

Project: Drainage and SUDS
Design, 18 Market Place,
Hinckley, LE10 1NT

Project No: 2572-C-R01

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Executive Summary

This Drainage Assessment reviews the existing drainage arrangement at the application site and proposes a surface water drainage strategy in line with Hinckley and Bosworth Council and Leicestershire County Council guidance.

The site is currently occupied by a single building and Public House with associated hardstanding and is located at 18 Market Place, Hinckley, LE10 1NT.

The proposed development comprises a small extension and refurbishment to part of the site to form a new block of residential units and associated hardstanding and external works.

The site is less than 1 hectare in size and within flood zone 1, so no flood risk assessment is required.

Surface Water Drainage

The proposed strategy presented in detail in this report aims to reduce the surface water discharge to less than 50% of the existing discharge rate. Attenuation and reduced discharge will be provided for all storm events up to and including the 1 in 100-year storm plus 40% allowance for climate change.

Sustainable Drainage Systems (SuDS) shall be used, including an area of tanked permeable paving for surface water attenuation.

It is proposed to reuse existing sewer connections where possible, or if these cannot be found, construct new sewer connections to the combined sewer in the street frontage.

An additional 10% allowance for urban creep has been included in the sizing of attenuation.

Maintenance/management of all onsite drainage infrastructure has been considered within a separate maintenance plan appended to this report. This will be updated through the development process.

The proposed drainage strategy is entirely based on-site and therefore the only off-site works will be the new sewer connection to the Severn Trent Water sewer should the existing sewer not be found.

Overall, the proposals provide a high level of water treatment, runoff reduction and flooding protection for the proposed development and are in accordance with all requirements of the Lead Local Flood Authority (LLFA).

Foul Drainage

It is proposed to discharge the foul drainage from the site into the existing Severn Trent Water sewer.

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1 INTRODUCTION

- 1.1.1 Arcelle Consulting was commissioned to undertake a Drainage Assessment for the proposed development of land located at 18 Market Place, Hinckley, LE10 1NT
- 1.1.2 This Drainage Assessment has been produced in support of a planning application and should be read in conjunction with the other planning documents.
- 1.1.3 The proposed development comprises a small extension and refurbishment to form a new block of residential units blocks and associated hardstanding and external works. Development proposals are provided in Appendix A.
- 1.1.4 The site is less than 1 hectare in size and within flood zone 1, so no flood risk assessment is required.
- 1.1.5 The total site area is 768 square metres. The development area is 220 square metres. Pre development the site is 100% impermeable. Post-development the impermeable area remains the same.
- 1.1.6 Since April 2015, Lead Local Flood Authorities (LLFA's) have become a statutory consultee on surface water drainage for many planning applications. For this site, the following is considered to be the required level of details for planning approval.
 - SuDS: Designs, Maintenance Plans & Calculations - for SuDS proposed, the LLFA require product specifications or design drawings, all supporting calculations and a maintenance plan. This needs to include details of any SuDS structures, and the type of SuDS system in accordance with the CIRIA C753 SuDS Manual.

2 Site Description

- 2.1.1 The site is approximately 787 square metres and is located at 18 Market Place, Hinckley, LE10 1NT

2.2 *Location*

- 2.2.1 A site location plan is provided in Appendix B.

3 Design principles and policy requirements

3.1 General Principles for Proposed Site Run-Off

3.1.1 The DEFRA Sustainable Drainage Systems Non-Statutory Technical Standards for Sustainable Drainage Systems (March, 2015) states that the following options must be considered for disposal of surface water runoff in order of preference:

- Discharge to ground
- Discharge to a surface water body
- Discharge to a surface water sewer
- Discharge to a combined sewer

Discharge to Ground

3.1.2 The potential for surface water to discharge to ground has been assessed through a review of the likely ground conditions and possible infiltration structures.

3.1.3 The area in which this site is located is generally underlain by impermeable clays. Based upon this information, it is unlikely that infiltration is possible on this site.

3.1.4 As well as the underlying ground conditions, the site and surrounds are urban in nature and have existing sewer connections. Hence it is considered that infiltration is not possible on this site.

Discharge to Surface Water Body

3.1.5 There are no suitable surface water bodies near to the site that can be used for surface water discharge.

Discharge to Surface Water Sewer/Combined Sewer

3.1.6 Discharge to the public sewer network should only be considered once all other options for draining surface water from the site have been exhausted.

3.1.7 The existing site has a surface and foul water connection to the public sewer. It is proposed to reuse these existing connections if possible, however this is subject to survey. Should the existing sewer connections not be suitable for reuse, new surface water and foul connections will be constructed to the existing combined sewer.

3.1.8 Attenuation will be provided in the form of an area of tanked permeable paving. The proposed attenuation structures will discharge via gravity to the Severn Trent Water combined sewer in the street. See Appendix C for design drawings and calculations.

3.2 Sustainable Drainage Systems (SuDS)

- 3.2.1 To maximise the potential use of SuDS at the site, a review has been undertaken as shown in Table 1 in accordance with the SuDS Hierarchy. This review highlights the components referenced in the SuDS Hierarchy and provides recommendations on whether the components could be incorporated into the development.

Table 1: SuDS Selection Based on the SuDS Hierarchy

Component	Recommendation
Green (living) roofs	Whilst the use of green roofs provides additional environmental benefits such as enhanced aesthetics and ecology, its exposure to wind and orientation must be considered. Access to undertake the construction and maintenance easily and safely is also a high priority. If feasible, depending on the roof design, a green roof will provide water quality, biodiversity and aesthetic benefits to the site. Additionally, the green roof/s will offer some attenuation for run-off, reducing volumes of run-off and in higher frequency events (i.e. 1in2 year storms) will result in no run-off for the building. Green roofs are not suitable for the existing roof.
Basins and Ponds	Ponds and attenuation basins can provide overland storage of surface water whilst also providing additional biodiversity and aesthetic/amenity value. There are no open areas on the site which are suitable for basins or ponds.
Filter Strips and Swales	Swales are linear vegetated drainage features, which provide overland conveyance and storage of surface water whilst trapping sediments and hydrocarbons within run-off. They also create biodiverse areas for planting and habitat. Swales are not considered suitable for this site due to the urban setting restricting the availability of space and suitability of swales.
Infiltration Devices	Infiltration devices are not suitable for this site in accordance with the recommendations of the section above.
Permeable Paving	Whilst incorporating attenuation storage, permeable paving also provides treatment through filtration of silt (and attached pollutants), settlement and retention of solids, adsorption of pollutants and biodegradation of organic pollutants, including petrol and diesel. An area of tanked permeable paving is proposed for site.
Tanked Systems	This is the least sustainable option in terms of the SuDS Hierarchy. However, the use of tanked systems would still be of benefit compared to traditional drainage systems as it does allow run-off to be slowed down to an acceptable discharge rate.

Component	Recommendation
	There are no tanks proposed for the site.

4 Surface Water Drainage Design

4.1 *Existing Site Runoff*

- 4.1.1 The development area currently an existing Public House and separate building with areas of parking and hardstanding. The existing and proposed areas are summarised below. Note that the existing Public House is not being developed and so the area of development does not include the whole site.

Table 2: Site Areas

Parameter	Existing (m2)	Existing (%)	Proposed (m2)	Proposed (%)
Impermeable area	220	100	220	100
Permeable area	0	0	0	0
Total area	220	100	220	100

4.2 *Design Considerations*

- 4.2.1 Consideration has been given to the following when calculating the proposed impermeable areas.

- The 2013 EA 'Rainfall Run-off Management for Developments' Report (SC030219) states that urban creep, the process of gradually increasing impermeable area within an urban area (through paving soft landscaped surfaces and constructed outbuildings etc), is an acknowledged issue. To include an allowance for urban creep, the impermeable area used in the drainage calculations has been increased by 10% in accordance with the recommendation made in SC030219.

- 4.2.2 Site discharge should be as close to greenfield rates as possible. However, as the site will be unchanged, outflow controls will be set to discharge at a rate of 50% of the existing discharge rate.

- 4.2.3 The climate change allowance used in the Drainage Strategy is in line with updated EA guidance values published in February 2016 for increased rainfall intensities by 2115.

4.3 *Existing Run-Off Rates*

- 4.3.1 The existing run-off rates for a variety of return periods have been calculated using the Wallingford method.

- 4.3.2 The total site area is 220 square metres and is 100% impermeable, resulting in an impermeable area of 220 square metres. Taking conservative peak 1 year, 30 year and 100 year rainfall rates of 50mm/hr, 125mm/hr and 185mm/hr respectively, the maximum existing peak discharge rates have been calculated as follows.

Contributing Area (ha) x 1 yr Rainfall (mm/hr) x 2.78

220/1000 x 50 x 2.78 = **3.1 l/s**

Contributing Area (ha) x 30 yr Rainfall (mm/hr) x 2.78

220/1000 x 125 x 2.78 = **7.6 l/s**

Contributing Area (ha) x 100yr Rainfall (mm/hr) x 2.78

220/1000 x 185 x 2.78 = **11.3 l/s**

- 4.3.3 The discharge rates for the existing and proposed site are summarised below.

Table 3: Existing Run-off Rates

Parameter	Existing Discharge (l/s)	Proposed Discharge (l/s)
QBAR	NA	NA
1 year	3.1	1.0
30 year	7.6	1.7
100 year	11.3	1.8
100 year +40%	NA	1.9

- 4.3.4 Site discharge should be as close to the greenfield rates as possible. However, as the site plan is unchanged, in accordance with best practice, outflow controls will be set to discharge at less than 2l/s for all storm events up to and including the 100 year + 40% storm.

4.4 **Drainage Design**

- 4.4.1 As infiltration is not possible on this site, reducing post development run-off volumes to pre-development volumes is achieved through attenuation.
- 4.4.2 By controlling run-off rates to less than 2l/s and providing attenuation for all storm events up to and including a 1 in 100-year storm plus climate change allowance, the risk of downstream flooding will be minimised.
- 4.4.3 Details of the drainage system and attenuation structures are presented in the design drawings and calculations in Appendix C.
- 4.4.4 A total attenuation volume of approximately 4 cubic metres is proposed to cater for the 100 year +40% storm event.

4.4.5 The attenuation is provided via an area of permeable paving.

4.5 ***Exceedance Flooding***

4.5.1 The existing site is not subject to overland flow or surface water flooding. (See EA surface water flood map below). As the general layout of the site is unchanged, the proposed flow routes will mimic existing, and fall toward the road and into the sewer system.

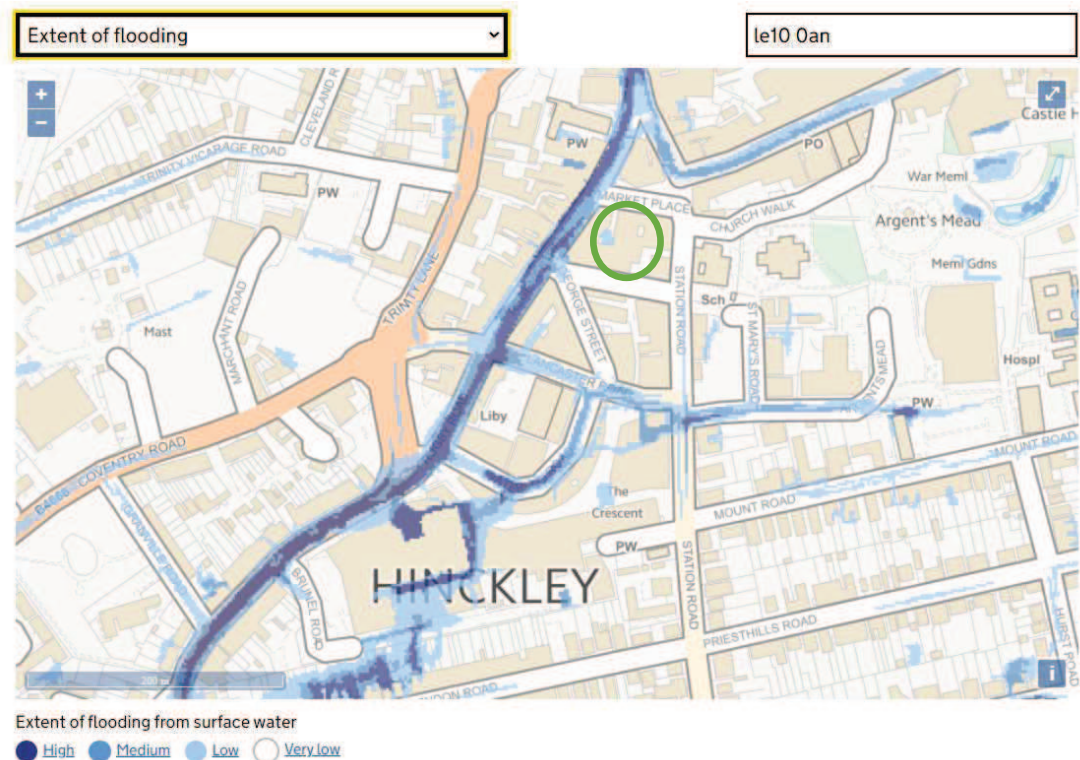


Figure 1: EA surface water flood map

4.5.2 It should be noted that the drainage system has been designed to cater for the 1 in 100 year + 40% climate change storm. ie in this storm event all surface water will be collected on site and slowly released. Thus, the flow route will only be in use in the event of drainage network failure or storms in excess of the 1 in 100 year + 40% climate change storm.

4.6 ***Consents, Offsite Works and Diversions***

4.6.1 The proposed surface water drainage strategy is accommodated mostly on-site, with the only requirement for off-site works being the connection to the Severn Trent Water sewer should the existing sewer not be able to be reused.

4.7 ***Maintenance***

- 4.7.1 A SuDS maintenance plan has been prepared to outline the management of the potential SuDS features. The maintenance plan is provided in Appendix D.

5 Foul Drainage

5.1 *Discharge to Public Sewer Network*

5.1.1 Severn Trent Water are the foul sewerage suppliers for the area.

5.1.2 The identified point of connection from the site is into the public combined sewer network in the street. A Sewer connection application will be submitted to Severn Trent Water for approval.

6 Drainage during construction

6.1 Construction Run-off Management

6.1.1 Installing the surface water and foul drainage system, whilst managing temporary run-off, are key aspects of the construction works involved in any development. The information provided below is in accordance with the 'C698 Site handbook for the construction of SUDS' (CIRIA, 2007).

6.1.2 Please note that the measures recommended below are recommendations only and need to be confirmed at the construction stage by the client and the contractor.

6.2 Management of Construction (Including Drainage)

6.2.1 Drainage is typically an early activity in the construction stage of a development, taking form during the earthworks phase. However, final construction i.e. piped drainage system connections to the SuDS devices, should not take place until the end of site development work, unless a robust strategy for silt-removal is implemented prior to occupation of the site.

6.2.2 A plan for the management of construction (including phasing of works, details of any offsite works etc.) cannot be provided at this early stage, as construction work plans are not yet known. However, the following key points are general construction issues associated with SuDS which will be addressed when these plans are complete:

- Silt-laden waters from construction sites represent a common form of waterborne pollution;
- These silt-laden waters cannot enter SUDS drainage systems unless specifically designed to accept this as it can clog the systems and pollute receiving waters. Therefore, piped drainage systems should not be connected to the attenuation SuDS devices until the late stages of construction.
- Any gullies and piped systems should be capped off during construction and fully jetted and cleaned prior to connection to the attenuation SuDS devices.

