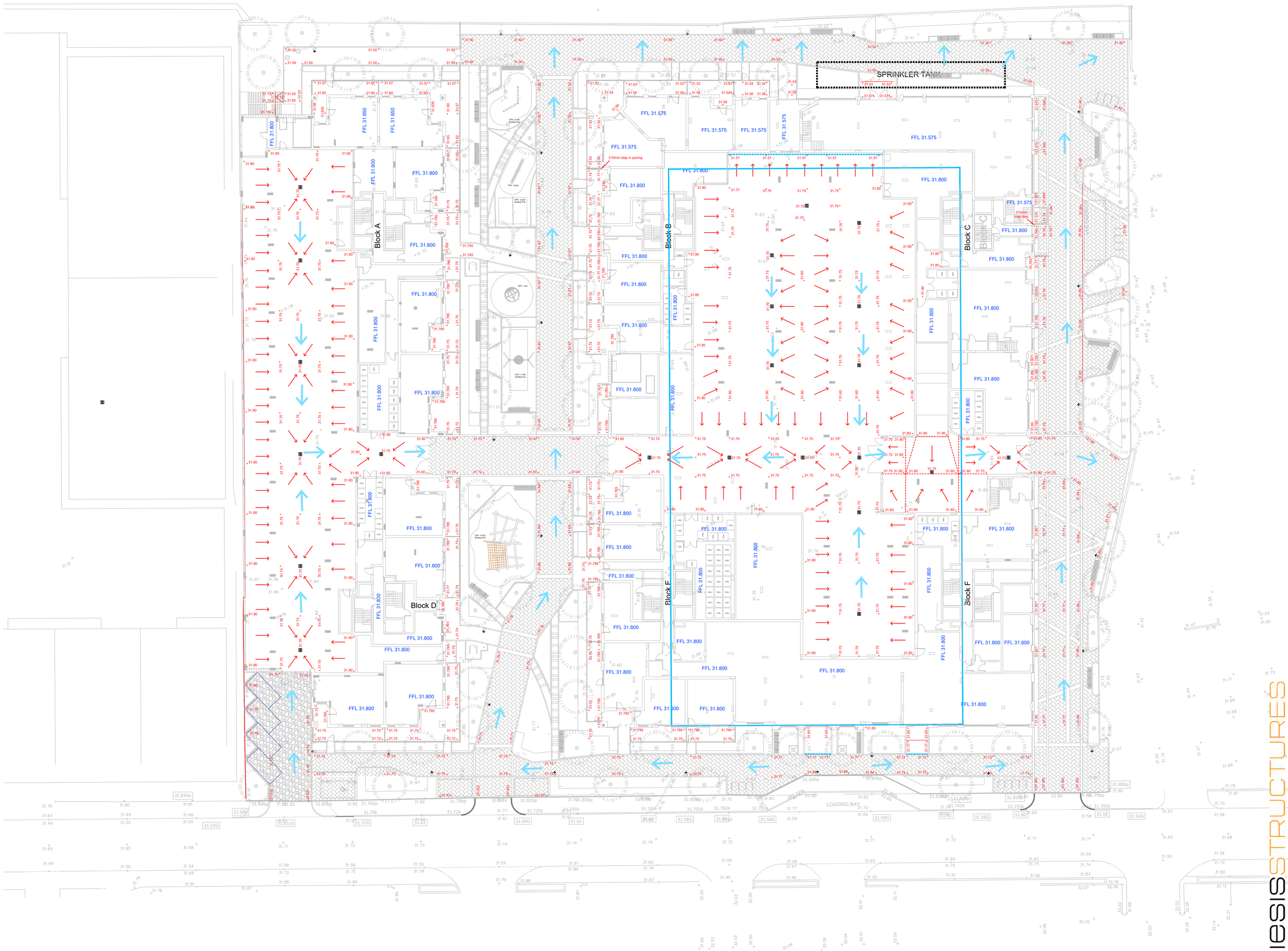
APPENDIX A COPY OF AS-BUILT DRAWINGS



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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.
	Exceedance Flood Route

REV	DATE	DRAWN/CHK	REVISION INFO
C04	13.05.25	BM/PT	EXCEEDANCE FLOOD ROUTE ADDED
C03	11.04.25	BM/PT	FINAL CONSTRUCTION ISSUE
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 5

