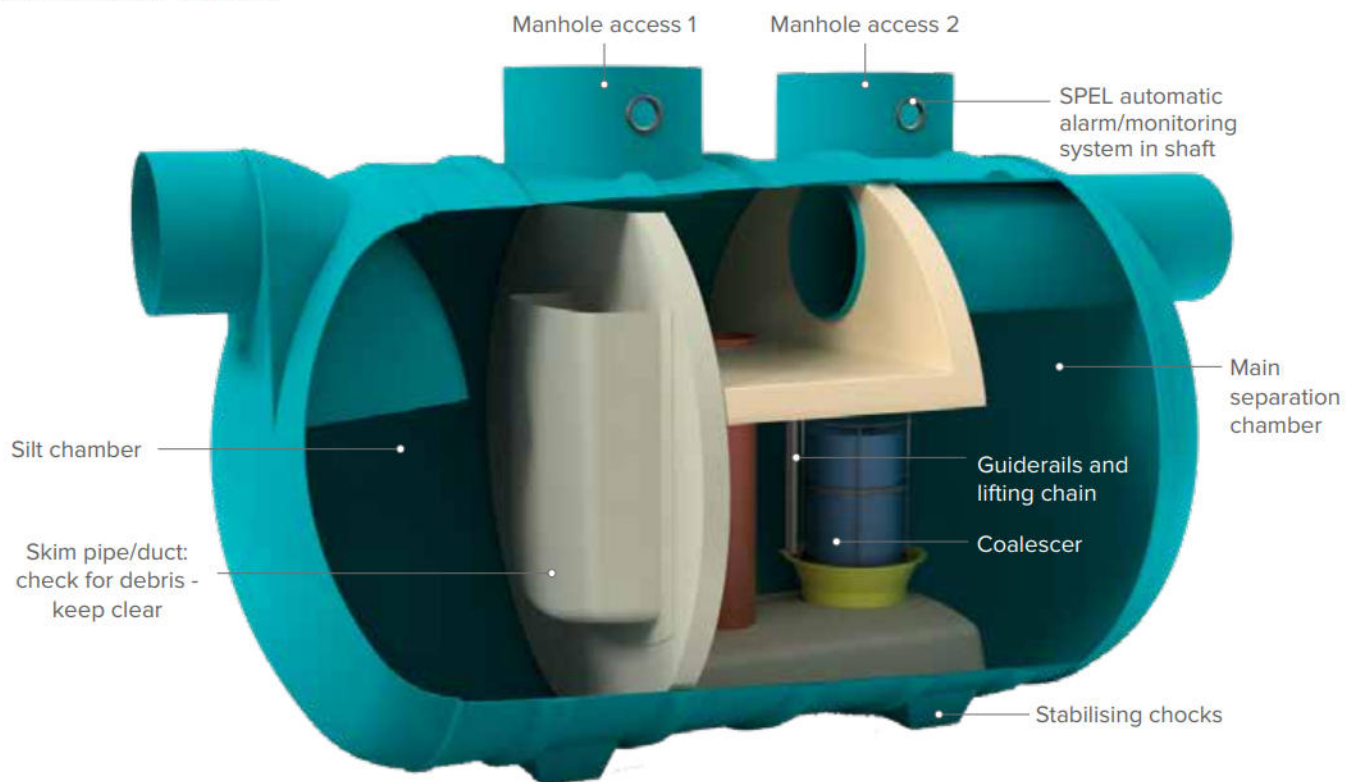
The SPEL ESR™ Bypass System is fully certified to meet the CIRIA SuDS Mitigation Index. It has been tested by WRc to the British Water Code of Practice for Manufactured Treatment Devices. This unit is also certified to the British and European Standard BS EN 858 by HR Wallingford. SPEL ESR Bypass systems are designed for long term performance and with SPEL high volume coalescer units, low maintenance.

SPEL ESR™ Bypass Systems are manufactured in class 1 models and with silt capacity in accordance with BS EN 858-1. The range of models is listed in the SPEL Data Manual or on the SPEL website.

SPEL automatic alarm/monitoring systems will automatically warn you when the SPEL ESR™ Bypass System requires emptying of light liquids and/or silts (depending on the alarm system chosen). However, regular inspections are recommended at intervals to suit the site conditions. We recommend the SPEL ESR™ Bypass System is checked at 3, 6, or 12 monthly intervals to ensure correct operation of the treatment device, alarm and check the pollutant levels.

Where a SPEL automatic alarm/monitoring system is not fitted, the SPEL ESR™ Bypass System should be checked at 3, 6, 12 monthly intervals, depending upon site conditions, to determine the depth of retained pollutants. When the depth of light liquids retained has reached the predetermined design level in accordance with the European Standard BS EN 858-1, or if excessive silt has accumulated, it should be emptied.

Maintenance Access



A wide range of SPEL ESR™ Bypass treatment devices are available incorporating coalescer unit/s for small to large catchment areas.

When emptying ensure both chambers (primary – chamber 1 and separation – chamber 3) are emptied equally to prevent unequal pressure on the internal partition.

Manhole access 1

This is the access to the primary chamber for removal of silt, the inspection of the skim pipe and clearing of any floating debris.

This also provides access to the junction chamber which is suitable as a sampling point for the final discharge.

