

GRAIN LNG IMPORTATION FACILITY

**National Grid Grain LNG Limited**

Environmental Impact Assessment  
Volume 3 Non Technical Summary

*Grain LNG Phase 3 Expansion*

**June 2006**

**nationalgrid**



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*Nitrogen Facility*

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## **NON TECHNICAL SUMMARY**

This document is the Non Technical Summary of the Environmental Statement (ES) prepared by Environmental Perspectives on behalf of National Grid Grain LNG Ltd. to accompany the planning application submission for the Grain LNG Phase 3 Grain LNG Importation Facility upgrade (the “*proposed development*”).

## **INTRODUCTION**

National Grid Grain LNG Ltd. (the “*Applicant*”) is seeking full planning permission and other consents, licenses and permissions to construct additional Liquefied Natural Gas (LNG) importation facilities at the Grain LNG Importation Facility, on the Isle of Grain, Kent.

The Phase 3 proposed development comprises the following elements:

- Demolition of the existing Jetty 8;
- Construction of new jetty approach and jetty head (New Jetty 8);
- Construction of a short section of above ground LNG pipeline;
- Construction of 2 LNG storage tanks, and vaporisers, compressors and other processing equipment; and
- Construction of a Nitrogen facility.

## **THE SITE**

The application site is located at the eastern end of the Hoo Peninsula, on the north bank of the Medway Estuary, on the Isle of Grain, near Rochester in Kent.

Ordnance Survey reference for the application site is NGR 587605 175315 and a site plan showing the location of the application site and the surrounding area can be found at Figure 1.

## **THE EIA LEGISLATIVE FRAMEWORK**

The Environmental Impact Assessment (EIA) is a systematic process during which potential significant environmental effects from a proposed development are identified, assessed and the scope for minimising these

presented within an ES to the relevant decision maker, in this case Medway Council.

There are two types of development that may be subject to EIA as defined by the *Town and County Planning (Environmental Impact Assessment) (England and Wales) Regulations, 1999* (“the EIA Regulations”).

These are:

- Schedule 1 Developments; and
- Schedule 2 Developments.

It is mandatory for any development falling within the description of a Schedule 1 Development to be subject to an EIA. Applications for permissions relating to Schedule 1 Developments must be accompanied by an ES.

It is not always mandatory for Schedule 2 Developments to be subject to an EIA. The EIA Regulations categorise development types and provide thresholds to assist with the identification of Schedule 2 Developments that may require an EIA.

The proposed development is not a Schedule 1 Development as defined by the EIA Regulations. Paragraph 10 (Infrastructure Projects) of Schedule 2 includes ‘Oil and gas pipeline installations’ where the area of development exceeds 1 hectare. Accordingly the proposed development falls under Schedule 2 and represents an EIA Development under the EIA Regulations.

In accordance with the EIA Regulations this ES will accompany the application submitted for the proposed development on behalf of the applicant.

The ES identifies the potential environmental effects likely to result from both the construction and operation phases of the proposed development. The significance of these effects are determined and where any adverse effects are identified, measures to avoid, minimise or compensate for these effects are proposed. The information within the ES will be a material consideration during the planning decision process.

## NON TECHNICAL SUMMARY

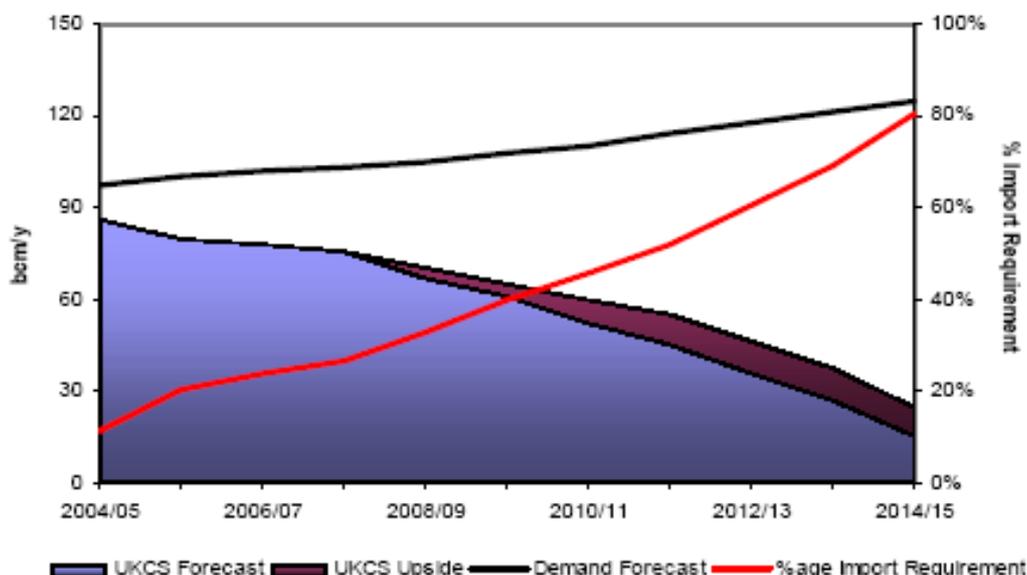
The Non Technical Summary is intended to provide members of the public and any other interested parties without specialist technical knowledge, with information to understand the proposals and the principal findings of the EIA, as presented in the ES.

