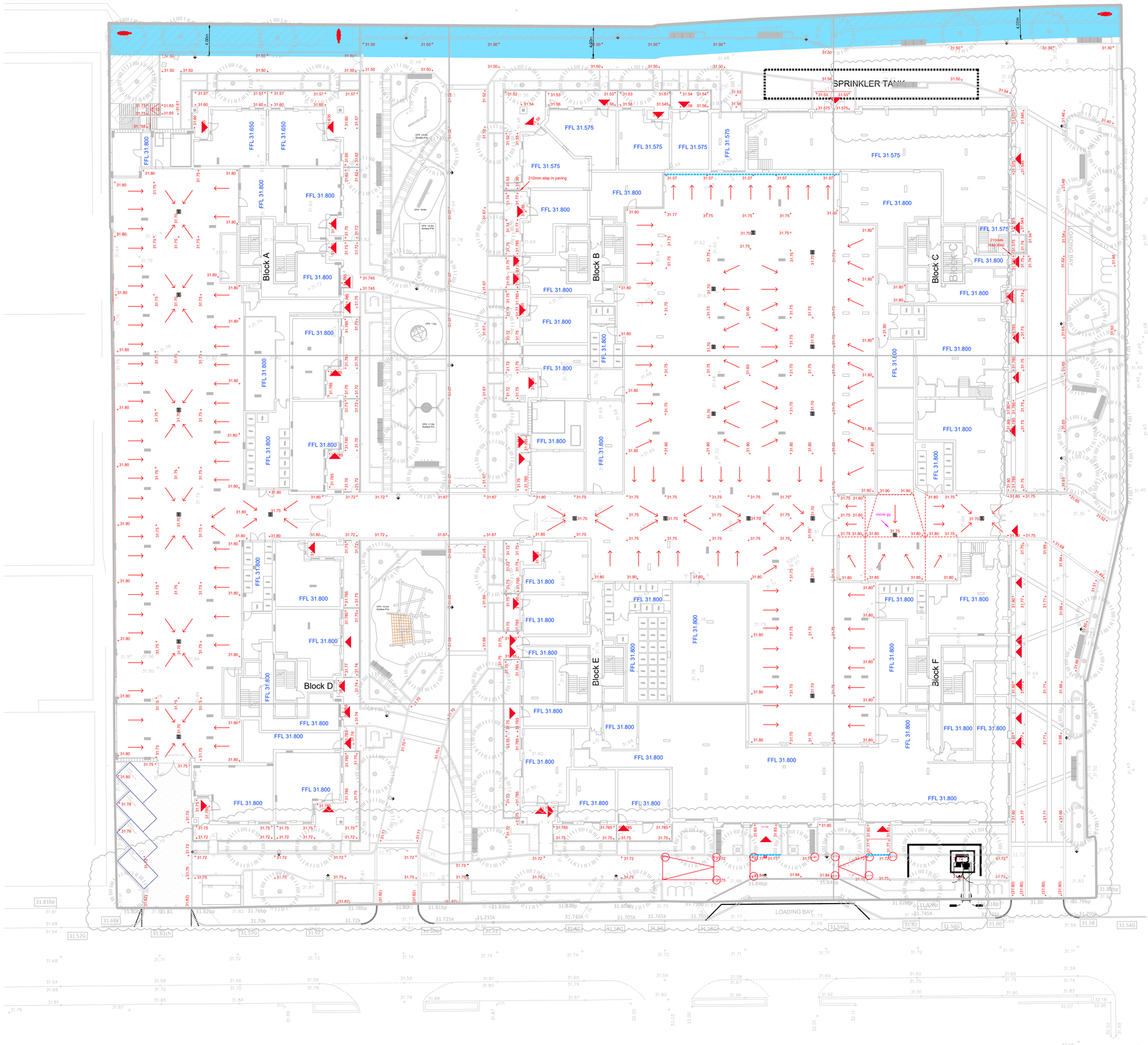
APPENDIX A COPY OF AS-BUILT DRAWINGS



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS (mm) ALL LEVELS ARE IN METERS (m).
2. DO NOT SCALE FROM DRAWINGS, WORK TO FIGURED DIMENSIONS ONLY.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS, THE SPECIFICATION AND THE CONTRACT DOCUMENTS.
4. ALL WORK IS TO COMPLY WITH THE RELEVANT EUROCODES, CODES OF PRACTICE AND THE BUILDING REGULATIONS.
5. ANY DISCREPANCIES BETWEEN THE ARCHITECTS AND THE ENGINEERS DRAWINGS TO BE BROUGHT TO THE ATTENTION OF THE DESIGN TEAM.
6. ALL SETTING OUT TO BE VERIFIED WITH THE ARCHITECT PRIOR TO COMMENCEMENT OF SITE CONSTRUCTION.
7. WORKS TO ENSURE THE STRUCTURAL STABILITY OF ALL ELEMENTS IN THEIR TEMPORARY STATE DURING CONSTRUCTION TO BE THE RESPONSIBILITY OF THE CONTRACTOR.

KEY:

+ 31.80	Proposed finished levels
+ (31.80)	Interpolated existing spot levels
FFL 31.800	Proposed finished floor level
× 31.75	Existing (pre-demolition) levels
	New drainage channel.
	New gully.

REV	DATE	DRAWN/CHK	REVISION INFO
C02	20.02.25	BM/PT	REPLOTTED WITH LATEST S278 LAYOUT
C01	13.11.23	BM/PT	REPLOTTED WITH LATEST SITE LAYOUT
P02	27.09.23	BM/PT	UPDATED TO LATEST SITE LAYOUT
P01	29.05.23	BM/PT	WIP ISSUE.

STATUS:

STAGE 4

CLIENT:

JJ RHATIGAN

PROJECT:

Crown Trading Centre
Hayes, UB3 1DU

DRAWING TITLE:

Proposed Finished Levels

JOB NUMBER:	SCALE AT A1:	REV. STATUS:
SE1560	1:250	S4

DRAWING NUMBER: CTC-ISS-XX-XX-DR-C-923051 REVISION: C02

IESISSTRUCTURES

LONDON 20 IRONMONGER LANE | LONDON | EC2V 8EP | UK
T: +44 (0)207 600 2912

BRISTOL 89-95 REDCLIFFE STREET | BRISTOL | BS1 6LU | UK
T: +44 (0)117 922 7039

MANCHESTER COMMERCIAL WHARF | 6 COMMERCIAL STREET
MANCHESTER, M15 4PZ | UK
T: +44 (0)845 643 2741

www.iesisgroup.com

Grand Union Canal

Blue hatch denotes extent of 4m wide easement where works within this area are subject to approval from the Canal & River Trust.

Key

- Porous Asphalt
- Permeable block paving
- Cellular attenuation system as Hewitech VarioBox. Refer to suppliers drawings and specification for installation details.
- CP — PCC surface water catchpit
- HB — PCC surface water flow control chamber and pipe run
- PCC foul water manhole and pipe run
- FW — Existing public foul water sewer manhole and pipe run
- Perforated pipe collector drain within porous sub base
- ACO channel Multi drain or similar approved
- GY — New road gully. 900 deep pot with 150 dia outlet
- yg — New yard gully. 600 deep pot with 100 dia outlet
- Polypropylene inspection chambers 1200 deep max, 450 dia. 100 inlet / outlet connections (6 no. max), 150 inlet/outlet connections (4 no max).

  Where deeper than 1.2m, use polypropylene 'non-entry' inspection chambers (3000 deep max), 450 dia (with 300 dia. or square cover) 100 inlet / outlet connections (6 no. max), or 150 inlet/outlet connections (4 no max)
- st — Denotes 4500 dia upvc silt trap with 300mm nominal sump. Provide non-entry access cover where noted 'nme'
- Denotes 600 dia inspection chamber with D400 rated access cover. Provide non-entry access where noted 'nme'
- st — Denotes 600 dia upvc silt trap with 300mm nominal sump. Provide non-entry access cover where noted 'nme'

Substation position is approximate Only. The substation information is taken from energypeople cable layout & trench detail drawing EP-22.186-200 Rev C

Substation CAD file require to finalise the exacts position of the drainage

Drainage Notes

1. This drawing is to be read in conjunction with the private and drainage construction details.
2. All private drainage works to be carried out in accordance with the provisions laid down in BS EN 752 & The Building Regulations, Part H.
3. Levels shown in buildings are Finished Floor Level.
4. Drainage under adopted roads to be either:-
   a) Vitrified Clayware to BSEN295.
   b) Concrete to BS 5911, Class M. Laterals to be formed of either vitrified clay or "Extra Strength", concrete "Class M".
5. Before commencing any Sewer or drainage works, the Developer's Groundworker must satisfy themselves, the developer and the Local Authority of actual levels and conditions of existing sewers.
6. Buried concrete to satisfy the requirements of BRE Special Digest 1 as predetermined by the site's Geotechnical Report
7. All abandoned, buried obstructions encountered during the construction of Highway & Drainage Works are to be broken out to bed level of drains and sewers, and to the formation of carparks and drives etc., and to sufficient depth to allow for laying service company's mains and services.
8. Depth and Location of existing services to be traced prior to any excavation.
9. All private drainage to be laid to levels shown using flexibly jointed pipes, either uPVC to BS 4660 and BS 5481 or vitrified clayware to BS EN 295.
10. Generally pipes to have granular Bed & Surround in accordance with manufacturers recommendations, ensuring adequate protection with respect to depth and location. Where bedding material is placed at depths susceptible to ground water ingress, it is to be wrapped in a geotextile (Terram 700 or better).
11. Private precast concrete manholes and catchpits to be constructed using conc. box sections or circular rings to BS 5911-200, with 150mm conc. surround, size and construction to comply with Table 12 of Approved Document, Part H.
12. Rodding eyes, etc are to be laid to manufacturers minimum cover and depth to allow adequate fall from adjoining unit.
13. Access panels are to be provided to all rainwater pipes, a max. 600 above finished ground level.
14. All manholes / inspection chambers in block paved areas, to have recessed covers. These are to be orientated such as to minimise cut blocks.
15. All pipework to be 100mm∅ (150∅ from road gullies) unless otherwise stated.
16. All levels in metres (m) unless specified otherwise.
17. All drain runs from Svp's, stub stacks or FW gullies to be laid at 1:40 gradient unless otherwise stated. Note: A gradient of 1:80 min is acceptable where at least one WC connects.
18. Svp's, stub stacks & RWP's are shown indicative only. Refer to Architectural GA & MEP drawings for accurate locations
19. House/Flat drainage to be laid prior to erection of scaffold.
20. All cover and invert levels shown are in metres. All pipe diameters are in millimetres U.N.O.
21. All chambers located in trafficked areas to have concrete surround as detailed on the drainage construction details
22. IMPORTANT NOTE:
    At depths where groundwater ingress is encountered, consider the use of a sump / pump arrangement. Additional reference should be made to the Interpretative Geotechnical Report for supplementary measures in such instances
    Where excavations are >1m deep, consider the use of full perimeter trench support.
23. IMPORTANT NOTE:
    The new sewer connections are be successfully made prior to commencing any upstream drainage works.

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS (mm) ALL LEVELS ARE IN METERS (m).
2. DO NOT SCALE FROM DRAWINGS, WORK TO FIGURED DIMENSIONS ONLY.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS, THE SPECIFICATION AND THE CONTRACT DOCUMENTS.
4. ALL WORK IS TO COMPLY WITH THE RELEVANT EUROCODES, CODES OF PRACTICE AND THE BUILDING REGULATIONS.
5. ANY DISCREPANCIES BETWEEN THE ARCHITECTS AND THE ENGINEERS DRAWINGS TO BE BROUGHT TO THE ATTENTION OF THE DESIGN TEAM.
6. ALL SETTING OUT TO BE VERIFIED WITH THE ARCHITECT PRIOR TO COMMENCEMENT OF SITE CONSTRUCTION.
7. WORKS TO ENSURE THE STRUCTURAL STABILITY OF ALL ELEMENTS IN THEIR TEMPORARY STATE DURING CONSTRUCTION TO BE THE RESPONSIBILITY OF THE CONTRACTOR.