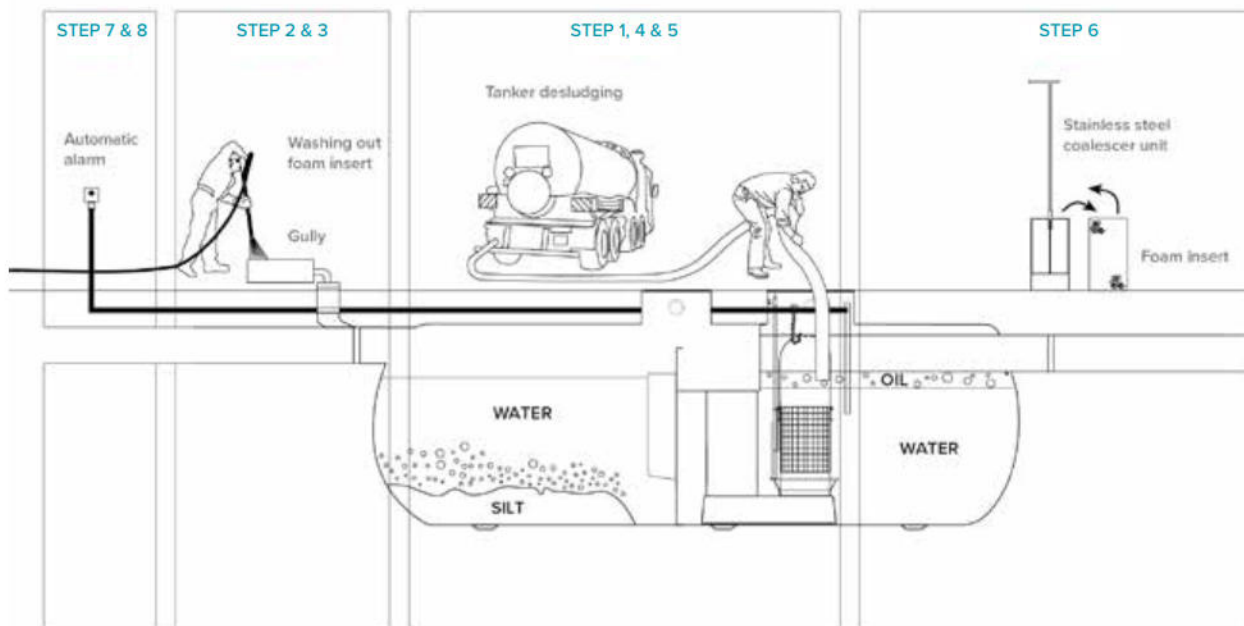
Manhole access 2

This provides access for the inspection, the removal and reinsertion of the coalescer units and the removal of hydrocarbons and silt. The SPEL automatic alarm/monitoring system probe is generally situated at in a probe protection tube in this access shaft (see section on alarms).

This is an example, exact number and location of access shafts will depend on exact model chosen.

SPEL ESR™ Bypass SuDS Treatment System

Maintenance



Important Note: When emptying, ensure both chambers are emptied equally starting with the silt retention chamber and then the coalescer chamber and back again until empty.

STEP 1

Sucking out oil/fuel

Suck off as much retained oil from both chambers of the ESR System as possible. This prevents oil coating the surface of the coalescer if this is removed first.

STEP 2

Coalescer Unit

Using the lifting handle, chain or wire rope, lift the coalescer unit out of the tank and place upstream of the ESR System.

STEP 3

Cleaning
Foam Insert

Remove foam insert and wash with normal water pressure ensuring the dirty water runs into the ESR System.

STEP 4

Sucking out silt

For Intermediate Maintenance, the use of a tanker with a rigid suction pipe can suck out the silt from the base of the system, without the need to empty the complete unit.

Note: For Intermediate Maintenance, go to Step 6.

STEP 5

Sucking out
complete contents
(if necessary)

For a Full Maintenance (at least once every 5 years, as recommended by EA, SEPA and NRW) the complete contents will need to be emptied and a structural and component check conducted.

Note: SPEL Recommend the replacement of coalescer unit(s) at all Full Maintenance intervals.

STEP 6

Re-insert coalescer unit

Re-insert the foam insert into the stainless steel coalescer basket and re-insert the coalescer unit into the ESR System. Re-position the lifting handle, chain or wire rope.

STEP 7

SPEL automatic alarm
monitoring system

The SPEL automatic alarm/monitoring system probe should be lifted out of the probe protection tube, wiped clean and re-inserted. The system should now be reset according to instructions. See Section 8 (Alarms) in the SPEL Data Manual.

STEP 8

Test SPEL automatic alarm

To test an alarm is working, ensure the previous step has been carried out.

Following this, an oil or silt alarm should sound when clean and dry and in contact with air, therefore, holding it in the air should set off the alarm on the control panel. For high level liquid alarms, putting them in water should set off the alarm.

SPEL Coalescer System

Important: ensure all coalescers are correctly seated in the coalescer cone following maintenance. The SPEL Coalescer Guide Rail or 3L System helps ensure correct seating.

SPEL Coalescer

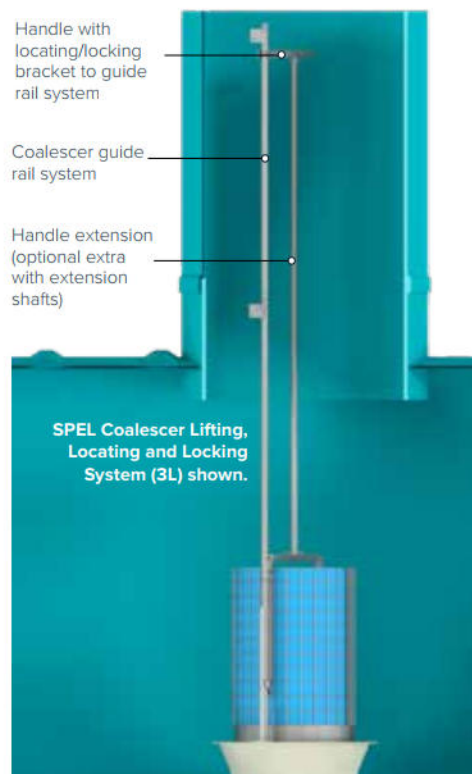
Normal servicing of the smaller SPEL systems frequently requires emptying the unit completely providing access for the coalescer units to be taken out, cleaned and returned and guided accurately to their seating positions. However larger SPEL systems may only require the hydrocarbon pollutants and silt to be removed.

In order to limit the servicing to sucking off the fuel/oil from the top and the silt from the bottom guide rails are required to ensure coalescer units are replaced into their correct positions.



SPEL Coalescer Lifting, Locating and Locking System (3L)

The SPEL 3L System has all the benefits of the below SPEL Guide Rail System and includes a locking mechanism and rigid lifting handle, this locks the coalescer in position and makes for easier lifting and locating.



SPEL Coalescer Guide Rail Systems

SPEL Guide Rail Systems are optional but strongly recommended for all tanks with deeper inverts or larger than 300 Series (1.8m dia.).



SPEL Coalescer System without Guide Rails

Optional lifting chains available for ease of maintenance.

Automatic Alarms/Monitoring Systems

Alarm systems are available for all SPEL Systems. These include probes for oil, silt and high level. There are also a range of control panels including solar power, more detail on our alarm systems can be found in Section 8.

Maintenance procedure

The SPEL automatic alarm/monitoring system will automatically warn you when the treatment system requires emptying. Where a SPEL automatic alarm/monitoring system is not fitted, SPEL systems should be checked at three, six or twelve-monthly intervals depending on site conditions, to determine the depth of retained pollutants and silt in both chambers. When the depth of the oil/fuel retained has reached the predetermined design level, in accordance with BS EN 858-1, it should be emptied.

Control Panels



Mains Powered Separator Alarms

For silt, oil and high level detection, compatible with the below alarm probes.

Solar Alarms

Available with optional flashing beacon, and GMS/ SMS communication, also compatible with the below alarm probes.

