SITE 1DM31.4: Setting of the Sanderstead Local Centre (1)

1) PROPOSED DEVELOPMENT

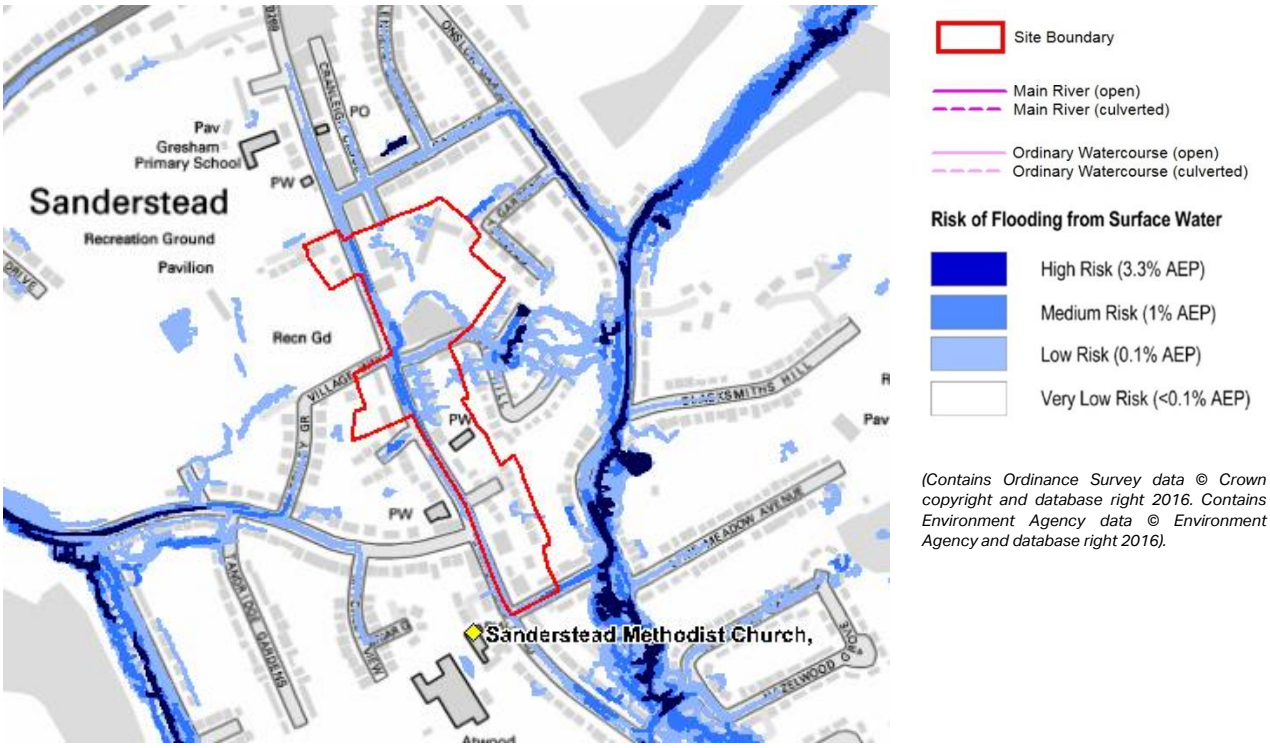
Site ID	1DM31.4
Site Address	Setting of the Sanderstead Local Centre (1)
Site Area	4.95 ha
Current Use	Residential and commercial use
Allocated Use	Area of focussed intensification
Vulnerability	More Vulnerable

2) SUMMARY OF LEVEL 1 FLOOD RISK

Flood risk from rivers

The site is located approximately 1.5km northeast from the closest Ordinary Watercourse. The site is located in Flood Zone 1, low probability of flooding from rivers.

Flood risk from all other sources			**Limitations**
Risk of flooding to the potential development site and surrounding area	Surface Water flooding: (uFMfSW)	**Medium Risk** 1 in 100 year (1% annual probability)	The uFMfSW data does not show the susceptibility of individual properties to surface water flooding. The uFMfSW also does not take into account the details of the existing drainage system.
	Groundwater flooding: (BGS Susceptibility to Groundwater Flooding)	**Medium Risk** Potential for groundwater flooding to occur at surface, but no historic records of groundwater flooding	The dataset cannot be used on its own to indicate risk of groundwater flooding and should not be used to inform planning decisions at a site scale. It is suitable for use in conjunction with a large number of other factors, e.g. records of previous incidence of groundwater flooding, to establish relative risk of groundwater flooding.



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Historic records of flooding

Historic records of flooding from each source within a 100m radius of potential development site	Fluvial records	Surface water records	Groundwater records	Sewer records	Multiple source records	Other
	0	**3**	**0**	**0** *(1 record within 125m of the site)*	**0**	**2 (TW Internal)** **6 (TW External)**

SITE 1DM31.4: Setting of the Sanderstead Local Centre (1)

3) RECOMMENDATIONS

In accordance with the NPPF, More Vulnerable development is considered compatible within Flood Zone 1 and does not require the application of the Exception Test. However, given the risk of surface water flooding to this site, the principles of the Exception Test should still be considered when developing on this site, namely:

1) *"it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk"* and
2) *"demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall"*.

The following information and recommendations are therefore provided for consideration.

Development Layout and Sequential Approach	An assessment of surface water flow paths should be made prior to site design, to encourage the location of buildings and more vulnerable aspects of the development away from those areas at risk of surface water ponding. Measures to manage surface water on the site should be considered early in the site masterplan to enable inclusion of attenuation SuDS where possible. Self-contained residential basements and bedrooms at basement level are not permitted in areas that have 'potential for groundwater to occur at the surface' (BGS Susceptibility to Groundwater Flooding). Less Vulnerable basements, basement extensions and conversions, such as car parking, must provide safe internal access to higher floors situated above ground level. Further ground investigations would be required at this site to confirm the the likelihood of groundwater occurrence.	Section 9.2
Finished Floor Levels	Although the site is within Flood Zone 1, it is good practice to set finished floor levels a minimum of 300mm above ground level in the areas at medium risk of surface water flooding in order to reduce the risk of flooding.	Section 9.2.1
Flood Resistance	Where there may be a future risk of surface water flooding on the site, flood resistant construction measures may be employed, such as raising property thresholds, and the use of landscaping to manage surface water and fluvial floodwater.	Section 9.3
Flood Resilience	Where parts of proposed buildings may be affected by surface water floodwaters, e.g. undercroft parking areas, flood resilient design techniques should be employed to minimise damage to buildings and structures. The use of concrete flooring and waterproof building materials could be considered.	Section 9.4
Flow Routing	Potential overland flow paths should be determined and appropriate solutions proposed to minimise the impact of the development, for example by configuring road and building layouts to preserve existing flow paths and improve flood routing, whilst ensuring that flows are not diverted towards other properties elsewhere.	Section 9.11
Surface Water Management	**Current risk of flooding** The site is located on the boundary between Drainage Catchment 46 to the west and Drainage Catchment 42 to the east, which is located to the south of the borough. The potential development must not increase flood risk to other areas in the Drainage Catchments. The uFMfSW indicates that the central area of the site is at medium risk of surface water flooding. The south and northeast of the site are at very low risk of surface water flooding. There are three historic records of surface water flooding held by Croydon Council in this location.	Section 4.3
	Indicative existing runoff rate: 29.6 l/s (1 in 1 year), 111.2 l/s (1 in 100 year) **Indicative Greenfield Runoff Rate:** 9.9 l/s	Level 2 Appendix B
	SuDS Suitability Reference to the SWMP Appendix C2 Figure 5 identifies that (prior to the completion of a site investigation to determine precise local conditions) for the majority of the site, infiltration of surface water into the ground is potentially suitable. For the southern area of the site, infiltration of surface water into the ground is potentially uncertain and requires further investigation prior to the development of a Drainage Strategy for the site. **Groundwater Source Protection Zones (SPZs)** The site is within SPZ2 (outer protection zone). Where infiltration SuDS are to be used for surface runoff from roads, car parking and public or amenity areas, they should have a suitable series of treatment steps to prevent the pollution of groundwater. The design of infiltration SuDS schemes and their treatment stages needs to be appropriate to the sensitivity of the location and subject to a relevant risk assessment considering the types of pollutants likely to be discharged, design volumes and the dilution and attenuation properties of the aquifer. Techniques which should be considered include infiltration SUDS such as soakaways, green roofs, filter strips, detention basins and ponds, as well as permeable surfacing. Infiltration tests should be carried out on site to confirm SUDS suitability.	Section 10.3 and 10.9

SITE 1DM31.4: Setting of the Sanderstead Local Centre (1)		
	Drainage Strategy and Approvals Croydon Council will require a Drainage Strategy to be prepared outlining the surface water management for the site, runoff rates and consideration of SuDS in line with the London Plan policy 5.13 and Local Plan policies. Where it is not possible to achieve greenfield runoff rates in accordance with the preferred standards set out in the London Plan policy 5.13 and Design and Construction SPG (April 2014), then justification must be provided. Arrangements for the future maintenance of the drainage system must be made and detailed in the Drainage Strategy. There is no automatic right to connect to the existing Thames Water network. Any potential diversions and/or discharges into a sewer or main river must be agreed with Thames Water or Environment Agency, respectively.	Section 10.6
	Indicative Unit Costs Green roofs ~ £90/m^2. Permeable paving ~ £30-50/m^2. Filter strips £2-4m^2. Detention basin £15-50m^3. Concrete storage tank £449-518/m^3.	Section 10.4

SITE 2DM31.4 : Setting of the Sanderstead Local Centre (2)

