From: Marie O'Keeffe <marie.o'keeffe@adur-worthing.gov.uk> on behalf of Marie O'Keeffe
Sent: 25 November 2020 09:41
To: west2@planninginspectorate.gov.uk
Subject: APP/Y3805/W/20/3253462 - Southview Road, Southwick, BN42 4TS
Attachments: Appeal Statement.docx; Appendix A- Adur DC adjusted 5 Year Supply Figures.pdf; Appendix B Drainage Statement.pdf; Appendix C - Drainage Maintenance & Management Plan.pdf; Appendix D - Highways comments.docx; Appendix E - County Ecologist's Dec comments.docx; Appendix F - Reptile Survey.pdf; Appendix G - Health's comments on emisisons report.msg; Appendix H - Air Quality Assessment.pdf; Appendix I - Sustainbility Report.pdf

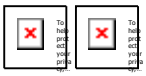
Good morning

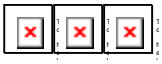
I attach the Council's statement with Appendices, A-I inclusive, together with suggested conditions should this appeal be allowed.

Kind regards.

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Appeal by SD Holdings Ltd
Site Address: 53 Southview Road, Southwick, BRIGHTON, BN42 4TS
APP/Y3805/W/20/3253462

Council's Statement

Housing Supply

The Council does not accept the appellant's contention that it cannot demonstrate a 5 year supply of housing. Whilst it is accepted that there is often a delay in delivering strategic sites, this is not the case for two of the strategic sites mentioned in the appellant's statement.

New Monks Farm is being built at present and Cala Homes has indicated that 30 dwellings are to be completed by the end of 20/21 with a further 50 per year forecast. Southern Housing has implemented its permission at Free Wharf for 540 dwellings (part of the broad location at Shoreham Harbour now supported by an adopted Joint Area Action Plan). The developer has utilised £10 million Housing Infrastructure Funding to complete the new sea wall and deal with site contamination. Its first phase, delivering 129 dwellings, is commencing shortly and is due to be completed by 2023/24 to secure affordable housing grant.

These two sites would deliver 309 dwellings and a recent permission for 255 dwellings at Kingston Wharf by Hyde Housing is scheduled to start early next year. As this is a 100 % affordable housing site (part of a strategic partnership with Homes England) this site is also due to be completed by 2023/24 and therefore this would exceed the estimate of 350 from Strategic Sites indicated in the adjusted 5 year supply published on the Councils website and attached to this statement as Appendix A. The Council is in the process of updating its Annual Monitoring Report and 5 year projections but as the above analysis indicates there is no concern that the Council cannot demonstrate a robust 5 year supply.

The completion of 120 dwellings at Ropetackle North and the delivery of 50 dwellings at Albion Street combined will ensure that the level of housing indicated in the Council's 5 year supply can be delivered in 2021/22.

Although the site has previously been promoted for development through the Call for Sites exercises, access constraints and the sites vulnerability to groundwater flooding saw it removed from the list. The site is considered to be too small to accommodate six dwellings and any dwellings that may be delivered on this site will be accounted for through other monitoring.

Flooding

There have been various drainage strategies submitted to the Council to deal with flooding on the site since the refusal of this planning application in December 2019. The revised scheme submitted with their appeal statement is also unacceptable to the Council and does not satisfy Local Plan policies 35 and 36.

However, the Council's drainage engineer has continued to engage with GTA Civils, the appellant's appointed Consulting Engineers, since the appeal was lodged. It would appear a satisfactory drainage strategy and drainage maintenance and management plan has been found. This was submitted to the Council in October 2020 and is attached as Appendix B and C respectively.

The Council's drainage engineer has made the following comments:

'I have attached the appellant's latest drainage strategy and drainage maintenance and management plan which are acceptable. The strategy addresses the concerns I raised during the original consultation. I therefore withdraw my objection subject to the following conditions being applied.

"No development shall commence until the wording of covenants of the properties and shared space have been submitted to and approved in writing by the Local Planning Authority."

"Immediately following implementation of the approved surface water drainage system and prior to occupation of any part of the development, the developer/applicant shall provide the local planning authority with as-built drawings of the implemented scheme together with a completion report prepared by an independent engineer that confirms that the scheme was built in accordance with the approved drawing/s (contained in the SuDS Drainage Statement, revision 8, dated 22nd October 2020) and is fit for purpose. The scheme shall thereafter be maintained in perpetuity in accordance with the approved Drainage Maintenance and Management Plan, revision 3, dated 22nd October 2020."

These conditions are fundamental to my objection being withdrawn. It is vitally important that the development is constructed as proposed, and maintained in this way to ensure that flood risk is not increased throughout the development's lifetime.'

Had this drainage scheme been submitted and agreed at application stage the Council are unlikely to have imposed Refusal Reason 1. However, it was only submitted to the Council's drainage engineer in late October this year. You will note from the committee report that Southern Water also wished to see a condition attached to any permission to have sight of and agree a drainage scheme (including surface water and foul drainage). It has not been possible in the timescale to consult Southern Water on this latest drainage scheme so the Council cannot be certain they would be agreeable to it. However, the Council's drainage engineer notes that:

'the applicant included a Southern Water capacity check within an appendix to the surface water drainage strategy. This capacity check details that there is 2l/s capacity at the nearest surface water drainage sewer node. The strategy proposes discharging at 2l/s so meets Southern Water's requirement. The applicant will have to obtain S106 approval for the proposed methods and means of connection to the sewer from Southern Water. It is often the case that this is obtained at building control stage.'

As a consequence, the Council respectfully requests the imposition of two conditions, one as above and one to agree foul drainage prior to commencement of any works if this appeal is allowed

Highways

West Sussex County Council's Highways Department has provided comments (24/11/2020) in respect of the revised access arrangements submitted as part of this appeal and shown in drawing 19012_P02. Their full comments are attached as Appendix D.

The Highway Authority is largely satisfied with this revised access arrangement and has removed their objection subject to conditions and informatives.

The appellant has been provided with a copy of their detailed comments to progress the outstanding matters.

Adur Council's Operational Waste Team's comments are still awaited.

Ecology

This site is not brownfield land. This site has never seen development and is in part made up of garden land formally belonging to Southview Road houses.

Prior to the Committee meeting in December 2019, but subsequent to the drafting of the officer's report, the applicant submitted additional ecology studies which the County Ecologist was able to provide further comments on, attached as appendix E with the Reptile Survey attached as Appendix F. These were reported verbally to the committee meeting. You will note the ecologist's withdrawal of his objection subject to the imposition of two important conditions. An extract reads:

'Conclusions
The Reptile Survey makes recommendations (s.5) for a formal reptile translocation exercise prior to site clearance. The recommendations are reasonable and appropriately detailed. In the absence of further communication from the developer/agent on their intentions, I recommend that an appropriately worded pre-commencement condition is imposed upon any future planning permission to secure the works required (to include identification and preparation of the receptor site) to safeguard this protected species.

The only other outstanding item is to secure by condition an ecological improvement plan (and its implementation) to the site, taking every available opportunity to what has become a highly constrained site ecologically. NPPF s.15 The National Planning Policy Framework encourages net gains for biodiversity to be sought through planning policies and decisions. Benefits could be achieved entirely on-site or by using off-site gains where necessary. Local planning authorities need to ensure that habitat improvement will be a genuine additional benefit, and go further than measures already required to implement a compensation strategy.'

As a consequence reason for refusal No. 3 was revised from that which appears in the officer's report to that which appears on the decision notice.

It is difficult to see how the site can be improved ecologically as so much of it is given over to hard standing, road or house building. Many of the trees within the site are to be removed and those that remain are threatened. The Council's Aboricultural officer objects to the proximity of house 8 to the TPO'd Horse Chestnut and anticipates pressure for its removal or pruning by any future occupier of this property, at the expense of the amenity of the tree itself. The same applies to those trees on the western boundary which are very close to the backs of houses 5-8 and oversail their rear gardens considerably.

In the event the Inspector is minded to allow this appeal two conditions are recommended based on the County Ecologist's advice.

Air Quality and the AQMA

This application was not refused on Air Quality grounds.

An Air Quality Assessment Report to deal with the site's situation close to an Air Quality Management Area was submitted to the Council on the 22nd November 2019. This report had not been assessed at the time of the publication of the committee report, ahead of the

meeting. However, Environmental Health officers did supply comments before the meeting and these were reported verbally. The comments are attached as Appendix G and are:

'Thank you for forwarding this AQ assessment (9313.S dated Nov 2019), apologies for the delay in responding. This assessment seems reasonable and the proposed mitigation measures are acceptable.

If permission is granted for this application I would recommend that the mitigation measures proposed in the Emission Mitigation Assessment are conditioned.

In relation to dust mitigation, I would recommend the Site Specific Mitigation the Highly Recommended Dust Mitigation Measures specified in Appendix A of the above assessment are conditioned.'

A condition is recommended in the event of the appeal being allowed. The report itself is appended as H.

Sustainable Development and Energy

The Sustainability Report (Appendix I) written by Phlorum Ltd and dated 4/12/19 was received by the Council on 5th December 2019 and was written against the background of the Council's adopted Supplementary Planning Document Sustainable Energy of August 2019. The application was not refused on sustainable energy grounds.

The report details the use of energy efficient building materials in an effort to be 'lean' as well as a 90% seasonal efficient combi boiler for each property. No further CO2 reductions have been achieved to meet the 'Be Clean' stage of the SPD.

The third 'Be Green' stage of the energy hierarchy involves the adoption of on-site Low and Zero Carbon (LZC) technologies to generate energy and offset CO2 emissions. Only PV's have been identified as suitable for this site. With 3 PV's on each dwelling, 1-8 (inc) and 5 on of each of units 9 and 10.

No details of the scale, design or location of these PV's was provided. A condition requiring the submission and agreement of these details is recommended.

Design, Character, future occupier's living condition, neighbour amenity

There is little to add to the officer's report in this regard or indeed in respect of reasons for refusal 4-6 (inclusive).

Supplementary Planning Document 1 'Space Around Dwellings' was adopted at the same time as the Local Plan (December 2017).

Since the decision to refuse this application last year the Government has increased the emphasis on good design within development in the changes to the National Planning Policy Framework and recent Government announcements, such as the Planning for the Future White Paper.

Houses in the street have the same front building line. Setting house 10 back as proposed will be anomalous in the streetscene. Adjacent to No. 57 its eaves and ridge lines do not relate. The deep, bulky, flank wall will be very exposed when viewed from the south.

The existing house at 55 has a similar ‘tail’ to that of No. 57, i.e. narrower, lower and further from the boundary with No. 57 than that proposed. The house proposed has a continuous flank wall deeper into the plot than the main flank wall of the existing house and closer to the boundary. It does not respect the separation built into these houses. Consequently it will have a ‘tunnel’ effect on the windows in the main rear wall and outrigger flank of No. 57.

The Council does not know that the side window in No. 51 is a secondary window. Vehicle movements associated with this development along the flank wall and rear garden boundary of No. 51 will be unneighbourly. No. 57, to the north of the site, has an imperforate flank wall. It is also in the applicant’s ownership.

The revised access arrangements and internal access road proposed in Drg: 19012_P02, submitted as part of this appeal, includes a communal bin store at the end of the garden of unit 10 and adjacent to the frontage of unit 1 as well as being alongside the rear garden boundary of No. 57 Southview Road. Presumably intended for both refuse and recycling storage. This was not part of the refused scheme and neighbours were not consulted on this basis.

This arrangement is unneighbourly. Not only will they have direct view of it but occupiers are also likely to experience noise and disturbance in terms of its use, possible smells from this amount of refuse storage in close proximity and potentially nuisance from scavenging animals etc.

The location of this bin store has also truncated the garden length of unit 10 to less than 11 metres and reduced its overall size.

The latest Highway Authority comments indicate that a communal bin store is not necessary or appropriate and that refuse vehicles can collect waste and recycling from Southview Road with residents taking their bins there on the day of collection.

Contamination

This site has never formally been assessed for contamination. Given the anecdotal neighbour advice that the land may be contaminated, and its known flooding problems, a contamination condition is recommended.

Conclusion

The scheme proposed is cramped and unneighbourly and will be harmful to the protected tree on site and the general openness of the site and its value as such to adjoining neighbours. The houses are top heavy and generally weak in their design. They do not represent good design.

Whilst risks associated with flooding of the site and the development’s access arrangements may have been resolved the proposal represents poor design which will have an unneighbourly impact. As the Council does not accept the appellant’s contention that it cannot demonstrate a 5 year supply of housing there is no overriding justification for allowing this development.

The Inspector is respectfully requested to DISMISS this appeal.

APP/Y3805/W/20/3253462

Suggested conditions should the appeal be Allowed.

1. 3 years
2. Approved Drawings

3. Immediately following implementation of the approved surface water drainage system and prior to occupation of any part of the development, the developer/applicant shall provide the local planning authority with as-built drawings of the implemented scheme together with a completion report prepared by an independent engineer that confirms that the scheme was built in accordance with the approved drawing/s (contained in the SuDS Drainage Statement, revision 8, dated 22nd October 2020) and is fit for purpose. The scheme shall thereafter be maintained in perpetuity in accordance with the approved Drainage Maintenance and Management Plan, revision 3, dated 22nd October 2020.
   Reason: To protect the site and wider area from flooding in accordance with Adur Local Plan policies 34, 35 and 36 and the National Planning Policy Framework.

4. No development shall be commenced until a scheme for the provision and implementation of foul drainage works has been submitted to and approved in writing by the Local Planning Authority. These drainage works shall be completed in accordance with the details and timetable approved by the Local Planning Authority and no dwellings occupied prior to completion of the works.
   Reason: To prevent pollution of the water environment by ensuring the necessary infrastructure is in place having regard to policies 29, 35 and 36 of the Adur Local Plan.

5. The formal reptile translocation exercise identified in the submitted Reptile and Terrestrial Amphibian Survey compiled by ASW Ecology and dated September 2019 shall be carried out prior to any site clearance. These works shall include identification and preparation of the receptor site to safeguard the protected species the details of which shall be notified to the Local Planning Authority for consultation prior to commencement of any such works.
   Reason: To safeguard the protected reptiles having regard to Adur Local Plan policy 31.

6. The development shall not commence until a scheme for biodiversity and ecological gain has been submitted and approved. The approved scheme shall thereafter be implemented before the buildings are first occupied

   Reason: To ensure there is enhancement of biodiversity in accordance with the NPPF and policy 31 of the Adur Local Plan.

7. The mitigation measures proposed in Phlorum's Air Quality Assessment dated November 2019, and in particular the Dust Mitigation Measures specified in Appendix A, shall be implemented at all times during this development.
   Reason: In the interests of local air quality having regard to the policies 28 and 34 of the Adur Local plan, the Air quality and emissions mitigation guidance for Sussex (2019) and National Planning Policy Framework.

8. Notwithstanding the report referred to in condition 7 details of Electric Vehicle charging points for all 10 houses shall be submitted in writing to the Local Planning Authority prior to construction works commencing. Such details as agreed shall be implemented prior to first occupation and thereafter retained.
   Reason: In the interest of air quality and sustainable travel having regards to Adur Local Plan policies 28 and 34, Air quality and emissions mitigation guidance for Sussex (2019), and the National Planning Policy Framework.

9. If, during development, any visibly contaminated or odorous material (for example asbestos-containing material, stained soil, petrol/diesel/solvent odour, underground tanks or associated pipework) not previously identified is found to be present at the site, then, unless otherwise agreed in writing with the Local Planning Authority, no further development shall be carried out until it has been investigated by the developer. The Local Planning Authority must be informed immediately of the nature and degree of the contamination present and a method statement detailing how the unsuspected contamination is proposed to be dealt with shall be submitted to and approved in writing by the Local Planning Authority and shall then be implemented as approved within an approved time period contained in the method statement.
   Reason: To prevent pollution of groundwater and in the interests of environmental protection and public health and safety, in compliance with the National Planning Policy Framework and policies 34 and 35 of the Adur Local Plan.

10. Prior to any works commencing on site details of the number, size and location of any photo voltaic panels shall be submitted in writing to the Local Planning authority for approval. Only such details as agreed shall be implemented prior to first occupation.
    Reason: In the interest of the visual appearance of the scheme and energy efficiency of the development having regard to policy 15 of the Adur Local Pan

11. No development shall be carried out unless and until a schedule of materials and finishes to be used for the external walls (including windows and doors) and roof of the proposed building has been submitted to and approved in writing by the Local Planning Authority and the development shall be completed in accordance with the approved schedule.
    Reason: In the interests of visual amenity and to comply with policy 15 of the Adur Local Plan.

12. Prior to occupation full details of all hard and soft landscaping works and the proposed times of planting have been approved in writing by the Local Planning Authority and all soft landscape works shall be carried out in accordance with those details and at those times. Any plants which within a period of five years from the time of planting die, are removed or become seriously damaged or diseased shall be replaced in the next planting season with others of similar size and species unless the Local Planning Authority gives written consent to any variation.
    Reason: In the interests of visual amenity and the environment and to comply with policies 15 and 30 of the Adur Local Plan.

13. Prior to occupation plans must be submitted to and approved in writing by the Local Planning Authority showing the positions, design, materials and types of boundary treatment to be erected. The boundary treatment shall be completed in accordance

with the approved details before the buildings are occupied. Thereafter the approved boundary treatment shall be retained permanently.
Reason: In the interests of visual amenity and having regard to policy 15 of the Adur Local Plan.

14. Notwithstanding the provisions of the Town and Country Planning General Permitted Development Order 2015 as amended (or any Order revoking and re-enacting that Order with or without modification), no windows or other openings (other than as hereby approved) shall be formed in the side walls of the houses.
Reason: To prevent overlooking and to comply with policy 15 of the Adur Local Plan.

15. Notwithstanding the provisions of the Town and Country Planning General Permitted Development Order 2015, as amended, (or any order revoking and re-enacting that Order with or without modification), the proposed dwellings shall not be extended or altered by means of any development as set out within Classes A, AA, B, C and D of Part 1 of the Schedule to that Order.
Reason: In the interests of amenity and the environment having regard to the nature of the site, policy 15 of the Adur Local Plan and Development Management Standard No. 1 Space Around New Dwellings and Flats.

16. No part of the development shall be first occupied until such time as the vehicular access has been constructed in accordance with plans and details to be submitted to and approved in writing by the Local Planning Authority.
Reason: In the interests of road safety having regard to Adur Local Plan policy 15 and the National Planning Policy Framework.

17. No part of the development shall be first occupied until maximum visibility splays shall be provided at the site access onto Southview Road in accordance with a plan to be submitted to and approved by the Local Planning Authority. These splays shall thereafter be kept clear of all obstructions to visibility above a height of 0.6 metre above the adjoining road level.
Reason: In the interests of road safety having regard to Adur Local Plan policy 15 and the National Planning Policy Framework.

18. No part of the development shall be first occupied until pedestrian visibility splays have been provided either side of the proposed site vehicular access onto Southview Road in accordance with plans and details to be submitted to and approved in writing by the Local Planning Authority. These visibility splays shall thereafter be kept free of all obstructions over a height of 0.6 metre above adjoining carriageway level or as otherwise agreed.
Reason: In the interests of road safety having regard to Adur Local Plan policy 15 and the National Planning Policy Framework.

19. No part of the development shall be first occupied until the vehicle parking and turning spaces have been constructed in accordance with plans and details to be submitted to and approved in writing by the Local Planning Authority. These spaces shall be provided prior to first occupation of any dwelling and thereafter retained for their designated use.

Reason: To provide adequate on-site car parking and turning space for the development in accordance with Local Plan policy 15 and the National Planning Policy Framework.

20. No part of the development shall be first occupied until covered and secure cycle parking spaces have been provided in accordance with plans and details to be submitted to and approved by the Local Planning Authority.
Reason: To provide alternative travel options to the use of the car in accordance with current sustainable transport policies and the National Planning Policy Framework.

21. No development shall commence unless and until a construction/demolition management plan (including details for all temporary contractors' buildings, plant and stacks of materials, provision for the temporary parking of contractors vehicles and the loading and unloading of vehicles associated with the implementation of this development, disposal of waste and surplus materials and dust suppression scheme) has been submitted to and agreed by the Local Planning Authority. The construction /demolition shall not be carried out other than in full accordance with any such approval.
Reason: In the interests of highway safety and to minimise harm to residential amenity having regard to policies 15, 31, 34 and 35 of the Adur Local Plan.

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INFORMATIVES

The applicant is required to obtain all appropriate consents from West Sussex County Council, as Highway Authority, to cover the off-site highway works. The applicant is requested to contact The Implementation Team Leader (01243 642105) to commence this process. The applicant is advised that it is an offence to undertake any works within the highway prior to the agreement being in place.

The applicant is advised that the erection of temporary directional signage should be agreed with the Local Traffic Engineer prior to any signage being installed. The applicant should be aware that a charge will be applied for this service.

Five Year Housing Land Supply (2019-2024)(with a 20% buffer)

The National Planning Policy Framework (NPPF) requires Local Planning Authorities to identify and update annually a supply of specific deliverable sites sufficient to provide five years' worth of housing against their housing requirements set out in adopted strategic policies, or against their local housing need where the strategic policies are more than five years old. In addition, the supply of specific deliverable sites should include a buffer (moved forward from later in the plan period) of:

5% to ensure choice and competition in the market for land; or

10% where it wishes to demonstrate a five year supply of deliverable sites through an annual position statement or recently adopted plan, to account for any fluctuations in the market during that year; or

20% where there has been significant under delivery of housing over the previous three years, to improve the prospect of achieving the planned supply

The revised NPPF (2018) has introduced the Housing Delivery Test against which housing delivery will now be measured. If housing delivery is below 85% of the housing requirement over the previous three years, a 20% buffer will be applied.

The Government published the results of the Housing Delivery Test in February 2020. Adur has failed the test and delivered 56% of its housing delivery target:

$$\text{HDT (\%)} = \frac{\text{Total net homes delivered over three year period}}{\text{Total number of homes required over three year period}}$$

$$\text{HDT (\%)} = \frac{300}{531} = 56\%$$

Therefore, the Council will apply a 20% buffer to its five year housing land supply calculation.

The table below shows the five year housing land supply position against the adopted Adur Local Plan capacity based housing delivery target. **It should be noted that the figures used to calculate the Adur five year housing land supply differ slightly from those used in the governments HDT calculation as they do not include housing completions in the South Downs National Park.**

There has clearly been a shortfall against the annualised delivery target of 177 dpa over the past eight years since the start of the Plan period. Since 2011, when measured against the Local Plan target, there has been an undersupply of 568 homes and the five year housing land supply calculation has been adjusted to reflect this.

The Local Plan trajectory demonstrates that, when measured against the Local Plan delivery target, this shortfall can be addressed in the five year period 2019-2024. This is due to the strategic allocations at New Monks Farm (Policy 5) and West Sompting (Policy 6) and sites within the Shoreham Harbour Regeneration Area (Policy 8) together with some SHLAA sites starting to deliver from 2021/2022.

Five year housing land supply 2019-2024 with a 20% buffer

		Dwellings (net)	**Annual Average**
a	Local Plan housing target 2011-2032	3718	177
b	Completed 2011-2019 (net)	848	
c	Number of years left in plan period = 13		
d	Remaining requirement 2019-2032 (a-b)	2870	
e	Five year target with no adjustment (177x5)	885	
f	Shortfall of housing provision from 2011 (177x 8 years = 1416) minus completions (b)	568	
g	Five year target including shortfall (e+f)	1453	
h	20% buffer (1453/100x20)	291	
i	Requirement for five years 2019-2024 with 20% buffer (g+h)	1744	349
	Supply:		
j	Commitments (large and small sites) at 1 April 2019	837	
k	SHLAA sites 2019	391	
l	Windfall allowance (32x2 years)	64	
m	Local Plan Strategic Allocations	350	
n	Shoreham Harbour Regeneration Area	170	
o	Total Commitments	1812	

p	Surplus (o-i) (1812-1744)	68	

This table demonstrates a 5.2 year supply of deliverable sites (o/349 from the current monitoring year 2019.

SuDS Drainage Statement

51-63 Southview Road, Southwick, BN42 4TS

Client

S.D. Holdings Ltd
4A Southview Road
Southwick
West Sussex BN42 4TU

Ref: 7346
Date: February 2019

Consulting Engineers

GTA Civils Ltd
Gloucester House
66a Church Walk
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West Sussex RH15 9AS

Tel: 01444 871444

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2	Proposed Site	4
3	Surface Water Drainage	4

Schedule of Appendices

A Site Location Map and Photographs of the Site

B Topographic Survey & Sewer Records

C Proposed Scheme Drawings Including Drainage Strategy

D Micro Drainage Calculations

E Site Investigation (Winter BRE365 Soakage Testing and Groundwater Monitoring)

F Southern Water Correspondence

Issue	Issue date	Compiled	Checked
Preliminary Issue	13 February 2019	JP	MR
2nd Preliminary/First Issue	21 February 2019	JP	MR
Second Issue	24 June 2019	JP	MR
Third Issue	05 July 2019	JP	MR
Fourth Issue	29 May 2020	JP	MR
Fifth Issue	12 June 2020	JP	MR
Sixth Issue	02 July 2020	JP	MR
Seventh Issue	22 July 2020	JP	MR
Eighth Issue	22 October 2020	JP	MR

1 Introduction & Site Description

1.1 This SuDS Drainage Statement has been prepared for S.D. Holdings Ltd. in conjunction with the proposed development at 51-63 Southview Road, Southwick BN42 4TS. No responsibility is accepted to any third party for all or part of this study in connection with this or any other development.

1.2 This statement has been amended following winter groundwater monitoring and a planning refusal. Due to the high water table level, the development's surface water will be routed to Southern Water's public sewer in Southwick Road. Southern Water has agreed to the maximum proposed discharge rate of 2.0l/s.

1.3 The application site lies in Southwick, which is administered by Adur and Worthing Councils (AWC). it comprises vacant garden space to the rear of dwellings along Southview Road. A site location map and aerial view are shown in Appendix A.

1.4 Topography: A topographical survey is shown in Appendix B. The site's levels range between approximately 11.7m AOD and 10.2m AOD. As the site is soft landscaped it is 100% permeable. The site area is approximately 2693m^2.

1.5 Geology: The BGS online map shows this area's bedrock is Tarrant Chalk. This is overlain by superficial deposits of Head (clay, silt, sand and gravel). Head has a notoriously low permeability, whilst the Chalk is likely to offer at least reasonable, if not good, porosity.

1.6 Surface water flooding: This site is affected by 2 overland flow routes that enter the site from higher land to the north and northwest.

1.7 It is considered likely that there will be porosity at depth for infiltration structures such as porous pavings, infiltration trenches/blankets etc. The Head, which has a high proportion of cohesive soil particles (which limits the porosity) acts as an impervious 'capping layer'. This is what is causing the LLFA drainage engineers to warn of the 'groundwater flooding problem' (in the pre-app letter).

1.8 A Site Investigation was carried out to determine the water table level, soil types down to 6m below ground level and soil soakage rates. The boreholes show the upper level of Head being mostly clay, while the lower level being mostly sand (sized particles).

1.9 Soakage tests were carried out in accordance with BRE365. Appendix E contains the test results and borehole records. The lowest soakage rate is 7.6 x 10^{-6}m/s.

1.10 Winter groundwater monitoring was undertaken between 09/11/19 and 03/04/20. The water table rose from 5.5m bgl to the surface on 24 January '20 and stayed there until the end of March. The data logger graph is in Appendix E. It is clear from this result that soakage is not a viable option, therefore.

1.11 Public Sewers: Southern Water's sewer records (in Appendix B) show both foul and storm water public sewers in Southview Road. The depth of the surface water sewer below ground level at both the manholes upstream and downstream of the site is approximately 1.5m.

1.12 A pre-application capacity check was sent in to Southern Water's. Agreement to discharge into the sewer at a maximum rate of 2.0l/s was sought and subsequently confirmed as acceptable.

1.13 The EA's Groundwater Source Protection Zones map show the site being removed from the nearest zone. The site overlies a Major Aquifer – High, according to Groundwater Vulnerability Zones map, however – as to be expected considering the Tarrant Chalk stratum (at depth).

1.14 The EA's surface water flood maps show that this site is liable to flood in the 1 in 100 years and 1 in 1000 years storm.

2 Proposed Site & Surface Water Drainage

2.1 The proposal is to build 10 new dwelling units. The existing and proposed site plans are shown in Appendix C.

2.2 Proposed surface water drainage: SuDS (Sustainable Drainage Systems) Policy states that surface water runoff for use must be discharged according to the following hierarchy:

- Infiltration to ground;
- Discharge to a surface water body;
- Discharge to a surface water sewer, highway drain, or another drainage system;
- Discharge to a combined sewer where there are absolutely no other options, and only where agreed in advance with the relevant sewerage undertaker.

2.3 The SuDS Hierarchy (infiltration, watercourses, public sewers, private sewers) was considered. The winter groundwater monitoring and soakage tests undertaken, see sections 1.9 and 1.10 above. Due to the high water table level, it is concluded that infiltration is not a viable option here.

2.4 The development's surface water will be routed to Southern Water's public sewer in Southview Road. A capacity check from Southern Water indicates that a maximum offsite runoff rate of 2.0l/s (in the critical 1% + 40% climate change event) is acceptable – see Appendix F.

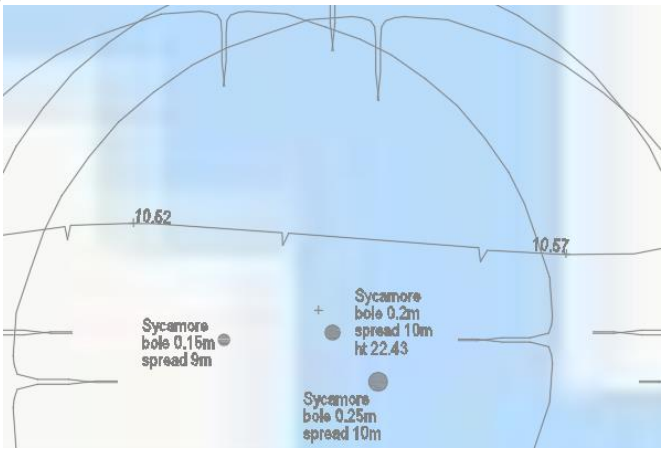
2.5 The sub-base of the (impermeable) road will act as a tank - as coarse granular fill has a voids ratio of 0.3. This will be lined to stop any rising groundwater from percolating into the SuDS network's storage volume.

2.6 The sub-base's volume (see the drainage strategy layout in Appendix C) has been calculated for the critical '1 in 100 years plus 40% climate change' storm. The calculation sheets are shown in Appendix D.