Alarm Probes



idOil-OIL oil probe

Detects oil and indicates when the treatment system's oil storage is full.

This probe is required in order for a treatment device to comply with BS EN 858.



idOil-SLU silt probe

Monitors the silt layer in the treatment system and indicates when the silt layer has reached its maximum level.



idOil-LiQ high liquid level probe

Indicates when the liquid level in the treatment system rises excessively e.g. in an outlet blockage situation.

Kiosks for externally mounted alarm/control panels are available. See Section 8 of our Data Manual for further detail.



Warranty

SPEL Underground Tank Shells

We warrant that our SPEL Tankstor® and Separator underground tank shells, as identified by the serial number, if installed strictly in accordance with the company's relevant installation procedure as detailed in the SPEL Data Manual, Section 7, Installation Guidance and verified with an 'as built' installation drawing prepared by a qualified design consultant or an approved person and stage photographs to show the methods adopted from start to completion having in mind particularly:- ground conditions, invert depth, water table depth in winter, external loading, type and quality of backfill material, will

1. providing our published specifications and installation requirements are fully met the shell laminate integrity will last for a period of twenty-five years following date of original delivery/collection.
2. not fail for a period of twenty-five years from the delivery/collection date due to external corrosion; and
3. not fail for a period of twenty-five years from the delivery/collection date due to internal corrosion provided the tank is solely used for:-

Rainwater storage

Potable water at ambient temperatures

Fuel/oil contaminated surface rainwater

Domestic sewage

For other applications the life expectancy will be determined by the contents, the operating conditions and the resin system/reinforcement specification used.

SPEL GRP Extension shafts come with a 12 month warranty as long as they are installed in-line with the SPEL Data Manual Section 7 Installation Guidance and verified with verified with an 'as built' installation drawing prepared by a qualified design consultant or an approved person and stage photographs to show the methods adopted from start to completion having in mind particularly:- ground conditions, invert depth, water table depth in winter, external loading, type and quality of backfill material.

Our liability under this warranty is set out in SPEL General Conditions of Sale available on request. In brief they shall be limited to, at our option,

- (1) repair of the defective tank
- (2) delivery of a replacement tank to the original site or
- (3) refund of the original purchase price.

We shall not be liable for any labour or other installation costs, indirect or consequential loss, damage or other damages in connection with such tanks.

Accessory warranties do not extend beyond the warranty period by our suppliers. This applies to such items as access covers and frames, monitoring equipment, Bauer type connections for emptying, pumping equipment or any accessories as defined in the company's official order acknowledgement/invoice.

The foregoing constitutes our exclusive obligation and we make no express or implied warranties, or any warranty of merchantability or fitness for any particular purpose whatsoever, except as stated.

Maintenance Log

Site Visit and Maintenance Carried Out

Company		Address	
Model Number		Asset Number/Location	
Serial Number		Installation Date	

Date	Visual Check	Oil Probe Clean/Check	Silt Probe Clean/Check	Control Panel Check/Test	Tank Empty	Coalescer Check/Clean	Coalescer Replacement	Structural Check
Tick all that apply								
Comments/Observations Date of Next Service:								

Date	Visual Check	Oil Probe Clean/Check	Silt Probe Clean/Check	Control Panel Check/Test	Tank Empty	Coalescer Check/Clean	Coalescer Replacement	Structural Check
Tick all that apply								
Comments/Observations								
Date of Next Service:								

Date	Visual Check	Oil Probe Clean/Check	Silt Probe Clean/Check	Control Panel Check/Test	Tank Empty	Coalescer Check/Clean	Coalescer Replacement	Structural Check
Tick all that apply								
Comments/Observations								

Date of Next Service:

Maintenance Log

Site Visit and Maintenance Carried Out

Company		Address	
Model Number		Asset Number/Location	
Serial Number		Installation Date	

Date	Visual Check	Oil Probe Clean/Check	Silt Probe Clean/Check	Control Panel Check/Test	Tank Empty	Coalescer Check/Clean	Coalescer Replacement	Structural Check
Tick all that apply								
Comments/Observations Date of Next Service:								

Date	Visual Check	Oil Probe Clean/Check	Silt Probe Clean/Check	Control Panel Check/Test	Tank Empty	Coalescer Check/Clean	Coalescer Replacement	Structural Check
Tick all that apply								
Comments/Observations								
Date of Next Service:								

Date	Visual Check	Oil Probe Clean/ Check	Silt Probe Clean/ Check	Control Panel Check/Test	Tank Empty	Coalescer Check/ Clean	Coalescer Replacement	Structural Check
Tick all that apply								
Comments/Observations								

Date of Next Service:

Maintenance Log

Site Visit and Maintenance Carried Out

Company		Address	
Model Number		Asset Number/Location	
Serial Number		Installation Date	

Date	Visual Check	Oil Probe Clean/ Check	Silt Probe Clean/ Check	Control Panel Check/Test	Tank Empty	Coalescer Check/ Clean	Coalescer Replacement	Structural Check
Tick all that apply								
Comments/Observations Date of Next Service:								

Date	Visual Check	Oil Probe Clean/Check	Silt Probe Clean/Check	Control Panel Check/Test	Tank Empty	Coalescer Check/Clean	Coalescer Replacement	Structural Check
Tick all that apply								
Comments/Observations Date of Next Service:								

Date	Visual Check	Oil Probe Clean/Check	Silt Probe Clean/Check	Control Panel Check/Test	Tank Empty	Coalescer Check/Clean	Coalescer Replacement	Structural Check
Tick all that apply								
Comments/Observations								
Date of Next Service:								

Operation & Maintenance

With SPEL Products

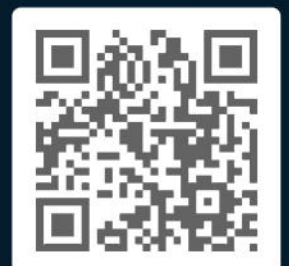
A guide that outlines the best practices, ensuring your SPEL system is achieving the best results for longer.