6.3 Temporary Drainage During Construction

6.3.1 The three principal aspects of drainage control during construction are trapping sediment, conveying run-off, and controlling run-off.

6.3.2 Sediment traps and barriers can include basin traps and sediment fences (with any necessary boundary controls). The principal basins are to be installed after the construction site is accessed. Sediment fences and barriers will then be installed as needed during grading.

6.3.3 Conveyance of run-off can be achieved through small ditches/stream, storm drains, channels and sloped drains with sufficient inlet/outlet protection.

6.3.4 Slope stability needs to be considered when using any channels to convey run-off across the site into any basins etc.

6.3.5 Run-off control measures will need to be implemented in order not overwhelm the temporary system and cause flooding issues. Run-off rates

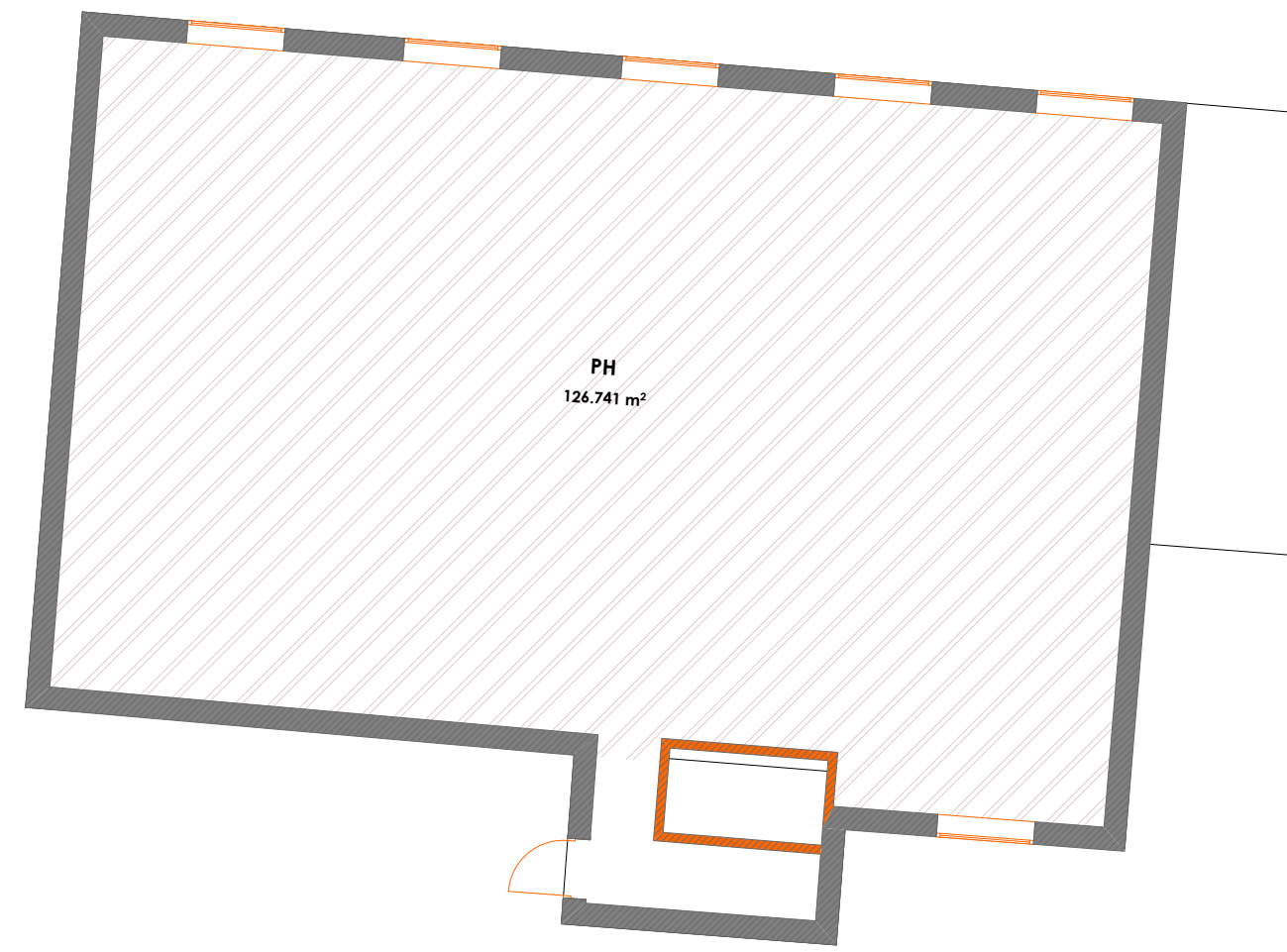
from the site will be managed so they are no greater than pre-development or in keeping with the best practice guidance to minimise risk of blockage. Any additional conveyance measures are to be installed as needed during grading.

- 6.3.6 Run-off control to include provision of perimeter ditches or appropriate levels grading to direct any water from the construction site to remain on site.
- 6.3.7 Any necessary surface stabilisation measures are to be applied immediately on all disturbed areas where construction work is either delayed or incomplete.
- 6.3.8 Maintenance inspections are to be performed weekly, and maintenance repairs to be made immediately after periods of rainfall.

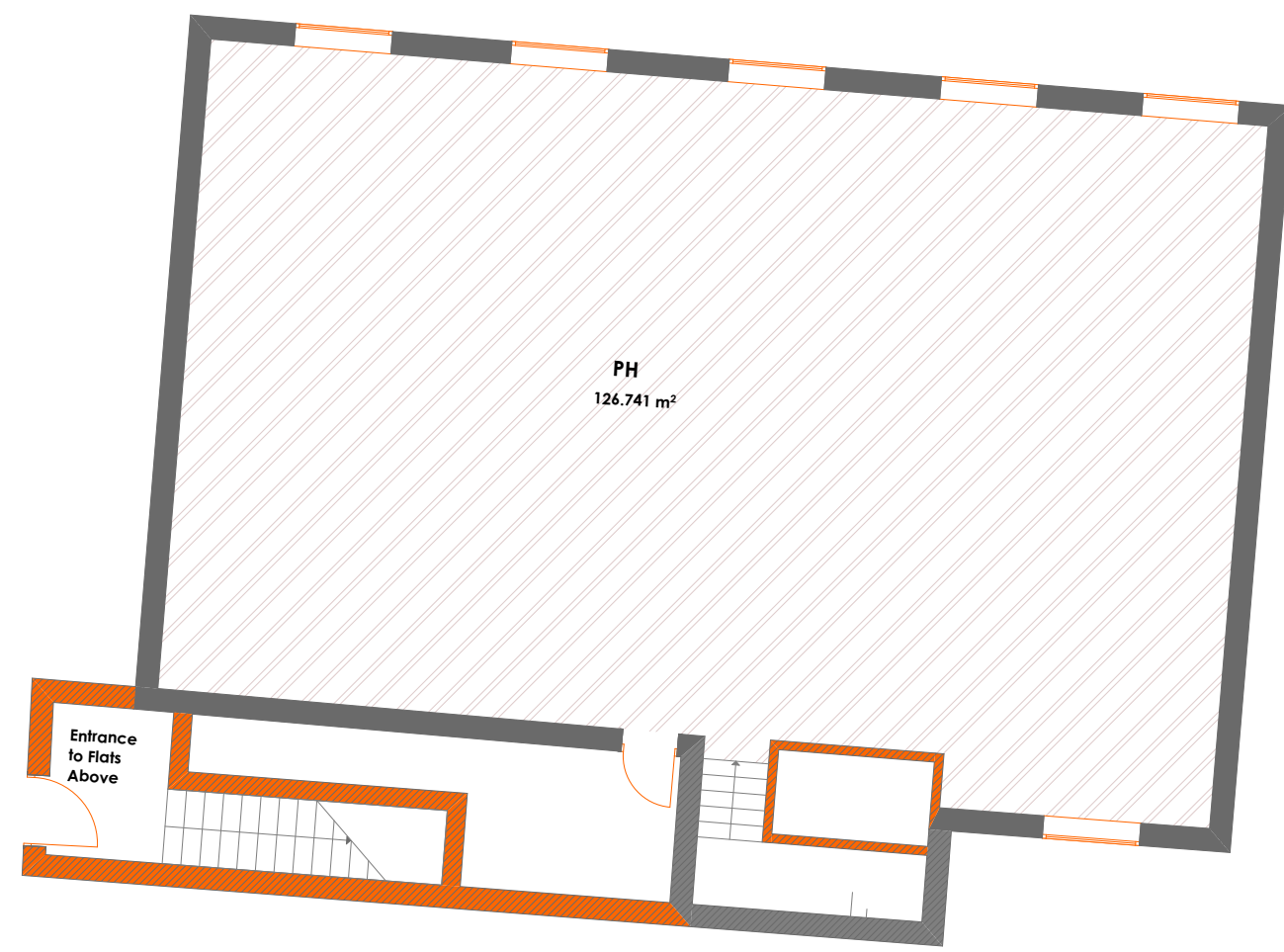
6.4 *Protection of Drainage Infrastructure during Construction*

- 6.4.1 All drainage infrastructure should be protected from damage by construction traffic and heavy machinery through the implementation of measures such as protective barriers, and storing construction materials away from the drainage infrastructure.

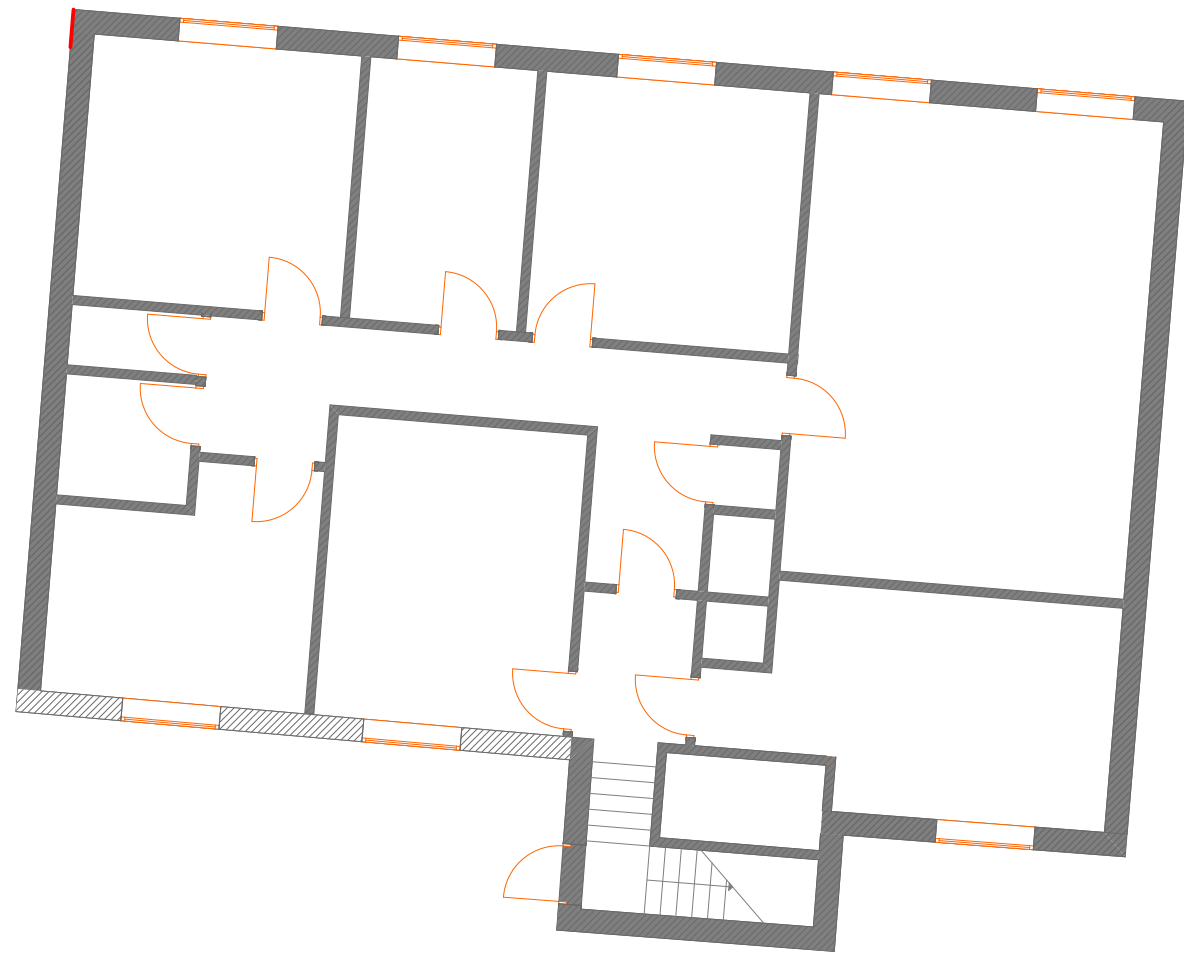
Appendix A: Proposed Development Details