KEY:

REV	DATE	DRAWN/CHK	REVISION INFO
C06	2025.02.20	PT	REPLOTTED WITH LATEST S278 LAYOUT
C05	11.04.24	PT	4m wide CRT Easement added. SW12,13,14 & 26 adjusted slightly to ensure they are located outside of the Canal River Trust's 4m wide consultation zone. Perforated pipework alongside adjust to suit.
C04	06.12.23	PT	ACO adjusted to Block B/C and outlet clarified. RWP relocated to Block D.
C03	02.11.23	PT	SW27, FW8 & FW11 updated, SW29 added. Minor adjustments to drainage laterals serving Blocks A/D & B/C to suit latest GA plans.
C02	20.10.23	BM	DRAINAGE REVISED NEAR THE SUBBSTATION
C01	13.10.23	RM	MANHOLE NUMBERS UPDATED
P02	21.09.23	RM	REVISED DRAINAGE
P01	04.09.23	BM/PT	REVISED DRAINAGE

STATUS: STAGE 4

CLIENT: JJ RHATIGAN

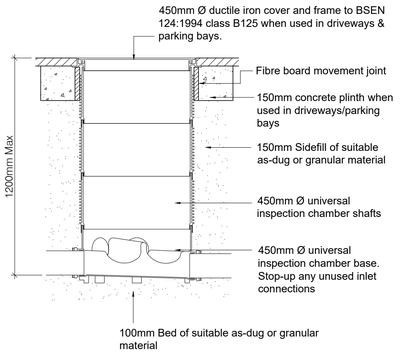
PROJECT: CROWN TRADING CENTRE HAYES, UB3 1DU

DRAWING TITLE: BELOW-GROUND DRAINAGE LAYOUT

JOB NUMBER:	SCALE AT A1:	REV. STATUS:
SE1560	1:250	S4

DRAWING NUMBER: CTC-ISS-XX-XX-DR-C-923071 REVISION: C06

iesis STRUCTURES
LONDON 20 IRONMONGER LANE | LONDON | EC2V 8EP | UK T: +44 (0)207 600 2912
BRISTOL 89-95 REDCLIFFE STREET | BRISTOL | BS1 6LU | UK T: +44 (0)117 922 7039
www.iesisgroup.com T: +44 (0)845 643 2741

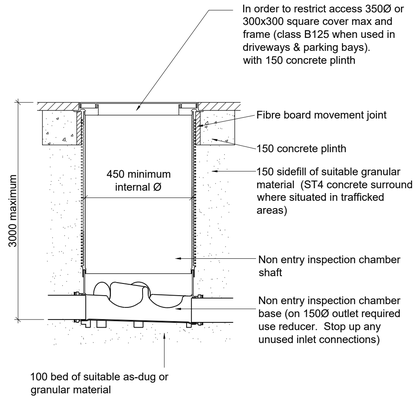


(Inlet/Outlet & 4 branch connections for 100Ø pipes)
(Inlet/Outlet & 2 branch connections for 150Ø pipes)

Note: Chambers in driveways and parking bays to have 150mm ST4 concrete surround.

1.2m Max. Polypropylene inspection chamber

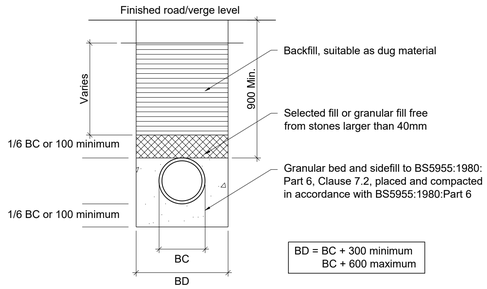
For use in soft areas, driveways and parking bays only



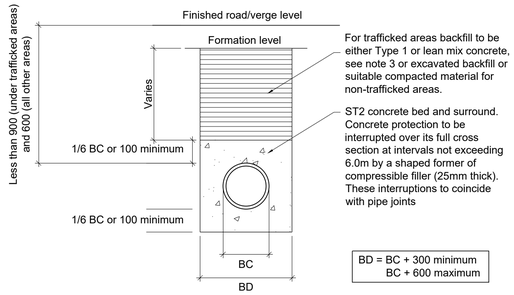
Note: Chambers in driveways and parking bays to have 150mm ST4 concrete surround.

1.2m to 3.0m deep non entry inspection chamber

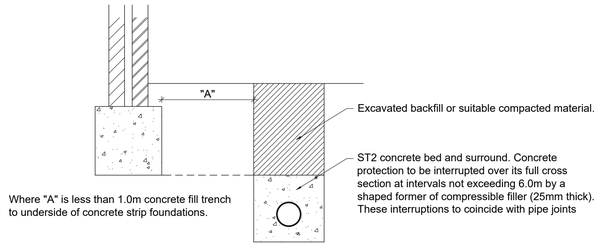
For use in soft areas, driveways and parking bays only, where noted 'nme' on layouts

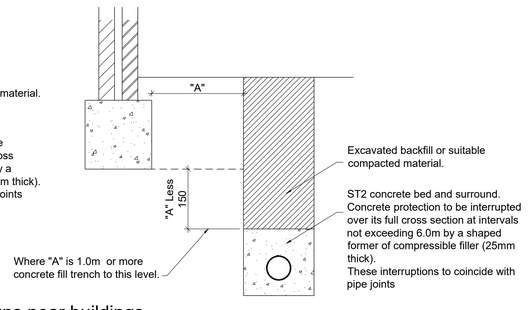


Typical trench detail

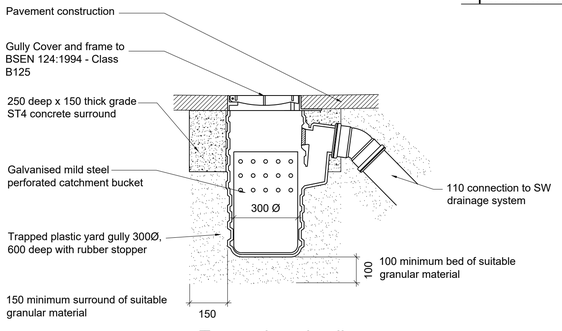


Shallow trench detail



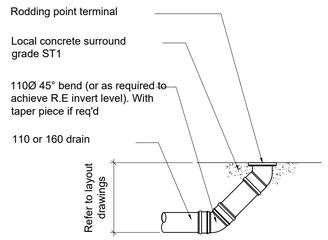


Pipe runs near buildings

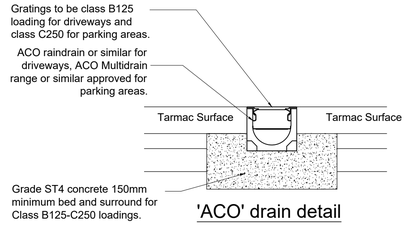


Trapped yard gully

Where noted 'yg' on layouts

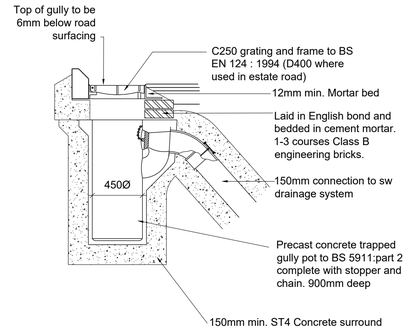


Rodding eye



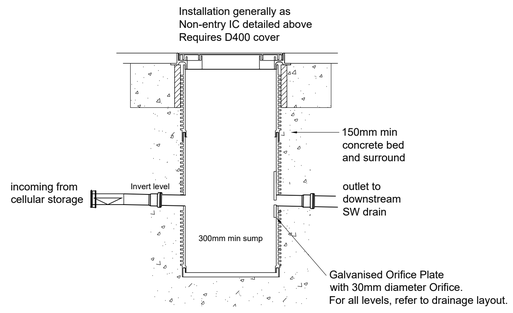
'ACO' drain detail

NOTES:
1. Roddable trapped sump units to be positioned at connection to drain, see layouts.
2. Loadings to BS EN 124: 1994

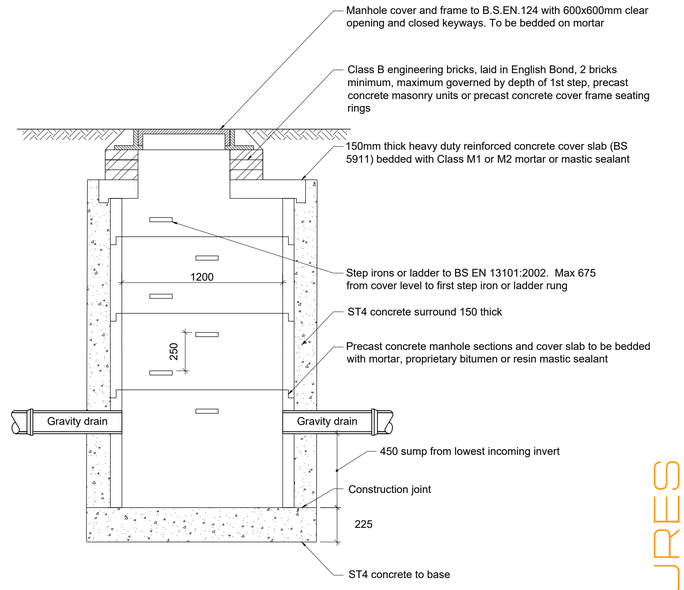


Trapped road gully

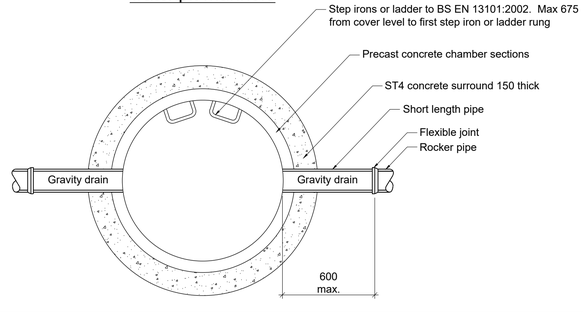
Where noted 'GY' on layouts



RIDGISTORM Orifice Plate Flow Control Chamber or similar approved



Catchpit manhole



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS (mm) ALL LEVELS ARE IN METERS (m).
2. DO NOT SCALE FROM DRAWINGS, WORK TO FIGURED DIMENSIONS ONLY.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS, THE SPECIFICATION AND THE CONTRACT DOCUMENTS.
4. ALL WORK IS TO COMPLY WITH THE RELEVANT EUROCODES, CODES OF PRACTICE AND THE BUILDING REGULATIONS.
5. ANY DISCREPANCIES BETWEEN THE ARCHITECTS AND THE ENGINEERS DRAWINGS TO BE BROUGHT TO THE ATTENTION OF THE DESIGN TEAM.
6. ALL SETTING OUT TO BE VERIFIED WITH THE ARCHITECT PRIOR TO COMMENCEMENT OF SITE CONSTRUCTION.
7. WORKS TO ENSURE THE STRUCTURAL STABILITY OF ALL ELEMENTS IN THEIR TEMPORARY STATE DURING CONSTRUCTION TO BE THE RESPONSIBILITY OF THE CONTRACTOR.
8. ALL FOUNDATION WORKS ARE TO BE UNDERTAKEN IN ACCORDANCE WITH PARTY WALL AWARDS.
9. FOR FULL DESIGN NOTES REFER TO IESIS DRAWING: JR006098-ISS-XX-ZZ-DR-S

KEY:

LEGEND:

REV	DATE	DRAWN/CHK	REVISION INFO
T03	31.10.23	DC/PT	Yard Gully detail added.
T02	26.09.22	DC/PT	REISSUED FOR STAGE 3B
T01	26.05.22	BM/PT	TENDER ISSUE.
P01	25.05.21	RM/PT	PRELIMINARY ISSUE.

STATUS:

TENDER

CLIENT:

GREYSTAR

PROJECT:

Crown Trading Centre
Hayes,UB3 1DU

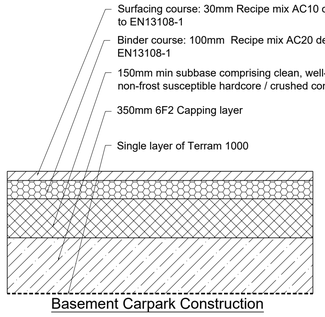
DRAWING TITLE:

Private Drainage
Construction Details Sheet 1

JOB NUMBER:	SCALE AT A1:	REV. STATUS:
SE1560	NTS	S1

DRAWING NUMBER: JR006098-ISS-XX-ZZ-DR-C-3008T03 REVISION:

IESIS STRUCTURES
LONDON 20 IRONMONGER LANE | LONDON | EC2V 8EP | UK T: +44 (0)207 600 2912
BRISTOL 89-95 REDCLIFFE STREET | BRISTOL | BS1 6LU | UK T: +44 (0)117 922 7039
MANCHESTER COMMERCIAL WHARF | 6 COMMERCIAL STREET MANCHESTER, M15 4PZ | UK T: +44 (0)845 643 2741
www.iesisgroup.com



Basement Carpark Construction

TABLE 11 MIN. DIMENSIONS FOR ACCESS FITTINGS AND INSPECTION CHAMBERS					
TYPE	DEPTH TO INVERT FROM COVER LEVEL (m)	INTERNAL SIZES		COVER SIZES	
		RECTANGULAR LENGTH AND WIDTH	CIRCULAR DIAMETER	RECTANGULAR LENGTH AND WIDTH	CIRCULAR DIAMETER
Rodding Eye		As drain but min 100			Same size as pipework (1)
Access Fittings small 150 dia 150x100 large 225x100	0.6 or less, except where situated in a chamber	150x100 225x100	150 225	150x100 (1) 225x100 (1)	Same size as access fitting
Inspection Chamber Shallow Deep	0.6 or less 1.2 or less >1.2 but <3.0	225x100 450x450 450x450	190 (2) 450 450	- Min 430x430 max 300x300 (3)	190 (1) 430 Access restricted to max 350 (3)

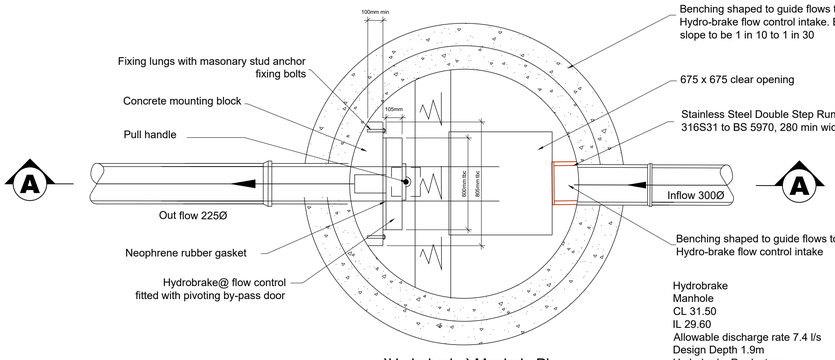
Notes:
(1) The clear opening may be reduced by 20mm in order to provide proper support for the cover and frame.
(2) Drains upto 150mm.
(3) A larger clear opening may be used in conjunction with a restricted access. The size is restricted for health and safety reasons to deter entry.