Lancaster Road, Shrewsbury, Shropshire SY1 3NQ

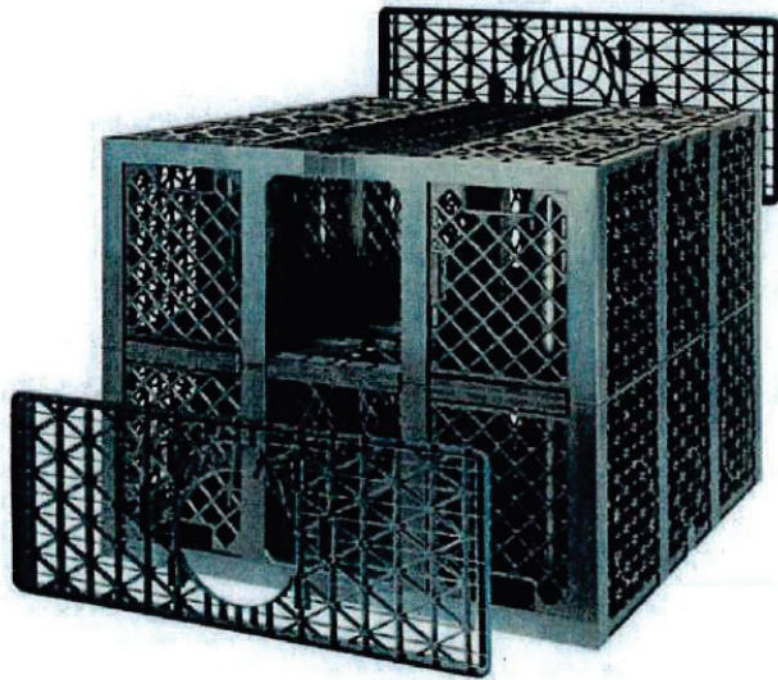
Phone: +44 (0)1743 445200

Email: info@spelproducts.co.uk / sales@spelproducts.co.uk

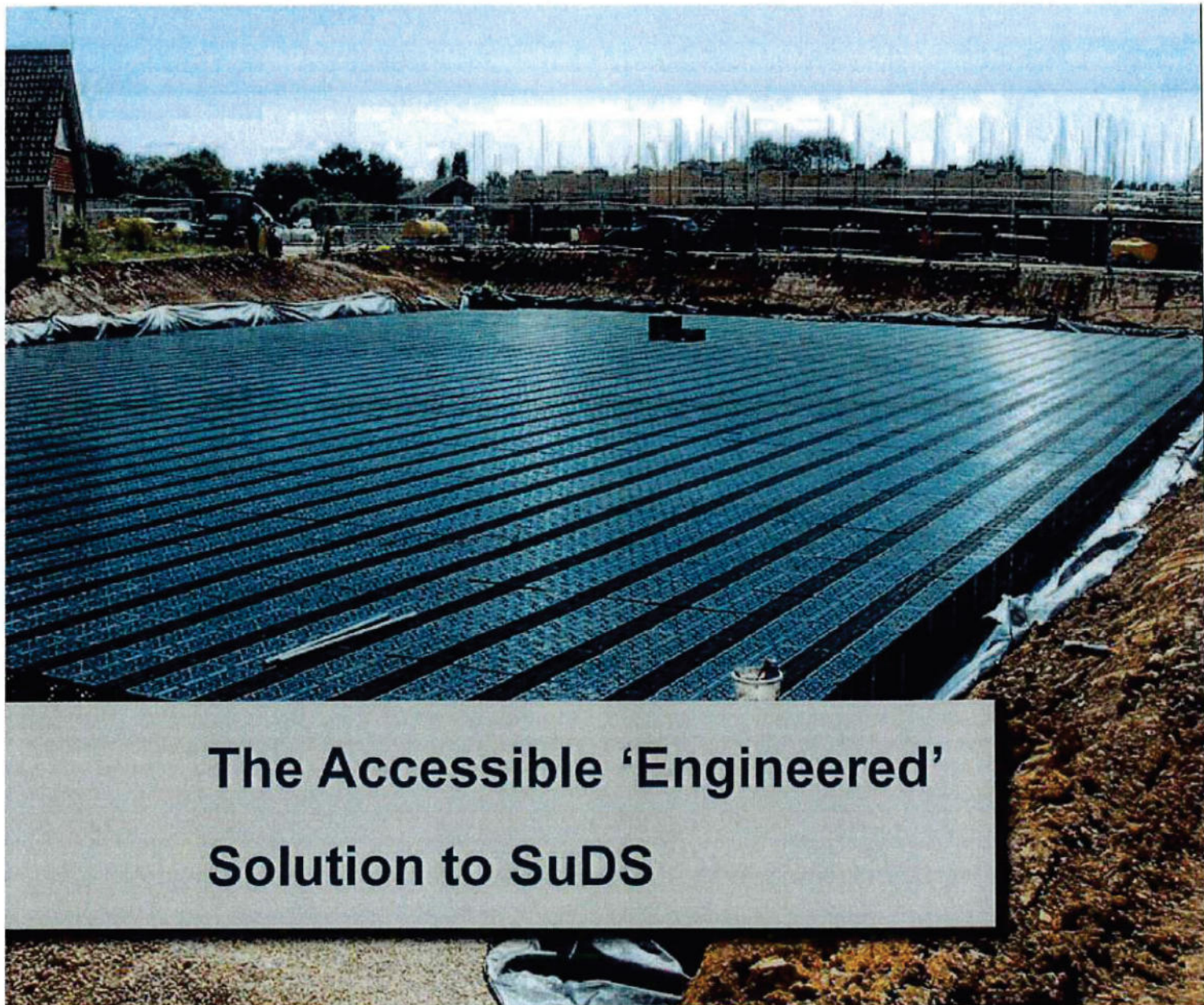


spelproducts.co.uk

15/07



Stormbloc® User Manual



The Accessible 'Engineered' Solution to SuDS

SuDS / Source Control

Regulatory and guidance documents such as PPS 25 and Building Regulations are putting increasing demands on developers and engineers to consider sustainable drainage systems (SuDS) wherever possible and to incorporate source control approaches into surface water drainage systems.

*"Sustainable drainage systems (SuDS) are increasingly being used to mitigate the flows and pollution from runoff. The philosophy of SuDS is to replicate as closely as possible the natural drainage from a site before development and to treat runoff to remove pollutants, so reducing the impact on receiving watercourses. This requires a reduction in the rate and volume of runoff from developments, combined with treatment to remove pollutants as close to the source as possible."*¹

¹ CIRIA C609 (2004) - Sustainable Drainage Systems - Hydraulic, structural and water quality advice.



Maintenance Instructions

The patented inspection / maintenance tunnels within each Stormbloc® module allows almost the entire volume of the construct to be inspected via CCTV camera and flushed through.

A catchpit chamber immediately upstream of the system is recommended as this will reduce the amount of silt entering the installation. For larger installations it may also be advantageous to add further catchpits to the system design or an advanced vortex silt trap such as the Downstream Defender® by Hydro International. The collection sump(s) should not be allowed to overfill as this will lead to silt carry-over into the Stormbloc® modules.