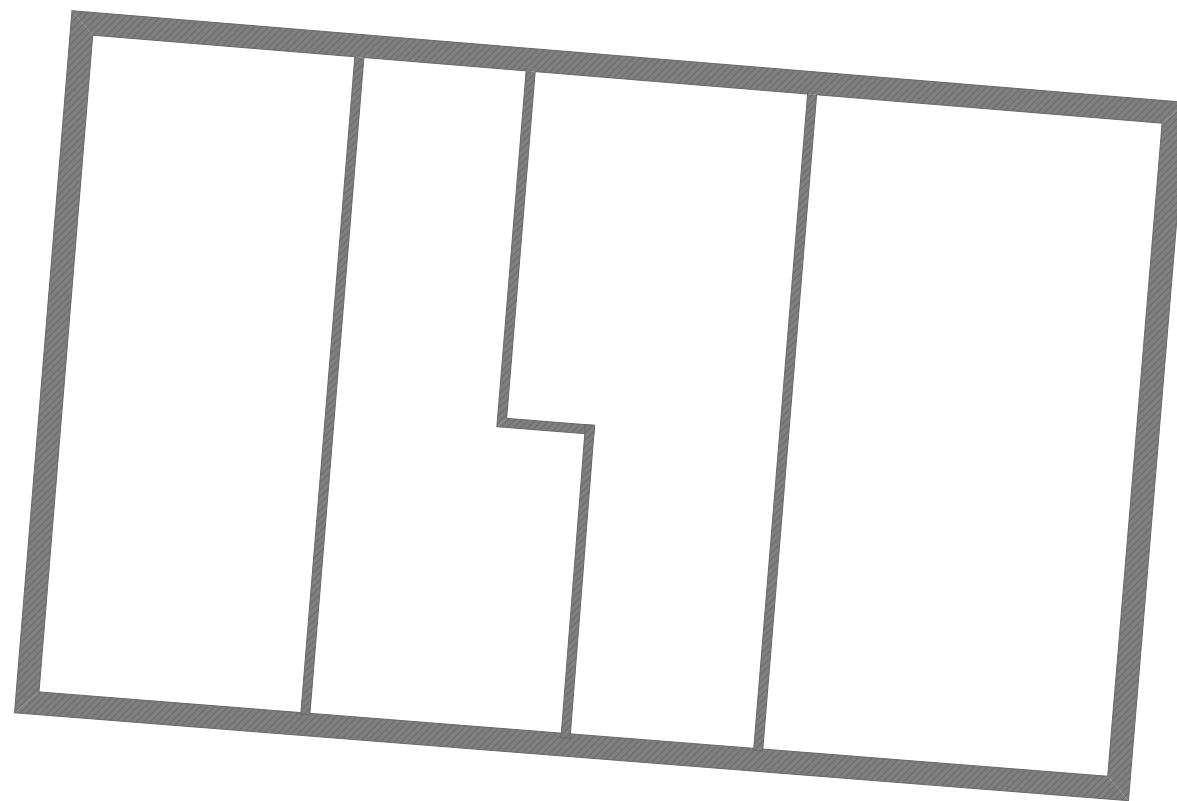
Existing ground floor plan @1:100



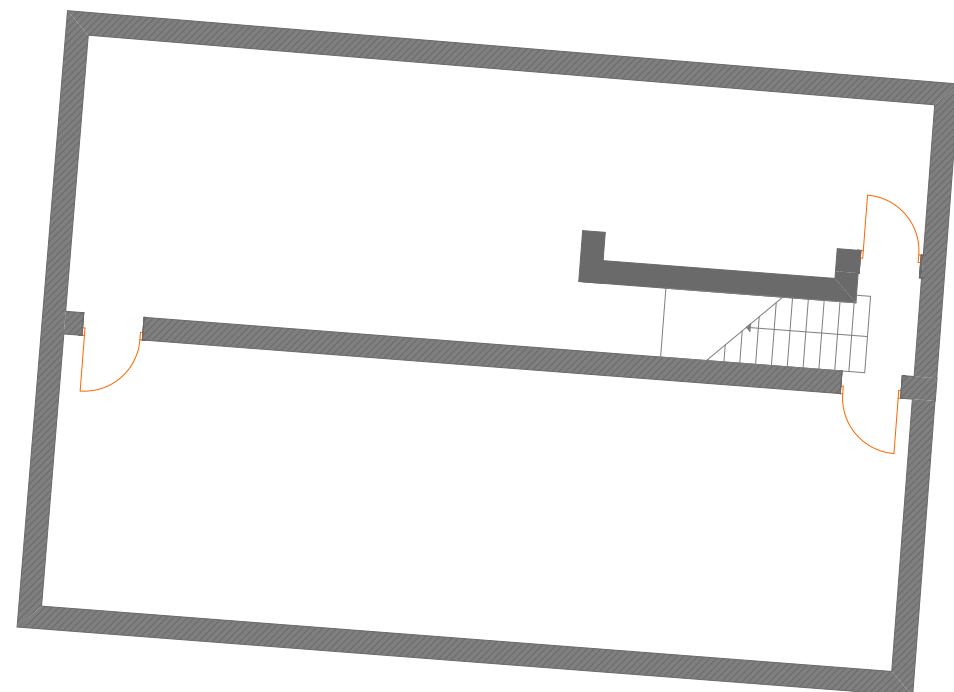
Proposed ground floor plan @1:100



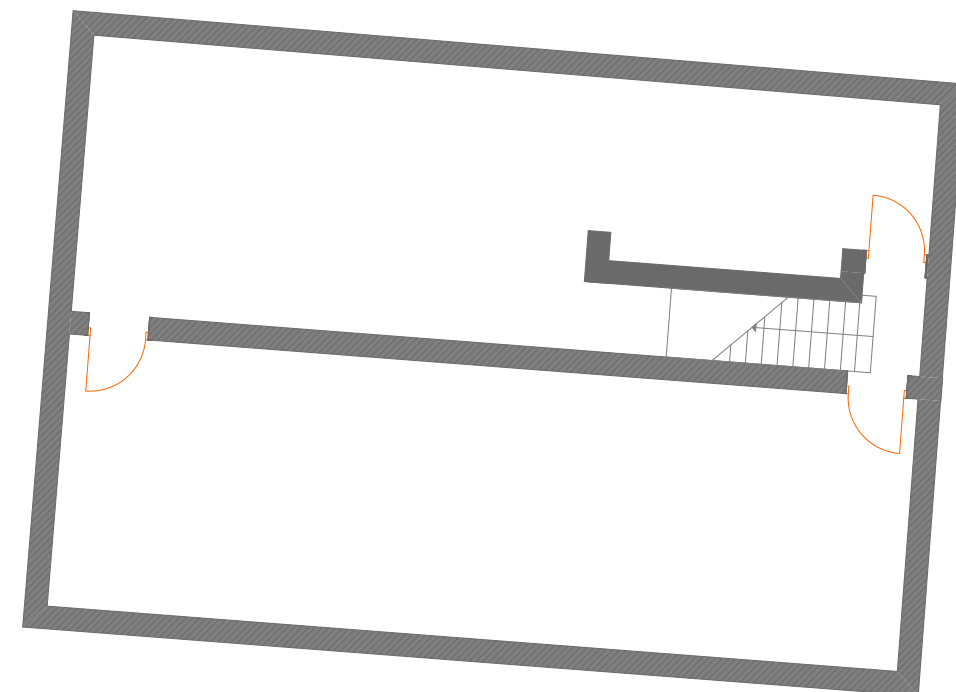
Existing first floor plan @1:100



Existing second floor plan @1:100



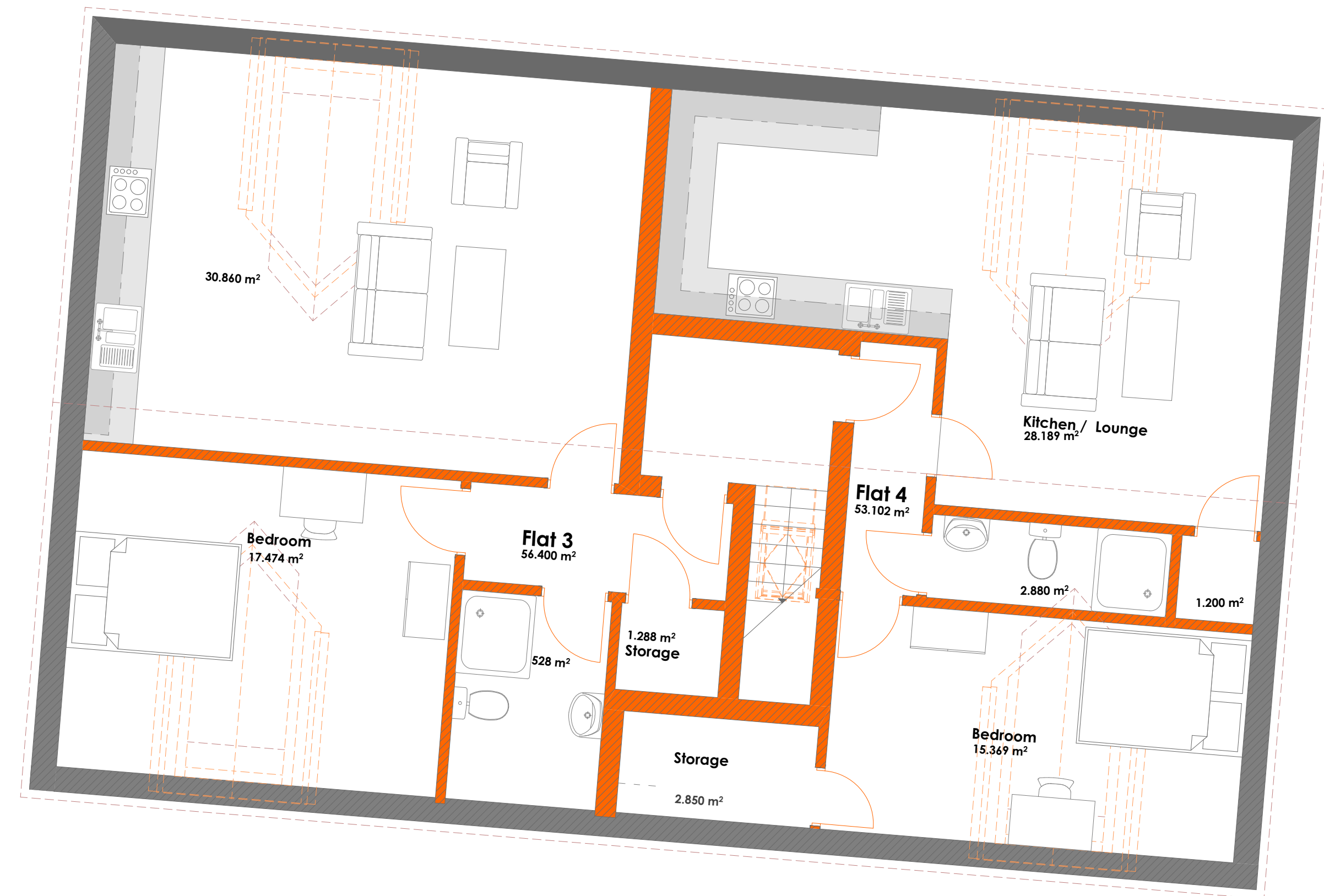
Existing cellar plan @1:100



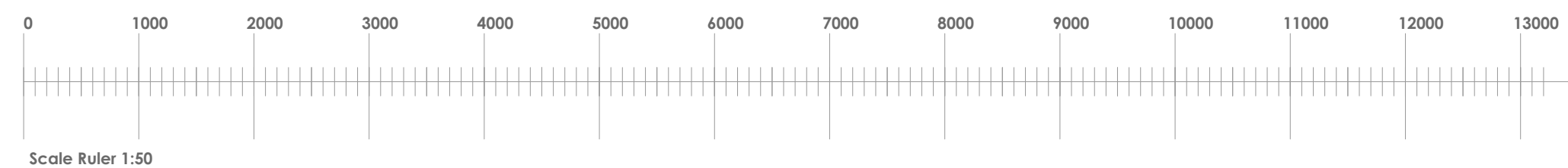
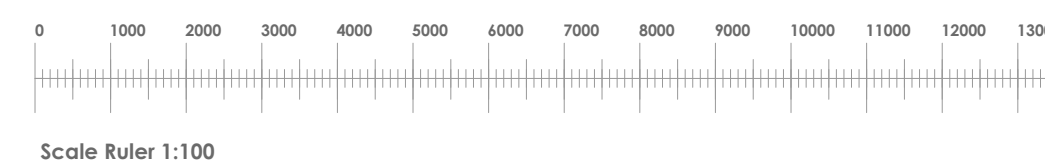
Proposed cellar plan @1:100

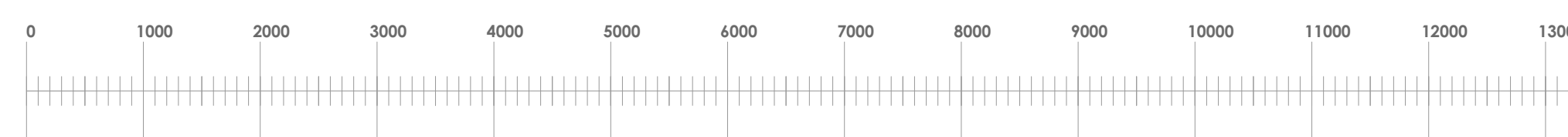
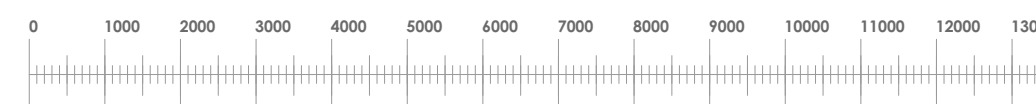
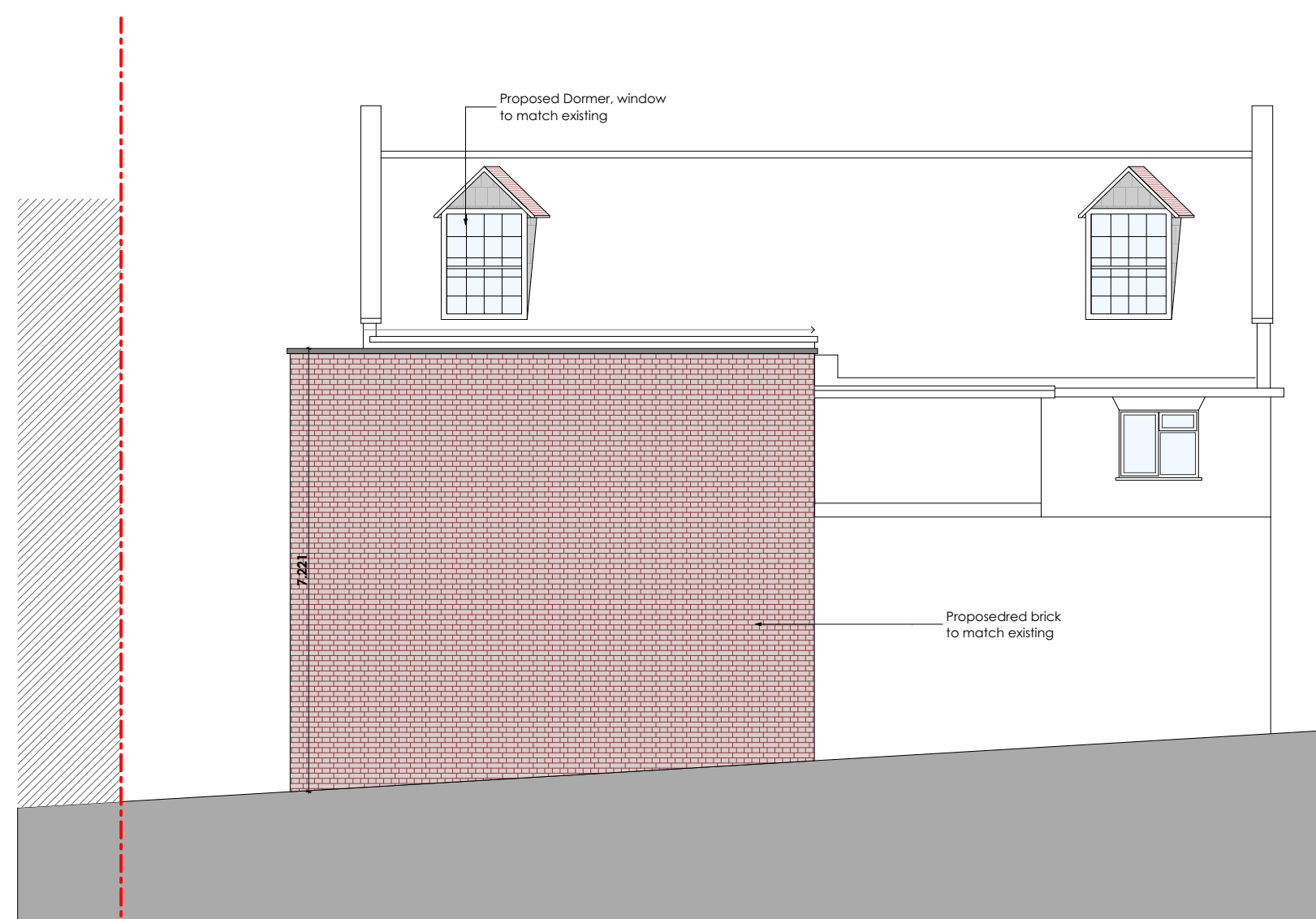
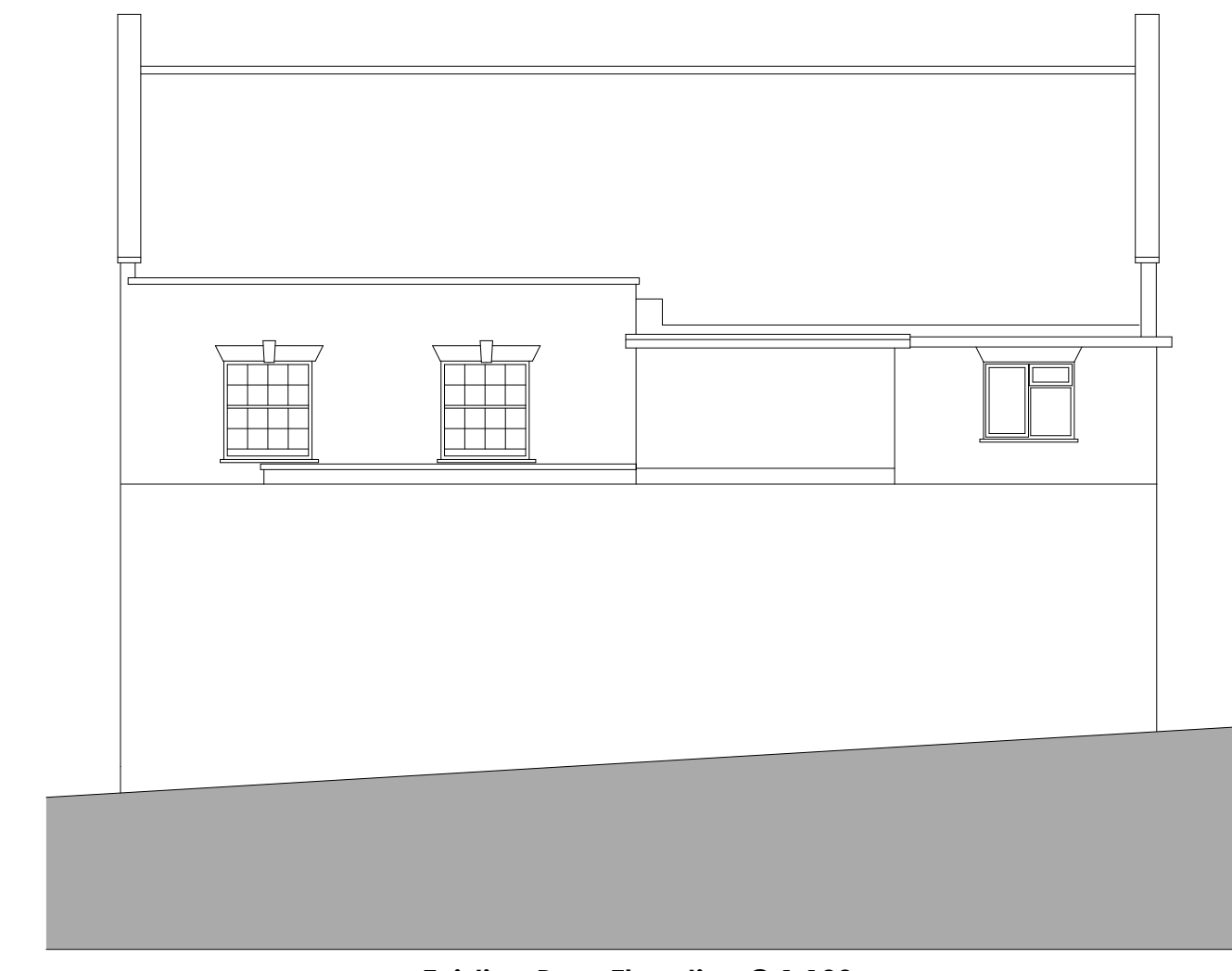