NOTES:

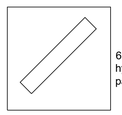
1. ALL DIMENSIONS ARE IN MILLIMETERS (mm) ALL LEVELS ARE IN METERS (m).
2. DO NOT SCALE FROM DRAWINGS, WORK TO FIGURED DIMENSIONS ONLY.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS, THE SPECIFICATION AND THE CONTRACT DOCUMENTS.
4. ALL WORK IS TO COMPLY WITH THE RELEVANT EUROCODES, CODES OF PRACTICE AND THE BUILDING REGULATIONS.
5. ANY DISCREPANCIES BETWEEN THE ARCHITECTS AND THE ENGINEERS DRAWINGS TO BE BROUGHT TO THE ATTENTION OF THE DESIGN TEAM.
6. ALL SETTING OUT TO BE VERIFIED WITH THE ARCHITECT PRIOR TO COMMENCEMENT OF SITE CONSTRUCTION.
7. WORKS TO ENSURE THE STRUCTURAL STABILITY OF ALL ELEMENTS IN THEIR TEMPORARY STATE DURING CONSTRUCTION TO BE THE RESPONSIBILITY OF THE CONTRACTOR.
8. ALL FOUNDATION WORKS ARE TO BE UNDERTAKEN IN ACCORDANCE WITH PARTY WALL AWARDS.
9. FOR FULL DESIGN NOTES REFER TO IESIS DRAWING: JR006098-ISS-XX-ZZ-DR-S.

KEY:

LEGEND:



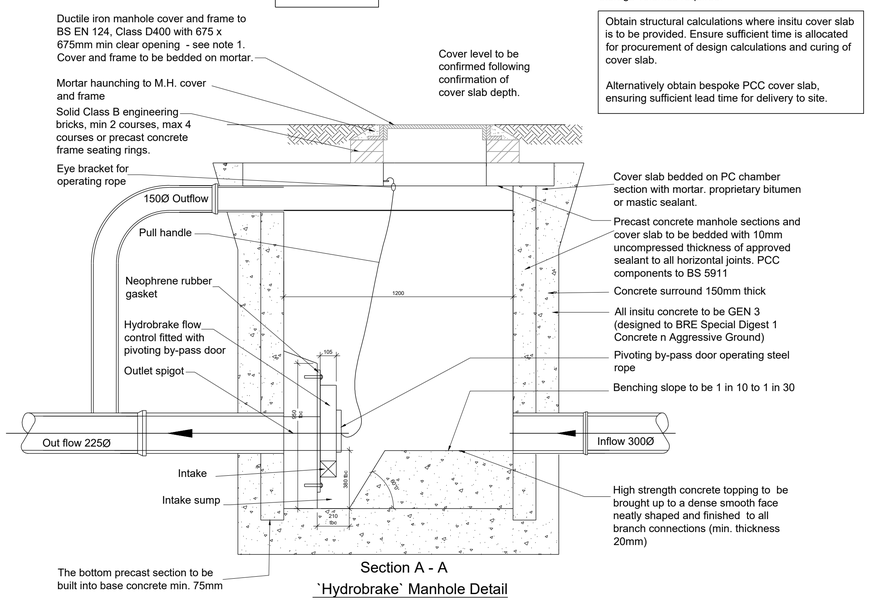
`Hydrobrake` Manhole Plan



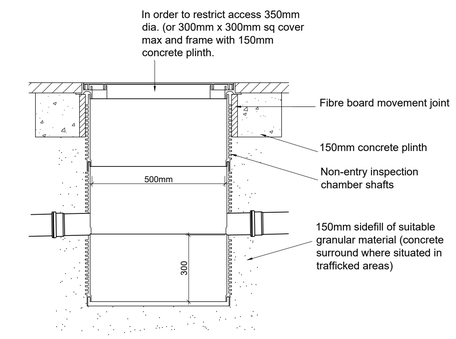
Important Note: -
1. Where hydrobrakes considered from alternative suppliers, provide Engineer with details of the flow/head relationship to allow a check to be made on the storage volume required. Flow control units have varying efficiencies and this may affect the storage volumes required.

Obtain structural calculations where insitu cover slab is to be provided. Ensure sufficient time is allocated for procurement of design calculations and curing of cover slab.

Alternatively obtain bespoke PCC cover slab, ensuring sufficient lead time for delivery to site.

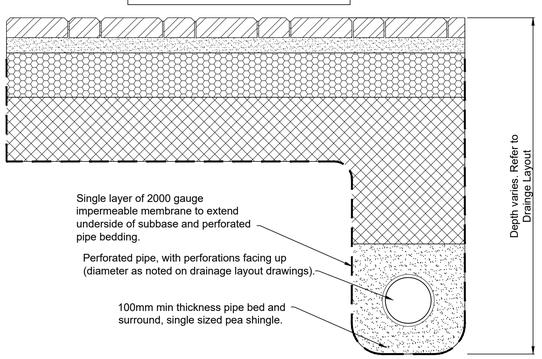


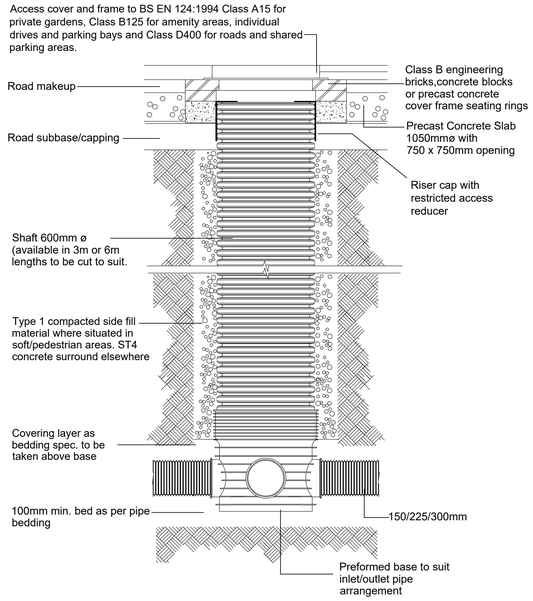
Section A - A
`Hydrobrake` Manhole Detail



Silt Trap

For porous pavement specification, refer to construction detailed prepared by LDA.





Polypipe 'IC600' Inspection chamber

For use in any trafficked areas (up to D400 rating) and / or where pipe diameters >150 and up to 300m IC600 suitable also for diameters up to and including 300mm diameter pipes.
Where noted 'R500' or 'R600' on layouts

REV	DATE	DRAWN/CHK	REVISION INFO
C01	13.10.23	RM/PT	TITLE BLOCK UPDATED
T01	29.05.23	BM/PT	WIP ISSUE.

STATUS: Stage 4

CLIENT: JJ RHATIGAN

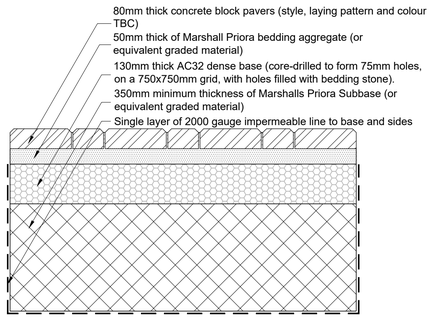
PROJECT: Crown Trading Centre
Hayes,UB3 1DU

DRAWING TITLE: Private Drainage
Construction Details Sheet 2

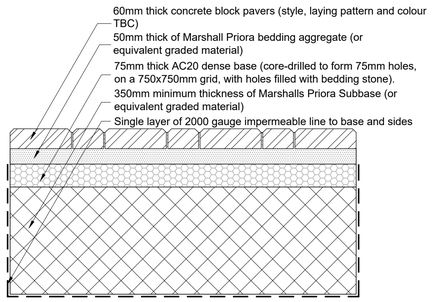
JOB NUMBER:	SCALE AT A1:	REV. STATUS:
SE1560	NTS	S2

DRAWING NUMBER: CTC-ISS-XX-XX-DR-CV-01-3172 REVISION: C01

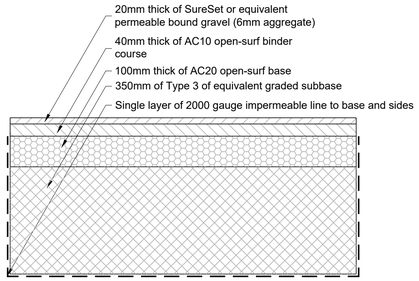
IESISTRUCTURES
LONDON 20 IRONMONGER LANE | LONDON | EC2V 8EP | UK T: +44 (0)207 600 2912
BRISTOL 89-95 REDCLIFFE STREET | BRISTOL | BS1 6LU | UK T: +44 (0)117 922 7039
MANCHESTER COMMERCIAL WHARF | 6 COMMERCIAL STREET MANCHESTER, M15 4PZ | UK T: +44 (0)845 643 2741
www.iesisgroup.com



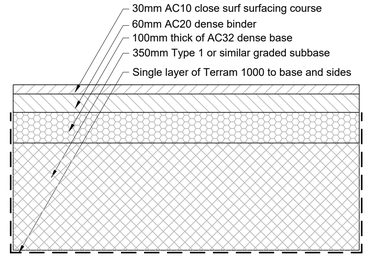
Permeable Block Paved Access Road



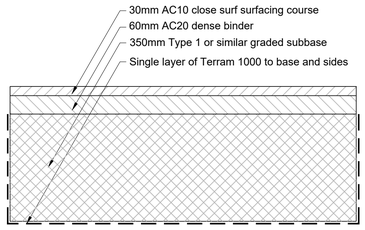
Permeable Block Paved Parking Bays



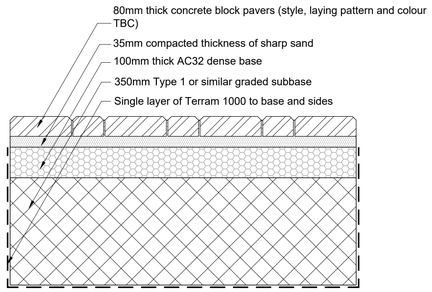
Permeable Resin Bound Gravel Parking Bays (or other lightly trafficked areas)



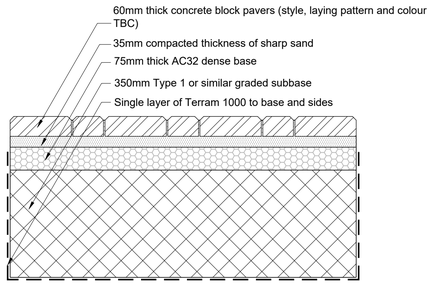
Non-Permeable Tarmac Access Road



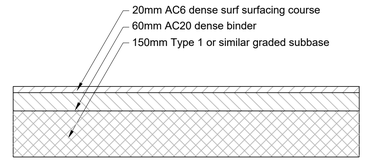
Non-Permeable Tarmac Parking Bays



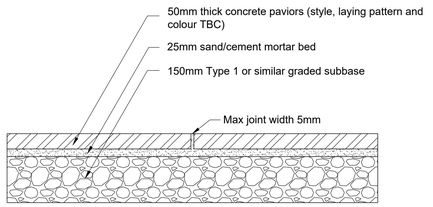
Non-Permeable Block Paved Access Road



Non-Permeable Block Paved Parking Bays



Tarmac Footway



PCC slab Paths and Patios

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS (mm) ALL LEVELS ARE IN METERS (m).
2. DO NOT SCALE FROM DRAWINGS, WORK TO FIGURED DIMENSIONS ONLY.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS, THE SPECIFICATION AND THE CONTRACT DOCUMENTS.
4. ALL WORK IS TO COMPLY WITH THE RELEVANT EUROCODES, CODES OF PRACTICE AND THE BUILDING REGULATIONS.
5. ANY DISCREPANCIES BETWEEN THE ARCHITECTS AND THE ENGINEERS DRAWINGS TO BE BROUGHT TO THE ATTENTION OF THE DESIGN TEAM.
6. ALL SETTING OUT TO BE VERIFIED WITH THE ARCHITECT PRIOR TO COMMENCEMENT OF SITE CONSTRUCTION.
7. WORKS TO ENSURE THE STRUCTURAL STABILITY OF ALL ELEMENTS IN THEIR TEMPORARY STATE DURING CONSTRUCTION TO BE THE RESPONSIBILITY OF THE CONTRACTOR.
8. ALL FOUNDATION WORKS ARE TO BE UNDERTAKEN IN ACCORDANCE WITH PARTY WALL AWARDS.
9. FOR FULL DESIGN NOTES REFER TO IESIS DRAWING: XXX-ISS-XX-XX-DR-S-7000.

