



## **Thurrock Flexible Generation Plant**

**Environmental Statement Volume 4: Cumulative Environmental Assessment  
Chapter 28: Hydrology and Flood Risk**

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**Environmental Impact Assessment**  
**Cumulative Effects Assessment**

**Volume 4**  
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## 1. Introduction and Approach

### 1.1 Purpose of this chapter

1.1.1 This chapter of the Environmental Statement (ES) provides an assessment of the Hydrological and Flood Risk effects of the proposed development in combination with other relevant future development projects that have been scoped into the cumulative assessment.

1.1.2 In particular, this cumulative effects assessment (CEA) topic chapter:

- identifies the potential impact interactions of the proposed development in combination with other relevant future development projects;
- identifies the receptors with the potential to be significantly affected by these potential impact interactions and characterises these receptors, including their sensitivity and any relevant environmental thresholds;
- evaluates the likely significant cumulative effects on these key receptors as a result of the proposed development in combination with other development projects;
- identifies any additional mitigation measures that are proposed to prevent, minimise, reduce or offset these significant cumulative effects; and
- taking into account any proposed mitigation measures, evaluates the significance of predicted residual cumulative effects.

1.1.3 There are other environmental topic areas that have relevance to aspects considered in this chapter, namely hydrogeology, ground conditions and ecology. The specific assessment of potential cumulative effects of these other environmental topics are provided in the relevant chapters of ES Volume 4.

### 1.2 Approach to cumulative assessment

1.2.1 The assessment of hydrological and flood risk cumulative effects follows the approach set out in ES Volume 2, Chapter 4: EIA Methodology, Section 3.

### 1.3 Study area

1.3.1 A review of other approved and proposed developments within a 500 m search area from the Thurrock Flexible Generation Plant has been undertaken.

1.3.2 A 500 m search area is considered appropriate for data collection taking into account the nature of the development and likely zone of influence on hydrological receptors. Given the landscape surrounding the development, current and ongoing activities, as well as natural baseline fluctuations it will be difficult to ascertain the exact source of any impacts on flood risk and / or water quality beyond 500 m.

### 1.4 Screening of cumulative developments

1.4.1 ES Volume 4, Chapter 18: Cumulative Effects Assessment Introduction and Screening identifies a short-list of potential cumulative developments that have been screened as potentially relevant to the CEA overall (i.e. for one or more topic areas). From this shortlist of cumulative development projects, Table 1.1 identifies those projects that fall within the zone of influence for Hydrology and Flood Risk and have potential for cumulative effects that require assessment in this topic area.

1.4.2 Developments have been shortlisted in Table 1.1 where:

- the conclusions of the environmental assessments for those developments predicted significant effects on receptors within the zone of influence for the proposed Thurrock Flexible Generation Plant development; or
- where there is considered to be potential for effects that were not predicted to be significant for those individual developments but that may become significant in the cumulative scenario; or
- where environmental studies for those developments have not been published but there is sufficient information available about the development to both indicate the potential for cumulative effects and allow assessment.

1.4.3 Where sufficient information about a development to consider its potential for cumulative effects was not publicly available, the development has not been shortlisted.