Proposed first floor plan @1:50



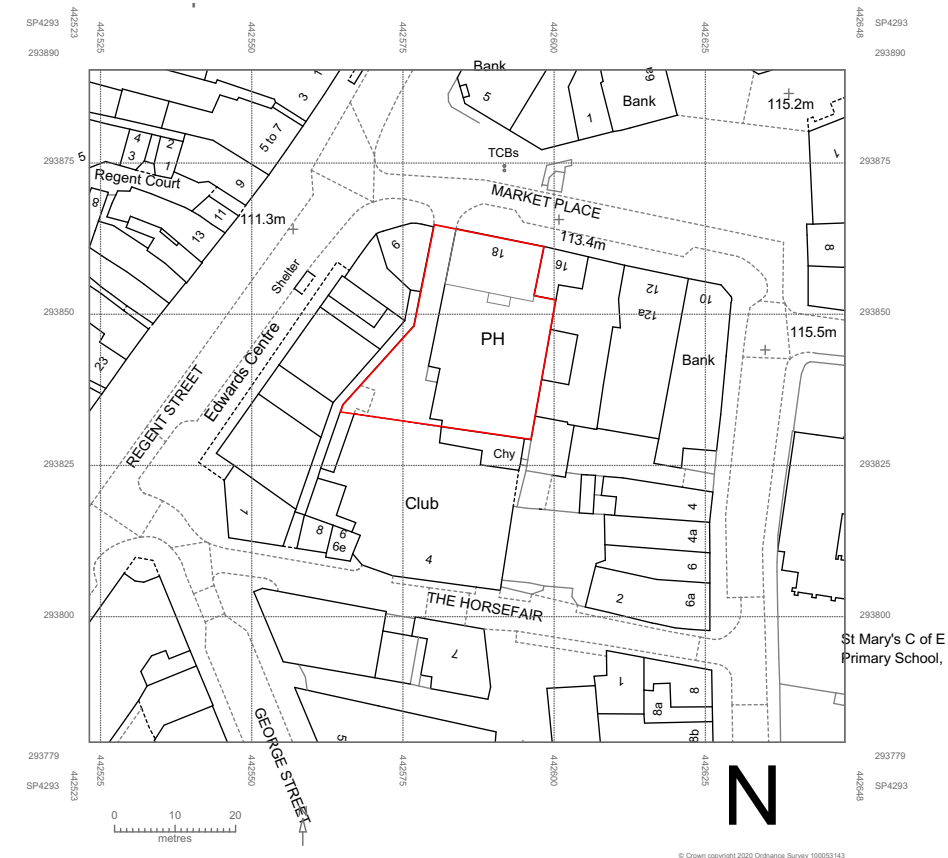
Proposed second floor plan @1:50



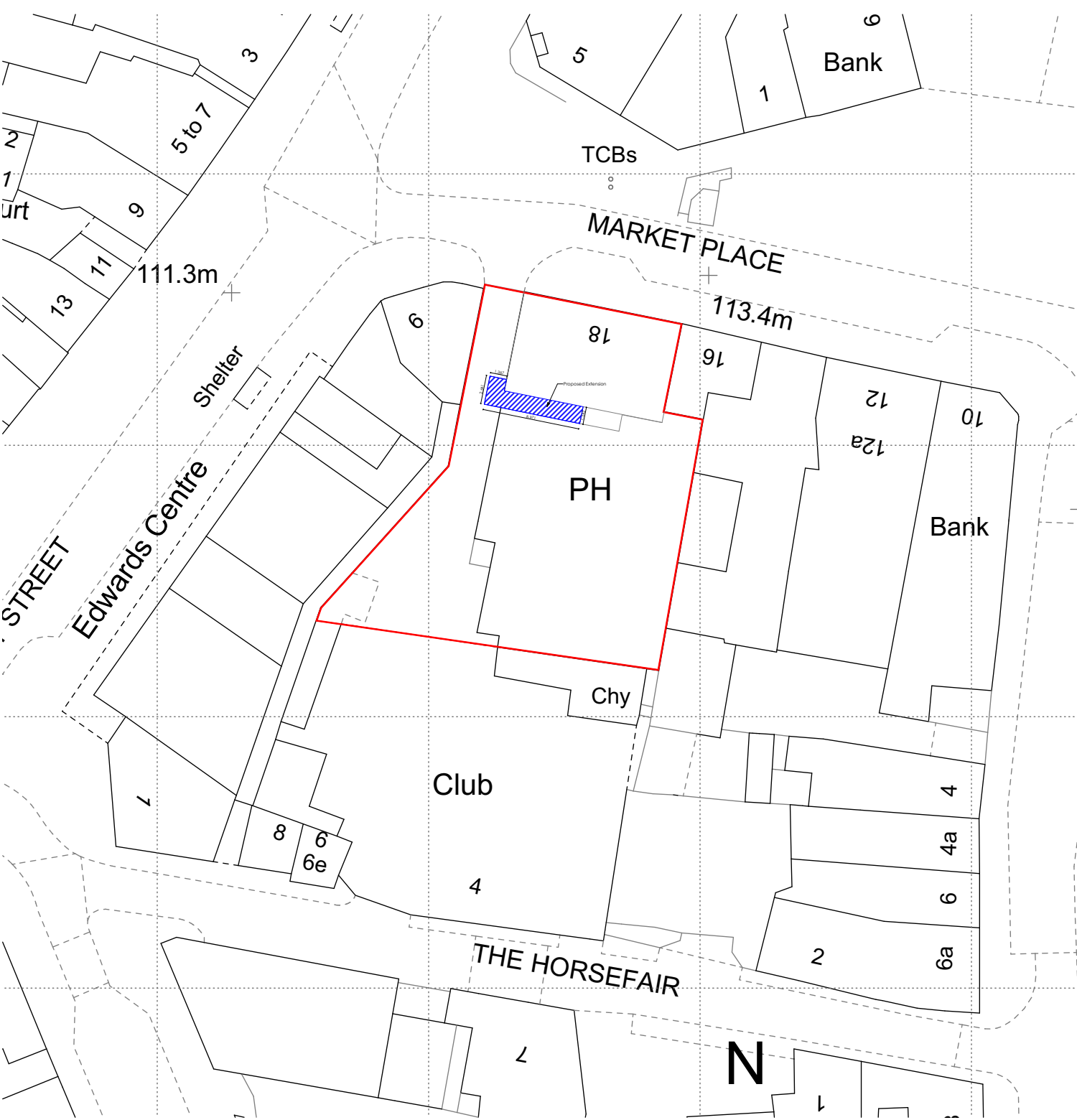
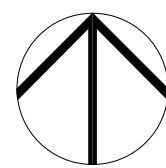


Job Title	Drawing Status		
Proposed 5 x 1 Bedroom Flats			
18 Market Place Hinxley Le10 1NF			
Dwg Name			
Existing / Proposed Elevations			
Dwg Code	As Shown @ A1		
Dwg ID	VD22575		
Sheet Number	A.01	Revision: 01	By: LW Date: 14/01/2023
			
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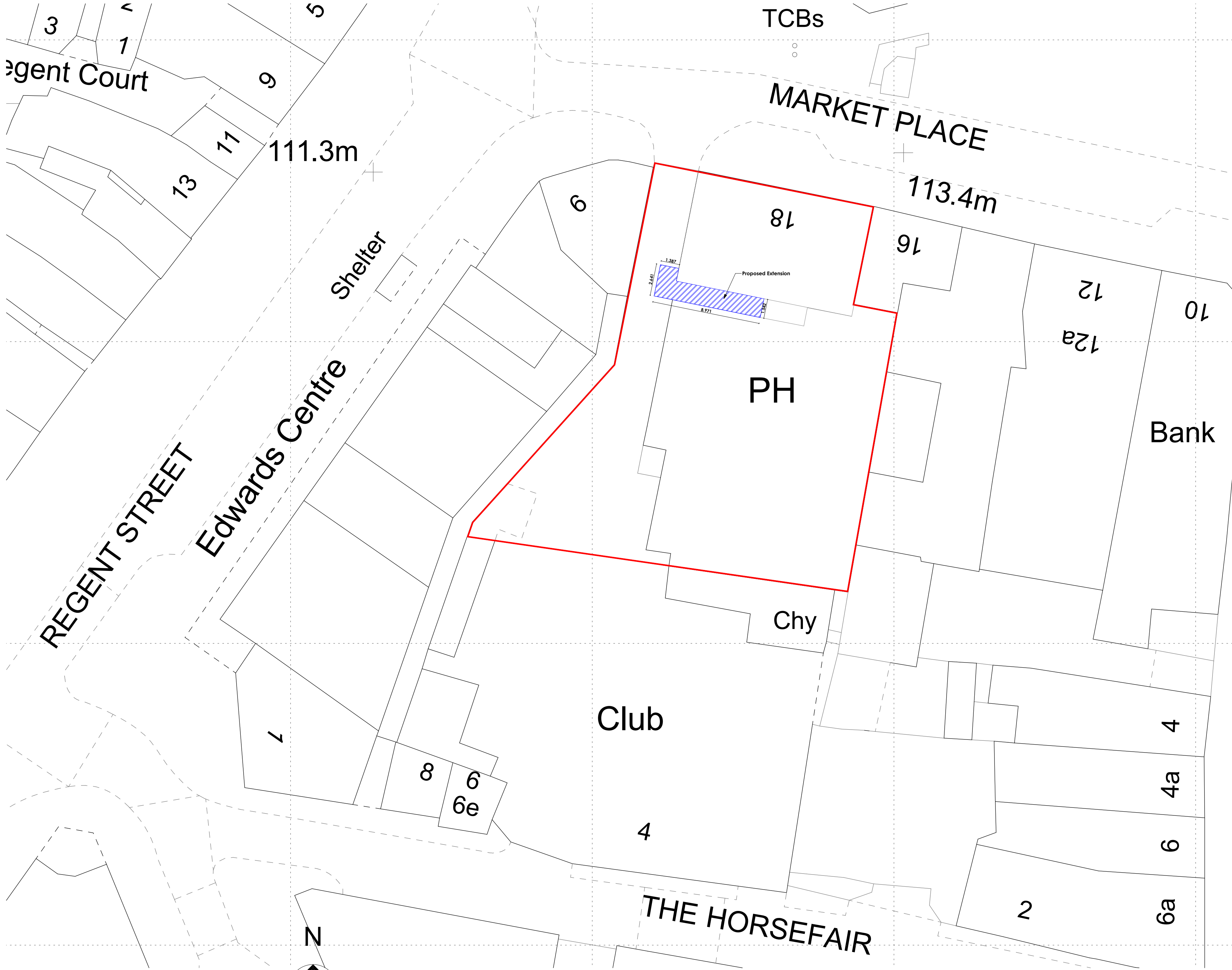
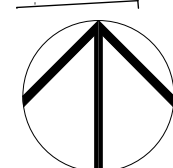
Appendix B: Location Plan