KEY:

LEGEND:

REV	DATE	DRAWN/CHK	REVISION INFO
P01	07.08.19	RM/PT	PRELIMINARY ISSUE.

STATUS:

INFORMATION

CLIENT:

ENGIE

PROJECT:

Crown Trading Centre
Hayes

DRAWING TITLE:

Example of
External Surfacing
Construction Details

JOB NUMBER:	SCALE AT A1:	REV. STATUS:
SE1560	NTS	-

DRAWING NUMBER: SE1560-155-XX-XX-DR-C-3005 REVISION: -

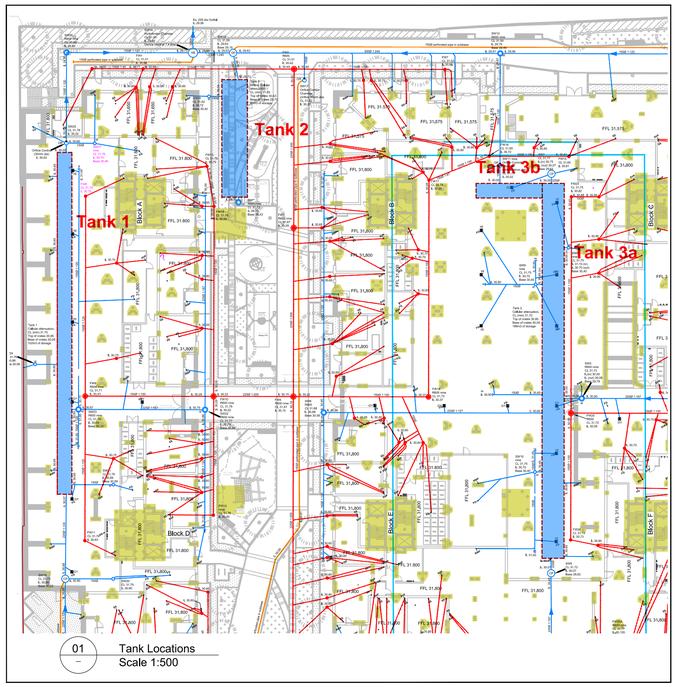
iesis STRUCTURES

LONDON 20 IRONMONGER LANE | LONDON | EC2V 8EP | UK
T: +44 (0)207 600 2912

BRISTOL 89-95 REDCLIFFE STREET | BRISTOL | BS1 6LU | UK
T: +44 (0)117 922 7039

MANCHESTER COMMERCIAL WHARF | 6 COMMERCIAL STREET
MANCHESTER, M15 4PZ | UK
T: +44 (0)845 643 2741

www.iesisgroup.com



01 – Tank Locations
Scale 1:500

Construction Sequence

Installation procedures should be carried out in accordance with the Health and Safety at Work Etc. Act (1974) and any other relevant legislation. Special attention should be paid to temporary work requirements in excavations.

Excavate to the required plan dimensions and level, ensuring that the excavation orientation will allow easy installation of connecting pipework. Consideration should be given to maintaining construction plant access for reinstating around the installed Variobox units. A minimum 300mm working space is required around the structure but 500mm is recommended for safe working practice.

Ensure that the ground bearing capacity at the formation level is sufficient for the proposed operational loads. The base of the excavation should be smooth and level, free of large stones and soft spots. Any soft spots should be excavated and replaced with suitable compacted granular material.

a) Attenuation Application

Place and compact a 100mm thick bedding layer of coarse sand. The base should be level and free of any undulations. Line the base and sides of the excavation with a 300g needle punched non- woven protective geotextile before placement of the impermeable geomembrane.

Install the geomembrane. Hewitech or the contractor seal the joints by wedge welding in accordance *Ciria 698 Site Handbook For The Construction of SUDS*, making an allowance for the connecting pipework or adapters. To ensure that the integrity of the geomembrane has been maintained, it is recommended that an inspection of the material is carried out, and welded joints are air tested in accordance with *Ciria 698 Site Handbook for the Construction of SUDS*.

If water is present, we recommend that the excavation depth is over dug by 200mm, with a base layer of 'TERRAM', overlaid by 150mm of compacted 'Type 1 road stone', topped off with a 50mm layer of pipe bedding. A sump should be excavated below the base layer of stone to allow the extraction of water via a drainage pump.

Variobox shear connectors (Detail C) are placed between all layers of Variobox units to give structural support to the tank. Sufficient Variobox clips (Detail D) are placed connecting Variobox units to maintain rigidity of the tank prior to backfilling the sides, the adjacent units being connected with two Variobox clips.

Place the Variobox shear connector into the recess at the edge of the unit, two number per unit as indicated Detail 05. Install the next layer of Variobox units, positioning the units in the upper layer so that they exactly mirror the position of the units in the lower layer. Repeat the above procedure until the necessary depth of Variobox structure has been achieved.

Pipe connections to the tank are made via flange adaptors which are attached to the Variobox units with tie wraps.
A Variobox attenuation structure requires ventilation to ensure proper hydraulic performance. Consideration should be given as to how this ventilation is to be installed, generally utilising a vent pipe to the downstream manhole (Detail 01), or alternatively a vertical vent pipe (Detail 02). One 110mm vent pipe per 7500m2 of drained area is recommended within *CIRIA C680 Structural Design of Modular Geocellular Drainage Tanks.*

Complete the geomembrane encapsulation of the entire Variobox structure, forming and testing joints where appropriate. Complete the geotextile protective fleece encapsulation of the Variobox structure, re-examining the geotextile for damage and joint integrity.

Contractor

Backfill around the sides of the encapsulated units, forming a thick layer of coarse sand or Class 6H selected granular material immediately adjacent to the units. Where required, remaining excavated areas around the units should be backfilled with Class 6N or 6P selected granular material, in accordance with *MCHW, Volume 1, Series 600* or similarly approved specification.

Above the wrapped Variobox units, place and lightly compact a minimum 100mm thick layer of either coarse sand or Class 6H selected granular material (with 100% passing the 5mm sieve), in accordance with *MCHW, Volume 1, Series 600.*

Final backfilling of the installation is dependent on the expected operational loads.
(NB. Compaction plant over and immediately adjacent to the Variobox units shall not exceed 2300 kg/m width).

Field conditions (e.g. landscaped areas)

The backfill material that lies within 300mm above the Variobox units should be free from particles exceeding 40mm in diameter, in accordance with Class 8 material to *MCHW, Volume 1, Series 600.* Final backfilling up to finished ground level may be achieved using selected as-dug material. Backfill material should be placed and compacted in layers no greater than 300mm, or in compliance with the approved specification.

Lightly trafficked (eg restricted access car park

Backfill with Class 1 or 2 material in accordance with *MCHW, Volume 1, Series 600.* Backfill material should be placed and compacted in layers not greater than 150mm. Where the Variobox units are installed beneath a paved area, the pavement sub-base may form part of the backfill material provided that minimum cover depths are maintained.

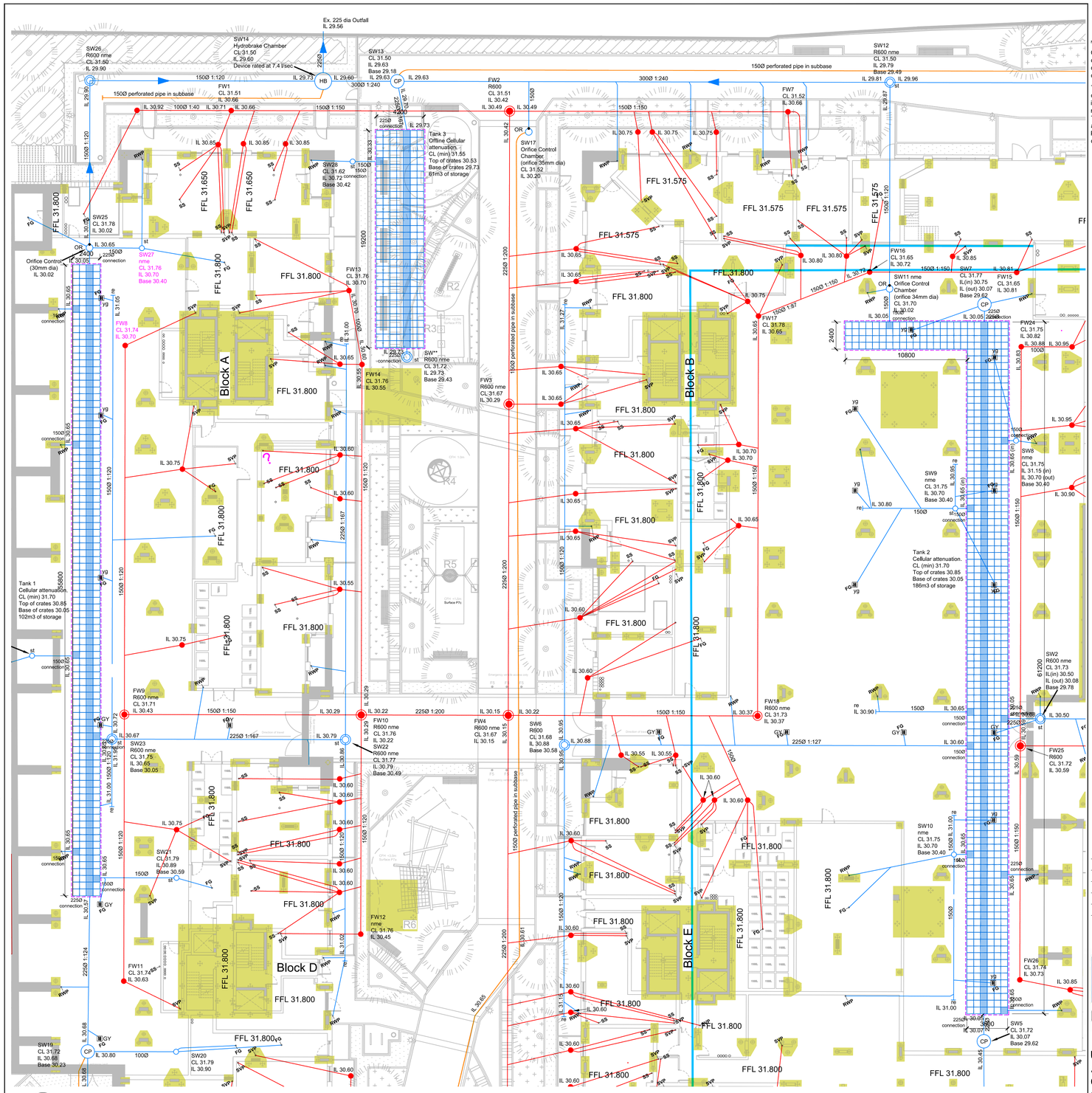
Heavily trafficked (e.g. service areas or roads)

Contact Hewitech for further information and guidance.

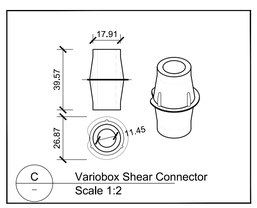
Complete pavement construction or landscaping over the Variobox system.

It should be noted that infiltration systems are not generally installed under roads due to the reduction in load bearing capacity of saturated soils. Specialist advice should be sought where this type of installation is proposed.

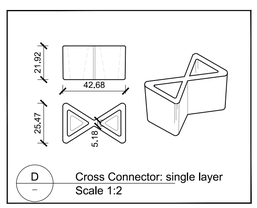
In attenuation systems, where groundwater may be present, a boyancy check should be undertaken by a qualified engineer to ensure that the imposed overburden pressure exceeds any uplift forces generated.