1) PROPOSED DEVELOPMENT

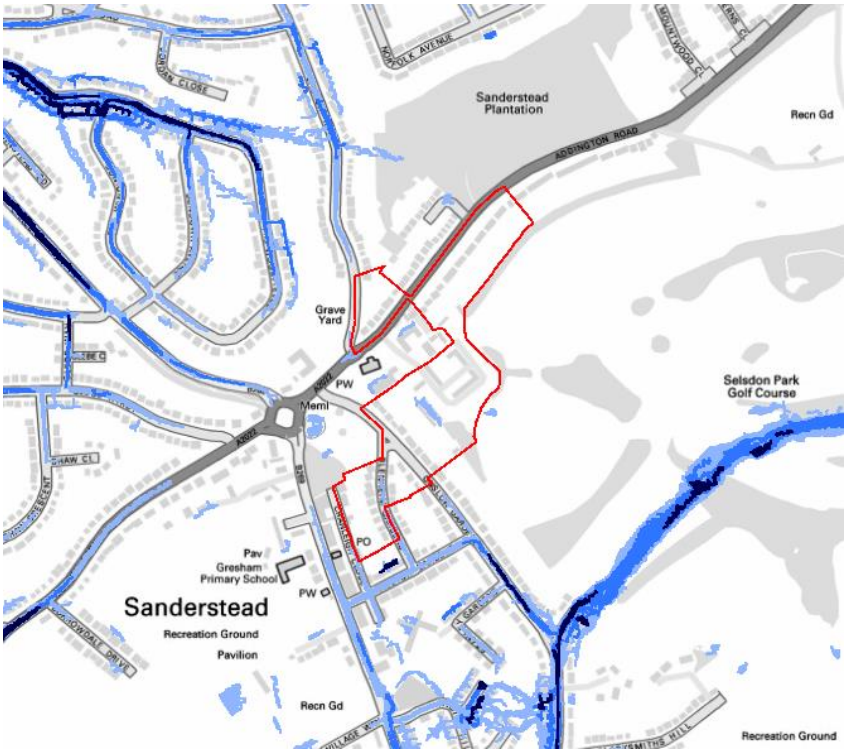
Site ID	2DM31.4
Site Address	Setting of the Sanderstead Local Centre (2)
Site Area	6.84 ha
Current Use	Residential
Allocated Use	Area of focussed intensification
Vulnerability	More Vulnerable

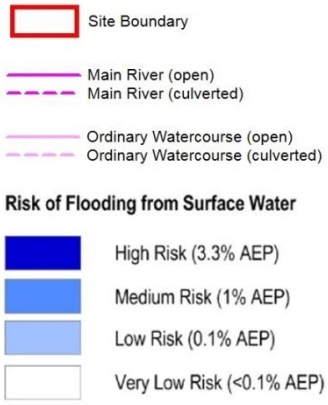
2) SUMMARY OF LEVEL 1 FLOOD RISK

Flood risk from rivers

The site is located approximately 1.7km north-east from the closest Ordinary Watercourse. The site is located in Flood Zone 1, low probability of flooding from rivers.

Flood risk from all other sources			**Limitations**
Risk of flooding to the potential development site and surrounding area	Surface Water flooding: (uFMfSW)	**Low Risk** 1 in 1000 year (0.1% annual probability)	The uFMfSW data does not show the susceptibility of individual properties to surface water flooding. The uFMfSW also does not take into account the details of the existing drainage system.
	Groundwater flooding: (BGS Susceptibility to Groundwater Flooding)	**Low Risk** Limited potential for groundwater flooding to occur.	The dataset cannot be used on its own to indicate risk of groundwater flooding and should not be used to inform planning decisions at a site scale. It is suitable for use in conjunction with a large number of other factors, e.g. records of previous incidence of groundwater flooding, to establish relative risk of groundwater flooding.





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Historic records of flooding

Historic records of flooding from each source within a 100m radius of potential development site	Fluvial records	Surface water records	Groundwater records	Sewer records	Multiple source records	Other
	0	**0**	**0**	**0**	**0**	**2 (TW Internal) 6 (TW External)**

SITE 2DM31.4 : Setting of the Sanderstead Local Centre (2)

3) RECOMMENDATIONS

In accordance with the NPPF, More Vulnerable development is considered compatible within Flood Zone 1 and does not require the application of the Exception Test. The following information and recommendations are therefore provided for consideration.

Development Layout and Sequential Approach	An assessment of surface water flow paths should be made prior to site design, to encourage the location of buildings and more vulnerable aspects of the development away from those areas at risk of surface water ponding. Measures to manage surface water on the site should be considered early in the site masterplan to enable inclusion of attenuation SuDS where possible.	Section 9.2
Flow Routing	Potential overland flow paths should be determined and appropriate solutions proposed to minimise the impact of the development, for example by configuring road and building layouts to preserve existing flow paths and improve flood routing, whilst ensuring that flows are not diverted towards other properties elsewhere.	Section 9.11
Surface Water Management	**Current risk of flooding** The site is located on the boundary between Drainage Catchment 46 to the west and Drainage Catchment 42 to the east, which is located to the south of the borough. The potential development must not increase flood risk to other areas in the Drainage Catchments. The uFMfSW indicates that the site is at low risk of surface water flooding. There are no historic records of surface water flooding held by Croydon Council in this location.	Section 4.3
	Indicative existing runoff rate: 40.3 l/s (1 in 1 year), 151.1 l/s (1 in 100 year) **Indicative Greenfield Runoff Rate:** 13.7 l/s	Level 2 Appendix B
	SuDS Suitability Reference to the SWMP Appendix C2 Figure 5 identifies that (prior to the completion of a site investigation to determine precise local conditions) for the majority of the site, infiltration of surface water into the ground is potentially suitable. For a small area in the northwest of the site, infiltration of surface water into the ground is potentially unsuitable. Site investigations will be required prior to the development of a Drainage Strategy for the site. **Groundwater Source Protection Zones (SPZs)** The site is within SPZ2 (outer protection zone). Where infiltration SuDS are to be used for surface runoff from roads, car parking and public or amenity areas, they should have a suitable series of treatment steps to prevent the pollution of groundwater. The design of infiltration SuDS schemes and their treatment stages needs to be appropriate to the sensitivity of the location and subject to a relevant risk assessment considering the types of pollutants likely to be discharged, design volumes and the dilution and attenuation properties of the aquifer. Techniques which should be considered include infiltration SUDS such as soakaways, green roofs, filter strips, detention basins and ponds, as well as permeable surfacing. Infiltration tests should be carried out on site to confirm SUDS suitability.	Section 10.3 and 10.9
	Drainage Strategy and Approvals Croydon Council will require a Drainage Strategy to be prepared outlining the surface water management for the site, runoff rates and consideration of SuDS in line with the London Plan policy 5.13 and Local Plan policies. Where it is not possible to achieve greenfield runoff rates in accordance with the preferred standards set out in the London Plan policy 5.13 and Design and Construction SPG (April 2014), then justification must be provided. Arrangements for the future maintenance of the drainage system must be made and detailed in the Drainage Strategy. There is no automatic right to connect to the existing Thames Water network. Any potential diversions and/or discharges into a sewer or main river must be agreed with Thames Water or Environment Agency, respectively.	Section 10.6
	Indicative Unit Costs Green roofs ~ £90/m^2. Filter strips £2-4m^2. Detention basin £15-50m^3. Permeable paving ~ £30-50/m^2. Concrete storage tank £449-518/m^3.	Section 10.4

SITE 3DM31.4 : Setting of the Sanderstead Local Centre (3)

1) PROPOSED DEVELOPMENT

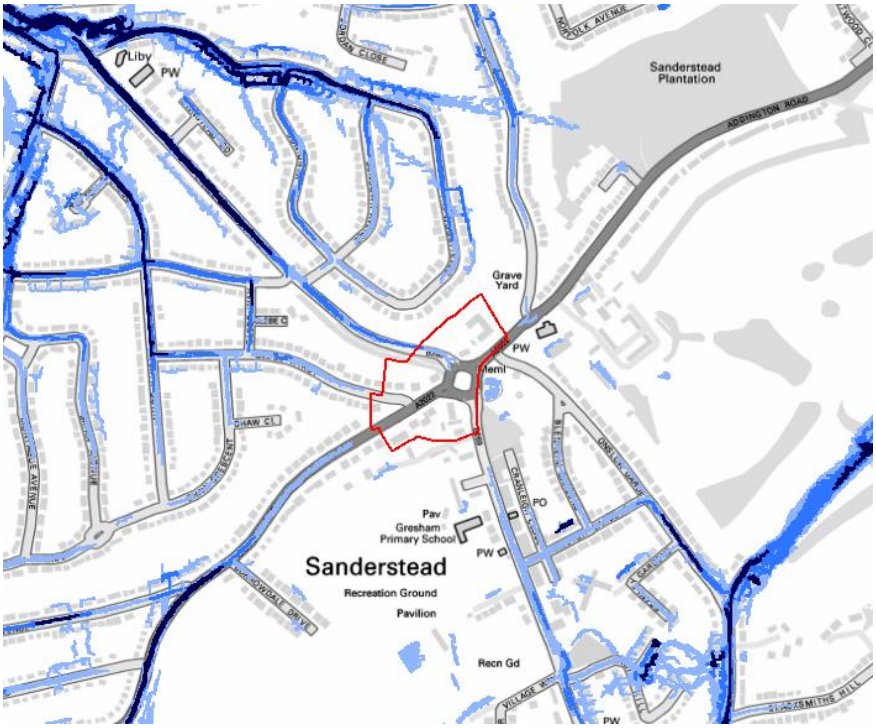
Site ID	3DM31.4
Site Address	Setting of the Sanderstead Local Centre (3)
Site Area	3.12 ha
Current Use	Residential and commercial use
Allocated Use	Area of focussed intensification
Vulnerability	More Vulnerable

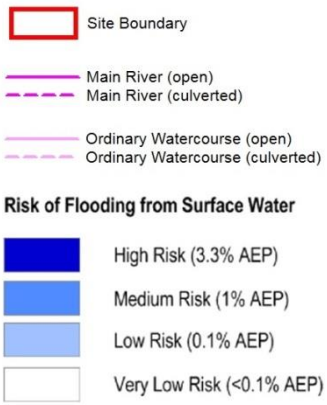
2) SUMMARY OF LEVEL 1 FLOOD RISK

Flood risk from rivers

The site is located approximately 1.7km north-east from the closest Ordinary Watercourse. The site is located in Flood Zone 1, low probability of flooding from rivers.