As all schemes are different, the frequency at which the catchpit(s) should be emptied will need to be determined on site. For small soakaways and individual infiltration tanks it will generally only be necessary to ensure that the catchpits / silt traps are free from debris such as leaves or sediment. It is recommended that any system be inspected no less frequently than at monthly intervals for the first 3 months and thereafter at 6 monthly intervals. In addition, it is suggested that the installation is inspected immediately following the first storm event, whenever this should occur post installation.

Individual maintenance schedules should be drawn up using the information obtained from the initial inspections. It should also be noted that more regular inspections may be required should the catchpit(s) fill more frequently and/or if the initial inspections reveal that maintenance / cleaning will be required more regularly than at six month intervals.

Flushing of the system can be achieved using a jetting system with a 150 bar pump pressure (ie. approximately 80 bar at the nozzle) at a discharge flow of 300 l/min. The jet nozzle should be introduced to the system via the Stormbloc® Inspect / manhole and the integral inspection / maintenance tunnel. The silt should be flushed to the Stormbloc® Inspect or catchpit manhole and removed from there.

References

- 1 Water Research Centre (2001)
Sewers for Adoption 5th Edition.
- 2 Department for Transport, Local Government and the Regions (2001).
Planning Policy Statement (PPS), Note 25: Development and Flood Risk.
- 3 The Building Regulations 2000 (amended 2001).
Approved Document H3.
- 4 British Standards Institute (1973).
CP312: Part 1: 1973 British Standard Code of Practice for Plastics Pipework (Thermoplastics Material). General Principles and Choice of Material.
- 5 Building Research Establishment (1991).
BRE Digest 365, Soakaway Design.
- 6 Construction Industry Research and Information Association (1995).
CIRIA Report 156 Infiltration Drainage - Manual of Good Practice.
- 7 Construction Industry Research and Information Association (1997)
The SUDS Manual (C. 697).
- 8 Micro Drainage.
The Micro Drainage Suite of Programs.
Website: www.microdrainage.co.uk
- 9 Hydro International.
Stormcell® User Manual.
- 10 Hydro International.
Stormwater Package Brochure.
- 11 WTB Geotechnics
SC Membrane: Technical Data Sheet.
- 12 WTB Geotechnics
AZTEX SPR14 Geotextile Technical Data Sheet.

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Agrément Certificate

10/4795

Product Sheet 1

HYDRO INTERNATIONAL STORMWATER MANAGEMENT SYSTEMS

STORMBLOC STORMWATER MANAGEMENT SYSTEM

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This relates to the Stormbloc Stormwater Management System, for use as sub-surface water storage or as a soakaway to manage run-off from impermeable surfaces.

AGRÉMENT CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



KEY FACTORS ASSESSED

System design — information is provided in the Certificate to assist in the design of a stormwater management system (see section 5).

Strength — the system has adequate strength and stiffness to resist long- and short-term loads when used in accordance with this Certificate (see section 6).

Resistance to chemicals — the system will have adequate resistance to the types and levels of chemicals likely to be found in rainwater and soils normally encountered in civil engineering practice (see section 9).

Durability — the system will have a service life in excess of 50 years when installed in accordance with this Certificate (see section 11).

The BBA has awarded this Agrément Certificate to the company named above for the system described herein. This system has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 24 December 2010

Brian Chamberlain

Head of Approvals — Engineering

Greg Cooper

Chief Executive

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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STORMBLOC® STORAGE SYSTEM – INSTALLATION GUIDELINES

Notes: Detailed design advice and installation instructions can be found in the Stormbloc® User Manual. Stormbloc® modules are delivered in stacks of 4 No 0.66m deep modules (20kg per module) or 8 No 0.35m deep modules (12kg per module). The maximum mass of any Stormbloc® Inspect component is 48kg. Modules should not be dropped or thrown and impacts should be avoided. Care should be taken when walking on the modules as these may be slippery especially when wet or frosty.

1) Excavate the area for the installation in accordance with the design. For installations greater than 3m from finished cover level to the base of the Stormbloc® tank, advice should be sought from Hydro International.



2) Form a level sand or gravel subgrade layer, min 100mm deep.



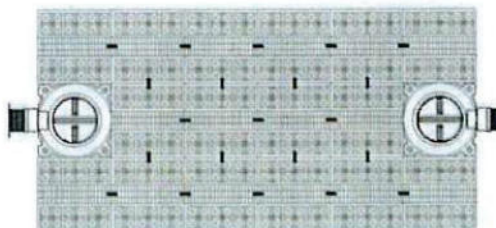
3) Line the excavation with a suitable impermeable geomembrane (min 460 g/m²). On sites where there are concerns relating to contamination, or groundwater level / protection, a fully encapsulated system, with a heat sealed membrane installed by a specialist lining contractor will often be required. Where multiple sheets are required, these should be lapped and sealed in accordance with the manufacturer's recommendations.



4) Inspect the modules for damage prior to installation. Lay the Stormbloc® modules and Stormbloc® Inspect Chambers on the geomembrane in accordance with the design. The integral inspection tunnels within the modules should generally create a continuous line along the length of the tank.

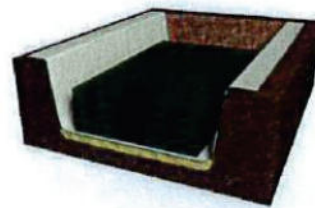


5) The modules should be connected using the supplied connecting pieces in the centre of each edge that neighbours another module. Where a single layer of 0.35m deep modules is used, the supplied connecting pieces should link the top of the structural support pillars of neighbouring modules.



6) For multi-layer designs, the supplied multi-layer connectors should be used between layers. Modules on the second and subsequent layers can then be located using the multi-layer connectors.

Where 0.35m deep modules are used, these should form the top layer and oriented such that the text imprinted on the 0.35m deep module is at the bottom edge.



7) All tunnel ends should be fitted with the appropriate end plate as supplied. End plates can be provided blank, with holes pre-cut to ease pipe connections, or with an adapter spigot in accordance with the design.

Pipe connections into the Stormbloc® Inspect modules may require a band-seal to attach onto the spigot. Please contact Hydro International for site specific details.



8) The sides and top of the Stormbloc® system should be completely wrapped within the geomembrane. Holes should be cut into the geomembrane to accommodate pipe connections and the extension shaft on the Stormbloc® Inspect chambers. Where multiple sheets are required, these should overlap by min 300mm. All joins, laps and pipe connections must be appropriately sealed.



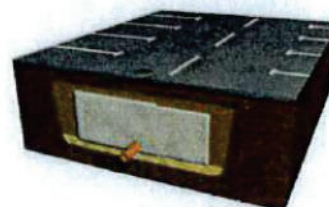
9) The sides of the excavation should be filled with a suitable granular material such as Type 1 or Type 2 sub-base or Class 6P selected granular material as defined in the Department for Transport Specification for Highway Works (SHW). This material should be compacted in 150mm layers using a laminar working device. Care should be taken to ensure that the geomembrane is not punctured or torn during installation or backfilling.



