



Surrey County Council

Level 2 Strategic Flood Risk Assessment

On behalf of: **Surrey County Council**



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Office Address: Waterloo House, Victoria Square, Birmingham B2 5TB
T: +44 (0)121 633 2900 E: birmingham@peterbrett.com



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	Name	Position	Signature	Date
Prepared by:	Natalie Yates	Assistant Engineer	N. Yates	31.05.18
Reviewed by:	Amy Hensler	Director	A. Hensler	31.05.18
Approved by:	David Atherton	Partner	<i>David Atherton</i>	31.05.18
For and on behalf of Peter Brett Associates LLP				

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1 Level 2 Strategic Flood Risk Assessment

1.1 Scope of Report

- 1.1.1 Peter Brett Associates LLP (PBA) has been commissioned by Surrey County Council (SCC) to undertake a desktop 'Level 2 Strategic Flood Risk Assessment' ('L2 SFRA'), to consider the flood risk to nine sites throughout the County and to subsequently assess the suitability of a number of waste technologies at each site from a flood risk perspective, in order to inform the Waste Local Plan.
- 1.1.2 The administrative area of SCC is impacted by fluvial flooding due to the presence of a number of main rivers within the area, including the River Wey, River Mole, Chertsey Bourne, River Thames and Addlestone Bourne. An assessment of flood risk is to be completed for each shortlisted site to determine its suitability for the range of waste facility types under consideration from a flood risk perspective.
- 1.1.3 The L2 SFRA is intended to: provide an overview of flood risk information at the shortlisted sites; inform whether waste management development would be suitable from a flood risk perspective; and to set out mitigation requirements for each site, as appropriate.
- 1.1.4 The results will assist SCC in understanding the flood risk posed to proposed waste facility sites and will inform SCC's assessment of site suitability for inclusion in the SCC new Waste Local Plan.
- 1.1.5 This assessment incorporates information from the SFRA's from the relevant Borough/District Councils, and is in accordance with local and national policy, as detailed in **Section 2.2**.
- 1.1.6 This L2 SFRA provides a detailed assessment of flood risk at the nine shortlisted sites. Different sources of flooding are considered, and information on historic flooding provided where applicable and where the date is readily available, see **Appendix B** and summary table in **Appendix C**.
- 1.1.7 The L2 SFRA has been prepared in accordance with the NPPF and associated Planning Policy Guidance (PPG) on Flood Risk and Coastal Change, and in accordance with the latest EA guidance on climate change (February 2016).
- 1.1.8 The National Planning Policy Framework (NPPF) and associated Planning Policy Guidance (PPG) provide the following detailed definitions of Flood Zones:
- **Flood Zone 1 'Low Probability'** – less than 1 in 1000 (0.1%) annual probability of river flooding;
 - **Flood Zone 2 'Medium Probability'** – between 1 in 100 (1%) and 1 in 1000 (0.1%) annual probability of river flooding, or between 1 in 200 (0.5%) and 1 in 1000 (0.1%) annual probability of sea flooding; and
 - **Flood Zone 3 'High Probability'** – greater than 1 in 100 (1%) annual probability of river flooding, or 1 in 200 (0.5%) of sea flooding.

1.2 L2 SFRA Requirements

- 1.2.1 In considering flood risk to the sites, it is necessary to fully consider the potential impacts of climate change for the lifetime of the development. Details of the latest EA climate change guidance on the application of climate change allowances in flood risk assessments is provided via the following link:

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>.

- 1.2.2 This guidance provides contingency allowances for potential increases in peak river flow in Table 1, and for potential increases in rainfall intensity in Table 2. **Table 1-1** below outlines the allowances relevant for the Thames River Basin District, in which all the shortlisted sites are located.

