



Chatham Maritime Interface Land Flood Risk Investigation

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Appendix A – Site Location Plan

Appendix B – Correspondence (including Flood Map)

1 Introduction

1.1 INTRODUCTION

WSP Development and Transportation has been commissioned by the South East of England Development Agency (SEEDA) to investigate flood risk and drainage constraints in order to inform a Development Brief Supplementary Planning Document (SPD) for the Chatham Maritime Interface Land development site in Medway.

The site was historically part of the working Chatham Dockyard, some remaining elements of which are now operated as a tourist attraction. The site is currently partly disused, and partly used for car parking associated with the tourist elements of the Historic Dockyard attraction.

The site lies within an area which has been the focus of a significant amount of development over the past decade, much of which was led by SEEDA, and a significant amount of proposed local development is still to be completed.

This report does not consider any specific development proposals, but the information contained within it has been used to inform an outline Masterplan layout which is not specifically associated with any particular development type. The study is aimed to identify the context of the development and the constraints in terms of flood risk and surface water drainage management. Further, the report provides advice on potential mitigation measures which should be put in place to ensure the safe development of the area.

This report has been produced in consultation with the Environment Agency (EA), Kent County Council and Thames Water. No information has been provided by Medway Council to date despite repeated enquiries; any information provided before the issue of the final version of this report will be included.

The Medway Strategic Flood Risk Assessment (SFRA, 2006) and the Medway Estuary and Swale Shoreline Management Plan (Consultation Draft, 2007) have also been reviewed and provided useful background information. However, the flood water levels included in the SFRA have not been used as they are superseded by the flood water levels provided by the EA to inform this study.

This report takes into account the requirements of the Planning Policy Statement 25 'Development and Flood Risk' (PPS25) and of the EA Standing Advice.

Further consultation at the time of the planning application will be required in order to take into account any up to date information which would become available in the future and develop a flood mitigation strategy appropriate for the type of development proposed.

A full Flood Risk Assessment (FRA) would be required in order to support a planning application for the site in line with the requirements of PPS25 and the EA Standing Advice.

2 Flood Hazard

2.1 TIDAL FLOODING

The site is mainly located within the tidal floodplain of the River Medway. The EA in their letter dated 17 December 2009, a copy of which is attached in Appendix B, stated that *the majority of the site lies within the outline of an area with a 1 in 200 (0.5%) chance of flooding in any given year from the sea* (i.e. Flood Zone 3).

The EA Flood Map, also attached in Appendix B, confirms that the majority of the site is located within the tidal Flood Zone 3.

As shown in the EA Flood Map, the eastern end of the site is located within Flood Zone 2 (i.e. probability of flooding lower than 1 in 200 and higher than 1 in 1000 in any year) and, in smaller percentage, Flood Zone 1 (i.e. probability of flooding lower than 1:1000 in any year).

This is because the ground levels, generally around 4 m AOD in the western part of the site, raise significantly towards the eastern end of the site which is out of the tidal floodplain.

The classification of Flood Zones 1, 2 and 3 does not take into account the presence of tidal flood defences. However, although the EA Flood Map does not show the site as defended, in their letter the EA confirmed that the site is defended against tidal flooding by the flood defences along the River Medway as discussed below.

2.1.1 Flood Water levels

In their letter the EA provided the modelled flood water levels taken from the 2007 Mott MacDonald 'Lower Medway 2D Modelling and Flood Risk Mapping Phase 5'. Copy of the modelled flood water levels is attached in Appendix B.

The modelled levels show the expected flood water levels in various parts of the site in case of a 200 year and 1000 year return period flood events respectively. Two different scenarios are modelled: defended and undefended.

Defended scenario

The site would remain dry in case of a 200 year return period tidal flood event; however, it would be flooded to a level of approximately 6.1 m AOD when climate change is factored in (2110 scenario).

In a 1000 year return period tidal flood event the site would remain dry; however, it would be flooded to level of approximately 6.4 m AOD when climate change is factored in (2110 scenario).

Undefended scenario

The model shows that if the protection offered by the tidal flood defences was not taken into account the site would be flooded up to a level of approximately 5.02 m AOD in a 200 year return period tidal flood event. This would become approximately 6.1 m AOD when climate change is factored in (2110 scenario).

In the absence of defences the site would be flooded to a depth of approximately 5.3 m AOD in a 1000 year return period flood event. This would become approximately 6.4 m AOD when climate change is factored in (2110 scenario).