10) Backfill over the top of the modules should also be carried out using Type 1 or Type 2 sub-base in accordance with the Department for Transport Specification for Highway Works (SHW). The initial 300mm of cover should be compacted using a laminar working device. Thereafter other types of compaction plant may be used provided the mass per metre width $\leq 2300\text{kg}$.



11) Once 500mm of well compacted cover has been achieved, heavier plant may run across the system up to a maximum mass per metre width of 5000kg. The wheel load from tipper trucks and excavators should not exceed 50 kN fully loaded. Vehicles should only traverse above the Stormbloc® in straight passes. If a change in direction is required, vehicles should drive off the system, turn and drive back on in the direction required.



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website: www.hydro-int.com



Agrément Certificate

08/4596

Product Sheet 1 Issue 6

HYDRO INTERNATIONAL HYDRO-BRAKE FLOW CONTROLS

S-RANGE HYDRO-BRAKE OPTIMUM FLOW CONTROLS

This Agrément Certificate Product Sheet⁽¹⁾ relates to S-Range Hydro-Brake Optimum Flow Controls⁽²⁾, a range of units to control the discharge outlet flow in stormwater management systems.

(1) Hereinafter referred to as 'Certificate'.

(2) Hydro-Brake, and Kick-Flo are registered trademarks of Hydro International Ltd.

The assessment includes

Product factors:

- compliance with Building Regulations
- compliance with additional regulatory or non-regulatory information where applicable
- evaluation against technical specifications
- assessment criteria and technical investigations
- uses and design considerations

Process factors:

- compliance with Scheme requirements
- installation, delivery, handling and storage
- production and quality controls
- maintenance and repair

Ongoing contractual Scheme elements†:

- regular assessment of production
- formal 3-yearly review



KEY FACTORS ASSESSED

- Section 1. Mechanical resistance and stability
- Section 2. Safety in case of fire
- Section 3. Hygiene, health and the environment
- Section 4. Safety and accessibility in use
- Section 5. Protection against noise
- Section 6. Energy economy and heat retention
- Section 7. Sustainable use of natural resources
- Section 8. Durability

The BBA has awarded this Certificate to the company named above for the products described herein. These products have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Sixth issue: 12 October 2023

Originally certificated on 18 October 2008

Hardy Giesler
Chief Executive Officer

This BBA Agrément Certificate is issued under the BBA's Inspection Body accreditation to ISO/IEC 17020. Sections marked with † are not issued under accreditation.

The BBA is a UKAS accredited Inspection Body (No. 4345), Certification Body (No. 0113) and Testing Laboratory (No. 0357).

Readers MUST check that this is the latest issue of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.

The Certificate should be read in full as it may be misleading to read clauses in isolation.

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

British Board of Agrément

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SUMMARY OF ASSESSMENT AND COMPLIANCE

This section provides a summary of the assessment conclusions; readers should refer to the later sections of this Certificate for information about the assessments carried out.

Compliance with Regulations

Having assessed the key factors, the opinion of the BBA is that S-Range Hydro-Brake Optimum Flow Controls, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations:



The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	H3(3)	Rainwater drainage
Comment:		The products can contribute to satisfying this Requirement. See section 1 of this Certificate.
Requirement:	7(1)	Materials and workmanship
Comment:		The products are acceptable. See sections 8 and 9 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of workmanship and materials
Comment:		The products can contribute to satisfying this Regulation. See sections 8 and 9 and the Annex of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	3.6	Surface water drainage
Comment:		The products can contribute to satisfying this Standard, with reference to clauses 3.6.1 ⁽¹⁾⁽²⁾ to 3.6.5 ⁽¹⁾⁽²⁾ . See section 1 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The products can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation:	12	Building standards applicable to conversions
Comment:		Comments made in relation to the products under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ .
		(1) Technical Handbook (Domestic).
		(2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23(1)(a)	Fitness of materials and workmanship
Comment:	(i)(iii)(b)	The products are acceptable. See sections 8 and 9 of this Certificate.
Regulation:	82	Rainwater drainage
Comment:		The products can be used in a construction to satisfy this Regulation. See section 1 of this Certificate.

Fulfilment of Requirements

The BBA has judged S-Range Hydro-Brake Optimum Flow Controls to be satisfactory for use as described in this Certificate. The products have been assessed as units to control the discharge outlet flow in stormwater management systems.

ASSESSMENT

Product description and intended use

The Certificate holder provided the following description for the products under assessment. S-Range Hydro-Brake Optimum Flow Controls are vortex flow controls manufactured from 3, 5 or 8 mm thick grade 1.4301 (A1 304)/ 1.4307 (A2 304L) and 1.4401 (A4 316)/ 1.4404 (A4 316L) stainless steel to BS EN 10088-4 : 2009. The units are self-activating without any moving parts and do not, therefore, require external power.

S-Range Hydro-Brake Optimum Flow Controls consist of:

- integral bypass door — on the front face of the unit, outlet pipe location spigot and mounting face gasket or push-fit sealing rings
- wire rope — to allow remote operation of the pivoting bypass door (3 mm diameter rope consisting of 7 x 7 strand elements of 0.018 mm diameter) and stainless-steel wire rope attachment brackets.

The products have the nominal characteristics given in Table 1.

Table 1 Nominal characteristics

Characteristic (unit)	Typical range of values
Design flow rate ($\text{l}\cdot\text{s}^{-1}$)	0.7 to 250
Design head (m)	0.4 to 4
Maximum lateral dimension (mm)	
Lug mounted units	180 to 2000
Backplate mounted units	Dependent on discharge pipe size
Push-fit units	180 to 2000
Mass (kg) excluding packaging	
Lug mounted units	6 to 680
Backplate mounted units	Dependent on discharge pipe size
Push-fit units	6 to 680

The products are available with the following types of mounting arrangement:

- lug mounting — lugs are provided at points around the perimeter of the flow control mounting face. This is appropriate for the majority of applications where the outlet diameter of the installation structure is approximately 0.5 times the flow control body diameter or less
- push-fit spigot — a push-fit spigot with rubber sealing rings is provided. A single lug may also be provided on the outside perimeter of the mounting face to prevent rotation of the flow control in service. Precise specification of the outlet pipe is essential for push-fit mounting, in order to ensure a watertight seal
- backplate mounting — a rectangular mounting plate is provided to allow fixing to the outlet of the installation structure where lug mounting is not appropriate. If a flat surface is not available, the mounting plate may also be provided curved to the same radius as the chamber in which it is to be fitted.

