

Gyoury Self

CONSULTING ENGINEERS

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Also at Fareham & St Albans

Our ref: 7033/2.7/SL

Laura Gibbons,
First Floor, Arun Civic Centre,
Maltravers Road,
Littlehampton,
BN17 SLF

25th June 2020

Dear Laura,

Angels Nursery, Yapton

In response to your e-mail dated 16th June, please see below our responses in Green and our drawings and calculations enclosed for your approval.

The maintenance report has not yet been revised but will follow shortly.

If you have any queries, please contact me.

Yours sincerely,

Stephen Lamprell BEng (Hons)
Senior Civil / Infrastructure Engineer
Direct Dial: 01444 225 654

1. It is noted that ground levels are being raised over much of the site, some significantly. This creates surface water run off issues on the eastern boundary which have been partly addressed but is discussed further in the comments below. The planning officer has been advised of the ground raising to determine any other potential planning considerations. A land drain has been added to the eastern boundary as shown on the latest plans to pick up any surface water, and also channel the existing ditch.
2. Infiltration has been discounted on this site due to the very high water table and poor infiltration at shallow depths, which is reflected on adjoining sites. Unless, you have evidence to suggest otherwise. No, this is accepted to be the case. The permeable paving is

designed to outfall into the main system, not infiltrate into the ground. A liner has been added to the permeable paving details.

3. The main surface water sewers are to be adopted by Southern Water and highway drainage adopted by West Sussex County Council. We will need to see their comments on the design and their requirements incorporated. The Section 38 and 104 have not been submitted since the planning condition has not yet been cleared.
4. ~~The pond is too close to the southern ditch ie. top of pond slope to be at least 3m from the top of the ditch bank. Reconfigure and include dimensions on plan.~~ Okay.
5. Permeable paving to be included in all parking areas/driveways. Please adjust and remove any yard gully's as necessary. *Permeable paving is not included within all driveways as requested.* The design of the SUDS approach to water treatment on this scheme has been taken to utilise the treatment stage of the pond in accordance with Ciria guidance C753. We have added notes to the pond to include planting and a wet bed level. The specification of the planting will be by other specialist landscape consultants.
6. Show permeable paved finished surface levels, based levels on sloping formation pavements (ie, adj. plots 79-82 and 76-78), sub base thickness, on plans. Ensure that all incoming pipes to the permeable paving is raised as high as possibly above formation level but obviously totally within the sub base. A number of connecting pipes have inverts made at formation level. Please investigate raising these. *Finish levels are now included on plans. However, sub-base thickness is not, formation levels unclear. Invert levels of incoming pipes have not changed. Invert levels need to be reviewed to ensure incoming I.L.s are at least the same as or higher than outgoing. See revised layout and details enclosed. Sub-base thickness varies where the formation is sloping. Depth of sub-base now noted where the formation is level. It isn't possible to raise DT levels in most cases due to the shallow levels*
7. Show finished road/surface levels. *Not shown. Now shown on latest plan.*
8. Building east of plots 48/50. The low ground levels are noted here, however, soakaways are not considered suitable – rethink needed. *Area directed into permeable paving. Please supply calculations to evidence that this increase in impermeable area is adequately accounted for in design. See enclosed latest Microdrainage calcs.*
9. Remove irrelevant tree symbols (circles) from plans and only include existing trees to be retained and trees to be planted (including associated root protection zones), in order that any impact on drainage can be assessed. *Irrelevant trees still shown, please remove as per original comment.* The circles are proposed trees except for the dashed green circles which are the TPZ areas. We can't remove any other proposed trees that have been designed by others.
10. ~~Catchpits required immediately upstream of any connection to a permeable pavement. Catchpits provided immediately upstream of connections to permeable pavement.~~
11. ~~All connections to pipelines not made to a manhole to be connected via oblique 45 degree junctions. Add note.~~ Okay.
12. Site access road – is some of this area to drain into Yapton Road – provide drainage details/discharge rate. *Section of road draining to Yapton Road clearly shown, approval of WSCC required.* The Section 278 drawings and calcs are enclosed. Still subject to approval by WSCC highways.
13. Add pipe diameters immediately upstream of all distribution tanks. *Missing from some areas, i.e. on some pipes for plots 24-26, 67-68, 79-82, etc. Please review. Added on latest plan.*
14. ~~Vicinity of plot 44 – provide manhole where drain from plots 42/43/ joins.~~ Okay.
15. ~~Plot 42 – RWP not connected.~~ Okay.
16. ~~Plot 53 – rodding eye invert level lower than downstream invert level.~~ Okay.