Flood risk from all other sources			**Limitations**
Risk of flooding to the potential development site and surrounding area	Surface Water flooding: (uFMfSW)	**Low Risk** 1 in 1000 year (0.1% annual probability)	The uFMfSW data does not show the susceptibility of individual properties to surface water flooding. The uFMfSW also does not take into account the details of the existing drainage system.
	Groundwater flooding: (BGS Susceptibility to Groundwater Flooding)	**Low Risk** Limited potential for groundwater flooding to occur.	The dataset cannot be used on its own to indicate risk of groundwater flooding and should not be used to inform planning decisions at a site scale. It is suitable for use in conjunction with a large number of other factors, e.g. records of previous incidence of groundwater flooding, to establish relative risk of groundwater flooding.





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Historic records of flooding

Historic records of flooding from each source within a 100m radius of potential development site	Fluvial records	Surface water records	Groundwater records	Sewer records	Multiple source records	Other
	0	**0**	**0**	**0**	**0**	**2 (TW Internal) 6 (TW External)**

SITE 3DM31.4 : Setting of the Sanderstead Local Centre (3)

3) RECOMMENDATIONS

In accordance with the NPPF, More Vulnerable development is considered compatible within Flood Zone 1 and does not require the application of the Exception Test. The following information and recommendations are therefore provided for consideration.

Development Layout and Sequential Approach	An assessment of surface water flow paths should be made prior to site design, to encourage the location of buildings and more vulnerable aspects of the development away from those areas at risk of surface water ponding. Measures to manage surface water on the site should be considered early in the site masterplan to enable inclusion of attenuation SuDS where possible.	Section 9.2
Flow Routing	Potential overland flow paths should be determined and appropriate solutions proposed to minimise the impact of the development, for example by configuring road and building layouts to preserve existing flow paths and improve flood routing, whilst ensuring that flows are not diverted towards other properties elsewhere.	Section 9.12
Surface Water Management	**Current risk of flooding** The site is within Drainage Catchment 46, which is located to the south of the borough. The potential development must not increase flood risk to other areas in the Drainage Catchment. The uFMfSW indicates that the site is at very low risk of surface water flooding. There are no historic records of surface water flooding held by Croydon Council in this location.	Section 4.3
	Indicative existing runoff rate: 18.3 l/s (1 in 1 year), 68.5 l/s (1 in 100 year) **Indicative Greenfield Runoff Rate:** 6.2 l/s	Level 2 Appendix B
	SuDS Suitability Reference to the SWMP Appendix C2 Figure 5 identifies that (prior to the completion of a site investigation to determine precise local conditions) infiltration of surface water into the ground is potentially suitable. Site investigations will be required prior to the development of a Drainage Strategy for the site. **Groundwater Source Protection Zones (SPZs)** The site is within SPZ2 (outer protection zone). Where infiltration SuDS are to be used for surface runoff from roads, car parking and public or amenity areas, they should have a suitable series of treatment steps to prevent the pollution of groundwater. The design of infiltration SuDS schemes and their treatment stages needs to be appropriate to the sensitivity of the location and subject to a relevant risk assessment considering the types of pollutants likely to be discharged, design volumes and the dilution and attenuation properties of the aquifer. Techniques which should be considered include infiltration SUDS such as soakaways, green roofs, filter strips, detention basins and ponds, as well as permeable surfacing. Infiltration tests should be carried out on site to confirm SUDS suitability.	Section 10.3 and 10.9
	Drainage Strategy and Approvals Croydon Council will require a Drainage Strategy to be prepared outlining the surface water management for the site, runoff rates and consideration of SuDS in line with the London Plan policy 5.13 and Local Plan policies. Where it is not possible to achieve greenfield runoff rates in accordance with the preferred standards set out in the London Plan policy 5.13 and Design and Construction SPG (April 2014), then justification must be provided. Arrangements for the future maintenance of the drainage system must be made and detailed in the Drainage Strategy. There is no automatic right to connect to the existing Thames Water network. Any potential diversions and/or discharges into a sewer or main river must be agreed with Thames Water or Environment Agency, respectively.	Section 10.6
	Indicative Unit Costs Green roofs ~ £90/m^2. Filter strips £2-4m^2. Detention basin £15-50m^3. Permeable paving ~ £30-50/m^2. Concrete storage tank £449-518/m^3.	Section 10.4

SITE 4DM31.4 : Around Forestdale Neighbourhood Centre

1) PROPOSED DEVELOPMENT

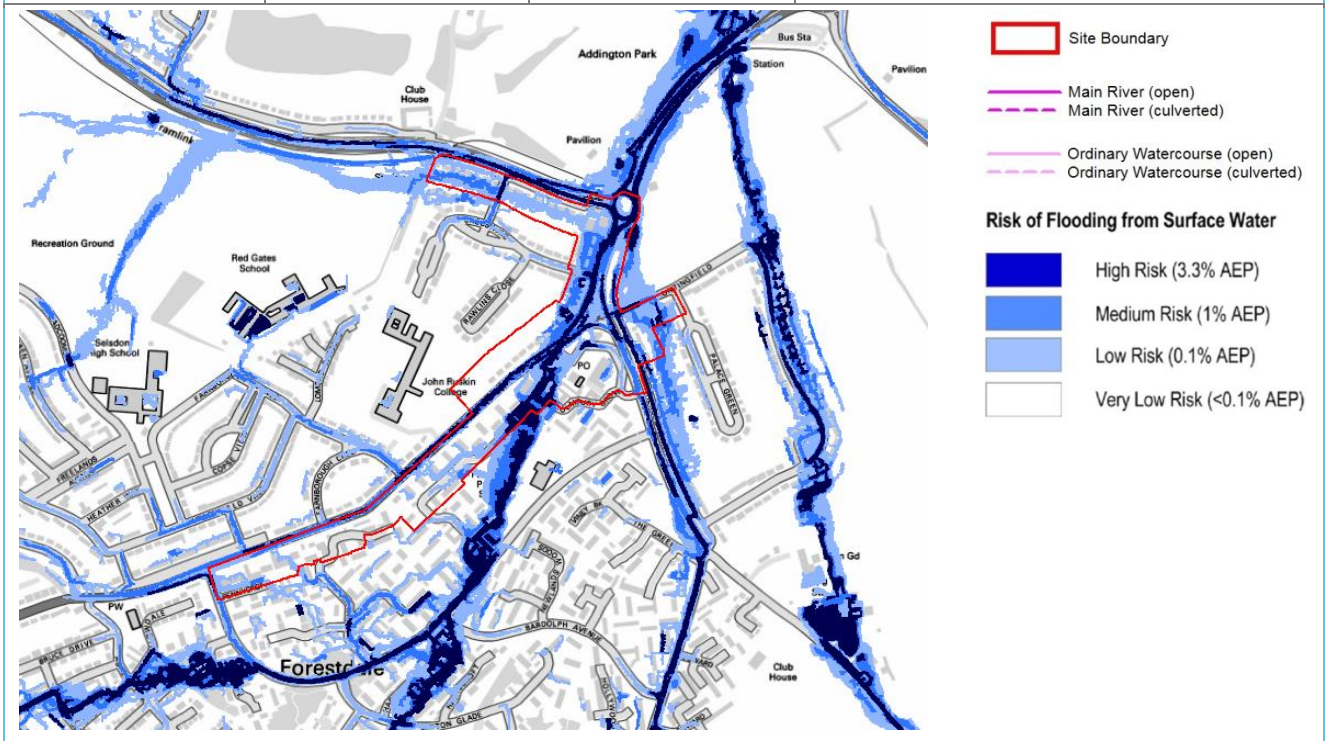
Site ID	4DM31.4
Site Address	Around Forestdale Neighbourhood Centre
Site Area	13.7 ha
Current Use	Residential and commercial use
Allocated Use	Area of focussed intensification
Vulnerability	More Vulnerable

2) SUMMARY OF LEVEL 1 FLOOD RISK

Flood risk from rivers

The site is located approximately 1.4km southwest of the closest Ordinary Watercourse. The site is located in Flood Zone 1, low probability of flooding from rivers.

Flood risk from all other sources			**Limitations**
Risk of flooding to the potential development site and surrounding area	Surface Water flooding: (uFMfSW)	**High Risk** 1 in 30 year (3.3% annual probability)	The uFMfSW data does not show the susceptibility of individual properties to surface water flooding. The uFMfSW also does not take into account the details of the existing drainage system.
	Groundwater flooding: (BGS Susceptibility to Groundwater Flooding)	**High Risk** Potential for groundwater flooding to occur at surface and historic records of groundwater flooding	The dataset cannot be used on its own to indicate risk of groundwater flooding and should not be used to inform planning decisions at a site scale. It is suitable for use in conjunction with a large number of other factors, e.g. records of previous incidence of groundwater flooding, to establish relative risk of groundwater flooding.