Table 1-1: Climate Change - Peak River Flow Allowances

River Basin District	Allowance Category	Total Potential Change Anticipated for '2020s'	Total Potential Change Anticipated for '2050s'	Total Potential Change Anticipated for '2080s'
Thames	Upper End	25%	35%	70%
	Higher Central	15%	25%	35%
	Central	10%	15%	25%

- 1.2.3 These allowances should be applied to reflect the proposed design life of buildings, and the 2050s horizon is the anticipated lifespan of waste facilities unless there is specific justification for a shorter/longer lifespan.
- 1.2.4 The EA guidance lists which allowance, i.e. Upper End, Higher Central or Central, should be considered, based on the vulnerability of the proposed development and the Flood Zone in which the site is located within.
- 1.2.5 The specific range of allowances to be considered for waste facility development under consideration within this L2 SFRA – i.e. 'Less Vulnerable' waste treatment (Paragraph 066, PPG) – is detailed in the **Table 1-2** below:

Table 1-2: Applicable Peak River Flow Climate Change Allowance Ranges

Flood Zone	'Less Vulnerable' Development with lifespan into the 2050s horizon
1	15% (Central)
2	15% (Central)
3a	15%-25% (Central and Higher Central)
3b	<i>Development should not be permitted</i>

- 1.2.6 Where a range of climate change allowances are applicable, the generally accepted approach is to use the lower end of the specified range of climate change allowances as a baseline for mitigation requirements.
- 1.2.7 The higher end is considered as a sensitivity test to consider residual risk and inform additional freeboard requirements – i.e. if floor levels should ideally be above this level, otherwise flood resistant/resilient measures should be incorporated to protect development under such conditions.

- 1.2.8 It should be noted that some of the proposed waste facility types generate electricity from waste, specifically pyrolysis and gasification and other thermal treatment, including mass burn incineration. Given the anticipated small scale of these plants and power produced, it is considered that the electricity-generating waste type facilities proposed would be classified as 'Less Vulnerable', i.e. 'Waste treatment (except landfill* and hazardous waste facilities)', as set out in Table 2: Flood risk vulnerability classification within the PPG. They would not be classed as 'essential infrastructure', which is defined in the PPG as, "Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood", which would apply to a regional or nationally important energy generation site. Given the likely scale of the plants, alternative sources of electricity generation could be utilised during the very unlikely event of flooding and the overall supply of electricity within the area would not be affected. Further, SCC consider the shortlisted sites are likely to be subject to a planning application rather than a Development Consent Order (DCO), reinforcing that these sites would not be considered critical or essential infrastructure. In conclusion, all the proposed waste facility types outlined in **Section 3** would fall within the 'Less Vulnerable' classification as set out in Table 2 of the PPG.
- 1.2.9 Mitigation measures for each site and specific waste facility types are outlined in **Section 4** and **Appendix B**, to include: raising finished floor levels of plant/buildings in a fixed location; providing floodplain compensation where necessary; providing safe access/egress arrangements; and providing a Surface Water Drainage Strategy utilising Sustainable Drainage Systems (SuDS) to ensure flood risk is not increased as a result of the proposed waste facilities.
- 1.2.10 The L2 SFRA should provide sufficient information to inform the application of the Exception Test, where appropriate through considering (where data is available):
- Flood probability;
 - Flood depth;
 - Flood velocity;
 - Rate of onset of flooding; and
 - Duration of flooding.
- 1.2.11 The Exception Test is detailed within paragraph 102 of the NPPF, and is a method used to demonstrate that flood risk to people and property will be managed satisfactorily, while allowing necessary development to be permitted in situations where suitable sites at lower risk of flooding are not available. The NPPF states:
- "...For the Exception Test to be passed:*
- it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a Strategic Flood Risk Assessment where one has been prepared; and*
- a site-specific flood risk assessment must 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."*
- 1.2.12 The government's detailed waste planning policies are set out in the document National Planning Policy for Waste (October 2014). Appendix B states:

“In testing the suitability of site and areas in the preparation of Local Plans and in determining planning applications, waste planning authorities should consider the factors below. They should also bear in mind the envisaged waste management facility in terms of type and scale.

a. protection of water quality and resources and flood risk management.