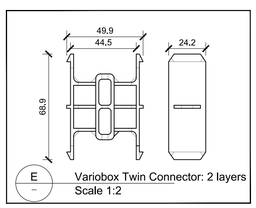
02 – Tanks 1 and 2 Plans
Scale 1:100



C – Variobox Shear Connector
Scale 1:2



D – Cross Connector: single layer
Scale 1:2



E – Variobox Twin Connector: 2 layers
Scale 1:2

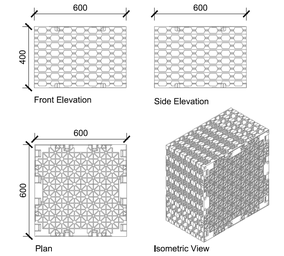
VARIOBOX TRAFFIC 400kN/m² / 100kN/m² CELLULAR STORAGE - ENGINEER TO CONFIRM FINAL VOLUMES										
Tank Ref	**Length (m)**	**Width (m)**	**Depth (m)**	**Area (m²)**	**Volume (m³)**	**Eff. Storage (m³)**	**No. Crates Long**	**No. Crates Wide**	**No. Crates High**	**Total No. Crates**
1	55.8	2.4	0.8	133.92	**107.14**	101.78	93	4	2	744
3	19.2	4.2	0.8	80.64	**64.51**	61.29	32	7	2	448
2a	61.2	3.6	0.8	220.32	**176.23**	167.44	102	6	2	1224
2b	10.8	2.4	0.8	25.92	**20.74**	19.70	18	4	2	144
			Total Size		**368.62**	**350.21**				**2560**

FOR CONSTRUCTION

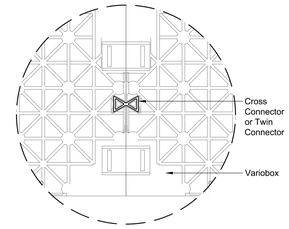
NOTES

DO NOT SCALE DRAWING

This information is of a generic nature and is provided for guidance purposes only. Final determination of the suitability of any information or material for your intended use will be site specific, and as such the manner of use is your sole responsibility, for which you must assume all risk and liability in this regard. This information is not intended to have any legal effect, whether by way of advice, representation or warranty.
Particular application and specific site conditions can be discussed in further detail with our technical representative.



A – 400x600mm Variobox Plus Detail
Scale 1:20



B – Variobox Plus Connection Detail
Scale 1:5

REV	DATE	DRAWN	CHECK
D	31.11.23	ACS	
C	29.10.23	ACS	
B	18.10.23	ACS	
A	11.10.23	ACS	
	04.10.23	ACS	

hewitech
INNOVATION IN PLASTIC

Unit 2, Andoversford Industrial Estate
Andoversford
Cheltenham,
Gloucestershire
GL54 4LB
Tel: +44 (0)1242 821678
email: sales@hewitech.co.uk
web: www.hewitech.co.uk

PROJECT EMAIL ADDRESS
sales@hewitech.co.uk

PROJECT
Crown Trading Centre
Hayes

TITLE
Attenuation Details
Tanks 1, 2 and 3

SCALE @ A1
As Shown

PROJECT NO
23-528

DRAWING NO
0001

REV
D

APPENDIX B DELIVERY TICKETS FOR PAVING WORKS

Springbridge

Turf / Topsoils / Aggregates / Composts / Barks / Haulage

CONVEYANCE NOTE / DUTY OF CARE CONTROLLED WASTE TRANSFER NOTE

Weights and Measures Act 1985 Control of Pollution Act 1990

Waste Carries Licence No. CBDU205876 Issued by Environment Agency

LOADED AT	CUSTOMER ORDER NUMBER	DATE OF DELIVERY
Tyttenhanger Quarry North Orbital Road St Albans AL4 0RY	1358903 **SALES ORDER NUMBER** 61409	Jan 31 2025 **SIC CODE:** 43120 **OR OTHER:**
DELIVERY ADDRESS A N CONSTRUCTION SOLUTION LTD Crown Trading Centre Clayton Road Hayes UB3 1DU	**ACCOUNT REFERENCE** GRS (Roadstone) Ltd	**CUSTOMER DETAILS** Unit 10, Goldsmith Way Eliot Business Park Nuneaton Warwickshire CV10 7RJ

QUANTITY	MATERIAL / WASTE
14.00	Haulage Of Materials, Haulage-PB, Per Bag HAULAGE - 20/40MM SINGLE SIZED GRAVEL

VEHICLE REGISTRATION:

GK22PXH

SIGNED FOR / ON BEHALF OF CUSTOMER AT COLLECTION SITE:

DATE & TIME: 31/01/2025 09:17:14

CUSTOMER AT DELIVERY ADDRESS:

I confirm that the above is an accurate description of the material / waste transferred and any waiting time. When ordering vehicles off the public road we do so entirely on our own responsibility. We accept responsibility for any damage caused by Springbridge Direct Ltd vehicles whilst on our site. All topsoil supplied must be used in accordance with RPS190.

DATE & TIME: 31/01/2025 10:44:41

RECEIVED ON BEHALF OF SITE OPERATOR:

PRINT: Peter

SIGN: ND on AVAILABLE JOSH

N.B WAITING TIME WILL BE CHARGED AFTER 30 MINUTES ON SITE.

Springbridge Direct Ltd. Oxford Road, Denham, Buckinghamshire, UB9 4DF
Tel: 0333 456 1919
Email: sales@springbridge.co.uk
www.springbridge.co.uk
VAT NO. 115 1497 32

GRS Building Products

GRS Building Products, Goldsmith Way, Eliot Business Park, Nuneaton, Warwickshire, CV10 7RJ, GRSBPdigital@grsbp.co.uk

Tel: 08452500793 - Website: www.grsroadstone.co.uk

INVOICE ADDRESS	
Name	GRS (ROADSTONE) LIMITED (BP)
Address	10 GOLDSMITH WAY
	ELIOT BUSINESS PARK
City	NUNEATON
Postcode	CV10 7RJ

COLLECTION ADDRESS	
Name	*TYTTENHANGER COLLECT TYTTENHANGER (GRS (ROADSTONE) LTD (BP))
Address	Lafarge Aggregates
	A414
	North orbital
City	St Albans
Postcode	AL4 0RY
Email	orders@grsroadstone.co.uk

JOB DETAILS			
Job No	408315	**Customer PO**	1374129
Scheduled Date	24/02/25	**Internal Job Ref**	1374307
Run Name	KS63VMY TYT 24/02/2025 r1	**Collection Instructions**	

ITEM DETAILS

Code	Description	Expected Qty	Actual Qty
GRS40GRAVBB	GRS SHINGLE - 40MM BULK BAG	14	14
	TOTALS	14	14

JOB COMPLETION DETAILS			
Arrived on Site	24/02/2025 08:23	**Customer Name**	Peter
Job Completed at	24/02/2025 09:23		
Job Completed by	sam bealby-parker		
Despatched Pallets	0	**Signature**	
GRS Pallets Collected (Good Condition)	0		
GRS Pallets Collected (Damaged)	0		
Pallet Collections GRC Number			
Driver Notes			

Generated Tue, 11 Mar 2025 13:30:02 by Barry Begley

GRS Building Products

GRS Building Products, Goldsmith Way, Eliot Business Park, Nuneaton, Warwickshire, CV10 7RJ, GRSBPdigital@grsbp.co.uk

Tel: 08452500793 - Website: www.grsroadstone.co.uk

INVOICE ADDRESS	
Name	GRS (ROADSTONE) LIMITED (BP)
Address	10 GOLDSMITH WAY
	ELIOT BUSINESS PARK
City	NUNEATON
Postcode	CV10 7RJ

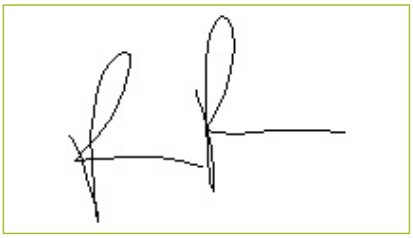
COLLECTION ADDRESS	
Name	*TYTTENHANGER COLLECT TYTTENHANGER (GRS (ROADSTONE) LTD (BP))
Address	Lafarge Aggregates
	A414
	North orbital
City	St Albans
Postcode	AL4 0RY
Email	orders@grsroadstone.co.uk

JOB DETAILS			
Job No	390294	**Customer PO**	1338641
Scheduled Date	17/12/24	**Internal Job Ref**	1339072
Run Name	KS63VMY TYT 17/12/2024 R2	**Collection Instructions**	

ITEM DETAILS

Code	Description	Expected Qty	Actual Qty
GRS40GRAVBB	GRS SHINGLE - 40MM BULK BAG	15	15
	TOTALS	15	15

JOB COMPLETION DETAILS

Arrived on Site	17/12/2024 14:52	**Customer Name**	Rob R
Job Completed at	17/12/2024 14:52		
Job Completed by	Robert Runciman		
Despatched Pallets	0	**Signature**	
GRS Pallets Collected (Good Condition)	0		
GRS Pallets Collected (Damaged)	0		
Pallet Collections GRC Number			
Driver Notes			

Generated Tue, 11 Mar 2025 13:29:06 by Barry Begley

APPENDIX C DELIVERY TICKETS FOR CELLULAR STORAGE

WARRANTY OF GEOMEMBRANE INSTALLATION WORKS

This records that all the installation procedures have been fulfilled and passed by the Quality Engineer of Hewitech UK ltd and that the welds conform to IFGW / BGA standards.
Should the liner or welded seams be found to be of sub-standard quality within a period of 30 years they will be repaired/replaced free of charge subject to correct backfilling procedures being carried out.

CONTRACTOR J B Structures SITE Crown Trading Estate Hayes

Work completed; 3 attenuation tanks as below –

Tank Ref	Length m	Width m	Depth m	Volume m3	Effective Storage
Tank 1	55.8	2.4	0.80	**107.14**	101.78
Tank 3	19.2	4.2	0.80	**64.51**	61.29
Tank 2a	61.2	3.6	0.80	**176.26**	167.44
Tank 2b	10.8	2.4	0.80	**20.74**	19.70
		Total	**Size**	**368.6**	**350.21**

Relevant Insurance covers are as follows -

Insurer Chaucer Policy Number UK GLB 8944191

Employers Liability £10,000,000
Public Liability £5,000,000
Products Liability £5,000,000

Insurer Hiscocks

Policy Number HU P16 1862611

Professional Indemnity £250,000

HEWITECHUK LTD
Unit 2
Andoversford Industrial Estate
Andoversford
Cheltenham
Gloucestershire
GL54 4LB
Telephone 01242 821678
Fax 01242 821510
Registered in England No. 08225079

Business Description Plastic Products, sales, advice and installation

Sign  Date 20.12.2023

D A Fozzard Managing Director

Hewitech Variobox & Controlbox Product Manual

Index

Introduction

About Hewitech

Hewitech is a major European extrusion and injection molding plastic manufacturer based in Ochtrup, Germany. Since 1993 Hewitech has been developing and producing plastic solutions for cooling towers, stormwater management and waste-water applications.

We believe our investment in modern in-house tooling is the reason behind Hewitech's quality products. Our machines run automatically to ensure continual production with the highest level of quality control.

Hewitech now employs over 100 people with production in Poland, Russia, Romania, England as well as Germany

Hewitech originated in the field of Customised Engineering. After a sustained period of growth Hewitech then expanded into the Plastic injection molding industry. Specialised processes for cooling tower installations were soon added to our portfolio, which included a twin cooling tower for testing and measuring, leading the way in research and development.

Injection molding

Injection-molded components are continuously innovated and developed for our markets. Specialised production processes and continuous testing of new materials in our in-house test facilities guarantee precision and high performance.

Research and Development

Potential innovations are modeled in the Hewitech CAD design department. Our in-house CNC tool-making and advanced mechanical engineering expertise deliver the shortest possible development and production time for new machinery and plastic components.

Variobox Plus and Variobox Traffic

Product Type

Defined by module height e.g. Variobox 200 = Variobox 600 x 600 x 200mm height

Weight & Volume

	Type 100	Type 150	Type 200	Type 300	Type 400	Type 600
Length	600mm	600mm	600mm	600mm	600mm	600mm
Width	600mm	600mm	600mm	600mm	600mm	600mm
Height	100mm	150mm	200mm	300mm	400mm	600mm
Structure Volume m3	0.036	0.054	0.072	0.108	0.144	0.216
Storage Volume m3	0.034	0.0513	0.0684	0.1026	0.1368	0.2052
Weight	1.8kg	2.7kg	3.6kg	5.4kg	7.2kg	10.8kg

Short Term Compressive Strength

Product	Vertical	Lateral
Variobox Plus	700kN/m2	200kN/m2
Variobox Traffic	400kN/m2	100kN/m2

Volumetric Void Ratio 95%

Average effective perforated surface area 60%

Controlbox

Weight & Volume

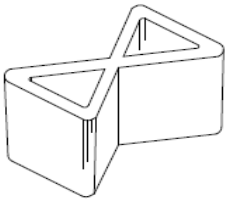
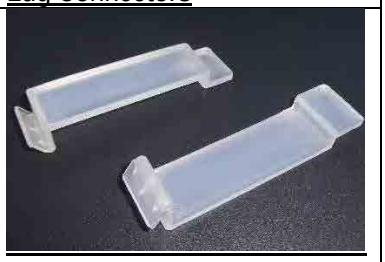
	Type 300	Type 600
Length	300mm	600mm
Width	600mm	600mm
Height	600mm	600mm
Structure Volume	.108m^3	.216m^3
Storage Volume m_3	.103m^3	.205m^3
Weight	5.18kg	10.36kg

Short Term Compressive Strength

Vertical	Lateral
200kN/m^2	200kN/m^2

Volumetric Void Ratio 95%

Ancillaries

Control End Plate	Cross Connector	Shear Connectors	Lug Connectors
			

Legislation and Standards

Surface water attenuation systems should be designed in accordance with current planning regulations – England, Planning Policy Statement 25 – Development and Floods, Wales, Technical Advise Note 15, and covered in Scotland by Planning Advice Note 61.