2.7 The overland flow route to the west of the site will be routed in a shallow depression to the area around the tree next to unit #8. One of the natural pond areas will be filled in and the equivalent volume transferred to a new area to the east, between the tree and road.

2.8 The overland flow route that bisects the site occurs only in the extreme (1 in 1000 years) storm. This will be routed across the road to the pond area. Any volume that overtops this will flow, much as it does currently southwards to the coast. The flow across the (almost planar) road would fan out wide and its depth is estimated as <50mm. Basis: the shallow and narrow overland flow route in the EA's flood map would be – in the post-development layout – no

narrower and therefore no deeper. This flow route has been superimposed on to the topographic survey below. This is the narrowest – and therefore deepest area of flow, at the south boundary. The difference in level between these spot levels is 50mm deep at the edges, making the depth less than this, estimated at 25mm – 30mm:



2.9 The width of this flow route is 3.3m. The flow route across the proposed road would be also approximately 3m – 3.3m wide, so the maximum depth would be 25mm – 35mm deep.

2.10 There will be no increase in flood risk to neighbouring sites as a result of this proposal. The combination of porous sub-base and pond volume provides a significant betterment in the attenuation characteristics. The controlled offsite flow rate from the roofed areas (into the public sewer) will also decrease the *overall* volume of water that will flow off this site *overland* in all the main storm events, ie 1 in 1 year, 30 years and 100 years + CC. Currently all the water flowing into this site, whether from higher land or the sky, finds its way to ground or off site to the south. Only a small proportion of this volume will flow to neighbouring land, *if any*. The combination of a controlled flow rate into the sewer (that has *confirmed capacity* for the 2l/s rate) - and SuDS storage volume with restricted flow rate - improves the flood risk of the downstream properties.

2.11 The water will be treated by the sub-base granular fill. The filtration qualities of coarse fill are excellent and, in this way, the quality - cleanliness - of water as it joins the sewer will be high. Table 26.2 of CIRIA's SuDS Manual shows that residential developments have pollution hazard indices as follows (overleaf):

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4

The TSS index for a private dwelling with a drive is 0.2 + 0.5 = 0.7, the metals index is 0.2 + 0.4 = 0.6 and the hydrocarbons index is 0.05 + 0.4 = 0.45.

2.12 Table 26.3 of CIRIA's SuDS Manual shows that permeable pavements have pollution hazard indices as follows, namely 0.7, 0.6 and 0.7 for each of the 3 categories:

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters

	Mitigation indices[1]		
Type of SuDS component	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4[2]	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6

Each of these equals or is higher than each respective pollution index – see section 2.11 above.

2.13 Maintenance of the SuDS system will be the overall responsibility of the Applicant. The reader is referred to GTA Civils and Transport's separate Drainage Maintenance & Management Plan, dated 01/07/20.

2.14 The Estate Management Company contracted to carry out this programme will seek half-yearly financial contributions (in the form of service charges) from the leaseholders/owners of the development to include for the regular costs of the maintenance of the site drainage. A separate sinking fund will be maintained to provide for the anticipated replacement cost of the major components at the end of the manufacturer's design life. These funds are to be held

in bank client accounts kept separate from the bank account of the Estate Management Company.

2.15 Exceedance flows: Appendix D shows the 1 in 1000 year calculation with permeable paving capped at 570mm. Although there is minor flooding of 19.7m^3, as the road area is 480m^2, 19.7m^3 would equate to 40mm of water either sitting on the surface or within the upper layers, ie the void space between blocks and tarmac base course and grit bedding. (Even if a small amount overflowed it would sit in the depressions in the landscaped area).

2.16 There are 2 overland flow routes passing through the site. These will be routed away from the units – as shown on the Overland Flow Routes layout drawing (101 rev D) in Appendix C.

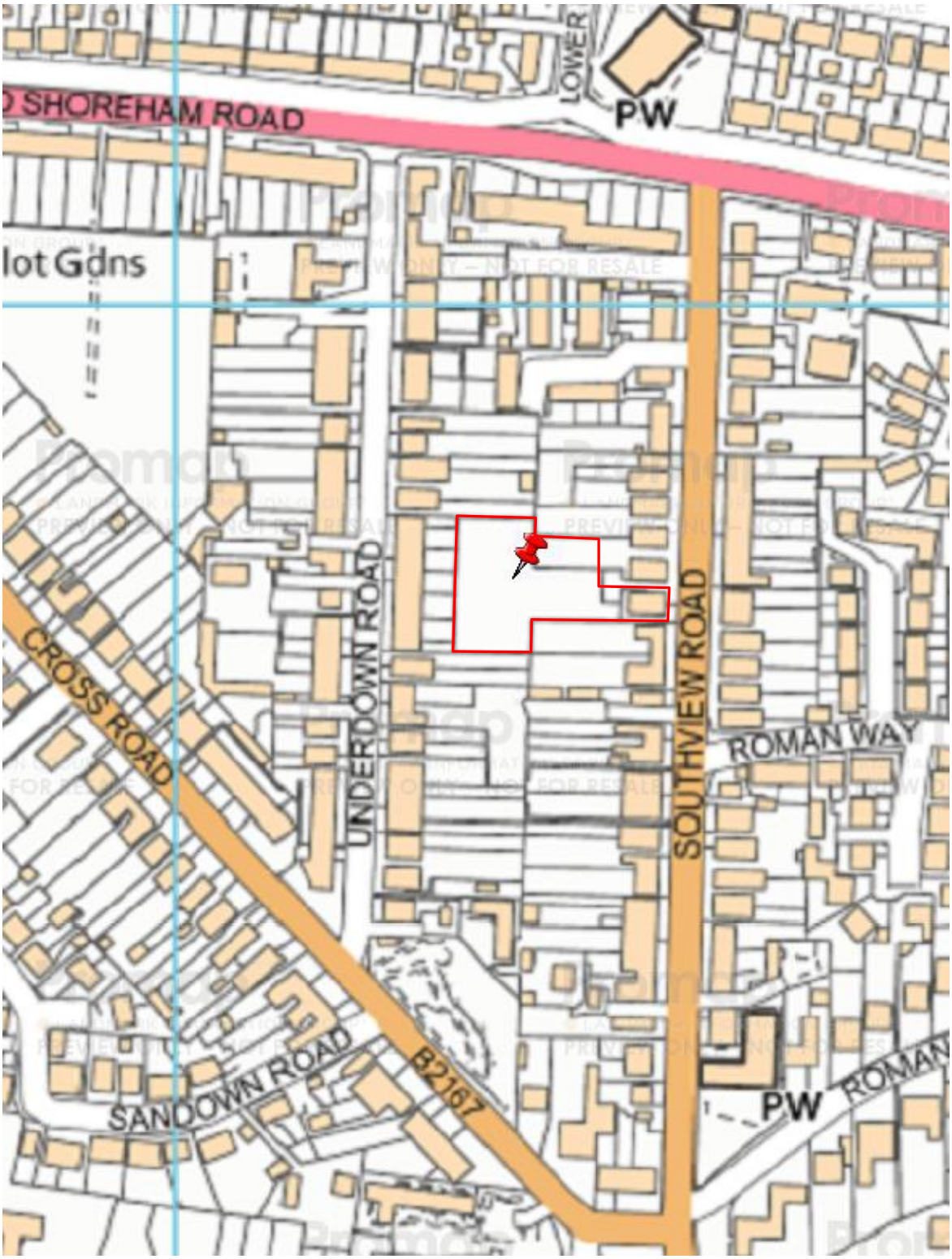
2.17 The possible loss of floodplain volume has been mitigated by lowering the levels in a crescent swale to the north of unit 9. In addition the gardens to the north of units 1 – 4 will be lowered by 150mm. This will compensate for the lost storage flooding area (medium risk scenario) allowing unimpeded passage of flood water through these gardens. This principle was agreed at a meeting between GTA and the LLFA engineer.

2.18 The existing and proposed volumes summary table in drawing ref 7346/103A in Appendix C shows that, once all the 3 separate zones of storage are added up, each of the depth bands in the post-development scenario offer a significant increase than the current setup. Drawing 7346/101 rev D shows the proposed swale and blanket areas (shaded) and a section through the proposed swale – with a 5x vertical exaggeration. The 150mm flood storage area within the gardens is shown. This was agreed at the same meeting between the LLFA and GTA.

- End of Statement -

Appendix A

Site Location Map and Photographs of the Site




Site Location
S D Holdings
Cee Catering Equipment Engineers
Underdown Rd
Southview Rd
Dog Treats
mymacfixer
House Of Beauty
Cross Rd



View of site from west boundary looking east



View looking northwards along west boundary

Appendix B

Topographic Survey & Sewer Records

This drawing is confidential and must not be copied or disclosed without written consent © ACAD MAPPING

Do Not Scale

CLIENT
Circle 25 Design

PROJECT
Land At Southview Road
Southwick

TITLE
SITE SURVEY

SCALE	DATE	BY
1:100	24/04/17	MG
NUMBER	SHEET	REVN
M1131	1	–

Acad Mapping Ltd
Land Surveyors
Frenches Farm House
Mark Cross
East Sussex TN6 3NS
Telephone (01892) 853663
Fax (01892) 853828
e-mail info@acadmapping.com

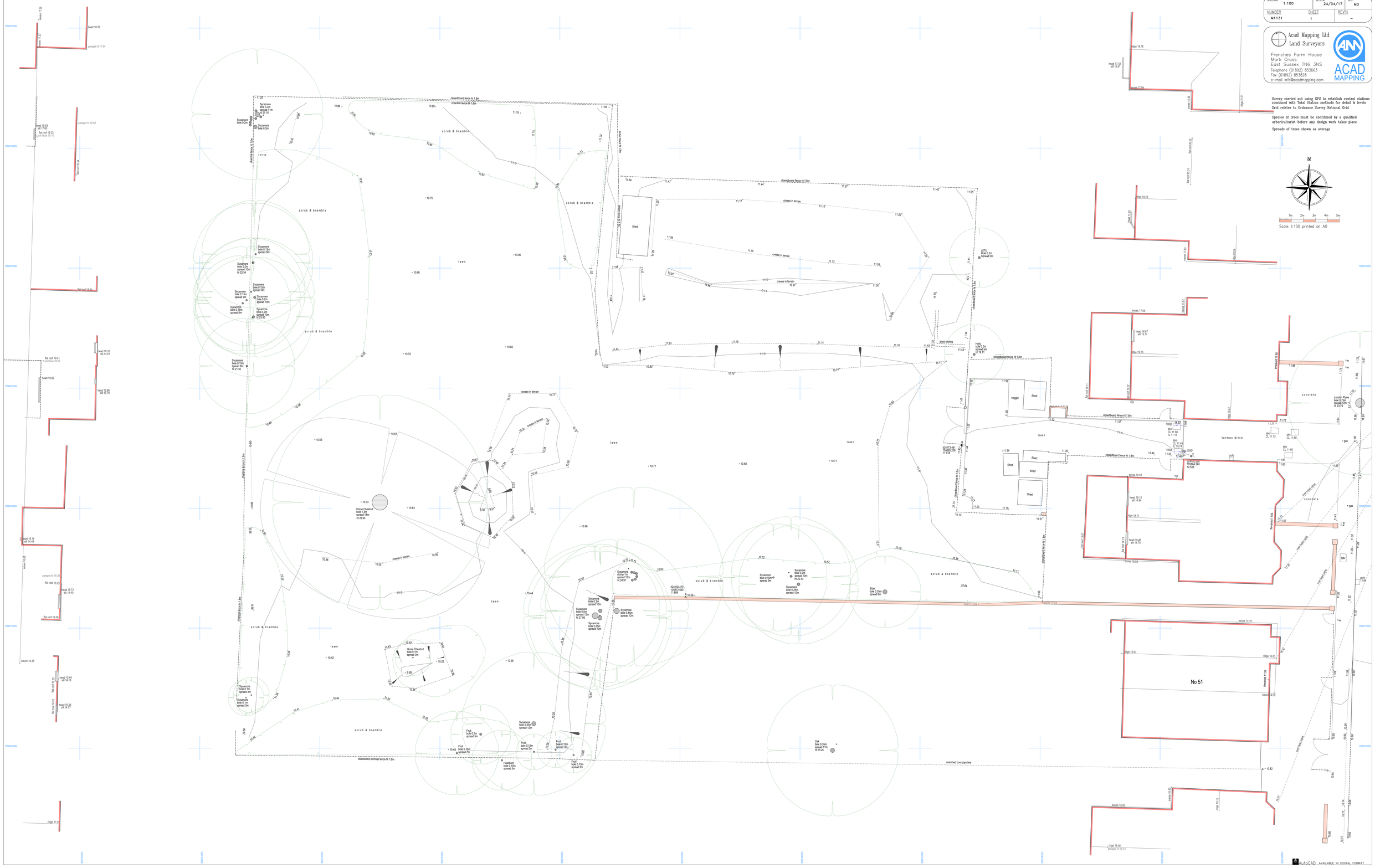
Survey carried out using GPS to establish control stations combined with Total Station methods for detail & levels
Grid relates to Ordnance Survey National Grid

Species of trees must be confirmed by a qualified arboriculturist before any design work takes place

Spreads of trees shown as average

N

1m 2m 3m 4m 5m
Scale 1:100 printed on A0



AutoCAD AVAILABLE IN DIGITAL FORMAT

SEWER RECORDS PAGE 1 OF 2

106026



105738

523958

524429

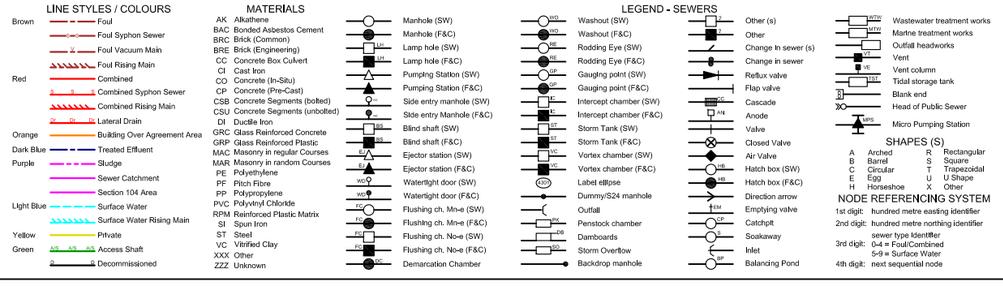
O.S. REF. TQ2405NW	Drawn by: gujskew	The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determnined on site. WARNING: BAC pipes are constructed of Bonded Asbestos Cement WARNING: Unknown (UNK) materials may Include Bonded Asbestos Cement
	Scale: 1:1250	
Title: 295119_51 to 63 Southview road	Date: 30/05/2018	Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.

N

Southern Water

SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape		Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
0701X	10.72	8.8	225	VC	CIRC		4901X	13.68	11.99	225	VC	CIRC												
0750X	10.62	9.4	150	VC	CIRC		4950X	16.47	11.47	750	CP	CIRC												
0753X	9.62	8.3	150	VC	CIRC		4951X	13.99	10.41	750	CP	CIRC												
0801X	10.12	8.32	200	VC	CIRC		4952X	14.32	12.63	150	VC	CIRC												
0850X	10.63	9.48	150	VC	CIRC		495DX	11		750	CP	CIRC												
0901X	12.11	10.15	200	VC	CIRC		9801X	11.74	9.66	200	VC	CIRC												
0950X	12.11	10	150	VC	CIRC	*	985DX	10.44		150	VC	CIRC												
0950Y	12.11		150	VC	CIRC	*																		
1004X	14.89	12.86	150	VC	CIRC																			
1005X	14.79	13.11	150	VC	CIRC																			
1054X	14.78	14.15	150	VC	CIRC																			
1701X			UNK	UNK	UNK																			
1702X			UNK	UNK	UNK																			
1801X			UNK	UNK	UNK																			
1802X			150	VC	CIRC																			
1803X			150	VC	CIRC																			
1804X			100	VC	CIRC																			
1805X			100	VC	CIRC																			
1901X	13.06	12.19	100	VC	CIRC																			
1902X	13.11	11.7	100	VC	CIRC																			
1903X	12.94	11.62	100	VC	CIRC																			
190DX			UNK	UNK	CIRC																			
191DX			UNK	UNK	CIRC																			
2006X	15.37	12.47	150	VC	CIRC																			
2054X	15.34	13.86	150	VC	CIRC																			
205DX	15.13	13.64	150	VC	CIRC																			
2702X			UNK	UNK	UNK																			
270DX			250	VC	CIRC																			
272DX			250	VC	CIRC																			
273DX			UNK	VC	CIRC																			
2801X	11.23	8.28	150	VC	CIRC																			
2802X	10.83	7.86	150	VC	CIRC																			
2803X	10.08	7.47	225	VC	CIRC																			
2804X	11.61	9.02	250	VC	CIRC																			
2805X			150	VC	CIRC																			
280DX			250	VC	CIRC																			
281DX			300	VC	CIRC																			
2850X	10.01	8.54	150	VC	CIRC																			
2851X	10.25	8.72	300	CP	CIRC																			
2852X	9.75	8.28	150	VC	CIRC																			
2901X	13.37	10.75	300	VC	CIRC																			
2902X	14.95	12.07	250	VC	CIRC																			
2903X	13.645	11.31	100	VC	CIRC																			
2904X	13.76	11.094	250	VC	CIRC																			
290DX			300	VC	CIRC																			
3004X	17.67	14.34	300	VC	CIRC																			
3007X	17.56	14.23	300	VC	CIRC																			
3051X	17.9	12.59	675	CP	CIRC																			
3052X	17.52	11.77	675	CP	CIRC																			
3801X	11.03		150	VC	CIRC																			
3802X	11.42	10.46	150	VC	CIRC																			
3850X	11.37	9.32	150	VC	CIRC																			
3901X	14.45	12.29	150	VC	CIRC																			
3902X	14.81	13.46	150	VC	CIRC																			
3950X	14.81	13.56	150	VC	CIRC																			
4001X	17.65	15.15	150	VC	CIRC	*																		
4001Y	17.65	15.11	225	VC	CIRC	*																		
4002X	18.4	14	450	CP	CIRC																			
4052X	17.37	15.45	375	CP	CIRC																			
4701X	10.72	8.96	225	VC	CIRC																			
4705X	10.5		200	VC	CIRC																			
4750X	10.73	8.55	OTHER	CP	CIRC																			
4801X	11.04		225	VC	CIRC																			
482DX	9.67		225	VC	CIRC																			
4850X	11.51	9.18	900	CP	CIRC																			



Drawn by:	gujskew
Title:	295119_51 to 63 Southview road
Date:	30/05/2018

Southern Water

Appendix C

Proposed Scheme Drawings Including Drainage Strategy

Figured dimensions only are to be used. Do not scale.
Any discrepancies between this drawing and other information should be reported to Circle 25 Design
Modifications to be made only by Circle 25 Design

19012_ P02		A1
Revision Date		drwn

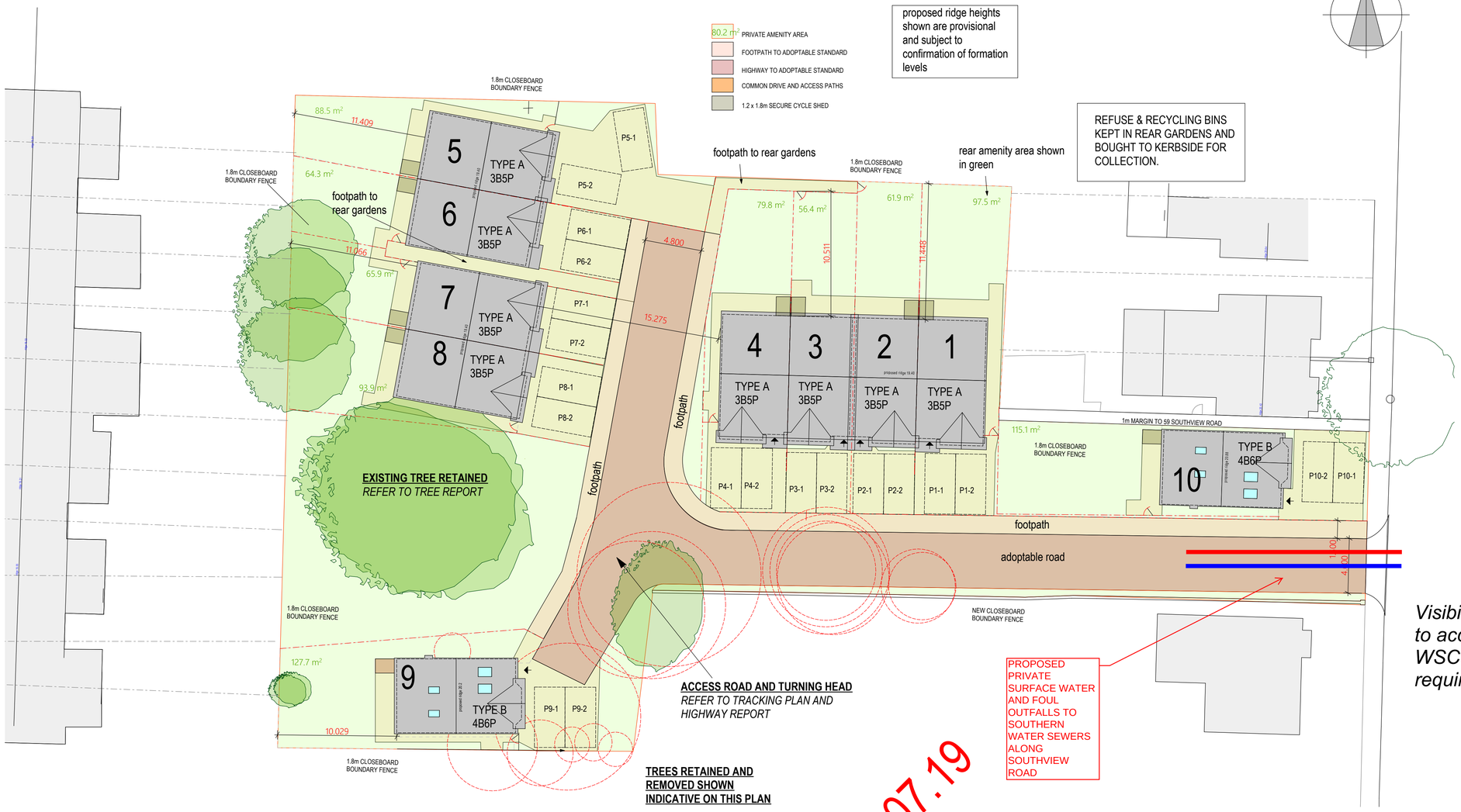
SITE PLAN 1:200

N

80.2 m² PRIVATE AMENITY AREA
FOOTPATH TO ADOPTABLE STANDARD
HIGHWAY TO ADOPTABLE STANDARD
COMMON DRIVE AND ACCESS PATHS
1.2 x 1.8m SECURE CYCLE SHED

proposed ridge heights shown are provisional and subject to confirmation of formation levels

REFUSE & RECYCLING BINS KEPT IN REAR GARDENS AND BOUGHT TO KERBSIDE FOR COLLECTION.



Plot 1	3B5P	96sq.m	1033sqft
Plot 2	3B5P	96sq.m	1033sqft
Plot 3	3B5P	96sq.m	1033sqft
Plot 4	3B5P	96sq.m	1033sqft
Plot 5	3B5P	96sq.m	1033sqft
Plot 6	3B5P	96sq.m	1033sqft
Plot 7	3B5P	96sq.m	1033sqft
Plot 8	3B5P	96sq.m	1033sqft
Plot 9	4B6P	115sq.m	1238sqft
Plot 10	4B6P	115sq.m	1238sqft

GROSS GAIN 10 HOUSES 998 SQ.M
NET GAIN 6 DWELLINGS
53 & 55 REMOVED = 4 DWELLINGS

Visibility splays to access to WSCC highway requirement

DRAFT 01.07.19

NGR: TQ241058

PROPOSED SITE PLAN 1:200 @ A1

REMOVE 53 / 55 SOUTHVIEW ROAD
(4 DWELLINGS_ 1 & 2 BED FLATS)

ERECT 10 NEW DWELLINGS _ 3 & 4 BED HOUSES

SDHoldings Ltd.

PLANNING

Project : Residential Redevelopment

Address : No 53-55 and land to rear of 51-63 Southview Road. Brighton BN42 4TS

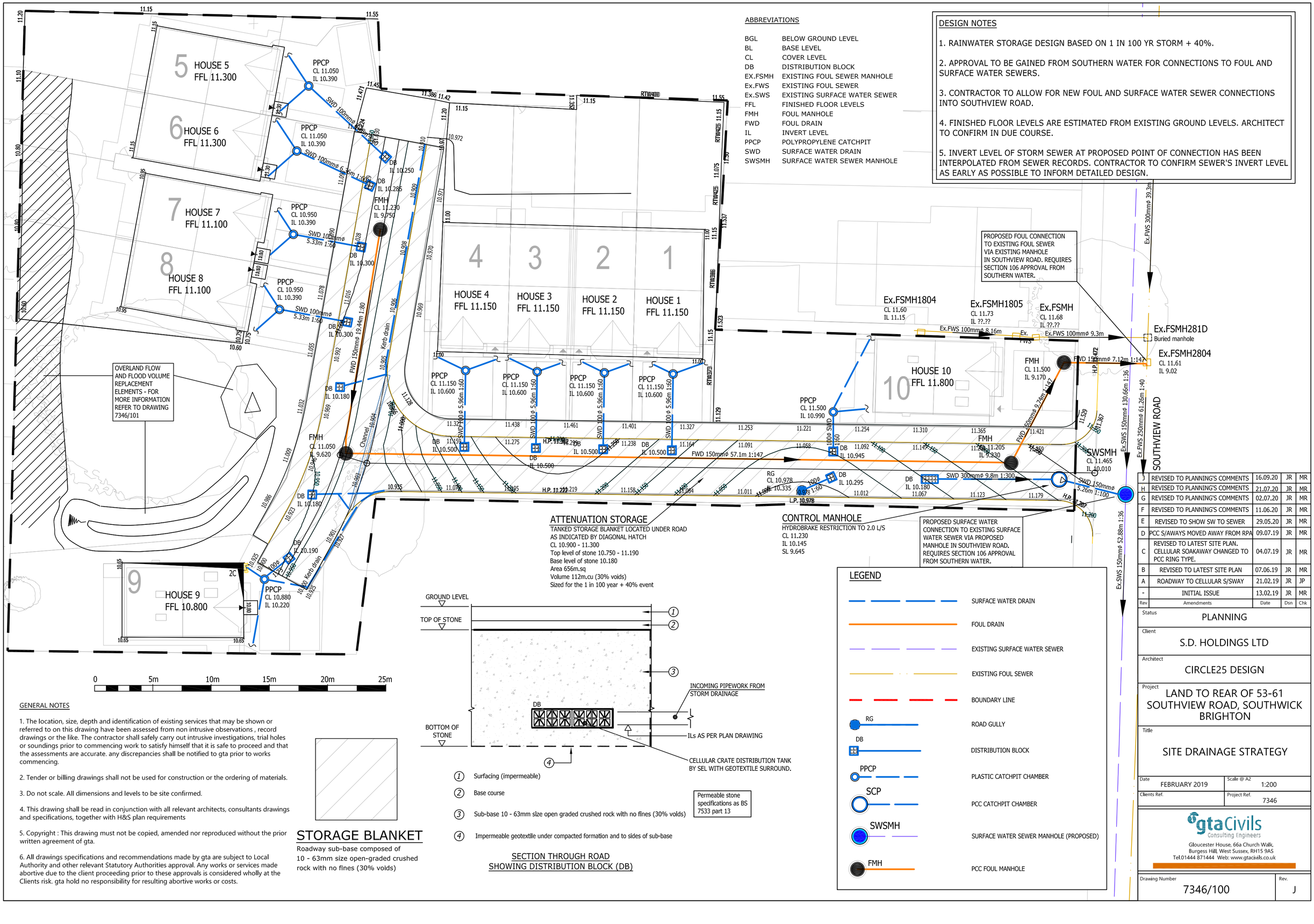
Drawing : Proposed Site Plan

Date : 25.06.2019 Scale : as shown @ A1

Dwg. No. 19012_ P01 Rev.

circle 25
Architectural Design & Planning
phone 07984 207786
email office@circle25.co.uk

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ABBREVIATIONS

BGL	BELOW GROUND LEVEL
BL	BASE LEVEL
CL	COVER LEVEL
DB	DISTRIBUTION BLOCK
EX.FSMH	EXISTING FOUL SEWER MANHOLE
Ex.FWS	EXISTING FOUL SEWER
Ex.SWS	EXISTING SURFACE WATER SEWER
FFL	FINISHED FLOOR LEVELS
FMH	FOUL MANHOLE
FWD	FOUL DRAIN
IL	INVERT LEVEL
PPCP	POLYPROPYLENE CATCHPIT
SWD	SURFACE WATER DRAIN
SWSMH	SURFACE WATER SEWER MANHOLE

DESIGN NOTES

1. RAINWATER STORAGE DESIGN BASED ON 1 IN 100 YR STORM + 40%.

2. APPROVAL TO BE GAINED FROM SOUTHERN WATER FOR CONNECTIONS TO FOUL AND SURFACE WATER SEWERS.

3. CONTRACTOR TO ALLOW FOR NEW FOUL AND SURFACE WATER SEWER CONNECTIONS INTO SOUTHVIEW ROAD.

4. FINISHED FLOOR LEVELS ARE ESTIMATED FROM EXISTING GROUND LEVELS. ARCHITECT TO CONFIRM IN DUE COURSE.

5. INVERT LEVEL OF STORM SEWER AT PROPOSED POINT OF CONNECTION HAS BEEN INTERPOLATED FROM SEWER RECORDS. CONTRACTOR TO CONFIRM SEWER'S INVERT LEVEL AS EARLY AS POSSIBLE TO INFORM DETAILED DESIGN.

