

RESIDENTIAL DEVELOPMENT
READING GOLF CLUB,
KIDMORE END ROAD,
EMMER GREEN,
READING,
RG4 8SQ

SUDS MANAGEMENT & MAINTENANCE PLAN

VISTRY THAMES VALLEY

OCTOBER 2023

REF: SS/23/0275/6452



DOCUMENT CONTROL RECORD

Document Issue:

Rev	Date	Issue Status	Prepared by	Checked by
-	22.05.23	First Issue	S. Smith	C. Pendle
A	31.05.23	Added para 2.6, 3.10 & 3.11	S. Smith	C. Pendle
B	30.08.23	Updated paragraph 2.6	S. Smith	C. Pendle
C	30.08.23	Updated paragraph 2.6	S. Smith	C. Pendle
D	01.09.23	Added engineering layouts to appendices	S. Smith	C. Pendle
E	12.10.23	Paragraph 2.7 added	S. Smith	C. Pendle

References:

The SUDS manual – CIRIA C753 (2015) ISBN 9780-86017-760-9
 National Planning Policy Framework (NPPF) – Communities and Local Government
 Technical Guidance - Flood Risk & Coastal Change (March 2012)



1 Introduction

- 1.1 This document sets out the principles for the long term management and maintenance of the proposed surface water Sustainable Drainage Systems (SuDS) to be installed at the residential development at Reading Golf Club in Emmer Green, Reading.
- 1.2 The purpose of this document is to set out the basis of the SuDS Maintenance Plan and to ensure that the adopting management company is entrusted with a robust inspection and maintenance programme to ensure that the optimum operation of the surface water drainage network is continually maintained for the lifetime of the development. Also, to prevent the increased risk of flooding both on and off site in accordance with the National Planning Policy Framework (NPPF).
- 1.3 The activities listed in this document are generic to the relative SuDS types and represent the minimum maintenance and inspection requirements, however additional tasks or varied maintenance frequency may be instructed by the maintenance company as required. Specific maintenance needs of the SuDS elements should be monitored and maintenance schedules adjusted to suit requirements.
- 1.4 The installed SuDS system at this development are the initial responsibility of Vistry Thames Valley. Following installation and after an initial period of operation, all SuDS are to be transferred to an appointed Management Company. An agreement shall be set up by Vistry Thames Valley, who shall confirm in writing to Reading Council when the maintenance agreement is completed and is operative.
- 1.5 The Management Company will then be responsible for maintaining the surface water system including all SuDS in perpetuity. All property owners should be advised that an annual management fee will need to be paid to the management company for this service.
- 1.6 All those responsible for maintenance should follow relevant Health and Safety legislation (Health and Safety at Work Regulations, 1999) for all activities listed within this report including lone working, if relevant) and risk assessments should always be undertaken.
- 1.7 Any contractor employed by the Management Company shall carry out periodic maintenance of all such SuDS in accordance with the schedules listed in this report. Inspection checks shall be carried out by a qualified and competent person, at the minimum intervals listed within the schedules and the appropriate work carried out.
- 1.8 This report is to read in conjunction with MJA drawings for the location of all SuDS elements present within the development. Reference should also be made to the detailed landscape proposals for the proposed treatment / maintenance regime for all landscape features. The operations contained within this plan shall (where feasible) be in conjunction with routine grounds maintenance operations to the surrounding landscape.

2 SuDS Layout & Design

- 2.1 The storm water drainage strategy for the proposed development is to utilise a range of SuDS features to attenuate all surface water runoff from impermeable areas, with discharge via infiltration to the ground below.
- 2.2 The proposed storm water system consists of the following SuDS components:
- Permeable block paving (under-drained)
 - Attenuation Basin
 - Storm water pipe work and road gullies
 - Flow control chambers
 - Outfall headwalls
- 2.3 There are three categories of maintenance activities referred to in this report:
- **Regular maintenance** (including inspections and monitoring).
Consists of basic tasks done on a frequent and predictable schedule, including vegetation management, litter and debris removal, and inspections.
 - **Occasional maintenance**
Comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal for example).
 - **Remedial maintenance**
Comprises intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised by good design.
Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and as such timings are difficult to predict.
- 2.4 It is also important that measures are taken to protect and ensure continued operation of drainage features during the construction phase. All road gullies will be blocked until the construction phase of the development site is complete. Mesh will be placed over the outfalls and swales to prevent construction silts clogging up the drainage system and basins. Any permeable paving will be capped with a layer of concrete during construction and cored through once the majority of the construction is complete. Road gullies will be capped and headwalls netted to ensure construction silts and debris does not enter the drainage system. Maintenance will comprise of the removal of large debris and litter by hand picker and sucking out the sediment / oil contents of any drainage feature into a tanker.
- 2.5 See Appendix A for SuDS phasing plan.
- 2.6 As part of the legal transfer documentation each resident receives, a specific covenant will be included to ensure the householder is responsible to maintain the SuDS drainage feature on their property, not only including the gutters, downpipes, rodding eyes and gullies etc, but also the permeable sub base below and the wording of the covenant will prevent the householder from making any changes to its agreed construction. This will ensure the driveways will always be able to deliver the requirements of the overall drainage strategy of the site.



- 2.7 The management company will also reserve step-in rights for residents' driveways in order to carry out maintenance where the resident does not sufficiently maintain their private drainage to ensure continued functionality of the drainage system onsite. The step-in rights covering the site include rights for the management company to repair any damage to the drainage system that inhibits its functionality. If the drainage system is altered, including the removal of the subbase, then this will be resorted to its original design.