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Historic records of flooding

Historic records of flooding from each source within a 100m radius of potential development site	Fluvial records	Surface water records	Groundwater records	Sewer records	Multiple source records	Other
	0	**2**	**1**	**0**	**0**	**3 (TW Internal) 5 (TW External)**

SITE 4DM31.4 : Around Forestdale Neighbourhood Centre

3) RECOMMENDATIONS

In accordance with the NPPF, More Vulnerable development is considered compatible within Flood Zone 1 and does not require the application of the Exception Test. However, given the risk of surface water flooding to this site, the principles of the Exception Test should still be considered when developing on this site, namely:

1) *"it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk"* and
2) *"demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall"*.

The following information and recommendations are therefore provided for consideration.

Development Layout and Sequential Approach	An assessment of surface water flow paths should be made prior to site design, to encourage the location of buildings and more vulnerable aspects of the development away from those areas at risk of surface water ponding. Measures to manage surface water on the site should be considered early in the site masterplan to enable inclusion of attenuation SuDS where possible. There is one historic record of groundwater flooding held by Croydon Council within 100m of this site. Self-contained residential basements and bedrooms at basement level are not permitted in areas that have 'potential for groundwater to occur at the surface' (BGS Susceptibility to Groundwater Flooding). Due to a high risk of groundwater flooding, it is recommended that Low Vulnerable basements are also not permitted at this site.	Section 9.2
Finished Floor Levels	Although the site is within Flood Zone 1, it is good practice to set finished floor levels a minimum of 300mm above ground level in order to reduce the risk of flooding from surface water, which is at high risk in this area.	Section 9.2.1
Flood Resistance	Where there may be a future risk of surface water flooding on the site, flood resistant construction measures may be employed, such as raising property thresholds, and the use of landscaping to manage surface water and fluvial floodwater.	Section 9.3
Flood Resilience	Where parts of proposed buildings may be affected by surface water floodwaters, e.g. undercroft parking areas, flood resilient design techniques should be employed to minimise damage to buildings and structures. The use of concrete flooring and waterproof building materials could be considered.	Section 9.4
Flow Routing	Potential overland flow paths should be determined and appropriate solutions proposed to minimise the impact of the development, for example by configuring road and building layouts to preserve existing flow paths and improve flood routing, whilst ensuring that flows are not diverted towards other properties elsewhere.	Section 9.11
Surface Water Management	**Current risk of flooding** The site falls under Critical Drainage Area (CDA) Group8_045, which is located in the south of the borough. The potential development must not increase flood risk to other areas in the CDA. The site is within Drainage Catchment 42, which is located to the south of the borough. The uFMfSW indicates that there is a significant surface water high risk pathway flowing along the site. Areas in the southern part of the site are at low risk of surface water flooding. There are two historic records of surface water flooding held by Croydon Council in this location.	Section 4.3
	Indicative existing runoff rate: 77.9 l/s (1 in 1 year), 292.2 l/s (1 in 100 year) **Indicative Greenfield Runoff Rate:** 27.4 l/s	Level 2 Appendix B
	SuDS Suitability Reference to the SWMP Appendix C2 Figure 5 identifies that (prior to the completion of a site investigation to determine precise local conditions) infiltration of surface water into the ground is potentially suitable, however there is a historic record of groundwater flooding at this site which suggests there is a high water table present. Site investigations will be required prior to the development of a Drainage Strategy for the site. **Groundwater Source Protection Zones (SPZs)** The site is partially within SPZ2 (outer protection zone). Where infiltration SuDS are to be used for surface runoff from roads, car parking and public or amenity areas, they should have a suitable series of treatment steps to prevent the pollution of groundwater. The design of infiltration SuDS schemes and their treatment stages needs to be appropriate to the sensitivity of the location and subject to a relevant risk assessment considering the types of pollutants likely to be discharged, design volumes and the dilution and attenuation properties of the aquifer. Techniques which should be considered include infiltration SUDS such as soakaways, green roofs, filter strips, detention basins and ponds, as well as permeable surfacing. Infiltration tests should be carried out on site to confirm SUDS suitability.	Section 10.3 and 10.9

SITE 4DM31.4 : Around Forestdale Neighbourhood Centre		
	Drainage Strategy and Approvals Croydon Council will require a Drainage Strategy to be prepared outlining the surface water management for the site, runoff rates and consideration of SuDS in line with the London Plan policy 5.13 and Local Plan policies. Where it is not possible to achieve greenfield runoff rates in accordance with the preferred standards set out in the London Plan policy 5.13 and Design and Construction SPG (April 2014), then justification must be provided. Arrangements for the future maintenance of the drainage system must be made and detailed in the Drainage Strategy. There is no automatic right to connect to the existing Thames Water network. Any potential diversions and/or discharges into a sewer or main river must be agreed with Thames Water or Environment Agency, respectively.	Section 10.6
	Indicative Unit Costs Green roofs ~ £90/m^2. Filter strips £2-4m^2. Detention basin £15-50m^3. Permeable paving ~ £30-50/m^2. Concrete storage tank £449-518/m^3.	Section 10.4

SITE 5DM31.4 : Settings of Shirley Local Centre and Shirley Road Neighbourhood Centre

1) PROPOSED DEVELOPMENT

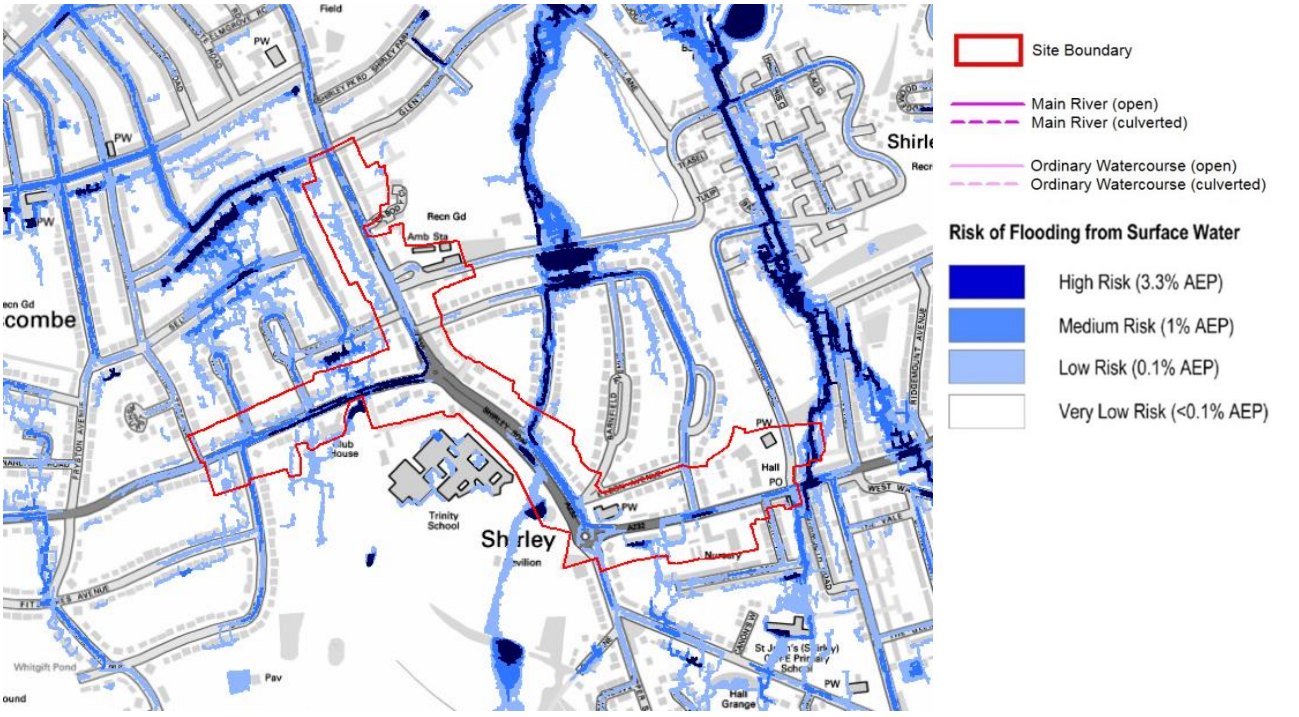
Site ID	5DM31.4
Site Address	Settings of Shirley Local Centre and Shirley Road Neighbourhood Centre
Site Area	20.17 ha
Current Use	Residential and commercial use
Allocated Use	Area of focussed intensification
Vulnerability	More Vulnerable

2) SUMMARY OF LEVEL 1 FLOOD RISK

Flood risk from rivers

The site is located approximately 1.1km southwest of the closest Ordinary Watercourse. The site is located in Flood Zone 1, low probability of flooding from rivers.

Flood risk from all other sources			**Limitations**
Risk of flooding to the potential development site and surrounding area	Surface Water flooding: (uFMfSW)	**High Risk** 1 in 30 year (3.3% annual probability)	The uFMfSW data does not show the susceptibility of individual properties to surface water flooding. The uFMfSW also does not take into account the details of the existing drainage system.
	Groundwater flooding: (BGS Susceptibility to Groundwater Flooding)	**High Risk** Limited potential for groundwater flooding to occur, however there is one historic record of groundwater flooding within 100m to the north of the site.	The dataset cannot be used on its own to indicate risk of groundwater flooding and should not be used to inform planning decisions at a site scale. It is suitable for use in conjunction with a large number of other factors, e.g. records of previous incidence of groundwater flooding, to establish relative risk of groundwater flooding.