ATTENUATION STORAGE

TANKED STORAGE BLANKET LOCATED UNDER ROAD AS INDICATED BY DIAGONAL HATCH
CL 10.900 - 11.300
Top level of stone 10.750 - 11.190
Base level of stone 10.180
Area 656m.sq
Volume 112m.cu (30% voids)
Sized for the 1 in 100 year + 40% event

CONTROL MANHOLE

HYDROBRAKE RESTRICTION TO 2.0 L/S
CL 11.230
IL 10.145
SL 9.645

1. Surfacing (impermeable)
2. Base course
3. Sub-base 10 - 63mm size open graded crushed rock with no fines (30% voids)
4. Impermeable geotextile under compacted formation and to sides of sub-base

Permeable stone specifications as BS 7533 part 13

SECTION THROUGH ROAD SHOWING DISTRIBUTION BLOCK (DB)

STORAGE BLANKET

Roadway sub-base composed of 10 - 63mm size open-graded crushed rock with no fines (30% volds)

LEGEND

- SURFACE WATER DRAIN
- FOUL DRAIN
- EXISTING SURFACE WATER SEWER
- EXISTING FOUL SEWER
- BOUNDARY LINE
- RG — ROAD GULLY
- DB — DISTRIBUTION BLOCK
- PPCP — PLASTIC CATCHPIT CHAMBER
- SCP — PCC CATCHPIT CHAMBER
- SWSMH — SURFACE WATER SEWER MANHOLE (PROPOSED)
- FMH — PCC FOUL MANHOLE

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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6. All drawings specifications and recommendations made by gta are subject to Local Authority and other relevant Statutory Authorities approval. Any works or services made abortive due to the client proceeding prior to these approvals is considered wholly at the Clients risk. gta hold no responsibility for resulting abortive works or costs.

Rev	Amendments	Date	Dsn	Chk
J	REVISED TO PLANNING'S COMMENTS	16.09.20	JR	MR
H	REVISED TO PLANNING'S COMMENTS	21.07.20	JR	MR
G	REVISED TO PLANNING'S COMMENTS	02.07.20	JR	MR
F	REVISED TO PLANNING'S COMMENTS	11.06.20	JR	MR
E	REVISED TO SHOW SW TO SEWER	29.05.20	JR	MR
D	PCC S/AWAYS MOVED AWAY FROM RPA	09.07.19	JR	MR
C	REVISED TO LATEST SITE PLAN. CELLULAR SOAKAWAY CHANGED TO PCC RING TYPE.	04.07.19	JR	MR
B	REVISED TO LATEST SITE PLAN	07.06.19	JR	MR
A	ROADWAY TO CELLULAR S/SWAY	21.02.19	JR	JP
-	INITIAL ISSUE	13.02.19	JR	MR

Status: PLANNING

Client: S.D. HOLDINGS LTD

Architect: CIRCLE25 DESIGN

Project: LAND TO REAR OF 53-61 SOUTHVIEW ROAD, SOUTHWICK BRIGHTON

Title: SITE DRAINAGE STRATEGY

Date: FEBRUARY 2019 | Scale @ A2: 1:200

Clients Ref. | Project Ref.: 7346

gtaCivils Consulting Engineers
Gloucester House, 66a Church Walk,
Burgess Hill, West Sussex, RH15 9AS
Tel.01444 871444 Web: www.gtacivils.co.uk

Drawing Number: 7346/100 | Rev.: J

0 5m 10m 15m 20m 25m

OVERLAND FLOW ISSUING FROM NEIGHBOURING LAND

LEVELS IN NORTHWEST CORNER TO REMAIN AS EXISTING

1No step 150mm riser

LEVELS WITHIN HATCHED AREA TO BE LOWERED BY 100-150mm

1No step 150mm riser

PATIO HOUSES 5-8 TO BE SET 150-300mm ABOVE REAR GARDEN LEVELS

2No steps 150mm risers

LEVELS WITHIN HATCHED AREA TO BE LOWERED BY 100-150mm

New Swale/Depression to allow ponding water to replace existing ponding volume lost. TOTAL proposed volume from level of 10.42- base of storage in 2 ponds= **27.6m³**

LEVELS IN SOUTHWEST CORNER TO REMAIN AS EXISTING

OVERLAND FLOW EXITING ONTO NEIGHBOURING LAND

Existing depression maintained

OVERLAND FLOW ISSUING FROM NEIGHBOURING LAND

Flush kerbs here to allow overland flow

Low spot retained for flood storage

Flush kerbs here to allow water to flow into landscaping

Flush kerbs here to allow water to overland flow into landscaping

5 HOUSE 5 FFL 11.300

6 HOUSE 6 FFL 11.300

7 HOUSE 7 FFL 11.100

8 HOUSE 8 FFL 11.100

9 HOUSE 9 FFL 10.800

4 HOUSE 4 FFL 11.150

3 HOUSE 3 FFL 11.150

2 HOUSE 2 FFL 11.150

1 HOUSE 1 FFL 11.150

10 HOUSE 10 FFL 11.800

SOUTHVIEW ROAD

LEGEND

	OVERLAND FLOW
1/15	DIRECTION OF FALL WITH GRADIENT
+11.335(e)	EXISTING GROUND LEVEL
+11.335	PROPOSED GROUND LEVEL

ABBREVIATIONS

FFL FINISHED FLOOR LEVEL

B-B

Datum: 9.000M AOD

EXISTING CHAINAGE (m)	0.000, 3.128, 5.283, 6.758
EXISTING LEVELS (m)	10.522, 10.479, 10.440, 10.408
Final Surface (m)	10.503, 10.533, 9.880, 9.880, 10.651

SECTION B-B THROUGH PROPOSED SWALE
SCALE 1:200H, 1:40V

Height Bands

- 10.42m - 10.22m
- 10.22m - 10.02m
- 10.02m - 9.82m
- 9.82m - 9.62m
- 9.62m - 9.42m

Rev	Amendments	Date	Dsn	Chk
D	REVISED TO LLFA'S COMMENTS	16.09.20	JR	MR
C	REVISED TO LLFA'S COMMENTS	21.07.20	JR	MR
B	REVISED TO LLFA'S COMMENTS	02.07.20	JR	MR
A	REVISED TO LLFA'S COMMENTS	11.06.20	JR	MR
-	INITIAL ISSUE	29.05.20	JR	MR

Status: PLANNING

Client: S.D. HOLDINGS LTD

Architect: CIRCLE25 DESIGN

Project: LAND TO REAR OF 53-61 SOUTHVIEW ROAD, SOUTHWICK BRIGHTON

Title: OVERLAND FLOW ROUTES

Date: MAY 2020 | Scale @ A2: 1:200

Clients Ref. | Project Ref.: 7346

gtaCivils Consulting Engineers
Gloucester House, 66a Church Walk,
Burgess Hill, West Sussex, RH15 9AS
Tel.01444 871444 Web: www.gtacivils.co.uk

Drawing Number: 7346/101 | Rev.: D

GENERAL NOTES

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

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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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HOUSE 5 FFL 11.300

HOUSE 6 FFL 11.300

HOUSE 7 FFL 11.100

HOUSE 8 FFL 11.100

HOUSE 4 FFL 11.150

HOUSE 3 FFL 11.150

HOUSE 2 FFL 11.150

HOUSE 1 FFL 11.150

HOUSE 10 FFL 11.800

HOUSE 9 FFL 10.800

SOUTHVIEW ROAD

No 51

NOTE

PROPOSED LEVELS ARE SHOWN IN BLACK AND CYAN COLOURS

EXISTING LEVELS ARE SHOWN IN FAINT GREY COLOUR

Rev	Amendments	Date	Dsn	Chk
B	Plots 1-4 FFLs revised	21.07.20	MR	JR
A	REVISED TO COMMENTS FROM LLFA	02.07.20	MR	JR
-	INITIAL ISSUE	11.06.20	JR	MR

Status: PLANNING

Client: S.D. HOLDINGS LTD

Architect: CIRCLE25 DESIGN

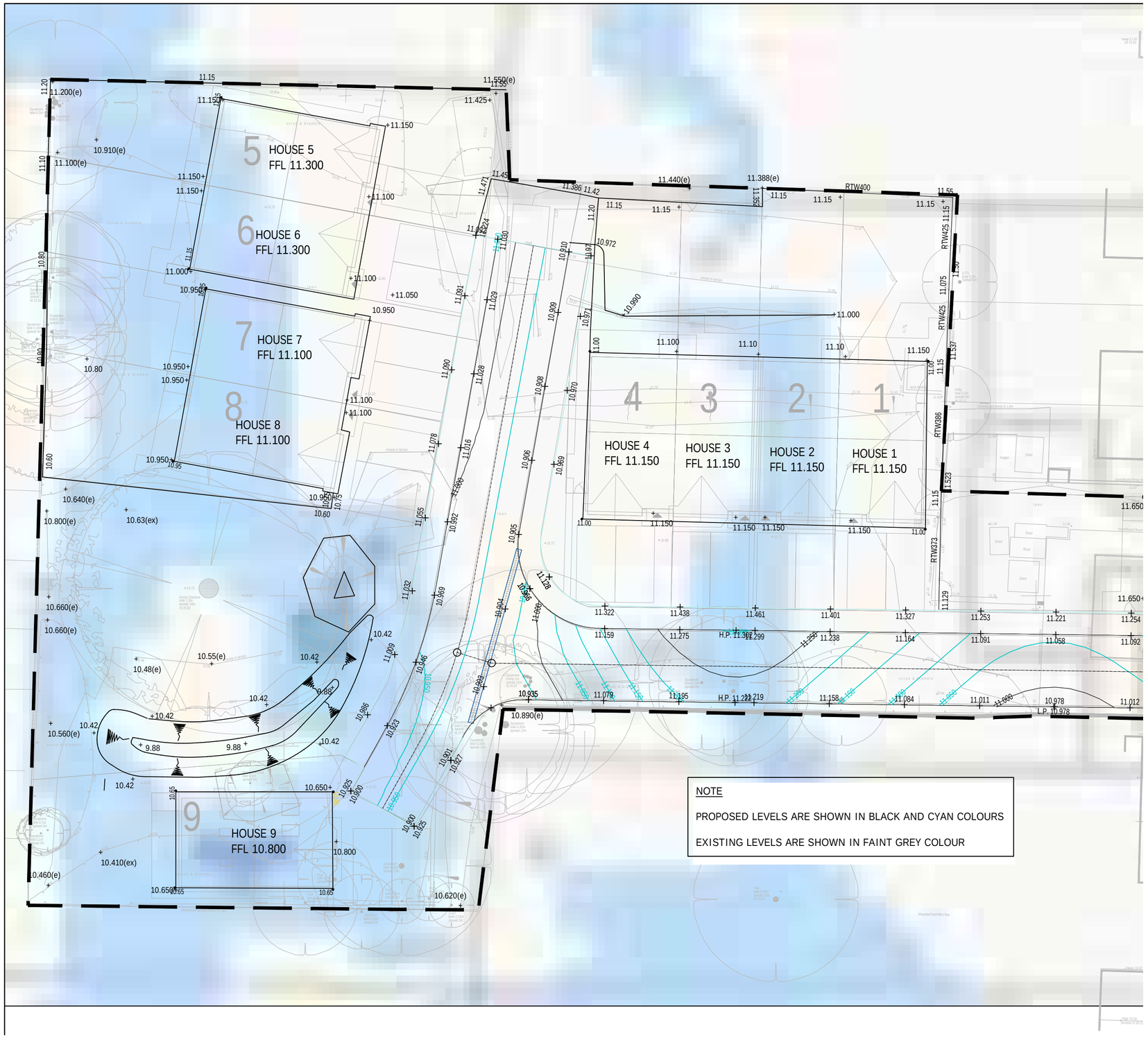
Project: LAND TO REAR OF 53-61 SOUTHVIEW ROAD, SOUTHWICK

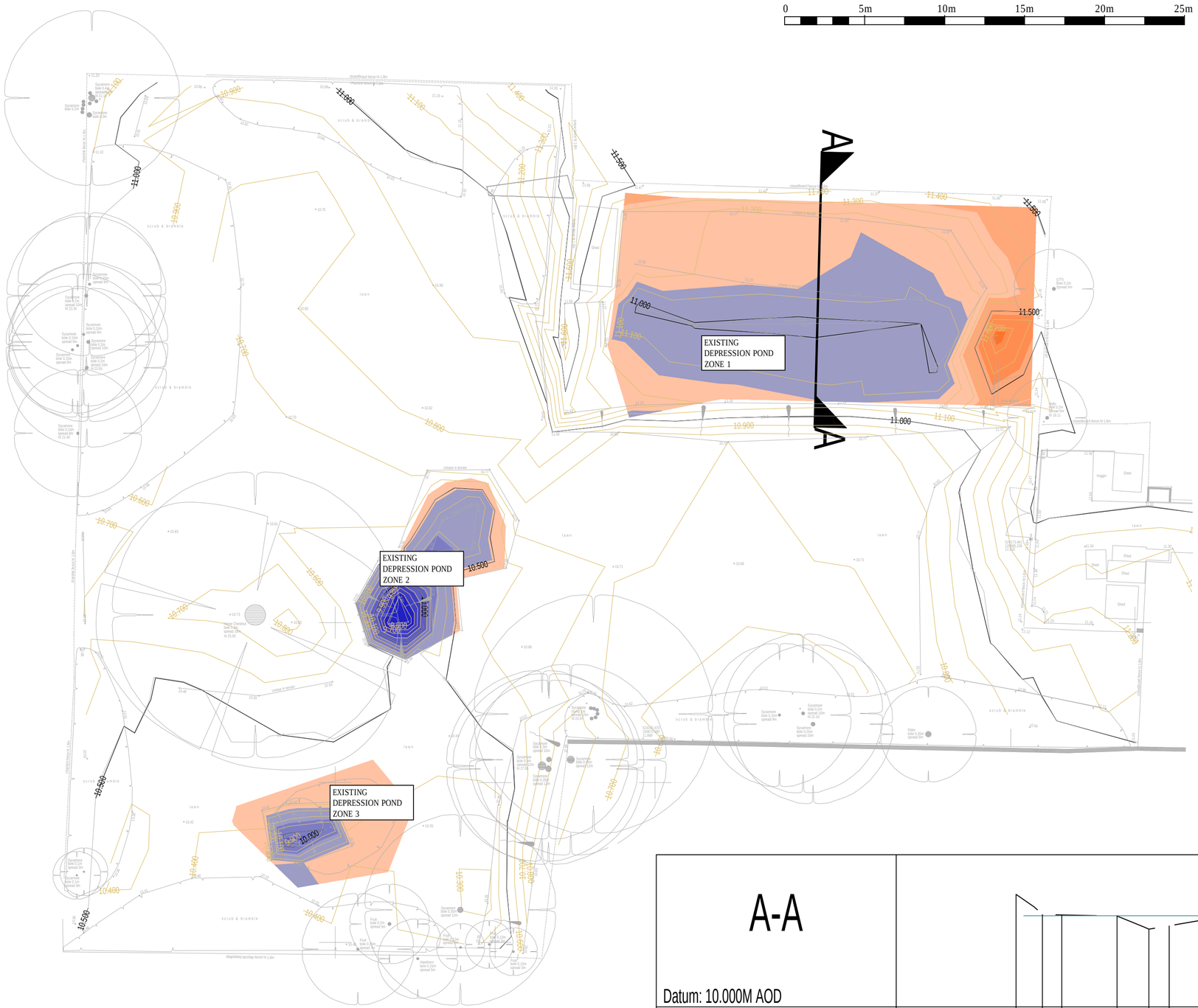
Title: PROPOSED EXTERNAL LEVELS

Date	Scale @ A2
JUNE 2020	1:200
Clients Ref.	Project Ref. 7346

gtaCivils Consulting Engineers
Gloucester House, 66a Church Walk,
Burgess Hill, West Sussex, RH15 9AS
Tel.01444 871444 Web: www.gtacivils.co.uk

Drawing Number	Rev.
7346/102	B


HOUSE 5
FFL 11.300
HOUSE 6
FFL 11.300
HOUSE 7
FFL 11.100
HOUSE 8
FFL 11.100
HOUSE 9
FFL 10.800
HOUSE 4
FFL 11.150
HOUSE 3
FFL 11.150
HOUSE 2
FFL 11.150
HOUSE 1
FFL 11.150
NOTE
PROPOSED LEVELS ARE SHOWN IN BLACK AND CYAN COLOURS
EXISTING LEVELS ARE SHOWN IN FAINT GREY COLOUR



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

5. Copyright : This drawing must not be copied, amended nor reproduced without the prior written agreement of gta.

6. All drawings specifications and recommendations made by gta are subject to Local Authority and other relevant Statutory Authorities approval. Any works or services made abortive due to the client proceeding prior to these approvals is considered wholly at the Clients risk. gta hold no responsibility for resulting abortive works or costs.

Summary of Existing and Proposed Floodplain Volumes

Pre-Development Floodplain:

Existing model: TOPO_SURFACE.DGM

Zone 1 - Plane at 11.14m AOD

Depth Range (m AOD)	Volume (cu.m.)
11.14 - 11.04	9.2
11.04 - 10.94	1.4
10.94 -	0.0
	10.6

Zone 2 - Plane at 10.40m AOD

Depth Range (m AOD)	Volume (cu.m.)
10.40 - 10.25	4.0
10.25 - 10.10	2.1
10.10 - 9.95	1.4
9.95 - 9.80	0.9
9.80 - 9.65	0.5
9.65 - 9.50	0.2
	9.1

Zone 3 - Plane at 10.34m AOD

Depth Range (m AOD)	Volume (cu.m.)
10.34 - 10.22	1.3
10.22 - 10.10	0.7
10.10 - 9.98	0.3
9.98 -	0.0
	2.4

Post-Development Floodplain:

Proposed model: PROPOSED_SURFACE.DGM

Zone 1 - Plane at 11.14m AOD

Depth Range (m AOD)	Volume (cu.m.)
11.14 - 11.04	12.0
11.04 - 10.94	3.7
10.94 -	0.0
	15.7

Zone 2 - Plane at 10.475m AOD

Depth Range (m AOD)	Volume (cu.m.)
10.475 - 10.325	3.0
10.325 - 10.175	2.4
10.175 - 10.025	1.7
10.025 - 9.875	1.1
9.875 - 9.725	0.7
9.725 - 9.575	0.5
9.575 -	0.0
	9.5

Zone 3 - Plane at 10.34m AOD

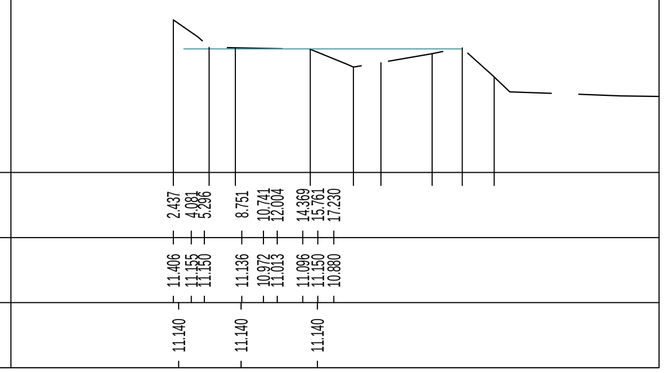
Depth Range (m AOD)	Volume (cu.m.)
10.34 - 10.19	8.5
10.19 - 10.04	6.2
10.04 - 9.89	4.2
9.98 - 9.74	2.0
9.74 -	0.0
	20.9

Zones 2 and 3 of the post-development setup are almost touching so these depthbands should be amalgamated.
Conclusion: there is an increase within each of the depthbands - so this complies fully

Height Bands
- 10.42m - 10.22m
- 10.22m - 10.02m
- 10.02m - 9.82m
- 9.82m - 9.62m
- 9.62m - 9.42m

A-A

Datum: 10.000M AOD



SECTION A-A THROUGH EXISTING DEPRESSION
SCALE 1:200H, 1:40V

Rev	Amendments	Date	Dsn	Chk
A	FP Volumes updated with depthbands	21.07.20	JP	MR
-	INITIAL ISSUE	02.07.20	JR	MR

Status: PLANNING

Client: S.D. HOLDINGS LTD

Architect: CIRCLE25 DESIGN

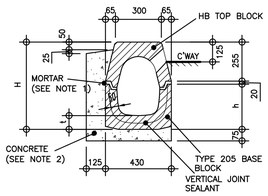
Project: LAND TO REAR OF 53-61 SOUTHVIEW ROAD, SOUTHWICK BRIGHTON

Title: EXISTING FLOOD VOLUMES AND REPLACEMENT VOLUME CALCS

Date: MAY 2020
Scale @ A2: 1:200
Clients Ref.:
Project Ref.: 7346

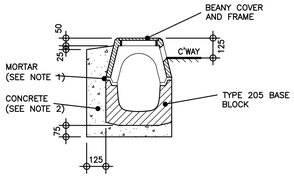
gtaCivils Consulting Engineers
Gloucester House, 66a Church Walk,
Burgess Hill, West Sussex, RH15 9AS
Tel.01444 871444 Web: www.gtacivils.co.uk

Drawing Number: 7346/103
Rev.: A



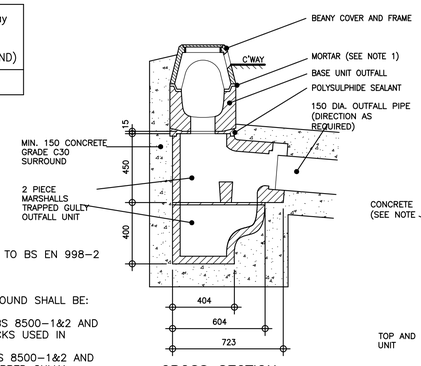
BASE UNIT	H	h	t	DEPTH: c/way CHANNEL TO INVERT (125 KERB UPSTAND)
BASE 205	480	205	70	285

HALF BATTERED TOP WITH BASE 205

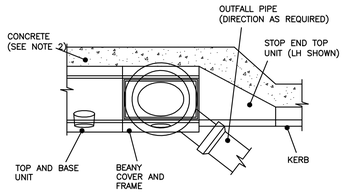


NOTES:

1. MORTAR CLASS 12 CEMENT MORTAR TO BS EN 998–2 FOR BEDDING THE TOP BLOCKS
2. CONCRETE BED, HAUNCH AND SURROUND SHALL BE:
   i. A MIX ST1 CONCRETE TO BS 8500–1&2 AND BS EN 206–1 FOR BASE BLOCKS USED IN NORMAL KERB APPLICATION.
   ii. A MIX ST4 CONCRETE TO BS 8500–1&2 AND BS EN 206–1 FOR BEANY TRAPPED GULLY AND OUTFALL DETAILS.
3. MARSHALLS' VERTICAL JOINT SEALANT, M–SEAL, SHALL BE APPLIED TO ALL BASE BLOCKS.

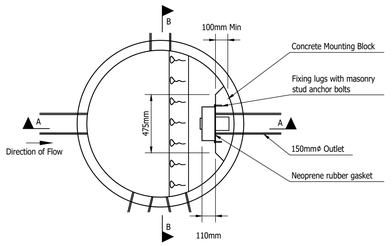


CROSS SECTION



PLAN

OUTFALL TYPE 3
(150 WITH 150 DIA OUTLET)



PLAN

ACCESS COVER TYPE 1 (AC1)

BEANY KERB DETAILS

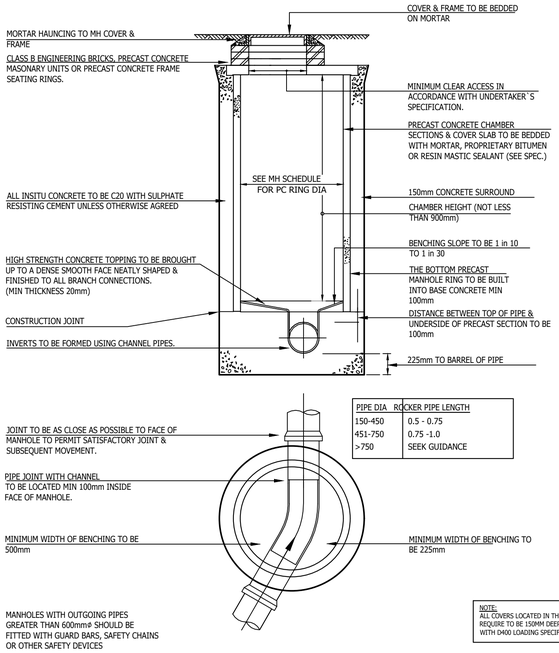
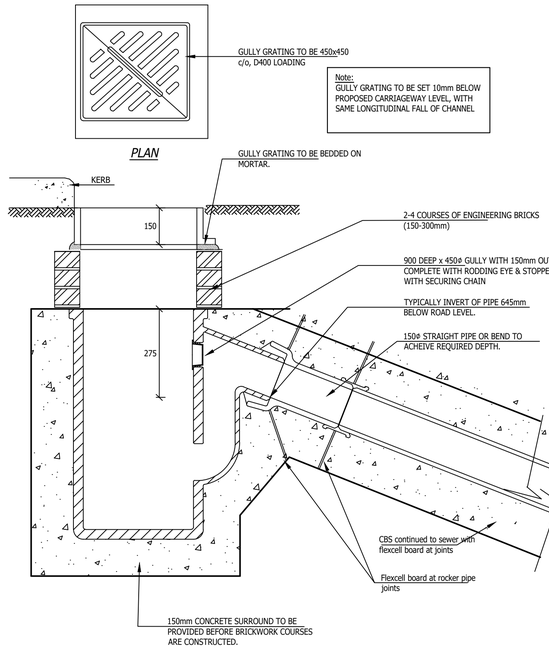
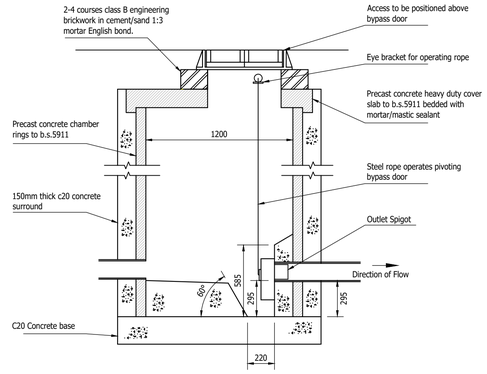


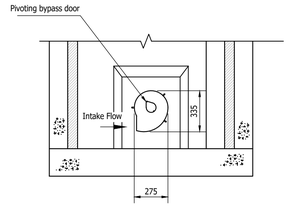
FIG 2.5 SFA 6 -
CIRCULAR PCC MANHOLE TYPE B
DEPTH 1.45m - 3m



ROAD GULLY



SECTION A-A

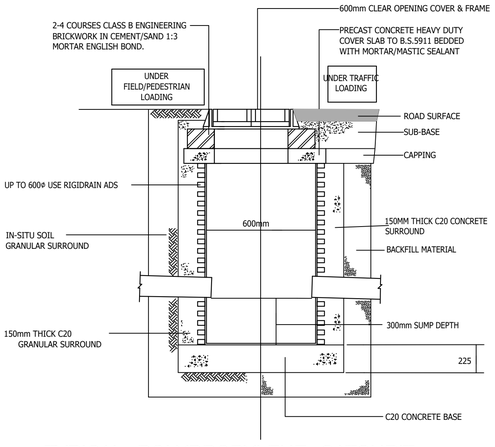


SECTION B-B

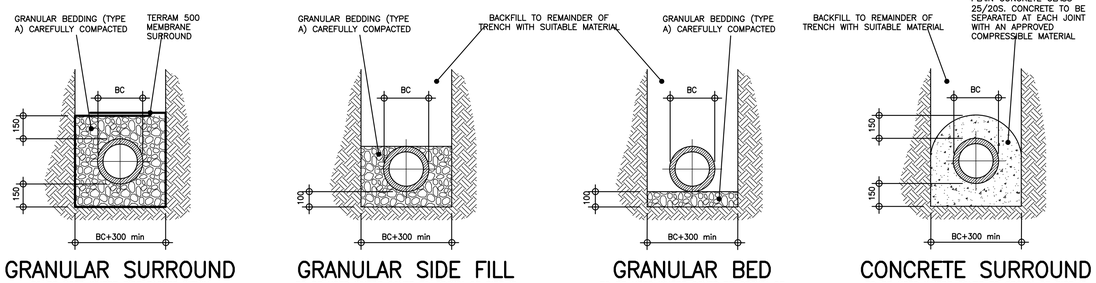
NOTES

1. ROCKER PIPES 600mm LONG FOR 100 TO 450 DIA PIPEWORK (1000mm LONG UP TO 750DIA) ON OUTLET AND EACH ENTRY STARTING 150mm FROM CONCRETE SURROUND.
2. DETAIL TO BE READ IN CONJUNCTION WITH GUIDELINES FROM HYDRO INTERNATIONAL PLC.