17. Provide a positive gradient between SCP5 and distribution tank. *Unchanged, please review (now SCP28). Revised on latest plan.*
18. ~~Plot 56—RWP connected against flow. Okay.~~
19. Plot 58 orifice control – is this necessary? *Removed from plans, please provide calculations and commentary to evidence this is okay. This is ok on the latest cales, refer to the revised Microdrainage cales.*
20. Permeable pavement area 2.000 – outlet pipe/distribution tank invert higher than permeable pavement formation. *Formation level raised, but I.L. on incoming DTs kept the same. One is now lower than formation level. Please revise. The lowest level of the DT is 8.650 now on the latest plan. This is the same as the formation level of the permeable paving*
21. All orifices less than 50mm diameter – can these been increased in diameter to at least 50mm? *Orifices less than 50mm diameter still included. Is there any scope to increase to 50mm? This would affect the downstream storage and cause further flooding.*
22. ~~A blue line surrounds some permeable paved area—remove blue line as it confuses with the drainage. Some areas were not included within this blue line—not sure why? Make it clear on the plans/legend as to the areas of permeable paving. Okay.~~
23. ~~Western boundary ditch—3m (free of buildings/fences) from the top of the bank has not been entirely achieved on the development side. In order to discuss this further, please provide an accurate plan showing your clients legal boundary in respect to the ditch and clearly mark your proposed fences/boundaries for the properties. A site visit my be required subsequently. Okay.~~
24. Footpath between plots 14/15 – is this permeable paving? Indicate how it drains. *Still unclear. This is designed to crossfall into the landscaping alongside the path.*
25. ~~All pipes to connect soffit to soffit unless otherwise stated (add note). Okay.~~
26. ~~Where pipes are connecting to larger pipes, show the invert level of the connecting pipes to show that item 25 is complied with. This includes the main pipelines in the estate road. Okay.~~
27. ~~Road gully east side of S15—show connection clearly. Okay.~~
28. Can the visitor spaces/laybys on the estate road be made permeable? *No change, please provide an explanation as to why these cannot be permeable or make permeable. The road is proposed to be adoptable and therefore cannot be permeable since highways would not accept this.*
29. ~~Road gullies west side of S2 not showing connections and road gully on east side connecting against the flow. Okay.~~
30. ~~RWP plot 41—connect direct to SCP5A rather than the distribution tank. Okay.~~
31. ~~RWP plot 38 garage—connect downstream of rodding eye. Okay.~~
32. ~~RWP plot 36 garage—no connection shown. Okay.~~
33. ~~Link from permeable paving area 3.000 to 7.000—specify pipe diameter. Pipes need to connect at formation level of the pavements. Okay.~~
34. Orifice manholes – include symbol on legend but adjust symbol to make them more obvious. *Please address the comment. The symbol has been amended on the latest plan*
35. ~~Permeable paving area 3.000—outlet pipe invert is lower than formation level. Okay.~~
36. Ensure all outlet diffuser unit symbols are different to incoming diffuser unit symbols. *Please review and add to the key. For example outgoing diffuser on permeable paving area 8.000 not shown correctly. Key has been revised on latest plans.*
37. ~~Plot 26 RWP connecting against flow. Okay.~~
38. ~~Plot 79—manhole upstream of distribution tank needs moving to accommodate pipe connections. Okay.~~