In a subsequent meeting the EA indicated that some refining of the existing hydraulic model is currently going on. As such the modelled flood water levels could be updated in the future although major changes are not expected.

2.1.2 Flood defences

The site is defended by a concrete river wall on the west side of the area facing the River Medway. The crest levels of this wall vary with minimum levels in excess of 5.3 m AOD and generally of 5.6 m AOD adjacent to the site.

The crest level of the defences adjacent to Dry Docks 2, 3 and 4 to the south of the site is also variable with similar heights.

The concrete wall to the south of the site is discontinuous in several places, such as the Slipway No. 7 and the Dry Docks 2, 3 and 4. However, there are steel gates and barriers, often welded in place, such that the defences can be considered continuous, but are subject to the integrity of those features.

Although the EA Letter dated 17 December 2009 states that the standard of protection is 1:100 year, based on the modelling results above this appears to be underestimated. In fact the modelling results show that the site would not be affected by a 200 year return period tidal flood event in a 'current' scenario; this is consistent with the crest level of the tidal flood defences which is several hundred millimetres higher than the modelled 200 year return period flood water level.

The EA indicated that the defences are dilapidated and the integrity of the wall in some places in doubt. The flood defences belong to SEEDA. The SFRA adds that *there appears not to be public knowledge of the flood defences at this location since they were previously owned and maintained by the Ministry of Defence and are currently privately maintained.*

2.1.3 History of flooding

In their letter the EA indicated that the site is not within their record of historic flooding from rivers and the sea.

2.2 SURFACE WATER FLOODING

Southern Water indicated in their email dated 13 January 2010 that there are no public surface water sewers in the vicinity of the site.

No information has been provided by Medway Council despite repeated enquiries.

Please refer to Chapter 3 in terms of existing water utilities constraints.

2.3 FOUL WATER FLOODING

Southern Water indicated in their email dated 13 January 2010 that there is inadequate capacity in the foul sewerage network to serve the development and that improvement are necessary to serve the development. Please refer to Chapter 3 in terms of existing water utilities constraints.

2.4 GROUNDWATER

Based on the Geo-Environmental Investigation carried out by WSP in parallel to this study, groundwater beneath the site is likely to be tidally influenced; the EA identified groundwater to be approximately 1 m AOD.

No history of groundwater flooding has been mentioned by any of the consultees.

3 Flood Risk Management and development of the area

3.1 INTRODUCTION

Due to its location largely within the defended tidal floodplain, the sustainable re-development of the area requires careful consideration and management of tidal flood risk. Any proposed masterplan would need to minimise flood risk mitigating it by design in line with the requirements of PPS25 and of the EA.

The sustainable management of surface runoff would also need to be at the core of any proposed masterplan. On this note, due to the substantially impermeable nature of the area, the optimisation of Sustainable Drainage Systems (SUDS) offers an excellent opportunity to provide ecological improvement and amenity for future residents while ensuring the appropriate management of surface water runoff.

The sections below provide advice on the general aspects which should be considered in developing a masterplan for the area in order to ensure a sustainable management of flood risk:

- Sequential Test
- State of the tidal flood defences
- Habitable levels
- Safe access
- Floodplain Storage Capacity and Conveyance Issues
- Emergency Planning
- Maintenance Strip
- Existing drainage services
- Sustainable Drainage

However, those provided are just general principles and advice that would need to be discussed and agreed with the EA and the other relevant authorities at the time of any proposed development of the area.

A full Flood Risk Assessment (FRA) would also be required to support the planning application for the area in line with PPS25 and the EA Standing Advice.

3.2 SEQUENTIAL TEST

In line with PPS25, development should be directed towards areas at low risk of flooding through a sequential approach which gives precedence to areas within Flood Zone 1. Only if there is no reasonably available site in Flood Zone 1, the flood vulnerability of the proposed development can be taken into account in locating development in Flood Zone 2 and then Flood Zone 3.

The application of the Sequential Test will be responsibility of the Local Planning Authority (i.e. Medway Council). Policy S9 of the Local Plan, a policy specific to the area states that:

At the Historic Dockyard, Chatham, as defined on the proposals map, development that respects the historic character of the site will be permitted. The standard of urban design must be of the highest order.

Chatham Maritime Interface is largely located within Flood Zone 3; assuming that the site passes the Sequential Test, development should be sequentially allocated within the site putting less vulnerable development (e.g. commercial spaces) within the highest risk areas and the more vulnerable development (e.g. residential units) within the lowest risk areas.