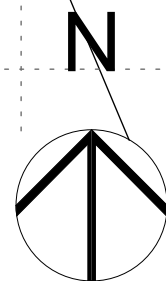
Location Plan @ 1:1250



Proposed Site Plan @ 1:500



Proposed Site Plan @ 1:200



Job Title		Drawing Status	
Proposed 5 x 1 Bedroom Flats		Preliminary Only	
18 Market Place Hinckley Le10 1NF			
Dwg Name			
Site and Location Plan			
Dwg Size		As Shown @ A1	
Dwg ID		VD22575	
Sheet Number		A.01	
		By: LW	Date: 16/01/2023
		Revision: 01	

Appendix C: Drainage Drawings and Calculations

GENERAL CONDITIONS AND PRECAUTIONS TO BE TAKEN WHEN CARRYING OUT WORK ADJACENT TO SEVERN TRENT WATER'S APPARATUS

Please ensure that a copy of these conditions is passed to your representative and/or your contractor on site. If any damage is caused to Severn Trent Water Limited (STW) apparatus (defined below), the person, contractor or subcontractor responsible must inform STW immediately on:

0800 783 4444 (24 hours)

a) These general conditions and precautions apply to the public sewerage, water distribution and cables in ducts including (but not limited to) sewers which are the subject of an Agreement under Section 104 of the Water Industry Act 1991(a legal agreement between a developer and STW, where a developer agrees to build sewers to an agreed standard, which STW will then adopt); mains installed in accordance with an agreement for the self-construction of water mains entered into with STW and the assets described at condition b) of these general conditions and precautions. Such apparatus is referred to as “STW Apparatus” in these general conditions and precautions.

b) Please be aware that due to The Private Sewers Transfer Regulations June 2011, the number of public sewers has increased, but many of these are not shown on the public sewer record. However, some idea of their positions may be obtained from the position of inspection covers and their existence must be anticipated.

c) On request, STW will issue a copy of the plan showing the approximate locations of STW Apparatus although in certain instances a charge will be made. The position of private drains, private sewers and water service pipes to properties are not normally shown but their presence must be anticipated. This plan and the information supplied with it is furnished as a general guide only and STW does not guarantee its accuracy.

d) STW does not update these plans on a regular basis. Therefore the position and depth of STW Apparatus may change and this plan is issued subject to any such change. Before any works are carried out, you should confirm whether any changes to the plan have been made since it was issued.

e) The plan must not be relied upon in the event of excavations or other works in the vicinity of STW Apparatus. It is your responsibility to ascertain the precise location of any STW Apparatus prior to undertaking any development or other works (including but not limited to excavations).

f) No person or company shall be relieved from liability for loss and/or damage caused to STW Apparatus by reason of the actual position and/or depths of STW Apparatus being different from those shown on the plan.

In order to achieve safe working conditions adjacent to any STW Apparatus the following should be observed:

1. All STW Apparatus should be located by hand digging prior to the use of mechanical excavators.
2. All information set out in any plans received from us, or given by our staff at the site of the works, about the position and depth of the mains, is approximate. Every possible precaution should be taken to avoid damage to STW Apparatus. You or your contractor must ensure the safety of STW Apparatus and will be responsible for the cost of repairing any loss and/or damage caused (including without limitation replacement parts).
3. Water mains are normally laid at a depth of 900mm. No records are kept of customer service pipes which are normally laid at a depth of 750mm; but some idea of their positions may be obtained from the position of stop tap covers and their existence must be anticipated.
4. During construction work, where heavy plant will cross the line of STW Apparatus, specific crossing points must be agreed with STW and suitably reinforced where required. These crossing points should be clearly marked and crossing of the line of STW Apparatus at other locations must be prevented.
5. Where it is proposed to carry out piling or boring within 20 metres of any STW Apparatus, STW should be consulted to enable any affected STW Apparatus to be surveyed prior to the works commencing.
6. Where excavation of trenches adjacent to any STW Apparatus affects its support, the STW Apparatus must be supported to the satisfaction of STW. Water mains and some sewers are pressurised and can fail if excavation removes support to thrust blocks to bends and other fittings.
7. Where a trench is excavated crossing or parallel to the line of any STW Apparatus, the backfill should be adequately compacted to prevent any settlement which could subsequently cause damage to the STW Apparatus. In special cases, it may be necessary to provide permanent support to STW Apparatus which has been exposed over a length of the excavation before backfilling and reinstatement is carried out. There should be no concrete backfill in contact with the STW Apparatus.
8. No other apparatus should be laid along the line of STW Apparatus irrespective of clearance. Above ground apparatus must not be located within a minimum of 3 metres either side of the centre line of STW Apparatus for smaller sized pipes and 6 metres either side for larger sized pipes without prior approval. No manhole or chamber shall be built over or around any STW Apparatus.
9. A minimum radial clearance of 300 millimetres should be allowed between any plant or equipment being installed and existing STW Apparatus. We reserve the right to increase this distance where strategic assets are affected.
10. Where any STW Apparatus coated with a special wrapping is damaged, even to a minor extent, STW must be notified and the trench left open until the damage has been inspected and the necessary repairs have been carried out. In the case of any material damage to any STW Apparatus causing leakage, weakening of the mechanical strength of the pipe or corrosion-protection damage, the necessary remedial work will be recharged to you.
11. It may be necessary to adjust the finished level of any surface boxes which may fall within your proposed construction. Please ensure that these are not damaged, buried or otherwise rendered inaccessible as a result of the works and that all stop taps, valves, hydrants, etc. remain accessible and operable. Minor reduction in existing levels may result in conflict with STW Apparatus such as valve spindles or tops of hydrants housed under the surface boxes. Checks should be made during site investigations to ascertain the level of such STW Apparatus in order to determine any necessary alterations in advance of the works.
12. With regard to any proposed resurfacing works, you are required to contact STW on the number given above to arrange a site inspection to establish the condition of any STW Apparatus in the nature of surface boxes or manhole covers and frames affected by the works. STW will then advise on any measures to be taken, in the event of this a proportionate charge will be made.
13. You are advised that STW will not agree to either the erection of posts, directly over or within 1.0 metre of valves and hydrants,

14. No explosives are to be used in the vicinity of any STW Apparatus without prior consultation with STW.

TREE PLANTING RESTRICTIONS

There are many problems with the location of trees adjacent to sewers, water mains and other STW Apparatus and these can lead to the loss of trees and hence amenity to the area which many people may have become used to. It is best if the problem is not created in the first place. Set out below are the recommendations for tree planting in close proximity to public sewers, water mains and other STW Apparatus.

15. Please ensure that, in relation to STW Apparatus, the mature root systems and canopies of any tree planted do not and will not encroach within the recommended distances specified in the notes below.

16. Both Poplar and Willow trees have extensive root systems and should not be planted within 12 metres of a sewer, water main or other STW Apparatus.

17. The following trees and those of similar size, be they deciduous or evergreen, should not be planted within 6 metres of a sewer, water main or other STW Apparatus. E.g. Ash, Beech, Birch, most Conifers, Elm, Horse Chestnut, Lime, Oak, Sycamore, Apple and Pear. Asset Protection Statements Updated May 2014

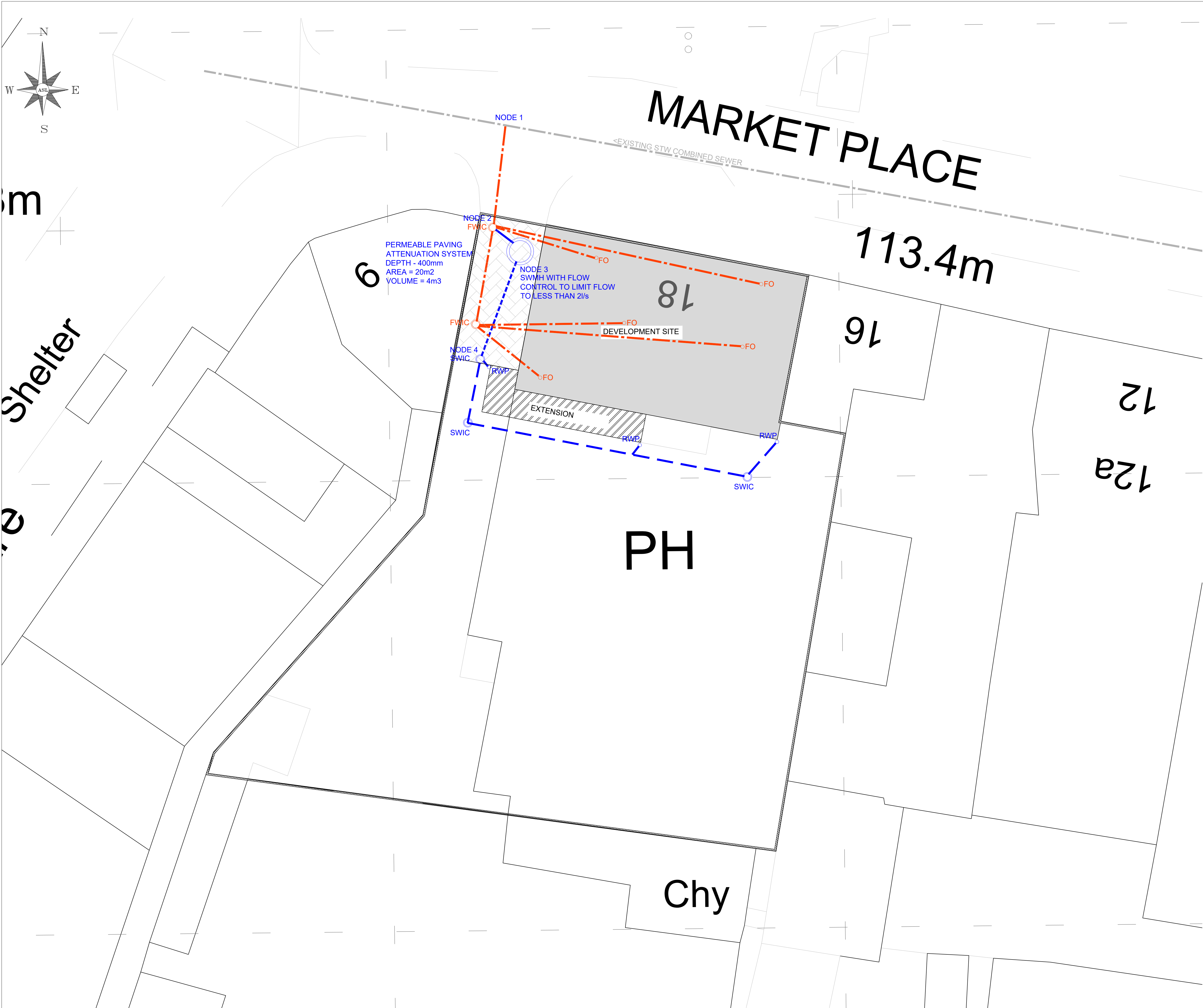
18. STW personnel require a clear path to conduct surveys etc. No shrubs or bushes should be planted within 2 metre of the centre line of a sewer, water main or other STW Apparatus.

19. In certain circumstances, both STW and landowners may wish to plant shrubs/bushes in close proximity to a sewer, water main or other STW Apparatus for screening purposes. The following are shallow rooting and are suitable for this purpose: Blackthorn, Broom, Cotoneaster, Elder, Hazel, Laurel, Privet, Quickthorn, Snowberry, and most ornamental flowering shrubs.

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
3606	C	109.44	107.76	1.68
3702	C	112.44	109.94	2.5
3801	C	119.28	118.17	1.11
4608	C	110.12	108.45	1.67
4612	C	109.1	105.29	3.81
4702	C	113.37	111.57	1.8
4703	C	111.6	109.06	2.54
4704	C	110.77	108.7	2.07
4710	C	109.9	106.16	3.74
4801	C	114.79	112.11	2.68
4802	C	116.68	114	2.68
4803	C	116.83	115.17	1.66
4804	C	115.6	113.72	1.88
4903	C	117.96	115.29	2.67
4905	C	117.9	116.36	1.54
4906	C	117.6	115.9	1.7
5701	C	110.14	0	0
5702	C	111.1	108.45	2.65
5705	C	111.58	108.78	2.8
5706	C	112.82	110.34	2.48
5801	C	110.86	0	0
5803	C	113.03	110.46	2.57
5806	C	111.76	109.89	1.87
5808	C	113.6	111.83	1.77
5812	C	111.62	107.55	4.07
5814	C	110.9	106.94	3.96
5907	C	111.99	110.01	1.98
6602	C	112.83	109.69	3.14
6606	C	112.83	109.42	3.41
6701	C	112.91	109.2	3.71
6702	C	113.55	110.31	3.24
6703	C	114.54	112.27	2.27
6704	C	113.18	111.12	2.06
6705	C	114.81	112.84	1.97
6801	C	114.88	113.08	1.8
6802	C	115.53	112.9	2.63
6803	C	117.03	116.21	0.82
6804	C	118.61	117.24	1.37
6902	C	112.97	111.34	1.63
6903	C	112.54	110.54	2
6904	C	113.07	111.42	1.65
7701	C	116.26	114.04	2.22
7801	C	121.27	119.69	1.58
7802	C	121.27	119.14	2.13
7803	C	123.94	122.04	1.9
7901	C	118.71	117.11	1.6
7902	C	120.8	118.6	2.2
3624	F	-	0	0

[illegible][illegible]

3625	F	-	0	0
3908	F	-	0	0



- Notes
- This drawing is for planning only and to be read in conjunction with all relevant series design drawings, specifications and documentation.
 - Location and levels of existing sewers are assumed only and should not be relied upon until confirmed by survey.
 - Dimensions must not be scaled from this drawing.
 - The contractor shall be responsible for the setting out of the works and the accuracy of all dimensions. He shall satisfy himself that the information given is correct and notify the relevant parties immediately of any discrepancies.
 - The building contractor is responsible for the design and coordination of all temporary works required on this project.
 - All services are to be located by the contractor and clearly marked prior to commencing work on site.
 - Construction to be in accordance with all British and European standards and building regulations.
 - All dimensions are in millimetres and levels in metres above local datum.
 - Any discrepancies in the details shown are to be reported to the employer's representative/engineer prior to construction.
 - The general specification of materials and workmanships for the construction of the access road, footpaths and other areas of hardstanding shall be the manual of contract documents for highway works, volume 1, specification of highway works (shw) published by the stationary office.
 - All surface water drainage is subject to detailed design and all RWP and FO shown are indicative only and subject to approval and setting out by the architect.
 - Node numbers refer to calculations within drainage report
 - Unless noted otherwise, pipes to be:
foul pipes under building Ø100@1:40,
foul pipes external Ø100@1:80,
surface water pipes Ø100@1:100

