

Surface Water Drainage Proposal Checklist

Ground Investigation Results				
No.	Requirement	Results/Information Provided?		
1	Winter groundwater monitoring results Please refer to guidance note 'a' below.	Yes	☒	No
2	Period of winter groundwater monitoring Note 'a'	From	22/12/17	To
		To	18/04/18	
3	Maximum recorded groundwater level Note 'a'	13.49	mAOD	2.96m
			mBGL	
4	Winter infiltration test results Notes 'b' and 'c'	Yes	☒	No
5	Date of winter infiltration testing Note 'b'	83/02/2020		
6	Details of the location and depth of the infiltration testing Notes 'b' and 'c'	Yes	☒	No
7	Minimum infiltration rate Note 'd'	8.57 x 10 ⁻⁵ m/s		

Guidance Notes

- Groundwater monitoring should be undertaken during the winter period (October to March inclusive) to enable the peak annual groundwater levels to be established. The duration of monitoring required for smaller developments (e.g. those consisting of less than 10 properties) can be discussed with the LPA's Engineers as; for some locations, a shorter duration may be acceptable. However, unless dispensation is agreed in advance with the LPA's Engineers, a full winter season of monitoring should be undertaken. Groundwater on sites near the coast may be influenced by tidal conditions and therefore this consideration needs to be factored into the monitoring programme.
- Infiltration testing should be undertaken during the wet winter months (typically January or February) and in line with BRE365 or a similar approved method, such as CIRIA R156. Infiltration testing needs to be carried out at the locations and depths of proposed infiltration structures, this must also be at a depth above the maximum recorded groundwater level in the vicinity of the test pit. Tests must be repeated 3 times consecutively, to replicate saturated ground conditions.
- Deep-bore Soakaways: Where it is not possible to undertake conventional BRE365 or CIRIA R156 testing due to depth; advice should be sought from the Council's engineers. Please note that; deep-bore soakaways are generally resisted unless there is no alternative. Evidence of the Environment Agency's agreement with the principle of using deep-bore methods to drain the site must be provided within the submission.
- The minimum infiltration rate obtained at the location and depth of the proposed infiltration structures should be used to inform the design of the infiltration structures. Please use the 'additional information' section at the end of this checklist if multiple infiltration structures are proposed, which utilise different minimum rates.

Proposed Method of Surface Water Disposal				
8	Infiltration on-site, via soakaway structures.	Yes	☒	No
9	If on-site infiltration is not to be used, has justification for this decision been provided? Note 'e'	Yes	N/A	No
10	Attenuation (on-site) with a restricted discharge to a watercourse on, or adjacent to, the site.	Yes	N/A	No
11	Attenuation (on-site) with a restricted discharge to a surface water sewer on, or adjacent to, the site.	Yes	N/A	No
12	Attenuation (on-site) with a restricted discharge to a foul water or combined sewer on, or adjacent to, the site.	Yes	N/A	No

Guidance Note

- e. If on-site infiltration is deemed unviable; evidence supporting the move to the next step(s) of the drainage hierarchy must be provided, to the satisfaction of the LPA's Engineer.

Drainage Design: Supporting Calculations				
	No.	Requirement	Provided?	
Infiltration Structures	13	Calculations demonstrating the 1 in 10 year event, plus climate change allowance (CCA), can be accommodated below the lowest incoming pipe within each structure. Notes 'f' and 'g'.	Yes	☒
	14	Calculations demonstrating the 1 in 100 year event, plus CCA can be accommodated on-site. Notes 'f' and 'g'.	Yes	☒
	15	Lowest base level of any infiltration structure (Pots 16 & 17)	14.85 mAOD 1.85 mBGL	
	16	Half-drain time for 10 year event (plus CCA)	Yes	No
			9.66 Hours	
	17	Half-drain time for 100 year event (plus CCA)	Yes	No
			9.66 Hours	
	18	Has the design sought to provide treatment of potential contaminants? E.g. hydrocarbons.	Yes	N/A
Attenuation / Restricted Discharge	19	Pre-development run-off rate calculations Note 'h'	Yes	No
	20	Proposed discharge rate Note 'h'		I/s
	21	Calculations demonstrating the 1 in 100 year event, plus CCA can be accommodated on-site. Note 'g' and 'h'	Yes	No
	22	Has the design sought to provide treatment of potential contaminants? E.g. hydrocarbons.	Yes	No
	23	If the proposed scheme incorporates any impermeable lined attenuation features, calculations are required to demonstrate that appropriate resistance to floatation (due to groundwater levels) is catered for in the design.	Yes	No
	24	Is a discharge into, or an alteration to, an ordinary watercourse is proposed? (If so, Ordinary Watercourse/ Land Drainage Consent will be required). Note 'i'	Yes	No
	25	If discharging to a watercourse, piped system or the sea, has the proposed drainage network been modelled against predicted top water levels for the 1 in 100 year storm event, plus CCA, within the existing system? Note 'j'	Yes	No