However, it is acknowledged that the highest risk areas along the River Medway are also the most desirable and the financial viability of any proposed scheme could depend on using those areas for residential development.

Any proposed layout would therefore need to be discussed with the EA and the local planning authority at the time of the planning application and adequate flood risk mitigation measures implement if residential development in the higher risk areas is proposed.

The Exception Test would also need to be applied and passed if residential development is proposed within Flood Zone 3.

3.3 STATE OF THE TIDAL FLOOD DEFENCES

The site is defended against tidal flooding by tidal flood defences. The Medway Estuary and Swale Shoreline Management Plan (Consultation Draft) confirms that the preferred long term plan for the area is to maintain protection against tidal flooding.

The standard of protection, based on the information provided by the EA, appears to be in excess of 1:200.

However, the EA have indicated that the existing hydraulic modelling of the River Medway is currently being refined and the modelled flood water levels could therefore be updated in future; as such the standard of protection would need to be verified in discussion with the EA at the time of any future planning application for the site.

Furthermore, the EA indicated that the defences may require attention and the integrity of the wall in some places is in doubt; also, the concrete wall to the south of the site is discontinuous in several places with protection depending on the integrity and closure of the existing steel gates and barriers at the slips and dry docks.

Therefore, any future development of the area would need to be supported by a comprehensive assessment of the structural state and standard of protection provided by the flood defences and potentially some improvement works would be required in order to ensure an adequate standard of protection.

A breach analysis through hydraulic modelling would likely be required in order to assess potential flood water levels and impacts on the site in case of future collapse and overtopping of the tidal flood defences.

Further, as the site could be affected by a breach or overtopping of the defences elsewhere (e.g. to the south, along the dry docks) it would also be important to investigate as far as possible the state and standard of protection of the defences off site in order to take into account every potential flood risk scenario.

Whilst the EA often seeks to encourage developers of waterside schemes to create low lying ground in waterside areas this option is not proposed for the future masterplan in the light of the historic nature of the Chatham Maritime Interface and the various constraints that limit the re-development of the site. However, if some localised managed realignment is considered viable and appropriate (given the historic context) at the time of the future application for the site, it could provide opportunities for recreation, amenity and environmental purposes improving the sustainability of the proposal in line with the guidance of PPS25. Should a managed realignment of the defences be carried out, consideration should be given to the protection of the historical river wall which is located inland of the current defences.

3.4 HABITABLE LEVELS

As mentioned above, the hydraulic modelling is currently being reviewed by the EA and the 200-1000 year return period modelled flood water levels could therefore change in the future.

Based on our discussion with the EA, as a general rule sleeping accommodation should be set to a level no lower than the 200 year flood water level + climate change allowance (100 years) + a freeboard variable between 300-600mm to be agreed with the EA. Based on the available information it is expected that the sleeping accommodation should therefore be set no lower than approximately 6.3-6.6 m AOD depending on the future modelling results.

Based on discussion with the EA, residential, non-sleeping accommodation could be set slightly lower than the sleeping accommodation (i.e. by reducing the freeboard above the 200 year flood water level + CC) due to its lower vulnerability, as long as the safety of the defences is investigated and confirmed. It is therefore expected that the residential non-sleeping accommodation should be set no lower than approximately 6.0 – 6.3 m AOD depending on the future modelling results

Commercial levels could be set in line with the existing ground levels as long as safe access or safe refuge to the first floor is provided.

Semi-basement car parkings could be acceptable as long as the entrance/exit is set above the 200 year flood water level + climate change allowance and no openings are proposed at a lower level.

3.5 SAFE ACCESS

Due to the location of large parts of the Chatham Maritime Interface within the tidal floodplain, it will be important to ensure the safety of future residents of the area through the provision of a safe access and egress route to out of the floodplain at or above the potential level of flooding. The safe access and egress route would also allow emergency services to access the area during a flood event; as such ideally safe access should allow vehicular access although it is acknowledged that this is not always feasible.

Discussion with the EA confirmed that safe access should be provided at a level at least equal to the 200 year flood water level + climate change allowance (100 years) and should be available for all the future residents of the area. Based on the modelling results currently available this would be 6.1 m AOD although the modelled level could

change in the future. Further discussion with the EA is recommended at the planning stage.

Safe access should be integrated within the design in the best possible way such that it does form part of the layout and is used frequently by residents and users of the development (e.g. raised paths through land re-shaping and corridors linking the buildings). Other options as for example bridges between the buildings, could be investigated; however, it should be borne in mind that emergency routes which are used only in time of flooding could cause issues in terms of maintenance and security and their effective availability in time of flooding would be more difficult to demonstrate.