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Historic records of flooding

Historic records of flooding from each source within a 100m radius of potential development site	Fluvial records	Surface water records	Groundwater records	Sewer records	Multiple source records	Other
	0	**1**	**1**	**1**	**0**	**3 (TW Internal) 5 (TW External)**

SITE 5DM31.4 : Settings of Shirley Local Centre and Shirley Road Neighbourhood Centre

3) RECOMMENDATIONS

In accordance with the NPPF, More Vulnerable development is considered compatible within Flood Zone 1 and does not require the application of the Exception Test. However, given the risk of surface water flooding to this site, the principles of the Exception Test should still be considered when developing on this site, namely:

1) *"it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk"* and
2) *"demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall"*.

The following information and recommendations are therefore provided for consideration.

Development Layout and Sequential Approach	An assessment of surface water flow paths should be made prior to site design, to encourage the location of buildings and more vulnerable aspects of the development away from those areas at risk of surface water ponding. Measures to manage surface water on the site should be considered early in the site masterplan to enable inclusion of attenuation SuDS where possible. There is one historic record of groundwater flooding held by Croydon Council within 100m of this site. Self-contained residential basements and bedrooms at basement level are not permitted in areas that have 'potential for groundwater to occur at the surface' (BGS Susceptibility to Groundwater Flooding). Due to a high risk of groundwater flooding, it is recommended that Low Vulnerable basements are also not permitted at this site.	Section 9.2
Finished Floor Levels	Although the site is within Flood Zone 1, it is good practice to set finished floor levels a minimum of 300mm above ground level in order to reduce the risk of flooding from surface water, which is at high risk in this area.	Section 9.2.1
Flood Resistance	Where there may be a future risk of surface water flooding on the site, flood resistant construction measures may be employed, such as raising property thresholds, and the use of landscaping to manage surface water and fluvial floodwater.	Section 9.3
Flood Resilience	Where parts of proposed buildings may be affected by surface water floodwaters, e.g. undercroft parking areas, flood resilient design techniques should be employed to minimise damage to buildings and structures. The use of concrete flooring and waterproof building materials could be considered.	Section 9.4
Flow Routing	Potential overland flow paths should be determined and appropriate solutions proposed to minimise the impact of the development, for example by configuring road and building layouts to preserve existing flow paths and improve flood routing, whilst ensuring that flows are not diverted towards other properties elsewhere.	Section 9.11
Surface Water Management	**Current risk of flooding** The site is within Drainage Catchment 40, which is located at the north-east part of the borough. The potential development must not increase flood risk to other areas in the Drainage Catchment. The uFMfSW indicates that there are three major surface water flow routes that cross this site, one to the west, one through the centre and one to the far east. These are areas of high risk from surface water flooding. In between these flow routes the surface water flood risk is low, and is mainly confined to the roads. There is one historic record of surface water flooding held by Croydon Council in this location.	Section 4.3
	Indicative existing runoff rate: 107.6 l/s (1 in 1 year), 403.8 l/s (1 in 100 year) **Indicative Greenfield Runoff Rate:** 40.3 l/s	Level 2 Appendix B
	SuDS Suitability Reference to the SWMP Appendix C2 Figure 5 identifies that (prior to the completion of a site investigation to determine precise local conditions) for the majority of the site, infiltration of surface water into the ground is potentially unsuitable. For the western part of the site and the area around the southern roundabout, infiltration of surface water into the ground is potentially suitable. Site investigations will be required prior to the development of a Drainage Strategy for the site. Techniques which should be considered include infiltration SUDS such as soakaways, green roofs, filter strips, detention basins and ponds, as well as permeable surfacing. Infiltration tests should be carried out on site to confirm SUDS suitability.	Section 10.3 and 10.9

SITE 5DM31.4 : Settings of Shirley Local Centre and Shirley Road Neighbourhood Centre		
	Drainage Strategy and Approvals Croydon Council will require a Drainage Strategy to be prepared outlining the surface water management for the site, runoff rates and consideration of SuDS in line with the London Plan policy 5.13 and Local Plan policies. Where it is not possible to achieve greenfield runoff rates in accordance with the preferred standards set out in the London Plan policy 5.13 and Design and Construction SPG (April 2014), then justification must be provided. Arrangements for the future maintenance of the drainage system must be made and detailed in the Drainage Strategy. There is no automatic right to connect to the existing Thames Water network. Any potential diversions and/or discharges into a sewer or main river must be agreed with Thames Water or Environment Agency, respectively.	Section 10.6
	Indicative Unit Costs Green roofs ~ £90/m^2. Filter strips £2-4m^2. Detention basin £15-50m^3. Permeable paving ~ £30-50/m^2. Concrete storage tank £449-518/m^3.	Section 10.4

SITE 6DM31.4: Brighton Road (Sanderstead Road) Local Centre with its setting

1) PROPOSED DEVELOPMENT

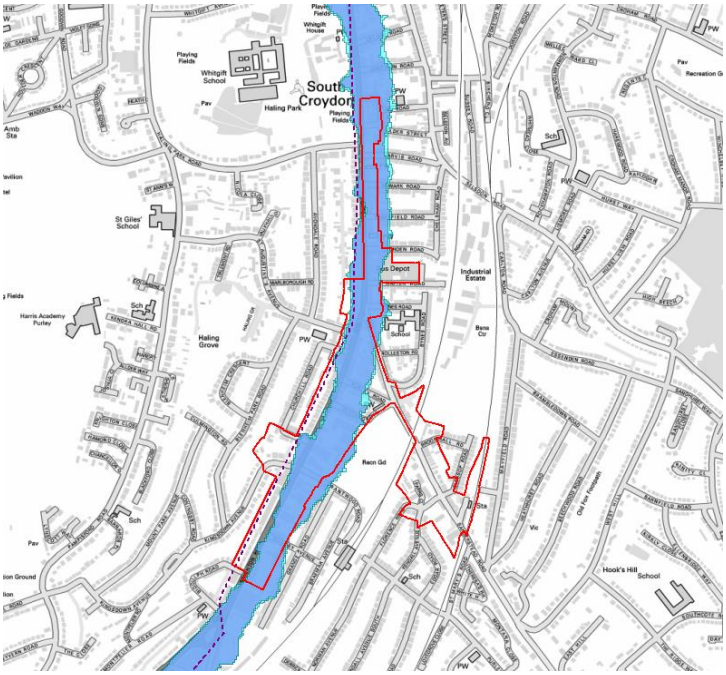
Site ID	6DM31.4
Site Address	Brighton Road (Sanderstead Road) Local Centre with its setting
Site Area	22.07 ha
Current Use	Residential and commercial use
Allocated Use	Area of focused intensification
Vulnerability	More Vulnerable

2) SUMMARY OF LEVEL 1 FLOOD RISK

Flood risk from rivers

The culverted River Wandle, which is incorporated in to the surface water sewer system (classified as an ordinary watercourse at this loction), flows through the western part of the site. Half of the site is located within Flood Zone 1 and the rest of the site lies within Flood Zone 3a.

Proportion of potential development site within Flood Zone	Flood Zone 3b	Flood Zone 3a	Flood Zone 2	Flood Zone 1	Area Benefiting of Defences
	0%	**47%**	**3%**	**50%**	**0%**



LEGEND

- Site Boundary
- Main River (open)
- Main River (culverted)
- Ordinary Watercourse (open)
- Ordinary Watercourse (culverted)

Flood Zones

- Flood Zone 1 Low Probability
- Flood Zone 2 Medium Probability
- Flood Zone 3a High Probability
- Flood Zone 3b Functional Floodplain

Flood risk from all other sources			**Limitations**
Risk of flooding to the potential development site and surrounding area	Surface Water flooding: (uFMfSW) *Figure 2.2 - Level 1 SFRA Appendix A*	**High Risk** 1 in 30 year (3.3% annual probability)	The uFMfSW data does not show the susceptibility of individual properties to surface water flooding. The uFMfSW also does not take into account the details of the existing drainage system.
	Groundwater flooding: (BGS Susceptibility to Groundwater Flooding)	**High Risk** Potential for groundwater flooding to occur at surface and historic records of groundwater flooding	The dataset cannot be used on its own to indicate risk of groundwater flooding and should not be used to inform planning decisions at a site scale. It is suitable for use in conjunction with a large number of other factors, e.g. records of previous incidence of groundwater flooding, to establish relative risk of groundwater flooding.