The *Floods and Water Management Act 2010* became law in April 2010. The Act defines the assessment of flood risk and mitigating measures within Sustainable Drainage Systems (SUDS). In the near future enactment of the measures and approval of systems will be the responsibility of newly founded SUDS Approval Bodies (SABs)

Soakaway storage volumes and surface area are designed in accordance with *BRE Digest 365* or *CIRIA Report 156*.

Variobox tank structures should be designed following guidance within *CIRIA C680 "Structural Design of Modular Geocellular Drainage Tanks".*

Site installations should be compliant with recommendations within *CIRIA C697 – "The SUDS Manual"* and CIRIA C698 *"Site Handbook for the Construction of SUDS"*

Design Considerations

Minimum Cover Required

Variobox Traffic and Variobox Plus

Car Park areas	600mm
HGV trafficked area	800mm

For lesser cover a detailed design is necessary, please contact Hewitech technical department

Maximum Burial Depth

A detailed design in accordance with *CIRIA C680 "Structural design of modular geo-cellular drainage tanks*" to take into account live and dead loads imposed and soil conditions should be carried out.

For assistance with calculations to define the design loads, please contact Hewitech technical department who have software compliant with C680 calculations.

Factors of Safety

Partial factors of safety should be applied to material properties and loads.

For Variobox the following material factors should be used:

Ultimate Limit State – 2.75

Serviceability Limit state – 1.5

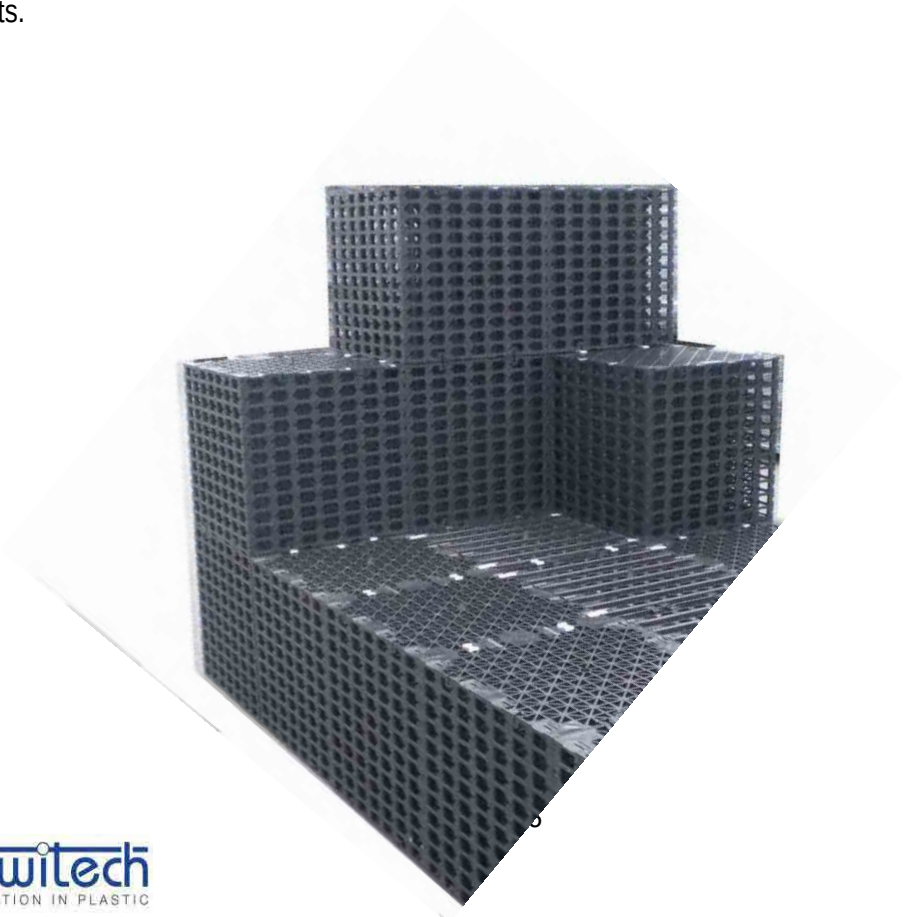
Appropriate partial safety factors for loads in the ultimate limit state are typically:

Live load – 1.5 and Dead load – 1.35

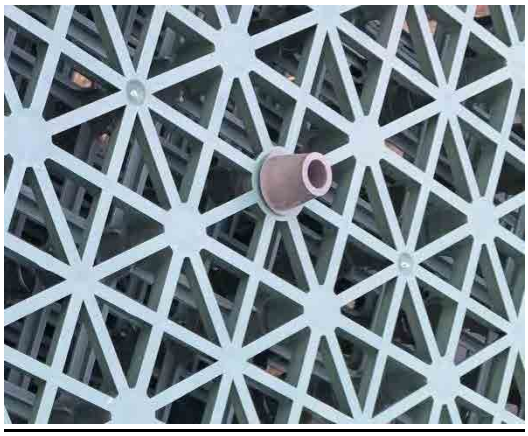
Installation

Variobox and Controlbox

Adjacent single rows of Variobox using Cross Connectors. This is also the jointing method for the top row of units.



Two rows of Variobox and Controlbox above one another can be jointed vertically the Shear Connector.



Varioboxes are connected laterally to Controlboxes with Lug Connectors.

Controlboxes are connected to other Controlboxes longitudinally with Cross Connectors.

Attenuation Membranes

Membranes are installed following guidelines within CIRIA 698 Site handbook for the construction of SUDS. C698 states – "All storage tanks should be fully sealed in accordance with waterproofing standards, i.e. Welded joints rather than adhesive tape, and the integrity of the seal checked through non-destructive testing, to ensure it is leak-proof".

Wedge Welding techniques, (conforming CQA standards taken from landfill applications), are employed to seal membrane sheets, which are then air tested to ensure the integrity of the joint.

Hewitech's dedicated installation team provide a quality assured supply and fix site installation service to industry standards.

Hewitech Installation is a SMAS “Worksafe” contractor as recognised by SSIP – Safety Schemes IN Procurement – SMAS certificate number 22365

Hewitech Soakaway Geotextile Specification – HSG1000

Mechanical Properties	Test Method	Units	HSG1000
Tensile Strength – MD	EN ISO 10319	kN/m	6.0
Tensile Strength – XD	EN ISO 10319	kN/m	6.0
Elongation at break – MD	EN ISO 10319	%	40.0
Elongation at break – XD	EN ISO 10319	%	40.0
CBR Puncture Resistance	EN ISO 12236	N	1000
Dynamic Cone Drop	EN ISO 13443	mm	40.0
Protection Efficiency	EN ISO 14574	N	48.0

Hydraulic Properties	Test Method	Units	HSG1000
Characteristic Opening Size	EN ISO 12956	µ°m	140.0
Permeability	EN ISO 11058	m/s	120 x 10^{-3}
Waterflow normal to the plane	EN ISO 11058	$1/m^2.s$	120
Waterflow in the plane	EN ISO 12958	m^2/s	1 x10^{-7}

Physical Properties	Test Method	Units	HSG1000
Thickness under 2 kPa	EN ISO 9863-1	mm	0.80
Weight	EN ISO 9864	g/m^2	80
Roll Size		m	4.5 x 100m

Hewitech Attenuation Protective Fleece Specification - HPF40

Mechanical Properties	Test Method	Value	Tolerance
Tensile Strength MD	EN ISO 10319	40 kN/m	-5.2 kN/m
Tensile Strength CD	EN ISO 10319	40 kN/m	-5.2 kN/m
Elongation MD	EN ISO 10319	55%	+/-12.7%
Elongation CD	EN ISO 10319	55%	+/-12.7%
Static puncture resistance – CBR	EN ISO 12236	6.50kN	-1.30 kN
Dynamic perforation resistance – cone drop	EN ISO 13433	5mm	+1.3mm
Protection efficiency	EN ISO 14574	617N	-123.4N

Hydraulic Properties	Test Method	Value	Tolerance
Water permeability normal to the plane	EN ISO 11058	35 X 10-3 m/s	-11 X 10.3 m/s
Water flow normal to the plane	EN ISO 11058	35 l/ $m^2.s$	-11 l/ $m^2.s$
Water flow capacity in the plane 20kPa	EN ISO 12958	8,5 X 10-6 m^2/s	-10% log g
Characteristic opening size (AOS)	EN ISO 12956	70,0 pm	+/-21.0 pm

Physical Properties	Test Method	Value	Tolerance
Thickness under 2 kPa	EN ISO 9863-1	3,00 mm	+/-0.60mm
Composition	100% polypropylene non-woven geotextile		
Durability	Predicted to be durable for a minimum of 25 years in natural soil with 4 < pH<9 and soil temperatures <25°C		

Attenuation Standard Membrane Specification .75mm

Tested Property	Unit	Test Method	Value
Thickness	mm	UNE EN 1849-2	0.75
Confidence level 95%	%	-	Tolerance ±6
Confidence level 90%	%	-	Tolerance ±4

Tensile Properties (*)	Unit	Test Method	Value
Tensile strength at break	N/mm	UNE-EN ISO 527 (type V)	23(19)
Elongation at break	%	UNE-EN ISO 527 (type V)	≥700
Tear Resistance	N	ISO 34-1	≥75
Puncture Resistance	KN	UNE-EN ISO 12236	2.10
Exploding Resistance	%	Pr EN 14151	<15
Dimensional Stability	%	UNE EN ISO 14632 (100°C, 1h)	±1.5

	Parameter	Units	0.75
PRESENTATION (Standard Sizes)	Roll Width	m	6/6.30
	Roll Length	m	280
	Surface	m^2	1680/1764

Attenuation Membrane for Contaminated Land Specification 1mm

Tested Property	Unit	Test Method	Value
Thickness	mm	UNE EN 1849-2	1.00
Confidence level 95%	%	-	Tolerance ±6
Confidence level 90%	%	-	Tolerance ±4

Tensile Properties (*)	Unit	Test Method	Value
Tensile strength at break	N/mm	UNE-EN ISO 527 (type V)	31 (26)
Elongation at break	%	UNE-EN ISO 527 (type V)	800 (>750)
Tear Resistance	N	ISO 34-1	≥100
Puncture Resistance	KN	UNE-EN ISO 12236	2.50
Exploding Resistance	%	Pr EN 14151	<15
Dimensional Stability	%	UNE EN ISO 14632 (100°C, 1h)	±1.5

	Parameter	Units	1.00
PRESENTATION	Roll Width	m	6

(Standard Sizes)	Roll Length	m	210
	Surface	m^2	1260

System Access and Maintenance

The Hewitech system offers two maintenance channel options dependant on structure size.