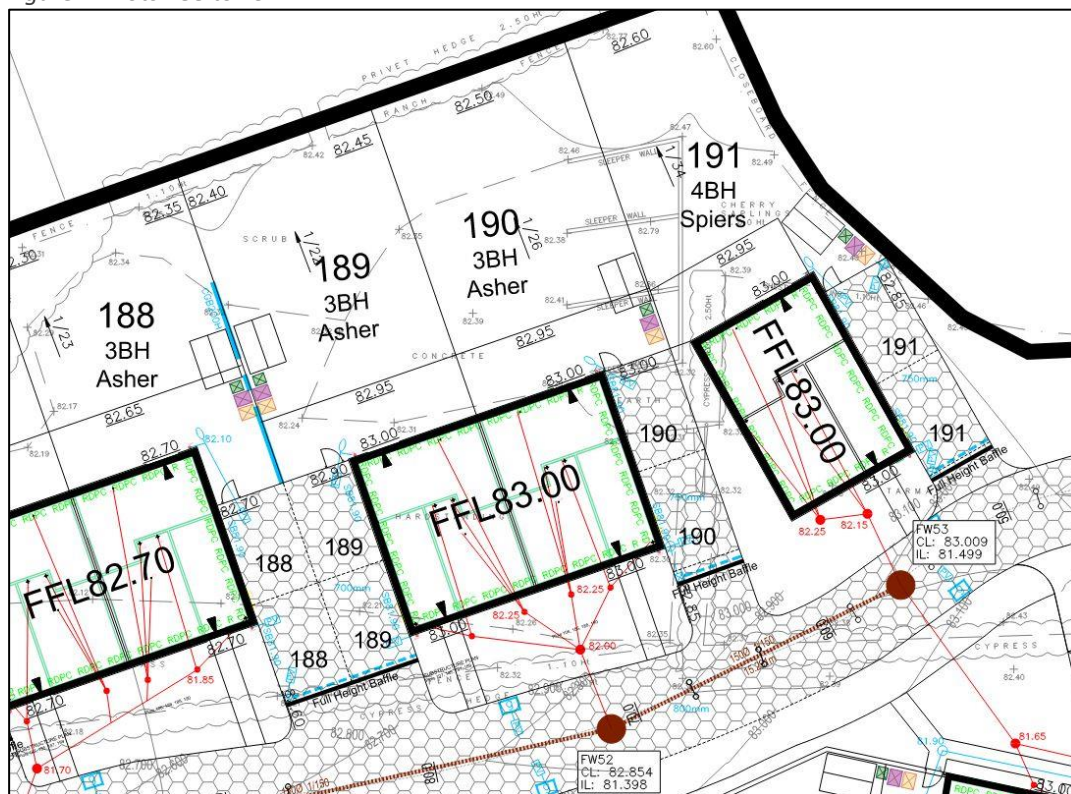
3 SUDS Management & Maintenance

Permeable Block Paving

- 3.1 Loose materials such as sand, cement soil or other loose substances should not be stored directly on top of the permeable blocks without the use of an impenetrable sheet. To ensure the continual optimal performance of the permeable paving, it is recommended that the following maintenance should be carried out. The following guidelines are offered as an initial regime, but maybe either increased or decreased by the management company depending on the local environment and any external contributing factors.
- 3.2 Permeable pavements should be visually inspected a minimum of monthly for the first three months after installation and then a minimum of three times a year, preferably during and after heavy rainfall to check effective operation and identify areas of ponding. These inspections should occur close to the end of winter (March), mid-summer (July) and after the autumn (November).
- 3.3 During this inspection identify any areas that require remedial maintenance such as topping up of jointing grit or removal of vegetation, weeds, silts and sediments that may be clogging the joints between the blocks. Small areas such as driveways can be swept with a hand bristle broom, for larger areas such as parking courts a lorry mounted rotary brush and vacuum sweeper device can be used. Weeds can be removed from the surface through the controlled application of proprietary non-persistent contact herbicides. Those containing Glyphosate are the most suitable.
- 3.4 Care should be taken to ensure that only the detritus is removed from the joints and avoid removal of the jointing material. If required, joints should be replenished with aggregate material to lip of paver using specific 6-2mm single size grit using a stiff brush to sweep the material in ensuring joints are filled. Do not replace the jointing grit with sand as this will stop the permeable system from working.
- 3.5 For winter maintenance, the controlled use of de-icing may be used without causing significant detrimental effects towards the permeable pavements performance. When used carefully, the use of these chlorides will not result in an increase in the chloride levels in the local ground.
- 3.6 Contamination of the permeable block paving from routine landscape maintenance such as grass clippings from mowing, hedge trimming, mulching plant beds etc. should be prevented. If contamination occurs the debris should be immediately swept, collected and removed by the homeowner or landscape operative.
- 3.7 Depending on the amount of usage and the environment the permeable pavement has received and been exposed to, the sub base laying course material including geotextile membranes/ grids may require either replacement or cleaning after a 25 to 30 year period. This would be evident if the infiltration rate of the paving became prolonged, allowing ponding to develop. Should this occur, the uplifting and cleaning or replacing of the laying course maybe considered. The laying course material, jointing and blocks can be reused once cleaned, minimising costs.

- 3.8 Replacement sub-base material to be used should be a clean 4/20mm coarse graded aggregate to BS EN13242:2002. Jointing material between the blocks should be 6-2mm single size grit to the joints. Refer to MJA Consulting construction detail drawing for type of geotextile membrane/ geogrids to be used.
- 3.9 Materials removed from the voids or the layers below the surface may contain heavy metals and hydrocarbons and 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.
- 3.10 Property owners will be advised upon purchase of a dwelling as to how their private drainage system functions and why it is important to not change the drainage regime of their plot.
- 3.11 As an example, Figure 1 shows the baffles that separate the private drainage systems with the drainage to be maintained by the management company. The driveway stone sub-bases are a separate system to the sub-base within the road. It is important that residents maintain their own drainage system of downpipes, gullies, channel drains and clear out sumps to allow their system to function as intended.

Figure 1: Plots 188 to 191.



Permeable Paving Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Brushing and vacuuming.	Three times/year at end of winter, mid-summer, after autumn leaf fall, or as required based on site-specific observations of clogging or manufacturers' recommendations.
Occasional maintenance	Stabilise and mow contributing and adjacent areas.	As required.
	Removal of weed.	As required.
Remedial actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving.	As required.
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users.	As required.
	Rehabilitation of surface and upper sub-structure.	As required (if infiltration performance is reduced as a result of significant clogging).
Monitoring	Initial inspection.	Monthly for 3 months after installation
	Inspect for evidence of poor operation and/or weed growth. If required take remedial action.	3-monthly, 48 h after large storms.
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually.
	Monitor inspection chambers.	Annually.

Storm water pipe work and road gullies

- 3.12 The key maintenance requirement for the upstream surface water drainage system includes the removal of sediments and debris from the system as required.
- 3.13 All storm water pipe work should be visually inspected a minimum of monthly for the first three months after installation and then a minimum of once year. As road gullies are the first on the treatment train and susceptible to higher silt loadings, these will need to be inspected a minimum of monthly for the first three months after installation and then a minimum of every four months, thereafter.
- 3.14 During this inspection identify any gully pots or pipes that require remedial maintenance such removal of sediment, debris, leaves and litter as required. This involves the removal all protective covers and grids and the cleaning out of channels or gully pots by hand or with suitable jetting equipment.
- 3.15 During the inspections the general operation and structural integrity of all components should be recorded and repaired as required.

Flow Control Chamber

- 3.16 The key maintenance requirement for the flow control chambers will be the inspection of the units for blockages of the vortex flow control unit and silt removal from sump of chamber.
- 3.17 The hydraulic vortex flow control unit has no moving parts and is self-activating, requiring minimal maintenance. After initial installation, it is recommended that the unit be inspected monthly for three months.
- 3.18 Thereafter the manhole chamber and control device should be inspected at least every six months to verify the condition and operation of the unit and check for blockages within the inlet of the chamber and of the flow control device. During these inspections, accumulated silts should be removed and the sump cleaned out using a conventional sump vacuum cleaner. Flow Controls are fitted with a pivoting by-pass door, which allows the manhole chamber to be drained down should blockages occur.

Headwalls

- 3.19 Outfall headwalls should be visually inspected a minimum of monthly for the first three months after installation and then a minimum of once a year. Accumulated sediments, debris and any overgrown vegetative material should be removed from the culvert and margins of the outlet headwalls as necessary.
- 3.20 During the inspections the general operation, and structural condition of the headwalls and any erosion of banks or scour control features should be identified and rehabilitated as required.

Attenuation Basins

- 3.21 Key Maintenance Requirements:
- Litter/trash removal
 - Inlet/outlet headwall inspection and cleaning
 - Vegetation management
 - Sediment monitoring and removal when required
- 3.22 Regular inspection and maintenance is important for the effective operation of the attenuation basin. The basin will be subject to a routine monitoring and maintenance schedule as part of the general site management. This will be carried out at intervals detailed below, and shall comprise of the following operations: Collection and removal of all litter/large debris from the attenuation pond, inlets, outflows, and water margins once a month. Monthly inspection of the attenuation ponds to check the following, and repair as necessary:
1. Any failure in the operation of the inlet and outlet headwalls unless adopted by others in which case they will be notified of any observed defect.
 2. Any damage or erosion to the perimeter edges and slopes of the attenuation ponds.

- 3.23 The attenuation basin will be sown with two grassland seed mixes to create a simple mosaic of grassland habitat. The floor of the basin will be seeded with a wet meadow mix (WF2), whilst the banks will be seeded with a standard wildflower meadow mix (WF1) as detailed on the landscape proposals drawings.

3.24 **Ground preparation**

The basin should be constructed of predominantly low fertility subsoil, with only a thin upper layer of topsoil to be left after ground modelling to take up in-perfections in the soil surface. Final surface to be harrowed / fully cultivated to break-up large soil clods. The basin area should then be continually cultivated of a period of several weeks to remove unwanted surface vegetation and weeds prior to meadow seeding. No herbicide is to be used due to the sensitive location for the basin construction. The ground should be cultivated to form a medium tilth and basin to be seeded at the recommended sowing rate, followed by light rolling (if necessary) throughout the meadow area.

3.25 **Landscape Maintenance (Year 1)**

In the first year, meadow areas should be managed more intensively to prevent the intrusion of invasive ground flora and allow a diverse sward to develop. The first cut should occur when the grass reaches approximately 100mm, down to 50mm, followed by subsequent cuts every 4-6 weeks down to 50mm throughout the first growing season.

Meadow areas should be monitored to assess the growth of any invasive species and grassland areas should be hand-weeded or spot swiped for any perennial weeds such as docks, nettles and ragwort.

3.26 **Landscape Maintenance (Year 2 onwards)**

Meadow areas will be maintained with a bi-annual cuts in May / June and after seed has dropped in late September. Meadow grassland should be cut to a height of approximately 100mm. All arising should be allowed to lay in-situ for 24 hours before being removed from site in order to allow any wildlife using the basin to disperse. No fertiliser should be added to the grassland at any time and an annual monitoring visit to the grassland should be conducted to inform management that may be required.

