PERSIMMON HOMES THAMES VALLEY
HAMPTON PARK
LITTLEHAMPTON

PHASE 4 - SURFACE WATER DRAINAGE (LU/184/21/DOC - DISCHARGE OF CONDITION 10)

SEPTEMBER 2021



ARUN DISTRICT COUNCIL LU/388/21/DOC

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SEPTEMBER 2021

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Prepared by:	**CG**
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Mayer Brown Limited, Lion House, Oriental Road, Woking, Surrey GU22 8AR
Telephone 01483 750508 Fax 01483 750437 wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

ARUN DISTRICT COUNCIL LU/388/21/DOC

Persimmon Homes Thames Valley

Hampton Park

Littlehampton

Phase 4 - Surface Water Drainage (LU/184/21/DOC - Discharge of Condition 10)

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1 Introduction

1.1 Mayer Brown Ltd (MBL) has been commissioned by Persimmon Homes Thames Valley (PHTV) to compile this report to facilitate the discharge of planning Condition 10 for their outlined approved development (**Arun DC reference LU/47/11/)** for up to 1,260 residential dwellings, B1 employment use, Class A facilities, a 100 bed hotel, 60 bed care home, primary school, plus many other facilities and improvements to the local infrastructure. Refer to Appendix A for the Site Location.

Planning Background

1.2 Outline Planning Consent was granted in 2011, under Arun District Council planning reference LU/47/11, which includes Condition 10 that relates to surface water drainage.

1.3 Conditional planning approval was granted for a reserved matters scheme on 7th May 2021 for 46 new dwellings under Arun District Council planning reference **LU/178/20/RES**. The approved layout, external works layout and planting scheme are contained in Appendix B of this report.

1.4 On the back of the conditional approval an application was submitted by PHTV to Arun DC to discharge a total of 10 number outline planning conditions under reference number **LU/184/21/DOC,** which includes:

- Condition10 - Surface water drainage,

(Note: PHTV refer to the application reserved matters area as Phase 2B, MBL refer to the reserved matters area as Phase 4)

Purpose of this Drainage Report

1.5 The purpose of this report is to provide sufficient information to discharge outline planning conditions 10 and to demonstrate the reserved matters application for 46 new dwellings can be safely drained of surface water run-off and will not cause flooding to itself or increase the risk of flooding to adjacent / downstream areas.

Proposed Development

1.6 The proposed Phase 4 application site for **46 new dwellings** covers approximately **1.47 hectares** over a long relatively narrow area that stretches along the western boundary of the central wetland area. Refer to the approved coloured plan, external works plan and planting plan in Appendix B.

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1.7 The shape and position of the development is such that it requires a number of different outfall locations so has been subdivided into three drainage catchments, which are shown in Appendix E:

- **Catchment 01**: 0.359 Hectares, Discharges to Phase 2 Existing Drainage Network
- **Catchment 02**: 0.254 Hectares, Discharges to Phase 2 Existing Drainage Network
- **Catchment 03**: 0.857 Hectares, Discharges to a new outfall into Central Wetland

1.8 These specific catchments are discussed in more detail within the report.

2 Outline Planning Conditions 10

2.1 Outline Planning Consent was granted in 2011, under Arun District Council planning reference LU/47/11, which includes Condition 10 that relates to surface water drainage. See below

Condition 10: *No development shall begin until a fully detailed surface water drainage scheme for that phase of the development, based on sustainable drainage principles and designed in accordance with the SUDS strategy for the whole development, has been submitted to and approved in writing by the Local Planning Authority. It should be demonstrated how each detailed scheme will contribute to delivering, and link into, the surface water drainage strategy for the site as a whole.*

- *The SUDS shall be designed to attenuate the 1 in 100 year storm event (plus climate change allowance of 30% in accordance with DEFRA's National Standards for Sustainable Drainage Systems).*
- *No infiltration of surface water drainage shall occur within ground affected by contamination unless suitable remediation is undertaken.*
- *Each detailed scheme should include a timetable for its implementation; and provide a management and maintenance plan in the form of a site specific Maintenance Manual for the SUDS system for the lifetime of the development. This shall include the arrangements for adoption by any public authority or statutory undertaker or details of the financial management of the scheme throughout its lifetime.*

Elements of the scheme serving any particular phase shall subsequently be implemented in accordance with the approved details (unless otherwise agreed with the Local Planning Authority) prior to the occupation of any dwellings in that phase and no building in that phase of the development shall be occupied until the surface water drainage scheme has been fully implemented in accordance with the approved details.

Reason: To ensure that the proposed development is satisfactorily drained to prevent the increased risk of flooding, and improve and protect water quality, habitat and amenity, and ensure future maintenance of these in accordance with national guidance and policies GEN7, GEN9 of the Arun District Local Plan.

3 Surface Water Catchments 01 & 02

3.1 As explained in the introduction the shape and position of the development is such that it requires a number of different outfall locations and, as such, it has been subdivided into three drainage catchments that which are shown in Appendix E and listed below:

- **Catchment 01**: 0.359 Hectares, Discharges to Phase 2 Existing Drainage Network
- **Catchment 02**: 0.254 Hectares, Discharges to Phase 2 Existing Drainage Network
- Catchment 03: 0.857 Hectares, Discharges to a new Phase 4 outfall into Central Wetland

3.2 Catchments 01 & 02 are positioned immediately to the west of Phase 2 (an application for 126 new dwellings) that has almost been completed. Appendix C shows the location of Phase 2 in relation to Phase 4.

West of Wetlands Drainage Strategy & Approval

3.3 The above is relevant because Phase 4 will drain catchments 01 and 02 into the existing Phase 2 drainage network. Phase 2 is located within the greater West of Wetlands (WW) drainage strategy.

- Following lengthy discussions and iterations with Laura Gibbons from Arun DC the WW strategy was considered technically acceptable in January 2018, and subsequently was approved by Arun DC in February 2019. Refer to the decision notice in Appendix H.
- S104 Technical Approval has also been obtained from ICOSA Water to enable them to adopt the WW surface water sewers (Including Phase 2)

3.4 The WW Drainage includes a development area of approximately 19.0 hectares. There are a total of 18 land parcels and associated road infrastructure within this catchment at varying states of progress (at least 11 parcels have yet to be commenced).

3.5 The WW report describes the design philosophy behind the main surface sewers within the road network that will eventually drain the existing and future development parcels within this area. It also specifies the proposed connection points and peak allowable surface water discharge from each of the parcels. This is quite a lengthy document and can be provided separately if required, or alternatively it can be viewed on the Arun DC planning portal under planning reference **LU/17/19/DOC**

3.6 In this instance approximately 40% of Phase 4 (catchments 01 & 02) has already been designed as one of the 18 land parcels within the West of Wetlands Area.

Surface Water Strategy (Catchments 01 & 02)

3.1 With the above in mind the surface water strategy for approximately 40% of Phase 4 (Catchments 01 & 02) is for a positive piped drainage network to discharge at an **unrestricted rate** into the already constructed and approved West of Wetlands drainage network.

3.2 The Phase 4 proposed drainage plans and longitudinal sections are contained in Appendix D.

Infiltration

3.3 Intrusive ground investigations and soakage testing undertaken by Merebrook confirmed that infiltration methods for the disposal of surface water runoff are unlikely to be practical across the majority of the site as the underlying material is generally found to comprise of Clay or the water table is too high. Review of these investigative reports appears to indicate only two areas where infiltration drainage was feasible but none of them are in the area of Phase 4.

3.4 Phase 4 will essentially be constructed an entirely new bulk earthworks platform that will extend into the central wetland area where the standing groundwater level is high. It's the lowest point of the entire Development and the proposed levels are high enough to achieve a gravity drainage network and protect it from flooding from the existing Black Ditch. Therefore, the drainage network will be just above the high water table so it rules out the ability to use infiltration drainage.

Discharge Rate & Calculations

3.5 The approved West of Wetlands strategy has already agreed a peak rate of surface water discharge for up to the **1 in 100 year return period + 30% climate change** will be restricted to **15 litres / second / hectare**. The only outfall from the 19 hectare west of wetlands area is positioned within the already constructed area of Phase 2 which is restricted to a rate of **285 litres / second**.

3.6 A large Micro Drainage model was created of the drainage network covering the overall catchment area of 19.0 hectares. The pipes were sized to convey the surface water run-off from each area, and the proposed peak allowable discharge has been specified from each future development plot. This large Micro Drainage already includes the

impermeable areas from Catchments 01 and 02 of the Phase 4 application. This micro drainage model has been updated to include an accurate representation of the proposed catchment 01 & 02 and the results are contained in Appendix I.

3.7 The approved west of wetlands report lists the peak allowable discharge rate from each of the individual land parcels (paragraph 2.30 & 2.31). It has been agreed that **Phase 4** can have a **free unrestricted discharge** into Phase 2 drainage network.

Exceedence Flows

3.8 The approved west of wetland drainage network is designed to cope with flooding up to the **1in100yr+30%CC** flood event and this water will be contained on site within the developed areas (not the wetlands).

3.9 The proposed Phase 4 drainage plans in Appendix D show the proposed levels and the route of overland flow in the event of system failure, blockage or overload.

3.10 Phase 4 is located on the edge of the central wetland area, and the road levels have been designed so they fall outwards away from the new dwellings. In the event of a system failure the surface water off will eventually flow over the western road kerbs and into the wetland area leaving properties unaffected.

Adoption and Maintenance

3.11 The proposed surface water drainage system for Phase 4 will be offered for adoption to ICOSA Water under a S104 agreement, which will ensure they are maintained in perpetuity.

3.12 Technical Approval has already obtained for the receiving Phase 2 drainage network and this will extend into Phase 4. See Appendix F for ICOSA Water technical approval. The same technical approval will be obtained for the drainage networks in Phase 4.

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4 Surface Water Catchment 03

4.1 As explained in the introduction the shape and position of the development is such that it requires a number of different outfall locations and, as such, it has been subdivided into three drainage catchments that which are shown in Appendix E and listed below:

- Catchment 01: 0.359 Hectares, Discharges to Phase 2 Existing Drainage Network
- Catchment 02: 0.254 Hectares, Discharges to Phase 2 Existing Drainage Network
- **Catchment 03**: 0.857 Hectares, Discharges to a new Phase 4 outfall into Central Wetland

4.2 Catchments 03 is positioned immediately to the southwest of Phase 2 and requires a stand-alone surface water drainage network that discharges into the central wetland area via a new surface water outfall. Appendix C shows the location of Phase 2 in relation to Phase 4.

4.3 The central wetland area, shown in Appendix K, will undergo considerable amount of re-shaping and landscaping that includes a new shallow ditch that meanders through the centre of the wetland area and eventually connects into the Black Ditch to the north. The proposed Phase 4 outfall will connect into this new ditch. These proposals for the central wetland still need some minor adjustment but the planning application will be submitted imminently.

Surface Water Strategy (Catchments 03)

4.4 With the above in mind the surface water strategy for approximately 60% of Phase 4 (Catchments 03) is for a positive piped drainage network to discharge at a **restricted rate** into the new central wetland ditch. (The rate of restriction is discussed below)

Infiltration

4.5 As discussed in section 3.0 of this report Phase 4 will essentially be constructed an entirely new bulk earthworks platform that will extend into the central wetland area where the standing groundwater level is high. It is the lowest point of the entire Development and the proposed levels are just high enough to achieve a gravity drainage network and protect from flooding from the existing Black Ditch. Therefore, the drainage network will be just above the high water table so it rules out the ability to use infiltration drainage.

Discharge Rate & Calculations

4.6 The approved West of Wetlands strategy has already agreed a peak rate of surface water discharge for up to the **1 in 100 year return period + 30% climate change** will be restricted to **15 litres / second / hectare**. The new outfall from the **0.857 hectare** area of Catchment 03 will also use this figure which works out a peak rate of **13 litres / second**.

4.7 Restricting the rate of run-off to 13 litres / second will require an attention volume of **214m3** that will be achieved using a buried proprietary attenuation as shown on the drainage plans. There are several manufacturers of these systems in the marketplace but it needs to adopted by ICOSA Water who we know will provide technical approval the Geolight system supplied by SDS Ltd. Their product specific information is contained in Appendix O.

4.8 A new Micro Drainage model has been created for the Catchment 03 drainage network covering and the results are contained in Appendix J.

Overflow from Phase 2 into Phase 4

4.9 When designing the 19-hectare West of Wetland model there was a requirement to add an overflow from the Phase 2 drainage network at the south west corner of the catchment (by SW01). The drainage is shallow in this location so there was no scope to add surface water attenuation under the road or adjacent parking areas.

4.10 The Phase 2 network will fill up entirely and water will eventually back-up out of the two existing gullies and flow benignly in the road channel line into the Phase 4 drainage network. This overflow only occurs for the extreme 1in100yr+30% climate change event and will not activate at all for the 1in100yr event. The principle of using this overflow has already discussed an approved with Arun DC.

4.11 The critical storm for Catchment 03 has been modelled as the 120-minute duration event. Therefore, the Phase 2 overflow volume coincides with this and the corresponding spill volume from the gullies has been simulated as **66.4m^3**.

4.12 Therefore, the volume of attenuation Catchment 03 has been increased so it will store an additional 66.4m3 and release it into the central wetland via the new outfall. A dedicated separate attenuation tank has been specified just for this overflow volume (The proposed peak outfall rate of 13 litres / second has not been increased to account for this additional flow from Phase 2)

Surface Water Treatment

4.13 Table 26.2 of the SuDS Manual identifies the pollution hazard level associated with the land uses within the Proposed Development as being 'Low'. On a scale from 0-1 a 'Low' pollution hazard level relates to the following pollution hazard indices (See table 26.2 of the SuDS Manual) This is applicable to runoff from residential roofs, driveways, paths, residential parking areas and low traffic roads:

- Total Suspended Solids = 0.5
- Metals = 0.4
- Hydrocarbons = 0.4

4.14 Table 26.3 of the SuDS Manual sets out the indicative mitigation indices provided by different SuDS features for discharges to surface water.

Permeable Paving

4.15 The visitor parking lay-bys on the western side of the central road will be constructed using permeable paving allowing the rainwater falling onto permeable paved areas to be treated by the microorganisms as it passes through drainage medium, see Figure 4.1 below.

4.16 Permeable paving provides sufficient pollution mitigation for runoff from low hazard land uses and provides mitigation indices of 0.7, 0.6 and 0.7, which are in excess of the requirement set out in paragraph 2.25.

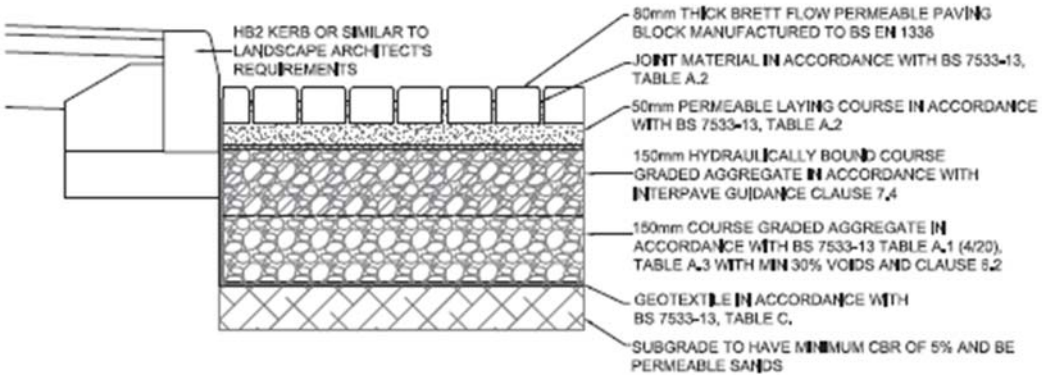


Figure 4.1: Typical Permeable Block Paving Construction

Swale (& Ditch in Central Wetland Area)

4.17 The new catchment 03 outfall into the central wetland area will flow through a swale before it connects into the new ditch passing through the central wetland area and eventually into the Black Ditch. This new ditch will be entirely flat (similar to the local

existing ditch network) so the water will be extremely slow moving allowing pollutants to drop out before it reaches the Black Ditch. Swales can remove coarse to medium sediments and associated pollutants by filtration through surface vegetation and groundcover, providing mitigation indices of 0.5, 0.6 and 0.6, which exceed the requirement set out in paragraph 4.14.

Traditional Gullies

4.18 Full size precast concrete gully pots draining the asphalt roads that will act as the first line of defence to trap silt and sediments in the drainage network.

Exceedence Flows

4.19 The Catchment 03 drainage network is designed to cope with flooding up to the **1in100yr+30%CC** flood event and this water will be contained on site within the developed area (not the wetlands).

4.20 The proposed Phase 4 drainage plans in Appendix D show the proposed levels and the route of overland flow in the event of system failure, blockage or overload.

4.21 Phase 4 is located on the edge of the central wetland area, and the main road level has been designed so it falls outwards away from the new dwellings. In the event of a system failure the surface water off will eventually flow over the western road kerb and into the wetland area leaving properties unaffected.

Surcharged Outfall

4.22 Similar to the main outfall to the north, it is important to ascertain what would happen if the central wetland area flooded and the new outfall becomes surcharged. The EA supplied 1in100yr+20%CC modelled flood level within the floodplain ranges from 1.72m AOD to 1.83m AOD. A flood level in the wetlands of 1.8m AOD by the outfall will result in the outfall (@ 1.0m AOD) being surcharged by approximately 0.8m.

4.23 The chance of the critical 1in100yr+CC flood level in the wetlands (which is tidal) coinciding with the peak 1in100yr+CC storm event on the site is very small. However, a fully surcharged outfall is incorporated into the drainage model simulated and the volume of attention required has been determined with this in mind.

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Adoption and Maintenance

4.24 The proposed surface water drainage system for Catchment 02 will be offered for adoption to ICOSA Water under a S104 agreement, which will ensure they are maintained in perpetuity.

4.25 Technical Approval has already obtained for the receiving Phase 2 drainage network and this will extend into Phase 4. See Appendix F for ICOSA Water technical approval. The same technical approval will be obtained for the drainage networks in Phase 4.

Attenuation Tank Maintenance

4.26 The primary purpose of the attenuation tanks is to attenuate surface water run-off during extreme rainfall events.

4.27 Regular inspection and maintenance are required to ensure the effective long-term operation of the below ground storage tanks, see table 2.1 below for details:

Maintenance Schedule	Required Action	Recommended Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually
	Debris removal from catchment surface (where may cause risk to performance).	Monthly.
	Remove sediment from pre-treatment structures.	Annually, or as required.
Remedial Actions	Repair/rehabilitation of inlets, outlets, overflows and vents.	As required.
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually and after large storms.
	Survey inside of tank for sediment build-up and remove if necessary.	Annually until evidence this is too regular, every 5 years thereafter.

Table 4.1: Attenuation Tank Maintenance Requirements

Pervious Pavement Maintenance

4.28 Pervious pavements are pavements that allow for pedestrian and/or vehicular traffic while allowing rainwater to infiltrate through the surface and into underlying structural foundation layers.

4.29 Regular inspection and maintenance are important for the effective operation of pervious pavements as designed, these are described below in table 2.2:

Maintenance Schedule	Required Action	Recommended Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface).	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment.
Occasional Maintenance	Stabilise and mow contributing and adjacent areas.	As required.
	Removal of weeds or management using a Herbicide-Free weed control (non glyphosphate) applied directly into weeds by an applicator rather than spraying.	As required – once per year on less frequently used pavements.
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm 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, and replace lost joining material.	As required.
	Rehabilitation of surface and upper substructure by remedial sweeping.	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging).
Monitoring	Initial inspection.	Monthly for three months after installation.
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action.	Three-monthly, 48h after large storms in first six months.
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually.
	Monitor inspections chambers.	Annually.

Table 4.2: Pervious Pavement Maintenance Requirements

Drainage Network Design Criteria

4.30 The positive drainage will be designed in accordance with Sewers for Adoption, and BS EN 752 – Drain and sewer systems outside buildings and the Building Regulations - part H (2002).

4.31 The surface water network design and rate of surface water runoff would be based on the Modified Rational method and designed in accordance with the Wallingford Procedure. In order to carry out the design of the networks, a number of Global Variables are used. These Global Variables / parameters are related to the location of the site in the UK and have been obtained from the **Flood Estimation Handbook (FEH).**

4.32 The exact total impermeable area has been measured as 0.435 hectares that has been fed into the model. Therefore, the proposed simulations have been run with a **Cv** value of **1.0**

4.33 The positive surface water system would be designed such that:

- The pipes remain unsurcharged during the 1 in 2 year design storm;
- The system should not flood during the worst case 1 in 30 year storm with a free outfall;
- The surface water run-off from the proposed development would be safely contained on site for up to and including the worst case 1 in 100 year storm event, plus an additional 30% for climate change;
- The pipe velocities are such that self-cleansing is achieved at lesser more moderate storm intensities:
    - Pipe roughness (ks) = 0.6
    - Minimum pipe velocity at full flow = 1.0 m/s
    - Cv Value of 1.0
    - Percentage Impermeable areas
        - Buildings = 100%
        - Carriageways and footpaths = 100%
        - Private and Communal Parking = 100%

Micro Drainage Software

4.34 The proposed network has been designed and analysed using the Micro drainage software package that is recognised as one of the industry standard design suites. There are two separate programmes used within the package to firstly generate and then analyse the completed model. These are ‘System 1’ and ‘Simulation’.

- Network: The surface water computer model has been generated in “System 1” in using proposed data, such as the cover levels, invert levels and catchment areas. This is used to size the pipes in the proposed network based on the global variable outlined above.
- Simulation: Once the proposed drainage system has been generated it was analysed using ‘Simulation’. This is a full hydrograph method for the determination of flood risk and system failure under extreme conditions. It can be used to analyse system overloads, storage, reverse flow characteristics, surcharging and backwater effects. It can also analyse against a wide variety of critical variables.

Return Periods & Critical Duration Storms

4.35 To determine the hydraulic requirements for an element of a drainage system, one must first consider the consequences of that capacity being exceeded, and then identify an acceptable frequency for this to occur. This acceptable frequency is termed the return period, the period of time during which the stated rainfall can be expected to be exceeded on average once. That element is then designed to accommodate a storm / flood with this return period.

4.36 Once the design return period is established, the most critical storm duration for each of the elements is determined. These range in duration from 15 to 1440 minutes. For example;

- A 1 in 30 year, 30 minute duration storm has an average intensity of 62mm/hr (figure taken from simulated result). This intensity storm would be used to size the pipes and other drainage elements for conveyance purposes.
- A 480 minute duration storm has an average intensity of only 8mm/hr. However, the 480 minute storm lasts 16 times longer, therefore generating a much greater volume of water, and would be used to size the attenuation devices.

5 Condition 10 Conclusion

5.1 This surface water drainage strategy report, with accompanying drawings, calculations and details demonstrate that the reserved matters planning application for Phase 4 of the greater outline approved Hampton Park development can be drained satisfactorily without increasing flood risk elsewhere.

5.2 Intrusive ground investigations and ground water monitoring have determined that infiltration drainage is not feasible on the Phase 4 application because of the high groundwater levels.

5.3 The Surface water runoff will be discharged to the Black Ditch at a peak allowable discharge of 15 litres / second / hectares for up to the 1 in 100-year return period, plus 30% allowance.

- Catchment 01 will discharge at an unrestricted rate into the approved Phase 2 drainage network.
- Catchment 02 will discharge at an unrestricted rate into the approved Phase 2 drainage network.
- Catchment 03 will discharge a a peak allowable discharge of 13 litres / second via a new outfall into the central wetland areas.

5.4 It has already been agreed that this proposed rate of discharge will provide considerable betterment when compared to the pre-demolition brownfield arrangement (as established in the west of wetland report). The provision of SuDS and attenuation features will store the balance of surface water runoff.

5.5 Phase 4 is located on the edge of the central wetland area, and the main road level has been designed so it falls outwards away from the new dwellings. In the event of a system failure the surface water off will mostly flow over the western road kerb and into the wetland area leaving properties unaffected.

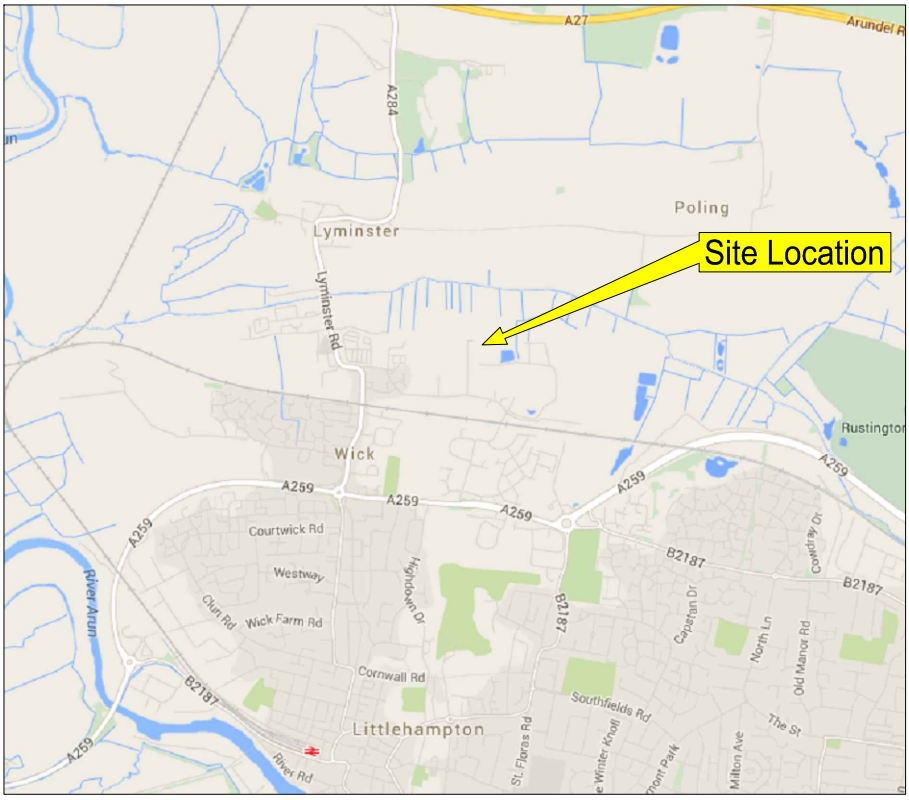
5.6 It is considered that the proposed civil and drainage design accompanying this DOC is sufficiently progressed to enable the discharge of planning condition 10, which contains:

- Appendix D - Drainage GA plans and longitudinal sections showing manholes locations, cover level and invert, pipe diameter and gradients, pipe bedding, gully cover and invert levels, exceedance flows, catchpits upstream of attenuation tank.

- Appendix L – Engineering plans for the approved layout that contains GA's, proposed levels, construction treatments and road longitudinal sections. The drainage designs in appendix D are based upon the engineering plans
- Appendix I & J – Microdrainage calculations that align with drainage plans in Appendix D, which also show a surcharged outfall
- Appendix K – Shows where catchment 3 outfall into the proposed swale in the Central Wetland that forms part of a future planning application to be submitted imminently.
- Appendices – M, N & O contain GTA drainage construction details and proprietary information for the permeable paving and attenuation tank. This will be progressed by GTA Civils as part of their S104 submission to ICOSA water and the construction package to enable it to be constructed

5.7 Therefore, it is considered that this evidence base, when read in conjunction with the approved West of Wetlands drainage strategy, provides sufficient information to discharge the outline planning Condition 10 for the Phase 4 reserved matters application.

APPENDIX A: Site Location & Pre-Demolition Layout



NOTES

1. This drawing is to be read in conjunction with all relevant documents and specifications.

2. Dimensions not to be scaled.

LOCATION

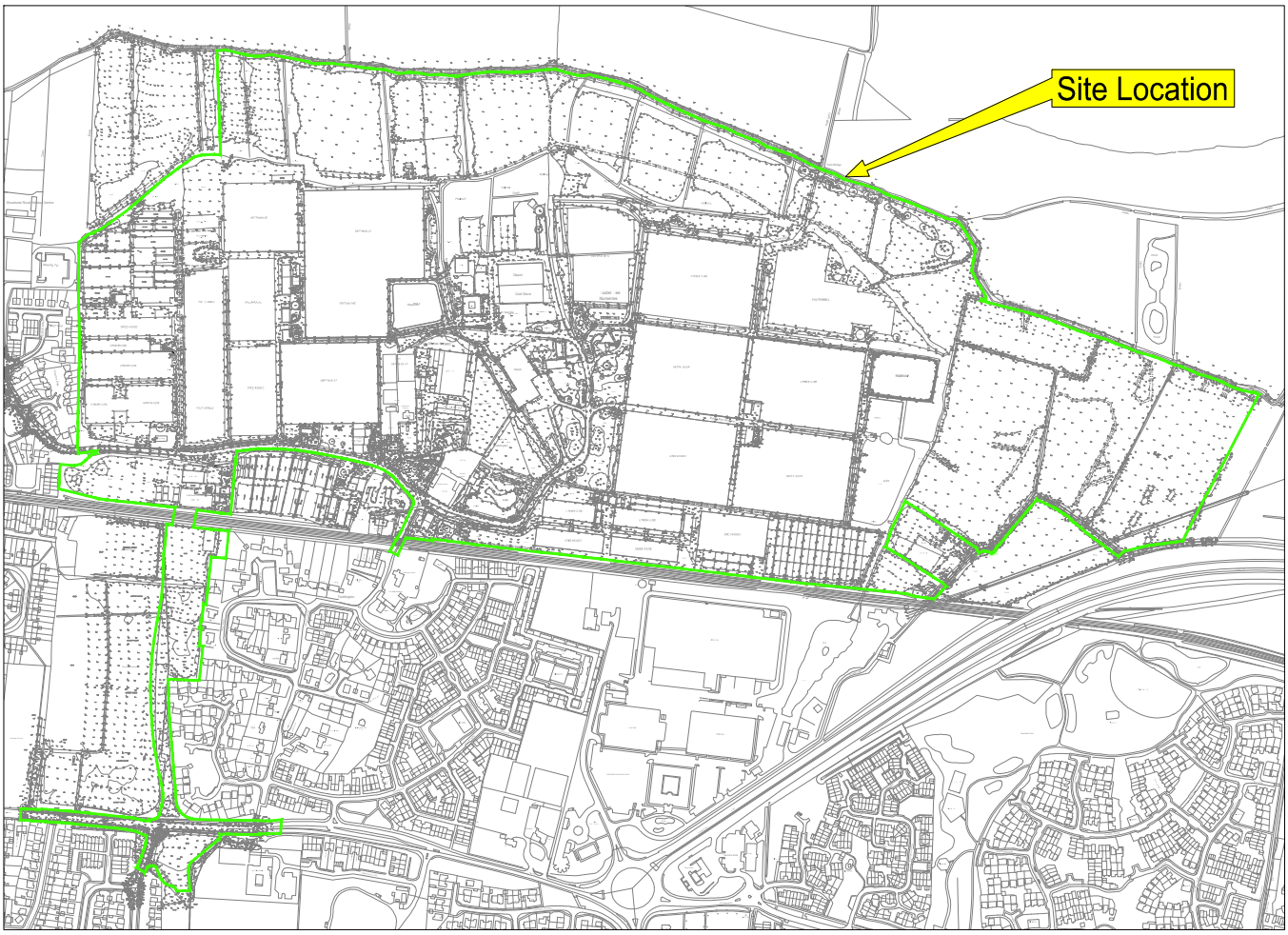
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Littlehampton
West Sussex
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National Grid reference: TQ 03414 03979

N

Plan NTS

Plan 1:10000

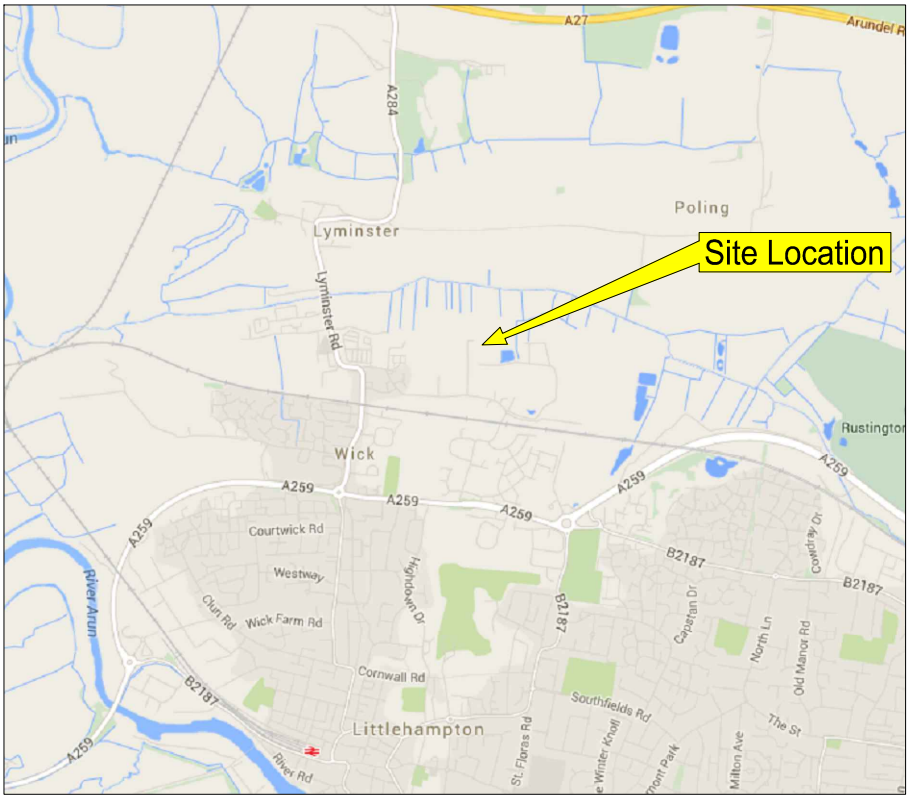


Glanville

Cornerstone House
62 Fo□hall Road, Didcot
O□on, O□11 7AD
Tel: (01235) 515550 Fax: (01235) 817799
postbox@glanvillegroup.com www.glanvillegroup.com

Project :	Land North of Toddington Lane, Littlehampton			
Title :	Site Location Plan			
Project Engineer :	J O'Kelly	Scale : As Shown@A4	Drawing No. N/A	Rev -
Project Director :	k Rayner	Date : December 14		