Considerations will include the proximity of vulnerable surface and groundwater aquifers. For landfill or land-raising, geological conditions and the behaviour of surface water and groundwater should be assessed both for the site under consideration and the surrounding area. The suitability of locations subject to flooding, with consequent issues relating to the management of potential risk posed to water quality from waste contamination, will also need particular care.”

1.3 Surrey County Council Draft Waste Local Plan

1.3.1 The SCC Draft Waste Local Plan (December 2017) states the following with regards to flood risk:

“Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk by applying the sequential test and if necessary the exception test.

Waste treatment (except landfill and hazardous waste facilities) are characterised as less vulnerable development and are generally appropriate in Flood Zone 1 and 2. Landfill and hazardous waste facilities are highly vulnerable and are generally appropriate in Flood Zone 1.

Development of any schemes within areas identified as at risk from flooding from surface water or groundwater should be assisted by early discussions with the Lead Local Flood Authority.”

1.3.2 Policy 14 – Development Management states:

“Planning permission for waste development will be granted where it can be demonstrated that there will not be unacceptable impact on communities and the environment including:

ii) Flood risk, including opportunities to enhance flood storage, surface water quality and surface water drainage; and

iii) Those on ground resources including ground water [sic] quality, the protection of Source Protection Zones and Areas of Groundwater Vulnerability; and

iv) Those related to contamination land or groundwater.”

1.3.3 PBA has considered the policy within the Draft Waste Local Plan to be acceptable and no amendments to the text are suggested.

2 Baseline Flood Risk Information

2.1 Sites under Consideration

2.1.1 This L2 SFRA has been prepared to determine the risk of flooding from a number of sources (fluvial, surface water, groundwater, sewer and artificial sources) at specified proposed waste development sites, as advised by SCC.

2.1.2 The site details correspond to those identified within the 'Draft Waste Local Plan- Annexe 1 Shortlisted Sites' (SCC, October 2017) and the sites are as follows:

- EL07: Former Weylands Sewage Treatment Works, Walton-on-Thames
- GU23: Land to the north east of Slyfield Industrial Estate, Moorfield Road, Guildford
- MO03: Land at and adjoining Leatherhead Sewage Treatment Works, Randalls Road, Leatherhead
- RE09: Land to the west of Earlswood Sewage Treatment Works, Redhill
- RU04: Land adjacent to Lyne Lane STW, Chertsey
- RU02: Land adjacent to Trumps Farm, Kitsmead Lane, Longcross
- SP02: Oakleaf Farm, Stanwell Moor
- TA10: Lambs Brickworks, Terra Cotta Road, Tillburstow Hill Road, South Godstone
- WO09: Land at Martyrs Lane, Woking

2.1.3 A plan identifying the site locations is provided in **Appendix A**.

2.1.4 PBA has produced a range of site location and flood risk maps for each site, sourced from freely available online data. The maps are also reproduced in **Appendix A**.

2.2 Sources of Information

2.2.1 This L2 SFRA has also been based on the following flood risk documentation and data provided by SCC:

- SCC Aggregates Recycling DPD Strategic Flood Risk Assessment (SFRA, August 2011);
- Thames Catchment Flood Management Plan (CFMP summary report, December 2009);
- Lower Thames Flood Risk Management Strategy (FRMS consultation report, July 2010);
- River Wey Catchment Implementation Plan (November 2011);
- River Wey: Reducing Flood Risk (online, 2018);
- River Hogsmill Integrated Urban Drainage Pilot (June 2008);
- Surrey Preliminary Flood Risk Assessment (PFRA, 2011);
- Surrey Local Flood Risk Management Strategy (LFRMS, 2015);

- 'Wetspots' flooding database and historic flood extents database.

2.2.2 The District/Borough Council SFRA's applicable to the relevant site within that local area have been reviewed and are listed in **Table 2-1** below.