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Plans/Drawings/Diagrams				
No.	Requirement	Provided?		
26	Plan detailing the location of groundwater monitoring and infiltration testing	Yes	☒	No
27	Detailed drainage layout plan Note 'k'	Yes	☒	No
28	Construction detail plans Note 'l'	Yes	☒	No
29	Exceedance flow route plans Note 'm'	Yes	☒	No
30	Impermeable area plan	Yes	☒	No
31	If ground levels are being raised $\geq 300\text{mm}$ above existing levels and is unavoidable, have fully detailed plans been provided, together with drainage proposals, to address any potential drainage related issues.	Yes	☒	No

Guidance Notes

k. Drainage layout plans should include:

- All surface water drainage pipes labelled with: diameters, pipe materials, gradients and invert levels.
- All infiltrating and attenuating structures (including permeable paving) labelled with: dimensions, invert/base and cover levels.
- All manholes labelled with: a reference number, cover levels, invert levels, cover loading grade.
- All silt traps clearly labelled with sump depths.
- Control structures with discharge rates, hydraulic head and invert levels.
- Proposed/existing levels of any areas subject to ground raising, together with suitable measures/detailed drawings for the associated management of surface water runoff. **Please note that ground raising should be avoided unless there are exceptional circumstances.** In any instances where this is envisaged early consultation with the Council Engineer is recommended.

l. Site specific construction detail plans should be supplied. The following elements must be included (where applicable): infiltrating structures; attenuating structures; manholes; catch-pits/silt traps; flow control devices; permeable paving; headwalls; channel drains; gullies; pipe bedding and surround, etc.

m. Unless specifically requested by the Council's drainage Engineers 'Exceedance Flow Route Plans' are only required for developments of more than 10 residential properties or more than 0.5ha of commercial development.

Proposed Method of Surface Water Disposal				
8	Infiltration on-site, via soakaway structures.	Yes	☒	No
9	If on-site infiltration is not to be used, has justification for this decision been provided? Note 'e'	Yes	N/A	No
10	Attenuation (on-site) with a restricted discharge to a watercourse on, or adjacent to, the site.	Yes	N/A	No
11	Attenuation (on-site) with a restricted discharge to a surface water sewer on, or adjacent to, the site.	Yes	N/A	No
12	Attenuation (on-site) with a restricted discharge to a foul water or combined sewer on, or adjacent to, the site.	Yes	N/A	No

Guidance Note

- e. If on-site infiltration is deemed unviable; evidence supporting the move to the next step(s) of the drainage hierarchy must be provided, to the satisfaction of the LPA's Engineer.

Drainage Design: Supporting Calculations				
	No.	Requirement	Provided?	
Infiltration Structures	13	Calculations demonstrating the 1 in 10 year event, plus climate change allowance (CCA), can be accommodated below the lowest incoming pipe within each structure. Notes 'f' and 'g'.	Yes	☒
	14	Calculations demonstrating the 1 in 100 year event, plus CCA can be accommodated on-site. Notes 'f' and 'g'.	Yes	☒
	15	Lowest base level of any infiltration structure (RDI)	15.00 mAOD 2.57 mBGL	
	16	Half-drain time for 10 year event (plus CCA)	Yes	☒
	17	Half-drain time for 100 year event (plus CCA)	Yes	☒
	18	Has the design sought to provide treatment of potential contaminants? E.g. hydrocarbons.	Yes	☒
Attenuation / Restricted Discharge	19	Pre-development run-off rate calculations Note 'h'	Yes	No
	20	Proposed discharge rate Note 'h'		I/s
	21	Calculations demonstrating the 1 in 100 year event, plus CCA can be accommodated on-site. Note 'g' and 'h'	Yes	No
	22	Has the design sought to provide treatment of potential contaminants? E.g. hydrocarbons.	Yes	No
	23	If the proposed scheme incorporates any impermeable lined attenuation features; calculations are required to demonstrate that appropriate resistance to floatation (due to groundwater levels) is catered for in the design.	Yes	No
	24	Is a discharge into, or an alteration to, an ordinary watercourse is proposed? (If so, Ordinary Watercourse/ Land Drainage Consent will be required). Note 'i'	Yes	No
	25	If discharging to a watercourse, piped system or the sea, has the proposed drainage network been modelled against predicted top water levels for the 1 in 100 year storm event, plus CCA, within the existing system? Note 'j'	Yes	No