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	S5

DRAWING NUMBER:	REVISION:
CTC-ISS-XX-XX-DR-C-923051	C04

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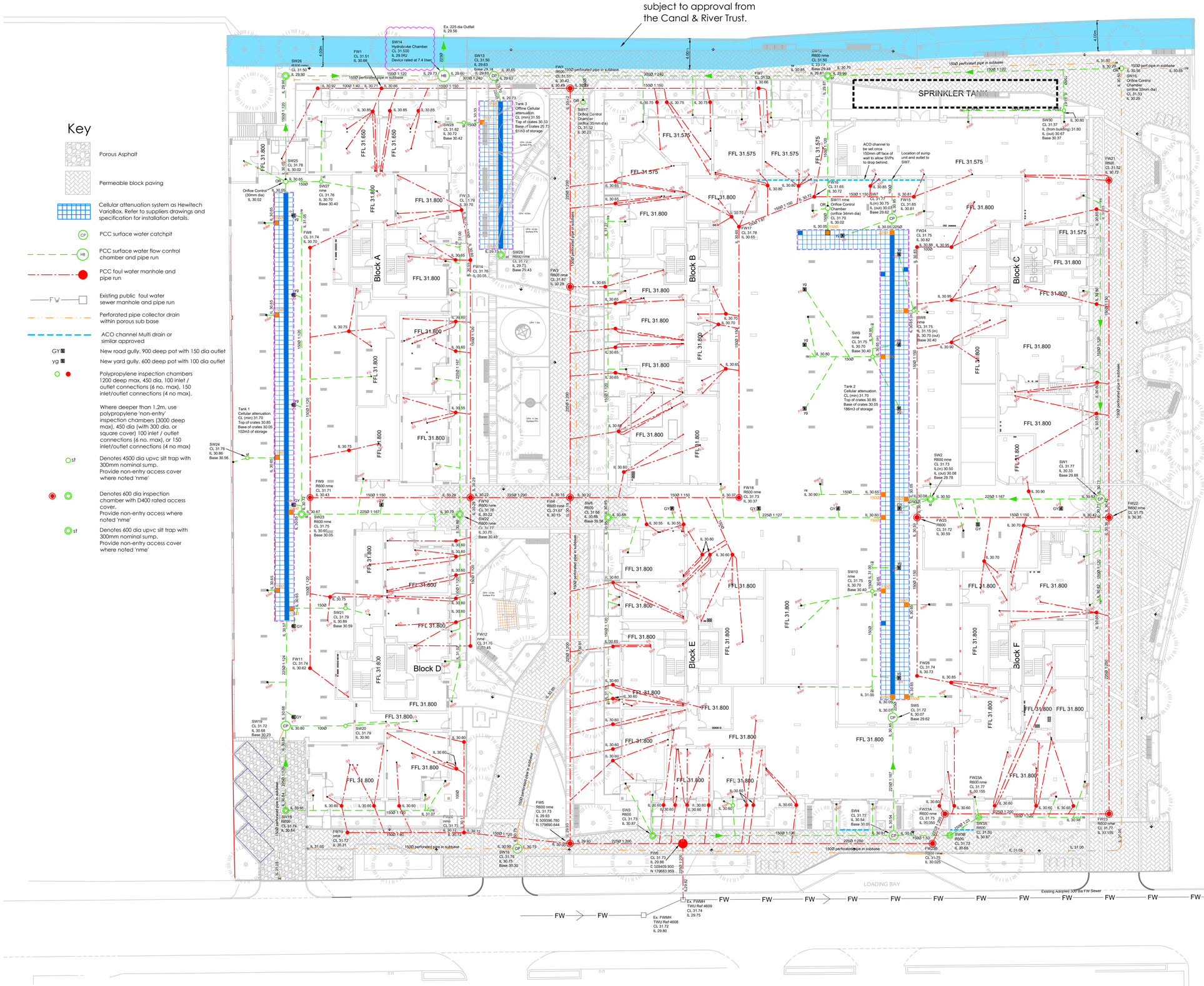

Key

- 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'

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 100mmØ (150Ø 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.

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KEY:

REV	DATE	DRAWN/CHK	REVISION INFO
C07	11.04.24	PT	Final construction issue
C06	20.02.25	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 5

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	S5

DRAWING NUMBER:	REVISION:
CTC-ISS-XX-XX-DR-C-923071	C07

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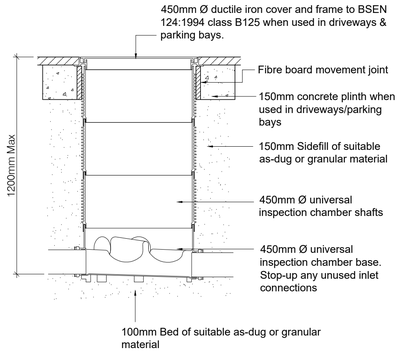
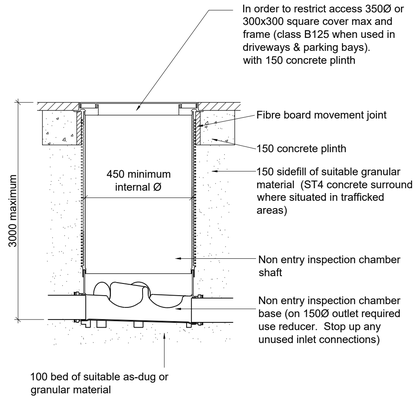


(Inlet/Outlet & 4 branch connections for 100Ø pipes)
(Inlet/Outlet & 2 branch connections for 150Ø pipes)

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

1.2m Max. Polypropylene inspection chamber

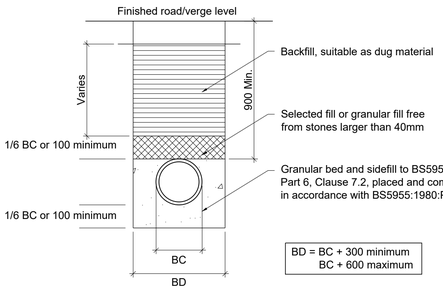
For use in soft areas, driveways and parking bays only



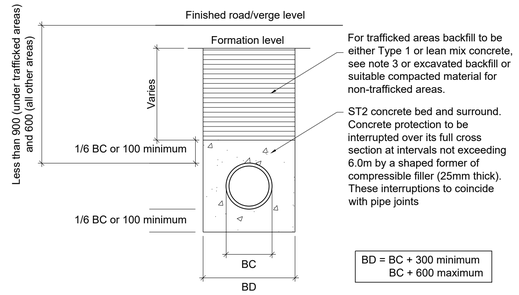
Note: Chambers in driveways and parking bays to have 150mm ST4 concrete surround.