CONTROL CHAMBER



TYPICAL POLYPROPYLENE CATCHPIT



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)

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.
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Rev	Amendments	Date	Dsn	Chk
-	INITIAL ISSUE	21.07.20	JP	MR

Status: PLANNING

Client: S.D. HOLDINGS LTD

Architect: CIRCLE25 DESIGN

Project: LAND TO REAR OF 53-61 SOUTHVIEW ROAD, SOUTHWICK BRIGHTON

Title: DRAINAGE DETAILS

Date	Scale @ A1
JULY 2020	NTS
Clients Ref.	Project Ref. 7346

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.
7346/104	-

Appendix D

Micro Drainage Calculations

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.400
Area (ha)	0.188	Urban	0.000
SAAR (mm)	712	Region Number	Region 7

Results l/s

QBAR Rural	0.7
QBAR Urban	0.7
Q100 years	2.1
Q1 year	0.6
Q30 years	1.5
Q100 years	2.1

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Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 469 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	10.406	0.226	0.0	2.0	2.0	44.5	O K
30 min Summer	10.480	0.300	0.0	2.0	2.0	58.9	O K
60 min Summer	10.553	0.373	0.0	2.0	2.0	73.5	O K
120 min Summer	10.621	0.441	0.0	2.0	2.0	86.7	O K
180 min Summer	10.649	0.469	0.0	2.0	2.0	92.2	O K
240 min Summer	10.659	0.479	0.0	2.0	2.0	94.3	O K
360 min Summer	10.665	0.485	0.0	2.0	2.0	95.3	O K
480 min Summer	10.657	0.477	0.0	2.0	2.0	93.9	O K
600 min Summer	10.648	0.468	0.0	2.0	2.0	92.1	O K
720 min Summer	10.639	0.459	0.0	2.0	2.0	90.2	O K
960 min Summer	10.618	0.438	0.0	2.0	2.0	86.2	O K
1440 min Summer	10.572	0.392	0.0	2.0	2.0	77.1	O K
2160 min Summer	10.507	0.327	0.0	2.0	2.0	64.3	O K
2880 min Summer	10.449	0.269	0.0	2.0	2.0	52.9	O K
4320 min Summer	10.357	0.177	0.0	2.0	2.0	34.9	O K
5760 min Summer	10.297	0.117	0.0	2.0	2.0	23.0	O K
7200 min Summer	10.260	0.080	0.0	1.9	1.9	15.7	O K
8640 min Summer	10.239	0.059	0.0	1.8	1.8	11.5	O K
10080 min Summer	10.229	0.049	0.0	1.6	1.6	9.6	O K
15 min Winter	10.434	0.254	0.0	2.0	2.0	50.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	131.128	0.0	46.1	19
30 min Summer	88.088	0.0	62.0	33
60 min Summer	56.422	0.0	79.5	64
120 min Summer	34.839	0.0	98.1	122
180 min Summer	25.861	0.0	109.3	182
240 min Summer	20.787	0.0	117.1	242
360 min Summer	15.300	0.0	129.3	360
480 min Summer	12.289	0.0	138.5	442
600 min Summer	10.359	0.0	145.9	500
720 min Summer	9.004	0.0	152.2	564
960 min Summer	7.211	0.0	162.6	694
1440 min Summer	5.263	0.0	178.0	956
2160 min Summer	3.833	0.0	194.4	1344
2880 min Summer	3.056	0.0	206.8	1728
4320 min Summer	2.218	0.0	225.0	2424
5760 min Summer	1.764	0.0	238.7	3120
7200 min Summer	1.478	0.0	249.9	3816
8640 min Summer	1.279	0.0	259.7	4416
10080 min Summer	1.133	0.0	268.2	5144
15 min Winter	131.128	0.0	51.7	18

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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	10.518	0.338	0.0	2.0	2.0	66.4	O K
60 min Winter	10.603	0.423	0.0	2.0	2.0	83.2	O K
120 min Winter	10.680	0.500	0.0	2.0	2.0	98.4	O K
180 min Winter	10.714	0.534	0.0	2.0	2.0	105.1	O K
240 min Winter	10.729	0.549	0.0	2.0	2.0	108.0	O K
360 min Winter	10.740	0.560	0.0	2.0	2.0	110.2	O K
480 min Winter	10.737	0.557	0.0	2.0	2.0	109.5	O K
600 min Winter	10.725	0.545	0.0	2.0	2.0	107.3	O K
720 min Winter	10.712	0.532	0.0	2.0	2.0	104.6	O K
960 min Winter	10.686	0.506	0.0	2.0	2.0	99.6	O K
1440 min Winter	10.627	0.447	0.0	2.0	2.0	88.0	O K
2160 min Winter	10.521	0.341	0.0	2.0	2.0	67.2	O K
2880 min Winter	10.432	0.252	0.0	2.0	2.0	49.6	O K
4320 min Winter	10.307	0.127	0.0	2.0	2.0	24.9	O K
5760 min Winter	10.245	0.065	0.0	1.8	1.8	12.9	O K
7200 min Winter	10.226	0.046	0.0	1.6	1.6	9.1	O K
8640 min Winter	10.216	0.036	0.0	1.4	1.4	7.0	O K
10080 min Winter	10.208	0.028	0.0	1.2	1.2	5.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	88.088	0.0	69.5	33
60 min Winter	56.422	0.0	89.0	62
120 min Winter	34.839	0.0	109.9	120
180 min Winter	25.861	0.0	122.4	178
240 min Winter	20.787	0.0	131.2	236
360 min Winter	15.300	0.0	144.9	348
480 min Winter	12.289	0.0	155.1	458
600 min Winter	10.359	0.0	163.5	560
720 min Winter	9.004	0.0	170.6	588
960 min Winter	7.211	0.0	182.1	740
1440 min Winter	5.263	0.0	199.4	1052
2160 min Winter	3.833	0.0	217.8	1468
2880 min Winter	3.056	0.0	231.7	1844
4320 min Winter	2.218	0.0	252.1	2508
5760 min Winter	1.764	0.0	267.3	3112
7200 min Winter	1.478	0.0	279.9	3744
8640 min Winter	1.279	0.0	290.8	4416
10080 min Winter	1.133	0.0	300.4	5152

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.900	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.188

Time (mins) From:	To:	Area (ha)
0	4	0.188

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Model Details

Storage is Online Cover Level (m) 10.900

Infiltration Blanket Structure

Infiltration Coefficient Base (m/hr)	0.00000	Diameter/Width (m)	6.1
Safety Factor	2.0	Length (m)	107.5
Porosity	0.30	Cap Volume Depth (m)	0.570
Invert Level (m)	10.180		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0071-2000-0700-2000
Design Head (m)	0.700
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	71
Invert Level (m)	10.145
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.700	2.0	Kick-Flo®	0.450	1.6
Flush-Flo™	0.207	2.0	Mean Flow over Head Range	-	1.7

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)
0.100	1.8	1.200	2.6	3.000	3.9	7.000	5.8
0.200	2.0	1.400	2.7	3.500	4.2	7.500	6.0
0.300	2.0	1.600	2.9	4.000	4.5	8.000	6.2
0.400	1.8	1.800	3.1	4.500	4.7	8.500	6.4
0.500	1.7	2.000	3.2	5.000	5.0	9.000	6.6
0.600	1.9	2.200	3.4	5.500	5.2	9.500	6.8
0.800	2.1	2.400	3.5	6.000	5.4		
1.000	2.4	2.600	3.7	6.500	5.6		

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Summary of Results for 1000 year Return Period

Half Drain Time : 569 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	10.446	0.266	0.0	2.0	2.0	52.4	O K
30 min Summer	10.540	0.360	0.0	2.0	2.0	70.9	O K
60 min Summer	10.637	0.457	0.0	2.0	2.0	89.9	O K
120 min Summer	10.720	0.540	0.0	2.0	2.0	106.2	O K
180 min Summer	10.900	0.720	0.0	2.1	2.1	112.4	FLOOD
240 min Summer	10.902	0.722	0.0	2.1	2.1	114.1	FLOOD
360 min Summer	10.902	0.722	0.0	2.1	2.1	114.3	FLOOD
480 min Summer	10.900	0.720	0.0	2.1	2.1	112.4	FLOOD
600 min Summer	10.740	0.560	0.0	2.0	2.0	110.2	O K
720 min Summer	10.726	0.546	0.0	2.0	2.0	107.4	O K
960 min Summer	10.699	0.519	0.0	2.0	2.0	102.1	O K
1440 min Summer	10.648	0.468	0.0	2.0	2.0	92.1	O K
2160 min Summer	10.568	0.388	0.0	2.0	2.0	76.4	O K
2880 min Summer	10.495	0.315	0.0	2.0	2.0	62.0	O K
4320 min Summer	10.383	0.203	0.0	2.0	2.0	40.0	O K
5760 min Summer	10.310	0.130	0.0	2.0	2.0	25.5	O K
7200 min Summer	10.266	0.086	0.0	1.9	1.9	17.0	O K
8640 min Summer	10.241	0.061	0.0	1.8	1.8	12.0	O K
10080 min Summer	10.230	0.050	0.0	1.7	1.7	9.8	O K
15 min Winter	10.479	0.299	0.0	2.0	2.0	58.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	153.682	0.0	54.1	19
30 min Summer	105.125	0.0	74.0	33
60 min Summer	68.009	0.0	95.8	64
120 min Summer	41.927	0.0	118.1	122
180 min Summer	30.855	0.3	130.4	182
240 min Summer	24.550	1.9	138.3	242
360 min Summer	17.854	2.2	150.9	360
480 min Summer	14.210	0.3	160.2	430
600 min Summer	11.888	0.0	167.5	516
720 min Summer	10.267	0.0	173.6	578
960 min Summer	8.136	0.0	183.4	704
1440 min Summer	5.843	0.0	197.6	982
2160 min Summer	4.181	0.0	212.2	1384
2880 min Summer	3.290	0.0	222.6	1756
4320 min Summer	2.340	0.0	237.5	2464
5760 min Summer	1.834	0.0	248.1	3120
7200 min Summer	1.519	0.0	256.9	3816
8640 min Summer	1.303	0.0	264.5	4488
10080 min Summer	1.145	0.0	271.2	5144
15 min Winter	153.682	0.0	60.6	19

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Summary of Results for 1000 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	10.586	0.406	0.0	2.0	2.0	79.9	O K
60 min Winter	10.695	0.515	0.0	2.0	2.0	101.4	O K
120 min Winter	10.908	0.728	0.0	2.1	2.1	120.0	FLOOD
180 min Winter	10.915	0.735	0.0	2.1	2.1	127.4	FLOOD
240 min Winter	10.918	0.738	0.0	2.1	2.1	130.1	FLOOD
360 min Winter	10.920	0.740	0.0	2.1	2.1	131.9	FLOOD
480 min Winter	10.918	0.738	0.0	2.1	2.1	130.3	FLOOD
600 min Winter	10.915	0.735	0.0	2.1	2.1	127.1	FLOOD
720 min Winter	10.911	0.731	0.0	2.1	2.1	123.4	FLOOD
960 min Winter	10.905	0.725	0.0	2.1	2.1	117.2	FLOOD
1440 min Winter	10.712	0.532	0.0	2.0	2.0	104.6	O K
2160 min Winter	10.604	0.424	0.0	2.0	2.0	83.4	O K
2880 min Winter	10.487	0.307	0.0	2.0	2.0	60.5	O K
4320 min Winter	10.332	0.152	0.0	2.0	2.0	29.8	O K
5760 min Winter	10.254	0.074	0.0	1.9	1.9	14.6	O K
7200 min Winter	10.229	0.049	0.0	1.6	1.6	9.6	O K
8640 min Winter	10.217	0.037	0.0	1.4	1.4	7.2	O K
10080 min Winter	10.209	0.029	0.0	1.3	1.3	5.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	105.125	0.0	82.9	33
60 min Winter	68.009	0.0	107.3	62
120 min Winter	41.927	7.9	132.3	120
180 min Winter	30.855	15.3	146.1	178
240 min Winter	24.550	17.9	154.9	236
360 min Winter	17.854	19.7	169.1	350
480 min Winter	14.210	18.2	179.4	458
600 min Winter	11.888	15.0	187.6	560
720 min Winter	10.267	11.3	194.5	586
960 min Winter	8.136	5.0	205.4	732
1440 min Winter	5.843	0.0	221.3	1054
2160 min Winter	4.181	0.0	237.6	1516
2880 min Winter	3.290	0.0	249.3	1876
4320 min Winter	2.340	0.0	266.0	2548
5760 min Winter	1.834	0.0	277.9	3120
7200 min Winter	1.519	0.0	287.7	3744
8640 min Winter	1.303	0.0	296.3	4488
10080 min Winter	1.145	0.0	303.7	5144

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	1000	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.900	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.188

Time (mins) From:	To:	Area (ha)
0	4	0.188

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Model Details

Storage is Online Cover Level (m) 10.900

Infiltration Blanket Structure

Infiltration Coefficient Base (m/hr)	0.00000	Diameter/Width (m)	6.1
Safety Factor	2.0	Length (m)	107.5
Porosity	0.30	Cap Volume Depth (m)	0.570
Invert Level (m)	10.180		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0071-2000-0700-2000
Design Head (m)	0.700
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	71
Invert Level (m)	10.145
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.700	2.0	Kick-Flo®	0.450	1.6
Flush-Flo™	0.207	2.0	Mean Flow over Head Range	-	1.7

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)
0.100	1.8	1.200	2.6	3.000	3.9	7.000	5.8
0.200	2.0	1.400	2.7	3.500	4.2	7.500	6.0
0.300	2.0	1.600	2.9	4.000	4.5	8.000	6.2
0.400	1.8	1.800	3.1	4.500	4.7	8.500	6.4
0.500	1.7	2.000	3.2	5.000	5.0	9.000	6.6
0.600	1.9	2.200	3.4	5.500	5.2	9.500	6.8
0.800	2.1	2.400	3.5	6.000	5.4		
1.000	2.4	2.600	3.7	6.500	5.6		

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Appendix E

Site Investigation (Winter BRE365 Soakage Testing and Groundwater Monitoring)

5. STORMWATER INFILTRATION SYSTEMS

In-situ infiltration testing[3] was carried out in trial pits TP101 to TP105. From the test results calculations were made to determine the infiltration rate that could be expected for infiltration systems constructed into the underlying Head soils.

In general, for each test the soil infiltration rate (f) was calculated by dividing the volume of water lost between 75% and 25% of the initial test depth by the sum of the average surface area of the sides of the trial pit in contact with the water during the test monitoring period, and its base area. This figure was then divided by the test duration (time taken for the water level to fall between 75% and 25% of the initial test depth) to give the soil infiltration rate in metres per second.

During the tests performed within trial pits TP101 (Test 1), TP101 (Test 3), TP103 (Test 1) and TP103 (Test 3), the water level within the test pits did not fall below 25% of the initial test depth due to either the water level not being able to be sufficiently raised during filling (TP101) or the pit being filled for another test prior to the 25% level having been met (TP103). Calculation of the soil infiltration rates in accordance with the BRE digest was not possible for these tests. The soil infiltration rate has therefore been calculated by dividing the volume of water lost during the test by the product of the average surface area of the trial pit in contact with water during the test period and the test duration in seconds.

The infiltration rates derived from the tests conducted within the Head deposits are summarised in the following table.

Table 2. Calculated Infiltration Rates

Exploratory Hole	Test Response Zone Depth (m)		Infiltration Rate (f) (m/sec)
	Top	Bottom	
TP101 Test 1	2.70	2.90	2.5×10^{-5}
TP101 Test 2	2.31	2.90	1.4×10^{-4}
TP101 Test 3	2.56	2.90	8.8×10^{-5}
TP102 Test 1	2.03	2.90	8.0×10^{-5}
TP102 Test 2	1.02	2.90	6.7×10^{-5}
TP102 Test 3	0.85	2.90	5.6×10^{-5}
TP102 Test 4	0.53	2.90	4.3×10^{-5}
TP103 Test 1	0.85	3.00	3.5×10^{-5}
TP103 Test 2	0.25	3.00	8.4×10^{-6}
TP103 Test 3	0.92	3.00	8.4×10^{-6}
TP103 Test 4	0.41	3.00	7.6×10^{-6}
TP104 Test 1	0.62	3.00	1.3×10^{-5}
TP104 Test 2	0.26	3.00	1.0×10^{-5}
TP104 Test 3	0.38	3.00	9.0×10^{-6}
TP104 Test 4	0.39	3.00	8.9×10^{-6}
TP105 Test 1	0.00	1.00	3.8×10^{-5}
TP105 Test 2	0.00	1.00	2.4×10^{-5}

[3] Conducted in general accordance with the requirements of BRE 365, Soakaway Design.

Exploratory Hole	Test Response Zone Depth (m)		Infiltration Rate (f) (m/sec)
	Top	Bottom	
TP105 Test 3	0.00	1.00	2.3×10^{-5}
TP105 Test 4	0.00	1.00	1.5×10^{-5}

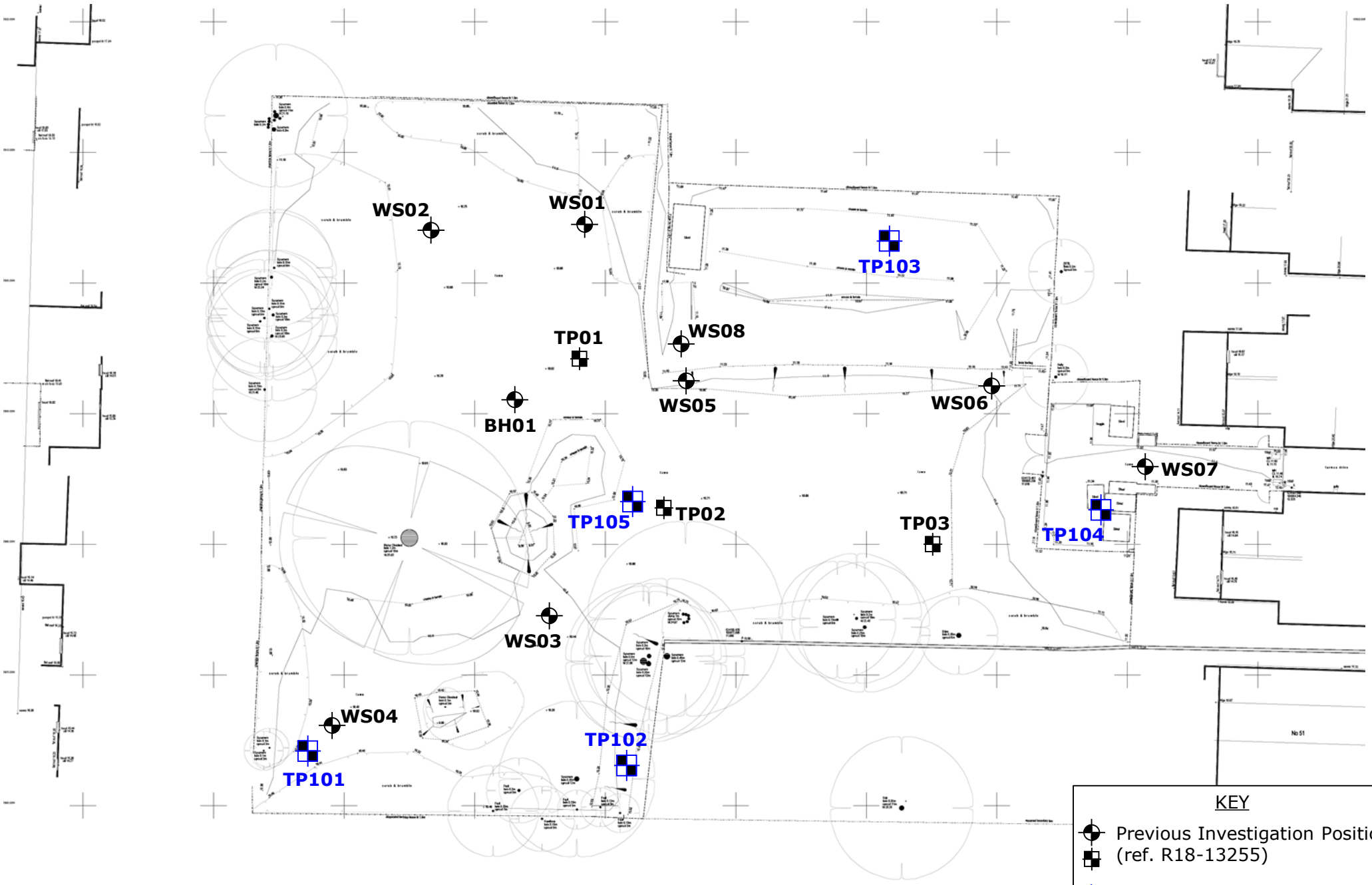
The value 'f' is equivalent to the soil infiltration coefficient 'q' quoted in the Construction Industry Research and Information Association (CIRIA) Report 156.

The results from the infiltration tests indicate that the Head soils possess moderate to good infiltration characteristics. The results from the infiltration tests should be provided to engineers responsible for the design of the drainage system.

To comply with building regulations[4], point discharging infiltration systems (conventional ring or trench soakaways) are required to be constructed a minimum of 5.0m away from proposed or existing buildings.

Ashdown Site Investigation Ltd.

[4] The Building Regulations 2010; Part H; Drainage and Waste Disposal



ASHDOWN SITE INVESTIGATION LIMITED

Site: 53 & 55 and Land Rear of 51-63 Southview Road, Southwick, West Sussex.

Site Plan.
Not To Scale

Figure 2
P14278

ASHDOWN SITE INVESTIGATION LIMITED
E-mail: contact@ashdownsi.co.uk
Web: www.ashdownsi.co.uk
Tel: 01273 483119

Site Name: 53 & 55 and Land Rear of 51-63 Southview Road, Southwick, West Sussex

Job Number: P14278

Start Date: 19/11/2019

End Date: 19/11/2019

Trial Pit Number: **TP101**

Sample/ Test Type	Samples and In Situ Testing: Depth From (m)	Depth To (m)	Test Result	Legend	Depth/ Reduced Level	Stratum Description
					0.00	Topsoil with frequent fine rootlets.
					0.30	Orange brown gravelly slightly sandy CLAY. Gravel is angular to subrounded fine to coarse flint. (Head)
D	1.00					becoming sandy below 1.00m depth.
D	1.90				2.00	Light orange brown very gravelly clayey fine to coarse SAND. Gravel is angular to subrounded fine to coarse flint. (Head)
D	2.80				2.90	End of trial pit at 2.90m

Remarks

Groundwater: Trial pit dry on completion.

Stability: Trial pit stable on completion.

Notes: n/a

Excavation Method: HDP

Pit Length: 2.20m

Pit Width: 0.70m

Made By: GR

ASHDOWN SITE INVESTIGATION LIMITED
E-mail: contact@ashdownsi.co.uk
Web: www.ashdownsi.co.uk
Tel: 01273 483119

Site Name: 53 & 55 and Land Rear of 51-63 Southview Road, Southwick, West Sussex

Job Number: P14278

Start Date: 19/11/2019

End Date: 19/11/2019

Trial Pit Number: **TP102**

Samples and In Situ Testing				Legend	Depth/ Reduced Level	Stratum Description
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result			
					0.00	Topsoil with occasional fragments of brick and frequent roots and rootlets.
					0.30	Brown slightly gravelly slightly sandy CLAY. Gravel is angular to subangular fine to coarse flint with occasional chalk. Sand is fine to coarse. (Head)
D	1.00				1.10	Orange brown and brown mottled very gravelly sandy CLAY. Gravel is fine to coarse angular to subrounded flint. Sand is fine to coarse. (Head)
D	1.90				2.00	Orange brown gravelly silty fine to coarse SAND. Gravel is angular to subrounded fine to coarse flint. (Head)
D	2.50				2.90	End of trial pit at 2.90m

Remarks

Groundwater: Trial pit dry on completion.

Stability: Trial pit stable on completion.

Notes: n/a

Excavation Method: HDP

Pit Length: 2.20m

Pit Width: 0.60m

Made By: GR

ASHDOWN SITE INVESTIGATION
L•I•M•I•T•E•D
E-mail: contact@ashdownsi.co.uk
Web: www.ashdownsi.co.uk
Tel: 01273 483119

Site Name: 53 & 55 and Land Rear of 51-63 Southview Road, Southwick, West Sussex

Job Number: P14278

Start Date: 19/11/2019

End Date: 19/11/2019

Trial Pit Number: **TP103**

Samples and In Situ Testing				Legend	Depth/ Reduced Level	Stratum Description
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result			
					0.00	Topsoil with frequent roots and rootlets.
					0.20	MADE GROUND: Dark brown gravelly sandy clay. Gravel is subangular to subrounded fine to coarse flint, chalk and rare brick fragmemts.
					0.40	Orange brown and brown mottled very gravelly slightly sandy CLAY. Gravel is angular to subrounded fine to coarse flint and chalk. Sand is fine to coarse. (Head)
D	1.00					
					1.50	Light brown gravelly slightly sandy silty CLAY. Gravel is angular to subrounded fine to coarse flint and chalk. (Head)
D	2.00					
D	3.00				3.00	End of trial pit at 3.00m

Remarks

Groundwater: Trial pit dry on completion.

Stability: Trial pit stable on completion.

Notes: n/a

Excavation Method: HDP

Pit Length: 2.20m

Pit Width: 0.60m

Made By: GR

ASHDOWN SITE INVESTIGATION LIMITED
E-mail: contact@ashdownsi.co.uk
Web: www.ashdownsi.co.uk
Tel: 01273 483119

Site Name: 53 & 55 and Land Rear of 51-63 Southview Road, Southwick, West Sussex

Job Number: P14278

Start Date: 19/11/2019

End Date: 19/11/2019

Trial Pit Number: **TP104**

Sample/ Test Type	Samples and In Situ Testing: Depth From (m)	Depth To (m)	Test Result	Legend	Depth/ Reduced Level	Stratum Description
					0.00	Topsoil.
					0.15	MADE GROUND: Dark brown and black brown very sandy angular to subangular fine to coarse gravel of flint, brick, clinker-like material, charcoal-like material, plastic, glass and crystalline rock.
					0.40	Orange brown and brown gravelly slightly sandy CLAY. Gravel is angular to subrounded fine to coarse flint and chalk. (Head)
D	1.00					
D	2.00					becoming light orange brown and silty with increased chalk gravel below 2.00m depth.
D	3.00				3.00	End of trial pit at 3.00m

Remarks

Groundwater: Trial pit dry on completion.

Stability: Trial pit stable on completion.

Notes: n/a

Excavation Method: HDP

Pit Length: 2.00m

Pit Width: 0.60m

Made By: GR

ASHDOWN SITE INVESTIGATION LIMITED
E-mail: contact@ashdownsi.co.uk
Web: www.ashdownsi.co.uk
Tel: 01273 483119

Site Name: 53 & 55 and Land Rear of 51-63 Southview Road, Southwick, West Sussex

Job Number: P14278

Start Date: 19/11/2019

End Date: 19/11/2019

Trial Pit Number: **TP105**

Samples and In Situ Testing				Legend	Depth/ Reduced Level	Stratum Description
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result			
					0.00	Topsoil with occasional brick fragments, rootlets and roots.
					0.30	Brown gravelly sandy CLAY with occasional fine rootlets. Gravel is angular to subangular fine to coarse flint. (Head)
D	1.00				1.00	End of trial pit at 1.00m

Remarks

Groundwater: Trial pit dry on completion.

Stability: Trial pit stable on completion.

Notes: n/a

Excavation Method: HDP

Pit Length: 1.30m

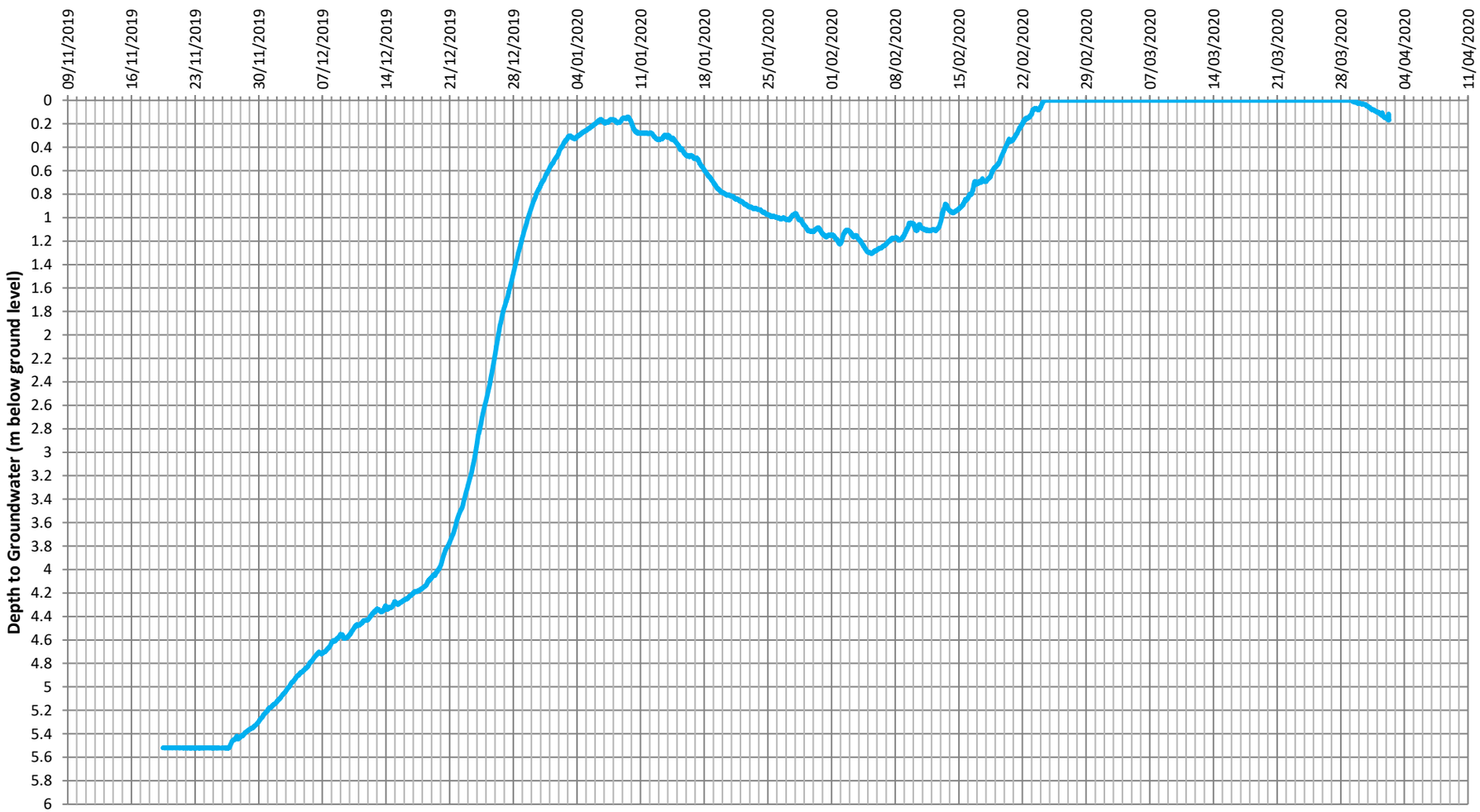
Pit Width: 0.70m

Made By: GR

Ashdown Site Investigation Limted

Site: 53 & 55 and Land Rear of 51-63 Southview Road, Southwick, West Sussex	Report No. P14278

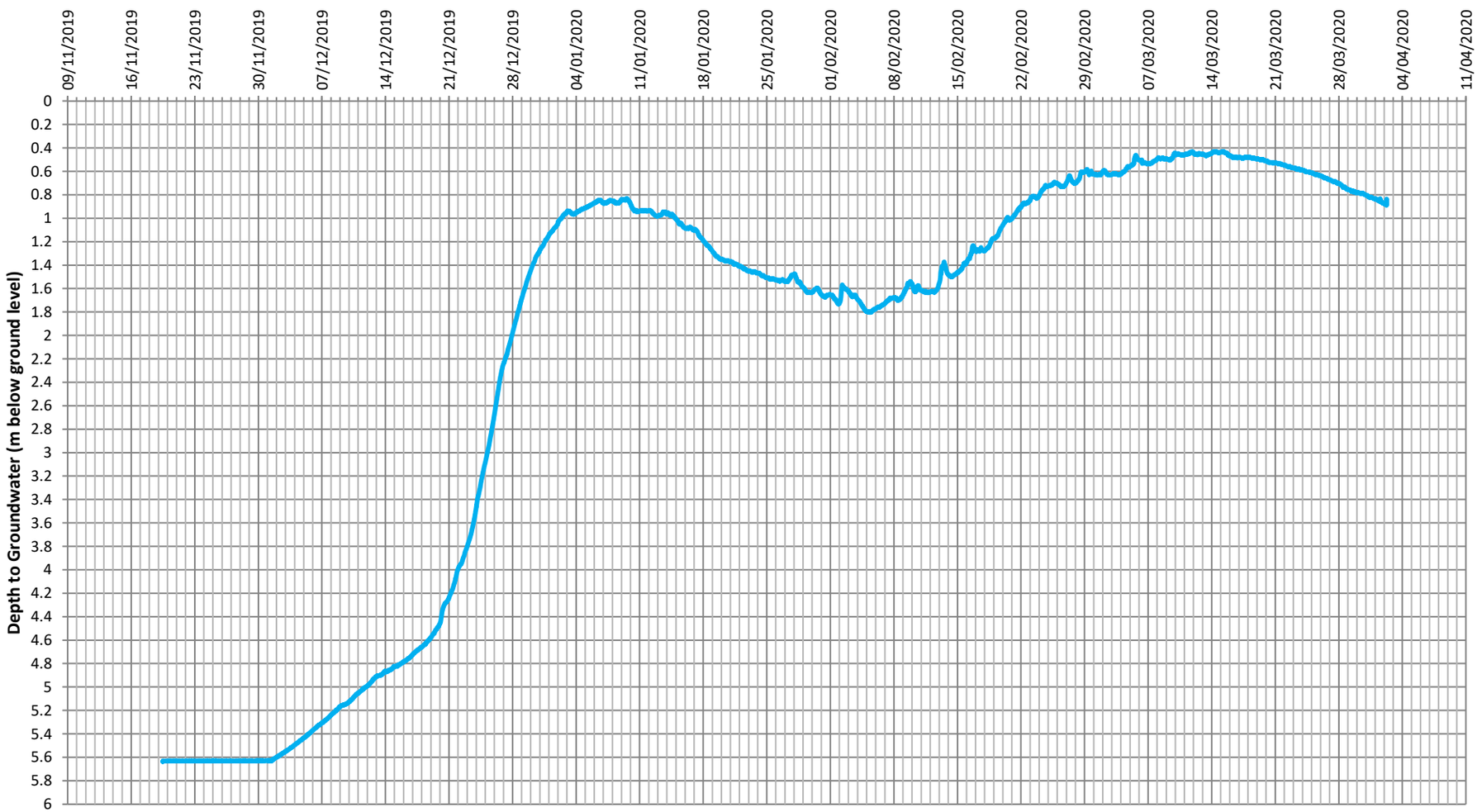
Groundwater Monitoring Results - WS01



Ashdown Site Investigation Limted

Site: 53 & 55 and Land Rear of 51-63 Southview Road, Southwick, West Sussex	Report No. P14278

Groundwater Monitoring Results - WS07



Appendix F

Southern Water's Correspondence

from Southern Water

John Roberts
GTA Civils Ltd
Gloucester House
66a Church Walk
Burgess Hill
West Sussex
RH15 9AS

Your ref

Our ref
DS_CC_PDE-117055

Date
15 May 2020

Contact

Tel 0330 303 0119

Dear Mr Roberts,

Site: 53 and 55 Southview Road, Southwick, Brighton, West Sussex, BN42 4TS.