39. If there are alternative options to running pipes under garages, then please consider. Please provide commentary. This is only done where necessary to avoid very long runs across shared gardens. Appropriate lintels will be provided in the construction of the garage to accommodate the pipe passing through the structure.
40. ~~RWP's rear plots 22, 26, 27, 78, 85 & 86 not connected.~~ *Okay.*
41. ~~2nd central ditch — add note to say 'to be filled in and banks on southern ditch to be made good'.~~ *Okay.*
42. ~~Plot 95 parking area construction appears too close to the ditch bank.~~ *Okay.*
43. Add note 'all ditches for which your client has riparian responsibility to be cleared/desilted to the satisfaction of the ADC drainage engineer'. *Please add a note on the southern section of the ditch, in addition to that added to eastern section. Notes added on latest plans*
44. Provide erosion control measures between the toes of pond inlet headwalls and the base of the pond. *Please provide. See latest details on drg 5105.*
45. ~~HWMH17 to S6 — should connect soffit to soffit at S6 and clashes with pipe from plots 90-95. Redirect 90-95 to S6?~~ *Okay.*
46. SW corner culvert – existing culvert to be removed entirely. New culvert to be of shorter length as possible and min. 600mm pipe (twin walled polypipe or concrete). Provide section drawing. Specify bedding, gradient, upstream & downstream invert levels. Provide headwall construction details (no grilles required). Pipe inverts to be set at 'true' bed level ie. not silt level. *Layout adjusted. Please provide section drawing and construction detail drawing. See section CC on revised drawing 1060.*
47. Land Drainage Consent required for culvert works in SW corner. The existing consent application for the outfall to the ditch will need to consider any necessary modifications resulting from this email. *Noted.*
48. Hydrobrakes – provide manufacturers technical data sheets. *Please provide. See enclosed Hydro data sheets*
49. Where pipes cross the diverted foul rising main – has this been checked for clashes? *Please confirm. The diverted foul rising main is subject to design by Southern Water. Once we have the design for this then we will check the levels and ensure that it doesn't clash with the other drainage runs.*
50. 450mm inlet pipes to pond to have 'cranked' grilles. *Please provide cranked grilles. See revised detail on drawing 5105.*
51. Overflow at S11 – is this required? *Please provide commentary. No, this has been removed.*
52. ~~Pond outlet pipe specified as 150mm and 225mm diameter?~~ *Okay.*
53. Pond outlet headwall requires cranked grille – may need to adjust proposed headwall construction to suit. *Please provide cranked grille. See revised detail on drawing 5105.*
54. SMH control manhole on pond outlet – overflow pipe shown on plan? *Overflow not shown on detail. Please provide site specific detail. Revised on drawing 5102.*
55. SMH hydrobrake specified with 1.6m head but this cannot be achieved based upon the levels provided. *Revised calculations need to be submitted. Design head must match between calculations and drawings. Refer to the latest Microdrainage cales enclosed.*
56. Road gullies outside plot 84 connecting against flow on 450mm pipe. *Connection shown into side of headwall. Please provide construction detail drawing for this. The layout has been revised to show a connection upstream into the 450mm pipe.*
57. Manhole south east corner plot 63- move to improve pipe angles ie. not <90 degrees. *Site layout appears to have changed.*

Confirmed – no longer an issue.

58. Ditch on eastern boundary – any section to be retained must have a maintenance corridor of 3m from the top of the bank (free of buildings/fences). I would suggest retaining the ditch from where it meets the southern ditch up to a point just south of plot 64. This section is to be cleared and desilted to the satisfaction of the ADC engineer – add note. Indicate proposed bed levels to achieve true bed levels. No granular material or crates to be placed into the ditch. North of here I would suggest laying a french drain/gravel filled trench (wrapped in permeable geotextile) all the way up the eastern boundary to intercept run off flowing towards the gravel boards and adjacent retaining walls. This would also replace any proposed crates. Headwall required where the french drain meets the shortened ditch. Adjust layout plan and provide construction details. Land drainage consent is also required for the ditch/headwall works. *Please provide construction details. See details on drawing S107.*
59. Road construction south of plot 64 is very close to the ditch bank – please advise and adjust to prevent any detriment to the road or ditch. *Layout adjusted.*
Confirmed layout has been adjusted.
60. Drg. 19812-GS-Z1-XX-DT-C-5106 – Make it clear that no part of the headwall structure should encroach into the profile of the ditch. *Add note to section drawings.*
Note added on latest drawing 5106.
61. Orifice chambers – specify weir levels. *Not specified.* The wier levels are shown on the layout adjacent to the orifice chambers.
62. Is there scope to raise the pond outlet pipe level in order to provide more freeboard between ditch bed and pipe invert? *No adjustment, please provide commentary.*
Unfortunately this isn't possible without raising the plot levels on the site further. This is because the road is to be adopted. Therefore the surface water drainage needs to be adopted by the water authority, therefore minimum cover needs to be provided on the main carrier drain. We already have only 850mm cover on the 300mm drain at S15 near the head of run – we can't lift this any further.
63. Southern and western ditches – provide proposed levels along its length to achieve true bed levels. These levels will need to tie in with true bed levels downstream of the site. *I presume that the levels shown are not the proposed levels, as these rise and fall along the watercourse length and bed level is higher than downstream culvert invert level.* The survey levels shown along the ditch are existing. It is only proposed to change the bed level by slightly lowering downstream of the outfall to provide enough freeboard for the site to drain effectively. There is more than sufficient scope for this as downstream on the adjacent site ditch levels are much lower, in fact at the eastern end of the ditch on the adjacent site bed levels are at 6.73m AOD.
64. Hydrobrake chamber detail – rings to be surrounded in 150mm thick concrete and to be extended down to the bottom of its base. All to be ST4 concrete. Add benching construction notes and include hydro international details referred to. *Note is not clear that surround extends to bottom of base, benching note missing, hydro international details not included.* See revised detail on drawing 5102.
65. PCC ring catchpit detail – unsure if this type is being specified anywhere? If, so detail where and include brickwork under manhole cover/frame and extend concrete surround up to top of cover slab. Specify ring diameter. *Unclear as to where specified, include MH schedule.* The Highway chambers at the northern end of the access road are catchpits. MH schedule has been added to the latest layout.