1.2m to 3.0m deep non entry inspection chamber

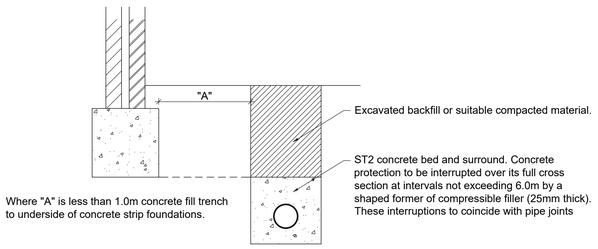
For use in soft areas, driveways and parking bays only, where noted 'nme' on layouts

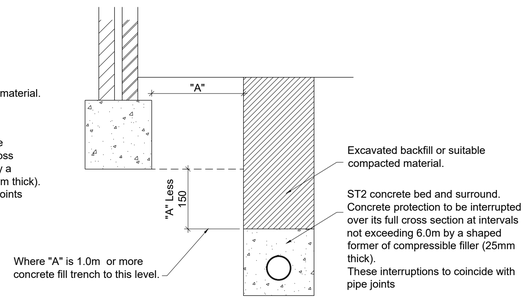


Typical trench detail

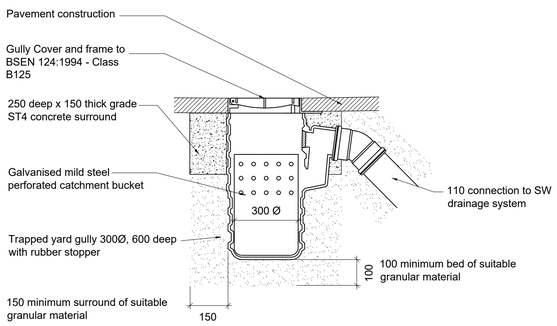


Shallow trench detail



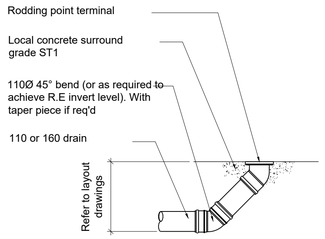


Pipe runs near buildings

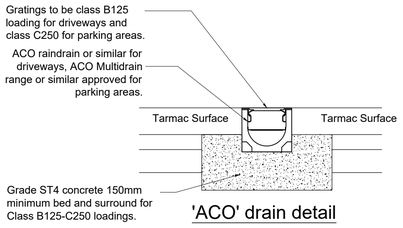


Trapped yard gully

Where noted 'yg' on layouts

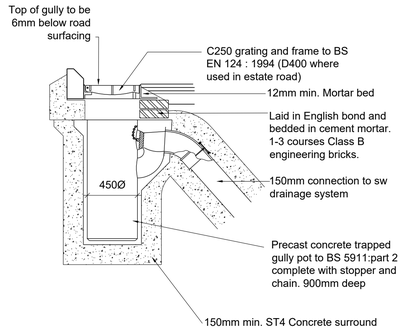


Rodding eye



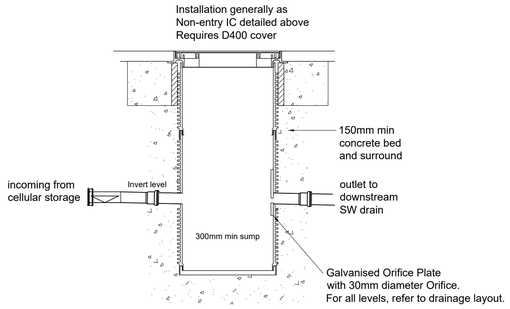
'ACO' drain detail

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

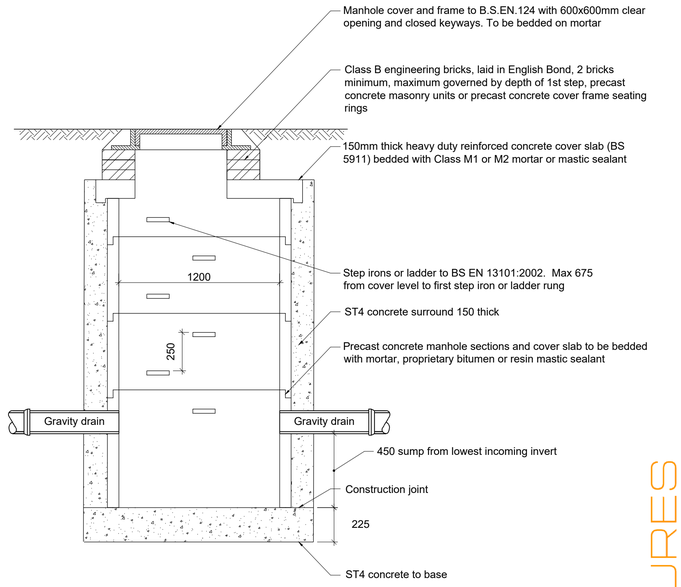


Trapped road gully

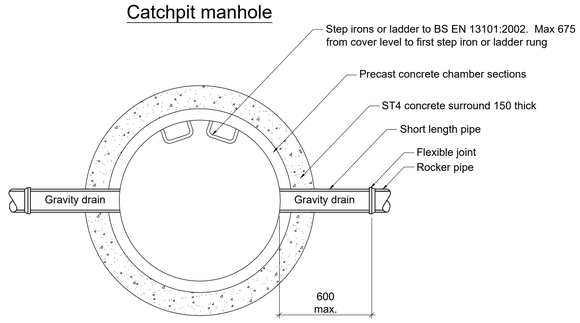
Where noted 'GY' on layouts



RIDGISTORM Orifice Plate Flow Control Chamber or similar approved



Catchpit manhole



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KEY:

LEGEND:

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C03	11.04.25	RM/PT	FINAL CONSTRUCTION ISSUE
C02	13.11.23	RM/PT	REISSUED.
C01	13.10.23	RM/PT	TITLE BLOCK UPDATED