We have completed the capacity check for the above development site and the results are as follows:

Surface Water

Following initial investigations, there is currently adequate capacity in the local surface network to accommodate a surface water flow of **2 l/s** for the above development at manhole reference TQ2405**2850**. Any excess surface water flows should be disposed of by an alternative means i.e. Soakaways, or any local drainage watercourses, subject to all interested parties' approval.

It should be noted that although the above assessment indicates that there is capacity available for your proposed surface water flows the LLFA (Local Lead Flood Authority) may impose/request that a lower flow is discharged to the public surface water sewer.

If the excess surface water flows are to be attenuated on site, it could have a significant effect on any proposed Section 104 Agreements. Any attenuation proposals should be agreed before any works are implemented on site. Where capacity is limited/restricted, agreement should be sought if you are to include any highway drainage within your proposals as Southern Water is not obligated to accept highway flows.

It should be noted that this information is only a hydraulic assessment of the existing sewerage network and does not grant approval for a connection to the public sewerage system. A formal S106 connection application is required to be completed and approved by Southern Water Services. Please see the link below:

southernwater.co.uk/ConnectiontoPublicSewer/ApplicationForm

Southern Water Services Ltd, Registered Office: Southern House, Yeoman Road, Worthing West Sussex BN13 3NX Registered in England No. 2366670

Should you require any further information, please contact us at the above-mentioned phone number or address shown in the footer.

Yours sincerely,



Joff Edevane
Growth Planning Lead
Business Channels

Please note: - The information provided above does not grant approval for any designs/drawings submitted for the capacity analysis. The results quoted above are only valid for 12 months from the date of issue of this letter.

Southern Water Services Ltd, Registered Office: Southern House, Yeoman Road, Worthing West Sussex BN13 3NX Registered in England No. 2366670



Civil Engineering - Transport Planning - Flood Risk

GTA Civils & Transport, Gloucester House, 66a Church Walk, Burgess Hill, West Sussex, RH15 9AS
T: 01444 871444 F: 01444 871401 E: enquiries@gtacivils.co.uk www: gtacivils.co.uk

GTA Civils & Transport Limited, Registered in England No. 11917461. VAT Registration No. 319 2609 02

Drainage Maintenance & Management Plan

51-63 Southview Road, Southwick, BN42 4TS

Client

S.D. Holdings Ltd
4A Southview Road
Southwick
West Sussex BN42 4TU

Ref: 7346
Date: July 2020

Consulting Engineers

GTA Civils Ltd
Gloucester House
66a Church Walk
Burgess Hill
West Sussex RH15 9AS

Tel: 01444 871444

Index

1	Introduction	2
2	Maintenance Responsibilities	2
3	Management of Spillage	2
4	Surface Water Drainage - Catchpits & Gullies	3
5	Surface Water Drainage - Pipes, Chambers and Outfalls	3
6	Foul Drainage	4
7	Flow Control Device (Hydro-Brake)	4

Schedule of Appendices

A Site Drainage Plan

Issue	Issue date	Compiled	Checked
Preliminary/First Issue	02 July 2020	JR	MR
Second Issue	22 July 2020	JR	MR
Third issue	22 October 2020	JR	MR

1 Introduction

1.1 This Drainage Maintenance & Management Plan has been prepared for S.D. Holdings Ltd. in conjunction with the proposed development at 51-63 Southview Road, Southwick BN42 4TS.

1.2 The Site Drainage plan to which this document refers is contained in Appendix A.

1.3 No responsibility is accepted to any third party for all or part of this study in connection with this or any other development.

2 Maintenance Responsibilities

2.1 The maintenance responsibilities within this report relate to the shared private drainage only. These comprise a) any drainage installed under the shared roadway and b) drainage serving more than one property at any location, i.e. within shared roadway or private areas.

2.2 The maintenance requirements for the shared private drainage elements will be contracted out to an Estate Management company.

2.3 The Estate Management Company will seek half-yearly financial contributions (in the form of service charges) from the leaseholders/owners of the development to include for the regular costs of the maintenance of the site drainage. A separate sinking fund will be maintained to provide for the anticipated replacement cost of the major components at the end of the manufacturer's design life and regular maintenance costs in the unlikely event of the Estate Management Company (or any subsequent Estate Management Company) being no longer able to fulfil its duties. These funds are to be held in bank client accounts kept separate from the bank account of the Estate Management Company.

3 Management of Spillage

3.1 The Environment Agency would prefer all spillages on any vehicular surface to be contained to prevent any downstream contamination. However, this cannot always be achieved, depending on the nature of the spillage. In all circumstances involving the spillage of substances on a roadway, it is important that the Environment Agency is notified as soon as possible so that they can provide advice and take appropriate action.

3.2 Prompt action following a spillage can prevent or reduce its effects, whilst inappropriate action may cause or worsen the pollution effects.

3.3 In the event of a spillage on the shared vehicular surface, it is the responsibility of the Property Maintenance company's staff to clear up any spillage before it enters the drainage system. The primary method of dealing with any spillage of hydrocarbons should be to use sand to soak up the leak and prevent any hydrocarbons entering the drainage system. Once sand has been contaminated it should not be washed into the drainage system but disposed of by a Licensed Contractor.

4 Surface Water Drainage - Catchpits & Gullies

Schedule	Action	Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	6 Monthly intervals.
	Common hardstanding areas to be swept clear of debris, to prevent possibility of blockages to the receiving drainage systems.	Weekly.
	Debris removal from gullies & silt pits (where may cause risks to performance).	6 Monthly intervals, after autumn leaf fall, or as required based on specific observations.
	Lift and inspect receiving manholes to check for any blockages.	Monthly.
Remedial Actions	Repair any damaged gully gratings or silt pit covers.	As required.

5 Surface Water Drainage - Pipes, Chambers and Outfalls

5.1 Inspection frequency: annually.

5.2 Maintenance Requirements: Carry out visual check of all inspection chambers, manholes and the outfall to ensure all pipes are clear and free flowing. If not, clean out by rodding or jetting.

5.3 Maintenance: A CCTV Drainage Survey should be completed every 10 Years and any of blockage/waste build up should be jet washed or removed by a Licensed Effluent Disposal Contractor.

6 Foul Drainage

6.1 Inspection frequency: annually.

6.2 Maintenance Requirements: Visual inspection of chambers & manholes is to be completed on a 5-yearly basis and any signs of blockage / waste build up should be jet washed or removed by a Licensed Effluent Disposal Contractor.

6.3 A CCTV Drainage Survey should be completed every 10 Years and any of blockage/waste build up should be jet washed or removed by a Licensed Effluent Disposal Contractor.

7 Flow Control Device (Hydro-Brake)

7.1 Little maintenance is usually required as there are no moving parts within the Hydro-Brake flow control. If blockages occur, they may do so at the intake.

7.2 Following installation of the Hydro-Brake flow control it is vitally important that any extraneous material i.e. building materials are removed from the unit and the chamber. After the system is made live, it is recommended that the unit be inspected monthly for three months and thereafter at six monthly intervals with hose down if required.

7.3 All Hydro-Brake flow control units are typically manufactured from grade 304 Stainless Steel, and if required they can also be manufactured in grade 316 Stainless Steel. Both materials have an estimated life span in excess of the design life of drainage systems.

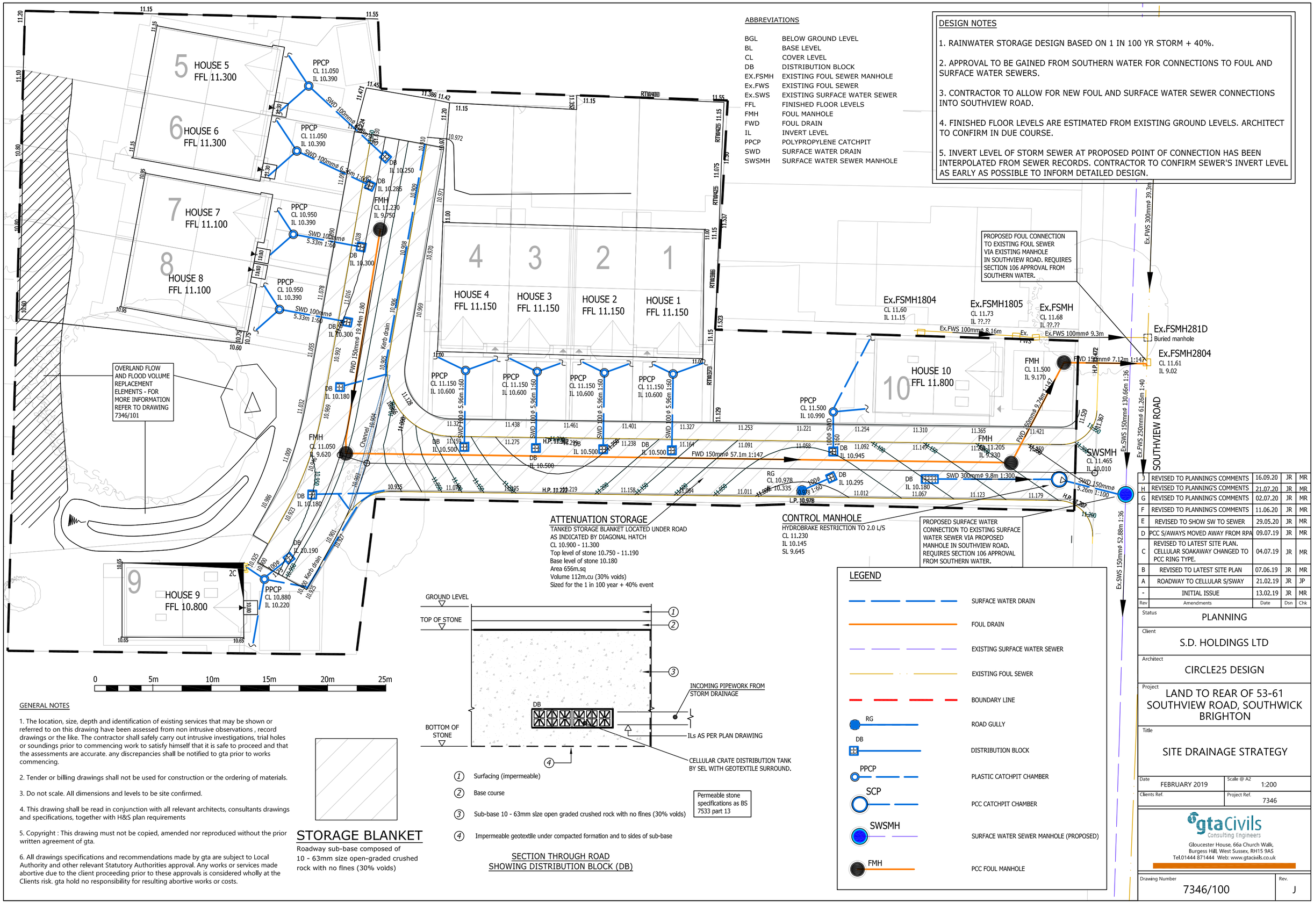
7.4 The maintenance frequencies set out in Section 4.0 shall be carried out. This will help prevent future blockages. The silt sump of the control manhole shall be treated in the same way as silt/catchpits in the table above.

7.1 The flow control device's bypass door shall be inspected every year and greased / replaced as necessary.

- End of Plan -

Appendix

Site Drainage Plan



ABBREVIATIONS

BGL	BELOW GROUND LEVEL
BL	BASE LEVEL
CL	COVER LEVEL
DB	DISTRIBUTION BLOCK
EX.FSMH	EXISTING FOUL SEWER MANHOLE
Ex.FWS	EXISTING FOUL SEWER
Ex.SWS	EXISTING SURFACE WATER SEWER
FFL	FINISHED FLOOR LEVELS
FMH	FOUL MANHOLE
FWD	FOUL DRAIN
IL	INVERT LEVEL
PPCP	POLYPROPYLENE CATCHPIT
SWD	SURFACE WATER DRAIN
SWSMH	SURFACE WATER SEWER MANHOLE

DESIGN NOTES

1. RAINWATER STORAGE DESIGN BASED ON 1 IN 100 YR STORM + 40%.

2. APPROVAL TO BE GAINED FROM SOUTHERN WATER FOR CONNECTIONS TO FOUL AND SURFACE WATER SEWERS.

3. CONTRACTOR TO ALLOW FOR NEW FOUL AND SURFACE WATER SEWER CONNECTIONS INTO SOUTHVIEW ROAD.

4. FINISHED FLOOR LEVELS ARE ESTIMATED FROM EXISTING GROUND LEVELS. ARCHITECT TO CONFIRM IN DUE COURSE.

5. INVERT LEVEL OF STORM SEWER AT PROPOSED POINT OF CONNECTION HAS BEEN INTERPOLATED FROM SEWER RECORDS. CONTRACTOR TO CONFIRM SEWER'S INVERT LEVEL AS EARLY AS POSSIBLE TO INFORM DETAILED DESIGN.

ATTENUATION STORAGE

TANKED STORAGE BLANKET LOCATED UNDER ROAD AS INDICATED BY DIAGONAL HATCH
CL 10.900 - 11.300
Top level of stone 10.750 - 11.190
Base level of stone 10.180
Area 656m.sq
Volume 112m.cu (30% voids)
Sized for the 1 in 100 year + 40% event

CONTROL MANHOLE

HYDROBRAKE RESTRICTION TO 2.0 L/S
CL 11.230
IL 10.145
SL 9.645

1. Surfacing (impermeable)
2. Base course
3. Sub-base 10 - 63mm size open graded crushed rock with no fines (30% voids)
4. Impermeable geotextile under compacted formation and to sides of sub-base

Permeable stone specifications as BS 7533 part 13

SECTION THROUGH ROAD SHOWING DISTRIBUTION BLOCK (DB)

STORAGE BLANKET

Roadway sub-base composed of 10 - 63mm size open-graded crushed rock with no fines (30% volds)

LEGEND

- SURFACE WATER DRAIN
- FOUL DRAIN
- EXISTING SURFACE WATER SEWER
- EXISTING FOUL SEWER
- BOUNDARY LINE
- RG — ROAD GULLY
- DB — DISTRIBUTION BLOCK
- PPCP — PLASTIC CATCHPIT CHAMBER
- SCP — PCC CATCHPIT CHAMBER
- SWSMH — SURFACE WATER SEWER MANHOLE (PROPOSED)
- FMH — PCC FOUL MANHOLE

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

5. Copyright : This drawing must not be copied, amended nor reproduced without the prior written agreement of gta.

6. All drawings specifications and recommendations made by gta are subject to Local Authority and other relevant Statutory Authorities approval. Any works or services made abortive due to the client proceeding prior to these approvals is considered wholly at the Clients risk. gta hold no responsibility for resulting abortive works or costs.

Rev	Amendments	Date	Dsn	Chk
J	REVISED TO PLANNING'S COMMENTS	16.09.20	JR	MR
H	REVISED TO PLANNING'S COMMENTS	21.07.20	JR	MR
G	REVISED TO PLANNING'S COMMENTS	02.07.20	JR	MR
F	REVISED TO PLANNING'S COMMENTS	11.06.20	JR	MR
E	REVISED TO SHOW SW TO SEWER	29.05.20	JR	MR
D	PCC S/AWAYS MOVED AWAY FROM RPA	09.07.19	JR	MR
C	REVISED TO LATEST SITE PLAN. CELLULAR SOAKAWAY CHANGED TO PCC RING TYPE.	04.07.19	JR	MR
B	REVISED TO LATEST SITE PLAN	07.06.19	JR	MR
A	ROADWAY TO CELLULAR S/SWAY	21.02.19	JR	JP
-	INITIAL ISSUE	13.02.19	JR	MR

Status: PLANNING

Client: S.D. HOLDINGS LTD

Architect: CIRCLE25 DESIGN

Project: LAND TO REAR OF 53-61 SOUTHVIEW ROAD, SOUTHWICK BRIGHTON

Title: SITE DRAINAGE STRATEGY

Date: FEBRUARY 2019 | Scale @ A2: 1:200

Clients Ref. | Project Ref.: 7346

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Tel.01444 871444 Web: www.gtacivils.co.uk

Drawing Number: 7346/100 | Rev.: J

APPENDIX D - APP/Y3805/W/20/3253462

AWDM/1119/19 - Land West Of 51 To 63 Southview Road Southwick

Local Highway Authority Appeal Statement

West Sussex County Council, in its capacity as the Local Highway Authority (LHA), has been asked to comment on revised access arrangements to application AWDM/1119/19 (for 10 x dwellings) by the Local Planning Authority (LPA).

The application was refused by the LPA, including for highways reasons under reason 2 – 'The application fails to identify safe access to the highway'. The application has been appealed and revised access arrangements have been submitted in support of this appeal.

In LHA comments to AWDM/1119/19 dated 03/10/2019 further information was requested in respect to the access arrangements. This information was not provided and subsequently the LPA refused the application citing several reasons. Taking the previous LHA comments and revised access arrangement drawing no. *19012_P02*, the LHA does not wish to give transport grounds to resist the application, justified in the comments below.

Road Safety Audit (RSA) and Designers Response

Previously a Stage 1 RSA was carried out on the proposed access arrangements and two issues were raised. 2.1.1 referred to the access width of 4.6m and requested that swept path tracking diagrams be provided to show two cars passing in the access. Whilst amended swept path tracking plans have not been provided, the access within the site has been widened to 5.3m and where this meets with the public highway is approximately 6m wide. On-street parking outside no. 51 has not been shown on the previous swept path tracking plan for a refuse collection vehicle, however the LHA is mindful that the opposite properties feature dropped kerbs and majority of properties in the vicinity feature off-street parking. Ideally amended plans showing tracking for a refuse collection vehicle and two cars passing in the access should be provided. Nevertheless, the LHA consider that the access width meets with Manual for Streets (MfS) figure 7.1 whereby 4.1m is suitable for two cars to pass. Furthermore, the LHA consider that a more practical arrangement for refuse collection would be from Southview Road, as per neighbouring properties arrangements, omitting the need for a refuse collection vehicle to enter the site. Adur & Worthing, as the local waste authority may wish to consider whether this would be a preferred option.

Issue 2.3.1 of the RSA referred to obstructions in the visibility splays due to on-street parking south and north of the site access. A double crossover for plot 10 is now proposed north of the access meaning on-street parking cannot occur. To the south drawing no. *19012_P02* notes 'parking restriction' outside no. 51 in the form of double yellow lines. Such a parking restriction would require the developer to apply and pay for a Traffic Regulation Order (TRO), the process of which is separate and outcome not guaranteed. In light of the fact that suitable vehicle visibility splays have been demonstrated (outlined below) and refuse collection could take place on street, the LHA considers that such a short extent of parking restriction would be out of keeping with the surrounding area and is not considered necessary to make the application acceptable in planning terms. It is advised that reference to parking restriction is removed from the plans. Furthermore, the LHA consider paragraph 10.7.1 of MfS2 applies in this location whereby *"…parking in visibility splays in built-up areas is quite common, yet it does not appear to create significant problems in practice. Ideally, defined parking bays should be provided outside the visibility splay. However, in some circumstances, where speeds are low, some encroachment may be acceptable"*. It is considered that cars emerging from neighbouring accesses would be required edge forward and there is no road traffic collision data in the vicinity to suggest that this has caused a highways safety issue. Furthermore, vehicles from the site will be exiting in a forward gear.

The LHA therefore consider that widening of the access and demonstration of visibility (outlined below) addresses the previous concerns raised in the RSA. The applicant is advised to run the amended access arrangements shown on drawing no. *19012_P02* (with removal of parking restriction) past the auditor to check whether these resolve the previous issues raised.

For completeness the Designers Response should be provided in the format set out in Design Manual for Roads & Bridges (DMRB) table F4 & F5 of GG119. This will assist the WSCC

Implementation team in the future process of technical approval for the site access, if the appeal is allowed.

Demonstration of Visibility

Previously it was requested that as the splays pass through third party land, forward visibility along Southview Road should be demonstrated to show a vehicle emerging from the access can be observed by a vehicle traveling along the carriageway. The LHA consider that demonstration of this is not now required, in light of amended visibility splays shown on drawing no. *19012_P02*. WSCC and local mapping also indicate that the alignment of Southview Road is straight in this location and thus forward visibility is satisfactory and the presence of neighbouring accesses means that a car travelling along the carriageway should be anticipating emerging vehicles and be able to react accordingly.

Visibility splays of 2m by 43m have been provided as achievable passing through applicant owned land and publically maintained highway. As per previous comments the 2m 'X' distance is considered appropriate in this location in line with MfS paragraph 7.7.7 (…*"a minimum 'X' distance of 2 m may be considered in some very lightly-trafficked and slow-speed situations, but using this value will mean that the front of some vehicles will protrude slightly into the running carriageway of the major arm. The ability of drivers and cyclists to see this overhang from a reasonable distance, and to manoeuvre around it without undue difficulty, should be considered"*).

43m is the required Stopping Site Distance (SSD) for the 30mph posted limit as set out in MfS. As per previous comments this has been taken to the centreline of the carriageway as the presence of some on-street parking at the extent of the splays means that vehicles are anticipated to be travelling at a distance from the kerbline, this is supported by MfS paragraph 7.7.5 ("*Some circumstances make it unlikely that vehicles approaching from the left on the main arm will cross the centreline of the main arm... If so, the visibility splay to the left can be measured to the centreline of the main arm"*).

Whilst the northern splay passes through a tree trunk, MfS paragraph 7.8.6 states that "*The impact of other obstacles, such as street trees and street lighting columns, should be assessed in terms of their impact on the overall envelope of visibility. In general, occasional obstacles to visibility that are not large enough to fully obscure a whole vehicle or a pedestrian, including a child or wheelchair user, will not have a significant impact on road safety*". Furthermore, a greater splay behind the line of the tree does appear achievable without passing through third party land and therefore the LHA would advise that maximum achievable visibility splays are secured via condition, if the appeal is allowed.

A pedestrian visibility splay of 2m by 2m has been demonstrated north of the proposed site access. This area, and boundary treatment south of the site access, should be kept clear of obstructions above 0.6m in height to enhance visibility of pedestrians on the adjacent footway for vehicles emerging from the site.

Conclusion

In summary the LHA consider that the amended access arrangements and visibility splays as shown on drawing no. *19012_P02* demonstrate that safe and suitable access for all users has been demonstrated as per paragraph 108 of the National Planning Policy Framework (NPPF). Whilst greater visibility splay to the north, without passing through the tree, may be achievable, it is considered that details of this could be secured via condition.

Furthermore, the parking restriction shown outside no. 51 Southview Road should be removed as it is not considered necessary or reasonable to the development as per paragraph 55 of the NPPF.

The applicant is advised to gain the views of the auditor on whether the revised arrangements address the two points previously raised in the RSA, although it should be noted that the LHA consider that these points have been suitably addressed. The applicant should also provide a Designers Response as per table F4 & F5 of GG119 (DMRB).

Subject to conditions securing details of access (with 'parking restriction' removed), maximum vehicle visibility splays, pedestrian visibility/boundary treatment, car parking and turning, bicycle storage and construction management, the LHA does not wish to uphold reason 2 of Adur & Worthing Councils decision notice to refusal of AWDM/1119/19.

If the appeal is allowed then the following conditions and informatives are advised:

Access
No part of the development shall be first occupied until such time as the vehicular access has been constructed in accordance with plans and details to be submitted to and approved in writing by the Local Planning Authority.
Reason: In the interests of road safety.

Vehicle Visibility Splays
No part of the development shall be first occupied until maximum visibility splays shall be provided at the site access onto Southview Road in accordance with a plan to be submitted to and approved by the planning authority. These splays shall thereafter be kept clear of all obstructions to visibility above a height of 0.6 metre above the adjoining road level.
Reason: In the interests of road safety.

Pedestrian Visibility
No part of the development shall be first occupied until pedestrian visibility splays have been provided either side of the proposed site vehicular access onto Southview Road in accordance with plans and details to be submitted to and approved in writing by the Local Planning Authority. These visibility splays shall thereafter be kept free of all obstructions over a height of 0.6 metre above adjoining carriageway level or as otherwise agreed.
Reason: In the interests of road safety.

Vehicle parking and turning
No part of the development shall be first occupied until the vehicle parking and turning spaces have been constructed in accordance with plans and details to be submitted to and approved in writing by the Local Planning Authority. These spaces shall thereafter be retained for their designated use.
Reason: To provide adequate on-site car parking and turning space for the development.

Cycle parking
No part of the development shall be first occupied until covered and secure cycle parking spaces have been provided in accordance with plans and details to be submitted to and approved by the Local Planning Authority.
Reason: To provide alternative travel options to the use of the car in accordance with current sustainable transport policies.

Construction plant and materials
No development shall be commenced until such time as plans and details have been submitted to and approved in writing by the Local Planning Authority showing the site set up during construction. This shall include details for all temporary contractors' buildings, plant and stacks of materials, provision for the temporary parking of contractors vehicles and the loading and unloading of vehicles associated with the implementation of this development. Such provision once approved and implemented shall be retained throughout the period of construction.
Reason: To avoid undue congestion of the site and consequent obstruction to access.

INFORMATIVE

The applicant is required to obtain all appropriate consents from West Sussex County Council, as Highway Authority, to cover the off-site highway works. The applicant is requested to contact The Implementation Team Leader (01243 642105) to commence this process. The applicant is advised that it is an offence to undertake any works within the highway prior to the agreement being in place.

INFORMATIVE

The applicant is advised that the erection of temporary directional signage should be agreed with the Local Traffic Engineer prior to any signage being installed. The applicant should be aware that a charge will be applied for this service.

Katie Kurek
West Sussex County Council – Planning Services

03/12/2019
WSCC Ecological Response to…

APPLICATION No.:	**AWDM/1119/19**
PROPOSAL:	**Demolition of 53 and 55 Southview Road and construction of 4 No. 3 bedroom terrace and 4 No. semi-detached dwellings and 2 no. 4 bed detached dwellings with new vehicular access from Southview Road and associated parking and amenity areas.**
SITE:	**Land West Of 51 To 63 Southview Road Southwick West Sussex**

There is no ecological objection to the proposed development subject to the imposition of suitably worded conditions.

A preliminary Ecological Assessment (PEA) was undertaken during August 2019
A bat emergence survey was undertaken during September 2019
A bat roosts assessment was undertaken during November 2019
A reptile and terrestrial amphibian survey was undertaken during September 2019

Summary ecological survey results
All surveys have been completed in accordance with best practice.

The PEA described the application site as being composed of species poor semi-improved grasslands with ruderals, trees and shrubs present. The PEA also identified potential for protected species notably bats and reptiles.

During the September bat emergence survey two bat species were recorded as using the wider site for commuting and foraging with no immediate evidence of bat use of any structure or tree on site. To confirm the status of the main building a follow up internal inspection was made of the house. This confirmed no evidence of use by bats.

The reptile survey competed in September concluded that the site is used by a medium population of slow worms.

Conclusions
The Reptile Survey makes recommendations (s.5) for a formal reptile translocation exercise prior to site clearance. The recommendations are reasonable and appropriately detailed. In the absence of further communication from the developer/agent on their intentions, I recommend that an appropriately worded pre-commencement condition is imposed upon any future planning permission to secure the works required (to include identification and preparation of the receptor site) to safeguard this protected species.

The only other outstanding item is to secure by condition an ecological improvement plan (and its implementation) to the site, taking every available opportunity to what has become a highly constrained site ecologically. NPPF s.15 The National Planning Policy Framework encourages net gains for biodiversity to be sought through planning policies and decisions[1]. Benefits could be achieved entirely on-site or by using off-site gains where necessary[2]. Local planning authorities need to ensure that habitat improvement will be a genuine additional benefit, and go further than measures already required to implement a compensation strategy[3].

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[1] PPG Paragraph: 022 Reference ID: 8-022-20190721
[2] PPG Paragraph: 023
[3] PPG Paragraph: 024

REPTILE AND TERRESTRIAL AMPHIBIAN SURVEY

NOS 53-55 AND LAND TO REAR OF 51-63

SOUTHVIEW ROAD, SOUTHWICK



Commissioned by: **SD Holdings Ltd**

Report Number: ASW/SDH/041/23/2019
September 2019

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EXECUTIVE SUMMARY

1. Slow-worms (*Anguis fragilis*) were found within the tall vegetation present at the application site during this 2019 reptile survey.