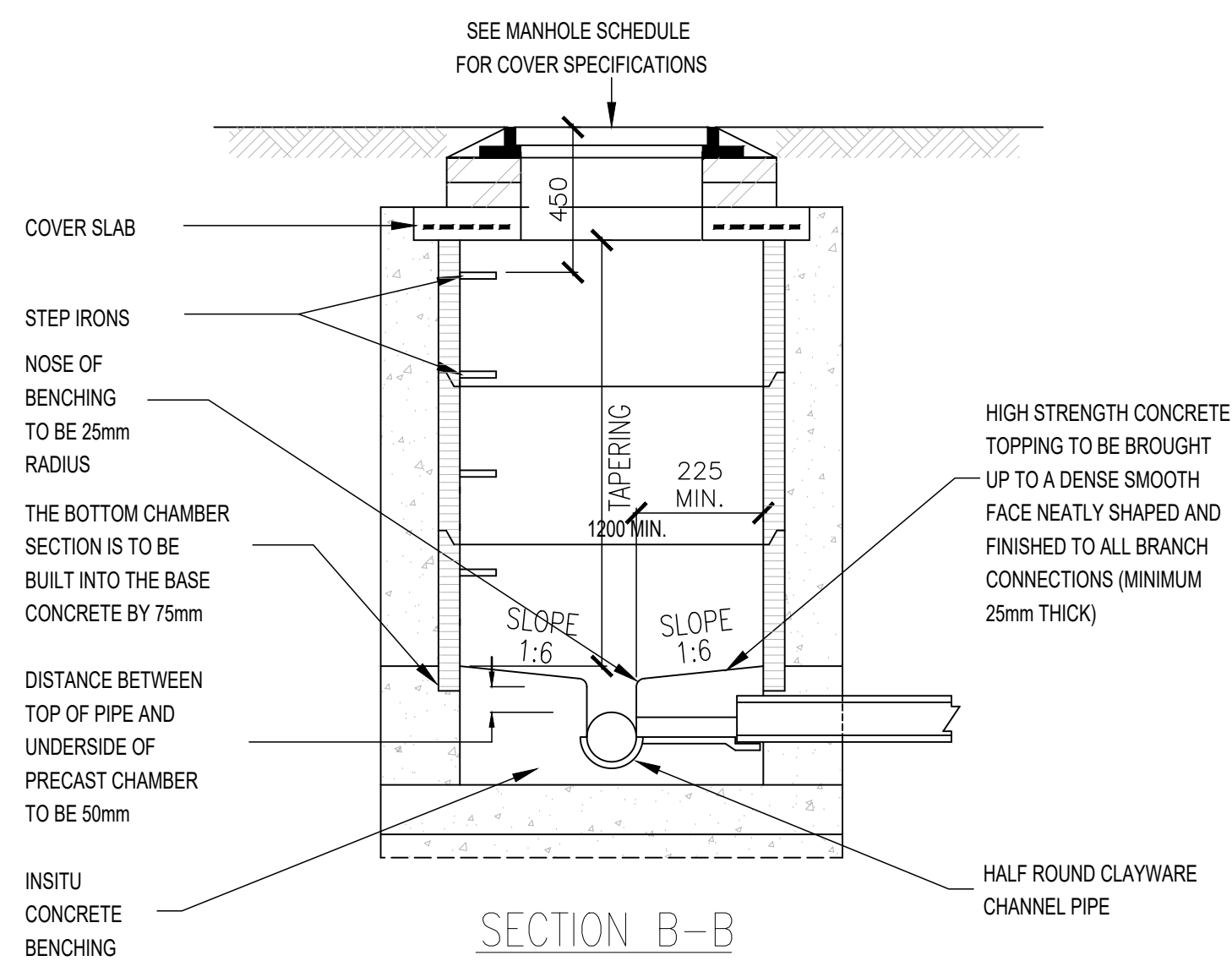
DRAINAGE KEY

Ø100@1:100>	Stormwater Pipe - Diameter and fall
Ø100@1:100>	Perforated Pipe - Diameter and fall
SMH Ø1200 CL 80.90 IL 80.00	Manhole type - SMH Surface Water Diameter Cover Level Invert Level
SWIC Ø450	Polypropylene Inspection Chamber (PPIC)
RWP	Rain Water Pipe
Ø150@1:100>	Foul Pipe - Diameter and fall
FMH Ø1200 CL 80.90 IL 80.00	Manhole type - FMH Foul Water Diameter Cover Level Invert Level
FWIC Ø450	Polypropylene Inspection Chamber (PPIC)
FO	Sewer Vent Pipe/Sub Stack/Foul Outlet
FOB	Basement Foul Outlet
Ø150@1:100>	Existing Combined Sewer

EXTERNAL WORKS KEY

18.30+	Proposed Level
FFL 80.90	Finished floor level
Permeable Paving	Permeable Paving - see detail

Rev	Description			Drawn Date	Checked Date
Drawn By	AW	Checked By	AW	Approved By	AW
Date	03.02.23	Date	03.02.23	Date	03.02.23
Base drawing scale 1:100 at A1					
Client	ANKIT THAKKAR				
Project	MARKET PLACE, HINCKLEY				
Title	SITE DRAINAGE PLAN				
arcelle Consulting T: 0116 254 5058 E: info@arcelleconsulting.co.uk Leicester Office 18 De Montfort Street Leicester LE1 7GL London Office 49 Constable House Adelaide Road London NW3 3QA					
Architect				Status	
VOLTA				Preliminary 	
Drawing No.				Tender	
2572-C01				Construction	
Revision	-				As Built

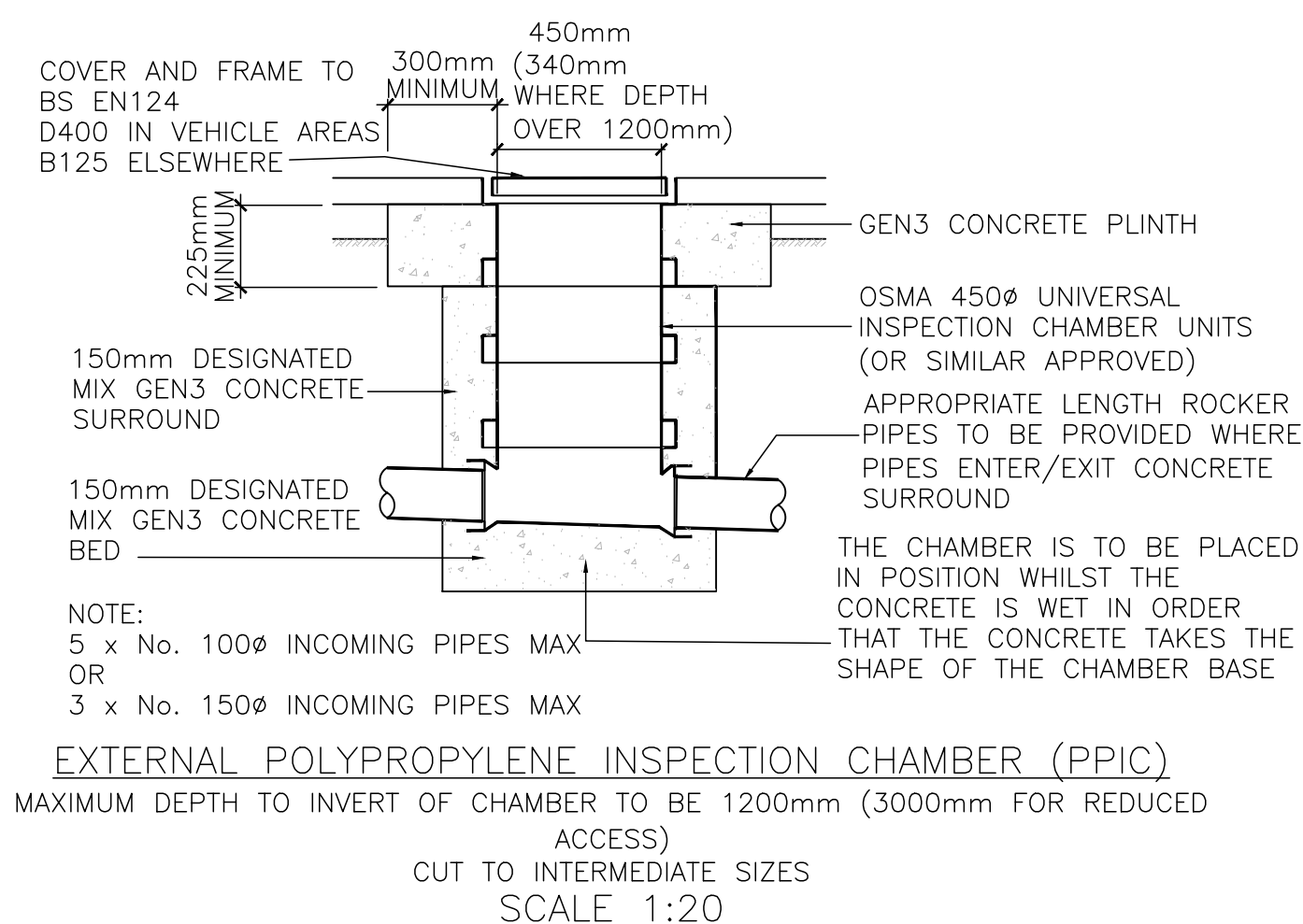
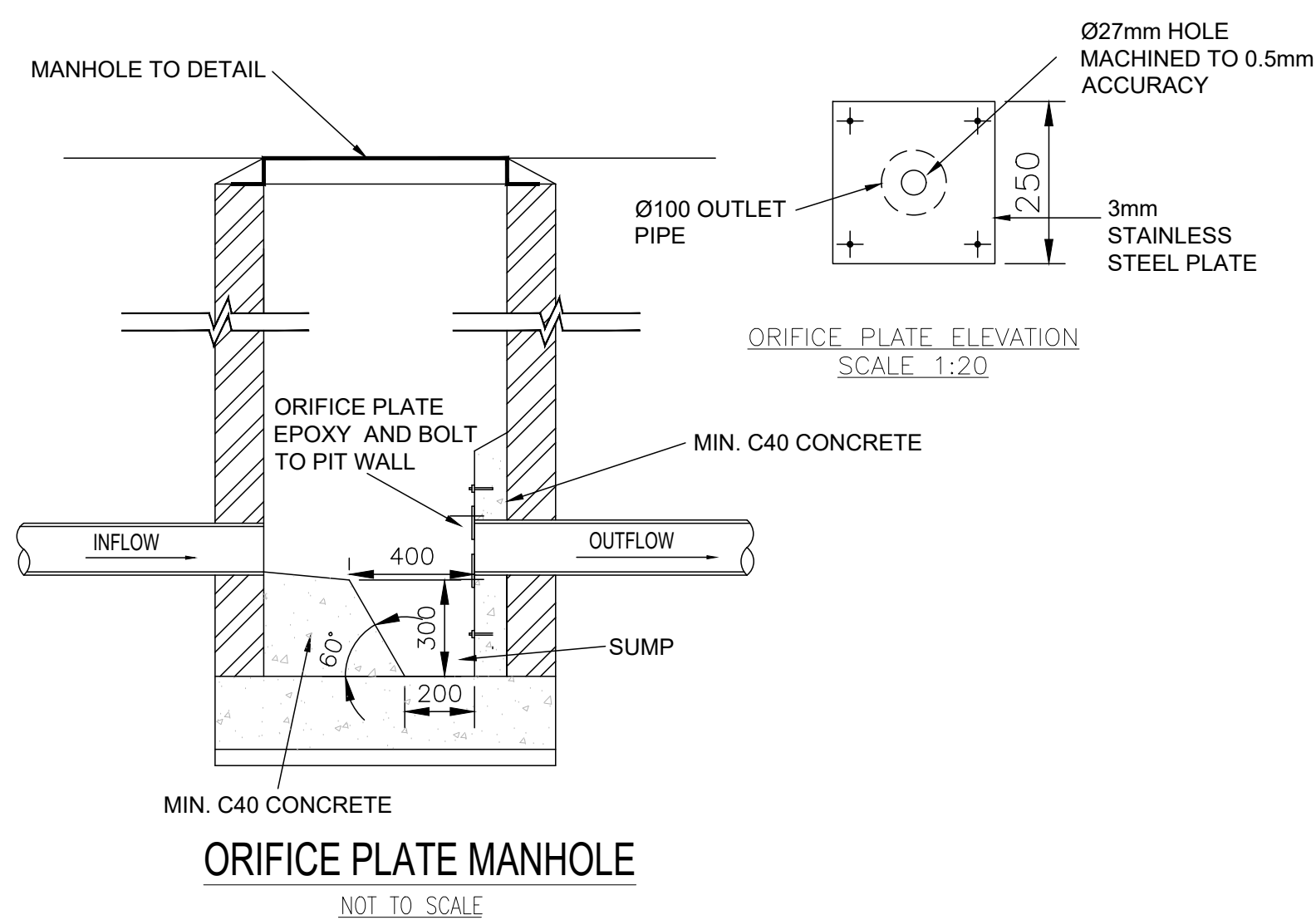
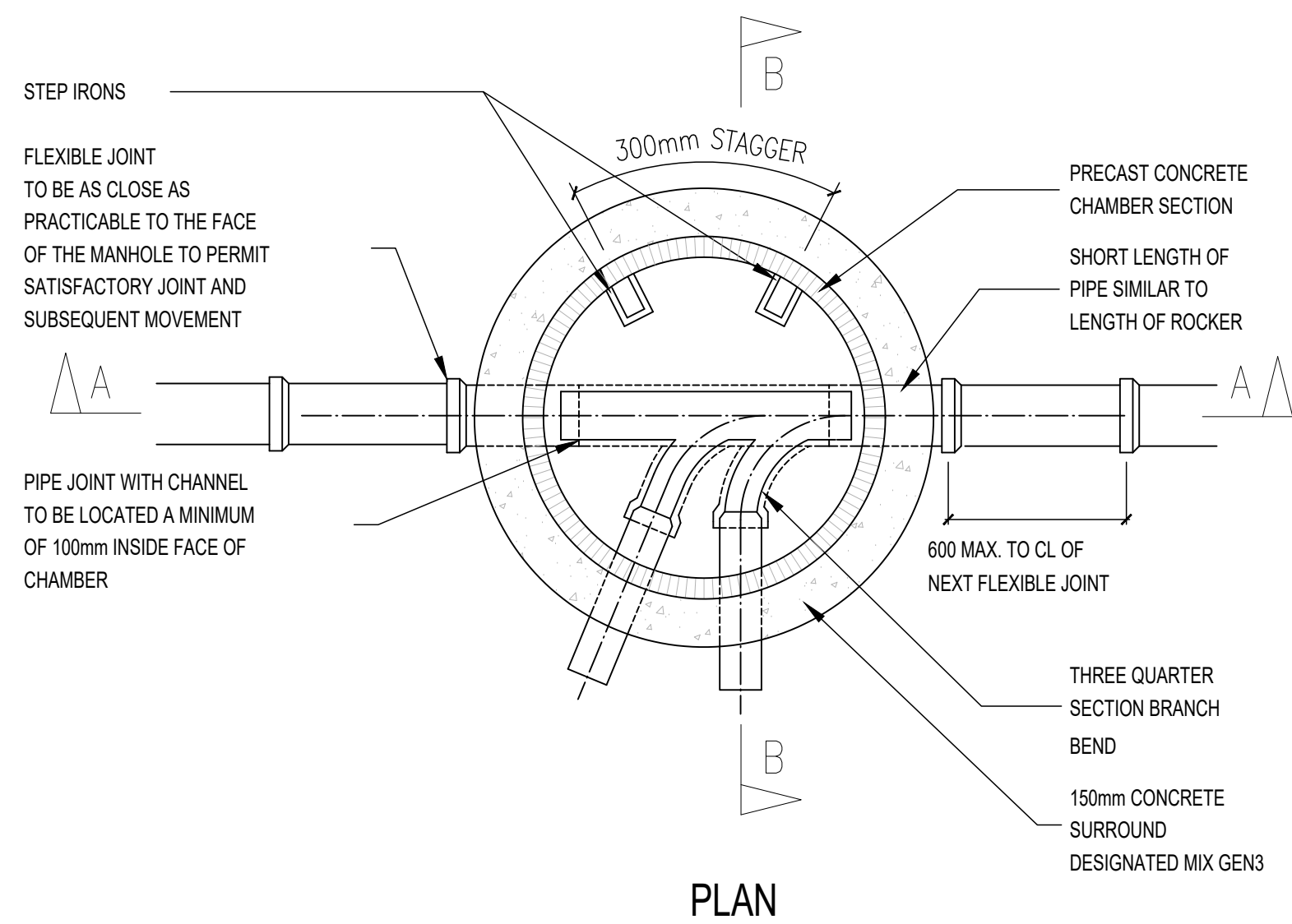


NOTES:
CHAMBERS WITH OUTGOING PIPES
GREATER THAN 500mm DIAMETER
SHALL BE FITTED WITH GUARD BARS,
SAFETY CHAINS OR OTHER SAFETY
DEVICES. TOE HOLES TO BE
PROVIDED IN BENCHING OF SEWERS
GREATER THAN 450mm DIAMETER
FOR ACCESS TO INVERT. WHERE
INTERNAL HEIGHT EXCEEDS 1800mm
MANHOLE MAY BE PROVIDED WITH
REDUCING COVER AND SHAFT.
SHAFT DIAMETER TO BE 600mm
DIAMETER OR 900mm DIAMETER IF
LONGER THAN 900mm.