- 3.27 An annual check carried out by a suitably qualified person, to assess the condition and operation of the attenuation basin inlet and outflow, and the accumulation of silt/sediment.

- 3.28 A record of maintenance visits and remedial operations shall be maintained.

- 3.29 The above operations shall (where feasible) be in conjunction with routine grounds maintenance operations to the surrounding landscape.

Basin Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Litter, debris and trash removal.	Monthly.
	Grass cutting – for landscaped areas and access routes.	Monthly (during growing season), or as required.
	Grass cutting – meadow grass in and around basin.	Half yearly (spring – before nesting season, and autumn).
	Manage other vegetation and remove nuisance plants.	Monthly (at start, then as required).
Occasional maintenance	Re-seed areas of poor vegetation growth.	Annually, or as required.
	Prune and trim trees and remove cuttings.	As required.
	Remove sediment from pre-treatment system when 50% full.	As required.
Remedial actions	Repair of erosion or other damage by re-seeding or re-turfing.	As required.
	Realignment of rip-rap.	As required.
	Repair/rehabilitation of inlets, outlets and overflows.	As required.
	Rehabilitate infiltration surface using scarifying and spiking techniques if performance deteriorates.	As required.
	Re-level uneven surfaces and reinstate design levels.	As required.
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly.
	Inspect banksides, structures, pipework, etc for evidence of physical damage.	Monthly.
	Inspect inlets and pre-treatment systems for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.
	Inspect infiltration surfaces for compaction and ponding.	Monthly.

3.30 Desilting of Attenuation Basins

In addition to regular routine items, SuDS maintenance will be carried out which may include de-silting the attenuation ponds, usually on a 10-15 year cycle depending on the on-going silt level checking. This can be an intrusive operation when carried out within housing areas and prior to any planned desilting or dredging, consultation will be undertaken with both the County Council and the Environment Agency.

- 3.31** Before any desilting operations are carried out, residents and members of the public in the general area will be informed and those in the immediate vicinity will be notified in writing well in advance of commencement of works.
- 3.32** The desilting work will be carried out under the supervision of consulting engineers and to a pre-agreed method statement. Such a method statement should be submitted in writing to the local authority and agreed in advance of the commencement of the works.
- 3.33** Prior to desilting works commencing, a suitably qualified ecologist shall be appointed to undertake an assessment of the ecological interest within the pond and its margins. In the event that the attenuation ponds develop particular ecological interest, then careful consideration will be given to the timing of this operation.

Contact Information

For further information on the management and maintenance of SuDS on the development please contact:

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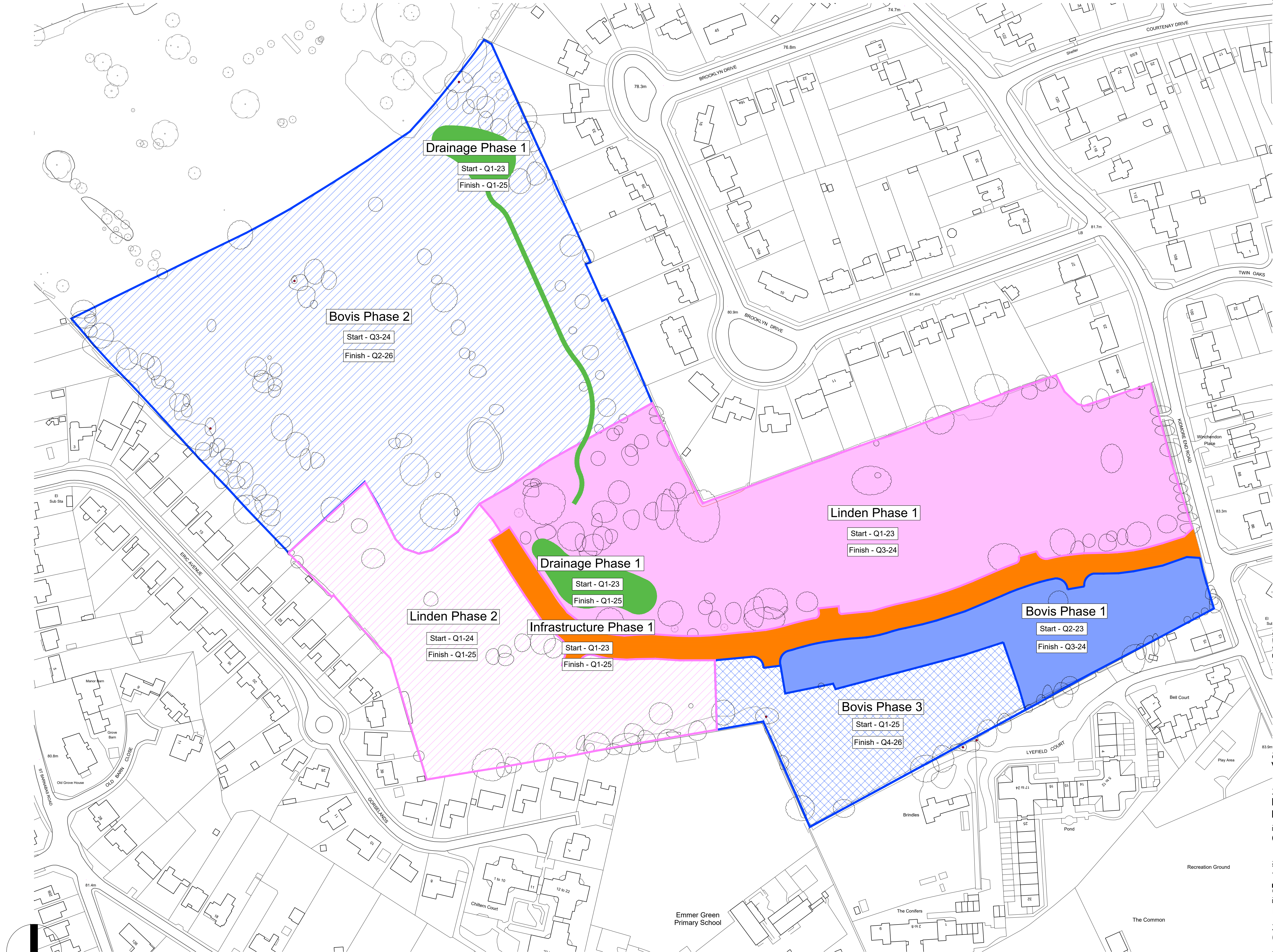
Appendix A – Phasing Plan

CDM 2015 Health & Safety Information

This information relates only to 'Significant Hazards' identified on this drawing and is to be read in conjunction with the Designer's Hazard Register.

Key:

- Bovis Phase 1
- Bovis Phase 2
- Bovis Phase 3
- Linden Phase 1
- Linden Phase 2
- Infrastructure Phase 1
- Drainage Phase 1



Rev	Date	Revision Details	Dr	Ch
C	16.11.22	Updated to clients comments	LP	MP
B	16.11.22	Updated to clients comments	LP	MP
A	09.11.22	Updated annotations	MP	NF