APPENDIX B: Approved Coloured Plan, External Works Plan and Planting Plan



NOTES

1. This drawing is to be read in conjunction with all relevant documents and specifications.

2. Dimensions not to be scaled.

LOCATION

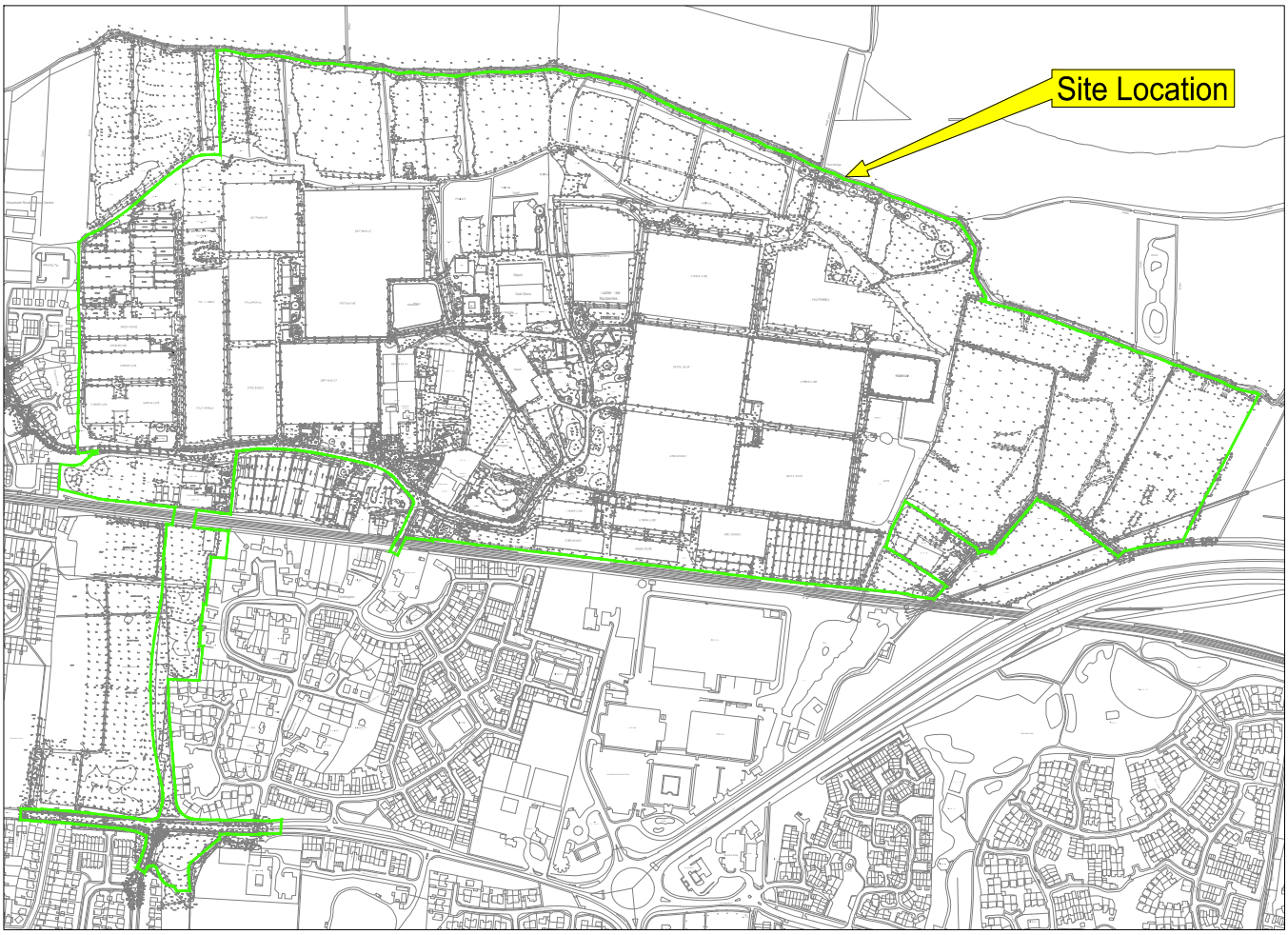
Address: Toddington Lane
Wick
Littlehampton
West Sussex
BN17 7PP

National Grid reference: TQ 03414 03979

N

Plan NTS

Plan 1:10000



Glanville

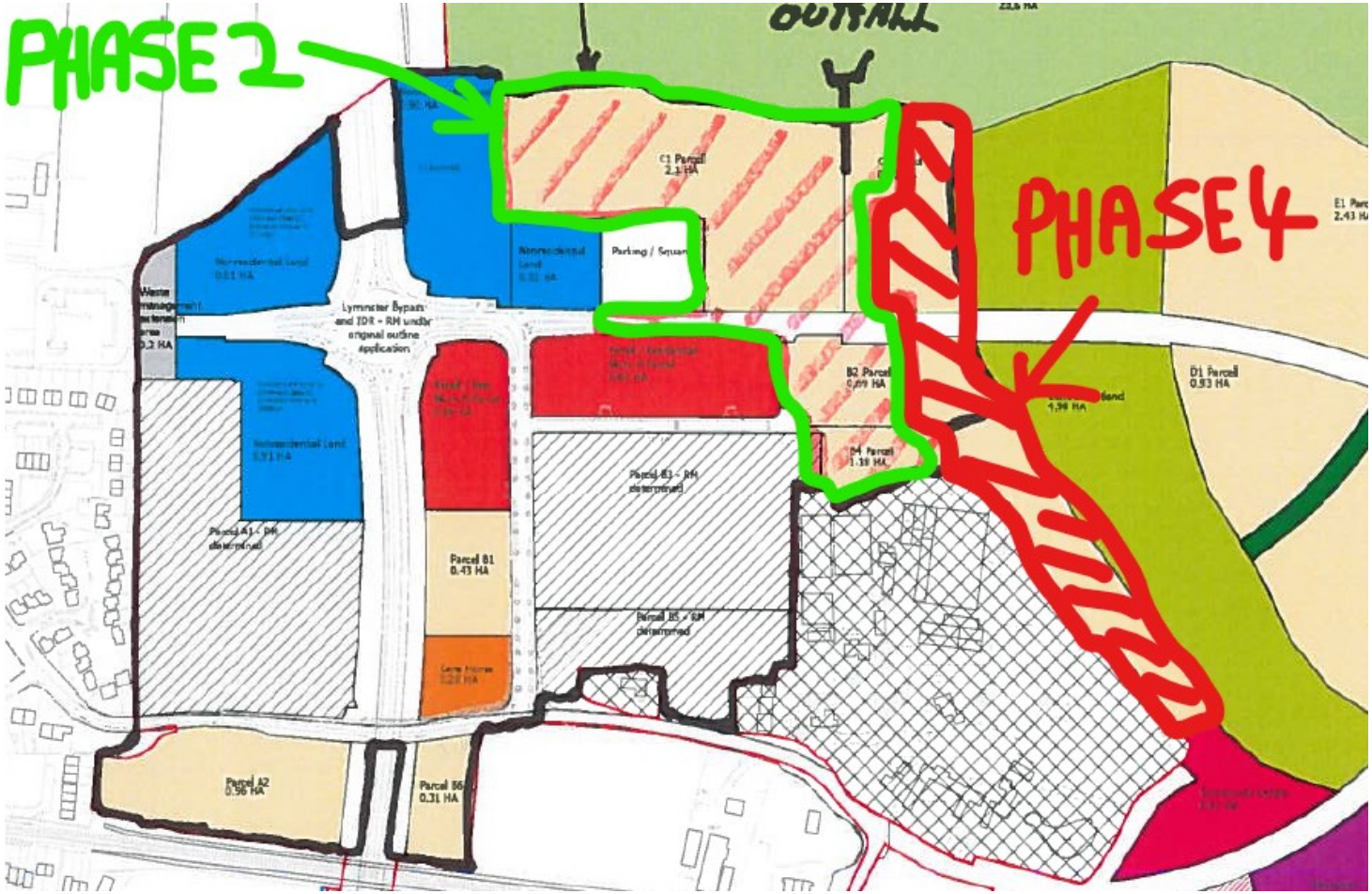
Cornerstone House
62 Fo□hall Road, Didcot
O□on, O□11 7AD
Tel: (01235) 515550 Fax: (01235) 817799
postbox@glanvillegroup.com www.glanvillegroup.com

Project :	Land North of Toddington Lane, Littlehampton			
Title :	Site Location Plan			
Project Engineer :	J O'Kelly	Scale : As Shown@A4	Drawing No. N/A	Rev -
Project Director :	k Rayner	Date : December 14		

APPENDIX C: Phase 4 Location within Masterplan

LITTLEHAMPTON – CONDITION 10, Surface Water Drainage

PROPOSED PHASE 4 IN RELATION TO EXISTING PHASE 2



APPENDIX D: Surface & Foul Drainage Plans & Longitudinal Sections

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DRAINAGE KEY:

- PROPOSED SURFACE WATER SEWER AND MANHOLE
- PROPOSED FOUL WATER SEWER AND MANHOLE
- PROPOSED FOUL WATER BACKDROP
- PROPOSED SURFACE WATER SEWER AND INSPECTION CHAMBER
- PROPOSED FOUL WATER SEWER AND INSPECTION CHAMBER
- PROPOSED ROAD GULLY
- PROPOSED RODDING EYE
- PROPOSED SURFACE WATER OUTFALL
- PROPOSED ATTENUATION TANK
- PROPOSED PERMEABLE PAVING & FIN DRAIN
- EXCEEDENCE FLOW ARROWS
- PROPOSED CONTOURS
- PROPOSED FOUL RISING MAIN
- SITE BOUNDARY

LEVELS KEY:

- FL=1.45 PROPOSED FLOOR LEVEL
- 1/200 PROPOSED GRADIENT
- 150 GB PROPOSED GRAVEL BOARD RETENTION
- TOW=3.85 PROPOSED RETAINING WALL

NOTES:

1. This drawing is not to be scaled.
2. Drawing based on Persimmon Homes Thames Valley Architect's 'Site Layout' drawing reference 545_PL_101, received on 04/06/2020.

FOR INFORMATION
NOT FOR CONSTRUCTION

rev.	amendment	checked	date
P8	Pipe gradients and manhole reference numbers updated. Gully's cover and invert levels added. (IC)	SF	01/09/21
P7	Junction between footpath linking phase 2 and 4, and cycleway amended to match revised Architect's layout received on 26/03/2021 (clouded). Red line boundary amended. (IC)	SF	30/03/21
P6	Footpath linking phase 2 and 4 amended to a constant 2m width. (TC)	SF	18/03/21
P5	Microdrainage pipe labels added. (TC)	SF	22/12/20
P4	Drawing updated following revised layout. Key Updated (TC)	SF	02/10/20
P3	Excedence Flow Arrows Added (SF)	SF	06/07/20
P2	Kerbs updated in parking courts A & B and along the main avenue. (TC)	SF	09/06/20
P1	Initial Issue. (TC)	SF	04/06/2020

mayer brown

Mayer Brown Limited
Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client
PERSIMMON HOMES THAMES VALLEY

project
PHASE 4
LITTLEHAMPTON

scale	drawn by	checked by
1:250	TC	SF

date	cad file
FEBRUARY 2020	20.DWG

title
PROPOSED DRAINAGE AND LEVELS DRAWING (SHEET 1 OF 3)

Mayer Brown Limited jobcode	suitability	revision
	-	P8

drawing number
PHLITTLE P4-20-1

Existing footpath in phase 2 to be adjusted to tie-in with proposed phase 4 footpath

Tie in with Existing Ground @ Appox 1.68m

3m Footpath

Ground south of footpath across wetlands to be lowered to 1.38m AOD

CENTRAL WETLAND

Bottom of Embankment: 1.38

PRIVATE DRIVE ONE (20MPH)

ROAD SIX (20MPH)

MAIN AVENUE (20MPH)

PHASE 2

Road 6a

Road 6

LOC.CR FL=4.40

FL=3.95

MFL=4.05

MFL=4.15

MFL=4.20

FL=4.25

FL=4.00

FL=4.45 BLOCK A 8 - 16

17 - 25 BLOCK B FL=4.45

2B4P X3

2B3P X3

Bin/Cycle Store

Cycle Store

FFL 4.000

FFL 4.100

FFL 4.200

FFL 3.850

FFL 4.150

Footpath 1:60

Maybone

Mayfair

Alnwick

Clayton

Lumley

Leicester

Gatehit

Temporary

SW-N1 CL:3.80 IL:2.69

FW-NIC CL:3.900 IL:3.000

FW-N1 CL:3.88 IL:2.55

SW-N2 CL:3.98 IL:2.54

FW-N2 CL:4.04 IL:2.28

SW-N4 CL:4.20 IL:2.33

FW-N4 CL:4.20 IL:2.02

SW-N3 CL:3.94 IL:2.65

FW-N3 CL:4.05 IL:2.40

SW-IC1 CL:4.20 IL:3.08

FW-IC1 CL:4.30 IL:2.80

SW-IC2 CL:4.09 IL:2.94

FW-IC2 CL:4.30 IL:3.07

SW-IC3 CL:4.06 IL:3.00

FW-IC3 CL:4.18 IL:2.75

SW-IC4 CL:4.28 IL:2.88

FW-IC4 CL:4.15 IL:2.37

SW-IC5 CL:4.15 IL:2.78

FW-IC5 CL:4.15 IL:2.35

SW-IC2 CL:4.00 IL:2.86

FW04 (BD) CL:4.029 IL:0.620

SW02 CL:3.991 IL:2.560

Stub FW04-1 IL:2.360

Stub SW02-1 IL:2.866

Ø225 1:152.5 (23.3m)

Ø100 1:80 (21.8m)

Ø100 1:80 (16.4m)

Ø225 1:142 (19.9m)

Ø150 1:140 (22.6m)

Ø300 1:250 (24.9m)

Ø100 1:80 (26.5m)

Ø225 1:90 (22.5m)

Ø150 1:150 (20m)

Ø150 1:150 (16.2m)

Ø100 1:40 (17.1m)

225ø 1:99.3 (24.2m)

225ø 1:140 (25.783m)

225ø 1:99.3 (87.3m)

225ø 1:140

Ø225 1:139

Ø300 1:250

Ø150 1:31.4

150ø 1/140 (33.6m)

ø 1/250 (31m)

ø 1/33 (21.9m)

ø 1/222 (20.0m)

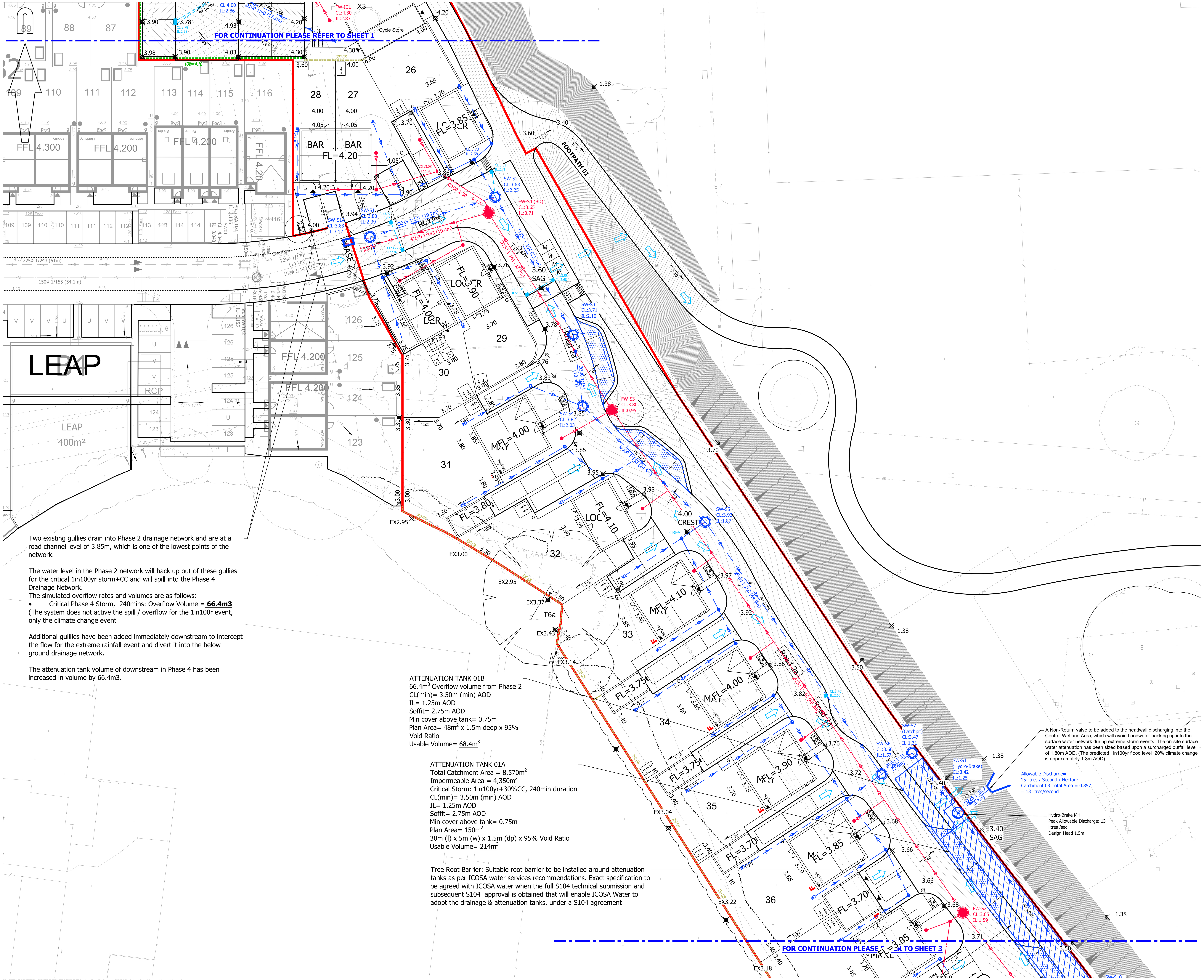
100ø 1/80 (30.4m)

100ø 1/15 (0.6m)

225ø 1/139 (58.4m)

FOR CONTINUATION PLEASE REFER TO SHEET 2

ARUN DISTRICT COUNCIL LU/388/21/DOC



Two existing gullies drain into Phase 2 drainage network and are at a road channel level of 3.85m, which is one of the lowest points of the network.

The water level in the Phase 2 network will back up out of these gullies for the critical 1in100yr storm+CC and will spill into the Phase 4 Drainage Network.
The simulated overflow rates and volumes are as follows:
- Critical Phase 4 Storm, 240mins: Overflow Volume = **66.4m3**

(The system does not active the spill / overflow for the 1in100r event, only the climate change event

Additional gulllies have been added immediately downstream to intercept the flow for the extreme rainfall event and divert it into the below ground drainage network.

The attenuation tank volume of downstream in Phase 4 has been increased in volume by 66.4m3.

ATTENUATION TANK 01B
66.4m³ Overflow volume from Phase 2
CL(min)= 3.50m (min) AOD
IL= 1.25m AOD
Soffit= 2.75m AOD
Min cover above tank= 0.75m
Plan Area= 48m² x 1.5m deep x 95% Void Ratio
Usable Volume= 68.4m³

ATTENUATION TANK 01A
Total Catchment Area = 8,570m²
Impermeable Area = 4,350m²
Critical Storm: 1in100yr+30%CC, 240min duration
CL(min)= 3.50m (min) AOD
IL= 1.25m AOD
Soffit= 2.75m AOD
Min cover above tank= 0.75m
Plan Area= 150m²
30m (l) x 5m (w) x 1.5m (dp) x 95% Void Ratio
Usable Volume= 214m³

Tree Root Barrier: Suitable root barrier to be installed around attenuation tanks as per ICOSA water services recommendations. Exact specification to be agreed with ICOSA water when the full S104 technical submission and subsequent S104 approval is obtained that will enable ICOSA Water to adopt the drainage & attenuation tanks, under a S104 agreement

A Non-Return valve to be added to the headwall discharging into the Central Wetland Area, which will avoid floodwater backing up into the surface water network during extreme storm events. The on-site surface water attenuation has been sized based upon a surcharged outfall level of 1.80m AOD. (The predicted 1in100yr flood level+20% climate change is approximately 1.8m AOD)

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- PROPOSED FOUL RISING MAIN
- SITE BOUNDARY

LEVELS KEY:

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- 1/200 PROPOSED GRADIENT
- 150 GB PROPOSED GRAVEL BOARD RETENTION
- TOW=3.85 PROPOSED RETAINING WALL

NOTES:

1. This drawing is not to be scaled.
2. Drawing based on Persimmon Homes Thames Valley Architect's 'Site Layout' drawing reference 545_PL_101, received on 04/06/2020.

FOR INFORMATION
NOT FOR CONSTRUCTION

rev.	amendment	checked	date
P13	Note added about Non Return Valve at Headwall discharging in Central Wetland. (TC)	IC	16/02/22
P12	Information relating to Cental Wetland removed. (TC)	IC	16/02/22
P11	Pipe gradients and manhole reference numbers updated. Gully's cover and invert levels added. (IC)	SF	01/09/21
P10	Surface water pipe from SW-S2 to SW-S7 (approx. 110m) increased from 225dia to 300dia in order to remove simulated flooding for the 1in100yr climate change event. (Clouded) (TC)	SF	20/04/21
P9	Note added about the Tree Root Barrier around the attenuation tank. (Clouded) (TC)	SF	13/04/21
P8	Footpath in clouded area amended to match revised Architect's layout received on 26/03/2021. Red line boundary amended. (IC)	SF	30/03/21
P7	Surface water manhole reference SW-S6 moved in order to reduce length of pipe in the verge and facilitate positioning of proposed trees. (SF)	SF	07/01/21
P6	Attenuation tank 01A and 01B lowered and depth increased. (SF)	SF	05/01/21
P5	Microdrainage pipe labels added. (TC)	SF	22/12/20
P4	Drawing updated following revised layout. Key Updated (TC)	SF	02/10/20
P3	Surface Water Attenuation updated, note about Phase 2 overlflow added, outfall swale and CWA ditch added, Exceedence flows arrows added. (SF)	SF	06/07/20
P2	Drawing updated following revised layout. (TC)	SF	05/06/2020
P1	Initial Issue. (TC)	SF	04/06/2020

mayer brown
Mayer Brown Limited
Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client
PERSIMMON HOMES THAMES VALLEY

project
PHASE 4
LITTLEHAMPTON

scale	drawn by	checked by
1:250	TC	SF

date	cad file
FEBRUARY 2020	20.DWG

title
DRAINAGE AND LEVELS
GENERAL ARRANGEMENT DRAWING
(SHEET 2 OF 3)

Mayer Brown Limited jobcode	suitability	revision
	-	P13

drawing number
PHLITTLE P4-20-2

under a S104 agreement

FOR CONTINUATION PLEASE REFER TO SHEET 2

ATTENUATION TANK 01A
Total Catchment Area = 8,570m²
Impermeable Area = 4,350m²
Critical Storm: 1in100yr+30%CC, 240min duration
CL(min)= 3.50m (min) AOD
IL= 1.25m AOD
Soffit= 2.75m AOD
Min cover above tank= 0.75m
Plan Area= 150m²
30m (l) x 5m (w) x 1.5m (dp) x 95% Void Ratio
Usable Volume= 214m³

Tree Root Barrier: Suitable root barrier to be installed around attenuation tanks as per ICOSA water services recommendations. Exact specification to be agreed with ICOSA water when the full S104 technical submission and subsequent S104 approval is obtained that will enable ICOSA Water to adopt the drainage & attenuation tanks, under a S104 agreement

Indictive location of Community Centre - Subject to change

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- PROPOSED RODDING EYE
- PROPOSED SURFACE WATER OUTFALL
- PROPOSED ATTENUATION TANK
- PROPOSED PERMEABLE PAVING & FIN DRAIN
- EXCEEDENCE FLOW ARROWS
- PROPOSED CONTOURS
- PROPOSED FOUL RISING MAIN
- SITE BOUNDARY

LEVELS KEY:

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- 150 GB PROPOSED GRAVEL BOARD RETENTION
- TOW=3.85 PROPOSED RETAINING WALL

NOTES:

1. This drawing is not to be scaled.
2. Drawing based on Persimmon Homes Thames Valley Architect's 'Site Layout' drawing reference 545_PL_101, received on 04/06/2020.

FOR INFORMATION
NOT FOR CONSTRUCTION

rev.	amendment	checked	date
P9	Information relating to Cental Wetland removed. (TC)	IC	16/02/22
P8	Pipe gradients and manhole reference numbers updated. Gully's cover and invert levels added. (IC)	SF	01/09/21
P7	Permeable paving and fin drain amended to suit parking bays. (clouded) (TC)	SF	20/04/21
P6	Note added about the Tree Root Barrier around the attenuation tank. (Clouded) (TC)	SF	13/04/21
P5	Microdrainage pipe labels added. (TC)	SF	22/12/20
P4	Drawing updated following revised layout. Key Updated. (TC)	SF	02/10/20
P3	Exceedence Flow arrows and permeable paving added. (SF)	SF	06/07/20
P2	Drawing updated following revised layout. (TC)	SF	05/06/2020
P1	Initial Issue. (TC)	SF	04/06/2020

mayer brown

Mayer Brown Limited
Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client
PERSIMMON HOMES THAMES VALLEY

project
PHASE 4
LITTLEHAMPTON

scale	drawn by	checked by
1:250	TC	SF

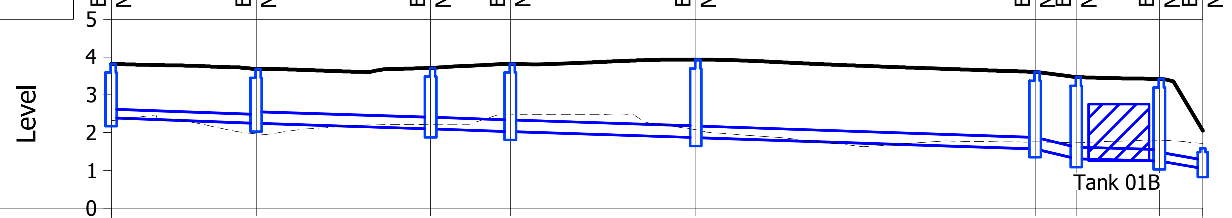
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FEBRUARY 2020	20.DWG

title
DRAINAGE AND LEVELS
GENERAL ARRANGEMENT DRAWING
(SHEET 3 OF 3)

Mayer Brown Limited jobcode	suitability	revision
	-	P9

drawing number
PHLITTLE P4-20-3

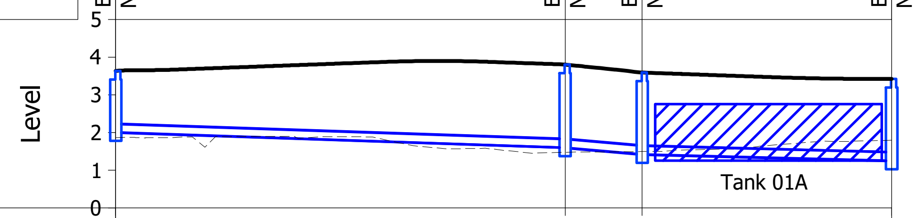
SW-S1 to Outfall
Scale= H 1:1000, V 1:200



MH Reference	Manhole Coordinates (Easting, Northing)	Cover Levels	Existing Ground Levels	Pipe Start / End Invert Levels	Pipe Start / End Cover (m)	Chainages (m)
SW-S1	E 503505.889 N 104115.817	3.817	3.817	2.390	1.195	0.000
SW-S2	E 503524.143 N 104121.670	3.677	3.677	2.250 / 2.250	1.195 / 1.120	19.169
SW-S3	E 503535.515 N 104101.583	3.708	3.708	2.100 / 2.100	1.301 / 1.301	42.251
SW-S4	E 503536.886 N 104091.131	3.819	3.819	2.030 / 2.030	1.482 / 1.482	52.793
SW-S5	E 503554.747 N 104074.304	3.927	3.927	1.870 / 1.870	1.750 / 1.750	77.332
SW-S6	E 503580.447 N 104037.505	3.604	3.604	1.570 / 1.570	1.727 / 1.727	122.217
SW-S7 (catchpit)	E 503584.910 N 104040.622	3.467	3.467	1.310 / 1.310	1.850 / 1.850	127.661
SW-S11(HB)	E 503591.576 N 104031.880	3.423	3.423	1.250 / 1.250	1.866 / 1.941	138.653
Outfall	E 503596.169 N 104035.319	1.582	2.054	1.050	0.772	144.392

Pipe	Pipe Length 2D (m)	Pipe Dia, Slope, Material and Bedding Class
SW-S1 – SW-S2	19.169	225mm 1:136.9 PVC Class S
SW-S2 – SW-S3	23.082	300mm 1:153.9 PVC Class S
SW-S3 – SW-S4	10.542	300mm 1:150.6 PVC Class S
SW-S4 – SW-S5	24.539	300mm 1:153.4 PVC Class S
SW-S5 – SW-S6	44.885	300mm 1:149.6 PVC Class S
SW-S6 – SW-S7	5.444	300mm 1:20.9 PVC Class S
SW-S7 – SW-S11(HB)	10.993	300mm 1:183.2 PVC Class S
SW-S11(HB) – Outfall	5.738	225mm 1:28.7 PVC Class S

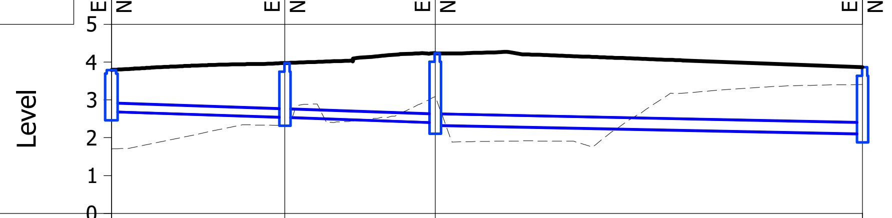
SW-S8 to SW-S11(HB)
Scale= H 1:1000, V 1:200



MH Reference	Manhole Coordinates (Easting, Northing)	Cover Levels	Existing Ground Levels	Pipe Start / End Invert Levels	Pipe Start / End Cover (m)	Chainages (m)
SW-S8	E 503648.037 N 103948.567	3.632	3.632	2.000	0.000	0.000
SW-S9	E 503611.492 N 103995.445	3.804	3.804	1.600 / 1.600	0.000 / 1.972	59.439
SW-S10 (catchpit)	E 503611.587 N 104005.638	3.590	3.590	1.420 / 1.420	1.938 / 1.938	69.633
SW-S11(HB)	E 503591.576 N 104031.880	3.423	3.423	1.250	1.941	102.634

Pipe	Pipe Length 2D (m)	Pipe Dia, Slope, Material and Bedding Class
SW-S8 – SW-S9	59.439	225mm 1:148.6 PVC Class S
SW-S9 – SW-S10	10.194	225mm 1:56.6 PVC Class S
SW-S10 – SW-S11(HB)	33.002	225mm 1:194.1 PVC Class S

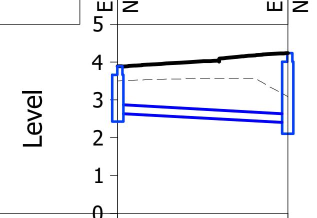
SW-N1 to SW07
Scale= H 1:1000, V 1:200



MH Reference	Manhole Coordinates (Easting, Northing)	Cover Levels	Existing Ground Levels	Pipe Start / End Invert Levels	Pipe Start / End Cover (m)	Chainages (m)
SW-N1	E 503497.409 N 104286.568	3.795	1.703	2.690	0.872	0.000
SW-N2	E 503493.402 N 104263.987	3.978	2.327	2.540 / 2.540	1.206 / 1.206	22.933
SW-N4	E 503493.402 N 104244.120	4.239	3.092	2.400 / 2.330	1.607 / 1.602	42.800
SW07	E 503436.902 N 104244.120	3.870	3.408	2.100	-0.157	99.300

Pipe	Pipe Length 2D (m)	Pipe Dia, Slope, Material and Bedding Class
SW-N1 – SW-N2	22.933	225mm 1:152.5 PVC Class S
SW-N2 – SW-N4	19.867	225mm 1:141.9 PVC Class S
SW-N4 – SW07	56.500	300mm 1:245.7 PVC Class S

SW-N3 to SW-N4
Scale= H 1:1000, V 1:200



MH Reference	Manhole Coordinates (Easting, Northing)	Cover Levels	Existing Ground Levels	Pipe Start / End Invert Levels	Pipe Start / End Cover (m)	Chainages (m)
SW-N3	E 503493.402 N 104221.628	3.894	3.503	2.650	1.012	0.000
SW-N4	E 503493.402 N 104244.120	4.239	3.092	2.400	1.607	22.493

Pipe	Pipe Length 2D (m)	Pipe Dia, Slope, Material and Bedding Class
SW-N3 – SW-N4	22.493	225mm 1:90.0 PVC Class S

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KEY

- EXISTING GROUND PROFILE (dashed line)
- PROPOSED ROAD PROFILE (solid black line)
- SURFACE WATER SEWER PROFILE (double blue line)

NOTES:

1. This drawing is not to be scaled.
2. The drawing is to be read in conjunction with Mayer Brown "Drainage General Arrangement" drawing series PHLITTLE-P4-20.
3. This drawing is to be read in conjunction with all other relevant engineering and landscaping drawings. Any discrepancies are to be reported to the engineer immediately for clarification.

FOR INFORMATION
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rev.	amendment	checked	date
P2	Manhole references adjusted and long sections updated. (IC)	SF	01/09/21
P1	Initial issue. (TC)	SF	04/06/20

mayer brown

Mayer Brown Limited
Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client: PERSIMMON HOMES THAMES VALLEY

project: PHASE 4 LITTLEHAMPTON

scale	drawn by	checked by
H=1:1000 V=200	TC	SF

date	cad file
JUNE 2020	40.DWG

title: PROPOSED SURFACE WATER DRAINAGE LONGITUDINAL SECTIONS

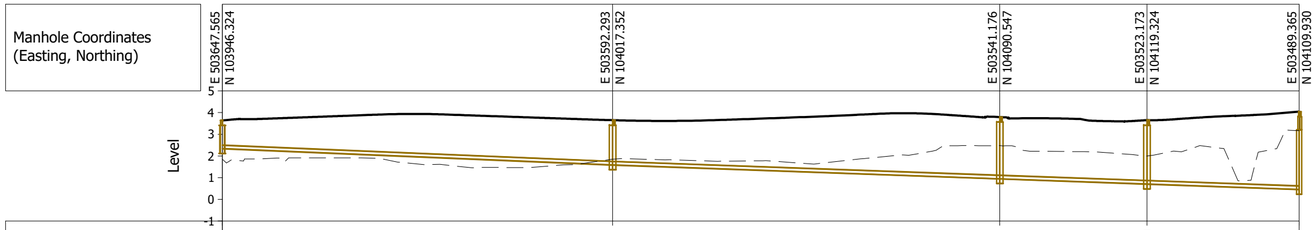
Mayer Brown Limited jobcode	suitability	revision
	-	P2

drawing number: PHLITTLE-P4-40-1

t:__design ab projects\02 - current jobs\phlittle-main\03 mb drawings\01 working drawings_phase 4\40-41 - drainage longsections.dwg

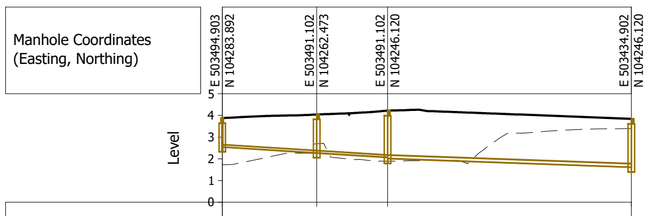
ARUN DISTRICT COUNCIL LU/388/21/DOC

FW-S1 to FW01(BD)



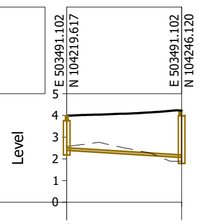
Manhole Coordinates (Easting, Northing)	E 503647.565 N 103946.324	E 503592.293 N 104017.352	E 503541.176 N 104090.547	E 503523.173 N 104119.324	E 503489.365 N 104109.930
MH Reference	FW-S1	FW-S2	FW-S3	FW-S4(BD)	FW01(BD)
Cover Levels	3.638	3.651	3.793	3.653	4.040
Existing Ground Levels	3.638	3.651	3.793	3.653	
Pipe Start / End Invert Levels	2.340	1.590 / 1.590	0.950 / 0.950	0.710 / 0.710	0.460
Pipe Start / End Cover (m)	1.134	1.897 / 1.897	2.679 / 2.679	2.779 / 2.779	-0.089
Pipe Length 2D (m)		90.000	89.278	33.944	35.088
Chainages (m)	0.000	90.000	179.278	213.222	248.311
Pipe Dia, Slope, Material and Bedding Class		150mm 1:120.0 Vitrified Clay Class S	150mm 1:139.5 Vitrified Clay Class S	150mm 1:141.4 Vitrified Clay Class S	150mm 1:140.4 Vitrified Clay Class S

FW-N1 to FW12



Manhole Coordinates (Easting, Northing)	E 503494.903 N 104283.892	E 503491.102 N 104262.473	E 503491.102 N 104246.120	E 503434.902 N 104246.120
MH Reference	FW-N1	FW-N2	FW-N4	FW12
Cover Levels	3.876	4.046	4.221	3.840
Existing Ground Levels	1.722	2.697	1.891	3.396
Pipe Start / End Invert Levels	2.550	2.275 / 2.275	2.070 / 2.020	1.620
Pipe Start / End Cover (m)	1.215	1.660 / 1.660	2.040 / 2.037	-0.089
Pipe Length 2D (m)		21.754	16.352	56.200
Chainages (m)	0.000	21.754	38.106	94.306
Pipe Dia, Slope, Material and Bedding Class		100mm 1:79.1 Vitrified Clay Class S	100mm 1:79.8 Vitrified Clay Class S	150mm 1:140.5 Vitrified Clay Class S

FW-N3 to FW-N4



Manhole Coordinates (Easting, Northing)	E 503491.102 N 104219.617	E 503491.102 N 104246.120	
MH Reference	FW-N3	FW-N4	
Cover Levels	3.990	4.221	
Existing Ground Levels	2.569	1.891	
Pipe Start / End Invert Levels	2.400	2.070	
Pipe Length 2D (m)	1.479	2.040	
Chainages (m)	0.000	26.504	
Pipe Dia, Slope, Material and Bedding Class		26.504	
		100mm 1:80.3 Vitrified Clay Class S	

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KEY

- EXISTING GROUND PROFILE
- PROPOSED ROAD PROFILE
- FOUL WATER SEWER PROFILE

NOTES:

1. This drawing is not to be scaled.
2. The drawing is to be read in conjunction with Mayer Brown "Drainage General Arrangement" drawing series PHLITTLE-P4-20.
3. This drawing is to be read in conjunction with all other relevant engineering and landscaping drawings. Any discrepancies are to be reported to the engineer immediately for clarification.