T01	29.05.23	BM/PT	WIP ISSUE.

STATUS:
Stage 5

CLIENT:
JJ RHATIGAN

PROJECT:
Crown Trading Centre
Hayes,UB3 1DU

DRAWING TITLE:
Private Drainage
Construction Details Sheet 1

JOB NUMBER:	SCALE AT A1:	REV. STATUS:
SE1560	NTS	S5

DRAWING NUMBER: CTC-ISS-XX-XX-DR-C-923171
REVISION: C03

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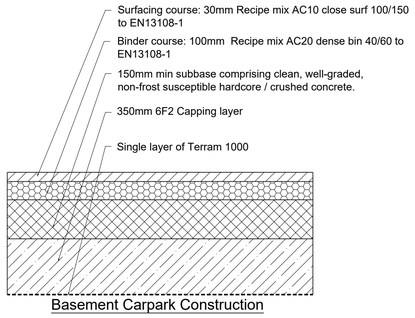
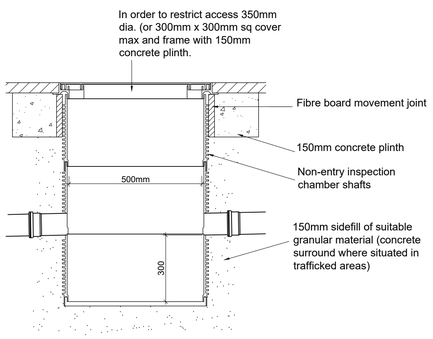


Basement Carpark Construction

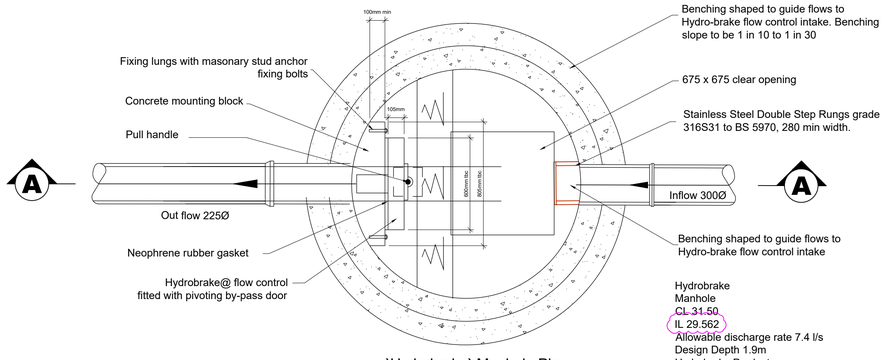
TABLE 11 MIN. DIMENSIONS FOR ACCESS FITTINGS AND INSPECTION CHAMBERS

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	0.6 or less	225x100	190 (2)	-	190 (1)
	1.2 or less	450x450	450	Min 430x430	430
Deep	>1.2 but <3.0	450x450	450	max 300x300 (3)	Access restricted to max 350 (3)

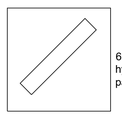
Notes:
(1) The clear opening may be reduced by 20mm in order to provide proper support for the cover and frame.
(2) Drains upto 150mm.
(3) A larger clear opening may be used in conjunction with a restricted access. The size is restricted for health and safety reasons to deter entry.