Table 2-1: District/Borough Council SFRA's

District/Borough Council SFRA	Relevant Sites
Reigate and Banstead Borough Council, Mole Valley District Council and Tandridge District Council Level 1 SFRA (RBBC, MVDC and TDC, December 2017)	<ul style="list-style-type: none"> ▪ RE09: Land to the west of Earlswood Sewage Treatment Works, Redhill ▪ MO03: Land at and adjoining Leatherhead Sewage Treatment Works, Randalls Road, Leatherhead ▪ TA10: Lambs Brickworks, Terra Cotta Road, Tillburstow Hill Road, South Godstone
Elmbridge Borough Council Level 1 SFRA (EBC, May 2015)	<ul style="list-style-type: none"> ▪ EL07: Former Weylands Sewage Treatment Works, Walton-on-Thames
Guildford Borough Council SFRA (GBC, Level 1, January 2016; Level 2, May 2016; Level 2 Addendum, December 2017)	<ul style="list-style-type: none"> ▪ GU23: Land to the north east of Slyfield Industrial Estate, Moorfield Road, Guildford;
Runnymede Borough Council Level 1 and Level 2 SFRA (RBC, January 2018)	<ul style="list-style-type: none"> ▪ RU04: Land adjacent to Lyne Lane STW, Chertsey ▪ RU02: Land adjacent to Trumps Farm, Kitsmead Lane, Longcross
Spelthorne Borough Council SFRA (SBC, December 2006)	<ul style="list-style-type: none"> ▪ SP02: Oakleaf Farm, Stanwell Moor
Woking Borough Council SFRA (WBC, November 2015)	<ul style="list-style-type: none"> ▪ WO09: Land at Martyrs Lane, Woking

2.2.3 PBA has been involved with previous work for SCC at four of the shortlisted sites (either at the site or in the vicinity of the site). As such, the following reports have been reviewed to inform this desktop assessment:

- Recycling and Recovery Park, Former Weylands Sewage Treatment Works, Walton on Thames: Environmental Statement Chapter 12 and Flood Risk Assessment Appendix 12 (November 2014);
- Bletchingley Baseline Assessment Report (December 2014);
- Bletchingley Wellsites, Kings Farm, Tilburstow Road, South Godstone: Flood Risk Assessment (June 2015);
- Slyfield Area Regeneration Project (SARP): Supplementary Report (no date provided);

- Slyfield Area Regeneration Project (SARP): Development Options, Draft Masterplan Summary Document 8, Geo-technical and Geo-environmental Constraints (December 2010);
 - Earlswood Community Recycling Facility, Surrey: Flood Risk Assessment (March 2014);
 - Earlswood Waste Transfer Facility: Phase 1 Geo-environmental Desk Study (October 2013).
- 2.2.4 PBA has contacted the EA, Thames Water (TW) and Southern Water (SW) in order to obtain the latest datasets of fluvial flood extent maps, flood levels and any additional relevant flood risk information, such as historic flooding and sewer flooding:
- TW has provided historical sewer flooding records for the eight sites for which they are the sewerage undertaker. SW has provided sewer flooding records for the one site located within their area (**Appendix B**).
 - Data has been received from the EA for the following sites:
 - GU23: Land to the north east of Slyfield Industrial Estate, Moorfield Road, Guildford
 - MO03: Land at and adjoining Leatherhead Sewage Treatment Works, Randalls Road, Leatherhead
 - RE09: Land to the west of Earlswood Sewage Treatment Works, Redhill
 - RU04: Land adjacent to Lyne Lane STW, Chertsey
 - RU02: Land adjacent to Trumps Farm, Kitsmead Lane, Longcross
 - TA10: Lambs Brickworks, Terra Cotta Road, Tillburstow Hill Road, South Godstone
 - WO09: Land at Martyrs Lane, Woking
- 2.2.5 For sites where detailed EA data has not been received at the time of writing (EL07 Former Weylands Sewage Treatment Works, Walton-on-Thames and SP02 Oakleaf Farm, Stanwell Moor) the initial site assessment is based solely on data provided by TW, SCC, online mapping including the EA's Flood Map for Planning (see **Appendix A**), previous work and the flood risk documentation as outlined above.
- 2.2.6 Site specific assessments based on the information detailed above can be found in **Appendix B**. A summary of the site specific assessments can be found in **Appendix C**.
- 2.2.7 A glossary of terms is given in **Appendix D** for ease of reference.