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Surface Water Drainage Proposal Checklist

Ground Investigation Results				
No.	Requirement	Results/Information Provided?		
1	Winter groundwater monitoring results Please refer to guidance note 'a' below.	Yes	☒	No
2	Period of winter groundwater monitoring Note 'a'	From	22/12/17	
		To	18/04/17	
3	Maximum recorded groundwater level Note 'a'	4.01 mAOD		
		13.49 mBGL		
4	Winter infiltration test results Notes 'b' and 'c'	Yes	☒	No
5	Date of winter infiltration testing Note 'b'	03/02/2020		
6	Details of the location and depth of the infiltration testing Notes 'b' and 'c'	Yes	☒	No
7	Minimum infiltration rate Note 'd'	8.57 x 10 ⁻⁵ m/s		

Guidance Notes

- Groundwater monitoring should be undertaken during the winter period (October to March inclusive) to enable the peak annual groundwater levels to be established. The duration of monitoring required for smaller developments (e.g. those consisting of less than 10 properties) can be discussed with the LPA's Engineers as; for some locations, a shorter duration may be acceptable. However, unless dispensation is agreed in advance with the LPA's Engineers, a full winter season of monitoring should be undertaken. Groundwater on sites near the coast may be influenced by tidal conditions and therefore this consideration needs to be factored into the monitoring programme.
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Plans/Drawings/Diagrams				
No.	Requirement	Provided?		
26	Plan detailing the location of groundwater monitoring and infiltration testing	Yes	☒	No
27	Detailed drainage layout plan Note 'k'	Yes	☒	No
28	Construction detail plans Note 'l'	Yes	☒	No
29	Exceedance flow route plans Note 'm'	Yes	☒	No
30	Impermeable area plan	Yes	☒	No
31	If ground levels are being raised $\geq 300\text{mm}$ above existing levels and is unavoidable, have fully detailed plans been provided, together with drainage proposals, to address any potential drainage related issues.	Yes	N/A	No

Guidance Notes

- k. Drainage layout plans should include:
- All surface water drainage pipes labelled with: diameters, pipe materials, gradients and invert levels.
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- l. Site specific construction detail plans should be supplied. The following elements must be included (where applicable): infiltrating structures; attenuating structures; manholes; catch-pits/silt traps; flow control devices; permeable paving; headwalls; channel drains; gullies; pipe bedding and surround, etc.
- m. Unless specifically requested by the Council's drainage Engineers 'Exceedance Flow Route Plans' are only required for developments of more than 10 residential properties or more than 0.5ha of commercial development.



The space below can be used to provide an explanation for any required information that has been omitted in the submission of this form or to raise specific queries seeking clarification. Please enter the appropriate line entry number to which the comments relate in the box at the left-hand side of the form.

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ZONE 3 (WS3)
Surface Water Drainage Proposal Checklist

Ground Investigation Results				
No.	Requirement	Results/Information Provided?		
1	Winter groundwater monitoring results Please refer to guidance note 'a' below.	Yes	☒	No
2	Period of winter groundwater monitoring Note 'a'	From	22/12/17	
		To	18/04/17	
3	Maximum recorded groundwater level Note 'a'	130.99 mAOD		
		3.51 mBGL		
4	Winter infiltration test results Notes 'b' and 'c'	Yes	☒	No
5	Date of winter infiltration testing Note 'b'	03/02/2020		
6	Details of the location and depth of the infiltration testing Notes 'b' and 'c'	Yes	☒	No
7	Minimum infiltration rate Note 'd'	8.5740 ⁻⁵ m/s		