66. ~~Provide catch pit detail for all manholes immediately upstream of permeable paving connections.~~ *Okay.*
67. Adoptable outfall headwall detail – remove flat grille and specify cranked including bar spacings, etc. Incorporate Athlon detailed drawing within this drawing. Pond bed level shown as 7.800 but 7.900 on plans. *Please address points.* Pond base level is shown as 8.000 on plan with a reduced wet base level of 7.750. The detail has been revised to show a sloped Althon Trash screen.
68. ‘Impermeable’ paving detail shows drilled holes below. If Impermeable what is the purpose of the holes? *Holes still stated.* Marshall's recommendation is to have holes in the DBM layer to prevent water sitting in the bedding layer for long periods, and causing instability of the bedding layer in the long term.
69. Permeable paving detail – show impermeable membrane wrapping at bottom and up sides, unless there are areas where permeable can be specified (bearing in mind ground raising) where some infiltration can be achieved and also ensuring that peak recorded groundwater levels will not be located within the sub base. *Please address.* Permeable paving is not designed to infiltrate into the ground and therefore a liner is shown on the detail on drawing 5103 and 5101, where it can be seen wrapping up the sides.
70. Provide sloping formation permeable paving detail. *Please provide.* The section through permeable paving and distribution tanks shown on drawing 5101 is applicable to both level and sloping formations. I have added a note this effect on the detail now.
71. ~~Baffle detail—Make it clear that the top of the concrete is level with the top of the sub base.~~ *Okay.*
72. Provide pond construction detail including impermeable liner and any necessary anti-buoyancy measures. Floatation calcs to be provided. *Please provide.* Pond sections now shown on drawing 5108.
73. Provide construction detail distribution tanks on permeable paving outlets. *Please make it clear that invert level of outlet tanks is at formation level.* Note added to DT detail on drg 5101.
74. Provide detail concrete bag inlets to pond. *Please ensure it is clear what these details refer to, text over text.* They refer to the locations where we have shown concrete bagwork headwalls on the layout. I have revised the detail to just show the one type of headwall which can be used for the pond or ditch location.
75. I note the pond bed is lower than the outlet from the pond. Are you looking to achieve a ‘wet’ pond. If so, is there to be a planting scheme? Provide details. *Please provide further detail, include on sections.* The pond sections are shown on drawing 5108. The detail of the planting is subject to detailed design by others.
76. The Microdrainage calcs will be reviewed once they have been revised to suit the comments in this email. However, the calculations will need to simulate against a surcharged outfall. Flooding was noted on the calculations – it needs to be proven that any flood water can be retained on site without detriment to property. Ensure that no water emanates from the road gully in the SE corner of the site which is likely to be one of the lowest spots. *No revised calculations submitted.* See enclosed microdrainage calcs.
77. The pond perimeter will require 300mm freeboard about the top predicted water levels. *Will be reviewed when construction details, revised calculations, and flotation calculations are provided.* The calculations show that there is approx. 150mm freeboard to the top of the pond on the 1 in 100 year + 40%cc simulation, and approx. 300mm freeboard on the 1 in 100 year + 20%cc simulation.
78. Maintenance manual;

- a. ~~Remove any reference to any infiltration from the pond.~~ *Okay.*
- b. ~~Explain via commentary as to how surface water drainage system is designed to work, so it can easily be understood by the management company/residents.~~ *Okay.*
- c. Include maintenance for orifice's, hydrobrakes, grilles and the eastern boundary french drain. *Maintenance of orifices is not clear in document, ensure importance of these being checked and cleared is emphasised. Expand upon French drain maintenance requirements. See updated maintenance plan*
- d. Adjust the manual to suit a 'wet' pond or primarily 'dry' pond bearing in mind item 75. *Okay, further review once construction detail is provided.*
- e. Include the removal of tree saplings that may root within the pond. *Okay, further review once construction detail is provided.*
- f. Approved drawings will eventually need to be included in the manual.
- g. The 'responsibility' drawing will need updating.
- h. Ditch clearance – specifically refer to the removal of silt in the ditch base. Make it clear that all ditches for which the management company will have 'riparian' responsibility to be included for maintenance. Make reference to bird nesting season and the limitations on maintenance during that time. *Okay.*