Ancillary Items

The Certificate holder recommends the following ancillary items for use with the products, but these materials have not been assessed by the BBA and are outside the scope of this Certificate:

- mounting anchor bolts (A2 304L or A4 316 stainless steel)
- storage facilities.

The products are intended for use in stormwater management systems to restrict the outlet flow from the system by increasing back pressure, achieved by inducing a vortex flow pattern in the water passing through the device. In this application, the units are often used in conjunction with geocellular storage systems, concrete tanks and oversized pipes and ponds.

Product assessment – key factors

The product was assessed for the following key factors, and the outcome of the assessments is shown below. Conclusions relating to the Building Regulations apply to the whole of the UK unless otherwise stated.

1 Mechanical resistance and stability

Data were assessed for the following characteristics.

1.1 Strength and stability

1.1.1 An assessment was made of the structural adequacy of the products under loads that they are expected to resist.

1.1.2 The products are manufactured from stainless steel of a sufficient strength and thickness to ensure that the products remain fit for purpose throughout their design life.

1.1.3 Under normal operation, the products will deflect by no more than the thickness of the material used for manufacture. This ensures that the volume of the unit available for water flow is not compromised during operation and therefore the hydraulic operation of the unit is not adversely affected by deformation of the unit.

1.2 Flow characteristics

1.2.1 An assessment of computational fluid dynamic (CFD) modelling was used to predict the hydraulic performance of the products.

1.2.2 An assessment of the Certificate holder's predicted characteristics was made against the results of hydraulic performance tests. Results of tests are given in Table 2.

Table 2 Characteristics of flow

Product assessed	Assessment method ⁽¹⁾	Requirement	Result
S-Range Hydro-Brake Optimum Flow Controls	Volume flow rate	±5% accuracy	Pass
	Dimensional accuracy	±2 mm accuracy	Pass

(1) In accordance with *Final Test Specification: Verification of Head Versus Flow Characteristic for Hydro International Hydro-Brake Flow Controls* document.

1.2.3 On the basis of data assessed, the products are deemed fit for the purpose of controlling the discharge outlet flow rates.

2 Safety in case of fire

Not applicable.

3 Hygiene, health and the environment

Not applicable.

4 Safety and accessibility in use

Not applicable.

5 Protection against noise

Not applicable.

6 Energy economy and heat retention

Not applicable.

7 Sustainable use of natural resources

The products are manufactured from stainless steel, which can be recycled.

8 Durability

8.1 The potential mechanisms for degradation and the known performance characteristics of the materials in the products were assessed.

8.2 Under normal service conditions, the products will have a life of at least 60 years, provided they are designed, installed and maintained in accordance with this Certificate and the Certificate holder's instructions.

PROCESS ASSESSMENT

Information provided by the Certificate holder was assessed for the following factors:

9 Design, installation, workmanship and maintenance

9.1 Design

9.1.1 The design process was assessed by the BBA, and the following requirements apply in order to satisfy the performance assessed in this Certificate:

9.1.1.1 The products are used to control flows across, or to limit the rate of discharge from, a site. Where used to limit the rate of discharge from a site, the allowable discharge rate to an appropriate outfall must be set by the Environmental Regulator, local Planning Authorities or the Sewer Undertaker.

9.1.1.2 The configuration of the inlet, volute and outlet is varied to achieve the required discharge control characteristics. The units must be fitted with a fixed inlet or an adjustable inlet gate to allow for post-installation adjustment of the discharge flow rate by up to 40%.

9.1.1.3 A minimum clear opening of 50 mm for protected and 100 mm for unprotected drainage system is needed. Except for some situations, where it is required to use a flow control with a smaller minimum opening. In which case, the installation of screens or debris removal systems upstream of the device is necessary.

9.1.2 Guidance on design of sustainable drainage systems is given in *Flood risk and coastal change guidance* and CIRIA C753 : 2015.

9.1.3 Additional information on flow characteristics of the units are given in Annex A of this Certificate.

9.2 Installation

9.2.1 Installation instructions provided by the Certificate holder were assessed and judged to be appropriate and adequate.

9.2.2 Installation must be carried out in accordance with this Certificate and the Certificate holder's instructions. A summary of instructions and guidance are provided in Annex A of this Certificate.

9.2.3 The units may be supplied for installation in purpose-built or existing structural housings on site. These must have adequate strength to resist the loads imposed by the units. The design of these structures is outside the scope of this Certificate.

9.2.4 The units may also be supplied ready-fitted to purpose-built reinforced concrete or plastic manhole chambers ready for installation into the ground. The performance of these chambers is outside the scope of this Certificate.

9.2.5 Other than where a curved backplate is supplied, this must incorporate a flat mounting surface on the inside face of the chamber wall at the outlet pipe.

9.2.6 The benching must be formed as indicated on the installation drawing.

9.2.7 Where an adjustable inlet gate is provided, the factory set position must not be adjusted without prior consultation with the Certificate holder.

9.3 Workmanship

Practicability of installation was assessed by the BBA on the basis of the Certificate holder's information and a site visit to witness installation in progress. To achieve the performance described in this Certificate, installation of the products must be carried out by a competent general builder, or a contractor, experienced with these types of products.

9.4 Maintenance and repair

9.4.1 Ongoing satisfactory performance of the products in use requires that they are suitably maintained. The guidance provided by the Certificate holder was assessed by the BBA and found to be appropriate and adequate.

The following requirements apply in order to satisfy the performance assessed in this Certificate:

9.4.2 Access must be allowed for clearing debris from the chamber housing the unit's flow control. In the event that the inlet to the unit becomes blocked, the pivoting bypass door may be operated by pulling the wire rope attached upwards to drain down the chamber and provide access for maintenance. The pivoting bypass door must be returned to the closed position following drain down of the chamber and clearance of the blockage.

9.4.2.1 Regular inspections must be carried out to ensure that debris that may obstruct the inlet to the flow control is not present in the chamber. The frequency of inspection will depend on the location of the units but must be at least once per year.

10 **Manufacture**

10.1 The production processes for the product have been assessed, and provide assurance that the quality controls are satisfactory according to the following factors:

10.1.1 The manufacturer has provided documented information on the materials, processes, testing and control factors.

10.1.2 The quality control operated over batches of incoming materials has been assessed and deemed appropriate and adequate.

10.1.3 The quality control procedures and product testing to be undertaken have been assessed and deemed appropriate and adequate.

10.1.4 The process for management of non-conformities has been assessed and deemed appropriate and adequate. An audit of each production location was undertaken, and it was confirmed that the production process was in accordance with the documented process, and that equipment has been properly tested and calibrated.