PRELIMINARY
NOT FOR CONSTRUCTION

rev.	amendment	checked	date
P1	Initial issue. (TC)	SF	04/06/20

mayer brown

Mayer Brown Limited
Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client
PERSIMMON HOMES THAMES VALLEY

project
PHASE 4
LITTLEHAMPTON

scale	drawn by	checked by
H=1:1000 V=200	TC	SF

date	cad file
JUNE 2020	40.DWG

title
PROPOSED FOUL WATER DRAINAGE
LONGITUDINAL SECTIONS

Mayer Brown Limited jobcode	suitability	revision
	-	P1

drawing number
PHLITTLE-P4-41-1

ARUN DISTRICT COUNCIL LU/38/21/DOC

APPENDIX E: Catchment 01 & C2_Phase 2 & Phase 4 Interface

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NOTES:

1. This drawing is not to be scaled
2. This drawing has been produced to show how Phase 4 surface water Drainage Catchments drain into the approved Phase 2 surfae water and eventually into the main West of Wetlands outfall
3. Most of Phase 2 has already been constructed and the Phase 2 existing sewers were oringinally designed to drain Catchments 01 & 02 of Phase 4

PHASE 4
CATCHMENT AREA 01
- Discharges to Phase 2 Outfall
- Unrestrited Discharge into Phase 2 network

PHASE 4
CATCHMENT AREA 02
- Discharges to Phase 2 Outfall
- Unrestricted Discharge into Phase 2 Network

PHASE 4
CATCHMENT AREA 03
- Discharges to new Phase 4 Outfall
- Restricted Discharge into Central Wetlands

PHASE 4

PH 4 OUTFALL INTO PH2

PHASE 2 - Constructed

PHASE 2 Outfall
(also outfall for most almost all of West Wetlands Catchment
Agreed Outfall Rate of 15 litrEs / second / hectare

Future PHASE

PHASE 2
To be Constructed

BOVIS DEVELOPMENT
- Constructed

Existing Discharge=
60 litres / Second

MAIN AVENUE WORKS SUBJECT TO S38 TECHNICAL REVIEW, APPROVAL AND AGREEMENT WITH WSCC

DRAINAGE WORKS SUBJECT TO SOUTHERN WATER TECHNICAL REVIEW, APPROVAL AND AGREEMENT

FOR INFORMATION
NOT FOR CONSTRUCTION

rev.	amendment	checked	date
P1	Initial tender issue. (OJN)	SF	10/11/2017

mayer brown

Mayer Brown Limited
Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client
PERSIMMON HOMES THAMES VALLEY

project
HAMPTON PARK, LITTLEMAPTON
PHASE 4

scale	1:250	drawn by	OJN	checked by	SF
date	JULY 2020	cad file	MBSK200702-1.DWG		

title
PHASE 4 SURFACE WATER DRAINAGE CATCHMENTS IN RELATION TO EXISTING PHASE 2

drawing number
MBSK200702-01

rev.
P1

APPENDIX F: Catchment 01 & 02_ICOSA Water S104 Technical Approval

TECHNICAL APPROVAL CERTIFICATE REV A

Technical Approval is hereby granted for 18-025 Toddington Lane, North Littlehampton in response to the application for a S104 Adoption under the Water Industry Act 1991.

Conditions to this technical approval are subject to the following:

- A pre-start site meeting should be held with Icosa Water and/or its appointed representative prior to construction or as soon as possible after approval is given if construction has already commenced.
- Any variations to layout or materials should be requested from Icosa Water and should only be constructed when confirmed in writing.
- Icosa Water reserve the right to withdraw or amend this technical approval should circumstances on site require it.

Site details	**Toddington Lane, Littlehampton**
Developer	**Persimmon Homes**
Designer	**Mayer Brown**
Icosa Water Consultant	David Antill
Reviewed by	David Antill
Approval date	27/09/19
Signed (Icosa Water Consultant)	
Name	David Antill
Signed (Icosa Water)	
Name	David Palmer

If you have any queries, please call: 0330 320 0762 or email: adoptions@icosawater.co.uk

Icosa Water Ltd
Sophia House
28 Cathedral Road
Cardiff
CF11 9LJ

ARUN DISTRICT COUNCIL LU/388/21/DOC

Project Reference	18-025	
Project Name	Toddington Lane, North Littlehampton	
List of Issued Drawings		
Drawing Number/Reference	Drawing Title	Rev
Aqua Swirl (SDS Systems)	SDS Aqua-Swirl - 1800 Ø - AS-6	-
MicroDrainage Calcs	Foul Sewerage Design	01/03/2019
MicroDrainage Calcs	Proposed Storm Water Network 1in1yr	01/03/2019
MicroDrainage Calcs	Proposed Storm Water Network 1in30yr	01/03/2019
MicroDrainage Calcs	Proposed Storm Water Network 1in100yr+cc	01/03/2019
PHLITTLE-INT/MHS/FW/104	Foul Water Manhole Schedule	A1
PHLITTLE-INT/MHS/SW/104	Surface Water Manhole Schedule	A3
A/PHLITTLE-INT.10/S104-10-1	Section 104 Drainage General Arrangement Surface and Foul Water – Sheet 1 of 4 (Overview)	P3
A/PHLITTLE-INT.10/S104-10-2	Section 104 Drainage General Arrangement Surface and Foul Water – Sheet 2 of 4	P1
A/PHLITTLE-INT.10/S104-10-3	Section 104 Drainage General Arrangement Surface and Foul Water – Sheet 3 of 4	P3
A/PHLITTLE-INT.10/S104-10-4	Section 104 Drainage General Arrangement Surface and Foul Water – Sheet 4 of 4	P4
A/PHLITTLE-INT.10/S104-20-1	Section 104 Drainage Surface and Foul Water Long Sections – Sheet 1 of 2	P4
A/PHLITTLE-INT.10/S104-20-2	Section 104 Drainage Surface and Foul Water Long Sections – Sheet 2 of 2	P1
A/PHLITTLE-INT.10/S104-50-1	Section 104 Drainage Surface and Foul Water Location Plan	P1
S104-MB-01	Section 104 Drainage Construction Details	P1
S104-MB-02	Section 104 Drainage Construction Details – Attenuation Tank 1	P3
E198619_01_-	Attenuation Tank 1 Detail	B

ARUN DISTRICT COUNCIL LU/388/21/DOC

APPENDIX G: Catchment 01 & 02_Drainage Strategy West of Wetlands

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SURCHARGED OUTFALL

EA modelled flood levels adjacent flood plain (black ditch)

- 1 in 1,000yr Flood Level: 2.38M AOD
- 1 in 100yr+20% Flood Level: Ranges 1.72m to 1.83m AOD

Drainage Network Modelled with a constant surcharged outfall level of 1.80m AOD (800mm surcharge) for all storm events and associated storm durations

SURFACE WATER OUTFALL 1.0m AOD

Peak Allowable Discharge =**285 litres / second**

(Catchment of 19.07 hectares with allowable discharge rate of 15 litres/sec/hectare)

Run-off restricted @ final manhole upstream of Outfall

Nonresidential Land 0.9HA

100 Bed Hotel

Nonresidential Land 0.81HA

Commercial Area up to 10000sqm
Class B1 Enterprise Area upto 3000sqm

Nonresidential Land 0.91HA

Commercial Area up to 10000sqm
Class B1 Enterprise Area upto 3000sqm

Nonresidential Land 0.32HA

Parking Square

1500m3 ATTENUATION TANK
(50m x 21m x 1.5m deep x 95% Void Ratio)

TOP WATER LEVEL=3.700
SOFFIT LEVEL=3.200
INVERT LEVEL=1.710

CAR PARK LEVEL=4.80m AOD

NO RESTRICTION REQUIRED ON MAIN ATTENUATION TANK UNDERNEATH THE CAR PARK. SURFACE WATER WILL BACK UP IN THE OVERSIZED 900ø PIPE FROM THE FINAL MANHOLE

PERMEABLE PAVED CAR PARK WITH ATTENUATION VOLUME OF APPROX. 260m3 IN THE PERMEABLE SUB-BASE. RESTRICTED FLOW OF 5 L/S INTO TANK UNDERNEATH CAR PARK

Retail / Residential Block A Parcel 0.81HA

Retail / Residential Block B Parcel 0.56HA

Parcel B1 0.45HA

Care Home 0.28HA

Parcel A2 0.96HA

Parcel B6 0.31HA

Residential Parcel C1

Residential C2

Residential B2

Residential B4 (Partial)

GREENHOUSE

ACCOMMODATION UNITS

POLYTUNNELS

CANTEEN

FOLIAGE

WATER

GRASS

GRAVEL

STONE

ATTENUATION Model 506m3

ATTENUATION Model 126m3

ATTENUATION Model 415m3

ATTENUATION Model 310m3

ATTENUATION Model 520m3

ATTENUATION Model 345m3

ATTENUATION Model: 400m3

ATTENUATION Model: 92m3

Allowable Discharge= **5 litres / Second**

Allowable Discharge= **10 litres / Second**

Existing Discharge= **60 litres / Second**

Existing Discharge from BOVIS SITE = **120 litres / Second**

Attenuation Already incorporated into the design of Parcel

Combined volume - Carehome & Parcel B1

SW Stub

Perm base Node 06

Perm base Node 05

Perm base Node 04

Perm base Node 03

Perm base Node 02

Perm base Node 01

Overflow into Adjacent Network

UNRESTRICTED DISCHARGE

SOFFIT/SOFFIT CONNECTIONS

Peak 1in1yr Flow=**175 l/s**

New Foul Rising Main to connect to Existing Foul Rising Main through Parcel A1

As-built SA8 IL=3.763

ng Discharge from Parcel A1 .5 litres / Second

uation Already incorporated he design of Parcel A1

Oversized 900ø 1/400

Oversized 1200ø 1/400

Ex 300ø

Ex 375ø

Ex 225ø Stub

Peak 1in1yr Flow=**61 l/s**

FOR INFORMATION
NOT FOR CONSTRUCTION

rev.	amendment	checked	date
P6	B2 future attenuation tank altered at PN 3.000. (OJN)	SF	11/01/2019
P5	Sub catchment location discharge rates added, pipe numbers updated. Attenuation Tank volumes amended for future plots and note on surcharged outfall added. (OJN)	SF	10/01/2019
P4	Drainage updated. (OJN)	SF	14/03/2018
P3	Foul drainage added. (OJN)	SF	08/03/2018
P2	Drainage layout updated. (OJN)	SF	06/02/2018

mayer brown

Mayer Brown Limited
Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client
PERSIMMON HOMES THAMES VALLEY

project
NORTH LITTLEHAMPTON PHASE 2
SITE WIDE DRAINAGE STRATEGY

scale	1:500	drawn by	OJN	checked by	SF
date	NOVEMBER 2017	cad file	MASTER.DWG		

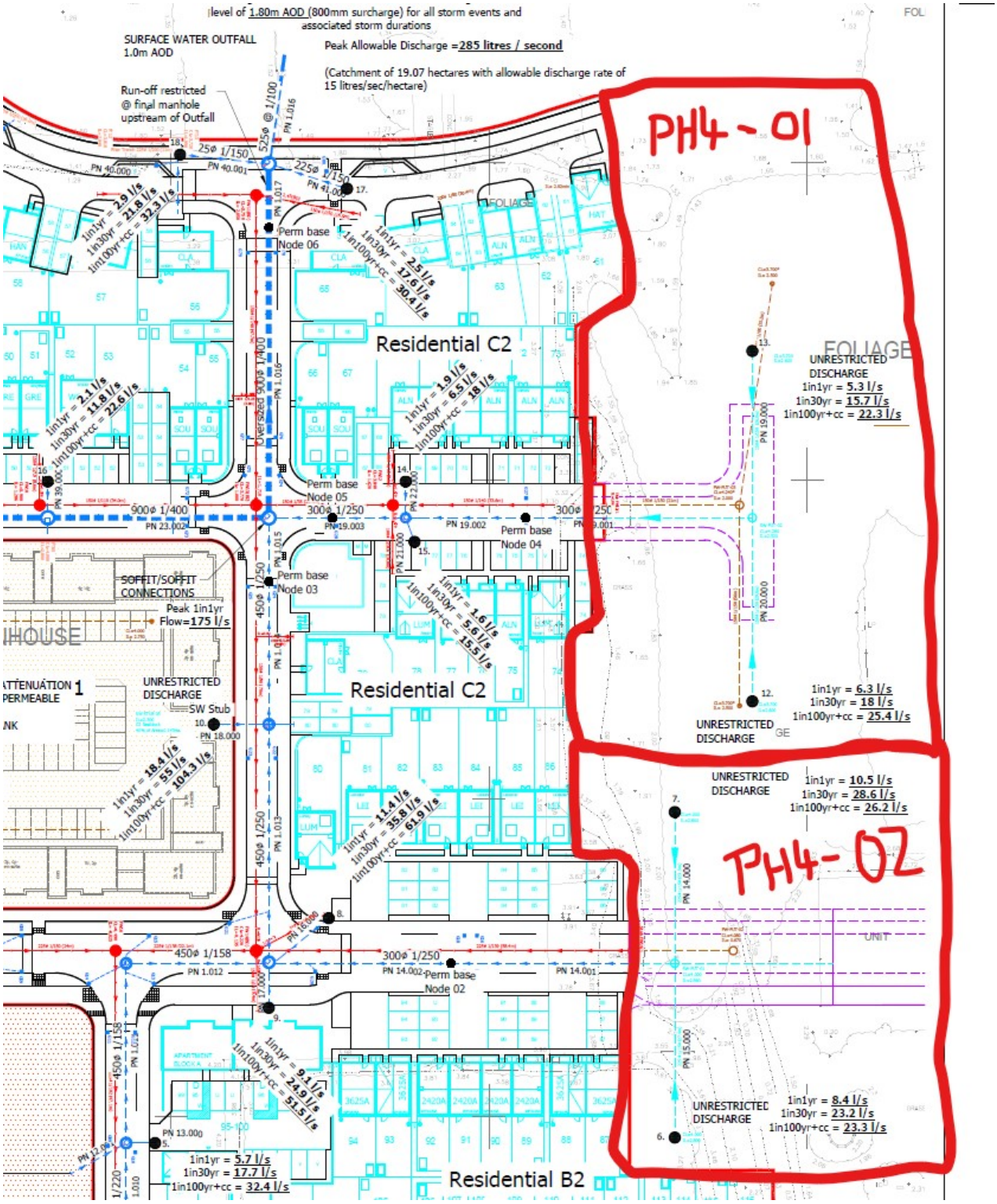
title
DRAINAGE STRATEGY DRAWING
WEST OF THE WETLANDS

drawing number
A/PHLITTLE.2/DS

rev.
P6

LITTLEHAMPTON – CONDITION 10, Surface Water Drainage

PROPOSED PHASE 4 CATCHMENTS 01 & 02 DRAINING INTO EXISTING PHASE 2



ARUN DISTRICT COUNCIL LU/388/21/DOC

Land North of Toddington Lane, Drainage Strategy, West of Wetlands

Parcels B2, B4 Partial, C1, C2 & C4

Sub Catchment Locations	Windes Pipe Number	Critical Storm (1in100yr event)	Peaks Discharge Rates Litres / Sec (Critical Storm)			Flood volume for 1in100yr+CC
			1in1yr	1in30yr	1in100yr +CC	
1	8.000	15min	3.6	11.2	19.8	0.45
2	9.000	15min	5.1	16.1	33.1	0
3	10.001	15min	9.3	31.6	41	16.8
4	11.000	15min	12.5	40.6	56.5	5.1
5	13.000	30min	5.7	17.7	32.4	0
6	15.000	15min	8.4	23.2	23.3	12.4
7	14.000	15min	10.5	28.6	26.2	16.5
8	16.000	15min	11.4	35.8	61.9	0.435
9	17.000	30min	9.1	24.9	51.5	0.68
10	18.000	15min	18.4	55	104.3	0
11	31.000	15min	22.6	62.3	74.1	23.5
12	20.000	15min	6.3	18	25.4	5.5
13	19.000	15min	5.3	15.7	22.3	3.5
14	22.000	240min	1.9	6.5	18	0
15	21.000	240min	1.6	5.6	15.5	0
16	39.000	240min	2.1	11.8	22.6	0
17	41.000	240min	2.5	17.6	30.4	0
18	40.001	240min	2.9	21.8	32.3	0
19	34.000	15min	10.3	33.8	55.9	0
20	36.000	15min	2.9	9.5	17.5	0
21	38.000	15min	7.3	23.9	44.1	0
22	37.002	15min	21.5	56.5	66.6	0
23	23.000	240min	2.1	5.3	10.3	0

APPENDIX H: Catchment 01 & 02_Phase 2 DOC Condition 10 Decision Notice

Arun District Council
Arun Civic Centre
Maltravers Road
Littlehampton
West Sussex BN17 5LF
Planning General Enquiries
Tel: (01903) 737756 Fax: (01903) 730442
Dx: 57406 Littlehampton
Minicom: 01903 732765
e-mail:planning@arun.gov.uk
website: www.arun.gov.uk/planning

Mr Robert Clark
Persimmon Homes Thames Valley
Persimmon House
Knoll Road
Camberley
GU15 3TQ

Your Ref: LU/17/19/DOC
Please ask for:
Michael Eastham
04 February 2019

Dear Persimmon Homes Thames Valley

Town & Country Planning Act 1990 (as amended)
Town and Country Planning (Development Management Procedure) (England) Order 2015
Approval of details reserved by condition imposed under LU/47/11/ relating to condition 10-surface water drainage.
Land North of Toddington Lane Littlehampton,,

Notification regarding the above application:

Condition Number 10

No development shall begin until a fully detailed surface water drainage scheme for that phase of the development, based on sustainable drainage principles and designed in accordance with the SUDS strategy for the whole development, has been submitted to and approved in writing by the Local Planning Authority. It should be demonstrated how each detailed scheme will contribute to delivering, and link into, the surface water drainage strategy for the site as a whole.

- The SUDS shall be designed to attenuate the 1 in 100 year storm event (plus climate change allowance of 30% in accordance with DEFRA's National Standards for Sustainable Drainage Systems).
- No infiltration of surface water drainage shall occur within ground affected by contamination unless suitable remediation is undertaken.
- Each detailed scheme should include a timetable for its implementation; and provide a management and maintenance plan in the form of a site specific Maintenance Manual for the SUDS system for the lifetime of the development. This shall include the arrangements for adoption by any public authority or statutory undertaker or details of the financial management of the scheme throughout its lifetime.

Elements of the scheme serving any particular phase shall subsequently be implemented in accordance with the approved details (unless otherwise agreed with the Local Planning Authority) prior to the occupation of any dwellings in that phase and no building in that phase of the development shall be occupied until the surface water drainage scheme has been fully implemented in accordance with the approved details.

Reason: To ensure that the proposed development is satisfactorily drained to prevent the increased risk of flooding, and improve and protect water quality, habitat and amenity, and ensure future maintenance of these in accordance with national guidance and policies GEN7, GEN9 of the Arun District Local Plan.

Decision:
docdeci

Arun District Council have decided to **APPROVE IN PART details reserved by condition**
The following information submitted regarding Condition 10 imposed on planning permission LU/47/11: relating to the submission of a fully detailed surface water drainage scheme for Parcel C1 and parts of Parcels B2, B4; and C2 (LU/121/17/RES) and constitutes Phase 2 of Persimmon Homes development at the North Littlehampton Strategic Development Area (SDA), based on sustainable drainage principles and designed in accordance with the SuDS strategy for the whole development at North Littlehampton Strategic Development Area (SDA) is approved and the condition is hereby part discharged.

- Persimmon Homes Thames Valley - Land North of Toddington Lane, Littlehampton - Drainage Strategy, West of Wetlands (Discharge of Condition 10), January 2019, prepared by Mayer Brown Limited (Project Code: A/PHDRAIN.10).

Please do not hesitate to contact the above officer if you require any further assistance.

Yours sincerely



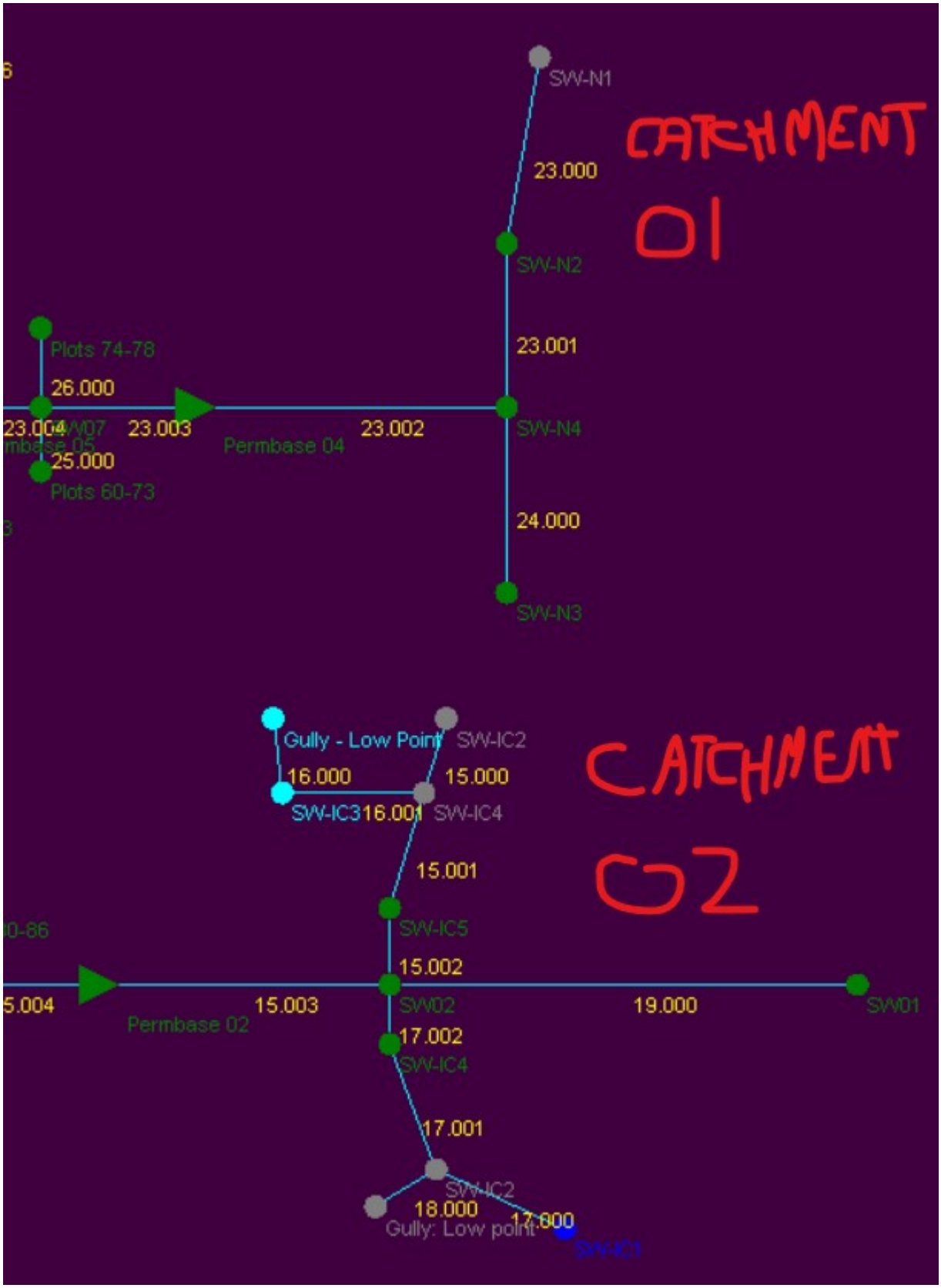
Neil Crowther
Group Head of Planning

docdeci

APPENDIX I: Catchment 01 & 02 Microdrainage Calculations

HAMPTON PARK, LITTLEHAMPTON (Dec 2020)

PHASE 4 CATCHMENT 01 & 02 WINDES PLAN (within overall west of wetlands model)



Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Offline Controls	1	Number of Time/Area Diagrams	0
Number of Online Controls	14	Number of Storage Structures	20	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	D3 (1km)	0.407
FEH Rainfall Version	1999	E (1km)	0.314
Site Location	GB 502850 104400 TQ 02850 04400	F (1km)	2.329
C (1km)	-0.027	Cv (Summer)	0.750
D1 (1km)	0.393	Cv (Winter)	0.840
D2 (1km)	0.274		

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Winter
Duration(s) (mins)	120, 240, 480
Return Period(s) (years)	100
Climate Change (%)	30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	TL_SW01	120 Winter	100	+30%				
1.001	TL_SW02	120 Winter	100	+30%	100/120 Winter			
2.000	Parcel A2_1	480 Winter	100	+30%	100/120 Winter			
2.001	Parcel A2_2	480 Winter	100	+30%	100/120 Winter			
1.002	TL_SW03	120 Winter	100	+30%	100/120 Winter			
3.000	Parcel B6_1	120 Winter	100	+30%	100/120 Winter			
3.001	Parcel B6_2	120 Winter	100	+30%	100/120 Winter			
1.003	TL_SW04	120 Winter	100	+30%	100/120 Winter			
1.004	TL_SW05	120 Winter	100	+30%	100/120 Winter			
4.000	Parcel B1&CH_1	480 Winter	100	+30%	100/120 Winter			
4.001	Parcel B1&CH 2	240 Winter	100	+30%	100/120 Winter			
1.005	Ex. SB10	120 Winter	100	+30%	100/120 Winter			
1.006	Ex. SB9	120 Winter	100	+30%	100/120 Winter			
5.000	Block B_1	120 Winter	100	+30%	100/120 Winter			
5.001	Block B_2	240 Winter	100	+30%	100/120 Winter			
5.002	Ex. SB17	120 Winter	100	+30%	100/120 Winter		100/120 Winter	3
1.007	Ex. SB8	120 Winter	100	+30%	100/120 Winter			
6.000	BovisA_1	120 Winter	100	+30%	100/120 Winter			
6.001	BovisA_2	120 Winter	100	+30%	100/120 Winter			
1.008	Ex SB7	120 Winter	100	+30%	100/120 Winter			
7.000	BovisB_1	240 Winter	100	+30%	100/120 Winter			
7.001	BovisB_2	240 Winter	100	+30%	100/120 Winter			
1.009	Dummy Node	480 Winter	100	+30%	100/120 Winter			
8.000	Plots 123 - 126	120 Winter	100	+30%	100/120 Winter			
9.000	Plots 111 - 116	120 Winter	100	+30%	100/120 Winter			
10.000	Gullies:PH4 SPILL	240 Winter	100	+30%	100/120 Winter	100/120 Winter		
8.001	SW01	240 Winter	100	+30%	100/120 Winter			
8.002	Permbase 01	240 Winter	100	+30%	100/120 Winter			
11.000	Plots 117 - 122	480 Winter	100	+30%	100/120 Winter			
11.001	Stub SW02/2	120 Winter	100	+30%	100/120 Winter			

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Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	TL_SW01	5.399	-0.071	0.000	0.19			13.2	OK	
1.001	TL_SW02	5.382	0.163	0.000	0.30			20.1	SURCHARGED	
2.000	Parcel A2_1	6.080	0.580	0.000	0.05			5.1	SURCHARGED	
2.001	Parcel A2_2	6.088	0.938	0.000	0.36			4.7	SURCHARGED	
1.002	TL_SW03	5.360	0.304	0.000	0.45			29.8	SURCHARGED	
3.000	Parcel B6_1	5.907	0.607	0.000	0.06			6.2	SURCHARGED	
3.001	Parcel B6_2	5.907	0.957	0.000	0.45			5.8	SURCHARGED	
1.003	TL_SW04	5.276	0.341	0.000	0.57			39.4	SURCHARGED	
1.004	TL_SW05	5.179	0.544	0.000	0.86			61.8	SURCHARGED	
4.000	Parcel B1&CH_1	4.819	0.319	0.000	0.26		314	14.3	SURCHARGED	
4.001	Parcel B1&CH 2	4.988	0.703	0.000	0.62			8.3	SURCHARGED	
1.005	Ex. SB10	4.885	0.675	0.000	0.94			64.0	SURCHARGED	
1.006	Ex. SB9	4.767	0.697	0.000	1.10			78.2	SURCHARGED	
5.000	Block B_1	5.142	0.342	0.000	0.05			8.2	SURCHARGED	
5.001	Block B_2	5.196	1.141	0.000	0.40			5.6	SURCHARGED	
5.002	Ex. SB17	4.357	0.407	0.000	0.17	56.9		11.0	SURCHARGED	
1.007	Ex. SB8	4.446	0.646	0.000	1.08			67.3	SURCHARGED	
6.000	BovisA_1	4.881	0.406	0.000	0.49		56	57.4	SURCHARGED	
6.001	BovisA_2	5.252	0.877	0.000	0.16			57.1	SURCHARGED	
1.008	Ex SB7	4.278	0.778	0.000	0.87			118.9	SURCHARGED	
7.000	BovisB_1	4.273	0.498	0.000	0.31		92	48.0	SURCHARGED	
7.001	BovisB_2	4.258	0.658	0.000	0.19			49.5	SURCHARGED	
1.009	Dummy Node	3.925	0.750	0.000	1.09			140.2	SURCHARGED	
8.000	Plots 123 - 126	4.002	0.697	0.000	0.72			6.3	FLOOD RISK	
9.000	Plots 111 - 116	3.985	0.699	0.000	0.68			9.2	FLOOD RISK	
10.000	Gullies:PH4 SPILL	3.916	0.571	66.140	0.82			31.6	FLOOD	3
8.001	SW01	3.951	0.686	0.000	1.38			31.9	FLOOD RISK	
8.002	Permbase 01	3.986	0.741	0.000	1.19		116	38.1	FLOOD RISK	
11.000	Plots 117 - 122	3.931	0.616	0.000	0.02			0.3	FLOOD RISK	
11.001	Stub SW02/2	4.100	1.007	0.000	0.71			21.3	SURCHARGED	

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Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
12.000	Plots 101-110	120 Winter	100	+30%	100/120 Winter			
8.003	SW02	240 Winter	100	+30%	100/120 Winter			
1.010	Ex SB6	120 Winter	100	+30%	100/120 Winter			
13.000	Ret Block A	480 Winter	100	+30%	100/120 Winter			
13.001	Ret Block A	480 Winter	100	+30%	100/120 Winter			
14.000	Plots 95-100	120 Winter	100	+30%	100/120 Winter			
1.011	SW03	120 Winter	100	+30%	100/120 Winter			
1.012	SW04	120 Winter	100	+30%	100/120 Winter			
15.000	SW-IC2	120 Winter	100	+30%	100/120 Winter			
16.000	Gully - Low Point	120 Winter	100	+30%	100/120 Winter	100/120 Winter		
16.001	SW-IC3	120 Winter	100	+30%	100/120 Winter	100/120 Winter		
15.001	SW-IC4	120 Winter	100	+30%	100/120 Winter			
15.002	SW-IC5	120 Winter	100	+30%	100/120 Winter			
17.000	SW-IC1	120 Winter	100	+30%	100/120 Winter	100/120 Winter		
18.000	Gully: Low point	120 Winter	100	+30%	100/120 Winter	100/120 Winter		
17.001	SW-IC2	120 Winter	100	+30%	100/120 Winter			
17.002	SW-IC4	120 Winter	100	+30%	100/120 Winter			
19.000	SW01	120 Winter	100	+30%	100/120 Winter			
15.003	SW02	120 Winter	100	+30%	100/120 Winter			
15.004	Permbase 02	120 Winter	100	+30%	100/120 Winter			
20.000	Plots 80-86	120 Winter	100	+30%	100/120 Winter			
21.000	Plots 87-94	120 Winter	100	+30%	100/120 Winter			
1.013	SW05	120 Winter	100	+30%	100/120 Winter			
22.000	C2 Resiblock A	120 Winter	100	+30%	100/120 Winter			
1.014	SW06	120 Winter	100	+30%	100/120 Winter			
1.015	Permbase 03	120 Winter	100	+30%	100/120 Winter			
23.000	SW-N1	120 Winter	100	+30%	100/120 Winter			
23.001	SW-N2	120 Winter	100	+30%	100/120 Winter			
24.000	SW-N3	120 Winter	100	+30%	100/120 Winter			
23.002	SW-N4	120 Winter	100	+30%	100/120 Winter			
23.003	Permbase 04	120 Winter	100	+30%	100/120 Winter			
25.000	Plots 60-73	120 Winter	100	+30%	100/120 Winter			
26.000	Plots 74-78	120 Winter	100	+30%	100/120 Winter			
23.004	SW07	120 Winter	100	+30%	100/120 Winter			
23.005	Permbase 05	120 Winter	100	+30%	100/120 Winter			
27.000	Plots 39-46	120 Winter	100	+30%	100/240 Winter			
28.000	SW-LYM 01	120 Winter	100	+30%	100/120 Winter			
29.000	Non resi	240 Winter	100	+30%	100/120 Winter			
29.001	Non resi	480 Winter	100	+30%	100/120 Winter	100/480 Winter		
28.001	SW-LYM 02	120 Winter	100	+30%	100/120 Winter			
30.000	Parcel A1	120 Winter	100	+30%	100/120 Winter			
30.001	As-built SA8	240 Winter	100	+30%	100/120 Winter			
31.000	Non Resi	240 Winter	100	+30%	100/120 Winter			
31.001	SW Stub 02	480 Winter	100	+30%	100/120 Winter			
30.002	SW-LYM 03/1	480 Winter	100	+30%	100/120 Winter			
28.002	SW-LYM 03	120 Winter	100	+30%	100/120 Winter			
28.003	SW-LYM 04	120 Winter	100	+30%	100/120 Winter			
32.000	SW-LYM 07	120 Winter	100	+30%	100/120 Winter			
32.001	SW-LYM 08	120 Winter	100	+30%	100/120 Winter			
33.000	SW-LYM 05A	120 Winter	100	+30%				
33.001	SW-LYM 05	120 Winter	100	+30%	100/120 Winter			
28.004	SW-LYM 10	120 Winter	100	+30%	100/120 Winter			
28.005	SW-LYM11	120 Winter	100	+30%	100/120 Winter			
34.000	ExSB17_Dum Node	120 Winter	100	+30%	100/120 Winter			
28.006	SW-LYM 12	120 Winter	100	+30%	100/120 Winter			
28.007	SW-FUT-03	120 Winter	100	+30%	100/120 Winter			
35.000	Stub SW18/1	120 Winter	100	+30%	100/120 Winter			
35.001	SW18	120 Winter	100	+30%	100/120 Winter			
28.008	SW19	120 Winter	100	+30%	100/120 Winter			
28.009	SW20	120 Winter	100	+30%	100/120 Winter			
36.000	Car Park	120 Winter	100	+30%	100/120 Winter			