Guidance Notes

- Groundwater monitoring should be undertaken during the winter period (October to March inclusive) to enable the peak annual groundwater levels to be established. The duration of monitoring required for smaller developments (e.g. those consisting of less than 10 properties) can be discussed with the LPA's Engineers as; for some locations, a shorter duration may be acceptable. However, unless dispensation is agreed in advance with the LPA's Engineers, a full winter season of monitoring should be undertaken. Groundwater on sites near the coast may be influenced by tidal conditions and therefore this consideration needs to be factored into the monitoring programme.
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- Deep-bore Soakaways: Where it is not possible to undertake conventional BRE365 or CIRIA R156 testing due to depth; advice should be sought from the Council's engineers. Please note that; deep-bore soakaways are generally resisted unless there is no alternative. Evidence of the Environment Agency's agreement with the principle of using deep-bore methods to drain the site must be provided within the submission.
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Proposed Method of Surface Water Disposal				
8	Infiltration on-site, via soakaway structures.	Yes	☒	No
9	If on-site infiltration is not to be used, has justification for this decision been provided? Note 'e'	Yes	N/A	No
10	Attenuation (on-site) with a restricted discharge to a watercourse on, or adjacent to, the site.	Yes	N/A	No
11	Attenuation (on-site) with a restricted discharge to a surface water sewer on, or adjacent to, the site.	Yes	N/A	No
12	Attenuation (on-site) with a restricted discharge to a foul water or combined sewer on, or adjacent to, the site.	Yes	N/A	No

Guidance Note

- e. If on-site infiltration is deemed unviable; evidence supporting the move to the next step(s) of the drainage hierarchy must be provided, to the satisfaction of the LPA's Engineer.

Drainage Design: Supporting Calculations				
	No.	Requirement	Provided?	
Infiltration Structures	13	Calculations demonstrating the 1 in 10 year event, plus climate change allowance (CCA), can be accommodated below the lowest incoming pipe within each structure. Notes 'f' and 'g'.	Yes	☒
	14	Calculations demonstrating the 1 in 100 year event, plus CCA can be accommodated on-site. Notes 'f' and 'g'.	Yes	☒
	15	Lowest base level of any infiltration structure <i>plus 35-30</i>	15.547 mAOD 2.35 mBGL	
	16	Half-drain time for 10 year event (plus CCA)	Yes	☒
	17	Half-drain time for 100 year event (plus CCA)	Yes	☒
	18	Has the design sought to provide treatment of potential contaminants? E.g. hydrocarbons.	Yes	☒
Attenuation / Restricted Discharge	19	Pre-development run-off rate calculations Note 'h'	Yes	☒
	20	Proposed discharge rate Note 'h'	N/A	I/s
	21	Calculations demonstrating the 1 in 100 year event, plus CCA can be accommodated on-site. Note 'g' and 'h'	Yes	No
	22	Has the design sought to provide treatment of potential contaminants? E.g. hydrocarbons.	Yes	No
	23	If the proposed scheme incorporates any impermeable lined attenuation features: calculations are required to demonstrate that appropriate resistance to flotation (due to groundwater levels) is catered for in the design.	Yes	No
	24	Is a discharge into, or an alteration to, an ordinary watercourse is proposed? (If so, Ordinary Watercourse/ Land Drainage Consent will be required). Note 'i'	Yes	No
	25	If discharging to a watercourse, piped system or the sea, has the proposed drainage network been modelled against predicted top water levels for the 1 in 100 year storm event, plus CCA, within the existing system? Note 'j'	Yes	No

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Plans/Drawings/Diagrams				
No.	Requirement	Provided?		
26	Plan detailing the location of groundwater monitoring and infiltration testing	Yes	✓	No
27	Detailed drainage layout plan Note 'k'	Yes	✓	No
28	Construction detail plans Note 'l'	Yes	✓	No
29	Exceedance flow route plans Note 'm'	Yes	✓	No
30	Impermeable area plan	Yes	✓	No
31	If ground levels are being raised $\geq 300\text{mm}$ above existing levels and is unavoidable, have fully detailed plans been provided, together with drainage proposals, to address any potential drainage related issues.	Yes	N/A	No

Guidance Notes

k. Drainage layout plans should include:

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