Table 1.1: Shortlist of relevant cumulative developments

ID	Development	Potential cumulative impacts (construction)	Potential cumulative impacts (operation and maintenance)	Potential cumulative impacts (decommissioning)	Receptor(s) affected
002	A new build 2 storey 420 place Primary School with car park, playground, floodlit artificial pitch, and associated landscaping with new access road, footpaths, highway improvements (including the widening of Westcott Avenue and the provision of a footpath link to Lanes Avenue) and service connections	Potential for areas of low permeable surfacing to increase surface water runoff rates and volumes. Potential for uncontrolled discharges to impact on surface water quality.	Increased flood risk. Potential for contaminated runoff to pollute controlled waters	Alteration to water quality as a consequence of unmanaged surface water runoff into local surface water environment.	Local drainage network and irrigation channels.
016	Retention and completion of waste wood processing plant (Class B2/B8) & fire retained area bounded by concrete push walls, erection of buildings to form associated storage, reception/ administration, security, and staff welfare area; formation of impermeable surface to form a lorry parking/waiting area; weighbridge and staff parking area together with associated highways and drainage works	Potential for areas of low permeable surfacing to increase surface water runoff rates and volumes. Potential for uncontrolled discharges to impact on surface water quality.	Increased flood risk. Potential for contaminated runoff to pollute controlled waters	Alteration to water quality as a consequence of unmanaged surface water runoff into local surface water environment.	Local drainage network and irrigation channels.
025	Demolition of Tilbury B power station and all associated buildings and structures (including remaining structures from Tilbury A power station). The Jetty will not be demolished.	Potential for areas of low permeable surfacing to increase surface water runoff rates and volumes. Potential for uncontrolled discharges to impact on surface water quality.	Increased flood risk. Potential for contaminated runoff to pollute controlled waters	Alteration to water quality as a consequence of unmanaged surface water runoff into local surface water environment.	Local drainage network and irrigation channels.
034	Outline application (with all matters reserved for a subsequent application) for proposed residential redevelopment of land between 39 and 41 St John's Road consisting of up to 43 dwellings, landscaping and new access.	Potential for areas of low permeable surfacing to increase surface water runoff rates and volumes. Potential for uncontrolled discharges to impact on surface water quality.	Increased flood risk. Potential for contaminated runoff to pollute controlled waters	Alteration to water quality as a consequence of unmanaged surface water runoff into local surface water environment.	Local drainage network and irrigation channels.
042	Tilbury 2: A new port facility acting alongside the existing Port of Tilbury. This will involve the extension of existing jetty facilities and the dredging of berth pockets in the River Thames, and land works and facilities for: a "Roll-On / Roll-Off" (Ro-Ro) terminal for importing and exporting containers on road trailers; a facility for importing and processing bulk construction materials; and areas of external storage for a variety of goods such as imported cars. The project also involves the construction of road and rail links to the site from adjacent networks.	Potential for areas of low permeable surfacing to increase surface water runoff rates and volumes. Potential for uncontrolled discharges to impact on surface water quality.	Increased flood risk. Potential for contaminated runoff to pollute controlled waters	Alteration to water quality as a consequence of unmanaged surface water runoff into local surface water environment.	Local drainage network and irrigation channels.

ID	Development	Potential cumulative impacts (construction)	Potential cumulative impacts (operation and maintenance)	Potential cumulative impacts (decommissioning)	Receptor(s) affected
050	EIA Screening Opinion - Application for a Certificate of Lawfulness of Proposed Use or Development: Proposed processing of biofuels and other suitable waste derived feedstocks into a manufactured clean gas product (Use Class B2).	Potential for areas of low permeable surfacing to increase surface water runoff rates and volumes. Potential for uncontrolled discharges to impact on surface water quality.	Increased flood risk. Potential for contaminated runoff to pollute controlled waters	Alteration to water quality as a consequence of unmanaged surface water runoff into local surface water environment.	Local drainage network and irrigation channels.
058	The Lower Thames Crossing will be a new road crossing connecting Essex and Kent. Located east of Gravesend and Tilbury, this new crossing will offer the improved journeys, new connections and network reliability, and economic benefits that only a new, alternative crossing, away from Dartford, can provide.	Potential for areas of low permeable surfacing to increase surface water runoff rates and volumes. Potential for uncontrolled discharges to impact on surface water quality.	Increased flood risk. Potential for contaminated runoff to pollute controlled waters	Alteration to water quality as a consequence of unmanaged surface water runoff into local surface water environment.	Local drainage network and irrigation channels.
064	Canal Basin Regeneration Area: Gravesend Local Plan Core Strategy Policy CS04 for mixed-use development of around 650 dwellings and 4,650 sq m of B1a and B1c employment floorspace.	Potential for areas of low permeable surfacing to increase surface water runoff rates and volumes. Potential for uncontrolled discharges to impact on surface water quality.	Increased flood risk. Potential for contaminated runoff to pollute controlled waters	Alteration to water quality as a consequence of unmanaged surface water runoff into local surface water environment.	Local drainage network and irrigation channels.
079	Proposed Short Term Operation Reserve (STOR) electricity generating station comprising 14 no. gas-fired generators with a capacity up to 21 MW with associated development at land adjacent to Tilbury Waste Water Treatment Works, Fort Road, Tilbury.	Potential for areas of low permeable surfacing to increase surface water runoff rates and volumes. Potential for uncontrolled discharges to impact on surface water quality.	Increased flood risk. Potential for contaminated runoff to pollute controlled waters	Alteration to water quality as a consequence of unmanaged surface water runoff into local surface water environment.	Local drainage network and irrigation channels.

## 1.5 Identifying cumulative developments affecting each receptor

1.5.1 Table 1.2 to Table 1.4 summarise the cumulative developments that have the potential to cause cumulative effects at each identified receptor, the sensitivity of that receptor to cumulative impacts, and the starting position to the cumulative effects assessment, which is the predicted residual effect of Thurrock Flexible Generation Plant alone during construction, operation and decommissioning (as established in ES Volume 3).