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Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
12.000	Plots 101-110	4.099	0.874	0.000	0.56			19.8	SURCHARGED	
8.003	SW02	4.075	1.020	0.000	1.44			38.5	FLOOD RISK	
1.010	Ex SB6	4.034	0.959	0.000	0.83			157.1	SURCHARGED	
13.000	Ret Block A	3.841	0.541	0.000	0.27			13.7	SURCHARGED	
13.001	Ret Block A	4.108	1.058	0.000	0.27			4.8	SURCHARGED	
14.000	Plots 95-100	3.926	0.701	0.000	0.32			14.4	SURCHARGED	
1.011	SW03	3.918	0.998	0.000	0.78			172.3	SURCHARGED	
1.012	SW04	3.786	1.046	0.000	0.86			180.6	SURCHARGED	
15.000	SW-IC2	3.897	0.807	0.000	0.15			1.9	FLOOD RISK	
16.000	Gully - Low Point	3.901	0.651	1.039	0.35			5.7	FLOOD	1
16.001	SW-IC3	3.900	0.750	0.041	0.69			9.6	FLOOD	1
15.001	SW-IC4	3.889	0.859	0.000	0.98			13.2	FLOOD RISK	
15.002	SW-IC5	3.863	0.933	0.000	1.11			15.2	FLOOD RISK	
17.000	SW-IC1	3.900	0.410	0.001	0.08			2.1	FLOOD	1
18.000	Gully: Low point	3.900	0.800	0.400	0.56			9.0	FLOOD	1
17.001	SW-IC2	3.891	0.881	0.000	0.98			13.3	FLOOD RISK	
17.002	SW-IC4	3.862	0.962	0.000	1.37			15.5	SURCHARGED	
19.000	SW01	3.876	0.611	0.000	0.41			17.3	SURCHARGED	
15.003	SW02	3.834	0.974	0.000	0.97			62.0	FLOOD RISK	
15.004	Permbase 02	3.744	1.024	0.000	0.77		62	50.0	FLOOD RISK	
20.000	Plots 80-86	3.719	1.019	0.000	0.82			18.8	SURCHARGED	
21.000	Plots 87-94	3.671	0.844	0.000	0.29			22.2	SURCHARGED	
1.013	SW05	3.658	1.058	0.000	1.40			259.6	SURCHARGED	
22.000	C2 Resiblock A	3.445	0.900	0.000	0.47			34.2	SURCHARGED	
1.014	SW06	3.439	0.999	0.000	1.73			290.9	FLOOD RISK	
1.015	Permbase 03	3.339	0.989	0.000	2.68		29	379.8	FLOOD RISK	
23.000	SW-N1	3.317	0.402	0.000	0.31			12.0	SURCHARGED	
23.001	SW-N2	3.315	0.550	0.000	0.53			20.8	SURCHARGED	
24.000	SW-N3	3.313	0.438	0.000	0.32			16.0	SURCHARGED	
23.002	SW-N4	3.311	0.681	0.000	0.62			40.8	SURCHARGED	
23.003	Permbase 04	3.306	0.831	0.000	0.65		17	39.4	SURCHARGED	
25.000	Plots 60-73	3.306	0.556	0.000	1.66			18.1	SURCHARGED	
26.000	Plots 74-78	3.307	0.557	0.000	1.34			21.6	SURCHARGED	
23.004	SW07	3.302	0.902	0.000	1.43			79.7	SURCHARGED	
23.005	Permbase 05	3.298	0.943	0.000	1.38		19	80.1	SURCHARGED	
27.000	Plots 39-46	3.323	-0.067	0.000	0.27			15.9	OK	
28.000	SW-LYM 01	4.503	0.538	0.000	0.33			9.9	SURCHARGED	
29.000	Non resi	4.840	0.390	0.000	0.10			24.2	SURCHARGED	
29.001	Non resi	5.189	1.244	0.018	0.14			5.0	FLOOD	
28.001	SW-LYM 02	4.478	0.613	0.000	0.53			18.1	SURCHARGED	
30.000	Parcel A1	4.478	0.028	0.000	0.12		105	26.9	SURCHARGED	
30.001	As-built SA8	4.469	0.481	0.000	0.62			24.8	SURCHARGED	
31.000	Non Resi	4.795	0.345	0.000	0.05			14.5	SURCHARGED	
31.001	SW Stub 02	5.133	1.268	0.000	0.13			4.8	SURCHARGED	
30.002	SW-LYM 03/1	4.193	0.398	0.000	0.71			30.4	SURCHARGED	
28.002	SW-LYM 03	4.426	0.851	0.000	1.45			48.3	SURCHARGED	
28.003	SW-LYM 04	4.362	0.837	0.000	0.83			51.7	SURCHARGED	
32.000	SW-LYM 07	4.417	0.322	0.000	0.26			11.0	SURCHARGED	
32.001	SW-LYM 08	4.393	0.498	0.000	0.48			29.3	SURCHARGED	
33.000	SW-LYM 05A	7.340	-0.160	0.000	0.45			62.5	FLOOD RISK	
33.001	SW-LYM 05	6.007	0.167	0.000	3.08			76.4	SURCHARGED	
28.004	SW-LYM 10	4.278	0.913	0.000	1.09			142.5	SURCHARGED	
28.005	SW-LYM11	4.040	0.910	0.000	1.01			184.7	SURCHARGED	
34.000	ExSB17_Dum Node	4.221	0.296	0.000	0.81			55.9	SURCHARGED	
28.006	SW-LYM 12	3.894	0.924	0.000	0.98			243.0	SURCHARGED	
28.007	SW-FUT-03	3.672	0.982	0.000	1.29			249.5	SURCHARGED	
35.000	Stub SW18/1	3.673	0.948	0.000	1.18			39.4	SURCHARGED	
35.001	SW18	3.555	0.950	0.000	1.33			46.5	SURCHARGED	
28.008	SW19	3.533	1.113	0.000	1.30			302.9	SURCHARGED	
28.009	SW20	3.372	1.087	0.000	1.48			301.3	SURCHARGED	

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Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
36.000	Car Park	4.698	0.748	0.000	0.05			9.7	SURCHARGED	

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Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
36.001	Car Park	240 Winter	100	+30%	100/120 Winter				4.754
37.000	Non Resi	480 Winter	100	+30%	100/120 Winter				3.657
37.001	Stub SW9/1	480 Winter	100	+30%	100/120 Winter				3.862
38.000	SW08	120 Winter	100	+30%					3.618
39.000	Non Resi	120 Winter	100	+30%	100/120 Winter				3.558
39.001	Stub SW9/2	480 Winter	100	+30%	100/120 Winter				3.640
40.000	Plots 1 - 4	120 Winter	100	+30%					4.342
37.002	SW09	120 Winter	100	+30%	100/120 Winter				3.391
41.000	SW12	120 Winter	100	+30%	100/120 Winter				3.522
41.001	SW13	120 Winter	100	+30%	100/120 Winter				3.508
41.002	SW14	120 Winter	100	+30%	100/120 Winter				3.481
41.003	SW15	120 Winter	100	+30%	100/120 Winter				3.421
42.000	Plots 16-22	120 Winter	100	+30%					3.487
37.003	SW16	120 Winter	100	+30%	100/120 Winter				3.357
37.004	SW17	120 Winter	100	+30%	100/120 Winter				3.352
28.010	SW21	240 Winter	100	+30%	100/120 Winter				3.531
27.001	SW22	240 Winter	100	+30%	100/120 Winter				3.523
43.000	Plots 47-55	120 Winter	100	+30%	100/120 Winter				3.305
27.002	SW23	240 Winter	100	+30%	100/120 Winter				3.500
1.016	SW24	120 Winter	100	+30%	100/120 Winter				3.310
1.017	Permbase 06	480 Winter	100	+30%	100/120 Winter				3.273
44.000	Plots	120 Winter	100	+30%	100/120 Winter				3.136
44.001	Stub SW25/1	120 Winter	100	+30%	100/120 Winter				3.191
45.000	Stub SW25/2	120 Winter	100	+30%	100/120 Winter				3.165
1.018	SW25	480 Winter	100	+30%	100/120 Winter				3.323

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
36.001	Car Park	1.204	0.000	0.11			4.6	FLOOD RISK	
37.000	Non Resi	0.507	0.000	0.05			9.5	SURCHARGED	
37.001	Stub SW9/1	1.037	0.000	0.12			4.6	SURCHARGED	
38.000	SW08	-0.157	0.000	0.20			19.1	OK	
39.000	Non Resi	0.408	0.000	0.02			5.6	SURCHARGED	
39.001	Stub SW9/2	0.915	0.000	0.10			4.5	SURCHARGED	
40.000	Plots 1 - 4	-0.118	0.000	0.10			5.4	OK	
37.002	SW09	0.766	0.000	0.93			37.5	SURCHARGED	
41.000	SW12	0.507	0.000	0.38			12.8	SURCHARGED	
41.001	SW13	0.603	0.000	0.64			25.5	SURCHARGED	
41.002	SW14	0.656	0.000	0.83			38.0	SURCHARGED	
41.003	SW15	0.951	0.000	0.82			50.8	SURCHARGED	
42.000	Plots 16-22	-0.103	0.000	0.22			13.6	OK	
37.003	SW16	0.957	0.000	0.76			100.2	SURCHARGED	
37.004	SW17	1.082	0.000	0.60			99.4	SURCHARGED	
28.010	SW21	0.971	0.000	0.38			225.4	SURCHARGED	
27.001	SW22	0.993	0.000	0.24			200.4	SURCHARGED	
43.000	Plots 47-55	0.580	0.000	1.07			24.5	SURCHARGED	
27.002	SW23	1.105	0.000	0.26			196.4	SURCHARGED	
1.016	SW24	1.000	0.000	0.48			375.6	SURCHARGED	
1.017	Permbase 06	1.073	0.000	0.56		165	282.1	SURCHARGED	
44.000	Plots	0.541	0.000	0.53			21.2	SURCHARGED	
44.001	Stub SW25/1	0.976	0.000	2.89			36.1	SURCHARGED	
45.000	Stub SW25/2	0.900	0.000	1.25			30.9	SURCHARGED	
1.018	SW25	1.598	0.000	0.83			284.8	FLOOD RISK	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 1 Number of Time/Area Diagrams 0
Number of Online Controls 14 Number of Storage Structures 20 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH	D3 (1km)	0.407
FEH Rainfall Version	1999	E (1km)	0.314
Site Location	GB 502850 104400 TQ 02850 04400	F (1km)	2.329
C (1km)	-0.027	Cv (Summer)	0.750
D1 (1km)	0.393	Cv (Winter)	0.840
D2 (1km)	0.274		

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Winter
Duration(s) (mins)	120, 240, 480
Return Period(s) (years)	100
Climate Change (%)	0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	TL_SW01	120 Winter	100	+0%				
1.001	TL_SW02	120 Winter	100	+0%				
2.000	Parcel A2_1	480 Winter	100	+0%	100/120 Winter			
2.001	Parcel A2_2	480 Winter	100	+0%	100/120 Winter			
1.002	TL_SW03	120 Winter	100	+0%				
3.000	Parcel B6_1	120 Winter	100	+0%	100/120 Winter			
3.001	Parcel B6_2	120 Winter	100	+0%	100/120 Winter			
1.003	TL_SW04	120 Winter	100	+0%				
1.004	TL_SW05	120 Winter	100	+0%	100/120 Winter			
4.000	Parcel B1&CH_1	120 Winter	100	+0%	100/120 Winter			
4.001	Parcel B1&CH 2	120 Winter	100	+0%	100/120 Winter			
1.005	Ex. SB10	120 Winter	100	+0%	100/120 Winter			
1.006	Ex. SB9	120 Winter	100	+0%	100/120 Winter			
5.000	Block B_1	240 Winter	100	+0%	100/120 Winter			
5.001	Block B_2	240 Winter	100	+0%	100/120 Winter			
5.002	Ex. SB17	120 Winter	100	+0%	100/120 Winter		100/120 Winter	3
1.007	Ex. SB8	120 Winter	100	+0%	100/120 Winter			
6.000	BovisA_1	120 Winter	100	+0%	100/120 Winter			
6.001	BovisA_2	120 Winter	100	+0%	100/120 Winter			
1.008	Ex SB7	120 Winter	100	+0%	100/120 Winter			
7.000	BovisB_1	120 Winter	100	+0%	100/120 Winter			
7.001	BovisB_2	120 Winter	100	+0%	100/120 Winter			
1.009	Dummy Node	120 Winter	100	+0%	100/120 Winter			
8.000	Plots 123 - 126	120 Winter	100	+0%	100/120 Winter			
9.000	Plots 111 - 116	120 Winter	100	+0%	100/120 Winter			
10.000	Gullies:PH4 SPILL	120 Winter	100	+0%	100/120 Winter	100/120 Winter		
8.001	SW01	120 Winter	100	+0%	100/120 Winter			
8.002	Permbase 01	120 Winter	100	+0%	100/120 Winter			
11.000	Plots 117 - 122	120 Winter	100	+0%	100/120 Winter			
11.001	Stub SW02/2	120 Winter	100	+0%	100/120 Winter			

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	TL_SW01	5.247	-0.223	0.000	0.15			10.2	OK	
1.001	TL_SW02	5.019	-0.200	0.000	0.24			16.3	OK	
2.000	Parcel A2_1	5.844	0.344	0.000	0.04			4.5	SURCHARGED	
2.001	Parcel A2_2	5.851	0.701	0.000	0.31			4.1	SURCHARGED	
1.002	TL_SW03	4.891	-0.165	0.000	0.40			26.3	OK	
3.000	Parcel B6_1	5.640	0.340	0.000	0.06		118	5.4	SURCHARGED	
3.001	Parcel B6_2	5.642	0.692	0.000	0.39			5.0	SURCHARGED	
1.003	TL_SW04	4.843	-0.092	0.000	0.54			37.2	OK	
1.004	TL_SW05	4.769	0.134	0.000	0.76			54.8	SURCHARGED	
4.000	Parcel B1&CH_1	4.689	0.189	0.000	0.20			10.9	SURCHARGED	
4.001	Parcel B1&CH 2	4.792	0.507	0.000	0.59			7.9	SURCHARGED	
1.005	Ex. SB10	4.529	0.319	0.000	0.92			63.0	SURCHARGED	
1.006	Ex. SB9	4.428	0.358	0.000	1.02			72.6	SURCHARGED	
5.000	Block B_1	4.992	0.192	0.000	0.03			5.9	SURCHARGED	
5.001	Block B_2	4.997	0.942	0.000	0.37			5.2	SURCHARGED	
5.002	Ex. SB17	4.054	0.104	0.000	0.16	51.7		10.8	SURCHARGED	
1.007	Ex. SB8	4.180	0.380	0.000	1.08			67.3	SURCHARGED	
6.000	BovisA_1	4.569	0.094	0.000	0.51		52	60.7	SURCHARGED	
6.001	BovisA_2	4.644	0.269	0.000	0.15			54.5	SURCHARGED	
1.008	Ex SB7	4.017	0.517	0.000	0.87			118.1	SURCHARGED	
7.000	BovisB_1	4.022	0.247	0.000	0.30		56	47.2	SURCHARGED	
7.001	BovisB_2	3.995	0.395	0.000	0.19			47.3	SURCHARGED	
1.009	Dummy Node	3.799	0.624	0.000	1.12			144.4	SURCHARGED	
8.000	Plots 123 - 126	3.866	0.561	0.000	0.55			4.8	FLOOD RISK	
9.000	Plots 111 - 116	3.859	0.573	0.000	0.51			6.8	FLOOD RISK	
10.000	Gullies:PH4 SPILL	3.850	0.505	0.061	0.02			0.9	FLOOD	1
8.001	SW01	3.854	0.589	0.000	0.86			19.9	FLOOD RISK	
8.002	Permbase 01	3.846	0.601	0.000	0.74		43	23.6	FLOOD RISK	
11.000	Plots 117 - 122	3.855	0.540	0.000	0.01			0.1	FLOOD RISK	
11.001	Stub SW02/2	3.855	0.762	0.000	0.53			15.7	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
12.000	Plots 101-110	120 Winter	100	+0%	100/120 Winter				3.854
8.003	SW02	120 Winter	100	+0%	100/120 Winter				3.845
1.010	Ex SB6	120 Winter	100	+0%	100/120 Winter				3.776
13.000	Ret Block A	480 Winter	100	+0%	100/120 Winter				3.586
13.001	Ret Block A	480 Winter	100	+0%	100/120 Winter				3.832
14.000	Plots 95-100	120 Winter	100	+0%	100/120 Winter				3.666
1.011	SW03	120 Winter	100	+0%	100/120 Winter				3.661
1.012	SW04	120 Winter	100	+0%	100/120 Winter				3.525
15.000	SW-IC2	120 Winter	100	+0%	100/120 Winter				3.559
16.000	Gully - Low Point	120 Winter	100	+0%	100/120 Winter				3.582
16.001	SW-IC3	120 Winter	100	+0%	100/120 Winter				3.575
15.001	SW-IC4	120 Winter	100	+0%	100/120 Winter				3.556
15.002	SW-IC5	120 Winter	100	+0%	100/120 Winter				3.531
17.000	SW-IC1	120 Winter	100	+0%	100/120 Winter				3.557
18.000	Gully: Low point	120 Winter	100	+0%	100/120 Winter				3.566
17.001	SW-IC2	120 Winter	100	+0%	100/120 Winter				3.553
17.002	SW-IC4	120 Winter	100	+0%	100/120 Winter				3.527
19.000	SW01	120 Winter	100	+0%	100/120 Winter				3.535
15.003	SW02	120 Winter	100	+0%	100/120 Winter				3.508
15.004	Permbase 02	120 Winter	100	+0%	100/120 Winter				3.420
20.000	Plots 80-86	120 Winter	100	+0%	100/120 Winter				3.434
21.000	Plots 87-94	120 Winter	100	+0%	100/120 Winter				3.408
1.013	SW05	120 Winter	100	+0%	100/120 Winter				3.398
22.000	C2 Resiblock A	120 Winter	100	+0%	100/120 Winter				3.249
1.014	SW06	120 Winter	100	+0%	100/120 Winter				3.231
1.015	Permbase 03	120 Winter	100	+0%	100/120 Winter				3.089
23.000	SW-N1	120 Winter	100	+0%	100/120 Winter				3.086
23.001	SW-N2	120 Winter	100	+0%	100/120 Winter				3.076
24.000	SW-N3	120 Winter	100	+0%	100/120 Winter				3.071
23.002	SW-N4	120 Winter	100	+0%	100/120 Winter				3.060
23.003	Permbase 04	240 Winter	100	+0%	100/120 Winter				3.039
25.000	Plots 60-73	120 Winter	100	+0%	100/120 Winter				3.067
26.000	Plots 74-78	120 Winter	100	+0%	100/120 Winter				3.071
23.004	SW07	240 Winter	100	+0%	100/120 Winter				3.036
23.005	Permbase 05	240 Winter	100	+0%	100/120 Winter				3.029
27.000	Plots 39-46	120 Winter	100	+0%					3.286
28.000	SW-LYM 01	120 Winter	100	+0%	100/120 Winter				4.039
29.000	Non resi	480 Winter	100	+0%	100/120 Winter				4.639
29.001	Non resi	480 Winter	100	+0%	100/120 Winter				4.888
28.001	SW-LYM 02	120 Winter	100	+0%	100/120 Winter				4.024
30.000	Parcel A1	120 Winter	100	+0%					4.298
30.001	As-built SA8	120 Winter	100	+0%	100/120 Winter				4.269
31.000	Non Resi	480 Winter	100	+0%	100/120 Winter				4.619
31.001	SW Stub 02	480 Winter	100	+0%	100/120 Winter				4.883
30.002	SW-LYM 03/1	120 Winter	100	+0%	100/120 Winter				4.014
28.002	SW-LYM 03	120 Winter	100	+0%	100/120 Winter				3.978
28.003	SW-LYM 04	120 Winter	100	+0%	100/120 Winter				3.805
32.000	SW-LYM 07	120 Winter	100	+0%					3.939
32.001	SW-LYM 08	120 Winter	100	+0%					3.777
33.000	SW-LYM 05A	120 Winter	100	+0%					7.321
33.001	SW-LYM 05	120 Winter	100	+0%	100/120 Winter				5.933
28.004	SW-LYM 10	120 Winter	100	+0%	100/120 Winter				3.719
28.005	SW-LYM11	240 Winter	100	+0%	100/120 Winter				3.576
34.000	ExSB17_Dum Node	120 Winter	100	+0%					3.853
28.006	SW-LYM 12	240 Winter	100	+0%	100/120 Winter				3.465
28.007	SW-FUT-03	240 Winter	100	+0%	100/120 Winter				3.316
35.000	Stub SW18/1	240 Winter	100	+0%	100/120 Winter				3.233
35.001	SW18	240 Winter	100	+0%	100/120 Winter				3.219
28.008	SW19	240 Winter	100	+0%	100/120 Winter				3.200
28.009	SW20	240 Winter	100	+0%	100/120 Winter				3.060
36.000	Car Park	240 Winter	100	+0%	100/120 Winter				4.649

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
12.000	Plots 101-110	0.629	0.000	0.41			14.5	SURCHARGED	
8.003	SW02	0.790	0.000	1.06			28.5	SURCHARGED	
1.010	Ex SB6	0.701	0.000	0.88			167.9	SURCHARGED	
13.000	Ret Block A	0.286	0.000	0.26			13.1	SURCHARGED	
13.001	Ret Block A	0.782	0.000	0.23			4.2	SURCHARGED	
14.000	Plots 95-100	0.441	0.000	0.21			9.5	SURCHARGED	
1.011	SW03	0.741	0.000	0.82			179.3	SURCHARGED	
1.012	SW04	0.785	0.000	0.88			184.5	SURCHARGED	
15.000	SW-IC2	0.469	0.000	0.11			1.4	SURCHARGED	
16.000	Gully - Low Point	0.332	0.000	0.22			3.7	SURCHARGED	
16.001	SW-IC3	0.425	0.000	0.54			7.4	SURCHARGED	
15.001	SW-IC4	0.526	0.000	0.76			10.2	SURCHARGED	
15.002	SW-IC5	0.601	0.000	0.87			11.8	SURCHARGED	
17.000	SW-IC1	0.067	0.000	0.06			1.7	SURCHARGED	
18.000	Gully: Low point	0.466	0.000	0.44			6.9	SURCHARGED	
17.001	SW-IC2	0.543	0.000	0.75			10.2	SURCHARGED	
17.002	SW-IC4	0.627	0.000	1.06			11.9	SURCHARGED	
19.000	SW01	0.270	0.000	0.31			13.3	SURCHARGED	
15.003	SW02	0.648	0.000	0.75			48.1	SURCHARGED	
15.004	Permbase 02	0.700	0.000	0.66		26	43.0	SURCHARGED	
20.000	Plots 80-86	0.734	0.000	0.58			13.3	SURCHARGED	
21.000	Plots 87-94	0.581	0.000	0.20			15.2	SURCHARGED	
1.013	SW05	0.798	0.000	1.31			243.8	SURCHARGED	
22.000	C2 Resiblock A	0.704	0.000	0.30			21.8	SURCHARGED	
1.014	SW06	0.791	0.000	1.58			266.3	SURCHARGED	
1.015	Permbase 03	0.739	0.000	2.40		44	339.8	SURCHARGED	
23.000	SW-N1	0.171	0.000	0.22			8.5	SURCHARGED	
23.001	SW-N2	0.311	0.000	0.41			16.1	SURCHARGED	
24.000	SW-N3	0.196	0.000	0.19			9.7	SURCHARGED	
23.002	SW-N4	0.430	0.000	0.43			28.0	SURCHARGED	
23.003	Permbase 04	0.564	0.000	0.39		77	23.6	SURCHARGED	
25.000	Plots 60-73	0.317	0.000	1.01			11.1	SURCHARGED	
26.000	Plots 74-78	0.321	0.000	0.82			13.1	SURCHARGED	
23.004	SW07	0.636	0.000	0.83			46.2	SURCHARGED	
23.005	Permbase 05	0.674	0.000	0.79		81	45.7	SURCHARGED	
27.000	Plots 39-46	-0.104	0.000	0.21			12.3	OK	
28.000	SW-LYM 01	0.074	0.000	0.28			8.5	SURCHARGED	
29.000	Non resi	0.189	0.000	0.07			15.9	SURCHARGED	
29.001	Non resi	0.943	0.000	0.13			4.5	SURCHARGED	
28.001	SW-LYM 02	0.159	0.000	0.52			17.6	SURCHARGED	
30.000	Parcel A1	-0.152	0.000	0.12		80	26.7	OK	
30.001	As-built SA8	0.281	0.000	0.62			24.8	SURCHARGED	
31.000	Non Resi	0.169	0.000	0.04			12.7	SURCHARGED	
31.001	SW Stub 02	1.018	0.000	0.12			4.6	SURCHARGED	
30.002	SW-LYM 03/1	0.219	0.000	0.69			29.7	SURCHARGED	
28.002	SW-LYM 03	0.403	0.000	1.46			48.6	SURCHARGED	
28.003	SW-LYM 04	0.280	0.000	0.84			52.6	SURCHARGED	
32.000	SW-LYM 07	-0.156	0.000	0.21			8.8	OK	
32.001	SW-LYM 08	-0.118	0.000	0.40			24.5	OK	
33.000	SW-LYM 05A	-0.179	0.000	0.34			48.1	FLOOD RISK	
33.001	SW-LYM 05	0.093	0.000	2.37			58.8	SURCHARGED	
28.004	SW-LYM 10	0.354	0.000	1.04			135.9	SURCHARGED	
28.005	SW-LYM11	0.446	0.000	0.65			118.7	SURCHARGED	
34.000	ExSB17_Dum Node	-0.072	0.000	0.75			51.9	OK	
28.006	SW-LYM 12	0.495	0.000	0.58			143.1	SURCHARGED	
28.007	SW-FUT-03	0.626	0.000	0.75			145.2	SURCHARGED	
35.000	Stub SW18/1	0.508	0.000	0.57			19.1	SURCHARGED	
35.001	SW18	0.614	0.000	0.65			22.6	SURCHARGED	
28.008	SW19	0.780	0.000	0.73			169.6	SURCHARGED	
28.009	SW20	0.775	0.000	0.82			168.1	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
36.000	Car Park	0.699	0.000	0.03		225	5.8	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
36.001	Car Park	240 Winter	100	+0%	100/120 Winter				4.689
37.000	Non Resi	480 Winter	100	+0%	100/120 Winter				3.364
37.001	Stub SW9/1	480 Winter	100	+0%	100/120 Winter				3.524
38.000	SW08	120 Winter	100	+0%					3.609
39.000	Non Resi	240 Winter	100	+0%	100/120 Winter				3.323
39.001	Stub SW9/2	240 Winter	100	+0%	100/120 Winter				3.344
40.000	Plots 1 - 4	120 Winter	100	+0%					4.338
37.002	SW09	240 Winter	100	+0%	100/120 Winter				3.153
41.000	SW12	120 Winter	100	+0%	100/120 Winter				3.191
41.001	SW13	240 Winter	100	+0%	100/120 Winter				3.182
41.002	SW14	240 Winter	100	+0%	100/120 Winter				3.167
41.003	SW15	240 Winter	100	+0%	100/120 Winter				3.136
42.000	Plots 16-22	120 Winter	100	+0%					3.481
37.003	SW16	240 Winter	100	+0%	100/120 Winter				3.122
37.004	SW17	240 Winter	100	+0%	100/120 Winter				3.092
28.010	SW21	240 Winter	100	+0%	100/120 Winter				3.034
27.001	SW22	240 Winter	100	+0%	100/120 Winter				3.030
43.000	Plots 47-55	240 Winter	100	+0%	100/120 Winter				3.030
27.002	SW23	240 Winter	100	+0%	100/120 Winter				3.028
1.016	SW24	240 Winter	100	+0%	100/120 Winter				3.020
1.017	Permbase 06	240 Winter	100	+0%	100/120 Winter				2.999
44.000	Plots	240 Winter	100	+0%	100/120 Winter				3.003
44.001	Stub SW25/1	240 Winter	100	+0%	100/120 Winter				2.995
45.000	Stub SW25/2	120 Winter	100	+0%	100/120 Winter				3.001
1.018	SW25	240 Winter	100	+0%	100/120 Winter				2.989

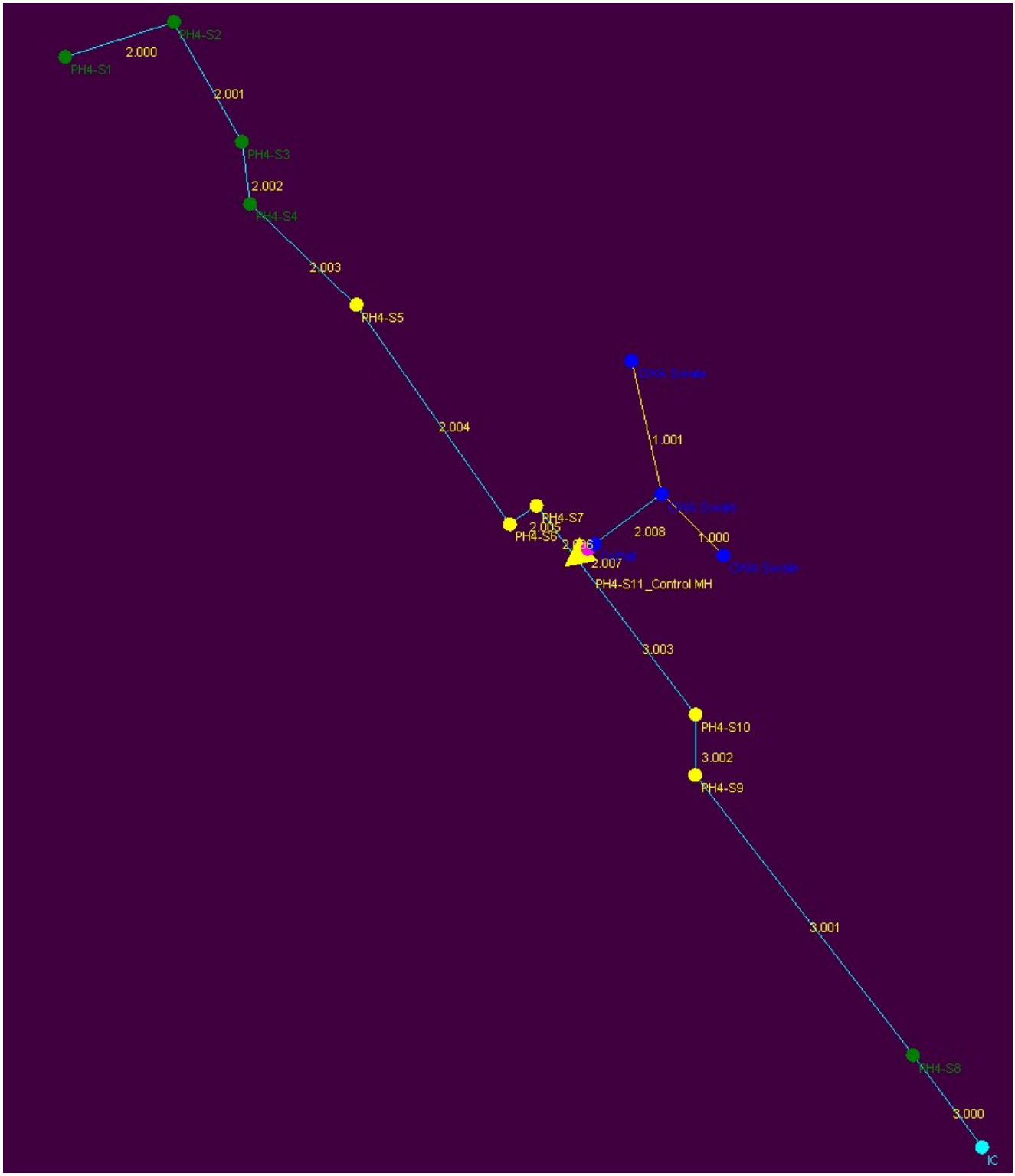
PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
36.001	Car Park	1.139	0.000	0.11			4.5	SURCHARGED	
37.000	Non Resi	0.214	0.000	0.04			6.4	SURCHARGED	
37.001	Stub SW9/1	0.699	0.000	0.10			4.0	SURCHARGED	
38.000	SW08	-0.166	0.000	0.16			14.7	OK	
39.000	Non Resi	0.173	0.000	0.02		210	4.5	SURCHARGED	
39.001	Stub SW9/2	0.619	0.000	0.08			3.5	SURCHARGED	
40.000	Plots 1 - 4	-0.122	0.000	0.08			4.1	OK	
37.002	SW09	0.528	0.000	0.53			21.4	SURCHARGED	
41.000	SW12	0.176	0.000	0.32			10.7	SURCHARGED	
41.001	SW13	0.277	0.000	0.30			12.0	SURCHARGED	
41.002	SW14	0.342	0.000	0.39			17.7	SURCHARGED	
41.003	SW15	0.666	0.000	0.38			23.7	SURCHARGED	
42.000	Plots 16-22	-0.109	0.000	0.17			10.4	OK	
37.003	SW16	0.722	0.000	0.37			49.6	SURCHARGED	
37.004	SW17	0.822	0.000	0.30			49.3	SURCHARGED	
28.010	SW21	0.474	0.000	0.40			239.1	SURCHARGED	
27.001	SW22	0.500	0.000	0.23			190.9	SURCHARGED	
43.000	Plots 47-55	0.305	0.000	0.76			17.4	SURCHARGED	
27.002	SW23	0.633	0.000	0.20			151.9	SURCHARGED	
1.016	SW24	0.710	0.000	0.40			315.0	SURCHARGED	
1.017	Permbase 06	0.799	0.000	0.55		223	275.9	SURCHARGED	
44.000	Plots	0.408	0.000	0.39			15.6	SURCHARGED	
44.001	Stub SW25/1	0.780	0.000	2.23			27.9	SURCHARGED	
45.000	Stub SW25/2	0.736	0.000	1.00			24.7	SURCHARGED	
1.018	SW25	1.264	0.000	0.79			272.3	SURCHARGED	

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APPENDIX J: Catchment 03 Microdrainage Calculations

HAMPTON PARK, LITTLEHAMPTON

PHASE 4 CATCHMENT 03 WINDES PLAN (Sept 2021)