† 10.2 The BBA has undertaken to review the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

11 Delivery and site handling

11.1 The Certificate holder stated that the products are supplied wrapped in polythene and plywood packaging for small units and on a pallet for large units. Each unit is stamped with the Certificate holder's unique project reference number and carries a label bearing the Certificate holder's contact information and advice on orientation. The packaging also bears details of the package weight and client details.

11.2 Delivery and site handling must be performed in accordance with the Certificate holder's instructions and this Certificate, including:

11.2.1 The products should be transported in their original packaging if possible. During unloading they must be handled with care.

11.2.2 The products should be stored appropriately to avoid being dropped or receiving impacts, eg from construction plant.

ANNEX A – SUPPLEMENTARY INFORMATION †

Supporting information in this Annex is relevant to the product but has not formed part of the material assessed for the Certificate.

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

Management Systems Certification for production

The management system of the manufacturer has been assessed and registered as meeting the requirements of ISO/IEC 9001 : 2015 by Lloyd's Register Quality Assurance Limited (Certificate LRQ 10509695).

Additional information on design

A.1 The allowable discharge rate is often calculated in respect of the greenfield equivalent run-off rate for the undeveloped site. Where a site is being redeveloped, the allowable discharge rate may be determined based on the discharge rate prior to the redevelopment.

A.2 The design head acting on the upstream side of products is generally determined by the maximum design top water level within the storage volume.

Additional information on flow characteristics

A.3 Owing to the 'S'-shaped head-flow characteristic, the units are able to pass greater volume flow rates at lower heads, whilst still limiting the flow at the duty/design point to an acceptable level.

A.4 The products have a hydraulic characteristic, comprising three distinct stages corresponding to different phases of operation:

- pre-initiation phase — at low heads, the flow control provides similar performance to an orifice plate with equivalent size to its outlet⁽¹⁾. Flow rate accuracy of $\pm 5\%$ of the ultimate duty/design flow is typically achievable in this region
- vortex initiation phase — as the head increases, vortex motion will start to develop inside the unit, starting to restrict the flow⁽¹⁾. Flow rate accuracy of -5% of flow to $+5\%$ of phase peak is typically achievable in this region
- post-initiation/design phase — following vortex initiation, the flow control characteristic stabilises, providing hydraulic performance equivalent to a substantially smaller orifice plate than the unit's outlet. The units can be specified to give a duty/design point in any part of this region, though in most practical cases specification will be at flow rates above the initiation phase peak (corresponding to the Flush-Flo point). Flow rate accuracy of $\pm 5\%$ of flow is typically achievable in this region.

As the water level subsides and water in the system drains, the energy within the flow reduces and the vortex collapses. Air is drawn into the volute and the unit returns to operating in a similar manner to an orifice of the same cross sectional area. This drains the system quickly so that the upstream network is ready for the next event.

(1) Although a flow control would not usually be selected with the duty/design point in this region, this part of the characteristic will have implications to overall drainage system operation.

A.5 The products allow the inlet, volute and outlet to be individually configured to suit the application, enabling the system to be designed to provide the appropriate hydraulic performance or to suit constant discharge, multi-stage discharge or risk-based network designs. Individual configuration of the inlet, volute and outlet also allows the system designer to adjust the physical dimensions of the unit in order to:

- maximise the internal clearances
- comply with minimum outlet guidelines
- retrofit to existing infrastructure.

A.6 The products are specified and supplied to meet individual application requirements. Though the characteristics are incorporated into a number of commercially available hydraulic modelling packages, the Certificate holder should be contacted directly for advice on correct selection. The following information should be provided:

- operating head — depth from the unit's outlet invert to the design water level(s)
- flow — required discharge at the given head(s)
- manhole details or control chamber proposals, including outlet size
- information on any 'special' conditions, for example if the unit is expected to be subjected to downstream surcharging or possible siphoning effects.

A.7 In most cases the downstream drainage system will be designed to allow the unit a free discharge. However, this is not always possible and in certain cases it will be necessary to design the flow control to surcharge conditions. Surcharge of the flow control will affect the hydraulic performance, and advice should be sought from the Certificate holder. Installations where the outlet is surcharged are outside the scope of this Certificate.

A.8 Where a drainage system has been designed and hydraulically modelled based on the use of the products, it is essential to ensure that the same flow control, or a flow control that has been confirmed to provide an equivalent hydraulic performance across the whole design head range, is used in the final installation.

Additional information on installation

A.9 Care should be taken handling the units and when lowering into position for installation. Where appropriate, larger units should be lifted via the fitted lugs using mechanical lifting/lowering equipment.

A.10 The unit is offered up to the chamber outlet wall until the spigot projects into the outlet pipe with its invert seated to the outlet pipe invert and with the unit in the correct orientation.

Additional information on maintenance

A.11 Measures should be taken to remove silt sediment and debris from the surface water at an early stage to prevent problems further downstream.

A.12 The units may be jetted, in accordance with standard sewer jetting procedures, without affecting the hydraulic performance of the stormwater management systems.

Bibliography

BS EN 10088-4 : 2009 *Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for construction purposes*

CIRIA C753 : 2015 *The SuDS manual*

ISO/IEC 9001 : 2015 *Quality management systems — Requirements*

Flood risk and coastal change guidance — National Planning Policy Framework — August 2022

Conditions of Certificate

Conditions

1 This Certificate:

- relates only to the product that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page – no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document – it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

3 This Certificate will be displayed on the BBA website, and the Certificate Holder is entitled to use the Certificate and Certificate logo, provided that the product and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

5 In issuing this Certificate the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

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- actual installations of the product, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to UKCA marking and CE marking.

6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product which is contained or referred to in this Certificate is the minimum required to be met when the product is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.

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APPENDIX G – DRAINAGE RECORD LOG SHEETS

Inspection Log – Year..... sheet 1 of 2

Inspection Date	A - Surface Water Catchpit Manholes	B - Foul Water Manholes	E – Surface Water Treatment	G – Hydro Attenuation	Comments
January					
February					
March					
April					
May					
June					

How to complete this Log:

- 1.0 Write date in LH column.
- 2.0 Tick which items have been inspected for that date.
- 3.0 Add to notes and maintenance completed e.g. Catch pits or Channels emptied.

Inspection Log – Year..... sheet 2 of 2

Inspection Date	A - Surface Water Catchpit Manholes	B - Foul Water Manholes	E – Surface Water Treatment	G – Hydro Attenuation	Comments
July					
August					
September					
October					
November					
December					

How to complete this Log:

- 1.0 Write date in LH column.
- 2.0 Tick which items have been inspected for that date.
- 3.0 Add to notes and maintenance completed e.g. Catch pits or Channels emptied.