**Table 1.2: Summary of cumulative developments affecting each receptor (construction)**

Receptor affected	Sensitivity of receptor to cumulative effects	Standalone effect of Thurrock Flexible Generation Plant on receptor	Cumulative development(s) with the potential to affect this receptor
Local watercourses, drainage network and irrigation channels.	High	Negligible to minor adverse (not significant in EIA terms)	All

**Table 1.3: Summary of cumulative developments affecting each receptor (operation and maintenance)**

Receptor affected	Sensitivity of receptor to cumulative effects	Standalone effect of Thurrock Flexible Generation Plant on receptor	Cumulative development(s) with the potential to affect this receptor
Local watercourses, drainage network and irrigation channels.	High	Negligible to minor adverse (not significant in EIA terms)	All

**Table 1.4: Summary of cumulative developments affecting each receptor (decommissioning)**

Receptor affected	Sensitivity of receptor to cumulative effects	Standalone effect of Thurrock Flexible Generation Plant on receptor	Cumulative development(s) with the potential to affect this receptor
Local watercourses, drainage network and irrigation channels.	High	Minor adverse (not significant in EIA terms)	All

## 2. Assessment of Cumulative Effects

### 2.1 Construction phase of Thurrock Flexible Generation Plant

#### Flood Risk

- 2.1.1 A review of the shortlisted cumulative developments against the EA Flood Zone Maps indicate that the majority of the schemes are either wholly or partly located within an area defined as Flood Zone 3, and therefore at higher risk of flooding. However, as part of their planning applications, all cumulative developments within the 500 m hydrology and flood risk CEA study area would require a surface water drainage scheme/assessment to be conducted for the development in line with the applicable National Policy Statements (NPSs, where relevant), the National Planning Policy Framework (NPPF) and applicable Planning Practice Guidance (PPG, ID7).
- 2.1.2 Therefore, in line with national and local planning policy, the developments will not increase flood risk to the site or the surrounding areas. Consequently, it is unlikely that these developments would cause cumulative flood risk impacts with or to the construction of the Thurrock Flexible Generation Plant and/or the surrounding area.
- 2.1.3 Any impact is predicted to be of local spatial extent and of short-term duration during the construction period. It is also considered that any impact will be intermittent during the construction period and will be of high reversibility. All developments require a drainage strategy to be presented. It is predicted that the impact will affect surrounding local receptors directly. The magnitude of impact is therefore considered to be **minor**.
- 2.1.4 The land within the Thurrock Flexible Generation Plant hydrology and flood risk CEA study area is primarily farmland and therefore is of low vulnerability, high recoverability and low value. The sensitivity of the receptor is therefore, considered to be low. Overall, the sensitivity of the surrounding areas is considered to be **low**.
- 2.1.5 The effect on flood risk, based on the **minor** impact of Thurrock Flexible Generation Plant including mitigation measures adopted (described in Table 2.6 of Volume 3, Chapter 15: Hydrology and Flood Risk) together with the **minor** impact of cumulative developments incorporating measures required of them by the NPSs and/or NPPF and PPG (as applicable), on a **low** sensitivity receptor, is considered to be **negligible**, which is **not significant** in EIA terms.

#### Water Quality

- 2.1.6 The impact to watercourses takes into account the Water Framework Directive (WFD) classification of surrounding watercourses and the mitigation measures presented within Table 2.6 of Volume 3, Chapter 15: Hydrology and Flood Risk.
- 2.1.7 Under the NPSs, NPPF, PPG and local policies, development applications are required to ensure that there are no determinantal impacts on local water quality with a view of achieving and/or retaining a 'good' overall WFD status for watercourses. To that end approved applications outlined in this CEA should be supported by drainage scheme and water quality management strategies appropriate to the scale and nature and approved as part of the planning process by the Lead Local Flood Authority (LLFA) and/or Environment Agency (EA).
- 2.1.8 As a minimum requirement, schemes will require a surface water management strategy and drainage scheme to limit any dirty surface water runoff from the scheme to surrounding watercourses. Therefore, the magnitude of impacts on surface watercourses is predicted to be of local spatial extent, short term duration, intermittent occurrence and high reversibility. It is predicted that the impact will affect the receptor indirectly. The magnitude of impact is therefore considered to be negligible.
- 2.1.9 The sensitivity of watercourses is dependent on the nature of the specific watercourse. WFD classification obtained from the EA website and mapping for water quality (Table 2.10 of Chapter 15: Hydrology and Flood Risk) shows that rivers within the study area are considered to be of medium sensitivity based on water quality data supplied by the EA and considered to be highly vulnerable, but of moderate to high recoverability and moderate value. The sensitivity of the receptor is therefore considered to be **high**.
- 2.1.10 Taking into account the above, the **negligible** impact (which includes the integration of measures adopted in Table 2.6 of Chapter 15: Hydrology and Flood Risk and the measures required of other cumulative developments) on receptors of **high** sensitivity will therefore be of **minor adverse** significance, which is **not significant** in EIA terms.

#### Further mitigation or enhancement

- 2.1.11 No further mitigation or enhancement with respect to hydrology and flood risk is considered necessary.