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Client's Name
Vistry Group

Job Title
**Reading Golf Club
Kidmore End Road, Reading**

Drawing Title
Construction Phasing Plan

Scale
1:1000 @ A1 / 1:2000 @ A3

Drawn
RG

Checked
MP

Date
04.11.22

Job No
6960

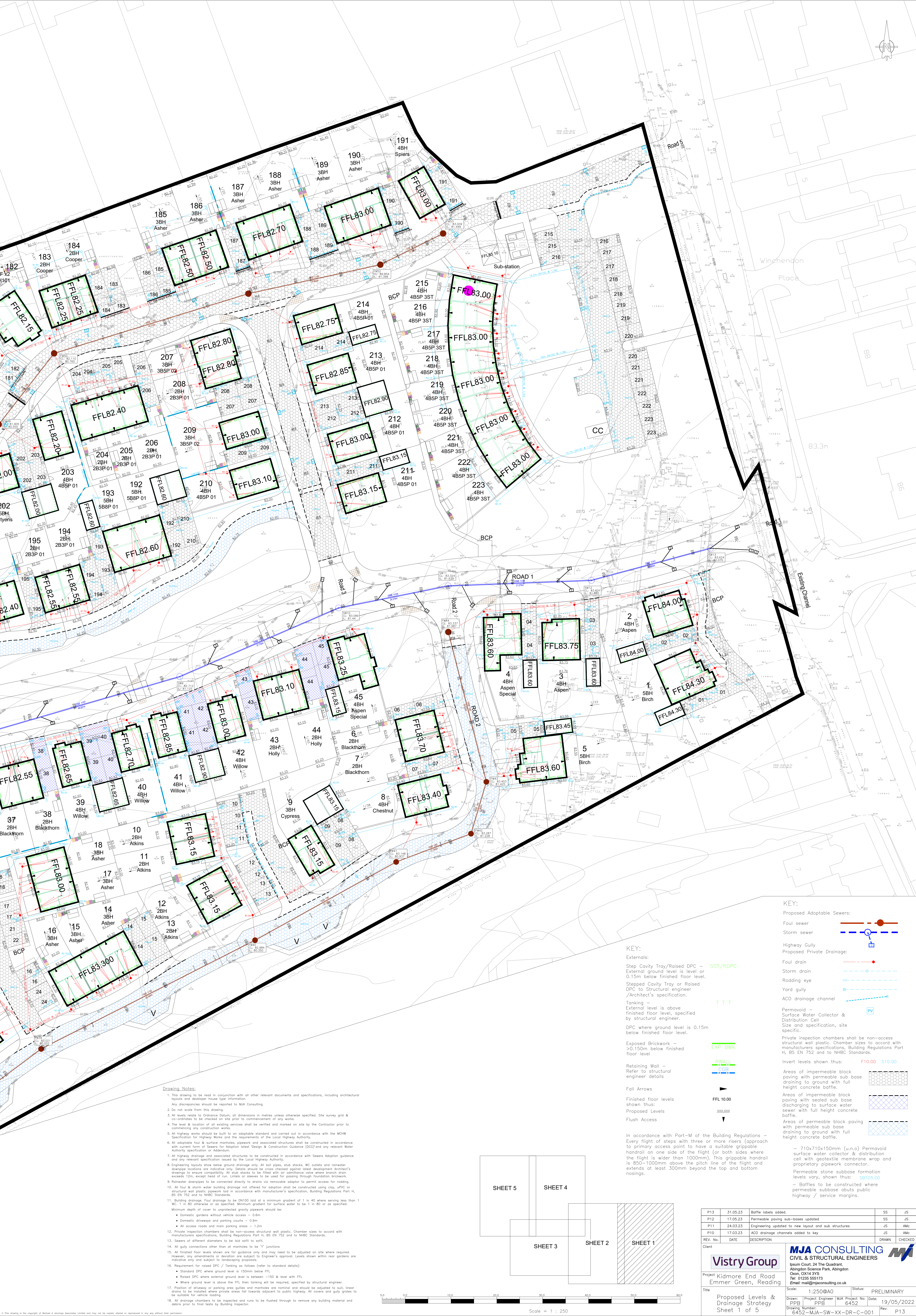
Drawing No
PL-067

Rev
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Status
APPROVAL



Appendix B – Engineering Layouts



Drawing Notes:

- This drawing to be read in conjunction with all other relevant documents and specifications, including architectural layouts and developer house type information.
- Do not scale from this drawing.
- All levels relate to Ordnance Datum; all dimensions in metres unless otherwise specified. Site survey grid & coordinates to be checked on site prior to commencement of any works.
- The level & location of all existing services shall be verified and marked on site by the Contractor prior to commencing any construction works.
- All highway works should be built to an adoptable standard and carried out in accordance with the MCHW Specification for Highway Works and the requirements of the Local Highway Authority.
- All adoptable foul & surface manholes, pipework and associated structures shall be constructed in accordance with current form of Sewers for Adoption latest Design & Construction Guidance (DCDG) and any relevant Water Authority specification or Addendum.
- All highway drainage and associated structures to be constructed in accordance with Sewers Adoption guidance and any relevant specification issued by the Local Highway Authority.
- Engineering layouts show below ground drainage only. All soil pipes, stub stacks, WC outlets and rainwater downpipe locations are indicative only. Details should be cross checked against latest development Architect's drawings to ensure compatibility. All stub stacks to be fitted with an admittance valve where branch drain exceeds 12m, except head of run, unless or sleeves to be used for passing through foundation blocks.
- Rainwater downpipes to be connected directly to drains via removable adaptor to permit access for rodding.
- All foul & storm water building drainage not offered for adoption shall be constructed using clay uPVC or structural wall plastic pipework laid in accordance with manufacturer's specification, Building Regulations Part H, BS EN 752 and to NIBIC Standards.
- Building drainage: Foul drainage to be DN100 laid at a minimum gradient of 1 in 40 where serving less than 1 WC, 1 in 80 otherwise or as specified. Minimum gradient for surface water to be 1 in 80 or as specified. Minimum depth of cover to unprotected gravity pipework shall be:
 - Domestic gardens without vehicle access - 0.6m
 - Domestic driveways and parking courts - 0.9m
 - All access roads and main parking areas - 1.2m
- Private inspection chambers shall be non-access structural wall plastic. Chamber sizes to accord with manufacturers specifications, Building Regulations Part H, BS EN 752 and to NIBIC Standards.
- Sewers of different diameters to be laid soft to soft.
- All gully connections other than at manholes to be 'Y' junctions.
- All finished floor levels shown are for guidance only and may need to be adjusted on site where required. However, any amendments or deviation are subject to Engineer's approval. Levels shown within rear gardens are indicative only and subject to landscaping proposals.
- Requirement for raised DPC / Tanking as follows (refer to standard details):
 - Standard DPC where ground level is 150mm below FFL
 - Raised DPC where external ground level is between -150 & level with FFL
 - Where ground level is above the FFL, then tanking will be required, specified by structural engineer.
- Position of driveway or parking area gutters and manholes are nominal and should be adjusted to suit, linear drains to be installed where private areas fall towards adjacent to public highway. All covers and gully grates to be suitable for vehicle loading.
- All drainage chambers to be inspected and runs to be flushed through to remove any building material and debris prior to final tests by Building Inspector.

KEY:

Externals:

- Step Cavity Tray/Raised DPC - SGT/RDPC
- External ground level is level or 0.15m below finished floor level.
- Stepped Cavity Tray or Raised DPC to Structural engineer /Architect's specification.
- Tanking
- External level is above finished floor level, specified by structural engineer.
- DPC where ground level is 0.15m below finished floor level.
- Exposed Brickwork - EXP BRWK
- Retaining Wall - Refer to structural engineer details
- Fall Arrows
- Finished floor levels shown thus: FFL 10.00
- Proposed Levels shown thus: XXX.XXX
- Flush Access

In accordance with Part-M of the Building Regulations - Every flight of steps with three or more risers (approach to primary access point to have a suitable grippable handrail on one side of the flight (or both sides where the flight is wider than 1000mm). This grippable handrail is 850-1000mm above the pitch line of the flight and extends at least 300mm beyond the top and bottom nosings.

KEY:

Proposed Adoptable Sewers:

- Foul sewer
- Storm sewer
- Highway Gully
- Proposed Private Drainage:
- Foul drain
- Storm drain
- Rodding eye
- Yard gully
- ACO drainage channel
- Permavoid - Surface Water Collector & Distribution Cell

Size and specification, site specific.

Private inspection chambers shall be non-access structural wall plastic. Chamber sizes to accord with manufacturers specifications, Building Regulations Part H, BS EN 752 and to NIBIC Standards.