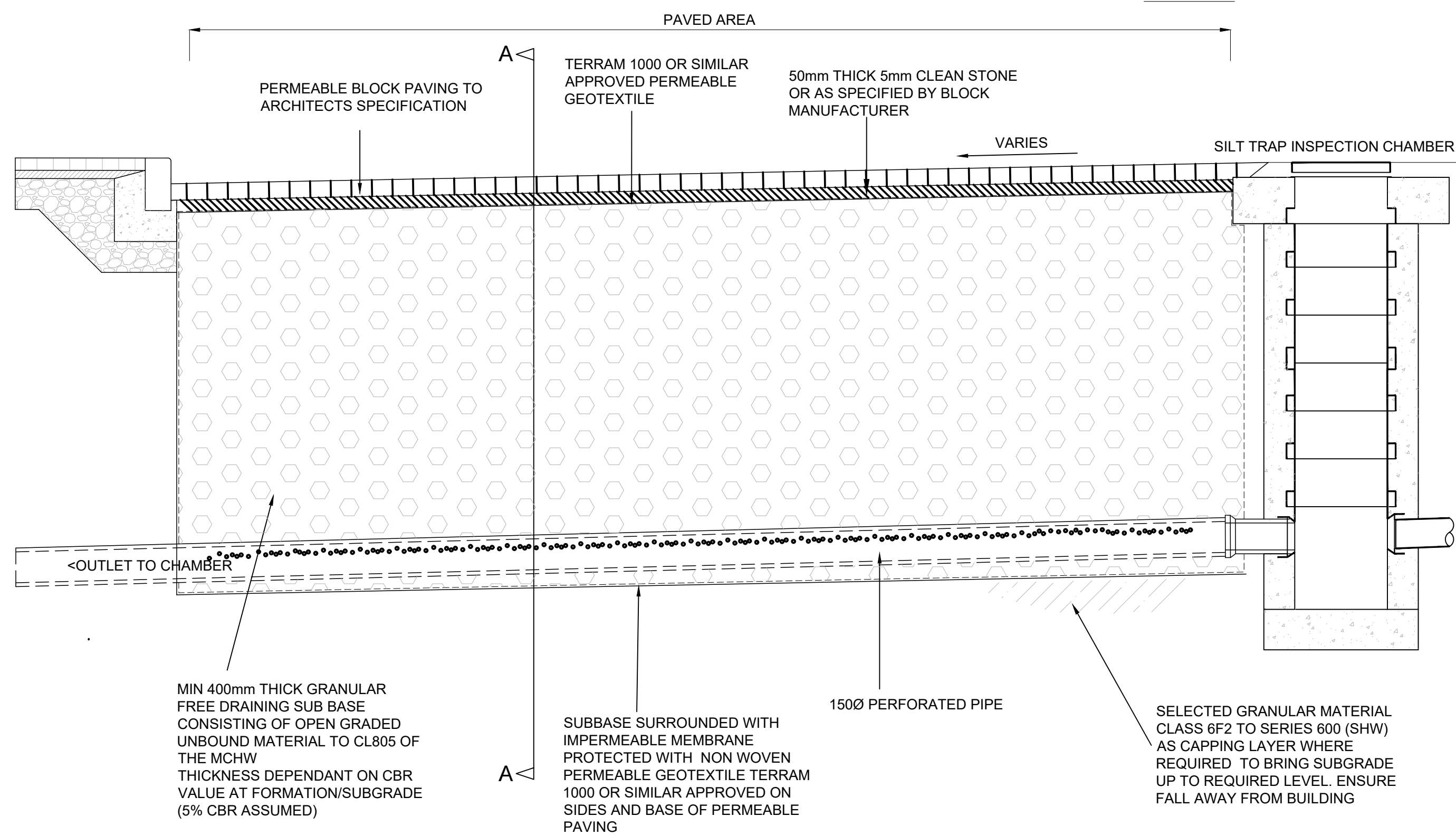
PIPE DIAMETER	ROCKER PIPE * LENGTH
150mm-450mm	500mm-750mm
475mm-750mm	750mm-1000mm
OVER 750mm	1200mm

* OR LINTEL AND COMPRESSIBLE SEALANT IN ACCORDANCE WITH CLAUSE 689 OF THE SPECIFICATION.

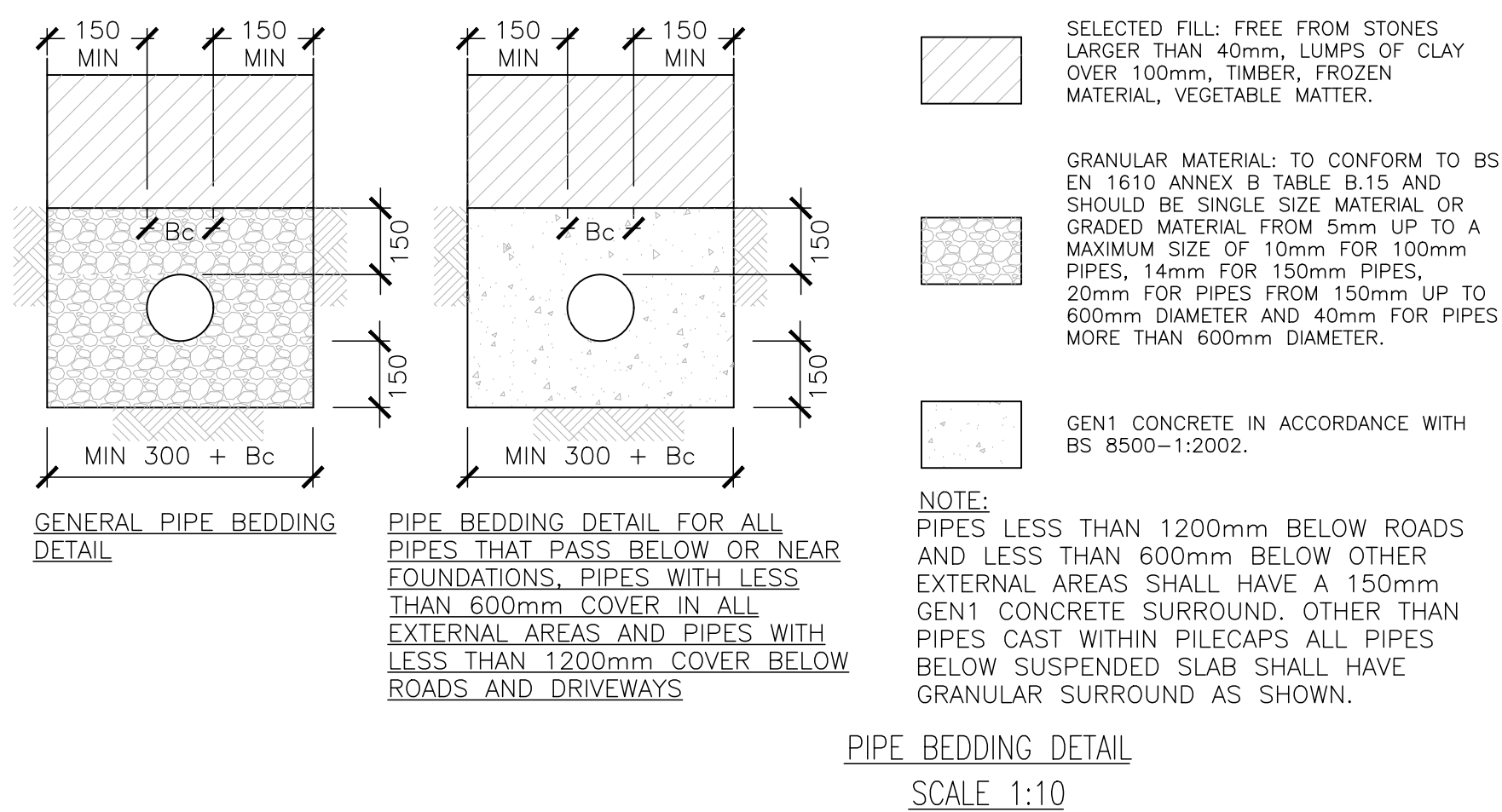
SCALE 1:20

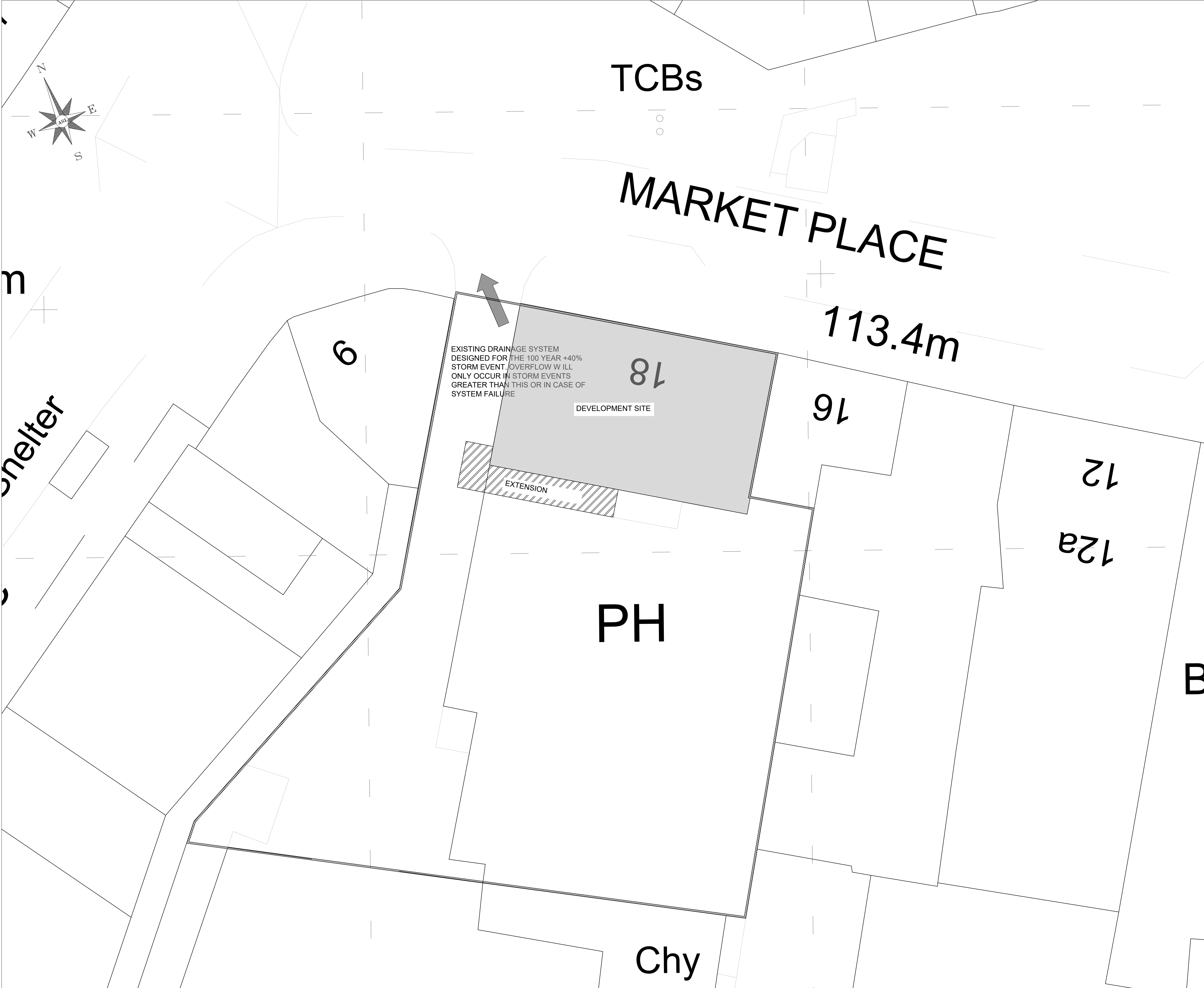


1. This drawing is for planning only and is to be read in conjunction with all relevant series design drawings, specifications and documentation.
2. Construction to be in accordance with all British and European standards and building regulations.
3. All dimensions are in millimetres and levels in metres above local datum.
4. Any discrepancies in the details shown are to be reported to the employer's representative/engineer prior to construction
5. all existing services are to be located prior to the commencement of any works, the contractor must notify the engineer immediately of any conflict with the proposed works.
6. For gravity sewers, all drainage and fittings are to be flexibly jointed UPVC to BSEN 1401-1 or clayware to BSEN 295 or concrete to BS5911 part 100
7. Chamber walls 225 thick to be constructed in class B engineering bricks to SHW series 2400 in designation (i) mortar or in-situ strength class C16/20 concrete to clause 2602
8. Chamber walls and cover slab to be constructed in precast concrete to BSEN 1917 and BS 5911-3.
9. Concrete mixes indicated on this drawing are designated mixes in accordance with BS8500-1:2006. all concrete to be sulphate resistant
10. Backfill to all trenches under carriageways to be type 1 sub-base material, elsewhere backfill to be in accordance with the specification, free draining readily compactable material, free from rubbish and organic matter, frozen soil clay lumps and large stones. to be compacted in layers not exceeding 150mm thick.
11. A flexible joint shall be provided as close as is feasible to outside face of any structure into which a pipe is built, in accordance with the detail.
12. The general specification of materials and workmanships for the construction of the access road, footpaths and other areas of handstanding shall be the manual of contract documents for highway works, volume 1. specification of highway works (SHW) published by the stationary office.
13. All pipes to be laid soffit to soffit unless noted otherwise.
14. Manhole covers and frames shall comply with BSEN124 and shall be of a non-rocking design which does not rely on the use of cushion inserts. class D covers shall be used in carriageways, hard shoulders and parking areas used by all type of road vehicles. class C shall be used in footways, pedestrian areas and all comparable locations.