Based on the topography of the area and the floodplain contour the most logical escape route to out of the floodplain would be directed from west towards east. Escape routes towards north would require off-site land raising as the land to the north of the Chatham Maritime Interface is located within the floodplain

In case safe access cannot be provided for parts of the development (e.g. development fronting the River Medway, far away from the floodplain contour) it would be essential to demonstrate that the safety of the scheme can still be ensured through alternative mitigation measures. For example it would be important to demonstrate that the duration of flooding would be limited and that people could stay safely at home during the flood event.

Discussion with the emergency services and with the EA would be required in order to confirm that they are happy with the proposed solutions.

3.6 FLOODPLAIN STORAGE CAPACITY AND CONVEYANCE ISSUES

Within fluvial floodplains land raising can reduce the space available for water increasing flood water levels and risk elsewhere. Within tidal floodplains, usually floodplain storage capacity does not represent an issue as the flood water level is less influenced by the available floodplain storage capacity. However, previous investigation in the Chatham area demonstrated that significant land raising can negatively affect flood water levels despite the tidal nature of flooding within the area.

A limited reshaping of land, for example in order to provide safe access, is unlikely to significantly affect the flood water levels; the significance of any limited land raising would be further reduced by the extreme nature of a potential flooding event due to the presumed future high standard of protection within the area which would make flooding extremely unlikely.

However, more extensive changes in the floodplain storage capacity would need to be discussed with the EA and potentially hydraulic modelling could be required in order to demonstrate that the proposed scheme does not increase flood risk elsewhere.

3.7 EMERGENCY PLANNING

It would be advisable to produce a Flood Warning and Evacuation Plan before the development is occupied in order to ensure that appropriate emergency measures are in place in time of flooding and the safe access and egress routes clearly signalled. It is also recommended that the future managers/residents of the development subscribe to the 'FloodLine Warning Direct' service offered by the EA to receive a flood warning in

case of expected flooding and be able to put in place any necessary emergency procedures.

3.8 MAINTENANCE STRIP

Any works carried out within 15 metres from the foot of any flood defences would need previous formal consent of the EA in line with the Water Resources Act 1991 and associated Byelaws. A strip of land between the defences and the development is required to ensure access for maintenance but would also offer opportunities for biodiversity and amenity.

Early discussion with the EA is recommended and it is envisaged that, as an absolute minimum, a 5 metre wide strip would be required, although this would be subject to discussion with the EA.

3.9 EXISTING DRAINAGE SERVICES

There are both existing surface water and foul water sewers that cross the site.

The existing surface water system contains a large diameter surface water sewer (1500mm dia) which was installed to attenuate surface water run-off from other phases north of the development site (e.g. Leviathan Way & Western Avenue). Encroachment on its easement should be avoided.

Other notable surface water features include the open and tidal, north mast pond, which is connected to the Medway via an historic brick built culvert. The north mast pond is likely to be a suitable point to attenuate surface water from the development although it is understood to have scheduled ancient monument designation, so early consultation and consent for any works to the fabric or structure of the pond will be essential. It is also believed that the brick culvert falls under the same designation and similar consents may therefore be required.

Foul water sewers also cross the site at various points to serve buildings that will remain. Whilst the existing services will need to be maintained to any occupied premises, suitable diversion and upgrading works will almost certainly be required to accommodate any proposed scheme within the local public sewer network.

Southern Water indicated that there is inadequate capacity in the foul sewerage network to serve future development and that improvements would be necessary.

Early discussion with Southern Water is recommended, they have highlighted the need for a Level 2 Capacity Check in order to assess what improvements are necessary to accommodate the development of the area.

3.10 SUSTAINABLE DRAINAGE

In line with PPS25 and the EA requirements it is recommended that as part of any future development of the area sustainable drainage systems (SuDS) are investigated and maximised (e.g. green roofs, rainwater harvesting). Due to the location of Chatham Maritime Interface in close proximity to the River Medway it is expected that surface water will be discharged into the river. Although there is no need for attenuating the

discharge, allowance for tidal locking will be required in order to ensure that even in time of high tide there is sufficient capacity within the surface water drainage network to manage surface water runoff. It is likely that the North Mast Pond could provide sufficient storage capacity for this purpose although this would need to be investigated at the planning application stage.

The EA have also indicated that a degree of attenuation may be required for water quality purposes, typically the 60 minutes storm with a 5 year return period.

Appendices, Figures & Tables