3 Waste Facility Type Implications

3.1 Waste Types under Consideration

3.1.1 There are six types of waste facility which are currently being considered for development at each site:

- Processing of Recyclables (MRFs)
- Mixed Waste Processing
- Composting
- Pyrolysis and gasification
- Anaerobic digestion; and
- Other thermal treatment, including mass burn incineration.

3.1.2 As described in **Section 1.2.8**, all waste facility types, including electricity-generating facilities due to their anticipated small scale, would be classified as 'Less Vulnerable' as set out in Table 2 of the PPG. As such, all proposed waste types under consideration for the shortlisted sites would generally be appropriate within Flood Zone 1 and Flood Zone 2, in accordance with Table 3 of the PPG, with appropriate mitigation measures (see **Section 4** and **Appendix B**).

3.1.3 If the site is used for small scale power generation (namely pyrolysis and gasification and other thermal treatment, including mass burn incineration), it is recommended that electricity-generating plant within each site is located following a sequential approach i.e. locating the sensitive plant on areas within Flood Zone 1 and areas of higher land to avoid residual risk of flooding.

3.1.4 The following sections provide an overview of the proposed waste facility types along with any restrictions to development and mitigation measures which may be required. Further details of each facility type are provided in the 'SCC Types of Waste Management Facilities: An Explanation Note' (October 2017).

3.1.5 The risks associated with each type of facility are detailed in the document 'Planning for Waste Management Facilities: A Research Study' (August 2004) and are described below. This document is considered the most up to date guidance for highlighting risks from waste management facilities.

Processing of Recyclables (MRFs)

3.1.6 These facilities typically process materials such as paper, card, glass, plastics, aluminium and cans/foil. They are designed to separate commingled recyclate into separate waste streams to be sent for reprocessing.

3.1.7 At larger sites there can be between 50-80 HGV movements per day. It may therefore be necessary to ensure candidate sites have dry access during flood events.

3.1.8 MRF facilities have an expected lifetime of 20 years, typically linked to a contract period.

3.1.9 The Research Study document states, "*some residual liquids in bottles and cans can potentially pose a risk to water resources. However, as most facilities are under cover and on concrete hard standing with separate foul water drainage, rainfall is unlikely to come into*

contact with the waste materials and, as such, water pollution is unlikely. Nevertheless, wash-down waters and any liquid within the waste needs to be managed appropriately”.

- 3.1.10 Mitigation measures are outlined in the Research Study document as follows, “avoidance of areas close to sensitive water resources, provision of a drainage system separating dirty and clean waters and transferring dirty waters to sewer or other appropriate treatment will prevent serious water pollution”.

Mixed Waste Processing

- 3.1.11 These facilities cover the operations, primarily of a mechanical and/or biological nature, which are designed to process the following: i) unsorted ‘black bag’ wastes; ii) residual household waste following doorstep separation of recyclables/green waste; iii) residual waste following centralised separation of recyclables/organics.
- 3.1.12 There are up to 30 waste collection vehicles per day for this waste type.
- 3.1.13 Mixed Waste Processing facilities have an expected lifetime of 20-25 years, typically linked to a contract period.
- 3.1.14 The Research Study document states, “*the nature of the material being handled can potentially constitute a risk to water resources. However, as most facilities are under cover, rainfall is unlikely to come into contact with the waste materials and, as such, water pollution is unlikely. Nevertheless, wash-down waters and any liquid within the waste needs to be managed appropriately. Because of this most facilities will require drainage systems to ensure that dirty waters are dealt with appropriately*”.
- 3.1.15 Mitigation measures are outlined in the Research Study document as follows: “*avoidance of areas close to sensitive water resources and provision of a drainage system separating dirt and clean waters and transferring dirty waters to sewer or other appropriate treatment will prevent any serious water pollution*”.