Historic records of flooding

Historic records of flooding from each source within a 100m radius of potential development site	Fluvial records	Surface water records	Groundwater records	Sewer records	Multiple source records	Other
	0	**4**	**1**	**0**	**0**	**0**

SITE 6DM31.4: Brighton Road (Sanderstead Road) Local Centre with its setting		
3) LEVEL 2 ASSESSMENT		
The Environment Agency hydraulic model of the River Wandle prepared in 2015, does not extend upstream to include the culverted section of the River Wandle beneath the Brighton Road. As a result, flood depth and hazard information are not available from the revised modelling for this area.		
4) RECOMMENDATIONS AND POLICIES		
Development Layout and Sequential Approach	Half of the site is within Flood Zone 1 and the other half lies within Flood Zone 3a. A minor part of the site lies within Flood Zone 2. The proposed development is classified as 'More vulnerable' and should be preferably located in Flood Zone 1. If it is essential to build on Flood Zones 2 or 3a, then all residential uses should be located in the first floor level or above. Measures to manage surface water on the site should be considered early in the site masterplan to enable inclusion of attenuation SuDS where possible. There is one historic record of groundwater flooding held by Croydon Council within 100m of this site. Self-contained residential basements and bedrooms at basement level are not permitted in areas that have 'potential for groundwater to occur at the surface' (BGS Susceptibility to Groundwater Flooding). Due to a high risk of groundwater flooding, it is recommended that Low Vulnerable basements are also not permitted at this site.	Section 9.2
Finished Floor Levels	For More Vulnerable development, a minimum freeboard of 300mm is required above the 1% AEP (1 in 100 year) including climate change peak fluvial flood level. The 1% AEP (1 in 100 year) including climate change peak flood water level should be derived for the immediate vicinity of the site as part of a site-specific FRA. Developers are required to undertake an assessment of the defended 1% AEP including allowances for climate change flood extend, in line with the Environment Agency's updated climate change allowances guidance (Section 1.4 of the Level 2 SFRA). It is recommended that developers consult with the Evironment Agency for pre-application advice for this site to confirm the approach to assessing the updated climate change allowances. In Flood Zones 2 and 3a, all new sleeping accommodation should be restricted to the first floor or above. Internal ground floors below this level could however be occupied by the Less Vulnerable garages, non-sleeping residential rooms (e.g. kitchen, study, lounge) or car parking. The site is at high risk of surface water flooding and it is considered that the finished floor level requirement for fluvial flood levels would also protect the property from a 3.3% AEP (1 in 30 year) surface water flood event.	Section 9.2.1
Flood Resistance	Where there may be a future risk of surface water flooding on the site, flood resistant construction measures may be employed, such as raising property thresholds, and the use of landscaping to manage surface water and fluvial floodwater.	Section 9.3
Flood Resilience	Where parts of proposed buildings may be affected by surface water floodwaters, e.g. undercroft parking areas, flood resilient design techniques should be employed to minimise damage to buildings and structures. The use of concrete flooring and waterproof building materials could be considered.	Section 9.4
Safe Access/ Egress	Access/Egress to the site is provided via Kingsdown Avenue, Haling Park Roadand St Augustine's Avenue to the west, seldom road to the east and Sanderstead Road to the southeast of the site. Within the site specific FRA, developers are required to provide a proposed safe route of escape away from the site and/or details of safe refuge. For this site, detailed hydraulic modelling will be required to determine the flood level, depth, velocity, hazard, rate of onset of flooding on the site.	Section 9.6 and Table 11-2
Floodplain Compensation Storage	Where proposed development results in an increase in building footprint, the developer must ensure that it does not impact upon the ability of the floodplain to store water and that it does not impact upon floodwater flow conveyance. 47% of the site area is located within Flood Zone 3 (1% AEP flood event). At this location there is currently no hydraulic modelling to illustrate the climate change scenario. New development must not result in a net loss of flood storage capacity in areas within the defended 1% AEP including allowances for climate change flood extend. Developers are required to undertake an assessment of the defended 1% AEP including allowances for climate change flood extent, in line with the Environment Agency's updated climate change allowances guidance (Section 1.4 of the Level 2 SFRA). It is recommended that developers consult with the Evironment Agency for pre-application advice for this site to confirm the approach to assessing the updated climate change allowances.	Section 9.8
Flow Routing	Potential overland flow paths should be determined and appropriate solutions proposed to minimise the impact of the development, for example by configuring road and building layouts to preserve existing flow paths and improve flood routing, whilst ensuring that flows are not diverted towards other properties elsewhere.	Section 9.11

SITE 6DM31.4: Brighton Road (Sanderstead Road) Local Centre with its setting		
Flood Warning and Evacuation Plan	A Flood Warning and Evacuation Plan (FWEP) must be prepared for the site, detailing how flood warning will be provided how the safety of occupants and access to/from the development will be ensured and what will be done to protect development and contents. Where possible, the FWEP should also detail the length of time before the site becomes inaccessible by emergency vehicles as well as outlining the potential duration of the flood. **Flood Warning Areas** The local area is not covered by the Environment Agency Flood Warning system. **Emergency Rest Centres** The closest designated emergency rest centre for this site is the 'United Reformed Church', located at Sanderstead Hill, approximately 1.5km to the south east of the development site.	Section 9.13
Surface Water Management	**Current risk of flooding** The majority of the site falls under Critical Drainage Area (CDA) Group8_041, which is located in the south of the borough. The most northern part of the site is locted in CDA Group8_042 and the south western area is outside the CDA boundaries. The potential development must not increase flood risk to other areas in the CDAs. The majority of the site is within Drainage Catchment 39, the south western section is within Drainage Catchment 45. The uFMfSW indicates that the site lies within an area of high risk of surface water flooding. There are four historic records of surface water flooding held by Croydon Council in this location.	Section 4.3
	Indicative existing runoff rate: 121.4 l/s (1 in 1 year), 455.7 l/s (1 in 100 year) **Indicative Greenfield Runoff Rate:** 44.1 l/s	Level 2 Appendix B
	SuDS Suitability Reference to the SWMP Appendix C2 Figure 5 identifies that (prior to the completion of a site investigation to determine precise local conditions) infiltration of surface water into the ground is potentially suitable for the site. Site investigations will be required prior to the development of a Drainage Strategy for the site. **Groundwater Source Protection Zones (SPZs)** The site is within a SPZ1 (inner protection zone) and SPZ2 (outer protection zone). Where infiltration SuDS are to be used for surface runoff from roads, car parking and public or amenity areas, they should have a suitable series of treatment steps to prevent the pollution of groundwater. Where infiltration SuDS are proposed for anything other than clean roof drainage in a SPZ1, the Environment Agency require a risk assessment to demonstrate that the SuDS scheme will not pose an unacceptable risk to the drinking water abstraction. The design of infiltration SuDS schemes and their treatment stages needs to be appropriate to the sensitivity of the location and subject to a relevant risk assessment considering the types of pollutants likely to be discharged, design volumes and the dilution and attenuation properties of the aquifer. Techniques which should be considered include green roofs, filter strips, detention basins and ponds, as well as permeable surfacing in combination with tanked systems	Section 10.3 and 10.9
	Drainage Strategy and Approvals Croydon Council will require a Drainage Strategy to be prepared outlining the surface water management for the site, runoff rates and consideration of SuDS in line with the London Plan policy 5.13 and Local Plan policies. Where it is not possible to achieve greenfield runoff rates in accordance with the preferred standards set out in the London Plan policy 5.13 and Design and Construction SPG (April 2014), then justification must be provided. Arrangements for the future maintenance of the drainage system must be made and detailed in the Drainage Strategy. There is no automatic right to connect to the existing Thames Water network. Any potential diversions and/or discharges into a sewer or main river must be agreed with Thames Water or Environment Agency, respectively.	Section 10.6
	Indicative Unit Costs Green roofs ~ £90/m^2. Permeable paving ~ £30-50/m^2. Filter strips £2-4m^2. Detention basin £15-50m^3. Concrete storage tank £449-518/m^3.	Section 10.4

SITE 6DM31.4: Brighton Road (Sanderstead Road) Local Centre with its setting

5) EXCEPTION TEST CONSIDERATIONS

The NPPF states that there are two parts to the Exception Test that must be passed for development to be allocated or permitted:

1) *"it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk"* and
2) *"demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall"*.

For this proposed development, the More Vulnerable uses should be located in Flood Zone 1 or areas of lowest hazard.

If More Vulnerable development cannot be avoided within the 1% AEP (1 in 100 year) including an allowance for climate change, then finished floor levels must be raised accordingly and sleeping accommodation restricted the first floor or above. Employment uses can be located on the ground floor. Depending on the modelled flood depth, flood resistant and resilient measures should be employed to mitigate the potential impacts of flooding. SuDS should be incorporated into the building design in order to reduce the risk of increasing flood risk elsewhere. There is potential that floodwaters will limit dry routes out of the local area, therefore it is necessary to prepare a FWEP for residents / occupants of the site detailing steps to evacuate the site prior to the onset of flooding. This site is at high risk of surface water and groundwater flooding. It is recommended that basements are not considered at this site.

Therefore, on the basis that these mitigation measures are in place, it is likely that this site would pass the Exception Test.

SITE 7DM31.4: Area around Kenley station

1) PROPOSED DEVELOPMENT

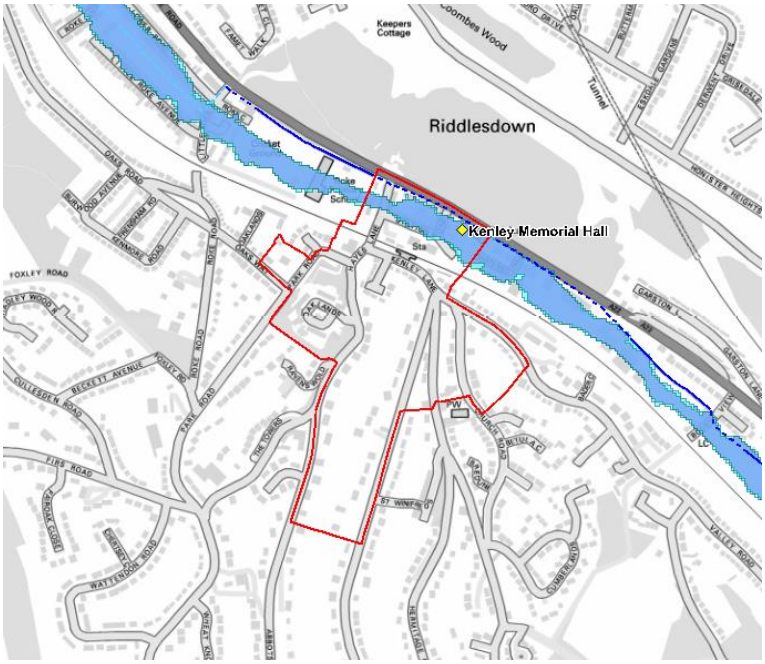
Site ID	7DM31.4
Site Address	Area around Kenley station
Site Area	31.24ha
Current Use	Residential and commercial use
Allocated Use	Area of focussed intensification
Vulnerability	More Vulnerable

2) SUMMARY OF LEVEL 1 FLOOD RISK

Flood risk from rivers

Caterham Bourne, a groundwater-fed river, is located along the northern boundary of the site. The river is culverted along the site boundary, however there is an open reach directly downstream (to the north west) of the site. Kenley Water Treatment Works is located in the vicinity of the site. The northern area of the site (to the north of the railway) is within Flood Zone 3a.