Existing Network Details for Storm

* - Indicates pipe has been modified outside of System 1

	PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
*	1.000	14.566	0.000	0.0	0.000	5.00	0.600	\/	27	Pipe/Conduit
*	2.000	19.169	0.140	136.9	0.048	5.00	0.600	o	225	Pipe/Conduit
*	2.001	23.083	0.150	153.9	0.048	5.00	0.600	o	300	Pipe/Conduit
*	2.002	10.543	0.070	150.6	0.048	0.00	0.600	o	300	Pipe/Conduit
*	2.003	24.538	0.160	153.4	0.048	0.00	0.600	o	300	Pipe/Conduit
*	2.004	44.885	0.300	149.6	0.048	0.00	0.600	o	300	Pipe/Conduit
*	2.005	5.444	0.260	20.9	0.051	0.00	0.600	o	300	Pipe/Conduit
*	2.006	10.994	0.060	183.2	0.000	0.00	0.600	o	300	Pipe/Conduit
*	3.000	19.284	0.590	32.7	0.024	5.00	0.600	o	150	Pipe/Conduit
*	3.001	59.447	0.400	148.6	0.048	0.00	0.600	o	225	Pipe/Conduit
*	3.002	10.000	0.110	90.9	0.048	0.00	0.600	o	225	Pipe/Conduit
*	3.003	33.001	0.170	194.1	0.024	0.00	0.600	o	300	Pipe/Conduit
*	2.007	3.818	0.200	19.1	0.000	0.00	0.600	o	225	Pipe/Conduit
*	2.008	14.044	0.050	280.9	0.000	0.00	0.600	\/	27	Pipe/Conduit
*	1.001	22.887	0.000	0.0	0.000	0.00	0.600	\/	27	Pipe/Conduit

	PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
*	1.000	CWA Swale	1.380	1.000	-0.073	1.380	1.000	-0.073		1800
*	2.000	PH4-S1	3.800	2.390	1.185	3.630	2.250	1.155		1200
*	2.001	PH4-S2	3.630	2.250	1.080	3.710	2.100	1.310		1200
*	2.002	PH4-S3	3.710	2.100	1.310	3.820	2.030	1.490		1200
*	2.003	PH4-S4	3.820	2.030	1.490	3.930	1.870	1.760		1200
*	2.004	PH4-S5	3.930	1.870	1.760	3.580	1.570	1.710		1200
*	2.005	PH4-S6	3.580	1.570	1.710	3.470	1.310	1.860		1200
*	2.006	PH4-S7	3.470	1.310	1.860	3.650	1.250	2.100		1200
*	3.000	IC	3.500	2.740	0.610	3.620	2.150	1.320		450
*	3.001	PH4-S8	3.620	2.000	1.395	3.820	1.600	1.995		1200
*	3.002	PH4-S9	3.820	1.600	1.995	3.600	1.490	1.885		1200
*	3.003	PH4-S10	3.600	1.420	1.880	3.650	1.250	2.100		1200
*	2.007	PH4-S11_Control MH	3.650	1.250	2.175	1.380	1.050	0.105	Hydro-Brake®	1200
*	2.008	Outfall	1.380	1.050	-0.123	1.380	1.000	-0.073		1200
*	1.001	CWA Swale	1.380	1.000	-0.073	1.380	1.000	-0.073		1200

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
CWA Swale	1.380	0.380	Open Manhole	1800	1.000	1.000	27				
PH4-S1	3.800	1.410	Open Manhole	1200	2.000	2.390	225				
PH4-S2	3.630	1.380	Open Manhole	1200	2.001	2.250	300	2.000	2.250	225	
PH4-S3	3.710	1.610	Open Manhole	1200	2.002	2.100	300	2.001	2.100	300	
PH4-S4	3.820	1.790	Open Manhole	1200	2.003	2.030	300	2.002	2.030	300	
PH4-S5	3.930	2.060	Open Manhole	1200	2.004	1.870	300	2.003	1.870	300	
PH4-S6	3.580	2.010	Open Manhole	1200	2.005	1.570	300	2.004	1.570	300	
PH4-S7	3.470	2.160	Open Manhole	1200	2.006	1.310	300	2.005	1.310	300	
IC	3.500	0.760	Open Manhole	450	3.000	2.740	150				
PH4-S8	3.620	1.620	Open Manhole	1200	3.001	2.000	225	3.000	2.150	150	75
PH4-S9	3.820	2.220	Open Manhole	1200	3.002	1.600	225	3.001	1.600	225	
PH4-S10	3.600	2.180	Open Manhole	1200	3.003	1.420	300	3.002	1.490	225	
PH4-S11_Control MH	3.650	2.400	Open Manhole	1200	2.007	1.250	225	2.006	1.250	300	
								3.003	1.250	300	
Outfall	1.380	0.330	Open Manhole	1200	2.008	1.050	27	2.007	1.050	225	
CWA Swale	1.380	0.380	Open Manhole	1200	1.001	1.000	27	1.000	1.000	27	
								2.008	1.000	27	
CWA Swale	1.380	0.380	Open Manhole	1200		OUTFALL		1.001	1.000	27	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
CWA Swale	503616.225	104032.302	503616.225	104032.302	Required	
PH4-S1	503505.889	104115.816	503505.889	104115.816	Required	
PH4-S2	503524.143	104121.669	503524.143	104121.669	Required	
PH4-S3	503535.514	104101.583	503535.514	104101.583	Required	
PH4-S4	503536.886	104091.130	503536.886	104091.130	Required	
PH4-S5	503554.747	104074.304	503554.747	104074.304	Required	
PH4-S6	503580.447	104037.505	503580.447	104037.505	Required	
PH4-S7	503584.910	104040.622	503584.910	104040.622	Required	
IC	503659.622	103933.151	503659.622	103933.151	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
PH4-S8	503648.037	103948.567	503648.037	103948.567	Required	
PH4-S9	503611.528	103995.482	503611.528	103995.482	Required	
PH4-S10	503611.587	104005.638	503611.587	104005.638	Required	
PH4-S11_Control MH	503591.576	104031.880	503591.576	104031.880	Required	
Outfall	503594.613	104034.193	503594.613	104034.193	Required	
CWA Swale	503605.889	104042.565	503605.889	104042.565	Required	
CWA Swale	503600.824	104064.885			No Entry	

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.001	CWA Swale	1.380	1.000	1.000	1200	0

Datum (m) 1.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	0.800	24	0.800	47	0.800	70	0.800	93	0.800	116	0.800	139	0.800	162	0.800
2	0.800	25	0.800	48	0.800	71	0.800	94	0.800	117	0.800	140	0.800	163	0.800
3	0.800	26	0.800	49	0.800	72	0.800	95	0.800	118	0.800	141	0.800	164	0.800
4	0.800	27	0.800	50	0.800	73	0.800	96	0.800	119	0.800	142	0.800	165	0.800
5	0.800	28	0.800	51	0.800	74	0.800	97	0.800	120	0.800	143	0.800	166	0.800
6	0.800	29	0.800	52	0.800	75	0.800	98	0.800	121	0.800	144	0.800	167	0.800
7	0.800	30	0.800	53	0.800	76	0.800	99	0.800	122	0.800	145	0.800	168	0.800
8	0.800	31	0.800	54	0.800	77	0.800	100	0.800	123	0.800	146	0.800	169	0.800
9	0.800	32	0.800	55	0.800	78	0.800	101	0.800	124	0.800	147	0.800	170	0.800
10	0.800	33	0.800	56	0.800	79	0.800	102	0.800	125	0.800	148	0.800	171	0.800
11	0.800	34	0.800	57	0.800	80	0.800	103	0.800	126	0.800	149	0.800	172	0.800
12	0.800	35	0.800	58	0.800	81	0.800	104	0.800	127	0.800	150	0.800	173	0.800
13	0.800	36	0.800	59	0.800	82	0.800	105	0.800	128	0.800	151	0.800	174	0.800
14	0.800	37	0.800	60	0.800	83	0.800	106	0.800	129	0.800	152	0.800	175	0.800
15	0.800	38	0.800	61	0.800	84	0.800	107	0.800	130	0.800	153	0.800	176	0.800
16	0.800	39	0.800	62	0.800	85	0.800	108	0.800	131	0.800	154	0.800	177	0.800
17	0.800	40	0.800	63	0.800	86	0.800	109	0.800	132	0.800	155	0.800	178	0.800
18	0.800	41	0.800	64	0.800	87	0.800	110	0.800	133	0.800	156	0.800	179	0.800
19	0.800	42	0.800	65	0.800	88	0.800	111	0.800	134	0.800	157	0.800	180	0.800
20	0.800	43	0.800	66	0.800	89	0.800	112	0.800	135	0.800	158	0.800	181	0.800
21	0.800	44	0.800	67	0.800	90	0.800	113	0.800	136	0.800	159	0.800	182	0.800
22	0.800	45	0.800	68	0.800	91	0.800	114	0.800	137	0.800	160	0.800	183	0.800
23	0.800	46	0.800	69	0.800	92	0.800	115	0.800	138	0.800	161	0.800	184	0.800

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Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
185	0.800	237	0.800	289	0.800	341	0.800	393	0.800	445	0.800	497	0.800	549	0.800
186	0.800	238	0.800	290	0.800	342	0.800	394	0.800	446	0.800	498	0.800	550	0.800
187	0.800	239	0.800	291	0.800	343	0.800	395	0.800	447	0.800	499	0.800	551	0.800
188	0.800	240	0.800	292	0.800	344	0.800	396	0.800	448	0.800	500	0.800	552	0.800
189	0.800	241	0.800	293	0.800	345	0.800	397	0.800	449	0.800	501	0.800	553	0.800
190	0.800	242	0.800	294	0.800	346	0.800	398	0.800	450	0.800	502	0.800	554	0.800
191	0.800	243	0.800	295	0.800	347	0.800	399	0.800	451	0.800	503	0.800	555	0.800
192	0.800	244	0.800	296	0.800	348	0.800	400	0.800	452	0.800	504	0.800	556	0.800
193	0.800	245	0.800	297	0.800	349	0.800	401	0.800	453	0.800	505	0.800	557	0.800
194	0.800	246	0.800	298	0.800	350	0.800	402	0.800	454	0.800	506	0.800	558	0.800
195	0.800	247	0.800	299	0.800	351	0.800	403	0.800	455	0.800	507	0.800	559	0.800
196	0.800	248	0.800	300	0.800	352	0.800	404	0.800	456	0.800	508	0.800	560	0.800
197	0.800	249	0.800	301	0.800	353	0.800	405	0.800	457	0.800	509	0.800	561	0.800
198	0.800	250	0.800	302	0.800	354	0.800	406	0.800	458	0.800	510	0.800	562	0.800
199	0.800	251	0.800	303	0.800	355	0.800	407	0.800	459	0.800	511	0.800	563	0.800
200	0.800	252	0.800	304	0.800	356	0.800	408	0.800	460	0.800	512	0.800	564	0.800
201	0.800	253	0.800	305	0.800	357	0.800	409	0.800	461	0.800	513	0.800	565	0.800
202	0.800	254	0.800	306	0.800	358	0.800	410	0.800	462	0.800	514	0.800	566	0.800
203	0.800	255	0.800	307	0.800	359	0.800	411	0.800	463	0.800	515	0.800	567	0.800
204	0.800	256	0.800	308	0.800	360	0.800	412	0.800	464	0.800	516	0.800	568	0.800
205	0.800	257	0.800	309	0.800	361	0.800	413	0.800	465	0.800	517	0.800	569	0.800
206	0.800	258	0.800	310	0.800	362	0.800	414	0.800	466	0.800	518	0.800	570	0.800
207	0.800	259	0.800	311	0.800	363	0.800	415	0.800	467	0.800	519	0.800	571	0.800
208	0.800	260	0.800	312	0.800	364	0.800	416	0.800	468	0.800	520	0.800	572	0.800
209	0.800	261	0.800	313	0.800	365	0.800	417	0.800	469	0.800	521	0.800	573	0.800
210	0.800	262	0.800	314	0.800	366	0.800	418	0.800	470	0.800	522	0.800	574	0.800
211	0.800	263	0.800	315	0.800	367	0.800	419	0.800	471	0.800	523	0.800	575	0.800
212	0.800	264	0.800	316	0.800	368	0.800	420	0.800	472	0.800	524	0.800	576	0.800
213	0.800	265	0.800	317	0.800	369	0.800	421	0.800	473	0.800	525	0.800	577	0.800
214	0.800	266	0.800	318	0.800	370	0.800	422	0.800	474	0.800	526	0.800	578	0.800
215	0.800	267	0.800	319	0.800	371	0.800	423	0.800	475	0.800	527	0.800	579	0.800
216	0.800	268	0.800	320	0.800	372	0.800	424	0.800	476	0.800	528	0.800	580	0.800
217	0.800	269	0.800	321	0.800	373	0.800	425	0.800	477	0.800	529	0.800	581	0.800
218	0.800	270	0.800	322	0.800	374	0.800	426	0.800	478	0.800	530	0.800	582	0.800
219	0.800	271	0.800	323	0.800	375	0.800	427	0.800	479	0.800	531	0.800	583	0.800
220	0.800	272	0.800	324	0.800	376	0.800	428	0.800	480	0.800	532	0.800	584	0.800
221	0.800	273	0.800	325	0.800	377	0.800	429	0.800	481	0.800	533	0.800	585	0.800
222	0.800	274	0.800	326	0.800	378	0.800	430	0.800	482	0.800	534	0.800	586	0.800
223	0.800	275	0.800	327	0.800	379	0.800	431	0.800	483	0.800	535	0.800	587	0.800
224	0.800	276	0.800	328	0.800	380	0.800	432	0.800	484	0.800	536	0.800	588	0.800
225	0.800	277	0.800	329	0.800	381	0.800	433	0.800	485	0.800	537	0.800	589	0.800
226	0.800	278	0.800	330	0.800	382	0.800	434	0.800	486	0.800	538	0.800	590	0.800
227	0.800	279	0.800	331	0.800	383	0.800	435	0.800	487	0.800	539	0.800	591	0.800
228	0.800	280	0.800	332	0.800	384	0.800	436	0.800	488	0.800	540	0.800	592	0.800
229	0.800	281	0.800	333	0.800	385	0.800	437	0.800	489	0.800	541	0.800	593	0.800
230	0.800	282	0.800	334	0.800	386	0.800	438	0.800	490	0.800	542	0.800	594	0.800
231	0.800	283	0.800	335	0.800	387	0.800	439	0.800	491	0.800	543	0.800	595	0.800
232	0.800	284	0.800	336	0.800	388	0.800	440	0.800	492	0.800	544	0.800	596	0.800
233	0.800	285	0.800	337	0.800	389	0.800	441	0.800	493	0.800	545	0.800	597	0.800
234	0.800	286	0.800	338	0.800	390	0.800	442	0.800	494	0.800	546	0.800	598	0.800
235	0.800	287	0.800	339	0.800	391	0.800	443	0.800	495	0.800	547	0.800	599	0.800
236	0.800	288	0.800	340	0.800	392	0.800	444	0.800	496	0.800	548	0.800	600	0.800

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: PH4-S11_Control MH, DS/PN: 2.007, Volume (m³): 5.7

Unit Reference	MD-SHE-0157-1300-1500-1300
Design Head (m)	1.500
Design Flow (l/s)	13.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	157
Invert Level (m)	1.250
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	13.0	Kick-Flo®	0.950	10.5
Flush-Flo™	0.443	13.0	Mean Flow over Head Range	-	11.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.6	0.800	12.0	2.000	14.9	4.000	20.7	7.000	27.1
0.200	11.7	1.000	10.7	2.200	15.6	4.500	21.9	7.500	28.0
0.300	12.7	1.200	11.7	2.400	16.2	5.000	23.1	8.000	28.9
0.400	13.0	1.400	12.6	2.600	16.9	5.500	24.1	8.500	29.8
0.500	13.0	1.600	13.4	3.000	18.1	6.000	25.2	9.000	30.6
0.600	12.8	1.800	14.2	3.500	19.4	6.500	26.2	9.500	31.4

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Storage Structures for Storm

Cellular Storage Manhole: PH4-S11_Control MH, DS/PN: 2.007

Invert Level (m) 1.250 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	150.0	150.0	1.500	150.0	255.0	1.501	0.0	255.0

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Catchment
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 502950 104450 TQ 02950 04450	Cv (Winter)	1.000

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	ON

Profile(s)	Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2
Climate Change (%)	0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	CWA Swale	480 Winter	2	+0%		2/15 Winter			1.417
2.000	PH4-S1	15 Winter	2	+0%					2.466
2.001	PH4-S2	15 Winter	2	+0%					2.352
2.002	PH4-S3	15 Winter	2	+0%					2.236
2.003	PH4-S4	15 Winter	2	+0%					2.171
2.004	PH4-S5	15 Winter	2	+0%					2.024
2.005	PH4-S6	15 Winter	2	+0%					1.702
2.006	PH4-S7	240 Winter	2	+0%	2/120 Winter				1.613
3.000	IC	15 Winter	2	+0%					2.781
3.001	PH4-S8	15 Winter	2	+0%					2.089
3.002	PH4-S9	15 Winter	2	+0%					1.708
3.003	PH4-S10	240 Winter	2	+0%					1.612
2.007	PH4-S11_Control MH	240 Winter	2	+0%	2/15 Winter				1.607
2.008	Outfall	480 Winter	2	+0%		2/15 Winter			1.417
1.001	CWA Swale	480 Winter	2	+0%		2/15 Winter			1.417

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	CWA Swale	-0.036	37.244	1.10			184.7	FLOOD	9
2.000	PH4-S1	-0.149	0.000	0.24			9.8	OK	
2.001	PH4-S2	-0.198	0.000	0.25			19.6	OK	
2.002	PH4-S3	-0.164	0.000	0.42			28.0	OK	
2.003	PH4-S4	-0.159	0.000	0.45			35.9	OK	
2.004	PH4-S5	-0.146	0.000	0.51			43.4	OK	
2.005	PH4-S6	-0.168	0.000	0.40			51.4	OK	
2.006	PH4-S7	0.003	0.000	0.22			13.6	SURCHARGED	
3.000	IC	-0.109	0.000	0.17			5.0	OK	
3.001	PH4-S8	-0.136	0.000	0.31			12.9	OK	
3.002	PH4-S9	-0.117	0.000	0.47			21.1	OK	
3.003	PH4-S10	-0.108	0.000	0.09			6.6	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
2.007	PH4-S11_Control MH	0.132	0.000	0.19		146	11.9	SURCHARGED	
2.008	Outfall	-0.086	37.258	0.41			170.6	FLOOD	9
1.001	CWA Swale	-0.036	37.289	2.70			465.8	FLOOD	9

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Catchment
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 502950 104450 TQ 02950 04450	Cv (Winter)	1.000

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	ON

Profile(s)	Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	30
Climate Change (%)	0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	CWA Swale	480 Winter	30	+0%		30/15 Winter			1.451
2.000	PH4-S1	15 Winter	30	+0%					2.514
2.001	PH4-S2	15 Winter	30	+0%					2.475
2.002	PH4-S3	15 Winter	30	+0%	30/15 Winter				2.433
2.003	PH4-S4	15 Winter	30	+0%	30/15 Winter				2.390
2.004	PH4-S5	15 Winter	30	+0%	30/15 Winter				2.250
2.005	PH4-S6	120 Winter	30	+0%	30/15 Winter				2.040
2.006	PH4-S7	120 Winter	30	+0%	30/15 Winter				2.038
3.000	IC	15 Winter	30	+0%					2.803
3.001	PH4-S8	15 Winter	30	+0%					2.156
3.002	PH4-S9	120 Winter	30	+0%	30/15 Winter				2.040
3.003	PH4-S10	120 Winter	30	+0%	30/15 Winter				2.035
2.007	PH4-S11_Control MH	120 Winter	30	+0%	30/15 Winter				2.030
2.008	Outfall	480 Winter	30	+0%		30/15 Winter			1.451
1.001	CWA Swale	480 Winter	30	+0%		30/15 Winter			1.451

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	CWA Swale	-0.002	71.130	1.10			184.6	FLOOD	9
2.000	PH4-S1	-0.101	0.000	0.53			21.2	OK	
2.001	PH4-S2	-0.075	0.000	0.50			39.9	OK	
2.002	PH4-S3	0.033	0.000	0.86			56.7	SURCHARGED	
2.003	PH4-S4	0.060	0.000	0.92			73.3	SURCHARGED	
2.004	PH4-S5	0.080	0.000	1.06			90.2	SURCHARGED	
2.005	PH4-S6	0.170	0.000	0.32			40.3	SURCHARGED	
2.006	PH4-S7	0.428	0.000	0.65			39.8	SURCHARGED	
3.000	IC	-0.087	0.000	0.37			10.8	OK	
3.001	PH4-S8	-0.069	0.000	0.78			31.9	OK	
3.002	PH4-S9	0.215	0.000	0.37			16.7	SURCHARGED	
3.003	PH4-S10	0.315	0.000	0.26			19.0	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
2.007	PH4-S11_Control MH	0.555	0.000	0.21		105	13.0	SURCHARGED	
2.008	Outfall	-0.052	71.152	0.41			170.9	FLOOD	9
1.001	CWA Swale	-0.002	71.163	3.83			661.3	FLOOD	9

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0	Number of Offline Controls 0	Number of Time/Area Diagrams 0
Number of Online Controls 1	Number of Storage Structures 1	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Catchment
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 502950 104450 TQ 02950 04450	Cv (Winter)	1.000

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	ON

Profile(s)	Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	CWA Swale	480 Winter	100	+0%	100/240 Winter	100/60 Winter			1.469
2.000	PH4-S1	60 Winter	100	+0%					2.485
2.001	PH4-S2	60 Winter	100	+0%					2.377
2.002	PH4-S3	60 Winter	100	+0%					2.334
2.003	PH4-S4	120 Winter	100	+0%					2.314
2.004	PH4-S5	120 Winter	100	+0%	100/60 Winter				2.308
2.005	PH4-S6	120 Winter	100	+0%	100/60 Winter				2.298
2.006	PH4-S7	120 Winter	100	+0%	100/60 Winter				2.294
3.000	IC	60 Winter	100	+0%					2.791
3.001	PH4-S8	120 Winter	100	+0%	100/60 Winter				2.305
3.002	PH4-S9	120 Winter	100	+0%	100/60 Winter				2.298
3.003	PH4-S10	120 Winter	100	+0%	100/60 Winter				2.293
2.007	PH4-S11_Control MH	120 Winter	100	+0%	100/60 Winter				2.289
2.008	Outfall	480 Winter	100	+0%		100/60 Winter			1.469
1.001	CWA Swale	480 Winter	100	+0%	100/240 Winter	100/60 Winter			1.469

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	CWA Swale	0.016	89.043	1.10			184.6	FLOOD	7
2.000	PH4-S1	-0.130	0.000	0.37			14.9	OK	
2.001	PH4-S2	-0.173	0.000	0.38			29.8	OK	
2.002	PH4-S3	-0.066	0.000	0.67			44.7	OK	
2.003	PH4-S4	-0.016	0.000	0.44			35.4	OK	
2.004	PH4-S5	0.138	0.000	0.52			44.2	SURCHARGED	
2.005	PH4-S6	0.428	0.000	0.38			49.1	SURCHARGED	
2.006	PH4-S7	0.684	0.000	0.79			48.6	SURCHARGED	
3.000	IC	-0.099	0.000	0.25			7.5	OK	
3.001	PH4-S8	0.080	0.000	0.32			13.3	SURCHARGED	
3.002	PH4-S9	0.473	0.000	0.42			19.1	SURCHARGED	
3.003	PH4-S10	0.573	0.000	0.31			22.9	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
2.007	PH4-S11_Control MH	0.814	0.000	0.21		121	13.0	SURCHARGED	
2.008	Outfall	-0.034	89.076	0.43			179.7	FLOOD	7
1.001	CWA Swale	0.016	89.080	4.46			768.8	FLOOD	7

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Catchment
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 502950 104450 TQ 02950 04450	Cv (Winter)	1.000

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	ON

Profile(s)	Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	30

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	CWA Swale	480 Winter	100	+30%	100/240 Winter	100/15 Winter			1.490
2.000	PH4-S1	15 Winter	100	+30%	100/15 Winter				3.649
2.001	PH4-S2	15 Winter	100	+30%	100/15 Winter				3.586
2.002	PH4-S3	15 Winter	100	+30%	100/15 Winter				3.516
2.003	PH4-S4	15 Winter	100	+30%	100/15 Winter				3.414
2.004	PH4-S5	15 Winter	100	+30%	100/15 Winter				3.138
2.005	PH4-S6	120 Winter	100	+30%	100/15 Winter				2.692
2.006	PH4-S7	120 Winter	100	+30%	100/15 Winter				2.688
3.000	IC	15 Winter	100	+30%	100/15 Winter				2.917
3.001	PH4-S8	15 Winter	100	+30%	100/15 Winter				2.733
3.002	PH4-S9	120 Winter	100	+30%	100/15 Winter				2.692
3.003	PH4-S10	120 Winter	100	+30%	100/15 Winter				2.687
2.007	PH4-S11_Control MH	120 Winter	100	+30%	100/15 Winter				2.682
2.008	Outfall	480 Winter	100	+30%		100/15 Winter			1.493
1.001	CWA Swale	480 Winter	100	+30%	100/240 Winter	100/15 Winter			1.491

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	CWA Swale	0.037	110.482	1.10			184.6	FLOOD	9
2.000	PH4-S1	1.034	0.000	0.70			28.2	FLOOD RISK	
2.001	PH4-S2	1.036	0.000	0.71			56.2	FLOOD RISK	
2.002	PH4-S3	1.116	0.000	1.21			80.0	FLOOD RISK	
2.003	PH4-S4	1.084	0.000	1.31			104.3	SURCHARGED	
2.004	PH4-S5	0.968	0.000	1.51			128.1	SURCHARGED	
2.005	PH4-S6	0.822	0.000	0.48			61.2	SURCHARGED	
2.006	PH4-S7	1.078	0.000	0.99			60.6	SURCHARGED	
3.000	IC	0.027	0.000	0.58			17.1	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
3.001	PH4-S8	0.508	0.000	1.16			47.4	SURCHARGED	
3.002	PH4-S9	0.867	0.000	0.56			25.6	SURCHARGED	
3.003	PH4-S10	0.967	0.000	0.41			30.2	SURCHARGED	
2.007	PH4-S11_Control MH	1.207	0.000	0.21			13.0	SURCHARGED	
2.008	Outfall	-0.010	112.519	0.46			193.1	FLOOD	9
1.001	CWA Swale	0.038	111.255	4.29			739.4	FLOOD	9

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APPENDIX K: Central Wetland Plans, Levels & Drainage (WIP)

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KEY

- PROPOSED SURFACE WATER SEWER AND MANHOLE FOR OTHER PHASES
- PROPOSED FOUL WATER SEWER AND MANHOLE FOR OTHER PHASES
- PROPOSED SURFACE WATER HEADWALL AND CULVERT
- PROPOSED SURFACE WATER SWALE
- 2.30 PROPOSED CONTOURS
- 2.30 PROPOSED SPOT LEVEL
- PROPOSED EMBANKMENT
- EXISTING WATER MAIN AND EASEMENT
- RED LINE BOUNDARY
- AREA TO BE DETAILED UP IN FUTURE RM PHASE APPLICATION
- SURFACE WATER DRAINAGE IN THIS AREA FEEDS INTO PHASE 5 RM APPLICATION

NOTES:

1. This drawing is not to be scaled.
2. Based on topographic survey by WYG drawing numbered GGL/A044029/LAY/01.
3. Grading plan layout taken from WYG drawing titled X-GRADING.
4. This drawing is to be read in conjunction with all relevant engineering and landscaping drawings. Any discrepancies are to be reported to the engineer immediately for clarification.
5. All on-site civils and drainage works constructed in accordance with the Mayer Brown Limited Specification, details and MH schedules.
8. Proprietary items are to be constructed in accordance with manufacturers recommendations / requirements.
9. All drainage works shall be carried out in accordance with the requirements of the Local Authority, the Environment Agency and in conjunction with all relevant British Standards, Codes of Practice and 'Sewers for Adoption' 7th Edition and any addendums as appropriate.
10. Invert levels and positions of existing drains / chambers / sewers where new connections are to be made must be checked and confirmed to the engineer prior to the commencement of any works.
11. Any part of the existing drainage system to be retained as part of the new scheme shall be cleaned and inspected. Any structural defects shall be repaired using appropriate and approved means.
12. All new manholes and catchpits are soffit to soffit unless noted otherwise. Invert level shown is outlet pipe.
13. All drainage shall comply with the typical details and the requirements of BS EN 752 and Part H of the Building Regulations.
14. All precast concrete units used in the drainage works shall be manufactured using sulphate resisting cement.
15. The diameters and gradients of the main surface water and foul water carrier drains are identified on the layout.
16. Cover levels are to be adjusted locally to suit finished ground levels.
17. HEALTH AND SAFETY: The works shall be carried out by specialist competent and experienced contractors who are members of a recognised national organisation.Operatives shall have received full and appropriate training for the operations they are to undertake. All work shall be carried out in accordance with all pertinent Health and Safety Regulations.

FOR APPROVAL
NOT FOR CONSTRUCTION

rev.	amendment	checked	date
P6	Drawing revised to show swale 7 as part of the CWA application. Red line boundary, notes and key updated. (TC)	SF	28/01/22
P5	Existing Water Main alignment amended. (TC)	SF	25/01/22
P4	Red line boundary updated. Project Name in title block amended. CWA Swale 01C and existing Water Main added to drawing. (TC)	SF	17/01/22
P3	Spot Levels updated in CWA Pond 03. (TC)	SF	11/11/21
P2	Removed Swale running from Outfall 03, change final outfall to Toddington Ditch. Swale north of Northern crossing revised. General updates. (TC)	SF	25/10/21
P1	Initial Issue (TC)	SF	09/07/21

Mayer Brown Limited
Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client
PERSIMMON HOMES THAMES VALLEY

project
NORTH LITTLEHAMPTON
CENTRAL WETLAND AND NORTHERN CROSSING

scale	drawn by	checked by
1:500	TC	SF

date	cad file
JULY 2021	20.DWG

title
PROPOSED LEVELS AND DRAINAGE

Mayer Brown Limited jobcode | suitability - | revision P6

drawing number
SF/PHLITTLE-CWA.10/20

VIEWPORT 1 - CENTRAL WETLAND

VIEWPORT 2 - SWALE 7

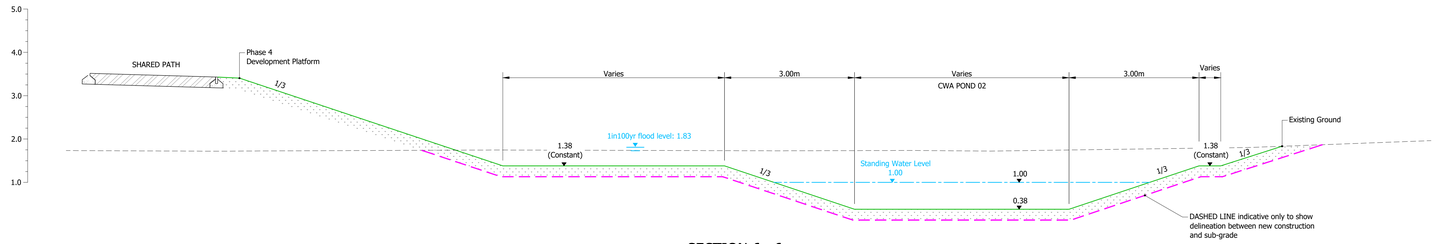
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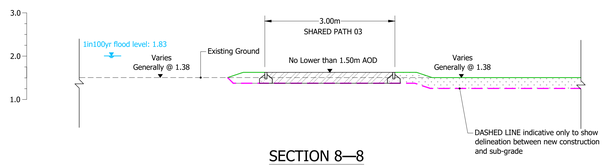
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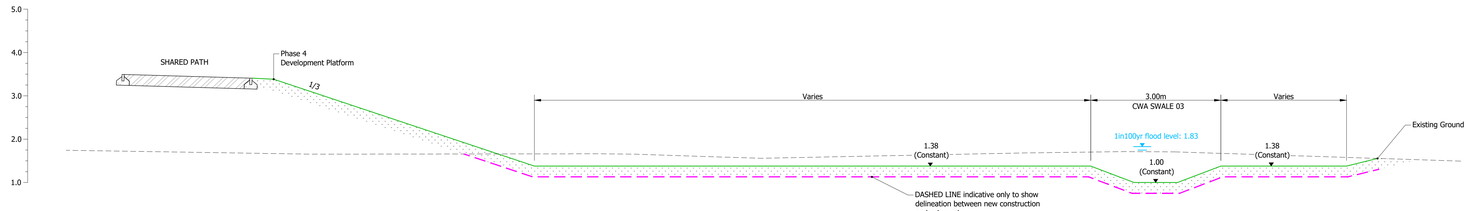
1. This drawing is not to be scaled.
2. This drawing is to be read in conjunction with the following Mayer Brown drawing references:
   - SF/PHLITTLE-CWA.10/20 series - Levels & Drainage Drawing
   - SF/PHLITTLE-CWA.10/30 series - Construction Treatments Drawing
3. Site Remediation dealing with potential contamination or intrusive plant species, and potential disposal thereof, is outside the scope of civils and drainage design undertaken by Mayer Brown Ltd. If required, this will be dealt with by others.