Composting

- 3.1.16 These facilities typically process organic waste, green waste (grass cuttings, leaves and pruning), cardboard, some food waste, and biodegradable industrial waste.
- 3.1.17 Composting facilities generate relatively low HGV movements, but this can increase depending on the composting process.
- 3.1.18 Composting facilities have an expected lifetime of 10-25 years.
- 3.1.19 The Research Study document states, “*compost can create leachate as a result of high moisture levels in the biodegradable waste feedstock, from cell and pressure water, and natural precipitation. Leachate has a high content of organic substances, which is highly polluting to surface water, groundwater and plant life, and can cause ground contamination. The design of the site should not only contain leachate, but if possible to recirculate it into dry piles as a wetting agent*”.
- 3.1.20 Mitigation measures are outlined in the Research Study document as follows, “*the protection of controlled waters by adequate site surfacing, segregated drainage and containment are essential in the control of leachate. Any leachate not recirculated should be collected and taken away, or directed to a sewer or watercourse with the appropriate consent, or a works inlet at a wastewater treatment plant*”.

Pyrolysis and gasification

- 3.1.21 These facilities generally generate energy from organic or hydrocarbon containing materials. The processes involve a chemical reaction which takes place at high temperature.
- 3.1.22 These facilities result in relatively low HGV movements, but this is dependent on the size of the facility.
- 3.1.23 Pyrolysis and gasification facilities have an expected lifetime 20-25 years.
- 3.1.24 The Research Study document does not identify any specific issues or recommended mitigation measures with regards to water resources.

Anaerobic Digestion

- 3.1.25 These facilities process organic waste and treated sewage sludge. Anaerobic digestion takes place in a large digester which is warm, sealed and airless. The process most commonly produces biogas, though can also produce fibre and liquor.
- 3.1.26 Anaerobic digestion facilities generate relatively high number of HGV movements, although this is dependent on the size of the facility.
- 3.1.27 Anaerobic digestion facilities have an expected lifetime of 20-25 years.
- 3.1.28 The Research Study document states, “waste water can be produced when the solid digestate is de-watered (depending upon the specific type of anaerobic digestion treatment). This can contain relatively high concentrations of metals, dissolved nitrogen and organic material, and may cause pollution if left untreated. This waste water may be disposed of to sewer and treated at a sewage works, but if the level of contaminants breaches the level imposed by the water companies, on-site treatment may be necessary”.

Other thermal treatment, including mass burn incineration

- 3.1.29 These facilities are typically used to generate either steam for process use or electricity for export to the national grid. Some plants may have a dual steam and electricity generating capability.
- 3.1.30 HGV movements to and from these facilities vary depending on the scale of the site.
- 3.1.31 Other thermal treatment facilities have an expected lifetime 20-25 years.
- 3.1.32 The Research Study document does not identify any specific issues or recommended mitigation measures with regards to water resources.

4 Requirements for Mitigation

4.1 Overview of Mitigation Requirements

- 4.1.1 The following sub-sections provide an overview of the mitigation requirements for the proposed waste facility types as described in **Section 3**, and have been applied in the recommendations when undertaking the site specific reviews in **Appendix B**.
- 4.1.2 It is recommended that a sequential approach to locating waste type development within each site is followed, whereby development is located within Flood Zone 1, i.e. the area of lowest flood risk. This is applicable to GU23 (Slyfield) which has a small area of Flood Zone 2 along its eastern boundary and RE09 (Earlswood) which has a small area of Flood Zone 3 along its southern boundary.