Silt Trap



`Hydrobrake` Manhole Plan

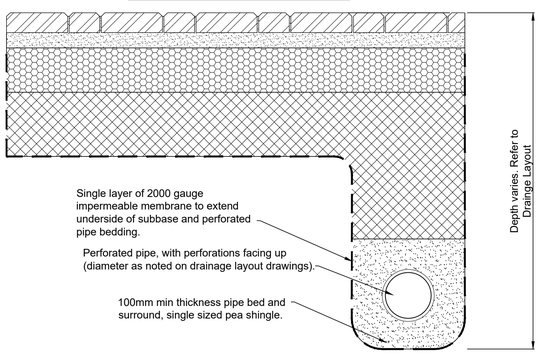


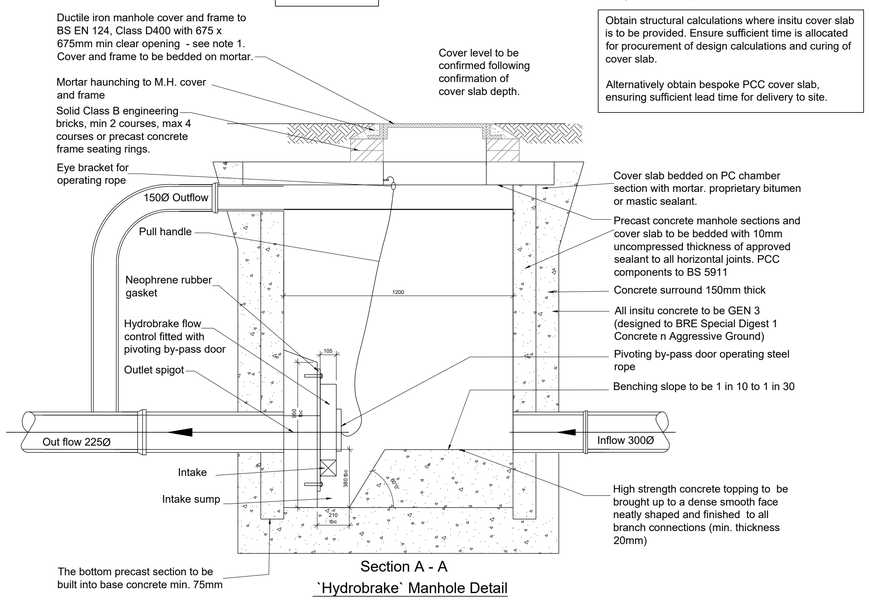
675 x 675 cleqar opening with hydrobrake (105 wide x 600 tbc long), passing through.

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.

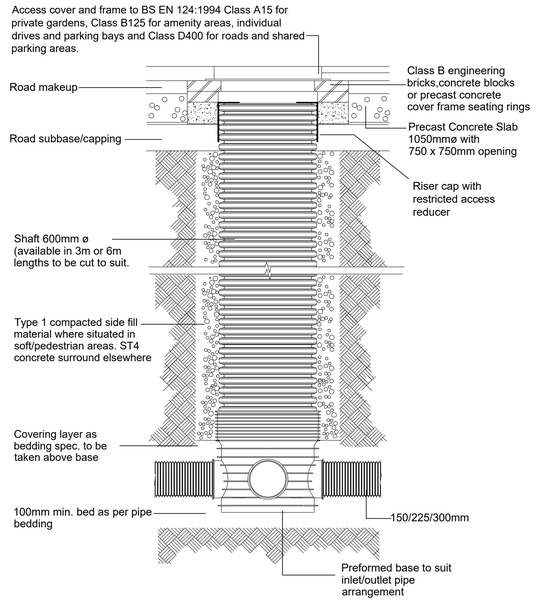
Obtain structural calculations where insitu cover slab is to be provided. Ensure sufficient time is allocated for procurement of design calculations and curing of cover slab.

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





Section A - A
`Hydrobrake` Manhole Detail



Polypipe 'IC600' Inspection chamber

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

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KEY:

LEGEND:

REV	DATE	DRAWN/CHK	REVISION INFO
C03	11.04.25	RM/PT	FINAL CONSTRUCTION ISSUE
C02	13.12.23	RM/PT	REISSUED.
C01	13.10.23	RM/PT	TITLE BLOCK UPDATED
T01	29.05.23	BM/PT	WIP ISSUE.

STATUS:
Stage 5

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	S5

DRAWING NUMBER:	REVISION:
CTC-ISS-XX-XX-DR-C-923172	C03

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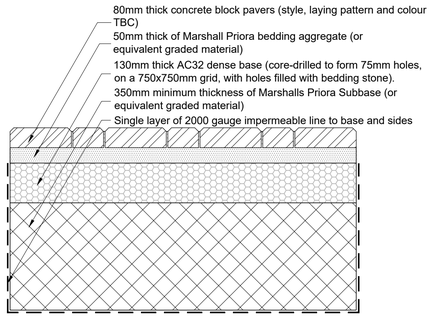
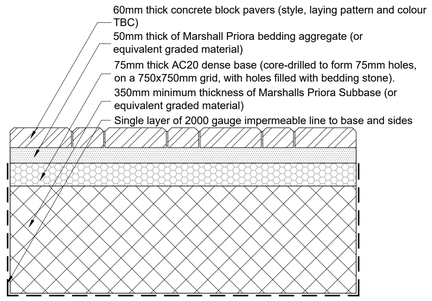
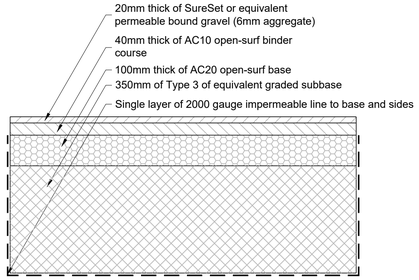