Invert levels shown thus: F10.00 S10.00

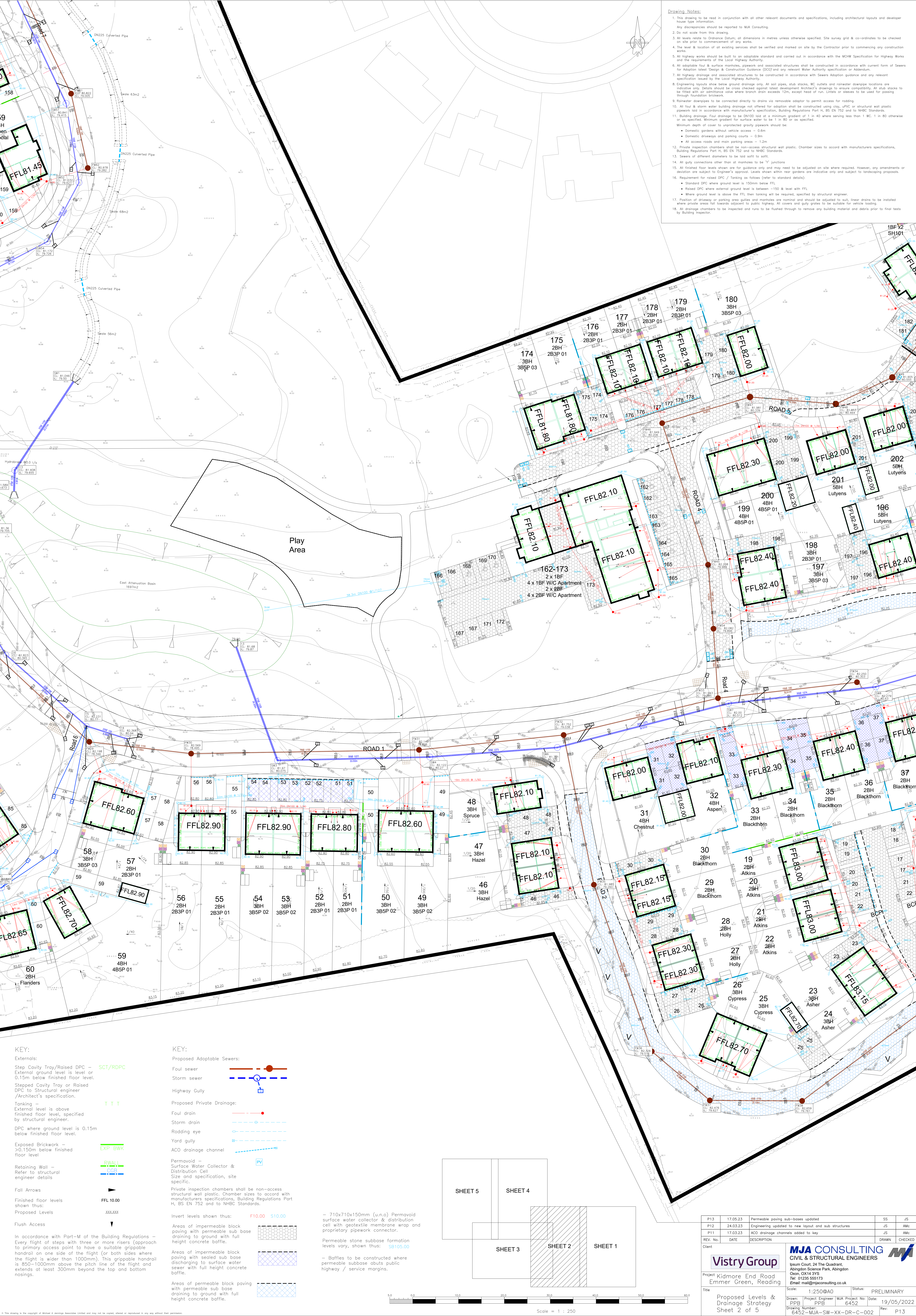
- Areas of impermeable block paving with permeable sub base draining to ground with full height concrete baffle.
- Areas of impermeable block paving with sealed sub base discharging to surface water sewer with full height concrete baffle.
- Areas of permeable block paving with permeable sub base draining to ground with full height concrete baffle.

- 710x710x150mm (u.n.o) Permavoid surface water collector & distribution cell with geotextile membrane wrap and proprietary pipework connector.

Permeable stone subbase formation levels vary, shown thus: S10.00

- Baffles to be constructed where permeable subbase abuts public highway / service margins.

P13	31.05.23	Baffle labels added.		SS	JS
P12	17.05.23	Permeable paving sub-bases updated		SS	JS
P11	24.03.23	Engineering updated to new layout and sub structures		JS	AMc
P10	17.03.23	ACO drainage channels added to key		JS	AMc
REV. No.	DATE	DESCRIPTION		DRAWN	CHECKED
Client			MJA CONSULTING CIVIL & STRUCTURAL ENGINEERS Issum Court, 24 The Quadrant, Abingdon Science Park, Abingdon Oxon, OX14 3YS Tel: 01235 556173 Email: mail@mjaconsulting.co.uk 		
Project			Kildmore End Road Emmer Green, Reading		
Title			Proposed Levels & Drainage Strategy Sheet 1 of 5		
Scale:			1:250@A0		
Status:			PRELIMINARY		
Drawn:			Project Engineer PPB		
MJA Project No:			6452		
Date:			19/05/2022		
Drawing Number:			6452-MJA-SW-XX-DR-C-001		
Rev:			P13		



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 - Raised DPC where external ground level is between -150 & level with FFL
 - Where ground level is above the FFL then tanking will be required, specified by structural engineer.
 - Position of driveway or parking area gullies and manholes are nominal and should be adjusted to suit, linear drains to be installed where private streets fall towards adjacent public highway. All covers and gully grates to be suitable for vehicle loading.
 - All drainage chambers to be inspected and runs to be flushed through to remove any building material and debris prior to final tests by Building Inspector.

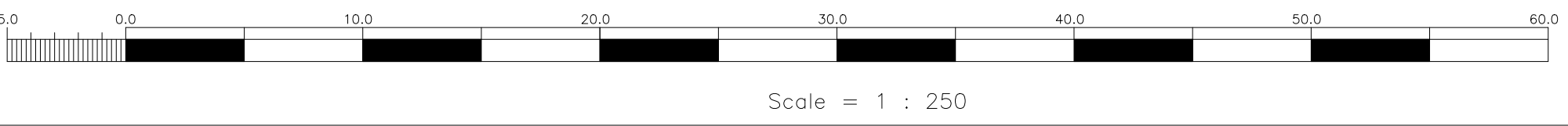
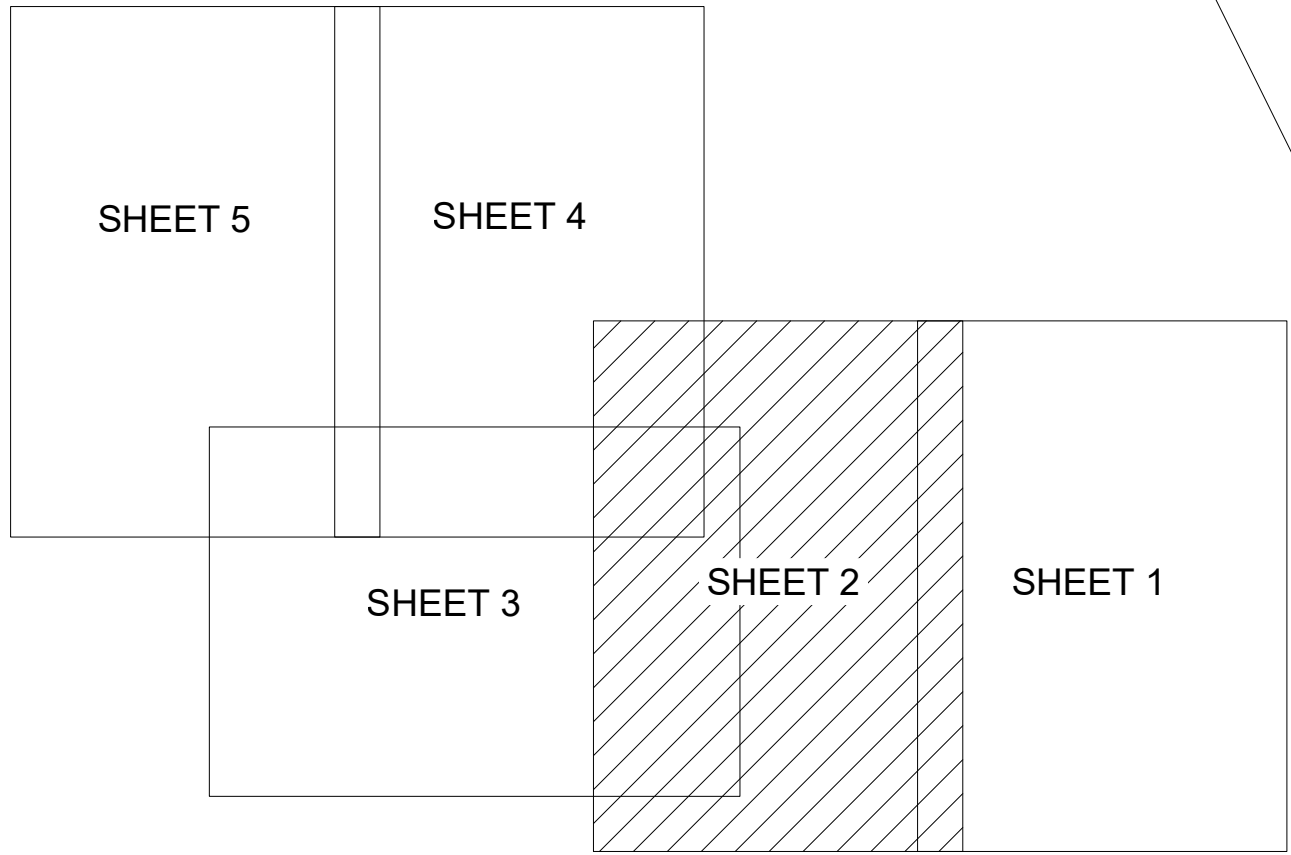
- KEY:**
- Externals:**
- Step Cavity Tray/Raised DPC - SCT/RDPC
 - External ground level is level or 0.15m below finished floor level.
 - Stepped Cavity Tray or Raised DPC to Structural engineer / Architect's specification.
 - Tanking - External level is above finished floor level, specified by structural engineer.
 - DPC where ground level is 0.15m below finished floor level.
 - Exposed Brickwork - >0.150m below finished floor level
 - Retaining Wall - Refer to structural engineer details
 - Fall Arrows
 - Finished floor levels shown thus: FFL 10.00
 - Proposed Levels
 - Flush Access