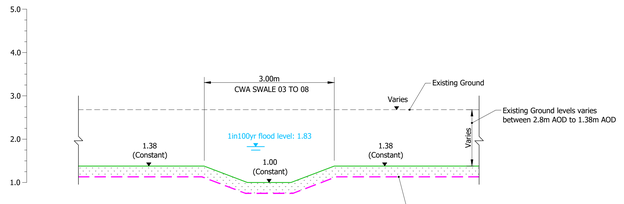
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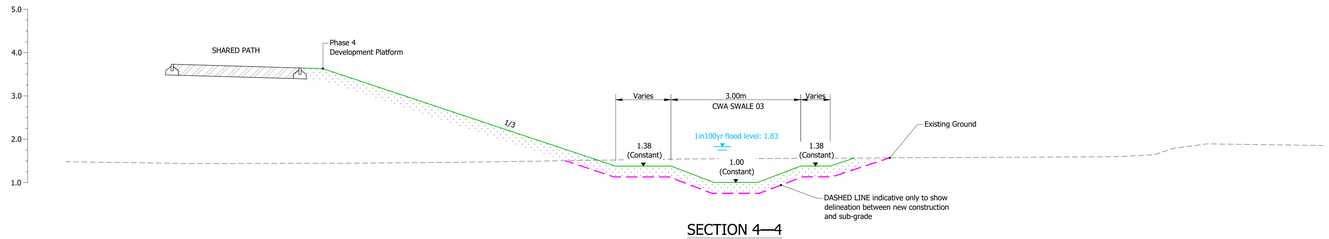
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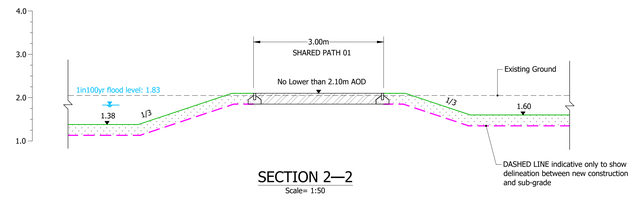
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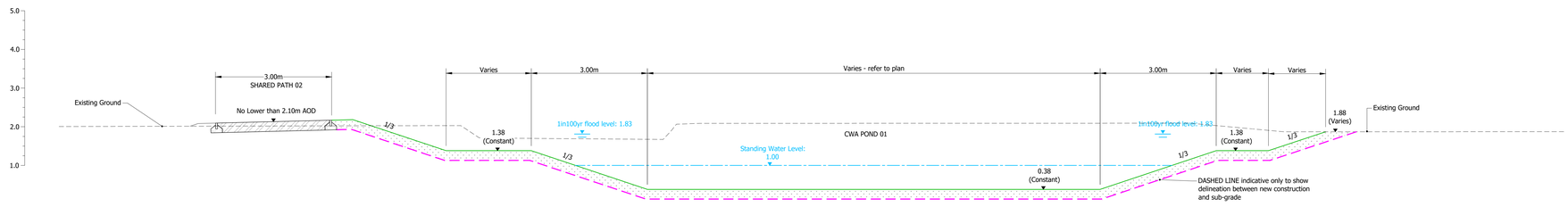
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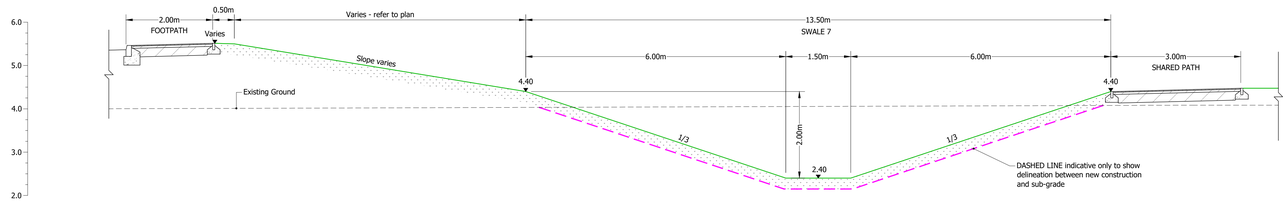
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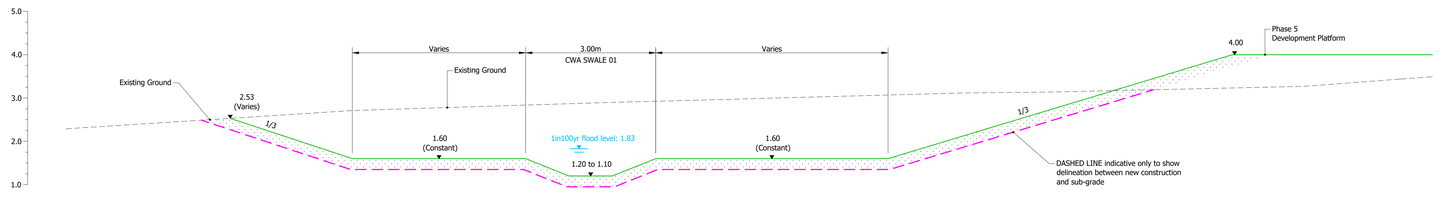
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SECTION 3—3
Scale= 1:50



SECTION 9—9
Scale= 1:50



SECTION 1—1
Scale= 1:50

FOR APPROVAL
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rev.	amendment	checked	date
P2	Section 9-9 added through Swale 07. (IC)	SF	31/01/2022
P1	Initial issue. (IC)	SF	09/07/2021

Mayer Brown Limited
Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client
PERSIMMON HOMES THAMES VALLEY

project
NORTH LITTLEHAMPTON
EAST OF WETLANDS
MAIN AVENUE & NORTHERN CROSSING

scale	drawn by	checked by
1:50	IC	SF

date	cad file
JULY 2021	MBC03.DWG

title
PROPOSED CENTRAL WETLAND SWALES
CONSTRUCTION DETAILS

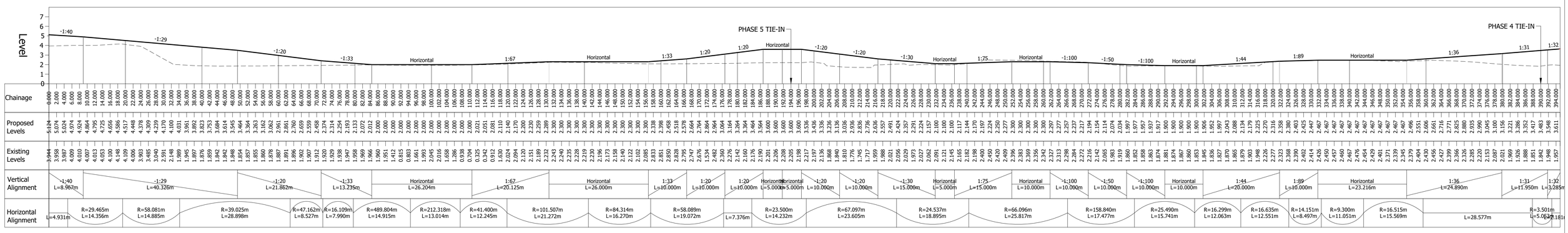
Mayer Brown Limited jobcode	suitability	revision
		P2

drawing number
MB/C/03

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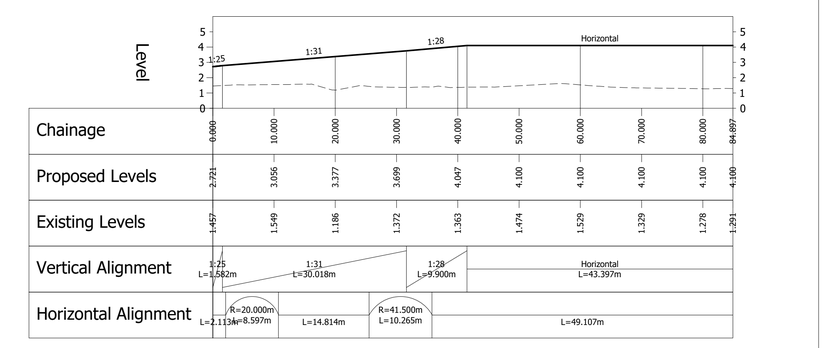
SHARED USE PATH 1 - LONGITUDINAL SECTION

SCALE: H 1:500, V 1:200



SHARED USE PATH 4 - LONGITUDINAL SECTION

SCALE: H 1:500, V 1:200



SHARED USE PATH 3 - LONGITUDINAL SECTION

SCALE: H 1:500, V 1:200

SHARED USE PATH 2 - LONGITUDINAL SECTION

SCALE: H 1:500, V 1:200

KEY

- EXISTING GROUND PROFILE
- PROPOSED FOOTPATH PROFILE
- RED LINE BOUNDARY
- AREA TO BE DETAILED UP IN FUTURE RM PHASE APPLICATION.

Notes:

1. This drawing is not to be scaled

FOR APPROVAL
NOT FOR CONSTRUCTION

rev.	amendment	checked	date
P3	Red line boundary updated. Project Name in title block amended. (TC)	SF	31/01/2022
P2	Red line boundary updated. Project Name in title block amended. (TC)	SF	17/01/2022
P1	Initial Issue (TC)	SF	09/07/2021

mayer brown

Mayer Brown Limited
Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client

PERSIMMON HOMES THAMES VALLEY

project

NORTH LITTLEHAMPTON
CENTRAL WETLAND AND NORTHERN CROSSING

scale	drawn by	checked by
PLAN= 1:500	TC	SF

date	cad file
JULY 2021	40.DWG

title

PROPOSED SHARED USE PATHS LONGITUDINAL SECTIONS AND CHAINAGES

Mayer Brown Limited jobcode	suitability	revision
	-	P3

drawing number

SF/PHLITTLE-CWA.10/40

APPENDIX L: Approved Engineering Plans - GAs, Levels, Construction Treatments & Longitudinal Sections

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KEY

- EXISTING KERB LINE
- PROPOSED KERB/EDGING LINE
- PROPOSED DROPPED KERB
- DIAG 1234 — PROPOSED ROAD MARKING
- PROPOSED TACTILE PAVING
- PROPOSED CORDUROY PAVING
- PROPOSED TRAFFIC SIGN AND SIGN POST
- JUNCTION VISIBILITY SPLAY 2.4m x 25m
- 11m FORWARD VISIBILITY AROUND BEND
- PEDESTRIAN INTERVISIBILITY 2.4m x 2.4m
- SITE BOUNDARY

NOTES:

1. Drawing based on Persimmon Homes Thames Valley Architect's 'Site Layout' drawing reference 545_PL_101, received on 04/06/2020.
2. Based on topographic survey by WYG drawing numbered GGL/A044029/LAY/01.

GAS MAIN
REFER TO STATUTORY
UNDERTAKERS RECORDS

Existing footpath in phase 2 to be adjusted to tie-in with proposed phase 4 footpath

PRIVATE DRIVE ONE (20MPH)

ROAD SIX (20MPH)

MAIN AVENUE (20MPH)

PHASE 2

Road 6

Road 6a

MARY

MAY

LOC.CR

LOC.CF

HOL

2B4P X3

2B3P X3

BLOCK A 8 - 16

17 - 25 BLOCK B

Bin/Cycle Store

Cycle Store

Bin Store

Sign to Diag 956

Signs to Diag 956 to be provided (back to back)

3m Footpath /

CENTRAL WETLAND

CENTRALWETLAND

CENTRAL WETLAND

WATER MAIN
REFER TO STATUTORY
UNDERTAKERS RECORDS

UNKNOWN SERVICE

FOR CONTINUATION REFER TO SHEET 2

KEY TO HEALTH AND SAFETY SYMBOLS

●	INDICATES A RESIDUAL RISK REQUIRING A COMPULSORY ACTION.
ⓘ	INDICATES A RESIDUAL RISK FOR INFORMATION.
⊘	INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION.
⚠	INDICATES A RESIDUAL RISK AS A WARNING.

FOR INFORMATION
NOT FOR CONSTRUCTION

rev.	amendment	checked	date
P9	Junction between footpath linking phase 2 and 4, and cycleway amended to match revised Architect's layout received on 26/03/2021 (clouded). Red line boundary amended. (IC)	SF	30/03/21
P8	Footpath linking phase 2 and 4 amended to a constant 2m width. (TC)	SF	18/03/21
P7	Drawing updated following Stage 2 RSA comments dated 28/11/2020. Key updated. (IC)	SF	18/12/20
P6	Drawing updated following revised layout. (TC)	SF	02/10/20
P5	Kerbs updated in parking courts A & B and along the main avenue. (TC)	SF	09/06/20
P4	Drawing updated following revised layout. (TC)	SF	05/06/20
P3	Drawing updated following revised layout. (TC)	SF	14/04/20
P2	Drawing updated following revised layout. (TC)	SF	06/03/20
P1	Initial Issue. (TC)	SF	04/02/20

mayer brown

Mayer Brown Limited
Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client
PERSIMMON HOMES THAMES VALLEY

project
PHASE 4
LITTLEHAMPTON

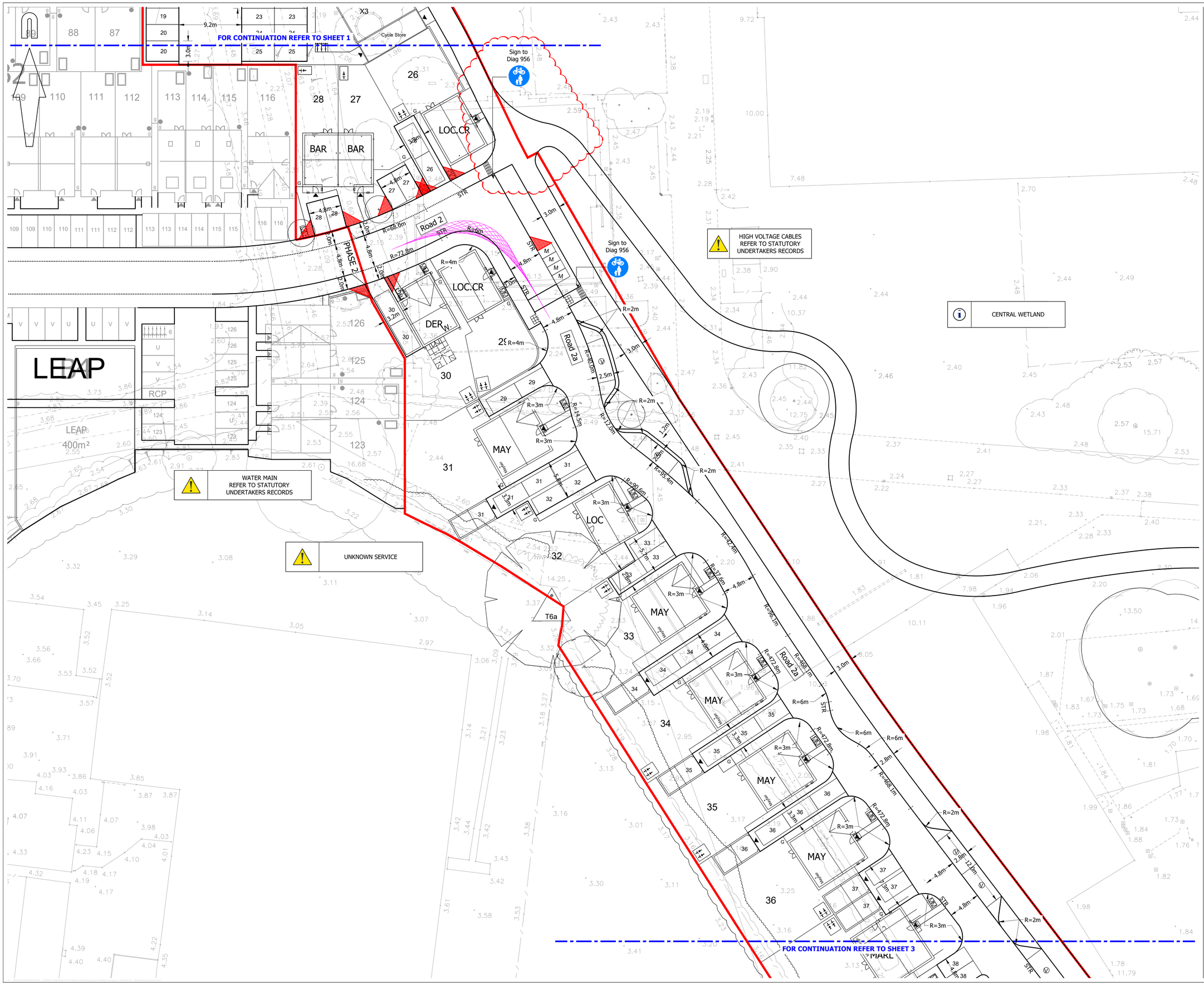
scale	drawn by	checked by
1:250	TC	SF

date	cad file
FEBRUARY 2020	10.DWG

title
GENERAL ARRANGEMENT DRAWING
(SHEET 1 OF 3)

Mayer Brown Limited jobcode	suitability	revision
	-	P9

drawing number
PHLITTLE P4-10-1



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KEY

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- PROPOSED TRAFFIC SIGN AND SIGN POST
- JUNCTION VISIBILITY SPLAY 2.4m x 25m
- 11m FORWARD VISIBILITY AROUND BEND
- PEDESTRIAN INTERVISIBILITY 2.4m x 2.4m
- SITE BOUNDARY

NOTES:

1. Drawing based on Persimmon Homes Thames Valley Architect's 'Site Layout' drawing reference 545_PL_101, received on 04/06/2020.
2. Based on topographic survey by WYG drawing numbered GGL/A044029/LAY/01.

KEY TO HEALTH AND SAFETY SYMBOLS	
	INDICATES A RESIDUAL RISK REQUIRING A COMPULSORY ACTION.
	INDICATES A RESIDUAL RISK FOR INFORMATION.
	INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION.
	INDICATES A RESIDUAL RISK AS A WARNING.

FOR INFORMATION
NOT FOR CONSTRUCTION

rev.	amendment	checked	date
P7	Footpath in clouded area amended to match revised Architect's layout received on 26/03/2021. Red line boundary amended. (IC)	SF	30/03/21
P6	Drawing updated following Stage 2 RSA comments dated 28/11/2020. Key updated. (IC)	SF	18/12/20
P5	Drawing updated following revised layout. (TC)	SF	02/10/20
P4	Drawing updated following revised layout. (TC)	SF	05/06/20
P3	Drawing updated following revised layout. (TC)	SF	14/04/20
P2	Drawing updated following revised layout. (TC)	SF	06/03/20
P1	Initial Issue. (TC)	SF	03/02/20

mayer brown

Mayer Brown Limited
Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client
PERSIMMON HOMES THAMES VALLEY

project
PHASE 4
LITTLEHAMPTON

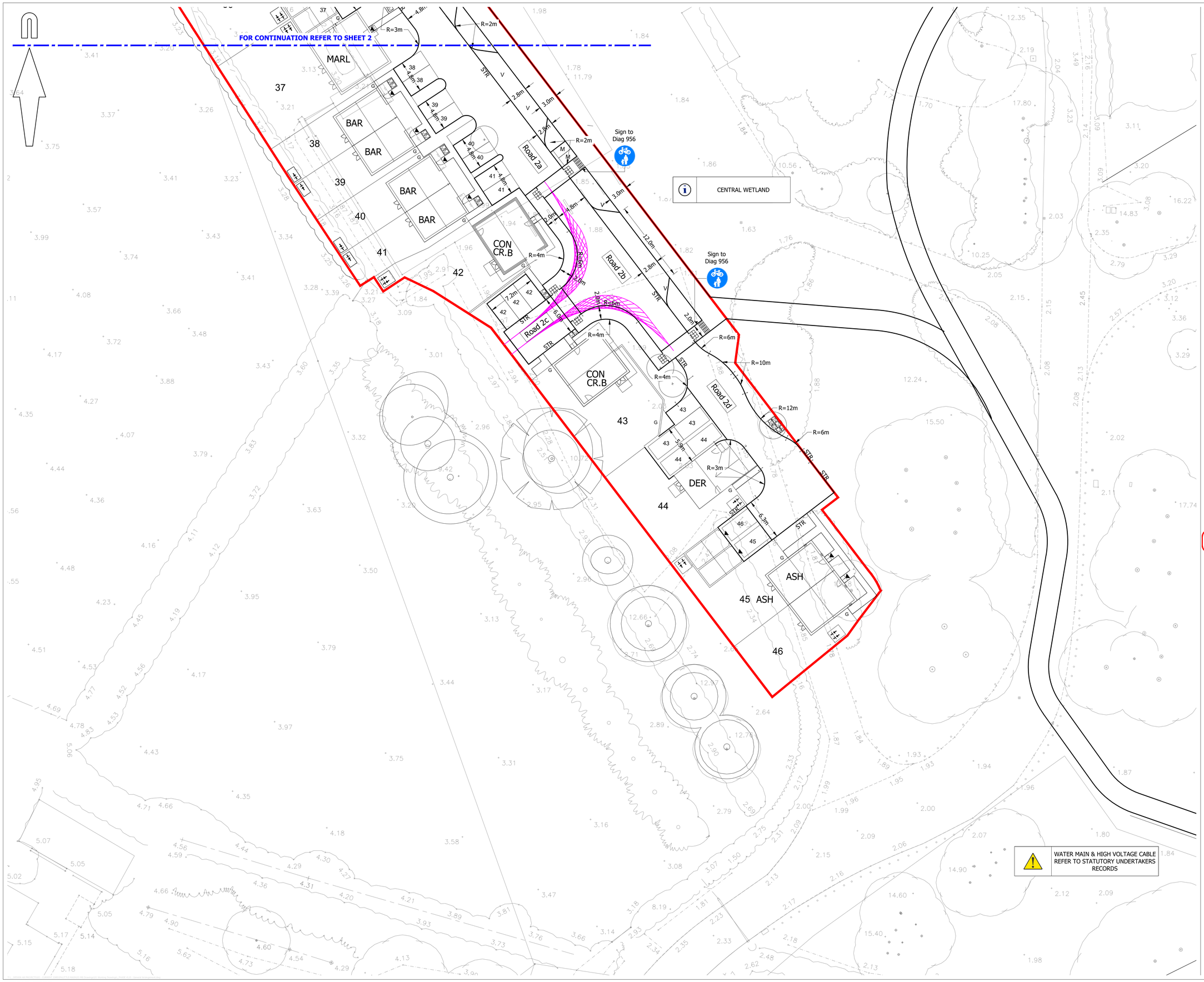
scale	drawn by	checked by
1:250	TC	SF

date	cad file
FEBRUARY 2020	10.DWG

title
GENERAL ARRANGEMENT DRAWING
(SHEET 2 OF 3)

Mayer Brown Limited jobcode	suitability	revision
	-	P7

drawing number
PHLITTLE P4-10-2



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- PROPOSED TRAFFIC SIGN AND SIGN POST
- JUNCTION VISIBILITY SPLAY 2.4m x 25m
- 11m FORWARD VISIBILITY AROUND BEND
- PEDESTRIAN INTERVISIBILITY 2.4m x 2.4m
- SITE BOUNDARY

NOTES:

1. Drawing based on Persimmon Homes Thames Valley Architect's 'Site Layout' drawing reference 545_PL_101, received on 04/06/2020.
2. Based on topographic survey by WYG drawing numbered GGL/A044029/LAY/01.

KEY TO HEALTH AND SAFETY SYMBOLS

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⊘	INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION.
⚠	INDICATES A RESIDUAL RISK AS A WARNING.

FOR INFORMATION
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rev.	amendment	checked	date
P6	Drawing updated following Stage 2 RSA comments dated 28/11/2020. Key updated. (IC)	SF	18/12/20
P5	Drawing updated following revised layout. (TC)	SF	02/10/20
P4	Drawing updated following revised layout. (TC)	SF	05/06/20
P3	Drawing updated following revised layout. (TC)	SF	14/04/20
P2	Drawing updated following revised layout. (TC)	SF	06/03/20
P1	Initial Issue. (TC)	SF	03/02/20

mayer brown

Mayer Brown Limited
Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client
PERSIMMON HOMES THAMES VALLEY

project
PHASE 4
LITTLEHAMPTON

scale	drawn by	checked by
1:250	TC	SF

date	cad file
JANUARY 2019	10.DWG

title
GENERAL ARRANGEMENT DRAWING
(SHEET 3 OF 3)

Mayer Brown Limited jobcode	suitability	revision
	-	P6

drawing number
PHLITTLE P4-10-3

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LEVELS KEY:

FL=1.45	PROPOSED FLOOR LEVEL
1/100	PROPOSED GRADIENT
4.35	PROPOSED SPOT LEVEL
150 GB	PROPOSED GRAVEL BOARD RETENTION
TOW=3.85	PROPOSED RETAINING WALL
4.35	PROPOSED CONTOUR
4.00	PHASE 2 PROPOSED SPOT LEVEL
1/12	PHASE 2 PROPOSED GRADIENT
	SITE BOUNDARY

NOTES:

1. This drawing is not to be scaled.
2. Drawing based on Persimmon Homes Thames Valley Architect's 'Site Layout' drawing reference 545_PL_101, received on 04/06/2020.

Existing footpath in phase 2 to be adjusted to tie-in with proposed phase 4 footpath

Footpath 1:60

PRIVATE DRIVE ONE (20MPH)

ROAD SIX (20MPH)

MAIN AVENUE (20MPH)

PHASE 2

Road 6

Road 6a

C2

B2

MFL=4.05

MFL=4.15

MFL=4.20

FL=3.95

FL=4.40 LOC.CR

FL=4.00

FL=4.25

FL=4.45 BLOCK A 8 - 16

17 - 25 BLOCK B FL=4.45

2B4P X3

2B3P

Bin/Cycle Store

Cycle Store

Tie in with Existing Ground @ Appox 1.68m

Ground south of footpath across wetlands to be lowered to 1.38m AOD

CENTRAL WETLAND

Bottom of Embankment: 1.38

FOR CONTINUATION PLEASE REFER TO SHEET 2

FOR INFORMATION
NOT FOR CONSTRUCTION

rev.	amendment	checked	date
P6	Junction between footpath linking phase 2 and 4, and cycleway amended to match revised Architect's layout received on 26/03/2021 (clouded). Red line boundary amended. (IC)	SF	30/03/21
P5	Footpath linking phase 2 and 4 amended to a constant 2m width. (TC)	SF	18/03/21
P4	Drawing updated following revised layout. (TC)	SF	02/10/20
P3	Kerbs updated in parking courts A & B and along the main avenue. (TC)	SF	09/06/20
P2	Drawing updated following revised layout. (TC)	SF	05/06/20
P1	Initial Issue. (TC)	SF	14/04/20

mayer brown

Mayer Brown Limited
Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client
PERSIMMON HOMES THAMES VALLEY

project
PHASE 4
LITTLEHAMPTON

scale	drawn by	checked by
1:250	TC	SF

date	cad file
FEBRUARY 2020	11.DWG

title
ENGINEERING AND LEVELS DRAWING (SHEET 1 OF 3)

Mayer Brown Limited jobcode	suitability	revision
	-	P6

drawing number
PHLITTLE P4-11-1

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1/200	PROPOSED GRADIENT
4.35	PROPOSED SPOT LEVEL
150 GB	PROPOSED GRAVEL BOARD RETENTION
TOW=3.85	PROPOSED RETAINING WALL
4.35	PROPOSED CONTOUR
4.00	PHASE 2 PROPOSED SPOT LEVEL
1/12	PHASE 2 PROPOSED GRADIENT
	ACOUSTIC FENCE DESIGNED BY OTHERS
	SITE BOUNDARY

NOTES:

1. This drawing is not to be scaled.
2. Drawing based on Persimmon Homes Thames Valley Architect's 'Site Layout' drawing reference 545_PL_101, received on 04/06/2020.

FOR CONTINUATION PLEASE REFER TO SHEET 1

FOR CONTINUATION PLEASE REFER TO SHEET 3

LEAP

Road 2

Road 2a

FOOTPATH 01

PHASE 2

BAR FL=4.20

Cycle Store

FFL 4.300

FFL 4.200

FL=3.85 LOWER

FL=3.90 LOWER

FL=4.00 LOWER

FL=3.60

FL=3.70

FL=3.65

FL=3.85

MFL=4.00

MFL=4.10

MFL=3.90

MFL=3.85

LOC=4.10

4.00 CREST

1in1000yr Flood Level = 2.38m AOD
1in100yr + 20%cc = 1.72m to 1.83m

Bottom of Embankment

GROUND LEVEL UNALTER

Existing Groundlir

Top Bank of Swale= 1.38

FOR INFORMATION
NOT FOR CONSTRUCTION

rev.	amendment	checked	date
P5	Footpath in clouded area amended to match revised Architect's layout received on 26/03/2021. Red line boundary amended. (IC)	SF	30/03/21
P4	Gravel board amended along boundary to the rear of plots 31-33. Bike storage in rear of plot 27 moved. (TC) (clouded).	SF	11/03/21
P3	Drawing updated following revised layout. (TC)	SF	02/10/20
P2	Drawing updated following revised layout. (TC)	SF	05/06/20
P1	Initial Issue. (TC)	SF	14/04/20

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Mayer Brown Limited
Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client
PERSIMMON HOMES THAMES VALLEY

project
PHASE 4
LITTLEHAMPTON

scale	drawn by	checked by
1:250	TC	SF

date	cad file
FEBRUARY 2020	20.DWG

title
ENGINEERING & LEVELS DRAWING
(SHEET 2 OF 3)

Mayer Brown Limited jobcode	suitability	revision
	-	P5

drawing number
PHLITTLE P4-11-2

FOR CONTINUATION PLEASE REFER TO SHEET 2

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1/200	PROPOSED GRADIENT
4.35	PROPOSED SPOT LEVEL
150 GB	PROPOSED GRAVEL BOARD RETENTION
TOW=3.85	PROPOSED RETAINING WALL
4.35	PROPOSED CONTOUR
4.00	PHASE 2 PROPOSED SPOT LEVEL
1/12	PHASE 2 PROPOSED GRADIENT
	SITE BOUNDARY

NOTES:

1. This drawing is not to be scaled.
2. Drawing based on Persimmon Homes Thames Valley Architect's 'Site Layout' drawing reference 545_PL_101, received on 04/06/2020.

FOR INFORMATION
NOT FOR CONSTRUCTION

rev.	amendment	checked	date
P3	Drawing updated following revised layout. (TC)	SF	02/10/20
P2	Drawing updated following revised layout. (TC)	SF	05/06/20
P1	Initial Issue. (TC)	SF	14/04/20

mayer brown

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Lion House Oriental Road Woking Surrey GU22 8AR
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wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

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project
PHASE 4
LITTLEHAMPTON

scale	drawn by	checked by
1:250	TC	SF

date	cad file
FEBRUARY 2020	20.DWG

title
ENGINEERING & LEVELS DRAWING
(SHEET 3 OF 3)

Mayer Brown Limited jobcode	suitability	revision
	-	P3

drawing number
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Existing footpath in phase 2 to be adjusted to tie-in with proposed phase 4 footpath

PRIVATE DRIVE ONE (20MPH)

ROAD SIX (20MPH)

MAIN AVENUE (20MPH)

3m Footpath / Cycleway

Road 6a

Road 6

MARY

MAY

LOC.CR

HOL

2B4P X3

2B3P X3

BLOCK A 8 - 16

17 - 25 BLOCK B

Bin/Cycle Store

Cycle Store

Temporary

C2

B2

FOR CONTINUATION PLEASE REFER TO SHEET 2

KEY

- EXISTING KERB LINE
- PROPOSED KERB/EDGING LINE
- PROPOSED DROPPED KERB
- PROPOSED TACTILE PAVING
- PROPOSED CORDUROY PAVING
- PROPOSED TRAFFIC SIGN AND SIGN POST
- PROPOSED BITUMEN MACADAM CARRIAGEWAY SURFACING
- PROPOSED FULL DEPTH LOCAL DISTRIBUTOR RAISED TABLE CONSTRUCTION MAIN AVENUE
- PROPOSED MARSHALLS BLOCK PAVED CARRIAGEWAY SURFACING (BRINDLE) COLOUR LAID IN HERRINGBONE PATTERN
- PROPOSED MARSHALLS BLOCK PAVED RAMP (BRINDLE) CONSTRUCTION TYPE 5
- PROPOSED PERMEABLE PAVING (BRINDLE) COLOUR
- PROPOSED MARSHALLS BLOCK PAVED SHARED / PRIVATE DRIVE SURFACING (BRACKEN) COLOUR LAID IN HERRINGBONE PATTERN
- PROPOSED BUFF COLOURED SELF BINDING COMPACTED GRAVEL (BUFF) COLOUR WITH TIMBER EDGING
- PROPOSED MARSHALLS BUFF COLOURED SLAB PRIVATE FOOTWAY CONSTRUCTION
- PROPOSED BITUMEN MACADAM FOOTWAY CONSTRUCTION
- PROPOSED BITUMEN MACADAM FOOTWAY CROSSOVER TYPE 1
- PROPOSED SOFT LANDSCAPING (REFER TO LANDSCAPE ARCHITECT DRAWINGS)
- SITE BOUNDARY

KERB TYPES

- (0) TYPE 0 - NO KERB
- (1) TYPE 1 - HB2 - 125mm UPSTAND
- (2) TYPE 2 - BN - 25mm UPSTAND (VEHICULAR CROSSOVER)
- (3) TYPE 3 - EF - FLUSH
- (4) TYPE 4 - HB2 - 100mm UPSTAND
- (5) TYPE 5 - BN - 50mm UPSTAND (UPSTAND ON RAISED TABLE)
- (6) TYPE 6 - MARSHALLS 'SPEEDCHECK' KERB (OR SIMILAR APPROVED)
- (7) TYPE 7 - CS1 - FLUSH
- (8) TYPE 8 - BN - 0-6mm FLUSH
- (9) TYPE 9 - 40mm x 150mm TIMBER EDGING

NOTES:

1. This drawing is not to be scaled.
2. Drawing based on Persimmon Homes Thames Valley Architect's 'Site Layout' drawing reference 545_PL_101, received on 04/06/2020.
3. Based on topographic survey by WYG drawing numbered GGL/A044029/LAY/01.
4. This drawing is to be read in conjunction with all other relevant engineering and landscaping drawings. Any discrepancies are to be reported to the Engineer immediately for clarification.

FOR INFORMATION
NOT FOR CONSTRUCTION

rev.	amendment	checked	date
P9	Junction between footpath linking phase 2 and 4, and cycleway amended to match revised Architect's layout received on 26/03/2021 (clouded). Red line boundary amended. (IC)	SF	30/03/21
P8	Footpath linking phase 2 and 4 amended to a constant 2m width. (TC)	SF	18/03/21
P7	Drawing updated following Stage 2 RSA comments dated 28/11/2020. Key updated. (IC)	SF	18/12/20
P6	Drawing updated following revised layout. Key Updated. (TC)	SF	02/10/20
P5	hatching in parking courts A & B and along the main avenue updated. (TC)	SF	09/06/20
P4	Drawing updated following revised layout. (TC)	SF	05/06/20
P3	Drawing updated following revised layout. (TC)	SF	14/04/20
P2	Drawing updated following revised layout. (TC)	SF	06/03/20
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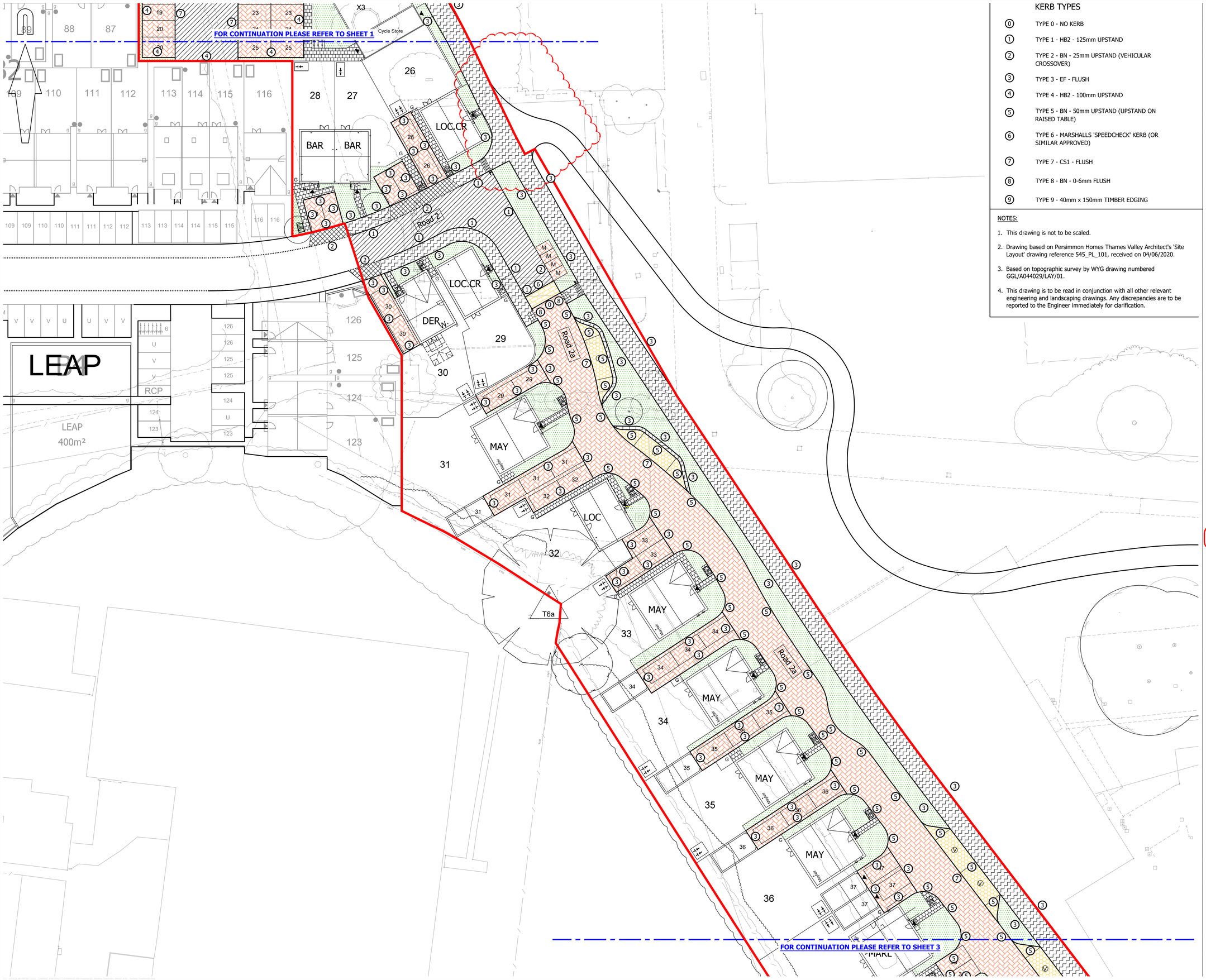
scale	drawn by	checked by
1:250	TC	SF

date	cad file
FEBRUARY 2020	30.DWG

title
SURFACE TREATMENTS DRAWING
(SHEET 1 OF 3)

Mayer Brown Limited jobcode	suitability	revision
	-	P9

drawing number
PHLITTLE P4-30-1



KERB TYPES

0	TYPE 0 - NO KERB
1	TYPE 1 - HB2 - 125mm UPSTAND
2	TYPE 2 - BN - 25mm UPSTAND (VEHICULAR CROSSOVER)
3	TYPE 3 - EF - FLUSH
4	TYPE 4 - HB2 - 100mm UPSTAND
5	TYPE 5 - BN - 50mm UPSTAND (UPSTAND ON RAISED TABLE)
6	TYPE 6 - MARSHALLS 'SPEEDCHECK' KERB (OR SIMILAR APPROVED)
7	TYPE 7 - CS1 - FLUSH
8	TYPE 8 - BN - 0-6mm FLUSH
9	TYPE 9 - 40mm x 150mm TIMBER EDGING

NOTES:

1. This drawing is not to be scaled.
2. Drawing based on Persimmon Homes Thames Valley Architect's 'Site Layout' drawing reference 545_PL_101, received on 04/06/2020.
3. Based on topographic survey by WYG drawing numbered GGL/A044029/LAY/01.
4. This drawing is to be read in conjunction with all other relevant engineering and landscaping drawings. Any discrepancies are to be reported to the Engineer immediately for clarification.