4.2 Site Levels

- 4.2.1 It is recommended that floor levels of any waste facility type with fixed plant or buildings should be set a minimum of 300mm above the modelled 1 in 100 annual probability plus appropriate allowance for climate change fluvial flood level. Given the proposed waste type uses of the sites, it is recommended that all critical/sensitive plant and materials are also set at or above this level (i.e. on higher land within the site to avoid residual risk of flooding), such as machinery associated electricity-generating waste facilities, specifically for pyrolysis and gasification and other thermal treatment, including mass burn incineration.
- 4.2.2 Setting finished floor levels of fixed plant and buildings a minimum of 300mm above the modelled 1 in 100 annual probability, plus appropriate allowance for climate change fluvial flood level, will also help mitigate against the residual risk of surface water and groundwater flooding.
- 4.2.3 It is advised that any proposed lowering of site levels does not create potential new flow routes that may cause detrimental flood risk beyond the sites. An uninterrupted corridor should be retained at existing ground level, separating the potential source of flooding from any land lowering to manage this.
- 4.2.4 Climate change allowances for 'Less Vulnerable' waste facility development, in the Thames River Basin District and with a lifetime into the 2050s, as outlined in **Section 1.2**, should be taken into account when considering mitigation measures for the site. Where a range of climate change allowances are applicable, the generally accepted approach is to use the lower end of the specified range of climate change allowances as a baseline for mitigation requirements. The higher end is considered as a sensitivity test to consider residual risk and inform additional freeboard requirements – i.e. if floor levels should ideally be above this level, otherwise flood resistant/resilient measures should be incorporated to protect development under such conditions.

4.3 Floodplain Storage

- 4.3.1 Any waste type development located in the vicinity of a watercourse should be constructed such that it does not reduce the available floodplain storage capacity over a site, which could potentially cause an increase in flood levels on-site or elsewhere.
- 4.3.2 The impacts require consideration over the proposed lifetime of the development and should therefore be considered up to the 1 in 100 annual probability plus appropriate allowance for climate change flood level, see **Section 1.2**.
- 4.3.3 In assessing the shortlisted sites, a high-level assessment has been provided in terms of the impact of development on the site to the floodplain storage capacity, with consideration of the

availability of compensatory flood storage in the form of higher ground or the removal of (non-floodable) existing building footprint, see **Appendix B**.

4.4 Safe Access and Flood Risk Management

- 4.4.1 It is necessary to consider and incorporate safe access arrangements as part of any mitigation, to ensure the personnel on site are safe in times of flooding.
- 4.4.2 Although a site may not be directly affected during a flood event, flooding of local roads and access routes may impact the ability of personnel and vehicles to access the site, in turn affecting the sites' operability.
- 4.4.3 For proposed 'Less Vulnerable' uses – i.e. all waste development types – safe access can typically be addressed through the incorporation of management systems including, in the event of widespread flooding, closure of the site in advance of flooding affecting the area and re-opening after the flooding has receded. It is recommended that a Flood Response Management Plan is prepared for each site.
- 4.4.4 As discussed in **Section 1.2.8** it is noted that electricity-generating waste facility types (specifically pyrolysis and gasification and other thermal treatment, including mass burn incineration) would be classified as 'Less Vulnerable' development, rather than essential infrastructure, due to the anticipated small scale of these plants and power produced. Therefore, in the very unlikely event of flooding, the electricity-generating waste facility types could also be closed in advance of flooding affecting the site and surrounding areas, without affecting the overall supply of electricity within the area.
- 4.4.5 Where required, site managers should be signed up to the relevant local EA Flood Warning Service which provides advance warnings of potential flooding events at, adjacent to, or within the vicinity of the site. This information can then be used to ensure the site(s) are closed or evacuated in advance of a flood event.