- KEY:**
- Proposed Adoptable Sewers:**
- Foul sewer
 - Storm sewer
 - Highway Gully
 - Proposed Private Drainage:
 - Foul drain
 - Storm drain
 - Rodding eye
 - Yard gully
 - ACO drainage channel
 - Permavoid - Surface Water Collector & Distribution Cell
 - Size and specification, site specific.
 - Private inspection chambers shall be non-access structural wall plastic. Chamber sizes to accord with manufacturers specifications, Building Regulations Part H, BS EN 752 and to NHBC Standards.
 - Invert levels shown thus: F10.00 S10.00
 - Areas of impermeable block paving with permeable sub base draining to ground with full height concrete baffle.
 - Areas of impermeable block paving with sealed sub base discharging to surface water sewer with full height concrete baffle.
 - Areas of permeable block paving with permeable sub base draining to ground with full height concrete baffle.

710x710x150mm (u.n.o) Permavoid surface water collector & distribution cell with geotextile membrane wrap and proprietary pipework connector.

Permeable stone subbase formation levels vary, shown thus: SB105.00

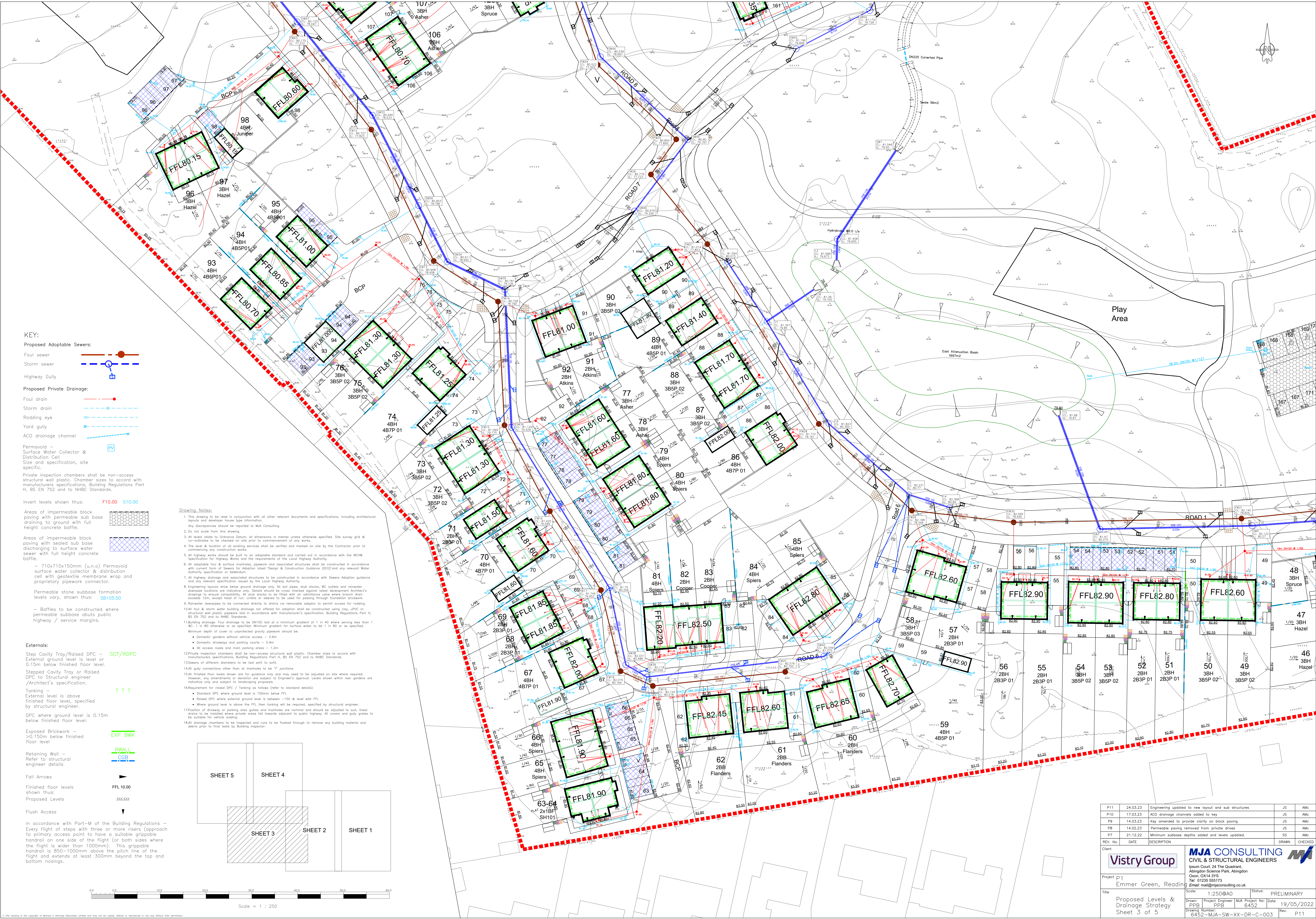
Baffles to be constructed where permeable subbase abuts public highway / service margins.