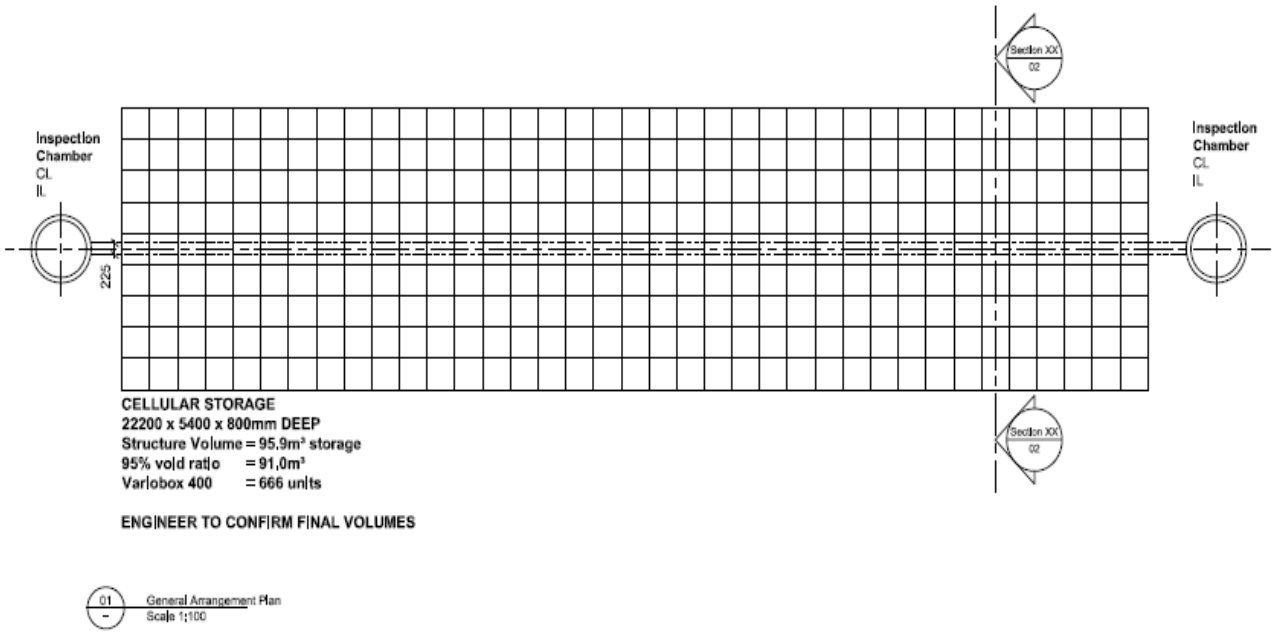
Large Tanks

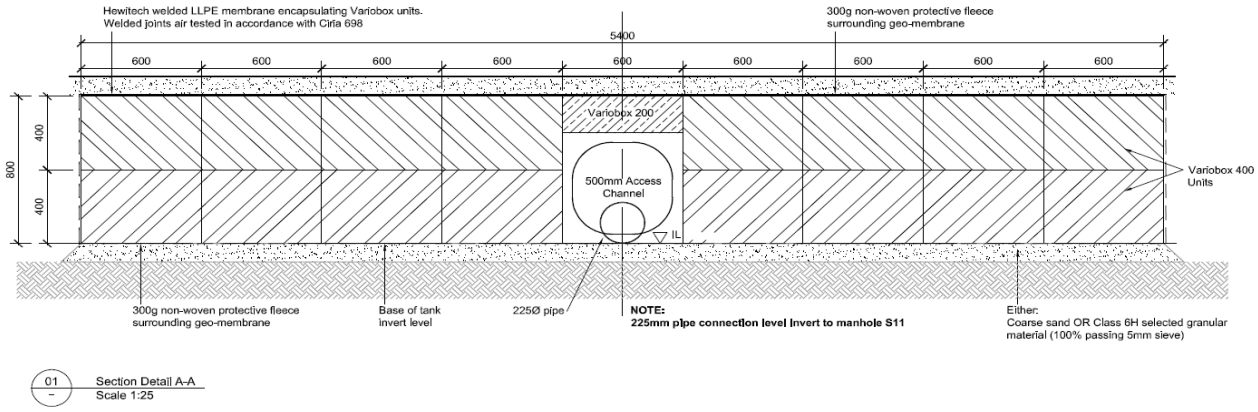
Controlbox 500mm Access

Small Tanks

Variobox 170mm Access

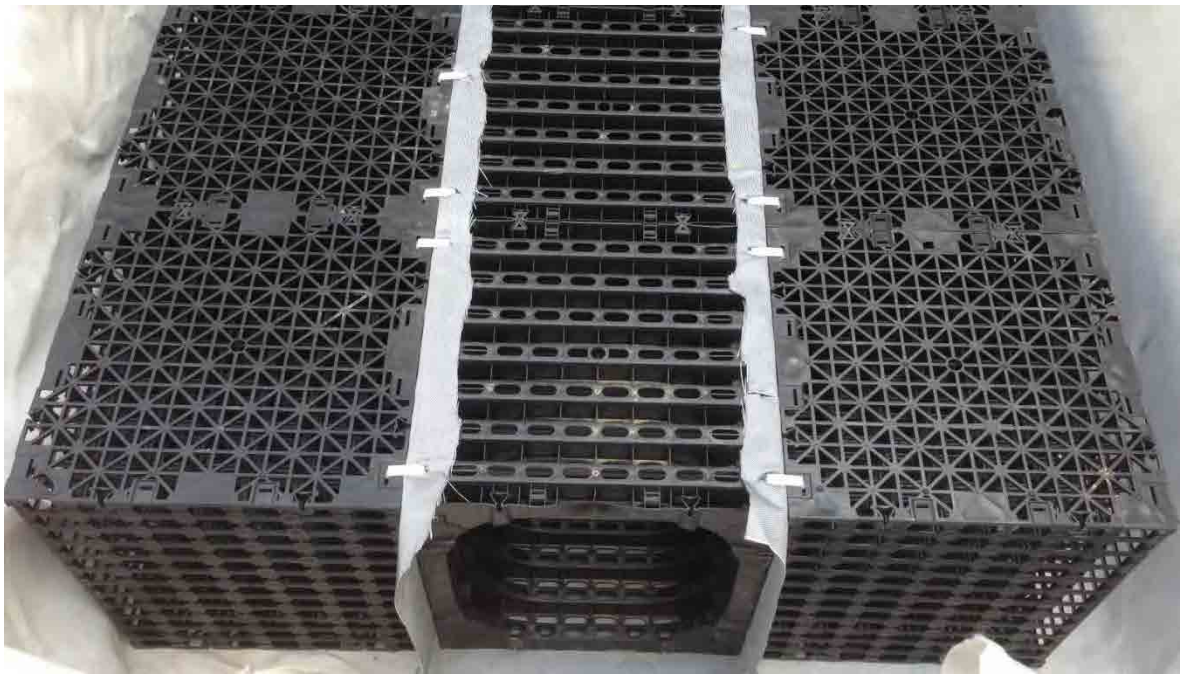
Attenuation systems should be designed with access upstream to downstream manhole through the tank.





Siltation Control

For siltation control wrap the Controlbox 500mm access channel and maintenance channel with a needle punched non-woven geotextile (HSG100). Any silt entering the system will be contained within the Controlbox maintenance channel.



Debris and silt entering the system can be removed using standard industry jetting techniques via the upstream or downstream manhole.

Site Construction Sequence

Installation procedures should be carried out in accordance with the Health and Safety at Work Act (1974) and any other relevant legislation. Special attention should be paid to temporary work requirements in excavations.

Excavate to the required plan dimensions and level, ensuring that the excavation orientation will allow easy installation of connecting pipework. Consideration should be given to maintaining construction plant access for reinstating around the installed Variobox units. A minimum 300mm working space is required around the structure but 500mm is recommended for safe working practice.

Ensure that the ground bearing capacity at the formation level is sufficient for the proposed operational loads. The base of the excavation should be smooth and level, free of large stones and soft spots. Any soft spots should be excavated and replaced with suitable compacted granular material.

a) Attenuation Application

Place and compact a 100mm thick bedding layer of coarse sand. The base should be level and free of any undulations. Line the base and sides of the excavation with a 300g needle punched non- woven protective geotextile before placement of the impermeable geomembrane.

Install the geomembrane. Hewitech or the contractor seals the joints by wedge welding in accordance *Ciria 698 Site Handbook For The Construction of SUDS*, making an allowance for the connecting pipework or adapters. To ensure that the integrity of the geomembrane has been maintained, it is recommended that an inspection of the material is carried out, and welded joints are air tested in accordance with *Ciria 698 Site Handbook for the Construction of SUDS.*

If water is present, we recommend that the excavation depth is over dug by 200mm, with a base layer of 'TERRAM', overlaid by 150mm of compacted 'Type 1 road stone', topped off with a 50mm layer of pipe bedding. A sump should be excavated below the base layer of stone to allow the extraction of water via a drainage pump.

Variobox connectors are placed between all layers of Variobox units to give structural support to the tank. Sufficient Variobox clips are placed connecting Variobox units to maintain rigidity of the tank prior to backfilling the sides, the adjacent units being connected with two Variobox clips.

Place the Variobox crossconnector into the recess at the edge of the unit, two per unit as indicated. Place a shear connector in the middle of the Variobox and install the next layer of Variobox units, positioning the units in the upper layer so that they exactly mirror the position of the units in the lower layer. Repeat the above procedure until the necessary depth of Variobox structure has been achieved.

Pipe connections to the tank are made by cutting out the Controlbox End Plate and inserting a length of pipe, or by forming the membrane around a pipe coupler.

A Variobox attenuation structure requires ventilation to ensure proper hydraulic performance. Consideration should be given as to how this ventilation is to be installed, generally utilising a vent pipe to the downstream manhole (detail1), or alternatively a vertical vent pipe (detail 2). One 110mm vent pipe per 7500m2 of drained area is recommended within *CIRIA C680 Structural Design of Modular Geocellular Drainage Tanks.*

Complete the geomembrane encapsulation of the entire Variobox structure, forming and testing joints where appropriate. Complete the geotextile protective fleece encapsulation of the Variobox structure, re-examining the geotextile for damage and joint integrity.

b) Soakaway Application

The installation sequence is the same as the attenuation sequence with the following amendment

- 300g protective fleece and geo-membrane are not required
- the Soakaway tank is surrounded in a needle punched non- woven geotextile
  (see page 8 – HSG1000 specification)

Contractor

Backfill around the sides of the encapsulated units, forming a thick layer of coarse sand or Class 6H selected granular material immediately adjacent to the units. Where required, remaining excavated areas around the units should be backfilled with Class 6N or 6P selected granular material, in accordance with *MCHW, Volume 1*, *Series 600* or similarly approved specification.

Above the wrapped Variobox units, place and lightly compact a minimum 100mm thick layer of either coarse sand or Class 6H selected granular material (with 100% passing the 5mm sieve), in accordance with *MCHW, Volume 1, Series 600.*

Final backfilling of the installation is dependent on the expected operational loads. (NB. Compaction plant over and immediately adjacent to the Variobox units shall not exceed 2300 kg/m width).

Field conditions (e.g. landscaped areas)

The backfill material that lies within 300mm above the Variobox units should be free from particles exceeding 40mm in diameter, in accordance with Class 8 material to *MCHW, Volume 1*, *Series 600*. Final backfilling up to finished ground level may be achieved using selected as-dug material. Backfill material should be placed and compacted in layers no greater than 300mm, or in compliance with the approved specification.

Lightly trafficked (e.g. restricted access car park)

Backfill with Class 1 or 2 material in accordance with *MCHW, Volume 1, Series 600.* Backfill material should be placed and compacted in layers not greater than 150mm. Where the Variobox units are installed beneath a paved area, the pavement sub-base may form part of the backfill material provided that minimum cover depths are maintained.

Heavily trafficked (e.g. service areas or roads)

Contact Hewitech for further information and guidance. Hewitech can provide site specific calculations including live and dead loads to ascertain product and design suitability.

Complete pavement construction or landscaping over the Variobox system.

It should be noted that infiltration systems are not generally installed under roads due to the reduction in load bearing capacity of saturated soils. Specialist advice should be sought where this type of installation is proposed.

In attenuation and soakaway systems, where groundwater may be present, a buoyancy check should be undertaken by a qualified engineer to ensure that the imposed overburden pressure exceeds any uplift forces generated.

Storage and Transport

Variobox and Controlbox units are stored on pallets 4 units per layer, with a product height of either 2.4m or 2.8m dependant on transport requirements.

Pallets should be offloaded with suitable machinery with fork attachments.

Machinery used for offloading and transportation must be LOLER rated for the application and conform to current safety requirements.

Technical Support

For further technical support please visit the Hewitech website or contact Hewitech Technical Services:

- Telephone 01242 821678
- Fax 01242 821510
- Email sales@hewitech.co.uk
- Web www.hewitech.co.uk

This information is of a generic nature and is provided for guidance purposes only. Final determination of the suitability of any information or material for your intended use will be site specific, and as such the manner of use is your sole responsibility, for which you must assume all risk and liability in this regard. This information is not intended to have any legal effect, whether by way of advice, representation or warranty.
Particular application and specific site conditions can be discussed in further detail with our technical representative.

APPENDIX D 106 AGREEMENT WITH THAMES WATER REGARDING FOUL

DS reference DS6103699

developer.services@thameswater.co.uk

0800 009 3921
Monday to Friday, 8am to 5pm

thameswater.co.uk/developerservices

Iesis Group – Mr Alan Werrett
Crown Trading Centre, Clayton Road, Hayes
London, Greater London
UB3 1DU

17 May 2023

Notice of consent to connect to a public sewer / public lateral drain

Site address: **Crown Trading Centre, Clayton Road, Hayes, London, Greater London UB3 1DU**

Dear Mr Alan Werrett,

Thank you for your application for a new sewer connection at the above address.

We are pleased to inform you that we have given our conditional consent for your proposed connection(s) to the public sewer under Section 106 of the Water Industry Act 1991.

What is this consent for?

This consent is given solely for the legal right of communication (i.e. method/mode of connection) with the public sewer, in accordance with the description below.

This consent does not guarantee capacity exists within our network. For capacity-based enquiries or preplanning concerns regarding our network please make a Pre-Planning Enquiry application. Applications can be made on the Thames Water website.

This Consent does not give you any inferred right to enter or cross land owned by a third party and must not be used to discharge any drainage-related planning conditions. You will be responsible for obtaining any necessary licences and/or permission from the highway authority, planning authority and/or private/third-party landowners.

Inspections and Completion certificates

We will need to physically inspect the connection to our sewer before you backfill the trench. Please call us on 0800 009 3921, at least **ten working days** prior to backfilling the connection works to schedule an inspection visit. Please refer to the ‘’Conditions of Consent (5)’’ for further details.
When the connection has been completed satisfactorily, a completion certificate will be issued. This certificate authenticates the standards to which your connection works were carried out and does not infer adoption of your new drains or sewers. You will be responsible for repairs and maintenance of all drains including those outside your site boundary. You will need to submit an adoption agreement under section 102 or 104 of the Water Industry Act if you want us to adopt any of your drains or sewers. You can do this via https://developers.thameswater.co.uk/Developing-a-large-site/Apply-and-pay-for-services/Wastewater-services/Adopting-sewers-and-other-assets

Sewer Connection Quotes

If you would like us to carry out the connection works on your behalf, we will provide you a quote and deliver in accordance with the below.