4.5 Surface Water Drainage

- 4.5.1 Any new waste facility type development needs to ensure that proposed surface water drainage arrangements are appropriately designed to ensure no increase – and preferably a decrease – in flood risk with priority given to the use of Sustainable Drainage Systems (SuDS) to replicate, as closely as possible, the natural/existing (pre-development) drainage regime of a site.
- 4.5.2 Different forms of SuDS contribute to the key pillars of water quantity, water quality, amenity and biodiversity and measures which provide an enhancement of these elements should be actively encouraged.
- 4.5.3 For waste facilities SuDS can provide multi-functional benefits such as pollution containment and control.
- 4.5.4 As of April 2015, the Lead Local Flood Authority (LLFA) has become the statutory consultee for surface water management on planning applications for 'major development'. As the LLFA, SCC are therefore responsible for the approval of surface water drainage systems within such development. Major development consists of any of the following:
- The provision of dwelling houses where residential development of 10 or more units; or where the development is to be carried out on a site having an area of 0.5 hectares or more and the number of units is not known;
 - The provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or,

- Development carried out on a site having an area of 1 hectare or more.
- 4.5.5 As each shortlisted site has a total area of over 1 hectare, SCC will be the statutory consultee for future planning applications for waste type facilities at the shortlisted sites.
- 4.5.6 With regards to outlining the high-level requirements for a Surface Water Drainage Strategy (provided for each site in **Appendix B**), guidance provided within the 'Water. People. Places' document (September 2013), prepared by the Lead Local Flood Authorities of the South East of England, including Surrey County Council has been reviewed. The document sets out best practice for SuDS design, including the requirement for a 'treatment train' and location of SuDS outside of the floodplain. The guidance also sets out the suitability of different SuDS techniques based on soil type/permeability, proximity to Source/Groundwater Protection Zones and availability of open space, amongst numerous other factors.
- 4.5.7 The SFRA (for each relevant Borough/District Council, see **Table 2-1**) also provides local guidance on the design criteria for Surface Water Drainage Strategies and the level of detail required for future planning applications within the relevant Borough/District Council. The most up-to-date SFRA specific to the relevant Borough/District Council has been reviewed for each shortlisted site in **Appendix B**. These SFRA's should be reviewed on an ongoing basis as more up-to-date revisions are produced.

5 Conclusion

- 5.1.1 This Level 2 Strategic Flood Risk Assessment (L2 SFRA) considers a range of flood sources at nine shortlisted waste development sites within the County of Surrey to inform the Waste Local Plan, see **Appendix B** (with a summary provided in **Appendix C**).
- 5.1.2 All the waste facility types under consideration at the shortlisted sites are classified as 'Less Vulnerable' in accordance with Table 2 of the PPG as '*Waste treatment (except landfill* and hazardous waste facilities)*'. 'Less Vulnerable' development is considered generally appropriate in Flood Zone 1 and Flood Zone 2, in accordance with Table 3 of the PPG, provided suitable mitigation measures are put in place.
- 5.1.3 It has been noted that some of the proposed waste facility types generate electricity from waste, specifically pyrolysis and gasification and other thermal treatment, including mass burn incineration. Given the anticipated small scale of these plants and megawattage produced, it is considered that the electricity-generating waste type facilities proposed would also be classified as 'Less Vulnerable'. They would not be classed as essential infrastructure, which would apply to a regional or nationally important energy generation site, due to the likely small scale of the plants and given that alternative sources of electricity generation could be utilised during the very unlikely event of flooding and the overall supply of electricity within the area would not be affected. Further, SCC consider that all shortlisted sites are likely to be subject to a planning application rather than a Development Consent Order (DCO), reinforcing that these sites would not be considered critical or essential infrastructure.
- 5.1.4 It has been considered that, provided appropriate flood risk mitigation techniques are incorporated into the development design, that development of the proposed waste facility types would be feasible at all shortlisted sites in accordance with the requirements of the NPPF. All of the sites should be subject to a site specific detailed Flood Risk Assessment.