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KEY

- EXISTING KERB LINE
- PROPOSED KERB/EDGING LINE
- PROPOSED DROPPED KERB
- PROPOSED TACTILE PAVING
- PROPOSED CORDUROY PAVING
- PROPOSED TRAFFIC SIGN AND SIGN POST
- PROPOSED BITUMEN MACADAM CARRIAGEWAY SURFACING
- PROPOSED FULL DEPTH LOCAL DISTRIBUTOR RAISED TABLE CONSTRUCTION MAIN AVENUE
- PROPOSED MARSHALLS BLOCK PAVED CARRIAGEWAY SURFACING (BRINDLE) COLOUR LAID IN HERRINGBONE PATTERN
- PROPOSED MARSHALLS BLOCK PAVED RAMP (BRINDLE) CONSTRUCTION TYPE 5
- PROPOSED PERMEABLE PAVING (BRINDLE) COLOUR
- PROPOSED MARSHALLS BLOCK PAVED SHARED / PRIVATE DRIVE SURFACING (BRACKEN) COLOUR LAID IN HERRINGBONE PATTERN
- PROPOSED BUFF COLOURED SELF BINDING COMPACTED GRAVEL (BUFF) COLOUR WITH TIMBER EDGING
- PROPOSED MARSHALLS BUFF COLOURED SLAB PRIVATE FOOTWAY CONSTRUCTION
- PROPOSED BITUMEN MACADAM FOOTWAY CONSTRUCTION
- PROPOSED BITUMEN MACADAM FOOTWAY CROSSOVER TYPE 1
- PROPOSED SOFT LANDSCAPING (REFER TO LANDSCAPE ARCHITECT DRAWINGS)
- SITE BOUNDARY

FOR INFORMATION
NOT FOR CONSTRUCTION

rev.	amendment	checked	date
P7	Footpath in clouded area amended to match revised Architect's layout received on 26/03/2021 . (IC)	SF	30/03/21
P6	Drawing updated following Stage 2 RSA comments dated 28/11/2020. Key updated. (IC)	SF	18/12/20
P5	Drawing updated following revised layout. Key Updated. (TC)	SF	02/10/20
P4	Drawing updated following revised layout. (TC)	SF	05/06/20
P3	Drawing updated following revised layout. (TC)	SF	14/04/20
P2	Drawing updated following revised layout. (TC)	SF	06/03/20
P1	Initial Issue. (TC)	SF	04/02/20

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Mayer Brown Limited
Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client
PERSIMMON HOMES THAMES VALLEY

project
PHASE 4
LITTLEHAMPTON

scale	drawn by	checked by
1:250	TC	SF

date	cad file
FEBRUARY 2020	30.DWG

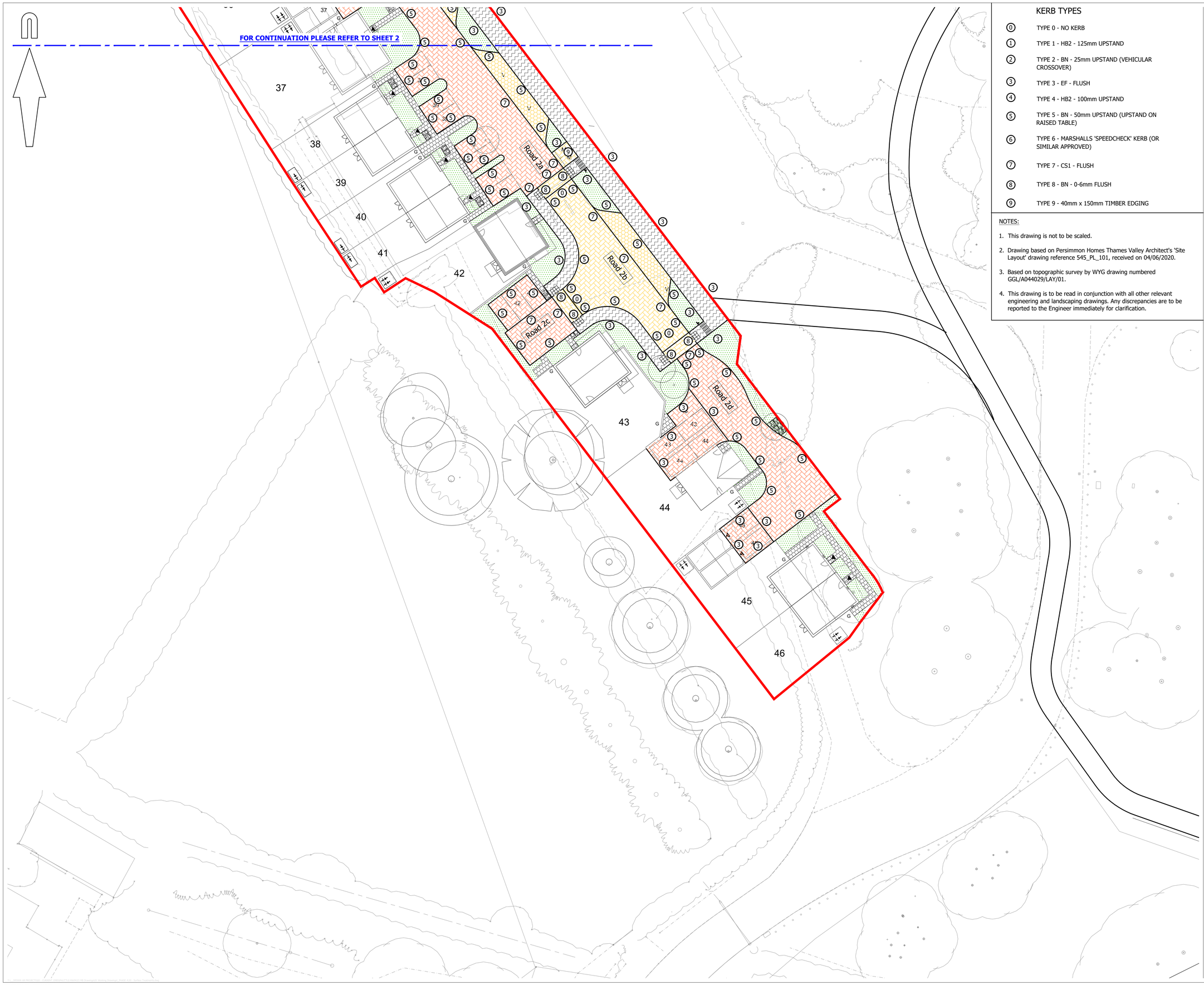
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SURFACE TREATMENTS DRAWING
(SHEET 2 OF 3)

Mayer Brown Limited jobcode	suitability	revision
	-	P7

drawing number
PHLITTLE P4-30-2

ARUN DISTRICT COUNCIL LU/38/21/DOC

FOR CONTINUATION PLEASE REFER TO SHEET 2



KERB TYPES

0. TYPE 0 - NO KERB
1. TYPE 1 - HB2 - 125mm UPSTAND
2. TYPE 2 - BN - 25mm UPSTAND (VEHICULAR CROSSOVER)
3. TYPE 3 - EF - FLUSH
4. TYPE 4 - HB2 - 100mm UPSTAND
5. TYPE 5 - BN - 50mm UPSTAND (UPSTAND ON RAISED TABLE)
6. TYPE 6 - MARSHALLS 'SPEEDCHECK' KERB (OR SIMILAR APPROVED)
7. TYPE 7 - CS1 - FLUSH
8. TYPE 8 - BN - 0-6mm FLUSH
9. TYPE 9 - 40mm x 150mm TIMBER EDGING

NOTES:

1. This drawing is not to be scaled.
2. Drawing based on Persimmon Homes Thames Valley Architect's 'Site Layout' drawing reference 545_PL_101, received on 04/06/2020.
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KEY

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- PROPOSED MARSHALLS BLOCK PAVED RAMP (BRINDLE) CONSTRUCTION TYPE 5
- PROPOSED PERMEABLE PAVING (BRINDLE) COLOUR
- PROPOSED MARSHALLS BLOCK PAVED SHARED / PRIVATE DRIVE SURFACING (BRACKEN) COLOUR LAID IN HERRINGBONE PATTERN
- PROPOSED BUFF COLOURED SELF BINDING COMPACTED GRAVEL (BUFF) COLOUR WITH TIMBER EDGING
- PROPOSED MARSHALLS BUFF COLOURED SLAB PRIVATE FOOTWAY CONSTRUCTION
- PROPOSED BITUMEN MACADAM FOOTWAY CONSTRUCTION
- PROPOSED BITUMEN MACADAM FOOTWAY CROSSOVER TYPE 1
- PROPOSED SOFT LANDSCAPING (REFER TO LANDSCAPE ARCHITECT DRAWINGS)
- SITE BOUNDARY

FOR INFORMATION
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rev.	amendment	checked	date
P6	Drawing updated following Stage 2 RSA comments dated 28/11/2020. Key updated. (IC)	SF	18/12/20
P5	Drawing updated following revised layout. Key Updated. (TC)	SF	02/10/20
P4	Drawing updated following revised layout. (TC)	SF	05/06/20
P3	Drawing updated following revised layout. (TC)	SF	14/04/20
P2	Drawing updated following revised layout. (TC)	SF	06/03/20
P1	Initial Issue. (TC)	SF	04/02/20

Mayer Brown Limited
Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client
PERSIMMON HOMES THAMES VALLEY

project
LITTLEHAMPTON
PHASE 4

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1:250	TC	SF

date	cad file
FEBRUARY 2020	30.DWG

title
SURFACE TREATMENTS DRAWING
(SHEET 3 OF 3)

Mayer Brown Limited jobcode	suitability	revision
	-	P6

drawing number
PHLITTLE P4-30-3

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KEY

SITE BOUNDARY

NOTES:

1. This drawing is to be read in conjunction with 'Proposed Road Longitudinal Sections' drawing ref. PHLITTLEP4-51-1
2. Drawing based on Persimmon Homes Thames Valley Architect's 'Site Layout' drawing reference 545_PL_101, received on 04/06/2020.

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P1	Initial Issue. (TC)	SF	05/06/20

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Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client
PERSIMMON HOMES THAMES VALLEY

project
PHASE 4
LITTLEHAMPTON

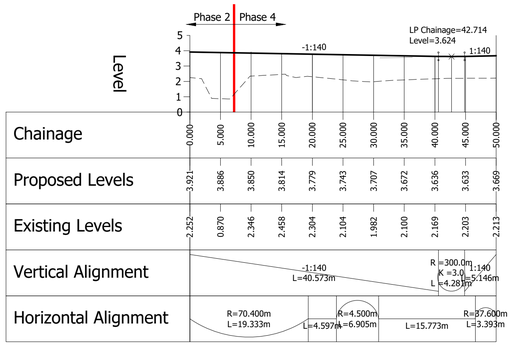
scale	drawn by	checked by
1:500	TC	SF

date	cad file
JUNE 2020	10.DWG

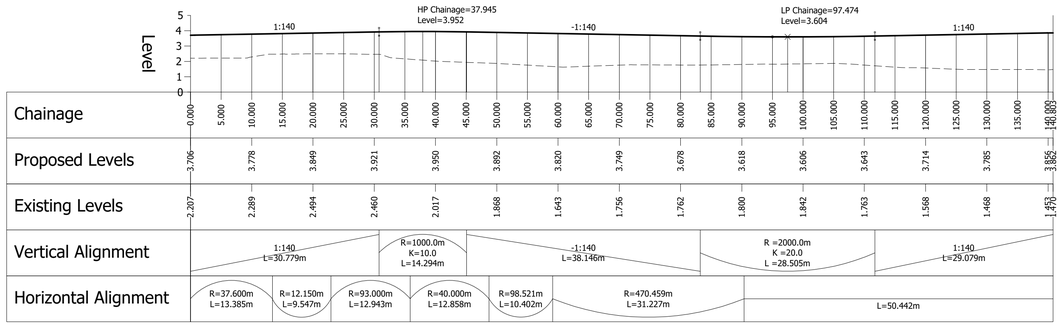
title
PROPOSED ROAD CHAINAGES DRAWING

Mayer Brown Limited jobcode	suitability	revision
	-	P1

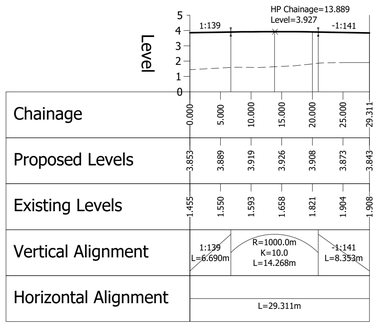
drawing number
PHLITTLE P4-50-1



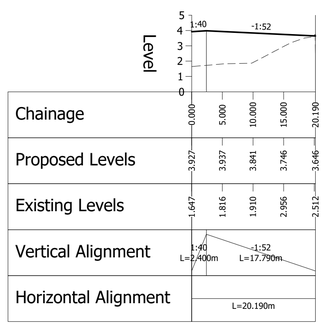
LONGITUDINAL SECTION ALONG ROAD 2



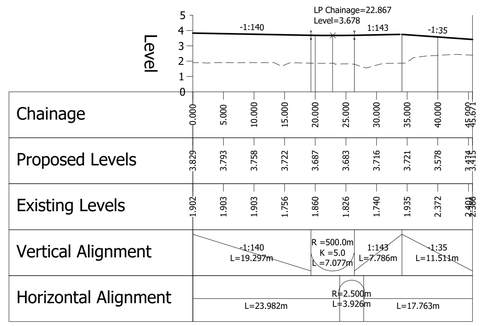
LONGITUDINAL SECTION ALONG ROAD 2a



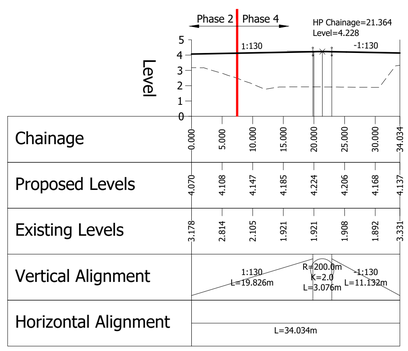
LONGITUDINAL SECTION ALONG ROAD 2b



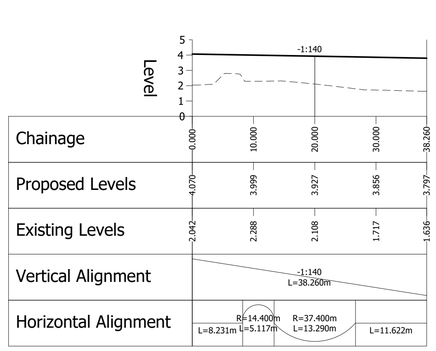
LONGITUDINAL SECTION ALONG ROAD 2c



LONGITUDINAL SECTION ALONG ROAD 2d



LONGITUDINAL SECTION ALONG ROAD 6



LONGITUDINAL SECTION ALONG ROAD 6a

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KEY

EXISTING GROUND PROFILE

PROPOSED ROAD PROFILE

RED LINE BOUDNARY

NOTES:

1. This drawing is to be read in conjunction with MBL 'Proposed Road Chainages Drawing' ref. PHLITTLEP4-50-1.

FOR INFORMATION
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rev.	amendment	checked	date
P1	Initial Issue. (TC)	SF	03/06/20

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Mayer Brown Limited
Lion House Oriental Road Woking Surrey GU22 8AR
Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client
PERSIMMON HOMES THAMES VALLEY

project
PHASE 4
LITTLEHAMPTON

scale	drawn by	checked by
H=1:500, V=200	TC	SF

date	cad file
JUNE 2020	50-51.DWG

title
PROPOSED ROAD LONGITUDINAL SECTIONS

Mayer Brown Limited jobcode	suitability	revision
	-	P1

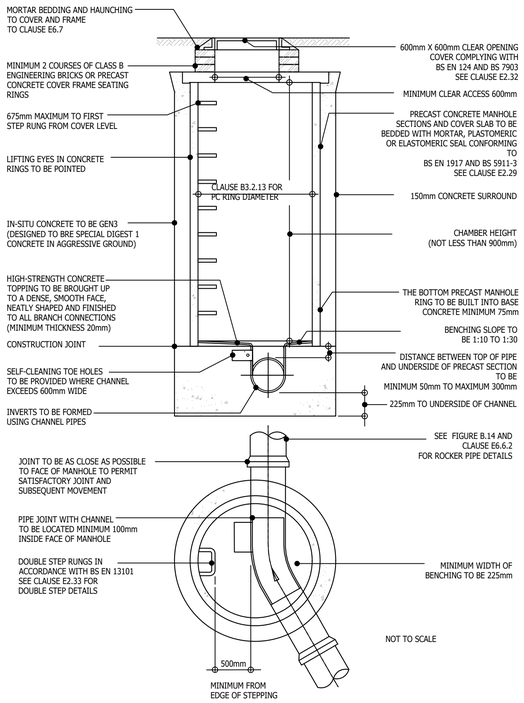
drawing number
PHLITTLE P4-51-1

ARUN DISTRICT COUNCIL LU188021DOC

APPENDIX M: Drainage Construction Details

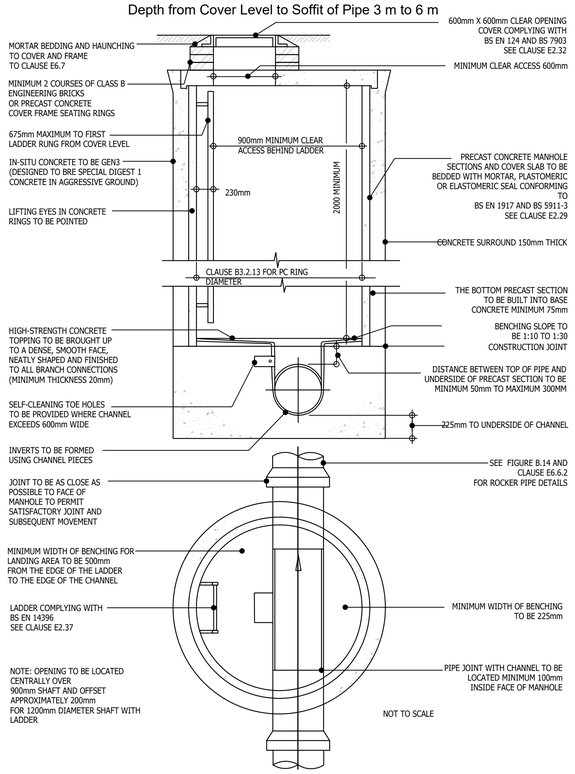
TYPICAL MANHOLE DETAIL - TYPE B

Maximum Depth from Cover Level to Soffit of Pipe 3.0 m



TYPICAL MANHOLE DETAIL - TYPE A

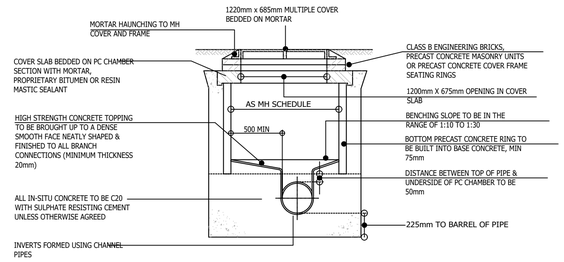
Depth from Cover Level to Soffit of Pipe 3 m to 6 m

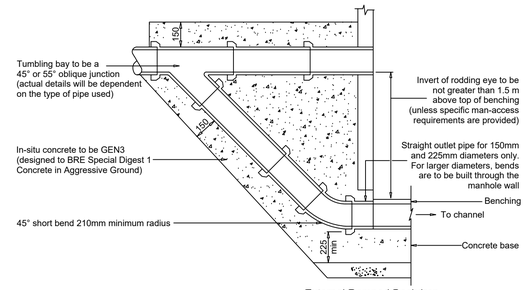


TYPICAL MANHOLE DETAIL - TYPE E

DEPTH FROM GROUND LEVEL TO SOFFIT OF PIPE 1.0m TO 1.45m

SELECTION OF THIS TYPE OF MANHOLE RESTRICTED TO LOCATIONS WHERE GRADE B COVERS ARE TO BE USED





External Ramped Backdrop

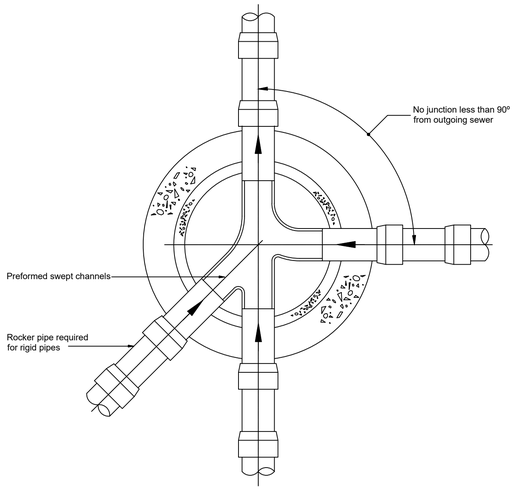
Not to scale, dimensions in millimetres

ALL DRAINAGE PIPEWORK MATERIAL UP TO 300mm TO BE VITRIFIED CLAY, HIGH STRENGTH. ABOVE 300mm TO BE HIGH STRENGTH CONCRETE

ALL WORK TO BE AS SEWERS FOR ADOPTION, 6TH EDITION+TECH ADDENDUM & ANY SOUTHERN WATER AMENDMENTS TO THIS EDITION

IMPORTANT NOTE:
ALL WORKS TO ADOPTABLE SECTION 104 SURFACE WATER AND FOUL WATER SEWERS WILL BE AT RISK UNTIL SECTION 104 TECHNICAL APPROVAL

FIGURE B.14
TYPICAL ARRANGEMENT OF PIPE JUNCTIONS WITHIN MANHOLES

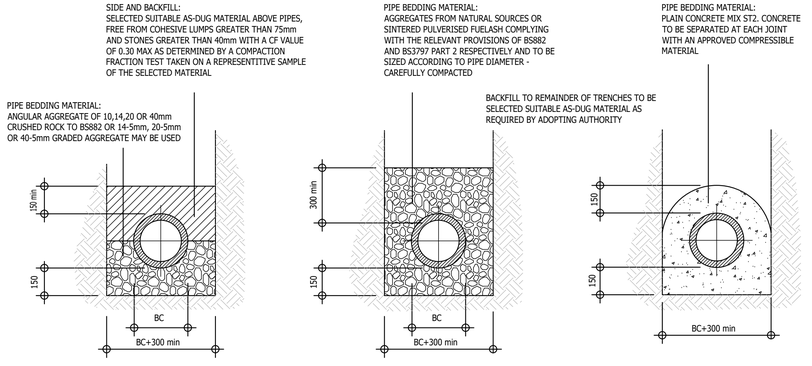


Sectional Plan

Rigid pipes built into manhole should have a flexible joint as close as feasible to the external face of the structure and the length of the next rocker pipe should be as shown.

Nominal diameter (mm)	Maximum effective length (m)
150 - 600	0.6
601 - 750	1.00
over 750	1.25

All pipes entering the bottom of the manhole to have soffits level.



CLASS B BEDDING

FOR USE WHERE COVER TO CROWN OF PIPE IS GREATER THAN 900mm UNDER VERGES, FOOTWAYS & CYCLEWAYS

CLASS S BEDDING

FOR USE WHERE COVER TO CROWN OF PIPE IS GREATER THAN 1200mm UNDER CARRIAGEWAYS

CLASS Z BEDDING

FOR USE WHERE COVER TO CROWN OF PIPE IS LESS THAN 1200mm UNDER CARRIAGEWAYS, OR LESS THAN 900mm UNDER OTHER AREAS

PIPE BEDDING DETAILS

GENERAL NOTES

1. The location, size, depth and identification of existing services that may be shown or referred to on this drawing have been assessed from non intrusive observations , record drawings or the like. The contractor shall safely carry out intrusive investigations, trial holes or soundings prior to commencing work to satisfy himself that it is safe to proceed and that the assessments are accurate. any discrepancies shall be notified to gta prior to works commencing.

2. Tender or billing drawings shall not be used for construction or the ordering of materials.

3. Do not scale. All dimensions and levels to be site confirmed.

4. This drawing shall be read in conjunction with all relevant architects, consultants drawings and specifications, together with H&S plan requirements

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Rev	Amendments	Date	Dsn	Chk
T1	INITIAL ISSUE	20.11.20	SDL	MR

Status: TENDER

Client: PERSIMMON
Together, we make a home
PERSIMMON HOMES - THAMES VALLEY

Architect:

Project: TODDINGTON LANE
LITTLEHAMPTON - PHASE 4

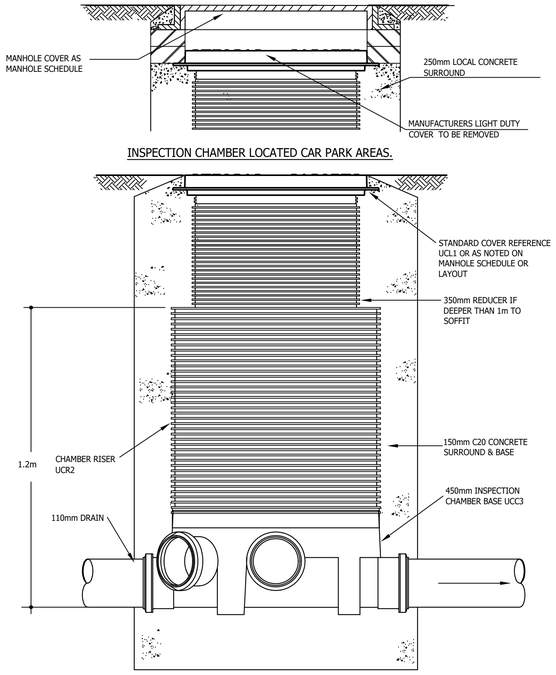
Title: MAIN DRAINAGE DETAILS

Date	Scale @ A1
NOV 2020	NTS
Base Layout Ref.	CAD File ref.
Clients Ref.	Project Ref. 10952

gta Civils & Transport
Gloucester House, 66a Church Walk,
Burgess Hill, West Sussex, RH15 9AS
Tel.01444 871444 Web: www.gtacivils.co.uk

Drawing Number	Rev.
10952/1500	T1

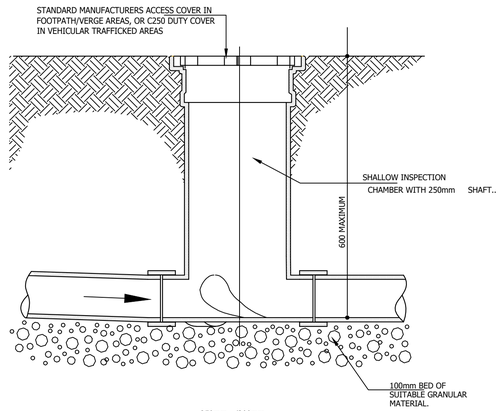
ARUN DISTRICT COUNCIL LU/080/2/DOC

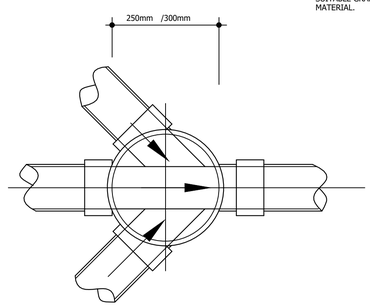


INSPECTION CHAMBER LOCATED CAR PARK AREAS.

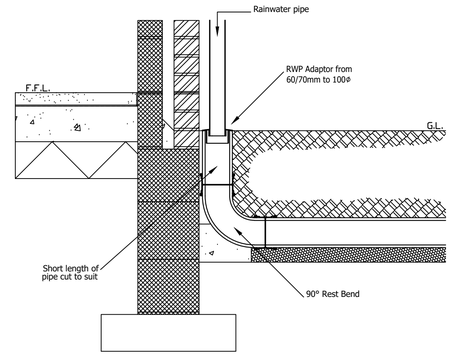
NOTE! ANY 450mm INSPECTION CHAMBER WITH A DEPTH EXCEEDING 1.2m THE INSPECTION CHAMBER MUST REDUCE TO 350mm dia AT THE 1.2m DEPTH TO THE COVER LEVEL. AS DETAIL ABOVE.

450ø POLYPROPYLENE CATCHPIT
D202.6

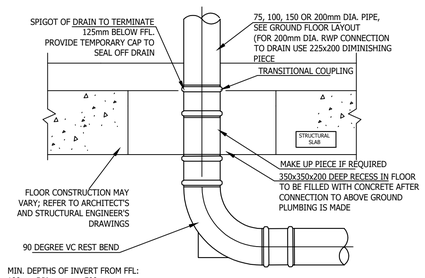




300ø SHALLOW ACCESS INSPECTION CHAMBER
D202.18



RAINWATER PIPE CONNECTION TO DRAIN
D203.5



MIN. DEPTHS OF INVERT FROM FFL:
100mm DIA = -500mm
150mm DIA = -550mm
225mm DIA = -760mm
(SEE LAYOUT DRG FOR INVERT)

DRAIN POINT TERMINATION
D307.0

GENERAL NOTES

1. The location, size, depth and identification of existing services that may be shown or referred to on this drawing have been assessed from non intrusive observations , record drawings or the like. The contractor shall safely carry out intrusive investigations, trial holes or soundings prior to commencing work to satisfy himself that it is safe to proceed and that the assessments are accurate. any discrepancies shall be notified to gta prior to works commencing.

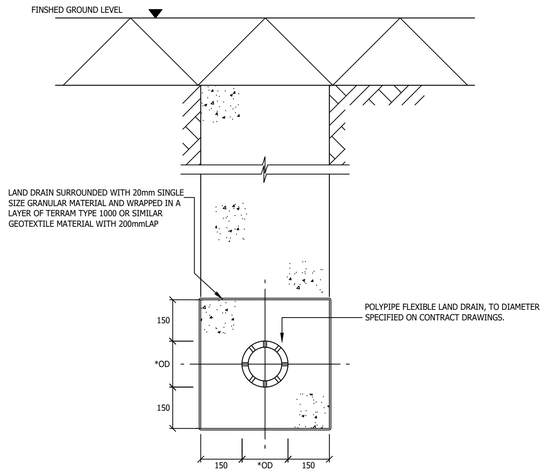
2. Tender or billing drawings shall not be used for construction or the ordering of materials.

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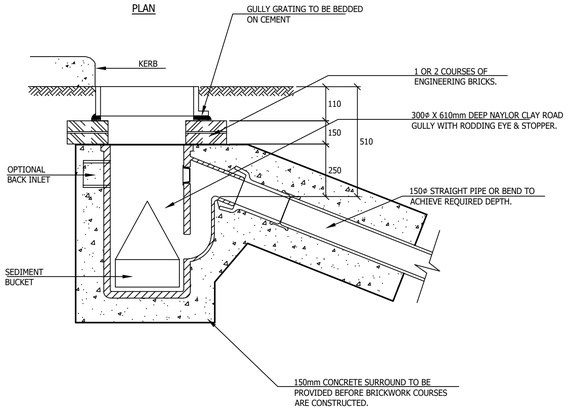
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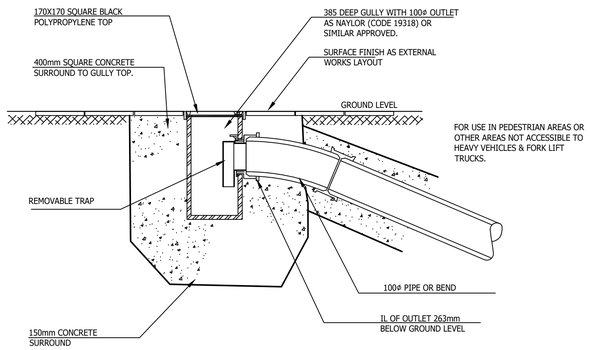
LAND DRAIN
D210.5



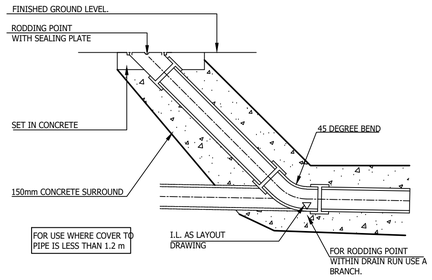
PLAN



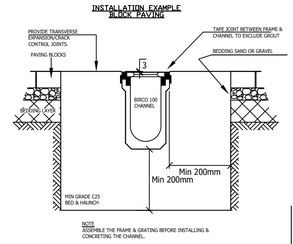
HEAVY DUTY YARD GULY
D209.2



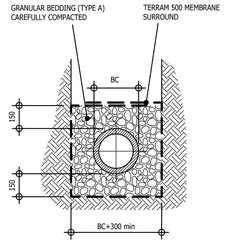
LIGHT DUTY YARD GULY/ BIN STORE GULLY
D209.0



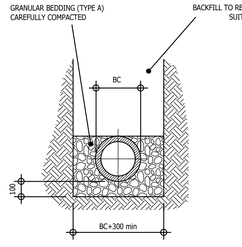
RODDING POINT SHALLOW DRAIN RUN
D213.1



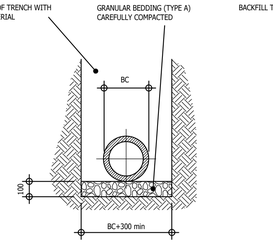
CHANNEL DRAIN
D207.2



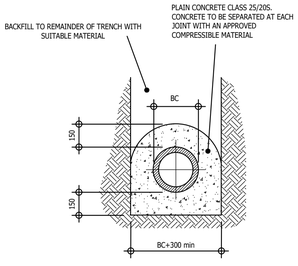
GRANULAR SURROUND
TO BE USED WHERE PIPE PASSES WITHIN 3M OF NEW OR EXISTING TREES UNLESS PIPE REQUIRED CONCRETE SURROUND



GRANULAR SIDE FILL
TO BE USED WHERE COVER TO CROWN OF PIPE IS GREATER THAN 900mm UNDER ROADS, FOOTWAYS & HARDSTANDINGS



GRANULAR BED
TO BE USED WHERE COVER TO CROWN OF PIPE IS GREATER THAN 600mm IN LANDSCAPED AREAS



CONCRETE SURROUND
TO BE USED WHERE COVER TO CROWN OF PIPE IS LESS THAN 900mm UNDER ROADS, FOOTWAYS & HARDSTANDINGS AND LESS THAN 600mm IN LANDSCAPED AREAS

GRANULAR BEDDING TYPE A - SHALL CONSIST OF AGGREGATES FROM NATURAL SOURCES OR SINTERED PULVERISED FUELASH COMPLYING WITH THE RELEVANT PROVISIONS OF BS 882 AND BS 3797 PART 2 RESPECTIVELY. TO BE SIZED ACCORDING TO PIPE DIAMETER TO APPROVED DOCUMENT H OF THE BUILDING REGULATIONS -
5mm TO 10mm SIZE MATERIAL FOR 100mm PIPES, 14mm FOR 150mm PIPES & 20mm FOR PIPES 150-600mm.