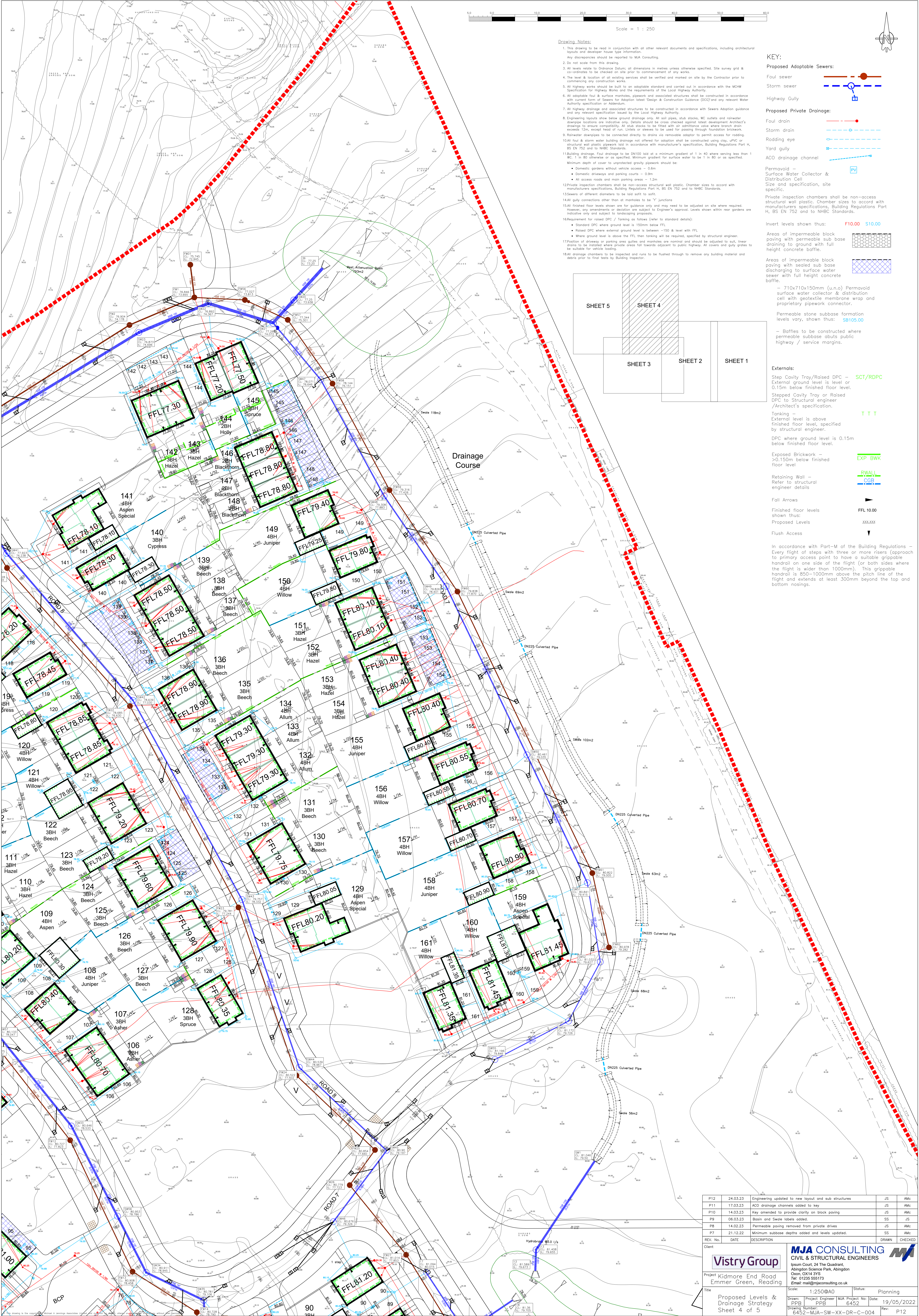


P13	17.05.23	Permeable paving sub-bases updated	SS	JS
P12	24.03.23	Engineering updated to new layout and sub structures	JS	AMC
P11	17.03.23	ACO drainage channels added to key	JS	AMC
REV. No.	DATE	DESCRIPTION	DRAWN	CHECKED
Client				
Project: Kidmore End Road, Emmar Green, Reading				
Title				
Scale:	1:250@A0	Status:	PRELIMINARY	
Drawn:	Project Engineer	MJA Project No:	Date:	19/05/2022
PPB	PPB	6452	AMC	
Drawing Number:	6452-MJA-SW-XX-DR-C-002	Rev:	P13	

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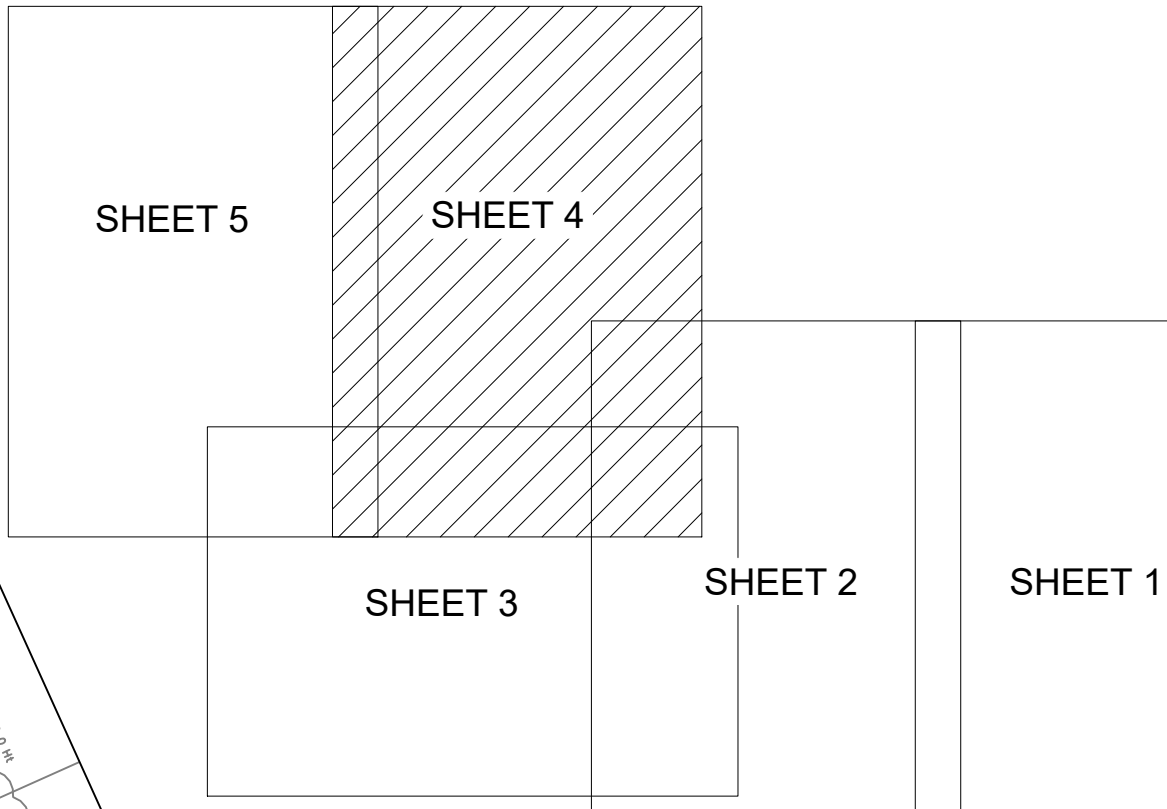
Ipsum Court, 24 The Quadrant,
Abingdon Science Park, Abingdon
Oxon, OX14 3YS
Tel: 01235 555173
Email: mail@mjaconsulting.co.uk





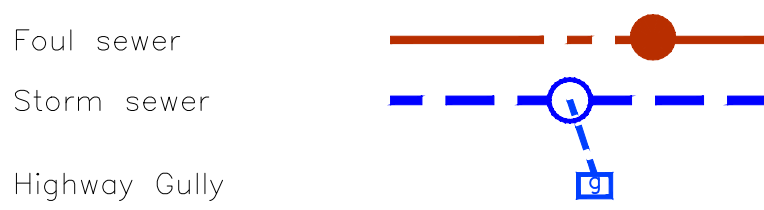
Drawing Notes:

- This drawing is to be read in conjunction with all other relevant documents and specifications, including architectural layouts and developer house type information. Any discrepancies should be reported to MJA Consulting.
- Do not scale from this drawing.
- All levels relate to Ordnance Datum; all dimensions in metres unless otherwise specified. Site survey grid & co-ordinates to be checked on site prior to commencement of any works.
- The level & location of all existing services shall be verified and marked on site by the Contractor prior to commencing any construction works.
- All highway works should be built to an adoptable standard and carried out in accordance with the MCHW Specification for Highway Works and the requirements of the Local Highway Authority.
- All adoptable foul & surface manholes, pipework and associated structures shall be constructed in accordance with current form of Sewers for Adoption latest Design & Construction Guidance (DCG) and any relevant Water Authority specification or Asendrum.
- All highway drainage and associated structures to be constructed in accordance with Sewers Adoption guidance and any relevant specification issued by the Local Highway Authority.
- Engineering layouts show below ground drainage only. All soil pipes, stub stacks, WC outlets and rainwater downpipes are shown. Details should be cross checked against latest development architect's drawings to ensure compatibility. All stub stacks to be fitted with an admittance valve where branch drain exceeds 150mm, except lead of run. Liners or sleeves to be used for passing through foundation bricks.
- Rainwater downpipes to be connected directly to drains via removable adaptor to permit access for rodding.
10. All foul & storm water building drainage not offered for adoption shall be constructed using clay, uPVC or structural wall plastic pipework laid in accordance with manufacturer's specification, Building Regulations Part H, BS EN 752 and to NHBC Standards.
11. Building drainage, foul drainage to be DN100 laid at a minimum gradient of 1 in 40 where saving less than 1 m; 1 in 80 otherwise or as specified. Minimum gradient for surface water to be 1 in 80 or as specified. Minimum depth of cover to unprotected gravity pipework should be:
 - Domestic gardens without vehicle access - 0.6m
 - Domestic driveways and parking courts - 0.8m
 - All access roads and main parking areas - 1.2m
12. Private inspection chambers shall be non-access structural wall plastic. Chamber sizes to accord with manufacturers specifications, Building Regulations Part H, BS EN 752 and to NHBC Standards.
13. Sewers of different diameters to be laid soft to soft.
14. All gully connections other than at manholes to be 'Y' junctions.
15. All finished floor levels shown are for guidance only and may need to be adjusted on site where required. However, any amendments or deviation are subject to Engineer's approval. Levels shown within rear gardens are indicative only and subject to landscaping proposals.
16. Requirement for raised DPC / tanking as follows (refer to standard details):
 - Standard DPC where ground level is 150mm below FFL
 - Raised DPC where external ground level is between -150 & level with FFL
 - Where ground level is above the FFL then tanking will be required, specified by structural engineer.
17. Position of drainage parking area gullies and manholes are nominal and should be adjusted to suit, linear drains to be installed where ground areas fall towards adjacent to public highway. All covers and gully grates to be suitable for vehicle loading.
18. All drainage chambers to be inspected and runs to be flushed through to remove any building material and debris prior to final tests by Building Inspector.