2. No other species of reptile or any amphibians were found at the application site. No great crested newts (*Triturus cristatus*) were recorded at this site.

3. From the survey findings, it is considered that there is a **Medium** population of slow-worms present within the application site.

4. Therefore, the client must take reasonable steps to avoid any reptiles being injured or killed during the proposed future clearance works.

5. Such reasonable steps include a pre-clearance formal translocation of the slow-worm population present to a suitable receptor site, which has the vegetation structure for these animals to successfully survive in.

6. The reptile translocation must follow best practice guidelines at all times including when this must be done and the total number of visits needed. Exclusion fencing must be installed beforehand, so that no potential new reptiles enter the construction zone.

7. The consultant ecologist will give the stop point for the translocation, once no animals have been found after five blank survey visits.

8. As good practice, a destructive search of the key areas to be cleared, will be undertaken after the end of the translocation. This will ensure that no reptiles will be present in the construction zone at any time.

1. INTRODUCTION

- A Reptile and Terrestrial Amphibian Survey at the Land to the Rear of 51-63 Southview Road and at Numbers 53-55 Southview Road, Southwick, Brighton, West Sussex BN42 4TS, was undertaken during September 2019, for the client: SD Holdings Ltd.

- This specialist assessment was required due to the proposed land clearance works, as part of a new development scheme.

- It was required therefore to investigate if reptiles or amphibians such as great crested newts, for example, are present within the application site. And if there will be an impact to any existing reptile populations from the future vegetation clearance works.

- The main method used for this survey, as well as the full results and the recommendations proposed can be found within this report.

- Both this survey and report were undertaken and compiled by Mr Andrew S. Waller, Consultant Ecologist, ASW Ecology, with the kind help from assistants.

- Mr Andrew S. Waller has been a Consultant Ecologist since 1997, has very extensive experience and knowledge of ecology and protected wildlife species/issues including reptiles, amphibians, mammals and birds. He has been studying wildlife for 38 years in Britain and in Europe. He has Natural England Survey Licences for great crested newts, bats and barn owls. He is also a Full Member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

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2. METHODOLOGY

2.1 Reptile survey

- Artificial reptile refugia were installed within suitable reptile related habitats within the application site during August 2019. These roofing felt sheets and carpet tiles were left for two weeks before the survey commenced so to "bed" in properly within the potential herpetofauna environment and any reptile home ranges.

- These artificial refugia included mainly cut up medium sized bitumin roofing felt sheets. These sheets would provide additional refuge places for reptiles to any already present. Reptiles would utilise these refugia for both sheltering and for basking. Amphibians will also use these sheets for shelter as well.

- However, additional carpet tiles were also installed so that these refugia would become damp and be suitable for amphibians such as great crested newts, which will shelter under such materials.

- A total of 60 roofing felt pieces and 20 carpet tiles were installed at a high density within the grassland, tall herbs and bramble scrub edge habitats present within the application site, and were searched during seven non-consecutive morning based visits during September 2019.

- Visits were undertaken by one reptile surveyor in suitable weather conditions only for reptiles e.g. includes not in freezing weather, no heavy rain or in strong winds, and on non-consecutive days as per current accepted best practice methods (Natural England, 2011).

- The "Reptile Survey Froglife Advice Sheet 10" (1999, Froglife) states that surveying can be done as long as the air temperature is between 9C to 18C. This was the case on all survey visits for this study.

- Any reptiles found would be identified to species level plus life stage recorded too as well as the location mapped for this report. The starting daytime temperature, relative humidity, general weather conditions and the maximum windspeed were also recorded for each survey visit.

2.2 Survey constraints

- The only constraint present was that this reptile survey can only cover the Summer and early Autumn period, due to the specific commissioning of this contract by the client.

- However, given the actual survey results and the conclusions, this is seen as a minor constraint only, since it is not possible to survey any site all year round.

- As always though, without taking into account any further active surveying or monitoring, this study can only provide a "snapshot" of the potential presence of reptile species at the site during the time of the survey visits.

3. SURVEY RESULTS

3.1 Results of the reptile and terrestrial newt survey

- **A maximum number of 72 slow-worms** were found within the natural habitats present, during this reptile survey of the application site. Please see Map A in Appendix 3 for these locations.

- This included a combination of adult, sub-adult and juvenile slow-worms.

- This is discussed further in the next chapter of this report.

- The only other animals found under the roofing felt sheets and carpet tiles were the occasional field vole, as well as various invertebrates.

- Suitable weather conditions were present throughout the survey, and all habitats represented within the overall survey area were well sampled for reptiles.

- The details from the survey visits can be found in Table 1 in Appendix 1 at the end of the report.

4. CONCLUSIONS

4.1 Significance of the reptile survey results

- In summary, a maximum of 72 slow-worms were found within the habitats at the application site during this 2019 reptile survey.

- No other species of reptile or any amphibians were found at the application site. No great crested newts were recorded at this site.

- From the survey findings, it is considered that there is a **Medium** population of slow-worms present within the application site.

- The slow-worms only starting using the installed refugia at the end of the survey period and took time to get used to the roofing felt sheets. Sometimes, it can take time for animals to use artificial refugia within their home ranges and this has clearly been the case at this site. Also, mixed/cooler weather conditions would have been better in late September, with a greater need for reptiles to use the sheets to heat up in the mornings.

- There will be a wider slow-worm population throughout the adjoining gardens along Southview Road, which has colonised this derelict site. Slow-worms would be expected to use the corridor of gardens to move around this part of Southwick.

- Therefore, the client must take reasonable steps to avoid any reptiles being injured or killed during the proposed future clearance works.

- Please see the next chapter of this report for the full details of the next steps now required by the client, before the proposed development works can commence.

4.2 Impact Assessment

In the absence of any mitigation measures or precautions, the following direct or indirect impacts from the future site development of the application site on reptiles would now be predicted as the following. Please note there would be no impact on great crested newts as none were present at the site:

- **Reptiles:** Without any mitigation, reptiles would be at risk of injury or killing, during the future habitat clearance and other associated works within the development footprint eg within the tall grass areas, the tall herbs areas and at the bramble scrub. **Potential impact level: HIGH**

4.3 Legal protection of reptiles and great crested newts in the UK (Simplified current summary only of the relevant legislation – please see other texts for full details)

4.3.1 Reptiles

- In the UK, reptiles are legally protected from intentional killing and injuring, as well as against sale too under the Wildlife and Countryside Act 1981 (as amended). The offences stated may be absolute, intentional, deliberate or reckless (English Nature, 2004).

- This means that reasonable steps must always be taken to avoid killing or injuring all reptiles if they are known to be present within the development footprint. A criminal conviction for injuring or killing reptiles could result in large fines being imposed, imprisonment and/or seizure of the equipment involved.

4.3.2 Great crested newts

Great crested newts have strong legal protection under both British and European legislation. This is briefly summarised below:

Great crested newts are legally protected under provisions within the Wildlife and Countryside Act 1981 (as amended), the Conservation Regulations 2010 and the Countryside and Rights of Way Act 2000. Taken together, it is illegal to:

- **Intentionally or deliberately capture or kill, or intentionally injure great crested newts.**
- **Deliberately disturb great crested newts or intentionally or recklessly disturb them in a place used for shelter or protection.**
- **Damage or destroy a breeding site or resting place.**
- **Intentionally or recklessly damage, destroy or obstruct access to a place used for shelter or protection.**
- **Possess a great crested newt, or any part of it, unless acquired lawfully.**
- **Sell, barter, exchange or transport or offer for sale great crested newts or parts of them.**

The maximum penalty that can be imposed for the above offences is (as at May 2010) a fine of up to £5,000, and/or up to six months imprisonment. The offences can be committed by individuals or by bodies corporate.

5. RECOMMENDATIONS

5.1 Requirement for a formal reptile translocation before site clearance

- **It is essential that a reptile translocation programme is undertaken within the development footprint at this site, before any habitat clearance works can commence**. A combination of reptile exclusion fencing and artificial refugia (such as roofing felt sheets) should be utilised throughout the area to be developed. All rubble, brick piles, wood or stone piles should also be removed from the construction zone beforehand.

- All captured reptiles should be carefully and humanely removed from the area and released in-situ onto the receptor site that has been agreed already beforehand (see below). All translocation work can only be undertaken by experienced reptile ecologists as animals can be easily injured without suitable skill and experience.

- Reptile fencing needs to follow current best practice standards and a specialist company can be approached for the installation of such exclusion fencing. This fencing must be installed at the boundaries of the construction zone so it is enclosed completely, and therefore no new reptiles can enter the development footprint from adjacent properties and land.

- Due to the low density of reptiles within the survey area at the application site, it is recommended that any translocation exercise should be undertaken by experienced reptile handlers over a period of at least 70 suitable days in good weather conditions only (HGBI advisory note, 1998).

- However, since a medium reptile population is present, a translocation may realistically be done over less days with another effort, but this all depends when the last animal is found. When no reptiles are found over five visits at the end of the translocation, then the ecologist can give a stop point to this, if they are satisfied that all slow-worms have been moved from the site.

- But a destructive search of the development footprint will then be needed with the ecologist present, so to ensure that no hidden reptiles are left. This involves hand searching the turf and top soil by the ecologist, working safely alongside a digger with a small toothed bucket.

- Approximately, at least fifty to sixty roofing felt sheets per hectare should be permitted as a density for this site, although more would be used so to go beyond current best practice.

- The main period for a reptile translocation to be undertaken is March to October (HGBI, 1998). But exclusion fencing must be installed first around the boundaries of the construction zone and more roofing felt added so the density of refugia is increased for this to be undertaken efficiently and robustly.

5.2 Receptor site requirement

- A new receptor site will need to be found for the reptiles at the application site, before any land clearance can begin.

- This receptor site should ideally be within the existing application site, which is the best solution for any reptile population, as this will cause a reduced impact.

- By keeping the reptiles in situ and inside the part of the application site not to be developed, then this will ensure the genetic integrity of the reptile population present and that it will reduce costs too during the translocation exercise. It will also allow reptiles to continue to use the habitat corridor which the chain of gardens form.

- The receptor site must be fenced off from the construction zone and must not be damaged at any time by any contractors during the land clearance and building works. No vehicles, machinery or materials must be installed within the receptor site at any time.

- The existing vegetation within the receptor site must be kept long with only annual management undertaken that has been permitted by the appointed ecologist.

- Once the development has been completed, all exclusion fencing can be removed and the reptiles can colonise the new development. The impact from the development will therefore be temporary to the local reptile population in regards to access to other parts of the application site.

- If the receptor site is outside of the application, then this can be done, but will cause time delays and incur further costs. As any potential new receptor site must be surveyed for reptiles first so to ensure that the carrying capacity is not full already.

5.3 Habitat management of the receptor site for reptiles

- It will be very important that appropriate resources are put aside by the client for the future habitat management at the chosen receptor site.

- This is standard practice as has been done at other sites, where such resources can be used for suitable grassland and bramble scrub management, for example.

- This will help ensure that the existing habitats within the receptor site for reptiles and amphibians too are maintained in the future, especially within the first few years or more, since the translocation was completed.

6. REFERENCES

(1) Arnold, N.E. (2002) A Field Guide to the Reptiles and Amphibians of Britain and Europe. Collins, London.

(2) English Nature (2004) Reptiles: guidelines for developers. English Nature, Peterborough.

(3) Froglife (1999) Reptile Survey. Froglife Advice Sheet 10. Froglife, Halesworth.

(4) Gent, A.H. and Gibson, S.D. (eds) (1998) Herpetofauna Workers' Manual. Joint Nature Conservation Committee, Peterborough, UK.

(5) HGBI (1998) Evaluating local mitigation/translocation programmes: maintaining best practice and lawful standards. HGBI advisory notes for amphibian and reptile groups (ARGs). HGBI, c/o Froglife, UK. Unpublished.

(6) Natural England (2011) Reptile Mitigation Guidelines. NE Technical Information Note TIN102. First Edition. Natural England.

(7) Treweek, J. (1999) Ecological Impact Assessment. Blackwell Science Ltd, UK

APPENDIX 1

Table 1: Reptile and amphibian survey results – 2019

Survey date	Time of day	Weather	Reptiles recorded
6/9/2019	Morning	Quite cloudy (3/8CC), mild, light wind, dry/ Temperature: 13°C/Windspeed: 7mph/Relative Humidity (RH): 77%	• **None**
9/9/2019	Morning	Cloudy (8/8CC), mild, light wind, dry/ Temperature: 12°C/Windspeed: 5mph/RH: 84%	• **None**
11/9/2019	Morning	Cloudy (8/8CC), mild, dry, light wind/ Temperature: 14°C/Windspeed: 7mph/RH: 86%	• **None**
14/9/2019	Morning	Clear (2/8CC), light wind, mild, dry/ Temperature: 13°C/Windspeed: 4mph/RH: 83%	• **None**
17/9/2019	Morning	Clear (0/8CC), mild, dry, light breeze/ Temperature: 12°C/Windspeed: 4mph/RH: 75%	• **10 Slow-worms: includes 6 sub-adults & 4 juveniles**
25/9/2019	Morning	Cloudy (8/8CC), mild, light wind, dry/ Temperature: 15°C/Windspeed: 8mph/RH: 88%	• **37 Slow-worms: includes 9 adult females, 2 adult males, 8 sub-adults & 18 juveniles**
28/9/2019	Morning	Quite cloudy (4/8CC), mild, light wind, dry/ Temperature: 15°C/Windspeed: 9mph/RH: 74%	• **72 Slow-worms: includes 16 adult females, 7 adult males, 22 sub-adults & 27 juveniles**

APPENDIX 2

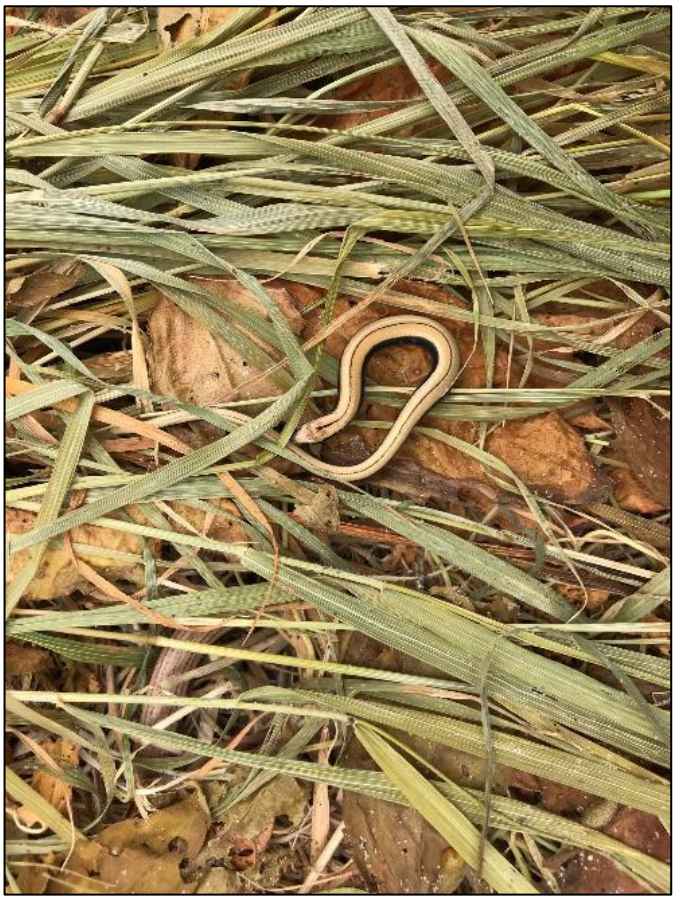
Photographs A-F



Photograph A
Slow-worms were found within the tall vegetation at this application site during this reptile survey



Photograph B
Reptiles were found under roofing felt sheets installed at the site, as shown in this photograph, and also under carpet tiles



Photograph C
This is a juvenile slow-worm, found under a roofing felt sheet at this site and this demonstrates a breeding population here



Photograph D
Another slow-worm found under a roofing felt sheets, installed within the tall grass and tall herbs that are present throughout the application site



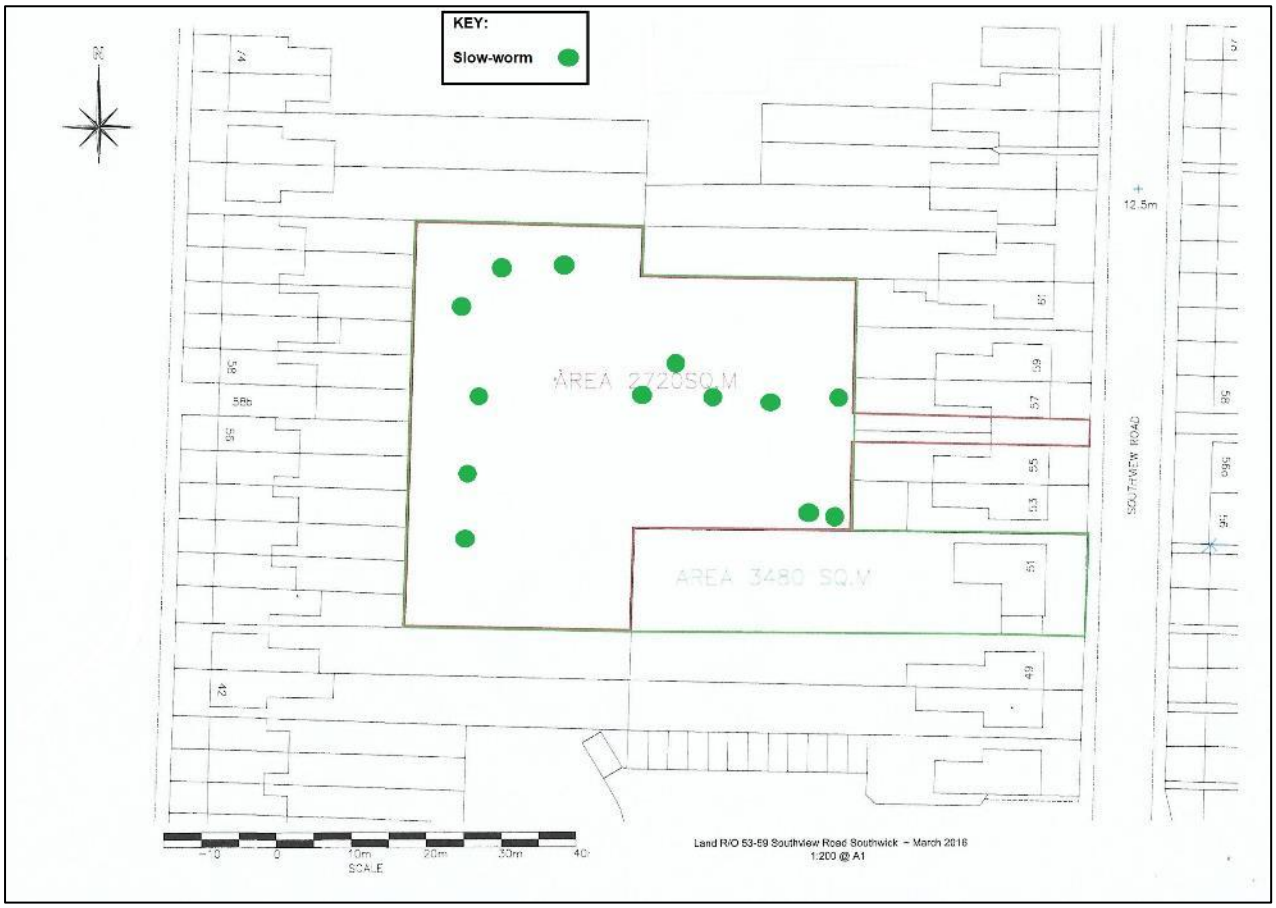
Photograph E
Adult slow-worms were also found during this survey, with both males and females recorded



Photograph F
A reptile translocation will be required before any habitat clearance can commence at the application site, with the receptor site ideally being at the same location, but outside of the construction zone

APPENDIX 3

Map A – Location of the reptiles found at the application site - 2019



From: Marie O'Keeffe <marie.o'keeffe@adur-worthing.gov.uk> on behalf of Marie O'Keeffe
Sent: 19 November 2020 13:26
To: Marie O'Keeffe
Subject: Fwd: Southview Road - awdm/1119/19

---------- Forwarded message ---------
From: **Marie O'Keeffe** <marie.o'keeffe@adur-worthing.gov.uk>
Date: Thu, 19 Nov 2020 at 13:13
Subject: Fwd: Southview Road - awdm/1119/19
To: Marie O'Keeffe <marie.o'keeffe@adur-worthing.gov.uk>

---------- Forwarded message ---------
From: **Hannah Powell** <hannah.powell@adur-worthing.gov.uk>
Date: Thu, 28 Nov 2019 at 14:17
Subject: Re: Southview Road - awdm/1119/19
To: Marie O'Keeffe <marie.o'keeffe@adur-worthing.gov.uk>

Hi Marie
Thank you for forwarding this AQ assessment (9313.S dated Nov 2019), apologies for the delay in responding. This assessment seems reasonable and the proposed mitigation measures are acceptable.

If permission is granted for this application I would recommend that the mitigation measures proposed in the Emission Mitigation Assessment are conditioned.

In relation to dust mitigation, I would recommend the Site Specific Mitigation the Highly Recommended Dust Mitigation Measures specified in Appendix A of the above assessment are conditioned.

Regards
Hannah Powell

On Fri, 22 Nov 2019 at 11:33, Marie O'Keeffe <marie.o'keeffe@adur-worthing.gov.uk> wrote:

> Hi Hannah
>
> I think you have been in discussion with the applicant's rep on this one. This is their submitted Air Quality Assessment received today.
>
> Your comments please?
>
> ---------- Forwarded message ---------
> From: <richard@circle25.co.uk>
> Date: Fri, 22 Nov 2019 at 11:16
> Subject: RE: Southview Road - awdm/1119/19
> To: Marie O'Keeffe <marie.o'keeffe@adur-worthing.gov.uk>

Cc: Peter Barnett <peter.barnett@adur-worthing.gov.uk>, <gary.peck@adur-worthing.gov.uk>, Paul Calland <paul@sdholdings.co.uk>, Russell Ashby <russell@sdholdings.co.uk>

Good Morning Marie

As requested the AQA for this project is attached with the energy assessment following early next week.

Best Regards

Richard Seymour

Circle25 Design

07984207786

From: Marie O'Keeffe <marie.o'keeffe@adur-worthing.gov.uk>
Sent: Tuesday, November 12, 2019 2:01 PM
To: richard@circle25.co.uk
Subject: Re: Southview Road - awdm/1119/19

Hi Richard

We are a long way from a favourable recommendation.

However, in response to your specific queries I think we have used a water efficiency (policy 18) pre-commencement condition before so this could work.

Energy efficiency needs to be worked up prior to a favourable recommendation in my view. As you say the final design/layout hasn't been finalised and a CHP or EV charging points etc. will have a bearing on layout potentially.

I am unclear where we are on highways. I believe I am waiting for a final decision and drawing to consult them on?

Kind regards.

On Tue, 12 Nov 2019 at 12:13, <richard@circle25.co.uk> wrote:

Good Afternoon Marie

We will respond on the extension of time matter separately.

However we would appreciate a response to the requested items below please.

Sustainable Design

Policy 18 Sustainable Design *At application time the only aspect of considered relevant on this project is water use and ,*

normally addressed and complied with at building regulation

Could this not be dealt with as a Condition of approval (should it be forthcoming) that

"All new dwellings must achieve a water efficiency standard of no more than 110 litres/person/day "

which would be satisfied with Building Reg approval ?

Policy 19 Decentralised Energy, Stand-alone Energy Schemes and Renewable Energy

At application stage this policy was considered and although designated a ' major ' application the proposals at just on threshold

(10 domestic size/ scale dwellings) in a residential area , district heating /cooling systems /CHP would not be considered feasible

due to scale/ setup / maintenance/ running costs. The dwellings if approved will comply with current building regulations which

will include > 10% renewables likely utilising PV panels feeding back in.

As the final design /layout has yet to be finalised , could this requirement be also dealt with by Condition of approval (should it be forthcoming) that

" the development will be expected to incorporate renewable/low carbon energy production equipment to provide at least 10% of predicted energy requirements"

The above measures seem to be more reasonable and in line with the scale of this development.

Please advise if you agree or disagree, that the above is a reasonable , apt response for the size and status of the development ,

not requiring premature technical calculations being presented on not yet approved designs.

Highways

Swept path diagrams past bin storage not now required (see above)

Further responses required from highways regarding the main access bearing in mind the above change.

Best Regards

Richard Seymour

Circle25 Design

07984207786

From: Marie O'Keeffe <marie.o'keeffe@adur-worthing.gov.uk>
Sent: Tuesday, November 12, 2019 10:36 AM
To: richard@circle25.co.uk
Subject: Re: Southview Road - awdm/1119/19

Dear Richard

Thank you for your email and partial summary of current position.

I have discussed the matter with Gary Peck, Planning Services Manager, and Peter Barnett, Team Leader.

We are not prepared to agree an extension of time to April next year. I have been asked to write this application up to the December meeting for refusal.

I would actively encourage you to withdraw this application. You are entitled to a free go within 12 months. A new application will enable you to submit a comprehensive scheme to deal with all outstanding issues, drainage, highways, AQMA, ecology, energy and water efficiencies , TPO'd tree and scale and design.

Please advise.

On Mon, 11 Nov 2019 at 17:00, <richard@circle25.co.uk> wrote:

> Good Afternoon Marie,
>
> Reviewing the current issues raised during the application process we have listed issues and actions currently in process for your information.
>
> **Drainage**
>
> Our consultants have reviewed Laura Gibbons comments and as requested have instructed the additional tests to be carried out.
>
> This data gathering required will take until the end of March as outlined in Laura's response.
>
> During this time the additional comments will be addressed with the drainage authority directly.
>
> **Refuse Collection**
>
> The communal bin storage collection point as proposed on our access/highway options has been agreed as acceptable by Operational Waste Dept. (email from Mark Quartly 8.11.19)

This will remove the necessity for Refuse collection swept path diagrams past the bin collection point and remove the concern regarding parked vehicles on the access road.

Highways

Swept path diagrams past bin storage not now required (see above)

Further responses required from highways regarding the main access bearing in mind the above change.

Air Quality Assessment

The report requested on 18.10.19 will be submitted to you this week.

Sustainable Design

Policy 18 Sustainable Design At application time the only aspect of considered relevant on this project is water use and ,

normally addressed and complied with at building regulation

Could this not be dealt with as a Condition of approval (should it be forthcoming) that

"*All new dwellings must achieve a water efficiency standard of no more than 110 litres/person/day "*

which would be satisfied with Building Reg approval ?

Policy 19 Decentralised Energy, Stand-alone Energy Schemes and Renewable Energy

At application stage this policy was considered and although designated a ' major ' application the proposals at just on threshold

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due to scale/ setup / maintenance/ running costs. The dwellings if approved will comply with current building regulations which

will include > 10% renewables likely utilising PV panels feeding back in.

As the final design /layout has yet to be finalised , could this requirement be also dealt with by Condition of approval (should it be forthcoming) that

" the development will be expected to incorporate renewable/low carbon energy production equipment to provide at least 10% of predicted energy requirements"

The above measures seem to be more reasonable and in line with the scale of this development.

Please advise if you agree or disagree, that the above is a reasonable , apt response for the size and status of the development ,

not requiring premature technical calculations being presented on not yet approved designs.

Application Progress

Obviously, the drainage monitoring will add time onto the application process.

If the monitoring results are due late March turning this around and consulting back with Adur Drainage Authorities will add time onto the

process the but this will give time to address any outstanding statutory and design issues.

We propose an extension of application process time to end April 2020 to allow full assessment of the Surface water

run off issues and our proposals to manage and improve the overall status.

We trust the above is clear but please call or get back to us if you require further information.

Best Regards

Richard Seymour

Circle25 Design

07984207786

From: Marie O'Keeffe <marie.o'keeffe@adur-worthing.gov.uk>
Sent: Tuesday, November 5, 2019 5:39 PM
To: richard@circle25.co.uk
Subject: Re: Southview Road - awdm/1119/19

Richard,

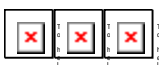
Thank you for your email.

Policies 18 and 19 are part of the Adur Local Plan adopted in December 2017. The SPD was adopted as of August this year and supplements these policies. It does not supersede them.

Regards.

--

Marie O'Keeffe
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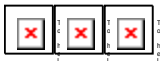


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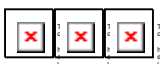
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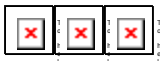
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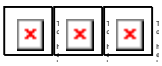
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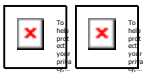
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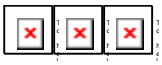
Hannah Powell
Environmental Health Technician, Adur & Worthing Councils
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Email: hannah.powell@adur-worthing.gov.uk
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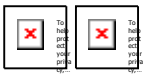


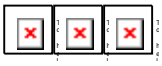


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Air Quality Assessment

Land at Southview Rd, Southwick

November 2019

www.phlorum.com

Air Quality Assessment

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November 2019

S.D. Holdings Ltd

4A Southview Rd
Southwick
West Sussex
BN42 4TU

Document Control:

Project no.	Project
9313.S	Land at Southview Rd, Southwick

Report No.	Ver/rev	Written By:	Checked by:	Authorised by:	Date
9313.S	Draft v1	R. Boakes	N. Jenkins	N. Jenkins	15/11/2019
	Final	R. Boakes	N. Jenkins	N. Jenkins	20/11/2019

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Figure 1: Site Location Plan

Figure 2: Construction Phase Receptors

Figure 3: Wind Rose – Shoreham 2018

Appendices:

Appendix A – IAQM Recommended Mitigation Measures for Medium Risk Sites

1. Introduction

1.1 Phlorum Ltd has been commissioned by S.D. Holdings Ltd to undertake an air quality assessment (AQA) for the proposed re-development at 53-55 Southview Rd and land to the rear of 51-63 Southview Rd, in Southwick, BN42 4TS. The National Grid Reference for the centre of the application site is 524150, 105880. A site location plan is included in Figure 1.

1.2 It is understood that the proposed development comprises the demolition of the existing 4 flats at 53 and 55 Southview Rd and the construction of 10 new residential dwellings in the space behind 51-63 Southview Rd, with associated parking and amenities. This open space was formerly the rear gardens to these properties and dwellings along Underdown Rd.

1.3 The main sources of air pollution in the vicinity of the application site are vehicles travelling on the local road network, particularly Old Shoreham Rd. This is the closest road with large traffic flows and is over 100m to the north.