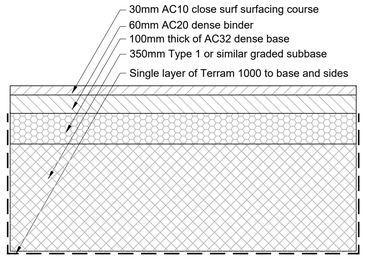
Permeable Block Paved Access Road



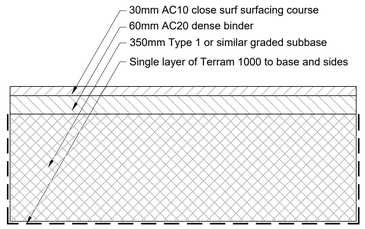
Permeable Block Paved Parking Bays



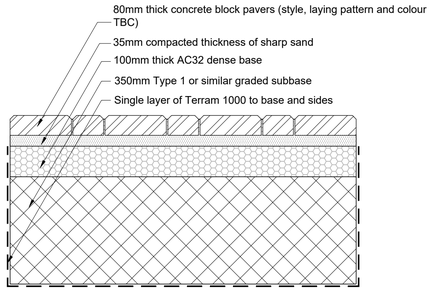
Permeable Resin Bound Gravel Parking Bays (or other lightly trafficked areas)



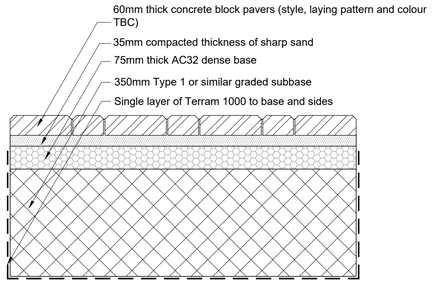
Non-Permeable Tarmac Access Road



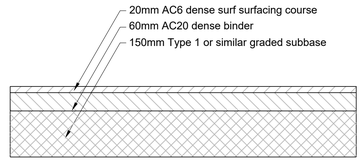
Non-Permeable Tarmac Parking Bays



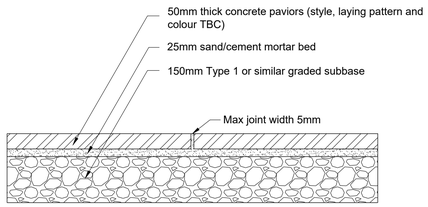
Non-Permeable Block Paved Access Road



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

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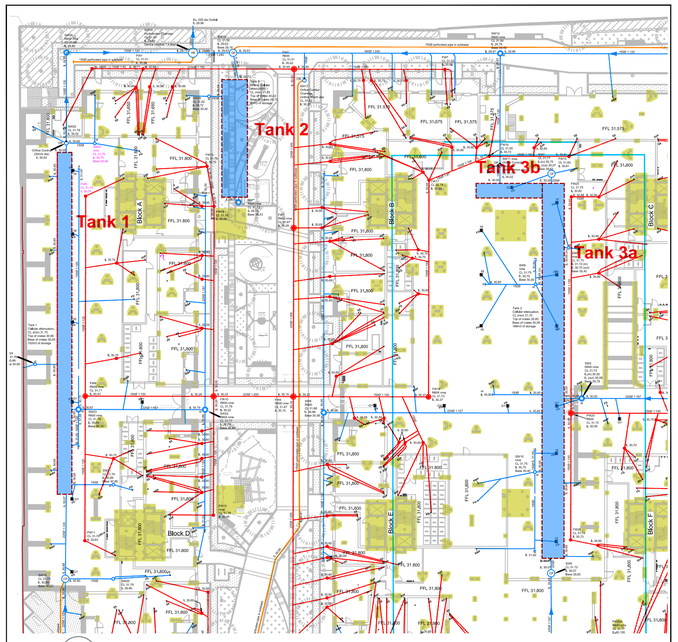


01 – Tank Locations
Scale 1:500

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.