#### Residual effects

- 2.1.12 Not significant.

## 2.2 Operation and maintenance phase of Thurrock Flexible Generation Plant

### Flood Risk

- 2.2.1 During the operation phase of the proposed development, clean surface water generated on site will be directed to an onsite attenuation system and discharged into the local surface water network at a 'greenfield' rate.
- 2.2.2 In accordance with national and local planning policies and guidance developments are required to retaining existing surface water discharge rates or alternatively provide a percentage betterment.
- 2.2.3 The effect on flood risk, based on the **minor** impact of Thurrock Flexible Generation Plant including mitigation measures adopted (described in Table 2.6 of Volume 3, Chapter 15: Hydrology and Flood Risk) together with the **minor** impact of cumulative developments incorporating measures required of them by the NPSs and/or NPPF and PPG (as applicable), on a **low** sensitivity receptor, is considered to be **negligible**, which is **not significant** in EIA terms.

### Water Quality

- 2.2.4 During the operation and maintenance phase, the main potential impacts would be the accidental spillage of oils and/or chemicals. A cumulative impact would therefore only occur where a spillage event happened at the Thurrock Flexible Generation Plant at the same time as an impact on water quality caused by a cumulative development.
- 2.2.5 Mitigation measures outlined in Table 2.6 of Volume 3, Chapter 15: Hydrology and Flood Risk will be in place during the operation and maintenance phase of the Thurrock Flexible Generation Plant to limit any potential adverse impacts for spillage events. It is assumed that the cumulative sites identified within the 500 m hydrology and flood risk CEA study area will be designed to local and national planning policy and industry best practice and therefore are likely to incorporate mitigation measures if applicable to the nature of their operation.
- 2.2.6 The impact is predicted to be of local spatial extent, short term duration, intermittent occurrence and reversible. The magnitude is therefore, considered to be **negligible**.
- 2.2.7 The main and ordinary watercourses in the Thurrock Flexible Generation Plant hydrology and flood risk study area are assessed to be of high vulnerability, moderate to high recoverability and moderate value based on the EA's WFD classification. The sensitivity of the receptor is therefore, considered to be **high**.

- 2.2.8 Overall, the sensitivity of the receptor is considered to be **high** and the magnitude of impact is deemed to be **negligible**. The effect will, therefore, be of **minor adverse** significance, which is **not significant** in EIA terms.

### Further mitigation or enhancement

- 2.2.9 No further mitigation or enhancement with respect to hydrology and flood risk is considered necessary.

### Residual effects

- 2.2.10 Not significant.

## 2.3 Decommissioning phase of Thurrock Flexible Generation Plant

- 2.3.1 In the event that Thurrock Flexible Generation Plant is decommissioned, cables and pipes are expected to remain in-situ, and no additional effects above those detailed under the construction and operation and maintenance phase are predicted. Effects from decommissioning of the Thurrock Flexible Generation Plant together with other cumulative development that may be occurring at the time would be similar and no worse than the construction or operation and maintenance phase effects, i.e. **negligible to minor adverse**, which is **not significant** in EIA terms.

### Further mitigation or enhancement

- 2.3.2 No further mitigation or enhancement with respect to hydrology and flood risk is considered necessary.

### Residual effects

- 2.3.3 Not significant.

## 2.4 Conclusions

- 2.4.1 A review of approved and proposed developments within a 500 m search area from the Thurrock Flexible Generation Plant development has been undertaken.
- 2.4.2 A 500 m search area is considered appropriate for data collection taking into account the nature of the development and likely zone of influence on hydrological receptors. Given the landscape surrounding the development, current and ongoing activities, as well natural baseline fluctuations it will be difficult to ascertain the exact source of any impacts on flood risk and / or water quality beyond 500 m.

- 2.4.3 The review of approved and proposed developments established that there are nine relevant shortlisted cumulative developments within the defined 500 m study area.
- 2.4.4 It is assumed, where relevant, in accordance with the NPSs and/or NPPF and Planning Practice Guidance ID7 – Flood Risk and Coastal Change, any new development is required to attenuate surface water run-off, where practicable, to the greenfield run-off rate and provide appropriate management techniques to treat potentially contaminated run-off prior to discharge into the local drainage network.
- 2.4.5 Any works undertaken by cumulative developments within 8 m of a watercourse and / or flood defence will require consent from either the EA, LLFA or Internal Drainage Board (IDB) depending on whether the waterbody is designated a Main River or Ordinary Watercourse. For the consent to be provided the developer is required to demonstrate that the risk of flooding during the lifetime of the development could be mitigated to a level acceptable to the EA, LLFA and / or IDB.
- 2.4.6 Therefore, the cumulative effects on water resources & hydrology are not predicted to be significant.