1.4 Adur District Council (ADC) has declared two Air Quality Management Areas (AQMAs) in the District; one on Old Shoreham Rd and the other along Shoreham High Street, 120m and 2km from the application site, respectively. These AQMAs were declared due to exceedances of the annual mean UK Air Quality Standard (AQS) for nitrogen dioxide (NO_2), in 2005.

2. Policy Context

The UK Air Quality Strategy (UKAQS)

2.1 The UKAQS[1] sets "standard" (AQS) concentrations for a number of key pollutants that are to be achieved at sensitive receptor locations across the UK by corresponding "objective" dates. The sensitive locations at which the standards and objectives apply are those where the population are reasonably expected to be exposed to said pollutants over the particular averaging period.

2.2 For those objectives to which an annual mean standard applies, the most common sensitive receptor locations used to compare concentrations against the standards are areas of residential housing. It is reasonable to expect that people living in their homes could be exposed to pollutants over such a period of time.

2.3 Schools and children's playgrounds are also often used as sensitive locations for comparison with annual mean objectives, due to the increased sensitivity of young people to the effects of pollution (regardless of whether or not their exposure to the pollution could be over an annual period). For shorter averaging periods of between 15 minutes, 1 hour or 1 day, the sensitive receptor location can be anywhere where the public could be exposed to the pollutant over these shorter periods of time. A summary of the AQS relevant to this assessment are included in Table 2.1, below.

Table 2.1 UK Air Quality Standards

Pollutant	Averaging Period	Air quality standard (AQS) (µg.m^{-3})	Air quality objective	Objective: to achieve the standard by
Nitrogen dioxide (NO_2)	1 hour	200	200 µg.m^{-3} not to be exceeded more than 18 times a year	31 December 2005
	Annual	40	40 µg.m^{-3}	31 December 2005
Particulate Matter (PM_{10})	24 hour	50	50 µg.m^{-3} not to be exceeded more than 35 times a year	31 December 2004
	Annual	40	40 µg.m^{-3}	31 December 2004

1 Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2) July 2007.

Particulate Matter ($PM_{2.5}$)	Annual	25	25 $\mu g.m^{-3}$	2020

2.4 The objectives adopted in the UK are based on the Air Quality (England) Regulations 2000[2], as amended, for the purpose of Local Air Quality Management. These Air Quality Regulations have been adopted into UK law from the limit values required by European Union Daughter Directives on air quality.

2.5 Obligations under the Environment Act 1995 require local authorities to declare an AQMA at sensitive receptor locations where an objective concentration has been predicted to be exceeded. In setting an AQMA, the local authority must then formulate an Air Quality Action Plan (AQAP) to seek to reduce pollution concentrations to values below the objective levels.

2.6 ADC published their most recent AQAP[3] in 2007, setting out proposed measures to improve the conditions of their AQMAs.

National Planning Policy Framework (NPPF)

2.7 The NPPF[4], which was revised in February 2019, sets out the Government's planning policy for England. At its heart is an intention to promote more sustainable development. A core principle in the NPPF that relates to air quality effects from development is that planning should "contribute to conserve and enhance the natural and local environment". In achieving this, it states in paragraph 170 that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by: [...]

preventing new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability [...]".

2.8 With regard to assessing cumulative effects the NPPF states the following at paragraph 180:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development."

2 The Air Quality (England) (Amendment) Regulations 2002 - Statutory Instrument 2002 No.3043.
3 ADC (2007). Local Air Quality Management: Air Quality Action Plan for Adur District Council.
4 Department for Communities and Local Government (DCLG), (2019), National Planning Policy Framework.

2.9 Regarding compliance with relevant limit values and national objectives for pollutants the NPPF, paragraph 181 states:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

2.10 The NPPF offers a broad framework but does not afford a detailed methodology for assessments. Specific guidance for air quality continues to be provided by organisations such as the Department for Environment, Food and Rural Affairs (Defra), Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM).

National Planning Practice Guidance (PPG)

2.11 Reference ID 32 (Air Quality) of the National Planning Practice Guidance (PPG)[5], which was updated in November 2019, provides guiding principles on how planning can take account of the impact of new development on air quality. The PPG summarises the importance of air quality in planning and the key legislation relating to it.

2.12 As well as describing the importance of International, National and Local Policies (detailed elsewhere in this report), it summarises the key sources of air quality information. It also explains when air quality is likely to be relevant to a planning decision, stating:

"Considerations that may be relevant to determining a planning application include whether the development would:

- *Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing*

5 Planning Practice Guidance (PPG) 32. (updated Nov 2019). Air Quality. http://planningguidance.planningportal.gov.uk/blog/guidance/air-quality/.

traffic volumes, vehicle speeds or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; could add to turnover in a large car park; or involve construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more;

- *Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; biomass boilers or biomass-fuelled Combined Heat and Power plant; centralised boilers or plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area; or extraction systems (including chimneys) which require approval or permits under pollution control legislation;*

- *Expose people to harmful concentrations of air pollutants, including dust. This could be by building new homes, schools, workplaces or other development in places with poor air quality;*

- *Give rise to potentially unacceptable impacts (such as dust) during construction for nearby sensitive locations;*

- *Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value."*

2.13 Details are also provided of what should be included within an air quality assessment. Key considerations include:

- Baseline local air quality;
- Whether the proposed development could significantly affect local air quality during construction/operation; and
- Whether the development is likely to expose more people to poor air quality.

2.14 Examples of potential air quality mitigation measures are also provided in the PPG.

Local Planning Policy

2.15 In 2017, ADC produced their Local Plan[6], stipulating the visions, objectives and policies to improve the local area. The following objective is of relevance to air quality, and ADC aim to achieve this by 2032:

6 ADC (2017). Adur Local Plan.

"Objective O9: To improve connectivity within and to Adur's communities as well as to Brighton and Worthing, achieve more sustainable travel patterns and reduce the need to use the private car through public transport services and infrastructure, demand management measures, and new and enhanced cycle and footpaths. These actions will contribute to an improvement in air quality. Innovative sustainable transport measures will be encouraged."

2.16 Following this, a series of policies are provided to achieve the objectives set out in the Local Plan. Of relevance to air quality are 'Policy 28: Transport and Connectivity' and 'Policy 34: Pollution and Contamination':

Policy 28:

"Ensure new development contributes to the mitigation of air pollution, particularly in Air Quality Management Areas. Air quality assessments may be required. Where practical, new development should be located and designed to incorporate facilities for electric vehicle charging points, thereby extending the current network."

Policy 34:

"Development should not result in pollution or hazards which prejudice the health and safety of the local community and the environment.

New development in Adur will be located in areas most suitable to the use of that development to avoid risks from noise, air, odour or light pollution.

Mitigation measures will need to be implemented for developments that could increase levels of pollution or have a negative impact on drinking water supplies in Adur. Where there are significant levels of increased pollution that cannot be mitigated, development will be refused."

Though not currently approved, the West Sussex Electric Vehicle Strategy (2019 - 2030) Consultation Draft[7] states an aim for "70% of all new cars in the county to be electric by 2030, but as a minimum we want to see at least 50% electric".

7 WSCC (2019). Electric Vehicle Strategy 2019-2030. Consultation Draft.

3. Assessment Methodology

Guidance

3.1 The Defra LAQM Technical Guidance (LAQM.TG(16))[8] were followed in carrying out the assessment. Guidance published by the IAQM[9] on the 'Assessment of Dust from Demolition and Construction' was also used when assessing the construction phase of the proposed redevelopment. The Greater London Authority (GLA) Supplementary Planning Guidance[10] on the control of dust from construction has also been referred to, which is considered best practice guidance for the UK. It details a number of mitigation measures that should be adopted to minimise adverse impacts from dusts and fine particles.

3.2 The latest Environmental Protection UK (EPUK) & IAQM guidance on 'Planning for Air Quality'[11] was also referred to for screening the requirements for detailed pollution modelling within this assessment.

3.3 ADC is also a participating member of the Sussex-air partnership, and fully encourages developments to comply with the guidance set out in the 'Air Quality and emissions mitigation guidance for Sussex (2019)'[12] (AQEMGFS). This has been followed alongside West Sussex County Council's Parking Guidance[13], within the emissions mitigation assessment.

Baseline

3.4 The baseline air quality conditions in the vicinity of the site are established through the compilation and review of appropriately sourced background concentration estimates and local monitoring data.

3.5 Defra provides estimated background concentrations of the UKAQS pollutants at the UK Air Information Resource (UK-AIR) website[14]. These estimates are produced using detailed modelling tools and are presented as concentrations at central 1km^2 National Grid square locations across the UK. At the time of writing, the most recent background maps were from May 2019 and based on monitoring data from 2017.

8 Defra. 2018. Part IV of the Environment Act 1995, Environment (Northern Ireland) Order 2002 Part III, Local Air Quality Management, Technical Guidance LAQM.TG(16). London: Defra.
9 IAQM. (2014). Guidance on the assessment of dust from demolition and construction.
10 Greater London Authority. (2014). The Control of Dust and Emissions During Construction and Demolition.
11 EPUK & IAQM. (2017). Land-Use Planning & Development Control: Planning For Air Quality.
12 Sussex-Air (2019). Air Quality and emissions mitigation guidance for Sussex (2019).
13 WSCC (2019). West Sussex County Council Guidance on Parking at New Developments.
14 Defra: UK-AIR. www.uk-air.defra.gov.uk

3.6 Being background concentrations, the UK-AIR data are intended to represent a homogenous mixture of all emissions sources within the general area of a particular grid square location. Concentrations of pollutants at various sensitive receptor locations can, therefore, be calculated by modelling the emissions from a nearby pollution source, such as a busy road, and then adding this to the appropriate UK-AIR background datum.

3.7 ADC automatic and non-automatic monitoring data were reviewed to establish baseline air quality. The most recent available data from ADC's annual status report[15] have been included and assessed.

Construction Phase

3.8 The construction phase of the proposed redevelopment will involve a number of activities that could potentially produce polluting emissions to air. Predominantly, these will be emissions of dust. However, they could also include releases of odours and/or more harmful gases and particles.

3.9 The IAQM's guidance to assess the impacts of construction on human and ecological receptors has been followed in carrying out this air quality assessment. The guidance suggests that where a receptor is located within 350m (50m for statutory ecological receptors) of a site boundary and/or 50m of a route used by construction vehicles, up to 500m from the site entrance, a dust assessment should be undertaken. High sensitivity receptors are considered particularly sensitive when located within 20m of a works area. Figure 2 shows receptors that could be sensitive to dust that are located within 350m of the boundaries of the site.

3.10 Review of the Multi Agency Geographic Information for the Countryside (MAGIC) website[16], which incorporates Natural England's interactive maps, has identified no statutory ecological sensitive receptors within 50m of the site, or within 50m of roads expected to be used, up to 500m from the site. Dust emissions from the construction phase of the proposed development will, therefore, have no significant impact on ecological receptors and this has not been considered further within this assessment.

Construction Significance

3.11 The IAQM guidance suggests that Demolition, Earthworks, Construction and Trackout should all be assessed individually to determine the overall significance of the construction phase.

15 Adur District Council (2019). LAQM Air Quality Annual Status Report 2019.
16 Natural England and MAGIC partnership organisations. Multi Agency Geographic Information for the Countryside. http://www.magic.gov.uk/ (accessed 30th October 2019).

3.12 In the IAQM dust guidance, the first step in assessing the risk of impacts is to define the potential dust emission magnitude. This can be considered 'Negligible', 'Small', 'Medium' or 'Large' for each of the construction stages. Whilst the IAQM provides examples of criteria that may be used to assess these magnitudes, the vast number of potential variables mean that every site is different and therefore professional judgement must be applied by what the IAQM refer to as a "technically competent assessor". The construction phase assessment therefore relies on the experience of the appraiser.

3.13 As such, attempts to define precisely what constitutes a negligible, small, medium or large dust emission magnitude should be treated with caution. Factors such as the scale of the work, both in terms of size and time, the construction materials and the plant to be used must be considered.

3.14 The second step is to define the sensitivity of the area around the construction site. As stated in the IAQM guidance:

"the sensitivity of the area takes into account a number of factors:

- *the specific sensitivities of receptors in the area;*
- *the proximity and number of those receptors;*
- *in the case of PM_{10}, the local background concentrations; and*
- *site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust."*

3.15 Based on these factors, the area is categorised as being of 'Low', 'Medium' or 'High' sensitivity.

3.16 When dust emission magnitudes for each stage and the sensitivity of the area have been defined, the risk of dust impacts can be determined. The IAQM provides a risk of impacts matrix for each construction stage. The overall significance for the construction phase can then be judged from the stages assessed. Again, this is subject to professional judgement.

3.17 Combustion exhaust gases from diesel-powered plant and construction vehicles accessing the site will also be released. However, the volumes and periods over which these releases will occur are unlikely to result in any significant peaks in local air pollution concentrations and therefore this has been scoped out of the assessment.

Operational Phase

3.18 The latest EPUK & IAQM planning guidance[11] provides indicative thresholds for changes in traffic flows which would require a detailed air quality assessment when within or adjacent to an AQMA. These are a change in 24-hour average annual daily traffic (AADT) flows of >100 light duty vehicles (LDV) and/or >25 heavy duty vehicles (HGV). Changes below these thresholds can be reasonably considered to have an insignificant impact on air quality.

3.19 Traffic data provided by West Sussex County Council, the Highways Authority shows that the proposed development is expected to generate approximately 45 daily vehicular trips (AADT); this is below the threshold for requiring a detailed air quality impact assessment. Traffic generated by the proposed development is, therefore, unlikely to have a significant impact upon air quality.

3.20 Furthermore, the proposed development is situated over 100m away from the nearest major A-Road. Utilizing guidance set out within LAQM.TG(16)[8] and the AEA 'Diffusion Tube for Ambient NO_2 Monitoring: Practical Guidance' document[17], it is considered that annual mean pollutant concentrations at this dwelling would be approaching the background levels set out in Paragraph 4.14. Background concentrations are well below their respective AQSs.

3.21 As such, it is considered that the proposed development will not introduce any new receptors into an area of poor air quality, and thus the need for a detailed assessment has been screened out.

Emissions Mitigation Assessment

3.22 The purpose of an emissions mitigation assessment is to determine an 'appropriate level' of mitigation required from a development. They are an alternative way to assess the impact of a development on air quality and they ensure that all developments, even those which have no significant impact on air quality, include appropriate mitigation to offset their potential impact.

3.23 At the request of ADC, this assessment follows the methodology set out in the latest Sussex-Air emissions guidance[12].

3.24 With reference to Screening Checklist 2, the proposed development is classified as 'Major', as it is to provide 10+ residential dwellings in close proximity to an AQMA. A damage cost calculation is, therefore, required to accompany the emissions mitigation assessment.

3.25 If mitigation is not integrated into the plan at design stage, the local planning authority may require this through planning conditions or a Section 106 Agreement.

17 AEA Energy and Environment (2008). Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories and Users.

Damage Cost Calculation

3.26 The calculation follows the methodology set out in the latest AQEMGFS (2019) and Defra's guidance on the application of damage costs[18], which are defined per tonne of emission by pollutant, and were updated in January 2019. The updated costs follow advice from the Committee on the Medical Effects of Air Pollutants (COMEAP).

3.27 The calculation requires the latest Defra Emissions Factor Toolkit (EFT)[19] and 'damage cost values' for specific pollutants over a period of 5 years, which are a simple way to value changes in air pollution. The Defra guidance provides a damage cost appraisal toolkit[20], which was used in the damager cost calculation. The calculation used in this assessment followed the following formula:

EFT output x Damage costs x 5 years = 5 year exposure cost value (in £)

3.28 As a number of the inputs are based on assumptions, the resulting figure should be treated with caution, but it can be used to give an idea of the scale of a development in terms of total generated transport emissions and therefore a gauge of what level of mitigation might be appropriate,

3.29 It is usual for costs established in this way to be apportioned to low emission measures associated with a proposed development. In doing this it should be possible for damage costs to be offset.

Consultation

3.30 ADC's Environmental Health Technician was contacted on 29th October 2019, to discuss the scope of this AQA. All aspects or the proposed scope were agreed with, but it was emphasized that a Transport Statement should be submitted to support the traffic generation figures estimated by WSCC's Highways Authority.

18 Defra Damage Cost (2019)
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770576/air-quality-damage-cost-guidance.pdf
19 https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html
20 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770577/air-quality-damage-cost-appraisal-toolkit.xlsm

4. Baseline

4.1 This chapter is intended to establish prevailing air quality conditions in the vicinity of the application site.

UK-AIR Background Pollution

4.2 The UK-AIR predicted background pollution concentrations for NO_2, PM_{10} and $PM_{2.5}$ for 2017 to 2021 are presented in Table 4.1. These data were taken from the central grid square location closest to the application site (i.e. grid reference: 524500, 105500).

Table 4.1: 2017 to 2021 background concentrations of pollutants at the application site.

Pollutant	Predicted background concentration ($\mu g.m^{-3}$)					Averaging Period	Air quality standard concentration ($\mu g.m^{-3}$)
	2017	2018	2019	2020	2021		
NO_2	15.1	14.6	14.1	13.5	13.0	annual mean	40
PM_{10}	15.6	15.5	15.3	15.1	15.0	annual mean	40
$PM_{2.5}$	10.9	10.8	10.6	10.5	10.4	annual mean	25

4.3 The data in Table 4.1 show that annual mean background concentrations of NO_2, PM_{10} and $PM_{2.5}$, in the vicinity of the application site between 2017 and 2021, were predicted to be well below their respective AQSs. The data show that in 2019, NO_2, PM_{10} and $PM_{2.5}$ concentrations were predicted to be below their AQSs by 65%, 62% and 58%, respectively. Pollution concentrations are likely to be below the respective AQSs at the application site.

4.4 Concentrations of all pollutants were predicted to decline each year. These reductions are principally due to the forecast effect of the roll out of cleaner vehicles, but also due to UK national and international plans to reduce emissions across all sectors.

Local Sources of Monitoring Data

4.5 Air quality monitoring is considered an appropriate source of data for the purposes of describing baseline air quality. At the time of writing, the most recent ASR[15] released by ADC included 2018 data.

Automatic Monitoring

4.6 ADC currently undertakes automatic (continuous) monitoring of NO_2 at one site across the district, on Shoreham High Street. The most recent data available from the monitoring site is included in Table 4.2.

Table 4.2: NO_2 monitoring data from the ADC automatic monitor

Monitor	Type	Distance from the application site (km)	NO_2 annual mean concentration ($\mu g.m^{-3}$)		
			2016	2017	2018
AD1	K	0.6	-	-	29.2

Note: "K" = kerbside.

4.7 The data in Table 4.2 show that annual mean concentrations of NO_2 at the above monitoring site, in 2018, were below the 40$\mu g.m^{-3}$ AQS by 27%. With this being a kerbside monitor, in the Shoreham AQMA, results are not considered representative of background concentrations at the application site.

4.8 Table 4.3 includes the most recent annual mean PM_{10} results from the automatic monitoring site stationed in the Shoreham AQMA.

Table 4.3: PM_{10} monitoring data from the ADC automatic monitor

Monitor	Type	Distance from the application site (km)	PM_{10} annual mean concentration ($\mu g.m^{-3}$)		
			2016	2017	2018
AD1	K	0.6	-	-	24.2

Note: "K" = kerbside.

4.9 Table 4.3 shows that annual mean PM_{10} concentrations are well below the 40$\mu g.m^{-3}$ AQS. In 2018, the monitor recorded a mean concentration 39.5% below the AQS. With this being a kerbside monitor, results are not considered representative of background concentrations at the application site.

4.10 ADC do not monitor for $PM_{2.5}$ within the district.

Non-Automatic Monitoring

4.11 ADC operates an extensive non-automatic, NO_2 diffusion tube monitoring network across the area. The neighbouring Brighton & Hove City Council (BHCC) also provides monitoring[21] in close proximity to the application site. The most recent available monitoring data for diffusion tubes located within 2km of the application site are included in Table 4.4.

Table 4.4: Monitoring data from ADC NO_2 diffusion tubes

Monitor	Type	Distance from the application site (km)	NO_2 annual mean concentration ($\mu g.m^{-3}$)		
			2016	2017	2018
S8	R	0.2	30.4	32.8	30.4
S9	R	0.4	34.5	35.8	35.0
S7	UB	0.4	14.8	15.1	15.9
S1	K	1.0	32.3	33.0	31.0
S39	K	1.2	-	-	26.1
S2	R	1.4	24.9	26.4	27.0
S3	UB	1.5	17.5	17.2	18.1
W19-09	R	1.5	**40.2**	38.1	**41.7**
S10	R	1.8	25.2	24.6	27.0
W18-10	UB	1.9	19.8	22.3	20.2
W17-09	R	1.9	**42.4**	**44.4**	**42.0**

Note: "UB" = urban background; "R" = roadside; "K" = kerbside. **Bold** denotes exceedance of the AQS.

4.12 The data in Table 4.4 show that annual mean concentrations of NO_2 have, at 2 sites, exceeded the AQS in 2018 in the administrative boundaries of BHCC. Given their distance from the application site and roadside position, these sites are not representative of background concentrations at the application site.

21 Brighton and Hove City Council (2019). LAQM Air Quality Annual Status Report 2019.

4.13 The most relevant diffusion tube locations in respect to likely conditions at the application sites are the three nearest background sites. S7 is the closest of the three, approximately 400m to the north, near Queens Rd. NO_2 concentrations are well below the annual mean 40µg.m^{-3} AQS. In 2018, the annual mean concentration of NO_2 here was 15.9µg.m^{-3}, which is below the AQS by 60%, and 9% above the UK-AIR prediction for the same year.

4.14 The application site is set away from any major roads (i.e. at a background location) and as such, monitored concentrations at S7 which is located in close proximity to the site are considered highly representative of conditions there.

5. Construction Phase Impacts

5.1 The construction phase of the proposed redevelopment will involve a number of activities that could produce polluting emissions to air. Predominantly, these will be emissions of dust.

5.2 The estimates for the dust emission magnitude for demolition, earthworks, construction and trackout below are based on the professional experience of Phlorum consultants, information provided by the clients and Google Earth imagery.

Dust Emission Magnitude

Demolition

5.3 The existing 4 flats at 53-55 Southview Rd are to be demolished to provide an access road to the new dwellings. This amounts to approximately 670m^3 of building to be demolished, all at heights of below 10m above ground level. These factors fall into the IAQM's 'Small' dust emission category for demolition.

5.4 As such, the overall dust emission magnitude for the demolition phase is considered to be *Small* with reference to IAQM guidance[9].

Earthworks

5.5 The area of the site has been approximated to be 3,100m^2. This is considered 'Medium' with reference to IAQM guidance.

5.6 During the earthworks phase, it is anticipated that up to 5 heavy earth moving vehicles will be active at any one time, shifting less than 20,000 tonnes of earth, which falls into the IAQM's 'Small' dust emission magnitude.

5.7 For conservative purposes, the overall dust emission magnitude for the earthworks phase is considered to be *Medium,* with reference to IAQM guidance.

Construction

5.8 During construction, activities that have the potential to cause emissions of dust may include concrete batching, sandblasting and piling. Localised use of cement powder and general handling of construction materials also have the potential to generate dust emissions, as does the effect of wind-blow from stockpiles of friable materials. Piling is anticipated on-site.

5.9 The primary construction materials and methods to be used for the proposed dwellings will be piled foundations, cavity wall masonry and trussed roofing. The total volume of the buildings to be constructed is anticipated to be below 25,000m^3, which falls into the IAQM's 'Small' dust emission category.

5.10 The overall dust emission magnitude for the construction phase is based on the materials to be used, the processes involved and development size. The IAQM suggest it may be appropriate to increase the overall dust emission magnitude category, if activities with a high potential for dust emissions, such a piling, is to be carried out. As such, dust emissions from construction activities are considered to be *Medium*, with reference to IAQM guidance.

Trackout

5.11 Construction traffic, when travelling over soiled road surfaces, has the potential to generate dust emissions and to also add soil to the local road network. During dry weather, soiled roads can lead to dust being emitted due to physical and turbulent effects of vehicles.

5.12 It is not thought at this stage that any unpaved road surfaces will be utilised during construction.

5.13 As well as the type of road surface, the number of daily outward movements of heavy duty vehicles (HGVs) accessing the site is used to determine dust emission magnitude during construction: <10 Small; 10-50 Medium; and >50 Large. It is anticipated that the number of daily heavy duty vehicles (HGVs) departing the site will be less than 10.

5.14 Therefore, the overall the dust emission magnitude for the trackout phase is considered to be *Small* with reference to IAQM guidance.

Emission Magnitude Summary

5.15 A summary of the dust emission magnitude as a result of the activities of Demolition, Earthworks, Construction and Trackout as specified in the IAQM guidance, and discussed above, are listed in Table 5.1 below. Overall, the dust emission magnitude is considered to be *Medium.*

Table 5.1: Dust Emission Magnitude for the construction activities, based on the IAQM's guidance.

Activity	Dust Emission Magnitude
Demolition	Small
Earthworks	Medium
Construction	Medium
Trackout	Small

Sensitivity of the Area

5.16 Having established the emission magnitude for dust above, the sensitivity of the area must be considered to establish the significance of effects. The effect of dust emissions depends on the sensitivity of each receptor. High sensitivity human receptors include residential dwellings, schools and hospitals.

5.17 The impacts of dust emissions from the sources discussed above have the potential to cause an annoyance to human receptors living in the local area. Within distances of 20m of the site boundary there is a high risk of dust impacts, regardless of the prevailing wind direction. Up to 100m from the construction site, there may still be a high risk, particularly if the receptor is downwind of the dust source.

5.18 With the exponential decline in dust with distance from dust generating activities, it is considered that for receptors more than 350m from the site boundary, the risk is negligible. Furthermore, the risks at over 100m only have the potential to be significant in certain weather conditions, e.g. downwind of the source during dry periods.

5.19 The approximate number of high sensitivity human receptors in the vicinity of the site is detailed in Table 5.2 below and shown in Figure 2.

Table 5.2: Approximate number of High Sensitivity Human Receptors close to the site.

Distance to site (m)	Approximate number of receptors	Receptor Details
<20	10	Residential
<50	50	Residential
<100	>100	Residential
<350	>500	Residential Roman's Care Home Busy Bees Pre-School Glebe Primary School

5.20 Figure 3, a Wind Rose from Shoreham Airport (2018), shows that the predominant wind directions at the application site are likely to be from the south west and the north. As shown in Figure 2, there are multiple highly sensitive receptors (residential) to the north-east (downwind) of the site. As such, the sensitivity of the area to dust soiling impacts is defined as *High.*

5.21 UK-AIR predicted annual mean concentrations of PM_{10} are well below 24µg.m^{-3} at the site. This provides a good indication that PM_{10} concentrations for both annual mean and daily mean concentrations are likely to be below the respective AQSs at the site and adjacent uses. Therefore, the sensitivity of the area to human health impacts is defined as *Low*.

Risk of Impacts

5.22 Having established the likely dust emission magnitudes and sensitivity of the area, the risk of impacts can be determined in accordance with the IAQM guidance. These are summarised in Table 5.3.

Table 5.3: Summary of Impact Risk by Construction Stage based on the IAQM's dust guidance.

Stage	Impact Risk		
	Nuisance Dust	Ecology	PM_{10}
Demolition	Medium	Negligible	Negligible
Earthworks	Medium	Negligible	Low
Construction	Medium	Negligible	Low
Trackout	Low	Negligible	Negligible

5.23 Overall, the proposed redevelopment is considered to present a *Medium Risk* for nuisance dust soiling effects, *Low* for PM_{10} health effects and *Negligible* for ecology, in the absence of mitigation.

Site Specific Mitigation

5.24 The GLA guidance suggests a number of mitigation measures that should be adopted in order to minimise impacts from dusts and fine particles. Appropriate measures that could be included during construction of the proposed redevelopment include:

- ideally cutting, grinding and sawing should not be conducted on-site and pre-fabricated material and modules should be brought in where possible;
- where such work must take place, water suppression should be used to reduce the amount of dust generated;
- skips, chutes and conveyors should be completely covered and, if necessary, enclosed to ensure that dust does not escape;

- no burning of any materials should be permitted on site;
- any excess material should be reused or recycled on-site in accordance with appropriate legislation;
- developers should produce a waste or recycling plan;
- following earthworks, exposed areas and soil stockpiles should be re-vegetated to stabilise surfaces, or otherwise covered with hessian or mulches;
- stockpiles should be stored in enclosed or bunded containers or silos and kept damp where necessary;
- hard surfaces should be used for haul routes where possible;
- haul routes should be swept/washed regularly;
- vehicle wheels should be washed on leaving the site;
- all vehicles carrying dusty materials should be securely covered; and
- delivery areas, stockpiles and particularly dusty items of construction plant should be kept as far away from neighbouring properties as possible.

5.25 In addition, the IAQM lists recommended mitigation measures for low, medium and high Dust Impact Risks. The highly recommended mitigation measures for Medium Risk sites are included in Appendix A of this report.

5.26 Where dust generation cannot be avoided in areas close to neighbouring properties, additional mitigation measures should be put in place, such as: windbreaks, sprinklers, and/or time/weather condition limits on the operation of some items of plant or the carrying out of activities that are likely to generate a particularly significant amount of dust.

Residual Effects

5.27 After the implementation of the mitigation measures listed above and in Appendix A, the significance of each phase of the construction programme will be reduced and the residual significance of impact for the construction phase is expected to be *Negligible*.

6. Emissions Mitigation Assessment

Damage Cost Calculation

6.1 The inputs used to calculate the total increases of NO_x and $PM_{2.5}$ due to the proposed development are outlined in Table 6.1, below.

Table 6.1: Calculation Inputs

Input	Value	Unit	Source/guidance
Trip Length	10	km	AQEMGFS
Traffic Flow (LDV)	45	AADT	WSCC
EFT Road Type	Urban (not London)	-	EFT
EFT Year	2019	-	This is a worst-case input assuming no future improvement in the vehicle fleet.
Average Speed	50	$km.hr^{-1}$	AQMGFS
Appraisal period	5	years	AQMGFS

6.2 Over a period of 5 years the NO_x emissions from road transport are predicted to equal 0.259 tonnes (0.052 tonnes per year).

6.3 Over a period of 5 years the $PM_{2.5}$ emissions from road transport are predicted to equal 0.016 tonnes (0.003 tonnes per year).

6.4 The emission damage cost was calculated using Defra's appraisal toolkit and is presented in Table 6.2 below.

Table 6.2: Emission Cost Calculation.