Waste connection only (no pipe laying)
We will discuss the requirements with you and quote for the works required and charge in accordance with section 7 (pages 25-28) of our current fixed price charging arrangements.

lateral drain and sewer requisitions
Waste connections including pipelaying for the provision of a lateral drain (pipe serving one property or one curtilage) and/or a new sewer (pipe serving more than one property).

If there is no public sewer easily accessible to your property or your site has no means to connect your lateral drain and/or sewer due to third party land, you can requisition (formally request) Thames Water to lay these pipes as part of our public network under Section 98-101 of the Water Industry Act 1991. Please refer to section 8 (pages 29-31) of our current charging arrangements.

You can estimate the costs for these connections yourself by referring to section 7 and 8 of our current charging arrangements here.

Our consent is subject to the conditions below:

Location	Description
Crown Trading Centre Clayton Road, Hayes London, Greater London UB3 1DU	**FOUL - Direct Foul water Connection** 1 x 225mm internal diameter direct foul water connection into an existing 300mm internal diameter foul water sewer located in Clayton Road via an existing manhole chamber referenced TQ09794609 in accordance with Code for Adoption sewerage. As per drawing No. JR006098-ISS-XX-ZZ-DR-C-3004T03

Please note that we will allow ONE amendment to be made to this consent within 12 months from date of issue. Any more than ONE amendment within this time period will entail additional fees. Any amendments sought beyond this time period will require a new application to be submitted.

The reference number for your application is DS6103699 please quote this in any future correspondence.

If you're proposing to build within three metres of a public sewer, or within one metre of a lateral drain, you'll need to apply to us for a separate build over agreement. You can do this via thameswater.co.uk/buildover.

If you've any queries, please call our helpdesk on 0800 009 3921 (8am to 5pm, Monday to Friday) or email developer.services@thameswater.co.uk.

Yours sincerely,

Ciara O'Connor on behalf of Thames Water
Technical Coordinator – Wastewater Connections

Conditions of Consent

1. This consent is subject to conditions that may be imposed through the planning process.
2. An infrastructure charge will be payable as a result of connecting a property to the Public Sewerage System for the first time for domestic purposes by virtue of Section 146(2)b of the Water Industry Act 1991. We will invoice this charge separately if applicable.
3. Where the connection is to be made to a public sewer in third party land (i.e. outside your site boundary including public land), it is recommended that a demarcation chamber is constructed on the lateral drain at the property boundary, or as near to the property boundary as possible. The demarcation chamber and lateral drain will not be adopted as part of the section 106 agreement. You will need to submit an adoption agreement under section 102 or 104 of the Water Industry Act if you want us to adopt any of your private drains or sewers. You can do this via https://developers.thameswater.co.uk/Developing-a-large-site/Apply-and-pay-for-services/Wastewater-services/Adopting-sewers-and-other-assets
4. All materials used and standard of sewer connection works should be in accordance with Code for Adoption sewerage. Where the connection is to be constructed in plastic, please confirm the standards of materials to be used with a technical coordinator/project engineer prior to carrying out the connection. Please ensure that the specification sheet/documents for the plastic materials used are kept for review by the field engineer. Please refer to the attached Construction and Connection guide for best practice.
5. It is your responsibility to ensure that your works are inspected before the trench is backfilled. You must arrange our attendance by calling 0800 009 3921 and giving us at least ten working days' notice. If the connection cannot be inspected by a field engineer for any reason, we may request that the trench is reopened for inspection or require additional information deemed necessary for us to approve the connection. Where a connection is made via a heading/tunnelling or a field engineer cannot attend site within the agreed ten working days' notice period required, we may, in exceptional circumstances accept photographs and/or a CCTV survey report and footage subject to prior agreement with a Technical Coordinator or Project Engineer.
6. It is your responsibility to confirm the exact location, diameter, and invert levels of the public sewer prior to making the connection. You will be held liable for any misconnection (i.e. foul water discharge to a surface water sewer or surface water discharge to foul water sewer) resulting from this connection. Where you are making an indirect connection, you should carry out connectivity surveys to confirm the type of sewer your existing private drains connect to and take appropriate action to rectify if you find cross connections.
7. Connections into manholes must be made with soffits level and must enter 'with the flow'. Backdrops must be constructed outside the manhole chamber.
8. Junction connections must be made by cutting in a purpose made oblique or swept junction fitting of the same material as the public sewer, jointed using flexible couplings. Core drilled saddle connections are usually not permitted on sewers smaller than 375mm (unless otherwise approved by a Technical Coordinator/Project Engineer in writing).

Where a core drilled saddle connection is approved, a flexible saddle fitting must be used to ensure that no part of the new drains protrude into the existing sewer. We do not accept clay saddles attached to the public sewer with mortar.

9. Some Infill/recessed manhole/chamber covers are permitted on adoptable drains/sewers in accordance with the attached construction and connection guide.
10. All connections to the public sewer should be via a gravity-fed pipe. A direct connection of a rising/pumped main to the public sewer is not permitted. Where there is a proposed connection from a pump station, a break chamber should be installed at the end of the pumped main to ensure that flows into the public sewer are via gravity for a minimum of 5m
11. It is your responsibility to ensure that your appointed private drainage contractor is competent and has all relevant permits necessary to carry out the connection. You will be responsible for obtaining any easements for crossing third party land and licences from the highway authority. All requirements of the highway authority must be observed and signing, guarding and lighting will be required at all times in accordance with Chapter 8 of the Department of Transport's Traffic Signs Manual 2009.
12. Where there is a proposed discharge from a private pumping station and rising main system, it is your responsibility to design the system to ensure acceptable discharge levels of hydrogen sulphide (H2S), this can be achieved by ensuring that all effluent is cycled through the pumping station and rising main within a maximum of six hours to prevent septicity. Where necessary, preventative measures to ensure H2S cannot build up to dangerous levels in the system should be installed. You will be responsible for the ongoing maintenance and monitoring of the private system. Hydrogen sulphide is a major public health risk and causes serious damage to the receiving sewerage network which may result in a third party damage claim against you under Section 111 of the Water Industry Act 1991.
13. Under no circumstances should foul water be discharged into the surface water sewerage system. Surface water drainage must not discharge to the foul sewerage system unless otherwise stated in the description above. If you want to discharge surface water directly to a soakaway or to a watercourse, then you will need to obtain the consent of the Environment Agency or the Lead Local Flood Authority.
14. All proposed discharge of surface water flows must be in accordance with the site's drainage strategy as approved by planning application, which should specify the final discharge rates and volumes. Sites proposing to discharge surface water flows with no planning requirement must connect into the nearest surface water sewer unless otherwise agreed by Thames Water.
15. Only the connections detailed in the enclosed notice are approved by Thames Water. No other works affecting the public sewerage system may be carried out without Thames Water's written consent.
16. Confined space entry procedures must be observed when breaking into the existing public sewerage system.

17. Where the developer/owner/occupier proposes to discharge trade effluent into the public sewer, a trade effluent consent will be required. Trade effluent can be best described as anything other than domestic sewage (toilet, bath or sink waste) or uncontaminated surface water and roof drainage (rainwater). For enquiries and application forms contact your Retailer or visit the Thames Water website at https://wholesale.thameswater.co.uk/Wholesale-services/Business-customers/Trade-effluent

Hazard information
Third-party connection to sewers

Anyone wishing to connect their property to a Thames Water sewer must comply with the requirements of Section 106 of the Water Act 1991, as amended.

Significant Hazards

We strongly recommend that before carrying out work to connect to our sewers, you consider the following significant hazards:

- Oxygen deficiency
- Toxic gases, fumes or vapours
- Explosion (methane, petrol)
- Flooding
- Physical injury (slips, trips, falls)
- Infections from sewage (Weils disease)

Confined spaces

Particular care must be taken before entering or working in confined spaces. A confined space is defined as any place in which, by virtue of its enclosed nature, there arises a foreseeable specified risk. A specified risk is a risk of any of the following:

- Serious injury from a fire or explosion
- Loss of consciousness due to an increase in body temperature
- Loss of consciousness or asphyxiation arising from gases or the lack of oxygen
- Drowning arising from an increase in the level of a liquid

In addition:

- When detailing the private drainage, you should assume that the public sewer might occasionally surcharge up to ground level, and particular care is needed where development is proposed in low lying areas.
- Before entering any Thames Water asset a competent person must carry out an assessment to determine the need for entry and a safe system of work to be applied.
- Children and young persons must not enter the workspace.
- After the sewer connection work, it is important to wash before eating, smoking or treating cuts and abrasions. It is also important to avoid infection by maintaining strict personal hygiene and effective care of cuts and abrasions.

APPENDIX E: MAINTENANCE AND MANAGEMENT REGIME

The Management Company

The responsibility for maintenance of all elements of the development remain with the developer until handed over to the Management Company.

Handover of external works to the Management Company coincides with completion of the final residential unit.

The Management Company employs a specialist Managing Agent to manage the development which includes all aspects of maintenance.

The Management Company BI registered No. ***'tbc'*** *was incorporated in* ***'tbc'*** *and its directors are currently made up of* the developer *representatives plus an appointment from the Managing Agent.*

The Managing Agents are ***'tbc'*** *who have over '****tbc'*** *years' experience in the industry.*

At handover the Management Company and Managing Agent receive as built information together with operating and maintenance manuals which detail all maintenance protocols.

Approximately 1 year following completion of the final unit the residents will be invited to elect members to become directors of the Management Company, the developer appointed directors at that time resign from the Management Company to be replaced by the elected representatives of the residents.

To ensure continuity and a full understanding of the development and the operation and maintenance of its various components the representative of the Managing Agent remains as a director of the Management Company and the appointment of the Managing Agents is fixed for a minimum period of two years following the date of resignation of the last developer director.

After that two year period the Management Company have the right to re-tender the Managing Agent services but it is very rare that a change is made as our original appointments provide an excellent service.

Within the first two years from the final unit completion on the development the residents have two ways in which they can report any defects and problems which would include flooding and that is either to our Aftersales department or to the Managing Agents, the residents are issued with telephone numbers for both which include out of hours emergency response.

After two years our Aftersales contacts are normally replaced by members of the Management Company. The residents therefore have the ability to contact them or the Managing Agents which then remains through the life of the development.

Attenuation (and surface water drainage system generally)

Cellular storage is incorporated into the site-wide drainage and SuDS strategy. |This takes the form of buried crate-based storage system.

The Management Company will ensure that the following measures are undertaken to ensure the longevity of this part of the system;

Quarterly

i) Inspect the performance of the attenuation system by lifting the cover of the chamber(s) immediately upstream of each feature and check that the outlet pipe (into the crates) is free of obstruction and visible (ie not submerged). If the outlet pipe is submerged then remedial action may be required. Remedial advice to be sought from a suitably qualified consulting infrastructure engineer.

Every 6 months

i) Remove silt build up from ***all*** catchpits and road gullies.

Annually

i) Select approx. 20% of the development's surface water inspection chambers (situated in accessible non-private areas) and inspect for blockages / silt build up. Remove silt and debris. Rotate on a 5 yearly cycle to cover all such chambers over this period.

Every 2-5 years (depending on outcome of aforementioned inspections)

i) Commission a CCTV survey and report on condition of the surface water piped drainage system upstream of the soakaways to check for structural integrity and hydraulic fluidity. Carry out promptly any remedial work as advised by CCTV company.

Permeable Paving

The permeable block paving areas are constructed in in order to;

a) Delay the surface water runoff from paved areas, and
b) Enhance the quality of the rainwater percolating through the construction layers before discharging into the below-ground drainage system.

The management company will ensure that the following measures are undertaken to ensure the longevity of the pervious pavement;

Quarterly

i) Inspect the permeable pavement for signs of ponding and ensure there is no migration of soils from adjacent landscaped areas or other deleterious material that may prematurely clog up the jointing stone situated in the gaps between the blocks. Ideally this type of inspection should be undertaken immediately following a heavy rainfall event.

ii) Commission vacuum sweeping and brushing of the pervious pavement to ensure joints are kept free of silt. Minimum 3 sweeping per year, thus;

a) End of Winter (April) – to collect winter debris
b) Mid-Summer (July/August) – to collect dust, flower and grass-type deposits.
c) After Autumn leaf fall (November)

The company commissioned to carry out this work should ensure that their vacuum equipment is adjusted accordingly to avoid removal of jointing material. Any lost material should be replaced promptly to avoid the blocks from being dislodged.

Last Resort Remedial Action

i) Should a portion of the pervious pavement become substantially impervious due to excessive siltation, the following procedure should be followed;

a) Lift block paving and laying course
b) Break out underlying bitmac base layer and replace with similar compacted depth of course aggregate subbase material to BS EN 13242:2002 Type 4/20, wrapped in geotextile as Terram 1000 or similar.
c) Renew laying course, replace blocks and renew jointing material

NB. Material removed from the voids or the layers below the surface may contain heavy metals and hydrocarbons and as such may need to be disposed of as 'controlled waste'. Sediment testing should be carried out before disposal to confirm its classification and appropriate disposal methods.