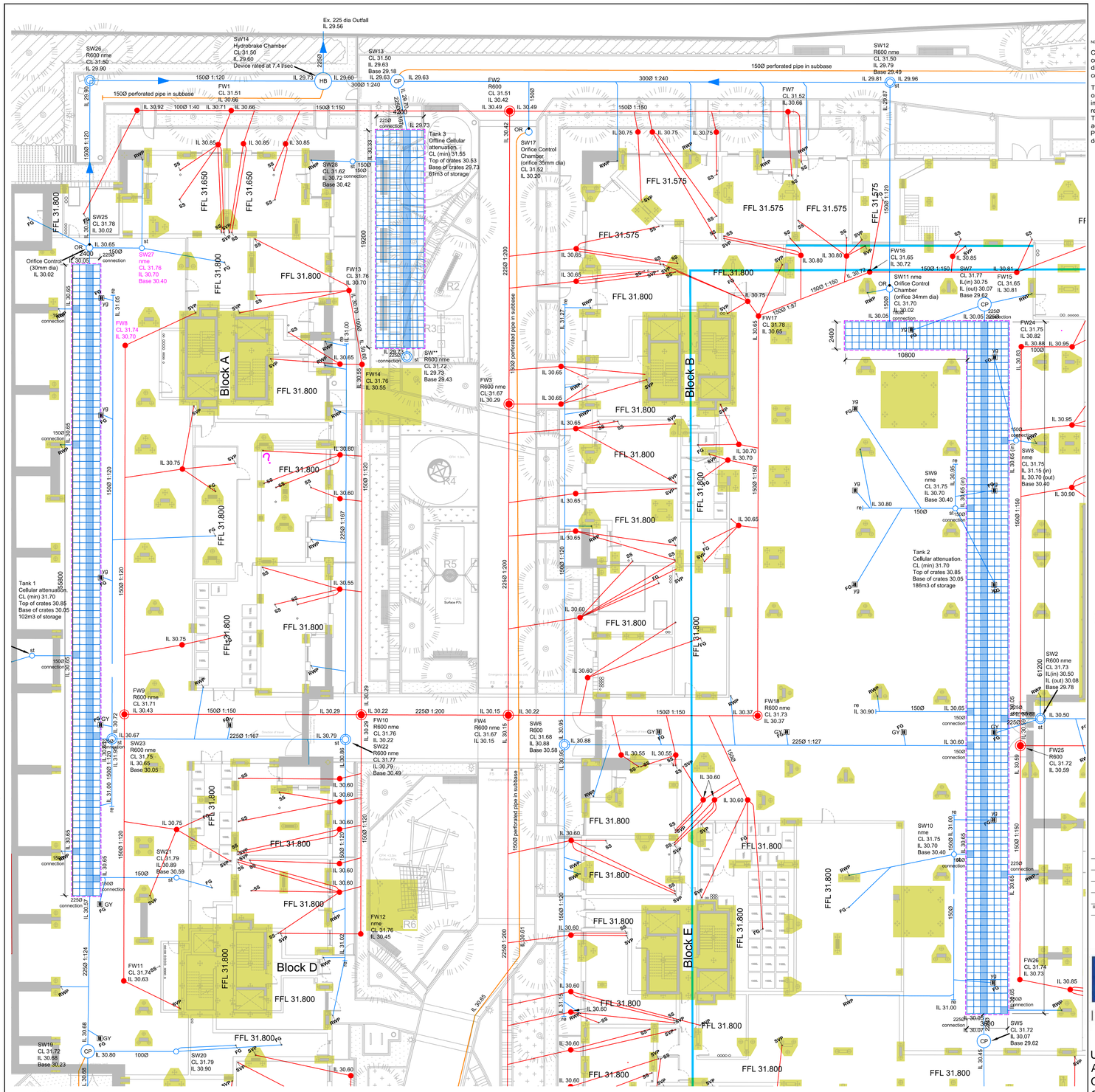
Heavily trafficked (e.g. service areas or roads)

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.

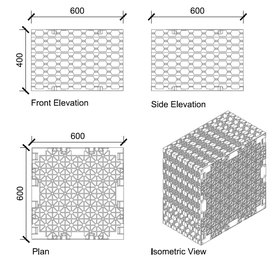


02 – Tanks 1 and 2 Plans
Scale 1:100

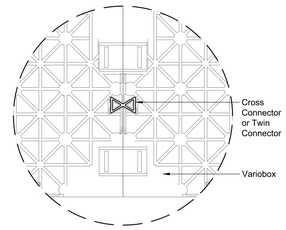
NOTES

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	

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PROJECT
Crown Trading Centre
Hayes

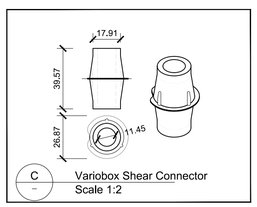
TITLE
Attenuation Details
Tanks 1, 2 and 3