SCALE 1:20

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- Notes
1. This drawing is to be read in conjunction with all relevant series design drawings, specifications and documentation.
 2. Construction to be in accordance with all British and European standards and building regulations.
 3. All dimensions are in millimetres and levels in metres above local datum.
 4. Any discrepancies in the details shown are to be reported to the employer's representative/engineer prior to construction

STORMWATER CONCEPT
LEGEND

- 18.30x

Proposed Level
- FFL 80.90

Finished floor level
- Overland flow

Rev	Description	Drawn Date	Checked Date
Drawn By	AW	Checked By	AW
Date	03.02.23	Date	03.02.23

Base drawing scale 1:100 at A1

Client ANKIT THAKKAR

Project MARKET PLACE, HINCKLEY

Title OVERLAND FLOW PLAN

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Architect	VOLTA	Status	Preliminary	☒
Drawing No.	2572-C03	Tender		
Revision	-	Construction		
		As Built		

Design Settings

Rainfall Methodology	FEH-13	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	40	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	0.600
Time of Entry (mins)	2.00	Include Intermediate Ground	x
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1			10.000	450	100.000	100.000	2.000
2			10.000	450	100.000	105.000	1.900
3	0.002	2.00	10.000	1200	103.000	107.000	1.800
4	0.020	2.00	10.000	450	103.000	112.000	1.600

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.002	2	1	5.000	0.600	8.100	8.000	0.100	50.0	100	2.15	50.0
1.001	3	2	3.606	0.600	8.200	8.100	0.100	36.1	150	2.08	50.0
1.000	4	3	5.000	0.600	8.400	8.200	0.200	25.0	150	2.04	50.0

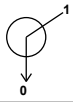
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.002	1.092	8.6	4.2	1.800	1.900	0.022	0.0	49	1.081
1.001	1.681	29.7	4.2	1.650	1.750	0.022	0.0	38	1.189
1.000	2.022	35.7	3.8	1.450	1.650	0.020	0.0	33	1.325

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.002	5.000	50.0	100	Circular	10.000	8.100	1.800	10.000	8.000	1.900
1.001	3.606	36.1	150	Circular	10.000	8.200	1.650	10.000	8.100	1.750
1.000	5.000	25.0	150	Circular	10.000	8.400	1.450	10.000	8.200	1.650

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.002	2	450	Manhole	Adoptable	1	450	Manhole	Adoptable
1.001	3	1200	Manhole	Adoptable	2	450	Manhole	Adoptable
1.000	4	450	Manhole	Adoptable	3	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	100.000	100.000	10.000	2.000	450		1 1.002	8.000	100
2	100.000	105.000	10.000	1.900	450		1 1.001	8.100	150
3	103.000	107.000	10.000	1.800	1200		1 1.000	8.200	150
4	103.000	112.000	10.000	1.600	450		0 1.001	8.200	150
							0 1.000	8.400	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	19.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	✓
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	------

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
10	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	IH124	Growth Factor 100 year	2.48
Positively Drained Area (ha)		Betterment (%)	0
SAAR (mm)		QBar	
Soil Index	1	Q 1 year (l/s)	
SPR	0.10	Q 30 year (l/s)	
Region	1	Q 100 year (l/s)	
Growth Factor 1 year	0.85		

Node 3 Online Orifice Control

Flap Valve	x	Invert Level (m)	8.200	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Diameter (m)	0.027		

Node 3 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	1.5	Invert Level (m)	9.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	29

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	20.0	0.0	0.400	20.0	0.0	0.401	1.0	0.0

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	103.832	29.381	10 year 720 minute winter	8.909	3.553
1 year 15 minute winter	72.865	29.381	10 year 960 minute summer	10.821	2.849
1 year 30 minute summer	67.515	19.105	10 year 960 minute winter	7.168	2.849
1 year 30 minute winter	47.379	19.105	10 year 1440 minute summer	7.784	2.086
1 year 60 minute summer	45.726	12.084	10 year 1440 minute winter	5.231	2.086
1 year 60 minute winter	30.379	12.084	30 year 15 minute summer	254.498	72.014
1 year 120 minute summer	28.340	7.489	30 year 15 minute winter	178.595	72.014
1 year 120 minute winter	18.828	7.489	30 year 30 minute summer	165.775	46.909
1 year 180 minute summer	21.894	5.634	30 year 30 minute winter	116.334	46.909
1 year 180 minute winter	14.231	5.634	30 year 60 minute summer	110.635	29.238
1 year 240 minute summer	17.401	4.599	30 year 60 minute winter	73.503	29.238
1 year 240 minute winter	11.561	4.599	30 year 120 minute summer	66.994	17.704
1 year 360 minute summer	13.397	3.448	30 year 120 minute winter	44.509	17.704
1 year 360 minute winter	8.709	3.448	30 year 180 minute summer	50.789	13.070
1 year 480 minute summer	10.573	2.794	30 year 180 minute winter	33.014	13.070
1 year 480 minute winter	7.024	2.794	30 year 240 minute summer	39.713	10.495
1 year 600 minute summer	8.677	2.373	30 year 240 minute winter	26.384	10.495
1 year 600 minute winter	5.929	2.373	30 year 360 minute summer	29.789	7.666
1 year 720 minute summer	7.750	2.077	30 year 360 minute winter	19.364	7.666
1 year 720 minute winter	5.209	2.077	30 year 480 minute summer	23.214	6.135
1 year 960 minute summer	6.393	1.683	30 year 480 minute winter	15.423	6.135
1 year 960 minute winter	4.235	1.683	30 year 600 minute summer	18.859	5.158
1 year 1440 minute summer	4.671	1.252	30 year 600 minute winter	12.885	5.158
1 year 1440 minute winter	3.140	1.252	30 year 720 minute summer	16.698	4.475
10 year 15 minute summer	200.971	56.868	30 year 720 minute winter	11.222	4.475
10 year 15 minute winter	141.032	56.868	30 year 960 minute summer	13.576	3.575
10 year 30 minute summer	129.855	36.744	30 year 960 minute winter	8.993	3.575
10 year 30 minute winter	91.126	36.744	30 year 1440 minute summer	9.708	2.602
10 year 60 minute summer	86.243	22.792	30 year 1440 minute winter	6.524	2.602
10 year 60 minute winter	57.298	22.792	100 year 15 minute summer	329.664	93.284
10 year 120 minute summer	52.179	13.789	100 year 15 minute winter	231.343	93.284
10 year 120 minute winter	34.667	13.789	100 year 30 minute summer	216.648	61.304
10 year 180 minute summer	39.634	10.199	100 year 30 minute winter	152.034	61.304
10 year 180 minute winter	25.763	10.199	100 year 60 minute summer	145.356	38.413
10 year 240 minute summer	31.075	8.212	100 year 60 minute winter	96.571	38.413
10 year 240 minute winter	20.646	8.212	100 year 120 minute summer	88.100	23.282
10 year 360 minute summer	23.443	6.033	100 year 120 minute winter	58.532	23.282
10 year 360 minute winter	15.239	6.033	100 year 180 minute summer	66.650	17.151
10 year 480 minute summer	18.333	4.845	100 year 180 minute winter	43.325	17.151
10 year 480 minute winter	12.180	4.845	100 year 240 minute summer	51.959	13.731
10 year 600 minute summer	14.935	4.085	100 year 240 minute winter	34.521	13.731
10 year 600 minute winter	10.205	4.085	100 year 360 minute summer	38.732	9.967
10 year 720 minute summer	13.257	3.553	100 year 360 minute winter	25.177	9.967

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year 480 minute summer	30.068	7.946	100 year +40% CC 120 minute winter	81.944	32.595
100 year 480 minute winter	19.977	7.946	100 year +40% CC 180 minute summer	93.311	24.012
100 year 600 minute summer	24.351	6.660	100 year +40% CC 180 minute winter	60.654	24.012
100 year 600 minute winter	16.638	6.660	100 year +40% CC 240 minute summer	72.743	19.224
100 year 720 minute summer	21.505	5.763	100 year +40% CC 240 minute winter	48.329	19.224
100 year 720 minute winter	14.452	5.763	100 year +40% CC 360 minute summer	54.225	13.954
100 year 960 minute summer	17.408	4.584	100 year +40% CC 360 minute winter	35.248	13.954
100 year 960 minute winter	11.531	4.584	100 year +40% CC 480 minute summer	42.096	11.125
100 year 1440 minute summer	12.367	3.314	100 year +40% CC 480 minute winter	27.967	11.125
100 year 1440 minute winter	8.311	3.314	100 year +40% CC 600 minute summer	34.091	9.325
100 year +40% CC 15 minute summer	461.530	130.597	100 year +40% CC 600 minute winter	23.293	9.325
100 year +40% CC 15 minute winter	323.881	130.597	100 year +40% CC 720 minute summer	30.106	8.069
100 year +40% CC 30 minute summer	303.307	85.825	100 year +40% CC 720 minute winter	20.233	8.069
100 year +40% CC 30 minute winter	212.847	85.825	100 year +40% CC 960 minute summer	24.371	6.417
100 year +40% CC 60 minute summer	203.498	53.779	100 year +40% CC 960 minute winter	16.144	6.417
100 year +40% CC 60 minute winter	135.199	53.779	100 year +40% CC 1440 minute summer	17.314	4.640
100 year +40% CC 120 minute summer	123.340	32.595	100 year +40% CC 1440 minute winter	11.636	4.640

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	13	8.023	0.023	1.0	0.0000	0.0000	OK
15 minute winter	2	13	8.124	0.024	1.0	0.0038	0.0000	OK
15 minute winter	3	12	8.633	0.433	3.2	0.4987	0.0000	SURCHARGED
15 minute winter	4	12	8.633	0.233	3.2	0.0951	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	2	1.002	1	1.0	0.710	0.115	0.0069	1.4
15 minute winter	3	Orifice	2	1.0				
15 minute winter	4	1.000	3	2.9	0.876	0.080	0.0880	

Results for 10 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1	23	8.028	0.028	1.5	0.0000	0.0000	OK
30 minute winter	2	23	8.129	0.029	1.5	0.0047	0.0000	OK
30 minute winter	3	23	9.142	0.942	3.1	1.0861	0.0000	SURCHARGED
30 minute winter	4	23	9.142	0.742	4.3	0.3036	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	2	1.002	1	1.5	0.791	0.171	0.0093	3.4
30 minute winter	3	Orifice	2	1.5				
30 minute winter	4	1.000	3	2.7	0.849	0.074	0.0880	

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1	24	8.030	0.030	1.7	0.0000	0.0000	OK
30 minute winter	2	23	8.132	0.032	1.7	0.0050	0.0000	OK
30 minute winter	3	23	9.449	1.249	3.8	1.4401	0.0000	SURCHARGED
30 minute winter	4	23	9.449	1.049	5.4	0.4292	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	2	1.002	1	1.7	0.821	0.197	0.0103	4.3
30 minute winter	3	Orifice	2	1.7				
30 minute winter	4	1.000	3	3.3	0.776	0.092	0.0880	

Results for 100 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1	24	8.031	0.031	1.8	0.0000	0.0000	OK
30 minute winter	2	24	8.133	0.033	1.8	0.0052	0.0000	OK
30 minute winter	3	24	9.610	1.410	6.3	2.2909	0.0000	SURCHARGED
30 minute winter	4	24	9.611	1.211	7.1	0.4952	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	2	1.002	1	1.8	0.834	0.210	0.0108	5.6
30 minute winter	3	Orifice	2	1.8				
30 minute winter	4	1.000	3	5.7	0.835	0.158	0.0880	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	1	45	8.032	0.032	1.9	0.0000	0.0000	OK
60 minute winter	2	45	8.134	0.034	1.9	0.0055	0.0000	OK
60 minute winter	3	45	9.854	1.654	6.3	4.0355	0.0000	FLOOD RISK
60 minute winter	4	45	9.855	1.455	6.3	0.5951	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	2	1.002	1	1.9	0.852	0.227	0.0114	9.9
60 minute winter	3	Orifice	2	1.9				
60 minute winter	4	1.000	3	5.7	0.787	0.159	0.0880	

Appendix D: SuDS Maintenance Report

Project: Drainage Maintenance,
18 Market Place, Hinckley, LE10
1NT

Project No: 2572-C-R02

Date: Feb 2023

Revision	Date	Author	Checker
-	08.02.23	AW	CA

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1.0 General

- 1.1** Sustainable Drainage Systems (SuDS) are an environmentally friendly approach to managing rainfall. SuDS techniques use landscape features to deal with surface water with the aim to:
- 1.1.1 Control the flow, volume and frequency of water leaving a development.
 - 1.1.2 Prevent pollution by intercepting silt and cleaning runoff from hard surfaces.
 - 1.1.3 Provide attractive surroundings for the community.
- 1.2** The surface water drainage strategy for this development utilises permeable paving as the main SUDS feature. The following sections provides a brief description of these features and outlines the maintenance programme that should be adopted.

2.0 Cleaning of the Drainage System

- 2.1** Drainage systems should be inspected at regular intervals and where necessary, thoroughly cleaned out at the same time. Any defects discovered should be made good.
- 2.2** The following operations should be carried out during the periodic cleaning of a drainage system:-

Product Type	Period	Responsibility	Maintenance Methods
<i>Silt Trap</i>	As necessary and before wet season	Owner/ Maintenance Company	- Sediment and debris that accumulated during summer needs to be removed before the wet season. - Inspect and clean out routinely prior to inlet pipework to minimise debris reaching the tank. - Conduct inspections more frequently during the wet season for the area where sediment or trash accumulates more often. Clean and repair as needed.
<i>Standard Manholes/ Inspection Chambers</i>	As necessary	Owner/ Maintenance Company	- Remove and clean any soil and vegetation that covers the manhole cover to prevent blockage of the drainage system at the manhole. - Renew/replace any damaged/missing bolts and damaged/missing manhole covers.

Product Type	Period	Responsibility	Maintenance Methods
Drainage Pipes	Six monthly interval	Owner/ Maintenance Company	Inspect underground drainage pipes to ensure that the distribution pipework arrangement is operational and free from blockages. If required, take remedial action.
Permeable Paving	As required	Site Owner for private areas. Maintenance Company for communal areas	Inspect the paving after any precipitation to ensure no displacement of any organic matter onto the surface of the pavement.
	Six monthly (Ideally, this activity to be carried out in spring and autumn seasons)	Site Owner for private areas. Maintenance Company for communal areas	Agitate (e.g. brush, vacuum, etc.) the block paving to ensure no vegetation of any sort is allowed to grow and develop in the joints (where may affect performance).
	Winter season	Site Owner for private areas. Maintenance Company for communal areas	De-icing may be used without causing significant detrimental effects towards the permeable pavement's performance. When used carefully, the use of these chlorides will not result in an increase in the chloride levels in the local ground.
Flow Control	As required	Maintenance Company	Regular maintenance in accordance with maintenance company recommendations/requirements

3.0 Sketches and Plans

- 3.1 The locations of the above features can be found by examining Drawing 2572-C01