Proportion of potential development site within Flood Zone	Flood Zone 3b	Flood Zone 3a	Flood Zone 2	Flood Zone 1	Area Benefiting of Defences
	0%	**6%**	**1%**	**93%**	**0%**



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Flood risk from all other sources			**Limitations**
Risk of flooding to the potential development site and surrounding area	Surface Water flooding: (uFMfSW) *Figure 2.2 - Level 1 SFRA Appendix A*	**High Risk** 1 in 30 year (3.3% annual probability)	The uFMfSW data does not show the susceptibility of individual properties to surface water flooding. The uFMfSW also does not take into account the details of the existing drainage system.
	Groundwater flooding: (BGS Susceptibility to Groundwater Flooding)	**Medium Risk** Potential for groundwater flooding to occur at surface, but no historic records of groundwater flooding	The dataset cannot be used on its own to indicate risk of groundwater flooding and should not be used to inform planning decisions at a site scale. It is suitable for use in conjunction with a large number of other factors, e.g. records of previous incidence of groundwater flooding, to establish relative risk of groundwater flooding.

Historic records of flooding

Historic records of flooding from each source within a 100m radius of potential development site	Fluvial records	Surface water records	Groundwater records	Sewer records	Multiple source records	Other
	0	**9**	**0**	**2**	**0**	**1 (TW Internal) 12 (TW External)**

SITE 7DM31.4: Area around Kenley station

3) LEVEL 2 ASSESSMENT

The Environment Agency hydraulic model outputs of the River Wandle prepared in 2015, does not extend upstream to include the culverted section of the River Wandle beneath Brighton Road or the Caterham Bourne. As a result, flood depth and hazard information are not available from the revised modelling for this area.

4) RECOMMENDATIONS AND POLICIES

Development Layout and Sequential Approach	The majority of the site is within Flood Zone 1 and a small section to the north of the site is in Flood Zone 3a. The proposed development is classified as 'More vulnerable'. This More Vulnerable development should be preferably located in Flood Zone 1. If it is essential to build on Flood Zone 2 or 3a, then all residential uses should be located in the first floor level or above. Development should be set back at least 8m from the Caterham Bourne culvert to the north of the site. Environment Agency consent is required for works within the 8m buffer zone and developers should explore opportunities for river restoration as part of any development. Measures to manage surface water on the site should be considered early in the site masterplan to enable inclusion of attenuation SuDS where possible. Less Vulnerable basements, basement extensions and conversions, such as car parking, must provide safe internal access to higher floors situated above ground level. Further ground investigations would be required at this site to confirm the the likelihood of groundwater occurrence. Self-contained residential basements and bedrooms at basement level are not permitted in areas that have 'potential for groundwater to occur at the surface' (BGS Susceptibility to Groundwater Flooding).	Section 9.2
Finished Floor Levels	For More Vulnerable development, a minimum freeboard of 300mm is required above the 1% AEP (1 in 100 year) including climate change peak fluvial flood level. The 1% AEP (1 in 100 year) including climate change peak flood water level should be derived for the immediate vicinity of the site as part of a site-specific FRA. Developers are required to undertake an assessment of the defended 1% AEP including allowances for climate change flood extend, in line with the Environment Agency's updated climate change allowances guidance (Section 1.4 of the Level 2 SFRA). It is recommended that developers consult with the Evironment Agency for pre-application advice for this site to confirm the approach to assessing the updated climate change allowances. In Flood Zones 2 and 3a, all new sleeping accommodation should be restricted to the first floor or above. Internal ground floors below this level could however be occupied by the Less Vulnerable garages, non-sleeping residential rooms (e.g. kitchen, study, lounge) or car parking. The site is at high risk of surface water flooding and it is considered that the finished floor level requirement for fluvial flood levels would also protect the property from a 3.3% AEP (1 in 30 year) surface water flood event.	Section 9.2.1
Flood Resistance	Where there may be a future risk of surface water flooding on the site, flood resistant construction measures may be employed, such as raising property thresholds, and the use of landscaping to manage surface water and fluvial floodwater.	Section 9.3
Flood Resilience	Where parts of proposed buildings may be affected by surface water floodwaters, e.g. undercroft parking areas, flood resilient design techniques should be employed to minimise damage to buildings and structures. The use of concrete flooring and waterproof building materials could be considered.	Section 9.4
Safe Access/ Egress	Access/Egress to the site is provided via Kenley Lane to the south of the site or Godstone Road (A22) to the north of the site.	Section 9.6
Floodplain Compensation Storage	Where proposed development results in an increase in building footprint, the developer must ensure that it does not impact upon the ability of the floodplain to store water and that it does not impact upon floodwater flow conveyance. The area of the site to the north of the railway is located within the outline of the 1% AEP (1 in 100 year) flood event. Within this area, new development must not result in a net loss of flood storage capacity. Developers are required to undertake an assessment of the defended 1% AEP including allowances for climate change flood extend, in line with the Environment Agency's updated climate change allowances guidance (Section 1.4 of the Level 2 SFRA). It is recommended that developers consult with the Evironment Agency for pre-application advice for this site to confirm the approach to assessing the updated climate change allowances.	Section 9.8

SITE 7DM31.4: Area around Kenley station		
Flow Routing	Potential overland flow paths should be determined and appropriate solutions proposed to minimise the impact of the development, for example by configuring road and building layouts to preserve existing flow paths and improve flood routing, whilst ensuring that flows are not diverted towards other properties elsewhere.	Section 9.11
Flood Warning and Evacuation Plan	A Flood Warning and Evacuation Plan (FWEP) must be prepared for the site, detailing how flood warning will be provided how the safety of occupants and access to/from the development will be ensured and what will be done to protect development and contents. Where possible, the FWEP should also detail the length of time before the site becomes inaccessible by emergency vehicles as well as outlining the potential duration of the flood. **Flood Warning Areas** The local area is not covered by the Environment Agency Flood Warning Areas. **Emergency Rest Centres** The closest designated emergency rest centre for this site is the 'Kenley Memorial Hall, located at the east of the development site, within its boundaries.	Section 9.13
Surface Water Management	**Current risk of flooding** The site falls under Critical Drainage Area (CDA) Group8_037, which is located in the south of the borough. The potential development must not increase flood risk to other areas in the CDAs. The site is within Drainage Catchment 56, which is located at the south part of the borough. The uFMfSW indicates that the site lies within areas of high risk of surface water flooding. There are nine historic records of surface water flooding held by Croydon Council in this location.	Section 4.3
	Indicative existing runoff rate: 102.6 l/s (1 in 1 year), 385.2 l/s (1 in 100 year) **Indicative Greenfield Runoff Rate:** 33.8 l/s	Level 2 Appendix B
	SuDS Suitability Reference to the SWMP Appendix C2 Figure 5 identifies that (prior to the completion of a site investigation to determine precise local conditions) for the majority of the site, infiltration of surface water into the ground is potentially suitable. For the northern part of the site along the railway, infiltration of surface water into the ground is potentially uncertain and requires further investigation prior to the development of a Drainage Strategy for the site. **Groundwater Source Protection Zones (SPZs)** The site is within a SPZ1 (inner protection zone). Where infiltration SuDS are to be used for surface runoff from roads, car parking and public or amenity areas, they should have a suitable series of treatment steps to prevent the pollution of groundwater. Where infiltration SuDS are proposed for anything other than clean roof drainage in a SPZ1, the Environment Agency require a risk assessment to demonstrate that the SuDS scheme will not pose an unacceptable risk to the drinking water abstraction. The design of infiltration SuDS schemes and their treatment stages needs to be appropriate to the sensitivity of the location and subject to a relevant risk assessment considering the types of pollutants likely to be discharged, design volumes and the dilution and attenuation properties of the aquifer. Techniques which should be considered include green roofs, filter strips, detention basins and ponds, as well as permeable surfacing in combination with tanked systems	Section 10.3 and 10.9
	Drainage Strategy and Approvals Croydon Council will require a Drainage Strategy to be prepared outlining the surface water management for the site, runoff rates and consideration of SuDS in line with the London Plan policy 5.13 and Local Plan policies. Where it is not possible to achieve greenfield runoff rates in accordance with the preferred standards set out in the London Plan policy 5.13 and Design and Construction SPG (April 2014), then justification must be provided. Arrangements for the future maintenance of the drainage system must be made and detailed in the Drainage Strategy. There is no automatic right to connect to the existing Thames Water network. Any potential diversions and/or discharges into a sewer or main river must be agreed with Thames Water or Environment Agency, respectively.	Section 10.6
	Indicative Unit Costs Green roofs ~ £90/m^2. Permeable paving ~ £30-50/m^2. Filter strips £2-4m^2. Detention basin £15-50m^3. Concrete storage tank £449-518/m3.	Section 10.4

SITE 7DM31.4: Area around Kenley station

5) EXCEPTION TEST CONSIDERATIONS

The NPPF states that there are two parts to the Exception Test that must be passed for development to be allocated or permitted:

1) *"it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk"* and
2) *"demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall"*.