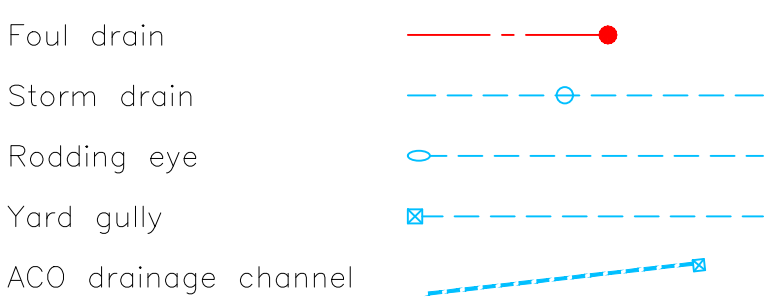


KEY:

Proposed Adoptable Sewers:



Proposed Private Drainage:



PermaVad Surface Water Collector & Distribution Cell Size and specification, site specific.

Private inspection chambers shall be non-access structural wall plastic. Chamber sizes to accord with manufacturers specifications, Building Regulations Part H, BS EN 752 and to NHBC Standards.

Invert levels shown thus: F10.00 S10.00

Areas of impermeable block paving with permeable sub base draining to ground with full height concrete baffle.

Areas of impermeable block paving with sealed sub base discharging to surface water sewer with full height concrete baffle.

710x710x150mm (u.n.o) PermaVad surface water collector & distribution cell with geotextile membrane wrap and proprietary pipework connector.

Permeable stone subbase formation levels vary, shown thus: S105.00

Baffles to be constructed where permeable subbase abuts public highway / service margins.

Externals:

Step Cavity Tray/Raised DPC - SCT/RDPC External ground level is level or 0.15m below finished floor level.

Stepped Cavity Tray or Raised DPC to Structural engineer / Architect's specification.

Tanking - External level is above finished floor level, specified by structural engineer.

DPC where ground level is 0.15m below finished floor level.

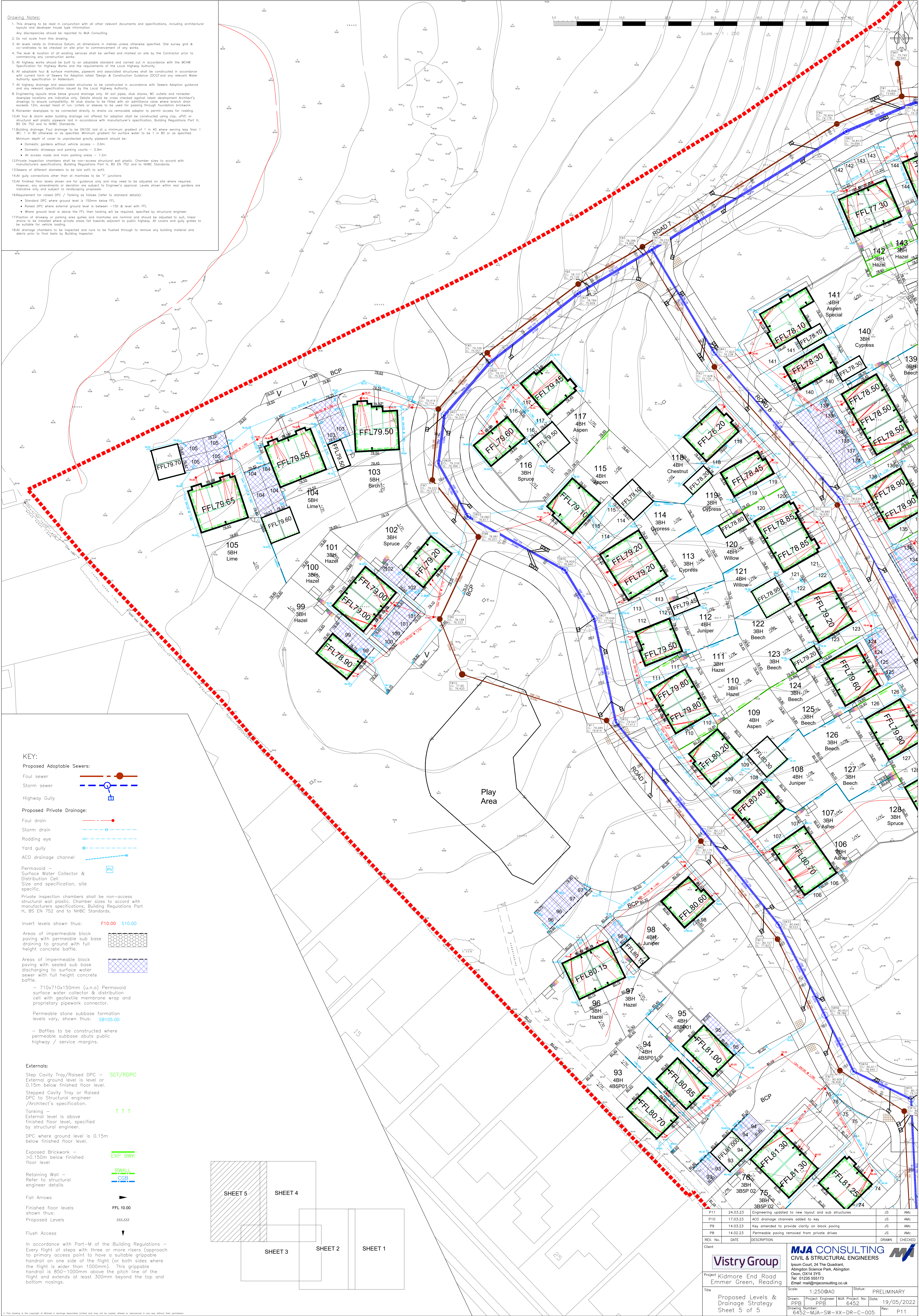
Exposed Brickwork - >0.150m below finished floor level

Retaining Wall - Refer to structural engineer details

Fall Arrows Finished floor levels shown thus: FFL 10.00 Proposed Levels Flush Access

In accordance with Part-M of the Building Regulations - Every flight of steps with three or more risers (approach to primary access point to have a suitable grippable handrail on one side of the flight (or both sides where the flight is wider than 1000mm). This grippable handrail is 850-1000mm above the pitch line of the flight and extends at least 300mm beyond the top and bottom nosings.

P12	24.03.23	Engineering updated to new layout and sub structures	JS	AMC
P11	17.03.23	ACO drainage channels added to key	JS	AMC
P10	14.03.23	Key amended to provide clarity on block paving	JS	AMC
P9	06.03.23	Basin and Swale labels added.	SS	JS
P8	14.02.23	Permeable paving removed from private drives	JS	AMC
P7	21.12.22	Minimum subbase depths added and levels updated.	SS	AMC
REV. No.	DATE	DESCRIPTION	DRAWN	CHECKED
Client				
Vistry Group MJA CONSULTING CIVIL & STRUCTURAL ENGINEERS Ipsium Court, 24 The Quadrant, Abingdon Science Park, Abingdon Oxon, OX14 3YS Tel: 01235 555173 Email: mja@mjaconsulting.co.uk				
Project Kidmore End Road Emmer Green, Reading				
Status				
Title	Proposed Levels & Drainage Strategy Sheet 4 of 5		Scale: 1:250@A0	Planning
Drawn:	Project Engineer	MJA Project No:	Date:	19/05/2022
	PPB	6452		
Drawing Number:	6452-MJA-SW-XX-DR-C-004			Rev: P12





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