PIPE BEDDING DETAILS (Scale 1:20)

Rev	Amendments	Date	Dsn	Chk
T1	INITIAL ISSUE	20.11.20	SDL	MR

Status: TENDER

Client: PERSIMMON
Together, we make a home
PERSIMMON HOMES - THAMES VALLEY

Architect:

Project: TODDINGTON LANE LITTLEHAMPTON - PHASE 4

Title: DRAINAGE DETAILS

Date	Scale @ A1
NOV 2020	NTS
Base Layout Ref.	CAD File ref.
Clients Ref.	Project Ref. 10952

gta Civils & Transport
Gloucester House, 66a Church Walk,
Burgess Hill, West Sussex, RH15 9AS
Tel.01444 871444 Web: www.gtacivils.co.uk

Drawing Number: 10952/1700
Rev.: T1

ARUN DISTRICT COUNCIL LU/081/EOC

APPENDIX N: Geolight Proprietary Attenuation Tank

SDS
Water Infrastructure Systems

INNOVATORS IN
WATER TECHNOLOGY

SDS GEOlight®

Stormwater Management System



SDS GEOlight® is an ultra lightweight honeycombed modular structure, made from recycled PVC, that provides an underground storage facility for the application of stormwater attenuation or infiltration.

ARUN DISTRICT COUNCIL LU/388/21/DOC

Stormwater Management

The Environment Agency is keen to promote the wider use of sustainable drainage systems, which reduce the impact of surface water runoff. There are two main ways of storing surface water for stormwater management:

- Stormwater attenuation tanks
- Soakaway infiltration systems

Stormwater Attenuation Systems

This consists of underground water storage facilities that hold excess water during periods of peak rainfall.

The stored water is gradually released in a controlled manner into the surface water drainage system or directly into watercourses, reducing the risk of upstream and downstream flooding.

Soakaway Infiltration Systems

Soakaways are designed to store surface water runoff until it can be gradually absorbed by the surrounding ground.

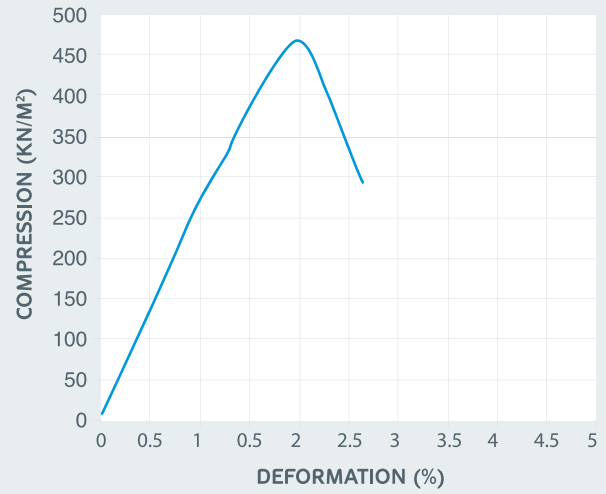
SDS GEOlight® – an efficient and economic solution for stormwater management.

SDS GEOlight® Attenuation

SDS GEOlight® has been specifically designed to form underground water storage reservoirs in stormwater management schemes. Its honeycombed structure gives it certain unique characteristics that make it ideal for this purpose:

- The high void rate (95%) of GEOlight® means that the maximum volume of water is stored in the minimum volume of storage unit.
- High compressive strength. GEOlight® is available in two strengths as standard: 200 and 400kN/m². Note: Higher compressive strengths available from 600 to 1000 kN/m². The graph on the right shows the results of a compression test, where samples of GEOlight® 400 were compressed at the rate of 1mm per minute. The deformation at 400kN/m² is about 1.6%.

RESULTS OF COMPRESSION TEST ON SDS GEOLIGHT® 400



The GEOlight® Stormwater Attenuation System consists of two manholes (inspection chambers) connected by a length of perforated distribution pipe which feeds the stormwater storage reservoirs on either side formed from GEOlight®.

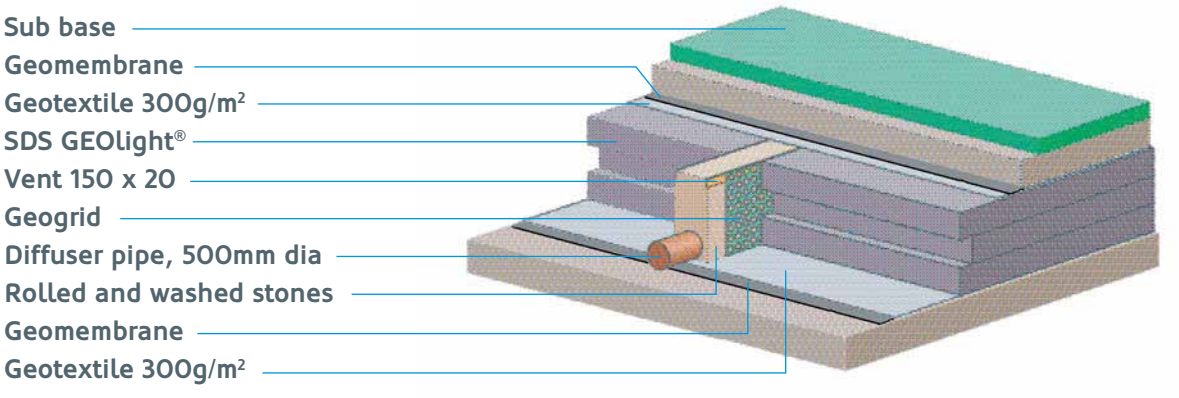
The distribution pipe is normally from 225mm up to 500mm diameter, generally covered in a trench that is filled with draining material such as 15/25 clean graded stone, free from fines.

The reservoirs and distribution pipe are wrapped in a waterproof membrane, such as butyl, to prevent seepage of water into the surrounding ground. The top of each GEOlight® reservoir has a vent which is connected back to the upstream manhole.

A geotextile or 10mm mesh geogrid is laid between the distribution pipe and GEOlight® to prevent the GEOlight® units being clogged by the draining materials.

ARUN DISTRICT COUNCIL LU/388/21/DOC

SDS GEOlight® Attenuation



How does it work?

→ 1. In normal conditions, water enters a back drop manhole. This is the upstream manhole and any silt or sediment will collect in the bottom of the chamber. The water then flows along the distribution pipe into the downstream manhole. The upstream pipework is sized to cope with normal flow conditions. The distribution pipe and attenuation tank are sized to cope with storm conditions. The outflow pipe is sized to cope with the permissible discharge.

→ 2. In storm conditions the flow restrictor (vortex flow control or orifice plate) in the downstream manhole limits the amount of water flowing out of the manhole. This causes the water level in the distribution pipe to rise and water to spill into the GEOlight® reservoirs on either side. As the water level rises in the reservoirs, air is forced out of the high level vents into the upstream manhole.

→ 3. Once the storm has passed, the water level in the GEOlight®reservoirs gradually falls as water passes through the flow restrictor in the downstream manhole. The vents now allow air to return into the GEOlight® reservoirs. Gradually the reservoirs empty. The flow restrictor prevents excess surges of flood water to pass downstream and uses the storage reservoirs to store the water for the period of the storm.

Calculating the storage capacity

The storage capacity of the GEOlight® reservoirs is determined by the maximum outflow permitted, (set by the water company or Environment Agency), the impermeable area of the site and the rainfall return period – normally 1 in 30 years, but again can be dictated by the water company. A full design service, including calculations, can be supplied via a third party consultant.
Please contact SDS for details.

Other uses

The water storage ability of SDS GEOlight® lends itself to a number of other uses:

→ Water recycling combines with irrigation systems – this is increasingly popular: GEOlight® is used to retain stormwater which is then pumped as required to a network of standpipes for irrigation.

→ Drainage channels – the natural permeability of GEOlight® lends itself for use as an underground drainage channel that collects and drains away groundwater.

→ Pollution control – improved water runoff quality. When used in combination with oil / petrol separators, GEOlight® can replenish groundwater without the risk of contamination from oil, chemicals or suspended solids.

→ To form lightweight embankments (slope stabilisation) - GEOlight® can be used to quickly form the base of embankments that only weigh a fraction of earth embankments.

ARUN DISTRICT COUNCIL LU/388/21/DOC

Stormwater Attenuation System

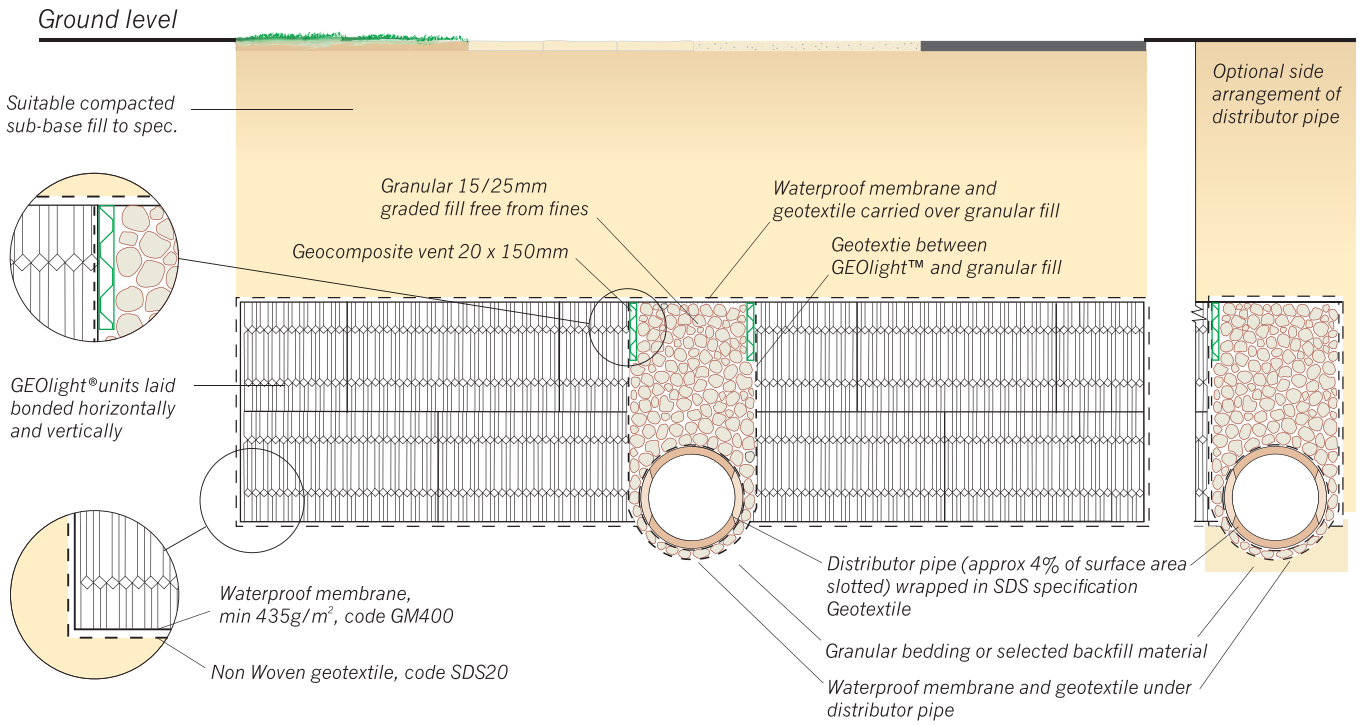
Design Details

The details on these two pages illustrate the construction of a typical SDS GEOlight® Stormwater Attenuation System. The length and height of the GEOlight® reservoirs is determined by the quantity of water to be stored.

The layout of each scheme is specifically designed to suit the characteristics and limitation of the site. Typically the distributor pipe would be arranged in the centre of the reservoir, but can alternatively be placed at the side where topographical constraints dictate.

The high performance waterproof membrane should be sealed continuously to encapsulate the GEOlight® reservoirs, distributor pipe and granular fill. It is protected by a heavyweight needle punched, non woven geotextile. To help with maintenance a high flow geotextile is placed between the granular fill and GEOlight® attenuation units to prevent silt and particles being washed into the reservoir. GEOlight® can be used under a range of surfaces e.g. grass, porous paving, standard paving block, tarmac and concrete.

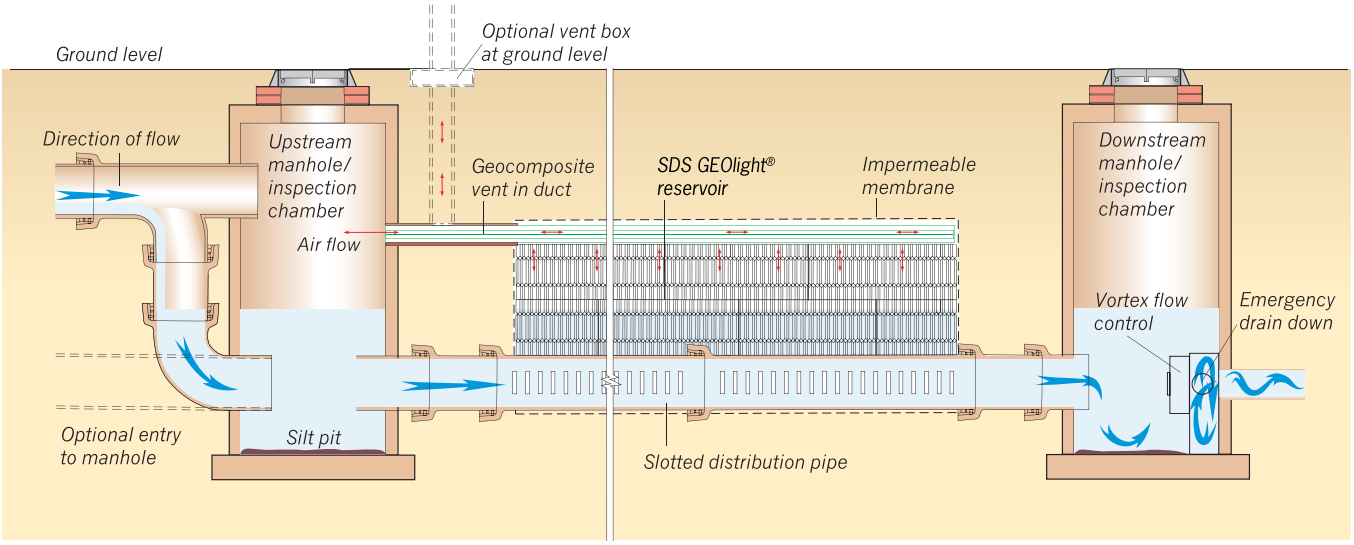
Cross Section



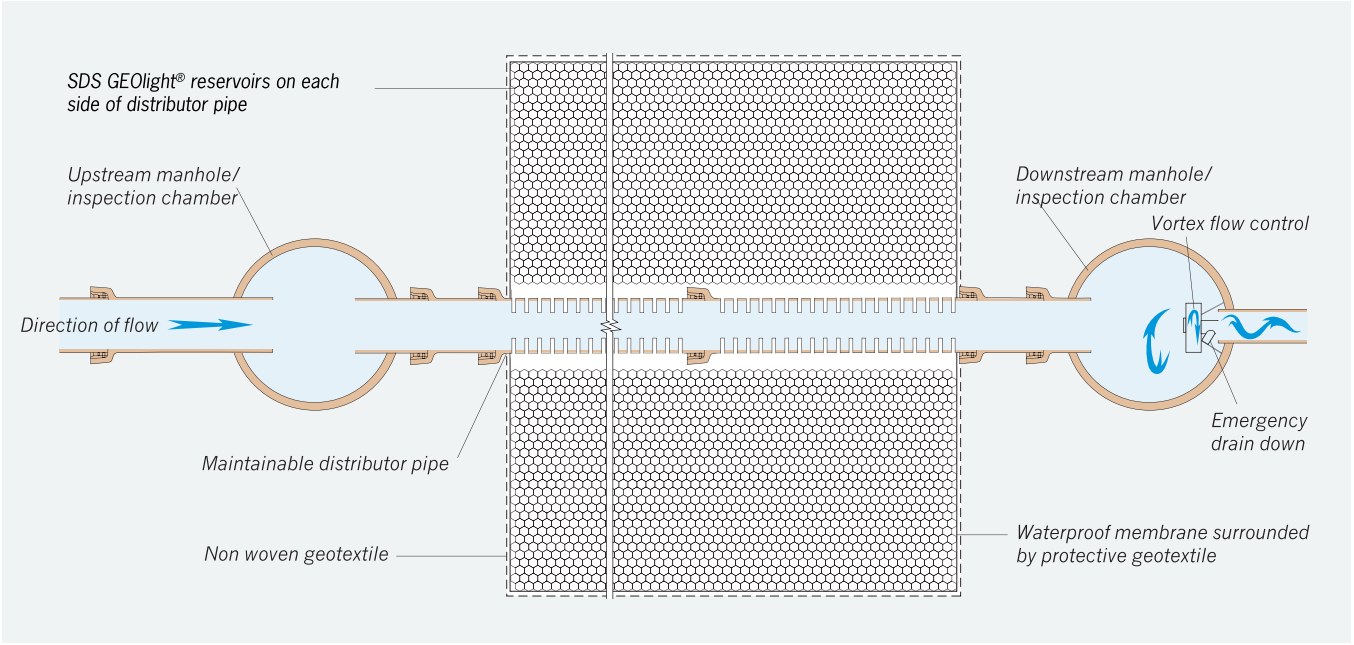
Stormwater Attenuation System

Design Details

Long Section



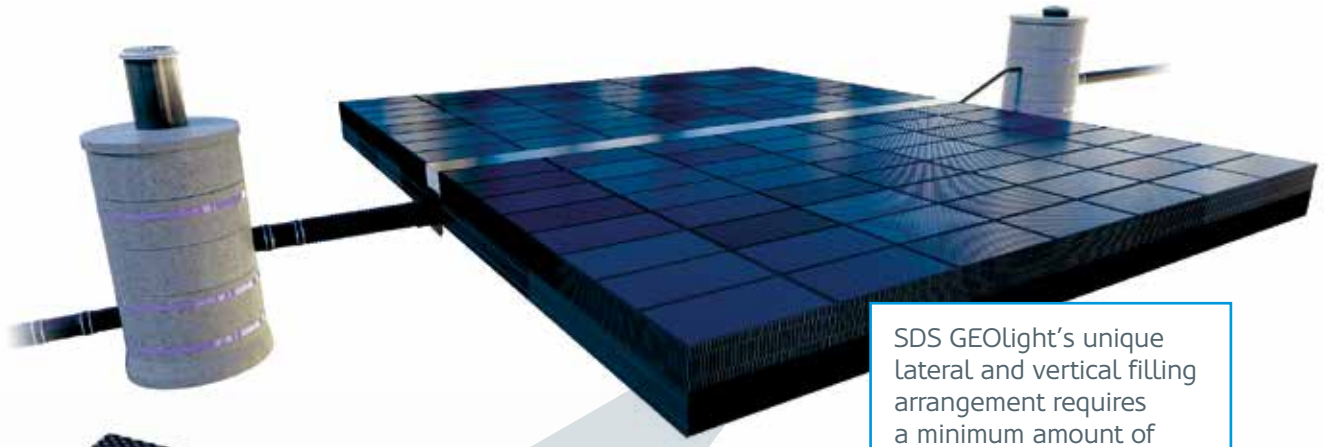
Plan



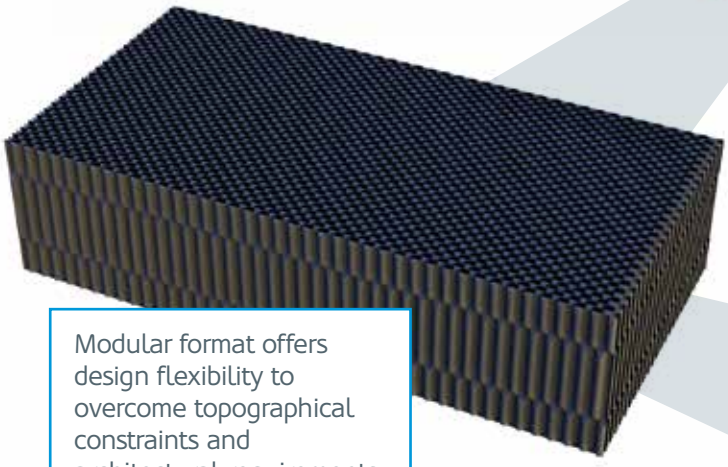
Benefits

- High compressive strength – can be located under all roads, car parks and amenity area surfaces.
- Reduced excavation costs – the very high void rate (95%) minimises the required volume of earthworks.
- Speed of installation – 1000m^3 reservoir, completed in one week.
- Light and easy to handle.
- Depth of tank invert reduced by using patented lateral supply.
- Simplified distribution pipe network, easy maintenance – dispensing with costly and complicated pipework configurations.
- Greatly reduces the risk of flooding when used as stormwater storage.
- Can also be used for water recycling and combining with irrigation systems.
- Can virtually eliminate pollution when used in combination with specialist petrol / oil separators.
- Design service available, including calculations.

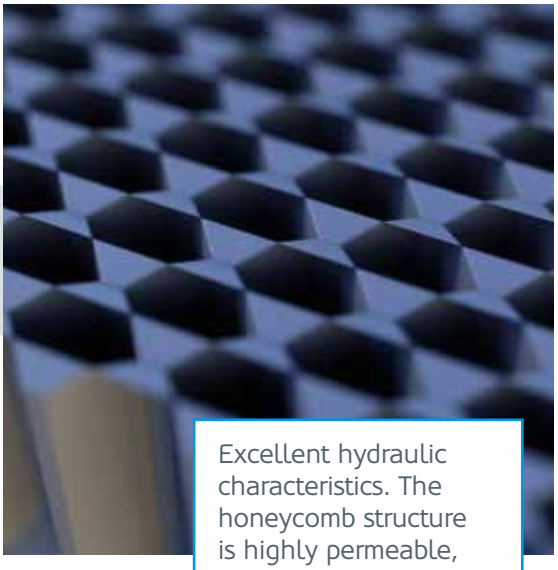
GEOlight® block



SDS GEOlight's unique lateral and vertical filling arrangement requires a minimum amount of pipework and stone.



Modular format offers design flexibility to overcome topographical constraints and architectural requirements.



Excellent hydraulic characteristics. The honeycomb structure is highly permeable, offering low resistance to water flow.

COSHH and Handling Information

1. COMPOSITION/INFORMATION ON INGREDIENTS:

Hazardous ingredients:
None as finished goods or products.

Types of materials:
Polyvinyl chloride (PVC)
MEK

2. HAZARDS IDENTIFICATION

Nature of hazard:
There are no health risks from the products during normal use. The products may contain various pigment colours and stabilisers that may be toxic. The chemicals are, however, bound within the product material and not easily extracted.

3. FIRST-AID MEASURES

Eye contact:
Plastic materials may cause physical irritation in the eyes. Wash out with large amounts of water. If irritation persists, seek medical advice.

Skin contact:
Not applicable.

Inhalation:
Not applicable.

Ingestion:
Not expected to have any toxic effects.

4. FIRE-FIGHTING MEASURES

Extinguishing media:
On small fires use any hand-held extinguisher type.
On large fires use water.

Fire and explosion hazards:
Melting plastics may flow and spread in a large fire.
Products of fire will be thick black toxic smoke.

Material characteristics:
PVC products will burn in the presence of a flame but are classed as self- extinguishing.

Protective equipment:
Wear self-contained breathing apparatus and protective clothing.

5. HANDLING AND STORAGE

Handling:
There are no hazards associated with the finished products. However, when cutting SDS GEOlight®, we recommend that the correct tools are used e.g. Handsaw or Alligator saw. When cutting, dust may be created; avoid inhaling these dusts. Take care of heat build-up within materials during cutting etc. The pallets of SDS GEOlight® units should be placed on level ground and should not be stacked on site. The maximum weight of the pallet of SDS GEOlight® units as delivered to site is 650kg (700kg on one copy), including packaging. Machines used to lift the pallet should be able to lift this weight safely. Loose individual units should not be stored more than three units high. SDS GEOlight® units are lightweight ranging from 23kg to 55kg and can be easily handled – one or two person lift.

Storage:
SDS GEOlight® units will resist the effects of UV light for up to six months; however, prolonged storage in direct sunlight should be avoided. SDS GEOlight® units should not be stored near to any fuel storage areas or any other solvents. SDS GEOlight® units are very robust and resistant to damage during normal handling; however, they should be secured in areas where impacts from vehicles or construction plant will be avoided.

Material characteristics:
PVC products will burn in the presence of a flame but are classed as self-extinguishing.

Protective equipment:
Wear self-contained breathing apparatus and protective clothing.

6. EXPOSURE CONTROLS / PERSONAL PROTECTION

Respiratory protection:
Not required under normal conditions of use. Where cutting etc. creates dust, wear a disposable half-mask to the standard FFP2S.

Hand protection:
Wear impervious strong gloves to prevent cuts to the hands while handling, cutting etc.

Eye protection:
Wear safety glasses when cutting etc.

Skin protection:
Wear overalls.

7. SITE HAZARDS

Other hazards for consideration:
Working in excavations and trenches – SDS GEOlight® may be designed with a shallow invert for infiltration (soakaway) or attenuation (storage) system. This negates the need for deep excavations or trenches, excavation near services e.g. gas, electricity or contaminated soil areas. N.B. All risk assessments should be undertaken by the main contractor for forklift, access to and working in excavations and trench support.

8. STABILITY AND REACTIVITY

Decomposition products:
Major thermal decomposition products are oxides of carbon.
Relevant differences are (in addition): PVC may produce amounts of Hydrogen Chloride.

Stability:
These materials are stable at temperatures up to normal operating limits (moulding parameters).

9. ECOLOGICAL INFORMATION

Biodegradability:
Plastic products are not readily biodegradable but are not detrimental to terrestrial wildlife.

Aquatic toxicity:
Non-toxic to marine life.

10. DISPOSAL CONSIDERATIONS

Method:
The preferred method of disposal is collection and recycling. Plastics can safely be placed with regular industrial or household wastes where recycling is not available.

11. OTHER INFORMATION

As the handling, storage, use and disposal of the product are beyond our control SDS disclaims all liability for loss, damage, injury or expense in any way connected with such activities and further makes no warranties, expressed or implied, as to the suitability of the product for any particular use.

The preferred method of disposal is collection and recycling. Plastics can safely be placed with regular industrial or household wastes where recycling is not available.

SDS
Water Infrastructure Systems

INNOVATORS IN WATER TECHNOLOGY



SDS Limited
Clearwater House
Castlemills
Biddisham
Somerset
BS26 2RE

T +44 (0)1934 751303
E info@sdslimited.com

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SDS
Water Infrastructure Systems

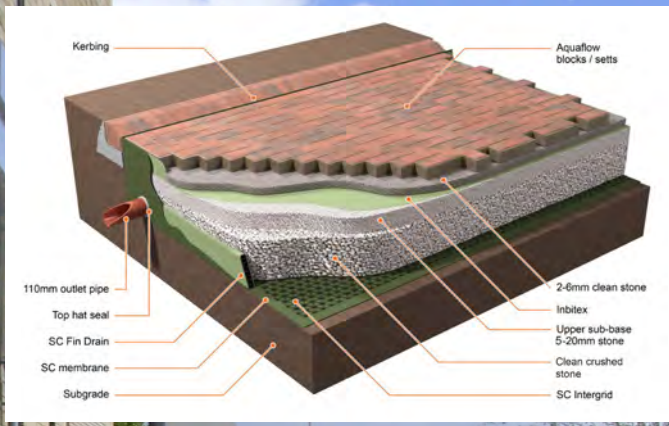
sdslimited.com

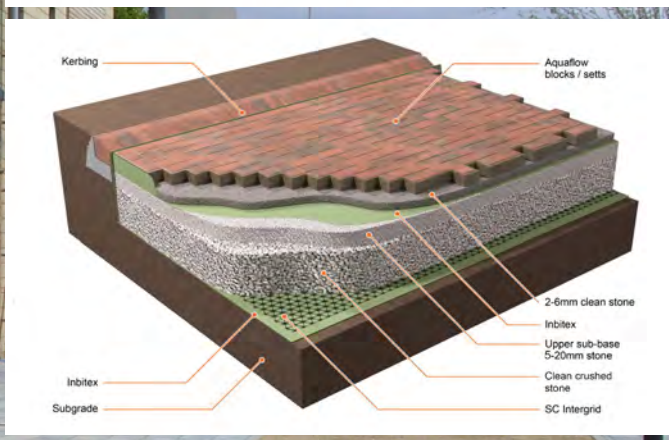
APPENDIX O: Permeable Paving Information

TCS®
GEOTECHNICS

Distributors of FORMPAVE AQUAFLOW geosynthetic components nationwide.







T: 01942 218597
E:sales@technicalcivils.co.uk
www.technicalcivils.co.uk

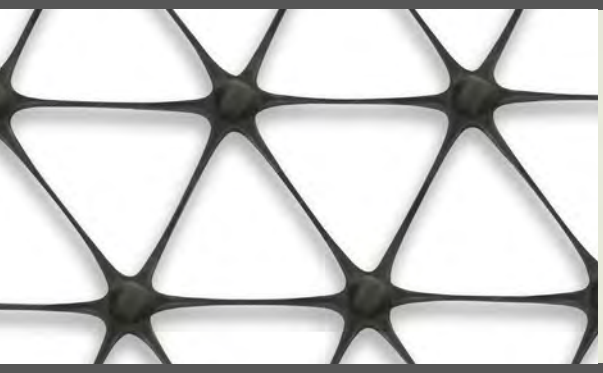
Units 2-5 Tetbury Close
Martland Industrial Park
Wigan, Lancashire
WN5 0LA

For FORMPAVE design service call: 01594 836999

Formpave®
INNOVATORS IN PERMEABLE PAVING

Inbitex®

Exclusive to the Formpave Aquaflow systems this specialist non-woven geotextile is used for separation, filtration and pollution control. Inbitex® provides initial filtering and cleansing of run-off, and prevents fine aggregate particles migrating down and clogging lower layers. When wet, micro-organisms grow within the layer which help remove pollutants and cleanse the water being filtered.

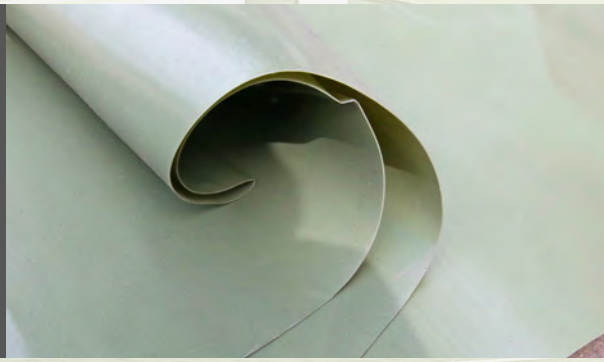


SC Intergrid®

Exclusive to Formpave Aquaflow systems, the unique SC Intergrid® effectively confines and stabilises the graded sub-base aggregate, providing a competent foundation for the permeable block paved surfacing whilst reducing construction thicknesses.

SC Membrane®

This specialist impermeable membrane is exclusive to the Formpave Aquaflow systems and is utilised to create an impermeable barrier around the graded sub-base aggregate thus creating a water retention tank beneath the surface. Joints can be taped or welded depending on application. Where welding is required a high grade membrane is required, SC GT Membrane.



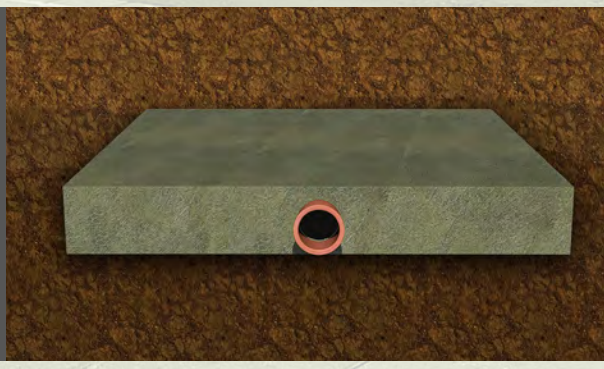


SC Findrain®

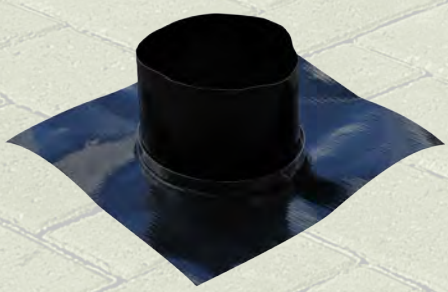
Provides an efficient and high flow drainage path from the sub-base to the drainage outlet pipe. Manufactured with a high crushing strength , the fin drain remains effectively clog-free due to the filtering effect of the unique Inbitex® geotextile wraparotund.

Formpave Aquaflow Distribution Tanks®

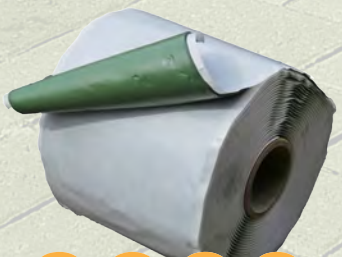
Used for connecting rainwater downpipes and other impermeable areas for drainage to the Aquaflow system. Can be used in trafficked areas. Available in three different sizes depending on catchment area.



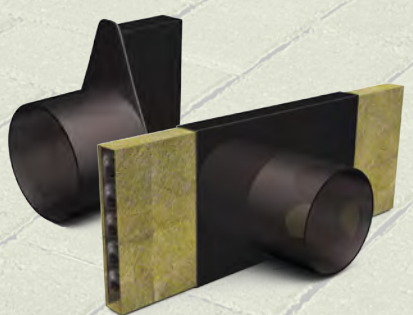
Top Hats



Tape



Fittings



T: 01942 218597 E:sales@technicalcivils.co.uk
www.technicalcivils.co.uk

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