	2019	2020	2021	2022	2023
NO_X increase (tonnes)	0.052	0.052	0.052	0.052	0.052
$PM_{2.5}$ increase (tonnes)	0.003	0.003	0.003	0.003	0.003
Rebased Damage cost (NO_X)	11,477	11,707	11,941	12,180	12,424
Rebased Damage cost ($PM_{2.5}$)	218,117	222,1479	226,929	231,467	236,097

Impacts NO_X (£)	594	585	577	569	560
Impacts $PM_{2.5}$ (£)	679	669	659	650	640
Total impacts (£)	**£6,183**				

Note: Central present value costs were used in the calculation (following Defra guidance).

6.5 The total emissions 'damage cost' for the proposed development, based on the AQMGFS and the latest Defra guidance, has been calculated as **£6,183.**

Emissions Mitigation Statement

6.6 The AQMGFS states that the mitigation options selected should be relevant and appropriate to:

- Local policies;
- The local authority's Air Quality Action Plan; and
- The type, size and location of the development.

6.7 This damage cost calculation gives a benchmark against which the proposed development can compare whether the level of mitigation is appropriate, irrelevant of whether the development would have a significant impact on local air quality.

6.8 For all residential developments considered as 'Major' under AQMGFS, the following mitigation measures are required:

- all gas-fired boilers are expected to meet a minimum standard of <40mgNO_x/kWh
- 20% of parking spaces (4 spaces for this scheme) should be fitted with 'active' electric vehicle charging points, with cable-ducting provided across the remaining spaces for future provision.

6.9 Following discussions with the EHO, it was suggested that a further 6 EV charging points should be implemented, in line with WSCC[13] and Sussex-Air[12] guidance documents. The client has agreed to include these measures, alongside the low NO_x boiler specifications, within the scheme. They are already implementing cycle infrastructure to encourage sustainable and active travel. It is believed that these measures should off-set the 'damage cost' stated above.

7. Summary

7.1 S.D. Holdings Ltd commissioned Phlorum to undertake an Air Quality Assessment for the redevelopment at 53-55 Southview Rd, Southwick. The proposal was to construct 10 new residential dwellings, demolishing the 4 flats currently occupying the two buildings.

7.2 UK-AIR background concentrations and local air quality monitoring results from the wider area suggest that whilst air quality within the nearby AQMA is often poor, background pollution concentrations across the site are likely to be below the relevant UK Air Quality Strategy Standard concentrations.

7.3 Increases in pollution concentrations as a result of development-generated traffic are not expected to have a significant impact on local air quality, as the vehicle trip generation is well below the threshold of 100 AADT, set by EPUK/IAQM.

7.4 Pollution concentrations across the site are predicted to be well below the relevant Air Quality Standards. As such, the site is considered acceptable for the proposed introduction of new receptors.

7.5 During construction, adopting appropriate mitigation measures should prevent any significant air quality effects on the surrounding area.

7.6 The EMA was carried out in line with guidance from the *Air quality and emissions mitigation guidance for Sussex (2019)*, WSCC's *Parking Guidance,* the latest Defra guidance for the application of Damage Costs, and the IAQM guidance for construction dust risk assessments.

7.7 The value of mitigation measures included in the proposed development is considered to be appropriate to offset the 'damage cost'.

7.8 Therefore, the proposed development should fulfil the requirements of the *Air quality and emissions mitigation guidance for Sussex (2019),* align with Policies 28 and 34 of the ADC Local Plan and comply with the NPPF.

7.9 Air quality should not, therefore, pose any significant obstacles to the planning process.

Figures and Appendices

Figure 1: Site Location Plan

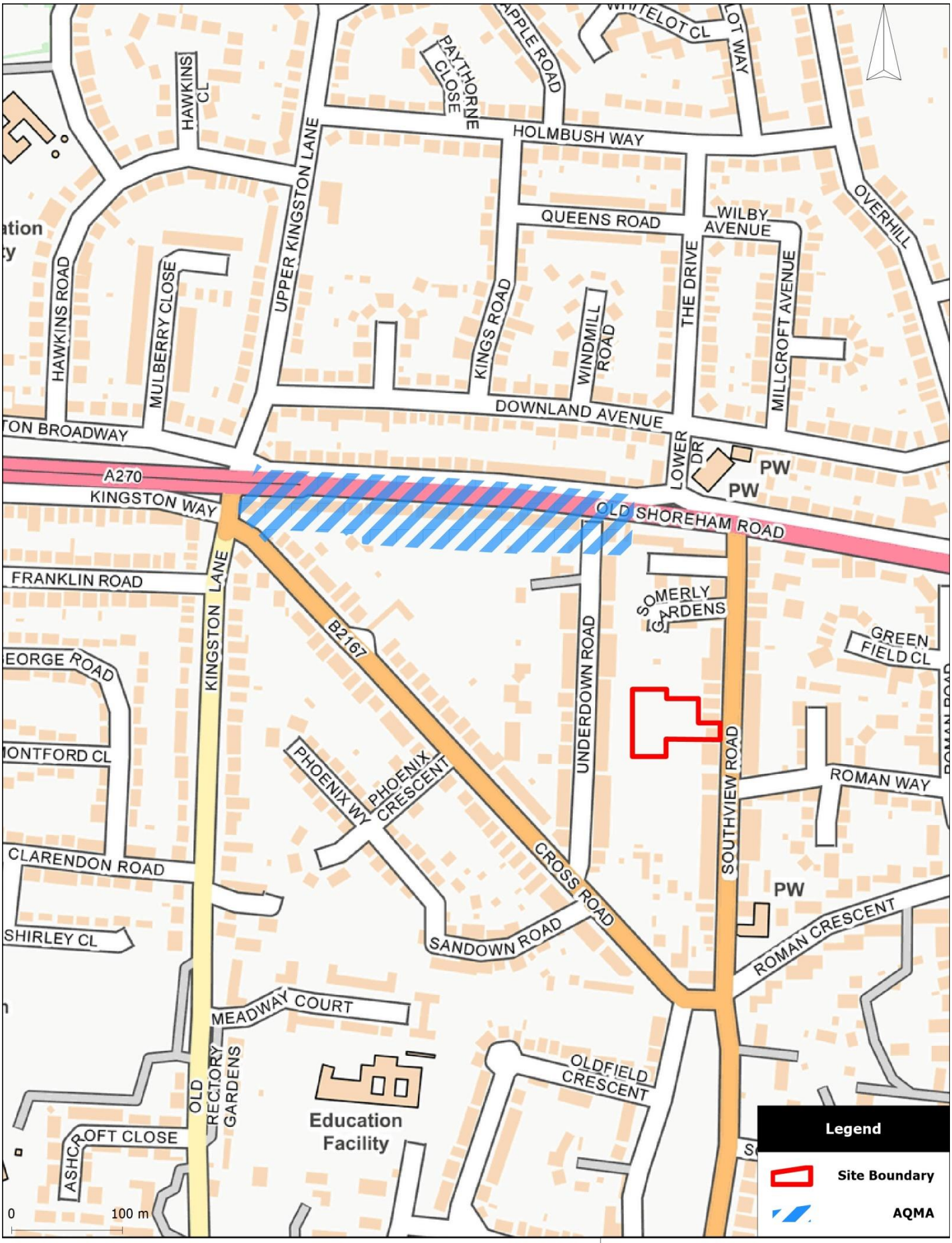


Figure 1: Site Location Plan

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Figure 2: Construction Phase Receptors

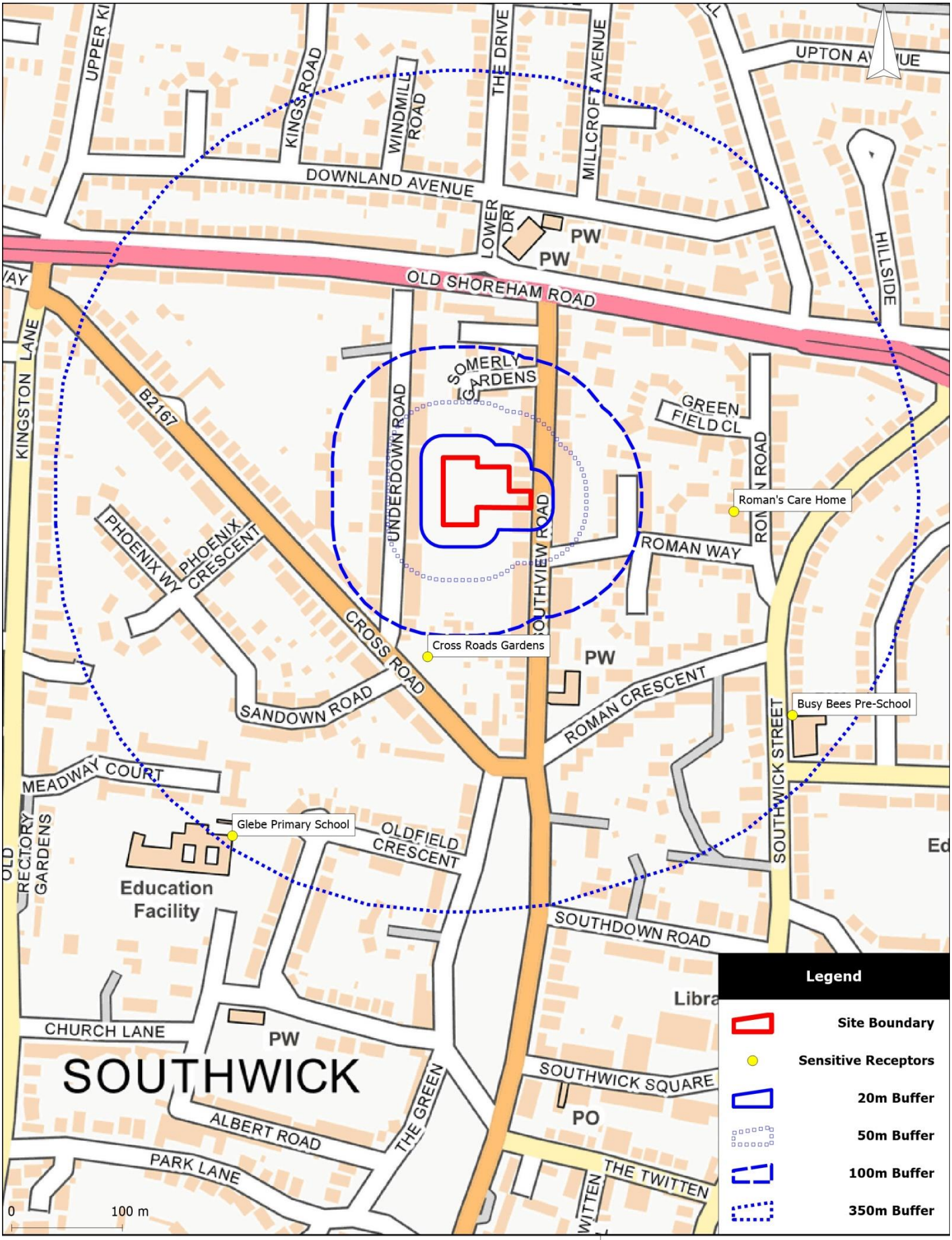
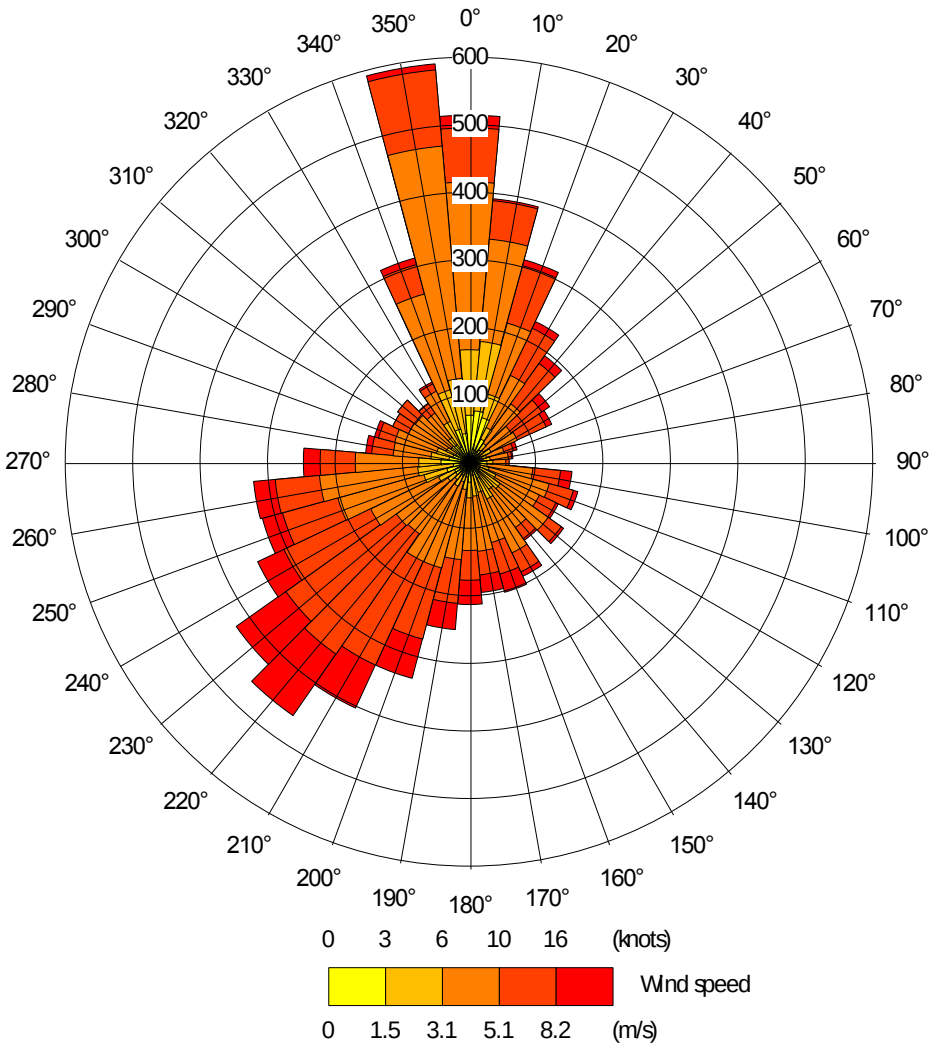


Figure 2: Construction Phase Receptors

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Figure 3: Wind Rose for Shoreham Airport, 2018



Appendix A: IAQM Highly Recommended Mitigation Measures for Medium Risk Sites

Appendix A: IAQM Highly Recommended Mitigation Measures for sites with a Medium Risk of Dust Impacts

Please refer to the IAQM's Construction Dust Guidance (*Guidance on the assessment of dust from demolition and construction (2014)*[9] and *Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites (2018)*[22] for further, "desirable", mitigation measures.

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.
- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this Appendix. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exception incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.

Monitoring

- Carry out regular site inspections to monitor compliance with the Dust Management Plan, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it is a large site, before work on a phase commences. Further guidance is provided by the IAQM[23] on *monitoring during demolition, earthworks and construction*.

Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible.

[22] IAQM. (2018). Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites. https://iaqm.co.uk/text/guidance/guidance_monitoring_dust_2018.pdf

- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicle/Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary – no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Avoid bonfires and burning of waste materials.

Demolition

- Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that

appropriate additional control measures are in place.

Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10m from receptors where possible.



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S.D HOLDINGS LTD

LAND AT SOUTHVIEW ROAD, SOUTHWICK

SUSTAINABLILITY REPORT

DECEMBER 2019

	Name	Date
Written By	George Kent	04 December 2019
Checked By	Ryan Boakes	04 December 2019
Authorised By	Harley Parfitt	04 December 2019

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This paper comes from sustainable forest stocks approved by the FSC

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1. INTRODUCTION

1.1 Phlorum Ltd has been instructed by S.D Holdings Ltd to produce an Energy Report for the proposed development at Southview Road (hereon referred to as 'The Site'). The development involves the construction of 10no. new houses on a predominantly undeveloped site and will comprise a mixture or terraced / semi-detached 3-bed properties and detached 4-bed properties.

1.2 The development falls within the Adur Local Plan Area and as such is subject to current Local Plan policy. ALP Policy 19 is shown in figure 1.

Figure 1: ALP Policy 19 from Adur Supplementary Planning Document

ALP Policy 19: Decentralised Energy, Stand-alone Energy Schemes and Renewable Energy

An assessment of the opportunities to use low carbon energy, renewable energy and residual heat/ cooling for both domestic and non-domestic developments must be provided with any major planning application. This must include details of:

- Any new opportunities for providing or creating new heating/cooling networks.
- The feasibility of connecting the development to existing heating / cooling / CHP networks where these already exist.
- Opportunities for expansion of any proposed networks beyond the development area over time, and to plan for potential expansion.

Where viable and feasible, commercial and residential developments in areas identified in the Shoreham Harbour Heat Network Study (2015) will be expected to connect to district heating networks where they exist.

Stand-alone energy schemes will also be supported subject to compliance with other policies in this Plan.

All new major development will be expected to incorporate renewable/low carbon energy production equipment to provide at least 10% of predicted energy requirements.

1.3 The Site does not fall within the Shoreham Harbour Heat Network Study area and so will not be required to connect to a network. However, as the development involves the construction of 10no. dwellings it is considered to be 'major' and so will be expected to incorporate Low or Zero Carbon (LZC) technologies on site to provide at least 10% of predicted energy requirements. Therefore, an energy statement is required to demonstrate that climate change mitigation measures comply with Policy 19 of the Adur Local Plan. This energy statement has been prepared following the energy hierarchy:

- **Be lean: use less energy**
- **Be clean: supply energy efficiently**
- **Be green: use renewable energy**

2. BASELINE ASSESSMENT

Summary

2.1 To determine the baseline CO_2 emissions for the development three sample Standard Assessment Procedure (SAP) 2012 calculations demonstrating compliance with Part L1A 2013 were undertaken and the results applied to similar dwellings on the site. The SAP calculations are based upon the dimensions of the properties, shown on drawings issued by Circle25 Design. As there are just two construction types on site the SAP results from these plots accurately reflect the other plots that they have been applied to. The three dwellings that were assessed using SAP 2012 were:

- Plot 1 (end terrace) – Results applied to all end terrace and semi-detached plots.
- Plot 2 (mid terrace) – Results applied to all mid terrace plots.
- Plot 9 (detached) – Results applied to all detached plots.

2.2 The Target Emission Rate (TER) was determined from each calculation and applied to the dwellings accordingly. The TER is the maximum permitted annual CO_2 emissions from the dwelling that is calculated by a SAP calculation using NCM (National Calculation Methodology) approved software.

Baseline Assessment Results

2.3 Table 1 below shows the CO_2 breakdown of the baseline SAP compliance analysis. The target annual CO_2 emissions for the site are 16,041kg.

Table 1: Annual Baseline CO_2 Emissions

Plot Nr	Area (m^2)	CO_2 Emissions	
		TER ($kg/m^2/yr$)	Total (kg/yr)
1	96	16.48	1,582
2	96	15.13	1,452
3	96	15.13	1,452
4	96	16.48	1,582
5	96	16.48	1,582
6	96	16.48	1,582

Plot Nr	Area (m^2)	CO_2 Emissions	
		TER ($kg/m^2/yr$)	Total (kg/yr)
7	96	16.48	1,582
8	96	16.18	1,582
9	115	15.84	1,822
10	115	15.84	1,822
Site Baseline CO2 emissions			16,041

3. 'BE LEAN' ASSESSMENT

Summary

3.1 The first step of the energy hierarchy is to improve a building's energy demand through the specification of thermally efficient building fabric and services. To reduce this energy demand from each dwelling high performance thermal insulation will be specified to reduce u-values significantly below what is required for AD L1A 2013 compliance. Enhanced construction details with a low y-value will be used to avoid thermal bridging as far as is practicable and the air tightness shall be improved to $5m^3hr/m^2$ at 50pa, which equates to a 50% reduction below AD Part L1A requirements. The 'Be Lean' fabric specification is shown in table 2 below.

Table 2: 'Be Lean' fabric performance

Thermal Element	Design U-value ($w/m^2/K$)	ADL1A U-value ($W/m^2/K$)
External walls	0.17	0.30
Roof	0.12	0.25
Floor	0.12	0.20
Glazing (g-value 0.5)	1.20	2.00
Air Permeability ($m^3/hr/m^2$ @ 50Pa)	5.00	10.00
Thermal bridging y-value (W/m.k)	0.08	0.15

3.2 To further reduce the energy demand from the properties efficient heating, hot water, ventilation and lighting will be utilised. Heating will be provided by a high efficiency gas fired condensing combi boiler with time and temperature controls to allow thermal zoning. This boiler will have a seasonal efficiency of at least 90%. Hot water will be provided from the combi boiler with no storage, avoiding storage losses and will also benefit from a flue gas heat recover unit fitted to the boiler, which will preheat incoming water for DHW use. Ventilation will be predominantly natural, with only high efficiency extract fans to WCs, bathrooms and kitchens. All lighting will utilise high efficiency LED lamps.

'Be Lean' Assessment Results

3.3 SAP calculations have been completed based upon the improved performance specification detailed above and the Dwelling Emission Rate (DER) for each sample SAP calculation has been applied to the appropriate plots as per section 3.1. The DER represents the CO_2 emission per sqm achieved by the dwelling as calculated by the SAP software and this must be below the TER threshold to be deemed compliant with AD Part L1A. The results of the 'Be Lean' assessment are shown in table 3 below, which shows the annual CO_2 emissions for the site to be 15,950kg, which is a reduction of 0.6% below the TER baseline.

Table 3: Annual 'Be Lean' CO_2 emissions

Plot Nr	Area (m^2)	CO_2 Emissions	
		TER ($kg/m^2/yr$)	Total (kg/yr)
1	96	16.47	1,581
2	96	14.75	1,416
3	96	14.75	1,416
4	96	16.47	1,581
5	96	16.47	1,581
6	96	16.47	1,581
7	96	16.47	1,581
8	96	16.47	1,581
9	115	15.79	1,816
10	115	15.79	1,816
Site Total Baseline CO2 Emissions			15,950
% Reduction below TER baseline			0.6%

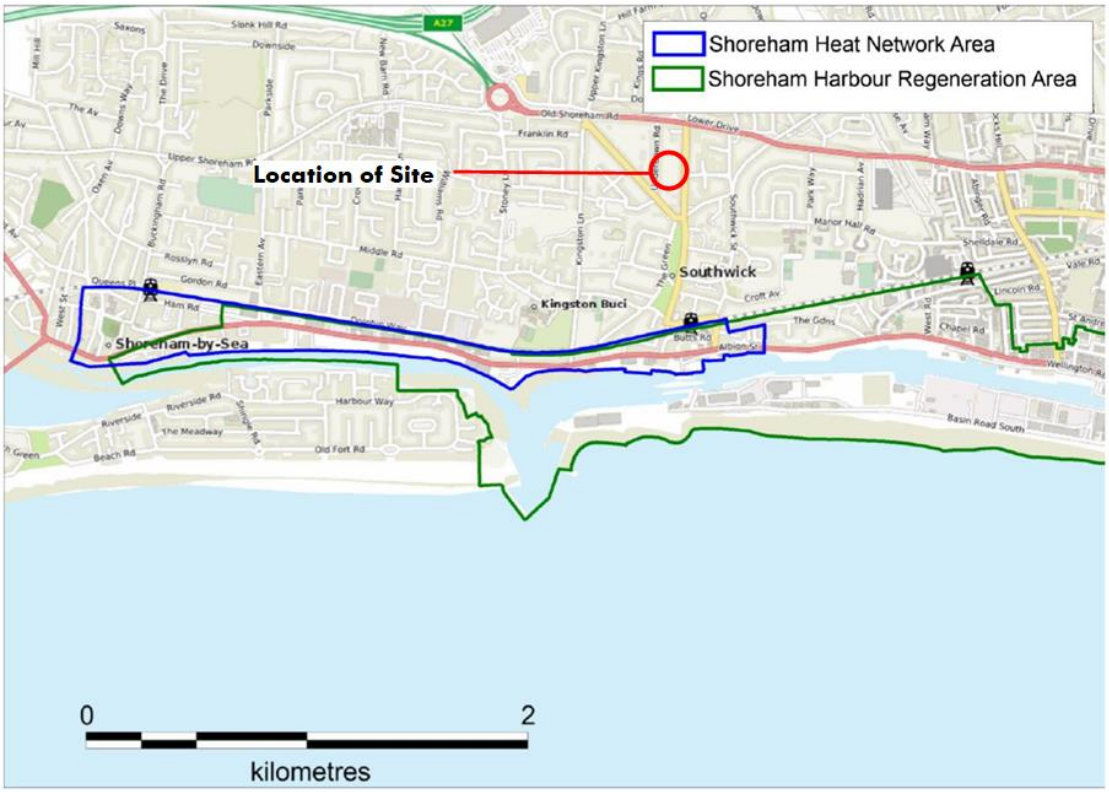
4. 'BE CLEAN' ASSESSMENT

4.1 Within Adur Local Plan policy 19 it is confirmed that the development must consider:

- Any new opportunities for providing or creating new heating/cooling networks
- The feasibility of connecting the development to existing heating / cooling / CHP networks where these already exist
- Opportunities for expansion of any proposed networks beyond the development area over time, and to plan for potential expansion.

4.2 Within the Supplementary Planning Document a map of the Shoreham Heat Network is provided, which is shown in figure 2 below. This map clearly shows that the site falls outside of the proposed area and so connection to any future network from the site would not be viable.

Figure 2: Map of Shoreham Heat Network Area



4.3 The development includes a total of 10no dwellings and is therefore only just on the threshold of what is considered to be a 'major development'. The scope and size of the development does not lend itself to a decentralised heating network as there will not be a consistent heat demand for a CHP engine.

4.4 Therefore, for the reasons stated above provision of or connection to a heat network is not considered viable for the development and no further CO_2 reductions have been achieved at the 'Be Clean' stage.

5. 'BE GREEN' ASSESSMENT

Summary

5.1 The third 'Be Green' stage of the energy hierarchy involves the adoption of on-site Low and Zero Carbon (LZC) technologies to generate energy and offset CO_2 emissions. Various technologies have been considered for inclusion as follows:

- Biomass Heating – Fuel storage / access concerns and high level of maintenance required not suited to typical resident.
- Ground Source Heat Pump – Insufficient site area available for horizontal system and vertical system not financially viable on what is a relatively small scale site.
- Air Source Heat Pump – Each individual property would require an external condenser unit, which would have both planning and noise implications.
- Wind Turbine – Suburban context of site and location within planning policy area means this technology would not be permitted in this location.
- Solar Thermal Panels – Energy can only be used when there is a demand in the building, otherwise it is 'dumped'. Available roof space better suited to PV, which can export energy to grid when not used within property.
- Photovoltaics – Sufficient roof space with appropriate aspect on all properties. No maintenance implications and generated energy can be exported to the national grid.

5.2 A (PV) array is therefore considered to be the most suitable onsite generation technology for inclusion within the scheme to reduce CO_2 emissions and meet local planning policy.

PV Requirements

5.3 Using SAP 2012 software the energy generated by a single $300W_p$ PV panel in the South East is assumed to be 260kWh/yr for a South facing panel at 30^0 inclination, whilst for an East or West facing panel it is 218kWh/yr. The regulated energy demand of each dwelling has been extracted from the SAP reports for the 'Be Lean' scheme and the number of PV panels required to meet at least 10% of this demand for each dwelling has been determined. The results of this analysis are shown in table 4 below. These demonstrate that a total of 34no $300W_p$ panels are proposed totalling $10.2kW_p$, which will meet 11.9% of the regulated energy demand across the site as a whole.

Table 4: PV required to meet at least 10% regulated energy demand

Plot Nr	Regulated Energy Use (kWh/yr)	Nr PV Panels	PV Energy Generated (kWh/yr)	% Regulated Energy met by PV
1	6,826	3	780	11.4%
2	6,042	3	780	12.9%
3	6,042	3	780	12.9%
4	6,826	3	780	11.4%
5	6,826	3	780	11.4%
6	6,826	3	780	11.4%
7	6,826	3	780	11.4%
8	6,826	3	780	11.4%
9	8,929	5	1,090	12.2%
10	8,929	5	1,090	12.2%
Site Totals	**70,897**	**34**	**8,420**	**11.9%**

'Be Green' Assessment Results

5.4 Each of the sample SAP analyses has been updated to include the required number of 300W$_p$ PV panels and the DER recalculated. The results of the 'Be Green' assessment are show in table 5 below. The 'Be Green' site CO_2 emissions are 11,830 kg/yr, which is a reduction of 26.3% below the TER baseline.

Table 5: Annual 'Be Green' CO_2 emissions

Plot Nr	Area (m^2)	CO_2 Emissions	
		TER ($kg/m^2/yr$)	Total (kg/yr)
1	96	12.38	1,188
2	96	10.66	1,023
3	96	10.66	1,023

Plot Nr	Area (m^2)	CO_2 Emissions	
		TER ($kg/m^2/yr$)	Total (kg/yr)
4	96	12.38	1,188
5	96	12.38	1,188
6	96	12.38	1,188
7	96	12.38	1,188
8	96	12.38	1,188
9	115	11.53	1,326
10	115	11.53	1,326
Site 'Be Green' CO_2 Emissions			11,830
% Reduction below TER baseline			26.3%

6. CONCLUSION

6.1 An energy strategy for the proposed development at Southview Road, Brighton has been assessed in accordance with Adur Local Plan Policy 19 based upon the energy hierarchy:

- Be lean: use less energy
- Be clean: supply energy efficiently
- Be green: use renewable energy

6.2 Following this approach has resulted in an energy efficient scheme that has minimised CO_2 emissions associated with the use of regulated energy through high thermal performance building fabric and high efficiency building services strategy. These measures have resulted in a site wide reduction in annual CO_2 emissions of 0.6%.

6.3 A decentralised CHP heat network is not considered to be viable for this project due to the scale of the development. Furthermore, the site is not within the Shoreham Heat Network area and so is not able to connect to any existing or future networks. A further reduction in CO_2 from 'Be Clean' measures is therefore not possible.

6.4 An LZC technology appraisal has been completed and individual PV arrays located at roof level are deemed to be the most viable strategy for generating energy on site. These would be orientated either South-facing or West-facing and would generate sufficient energy annually to meet 11.9% of the site's regulated energy requirements. These PV arrays would also result in an overall CO_2 reduction across the site of 26.3% below the Part L TER baseline. The results of the energy hierarchy analysis followed within this energy statement are shown in table 6 and figure 3 below.

Table 6: Results of energy hierarchy analysis using SAP 2012

Energy Hierarchy Stage	CO_2 Emissions (kg/yr)	CO_2 Reduction (kg/yr)	Reduction at each Stage (%)	Reduction from Baseline (%)
Baseline	16,041	-	-	-
'Be Lean'	15,950	90	0.6%	0.6%
'Be Green'	11,830	4,211	25.7%	26.3%

Figure 3: Graphical Results of Energy Hierarchy Analysis using SAP 2012