The proposed development is for focussed intensification, which has been assessed as More Vulnerable. More Vulnerable uses should be located in Flood Zone 1 or areas of low hazard, which includes the majority of the site, especially south of the railway.

If More Vulnerable development cannot be avoided within the 1% AEP (1 in 100 year) including an allowance for climate change, then finished floor levels must be raised accordingly and sleeping accommodation restricted the first floor or above. Employment uses can be located on the ground floor. It is recommended that basements are not considered at this site. To ensure occupants/residents evacuate the site safely in the event of a flood it is necessary to prepare a FWEP for residents / occupants of the site detailing steps to evacuate the site prior to the onset of flooding. The potential impacts of flooding should be mitigated through careful site layout and resilient construction techniques. SuDS should be incorporated into the building design in order to reduce the risk of increasing flood risk elsewhere.

Therefore, on the basis that these mitigation measures are in place, it is likely that this site would pass the Exception Test.

SITE 8DM31.4 : Settings of Shirley Local Centre and Shirley Road Neighbourhood Centre

1) PROPOSED DEVELOPMENT

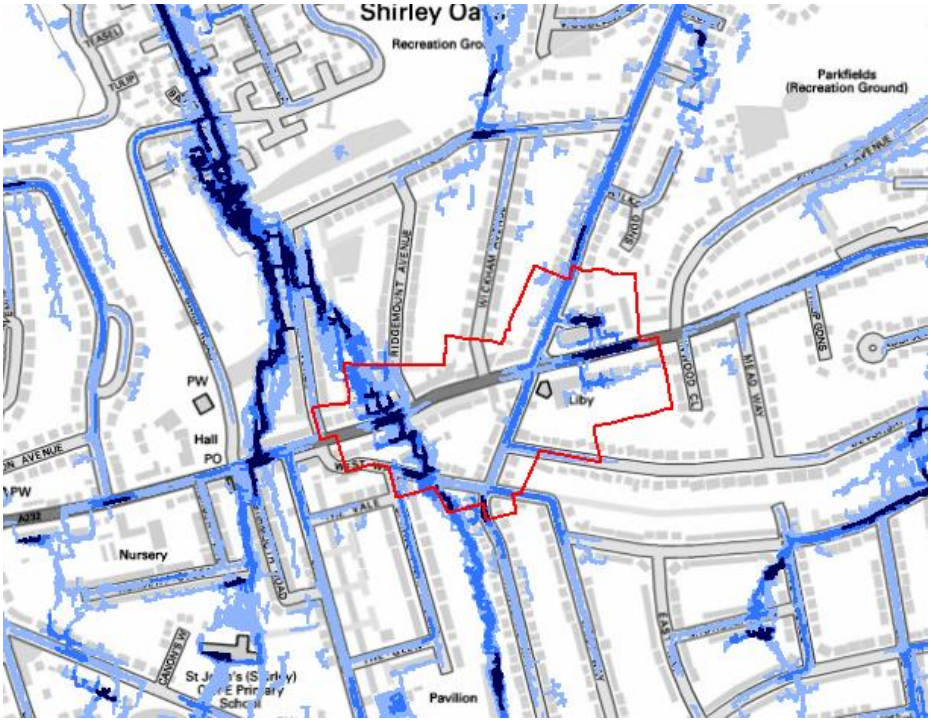
Site ID	8DM31.4
Site Address	Settings of Shirley Local Centre and Shirley Road Neighbourhood Centre
Site Area	8.6 ha
Current Use	Residential and commercial use
Allocated Use	Area of focussed intensification
Vulnerability	More Vulnerable

2) SUMMARY OF LEVEL 1 FLOOD RISK

Flood risk from rivers

The site is located approximately 700m southwest of an ordinary watercourse. The site is located within Flood Zone 1, low probability of flooding from rivers.

Flood risk from all other sources			**Limitations**
Risk of flooding to the potential development site and surrounding area	Surface Water flooding: (uFMfSW)	**High Risk** 1 in 30 year (3.3% annual probability)	The uFMfSW data does not show the susceptibility of individual properties to surface water flooding. The uFMfSW also does not take into account the details of the existing drainage system.
	Groundwater flooding: (BGS Susceptibility to Groundwater Flooding)	**Medium Risk** Potential for groundwater flooding to occur below surface and no historic records of groundwater flooding within 100m, however 3 records within 250m	The dataset cannot be used on its own to indicate risk of groundwater flooding and should not be used to inform planning decisions at a site scale. It is suitable for use in conjunction with a large number of other factors, e.g. records of previous incidence of groundwater flooding, to establish relative risk of groundwater flooding.



Historic records of flooding

Historic records of flooding from each source within a 100m radius of potential development site	Fluvial records	Surface water records	Groundwater records	Sewer records	Multiple source records	Other
	0	**0**	**0** *(3 records within 250m)*	**0**	**0**	**1 (TW External)**

SITE 8DM31.4 : Settings of Shirley Local Centre and Shirley Road Neighbourhood Centre

3) RECOMMENDATIONS

In accordance with the NPPF, More Vulnerable development is considered compatible within Flood Zone 1 and does not require the application of the Exception Test. However, given the risk of surface water flooding to this site, the principles of the Exception Test should still be considered when developing on this site, namely:

1) *"it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk"* and
2) *"demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall"*.

The following information and recommendations are therefore provided for consideration.

Development Layout and Sequential Approach	An assessment of surface water flow paths should be made prior to site design, to encourage the location of buildings and more vulnerable aspects of the development away from those areas at risk of surface water ponding. Measures to manage surface water on the site should be considered early in the site masterplan to enable inclusion of attenuation SuDS where possible. There are no historic records of groundwater flooding within 100m of this site, however there are three records within 250m of the site, one to the north and two to the east. Self-contained residential basements and bedrooms at basement level are not permitted in areas that have 'potential for groundwater to occur below surface' (BGS Susceptibility to Groundwater Flooding). Less Vulnerable basements, basement extensions and conversions, such as car parking, must provide safe internal access to higher floors situated above ground level. Further ground investigations would be required at this site to confirm the the likelihood of groundwater occurrence.	Section 9.2
Finished Floor Levels	Although the site is within Flood Zone 1, it is good practice to set finished floor levels a minimum of 300mm above ground level in areas at high risk of surface water flooding, to the southwest and northeast of the site, in order to reduce the risk of flooding.	Section 9.2.1
Flood Resistance	Where there may be a future risk of surface water flooding on the site, flood resistant construction measures may be employed, such as raising property thresholds, and the use of landscaping to manage surface water and fluvial floodwater.	Section 9.3
Flood Resilience	Where parts of proposed buildings may be affected by surface water floodwaters, e.g. undercroft parking areas, flood resilient design techniques should be employed to minimise damage to buildings and structures. The use of concrete flooring and waterproof building materials could be considered.	Section 9.4
Flow Routing	Potential overland flow paths should be determined and appropriate solutions proposed to minimise the impact of the development, for example by configuring road and building layouts to preserve existing flow paths and improve flood routing, whilst ensuring that flows are not diverted towards other properties elsewhere.	Section 9.11
Surface Water Management	**Current risk of flooding** The site is within Drainage Catchment 40, which is located at the north-east part of the borough. The potential development must not increase flood risk to other areas in the Drainage Catchment. The uFMfSW indicates that there is two areas of high risk from surface water risk in the site, located at the southwest and northeast of the site. There are no historic records of surface water flooding held by Croydon Council in this location.	Section 4.3
	Indicative existing runoff rate: 46.0 l/s (1 in 1 year), 172.8 l/s (1 in 100 year) **Indicative Greenfield Runoff Rate:** 17.2 l/s	Level 2 Appendix B
	SuDS Suitability Reference to the SWMP Appendix C2 Figure 5 identifies that (prior to the completion of a site investigation to determine precise local conditions) infiltration of surface water into the ground is potentially suitable. Site investigations will be required prior to the development of a Drainage Strategy for the site. Techniques which should be considered include infiltration SUDS such as soakaways, green roofs, filter strips, detention basins and ponds, as well as permeable surfacing. Infiltration tests should be carried out on site to confirm SUDS suitability.	Section 10.3 and 10.9

SITE 8DM31.4 : Settings of Shirley Local Centre and Shirley Road Neighbourhood Centre		
	Drainage Strategy and Approvals Croydon Council will require a Drainage Strategy to be prepared outlining the surface water management for the site, runoff rates and consideration of SuDS in line with the London Plan policy 5.13 and Local Plan policies. Where it is not possible to achieve greenfield runoff rates in accordance with the preferred standards set out in the London Plan policy 5.13 and Design and Construction SPG (April 2014), then justification must be provided. Arrangements for the future maintenance of the drainage system must be made and detailed in the Drainage Strategy. There is no automatic right to connect to the existing Thames Water network. Any potential diversions and/or discharges into a sewer or main river must be agreed with Thames Water or Environment Agency, respectively.	Section 10.6
	Indicative Unit Costs Green roofs ~ £90/m^2. Filter strips £2-4m^2. Detention basin £15-50m^3. Permeable paving ~ £30-50/m^2. Concrete storage tank £449-518/m^3.	Section 10.4