SCALE @ A1
As Shown

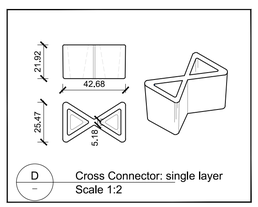
PROJECT NO
23-528

DRAWING NO
0001

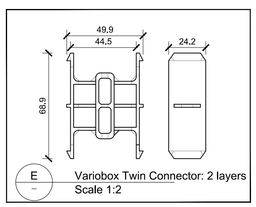
REV
D



C – Variobox Shear Connector
Scale 1:2



D – Cross Connector: single layer
Scale 1:2

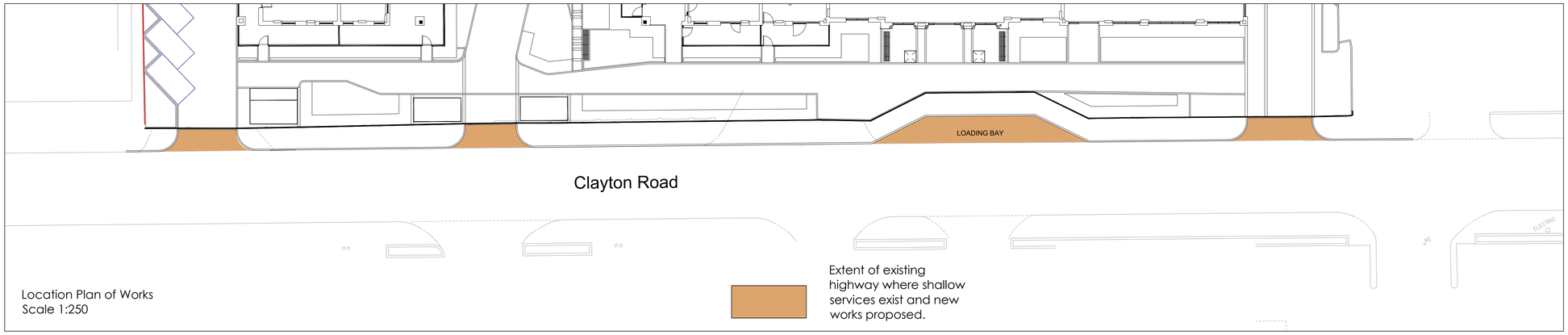


E – Variobox Twin Connector: 2 layers
Scale 1:2

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**

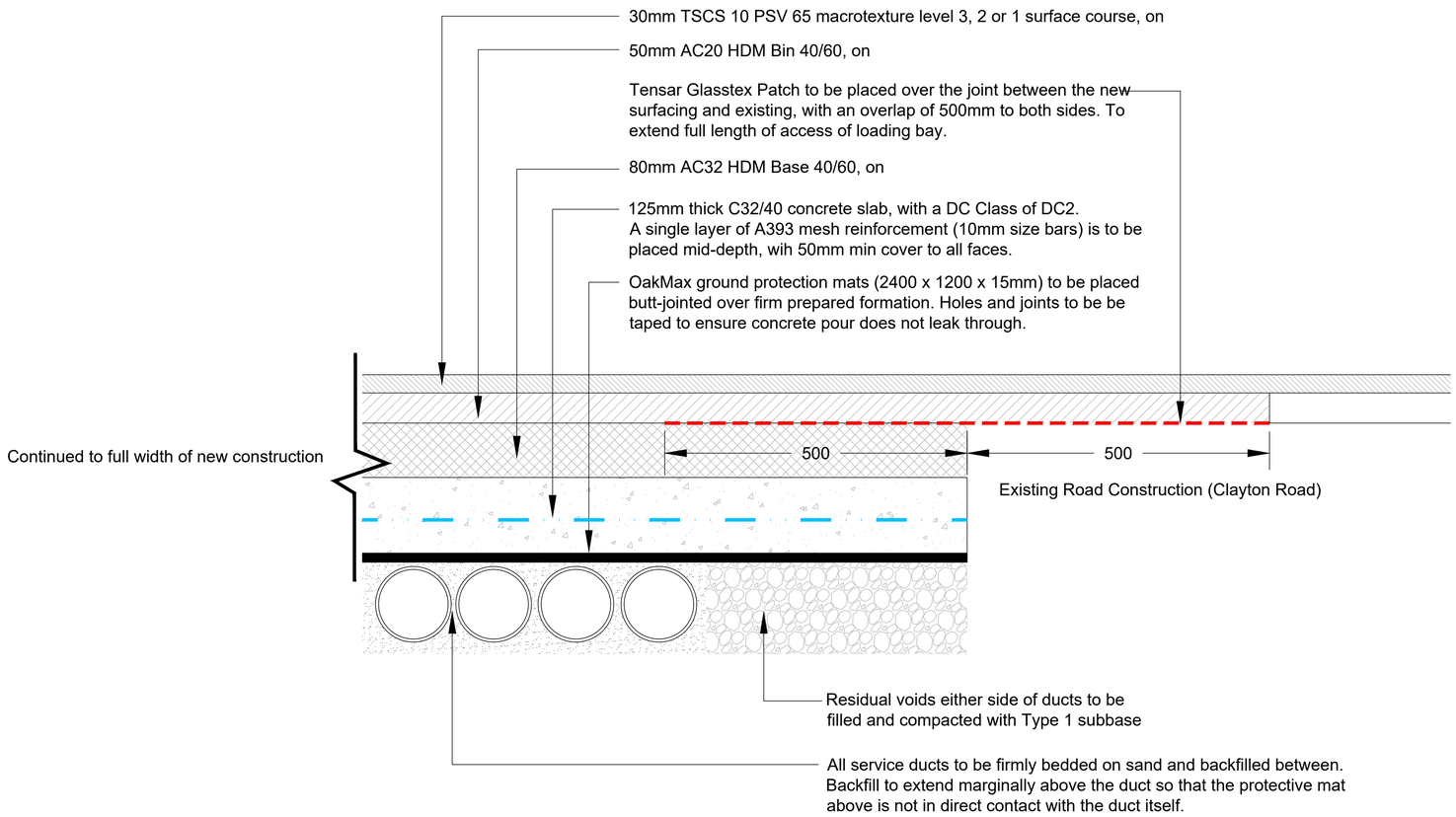
FOR CONSTRUCTION



Location Plan of Works
Scale 1:250

NOTES:

1. All works within the public highway to be carried out under the supervision of (and to the satisfaction of) Hillingdon Council's appointed Clerk of Works.
2. All works subject to approval from affected utility companies.



Crossover Construction
Detail where shallow
service exist
Scale 1:20

REV	DATE	DRAWN/CHK	REVISION INFO
C03	11.04.25	RM/PT	FINAL CONSTRUCTION ISSUE
C02	27.03.25	RM/PT	HIGHWAY COMMENTS ADDRESSED
C01	26.03.25	RM/PT	FOR APPROVAL

STATUS: Stage 5

CLIENT: JJ RHATIGAN

PROJECT: Crown Trading Centre
Hayes, UB3 1DU

DRAWING TITLE: S278 Works
Crossover Detail Where
Shallow Services Exist

JOB NUMBER:	SCALE AT A1:	REV. STATUS:
SE1560	As Shown @A1	S4

DRAWING NUMBER:	REVISION:
CTC-ISS-XX-XX-DR-C-923025	C03

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