## BACKGROUND

### UK Gas Importation

The UK was a net exporter of natural gas for over 20 years but in 2004, declining North Sea production meant that the UK became a net gas importer. Although the majority of the gas consumed in the UK is still sourced from fields in the UK sector of the North Sea, the ability to produce gas domestically is forecast to decline rapidly, so that by 2010 around 50% of UK demand will have to be met by imports, rising to 90% by 2020<sup>1</sup>.

**Figure 2 UK Production Forecasts and Import Requirement<sup>2</sup>**



As UK production declines, natural gas will need to be imported from three groups of sources:

- across gas interconnectors from Europe;

<sup>1</sup> Gas demand is normally measured in billions of standard cubic metres per year (bcm/yr). Total UK demand is forecast to rise at an average rate of 2% year for the foreseeable future. Figures from National Grid Gas Ten Year Statement 2005/6.

<sup>2</sup> Source: TYS 2005, Figure 4.6A

- by pipeline from the Norwegian sector of the North Sea; and
- as Liquefied Natural Gas (LNG) from a variety of sources to at least three LNG terminals.

### **The Grain LNG Importation Facility**

LNG is formed from natural gas by a super-cooling process known as “*cryogenic cooling*”. This liquefies the natural gas allowing its efficient transportation because the volume of liquid is much less than that of the equivalent gas. LNG is transported by sea in purpose-built ships.

The first modern LNG terminal in the UK, the Isle of Grain LNG Importation Facility, at the Isle of Grain in Kent, opened for commercial operations in July 2005 (the Phase 1 Development). Currently, the terminal is able to receive up to 3.3 million tonnes per year (mtpa) of gas as LNG, equivalent to about 4% of current UK gas demand. In August 2004 planning permission was granted for three additional LNG storage tanks, regasification facilities and ancillary development (the Phase 2 Development). The Phase 2 Development, currently under construction, will increase the terminal’s capacity to around 9.8 mtpa or 12% of current annual UK demand. It is scheduled to be commissioned by mid 2008 and will be available to receive commercial cargoes by winter 2008 / 2009.

## **STATEMENT OF NEED**

### **Benefits of LNG**

For distances greater than about 700 miles (1,100 km), it is cheaper to move gas by ship as LNG rather than by submarine pipeline. If the source and destination can be linked by onshore pipelines, this distance increases to about 2,200 miles (3,500 km).

Shipping LNG has the additional benefit that the supply route is less vulnerable to political upheaval in transit countries than piped gas. This vulnerability was illustrated in January 2006 when a disagreement between Russia and Ukraine briefly threatened gas supplies to several countries in Central and Western Europe that are heavily dependent on gas pipelines which cross Ukraine.

Similarly, the limited response by European gas markets to high UK prices over the winter of 2005 / 2006 restricted gas flow to the UK via the

Interconnector, raising questions about whether European pipeline operators were restricting gas flows towards the UK in order to protect their own reserves in the event of future shortages. While the European Commission continues to push for greater liberalisation of European markets, this agenda has so far had limited success in key markets such as France and Germany, which are also significant transit countries for Russian gas flowing towards the UK.

### **Energy Policy & Markets**

For well over ten years, it has been the policy of both Conservative and Labour Governments that the UK's energy needs should be met through the operation of the market. In this policy context, the question of whether there is an economic demand for the additional capacity to be provided by Grain LNG Phase 3 can only be answered by participants in the UK's energy markets.

Therefore, if UK energy market participants are willing to purchase long term capacity rights at the terminal, the Applicant would regard this as demonstrating a clear economic need for the capacity to be built.

In November 2005, the Applicant initiated a commercial sale process whereby market participants can bid to acquire rights to the capacity to be built under Phase 3. The Applicant has now received initial, non-binding bids from a number of interested parties, and has discussed these bids with those parties. While details are strictly confidential, the level of interest is very strong, more than sufficient to justify continuing to move forward with the Phase 3 proposed development. The strength of this interest reflects the continued and growing need for secure and diverse gas supplies. The Applicant recently invited interested parties to submit firm bids for Phase 3 capacity.

### **Need And Security Of Supply Benefits**

The Applicant's view, based on current market interest in the proposed development and our assessment of the likely load factors of other importation routes, is that there is a need for more capacity to provide greater market access as well as sufficient capacity margin to enhance security and diversity of supply.

This view is supported by recent Government statements. In a Ministerial Written Statement entitled "*Energy Statement of Need for Additional Gas*

*Supply Infrastructure*”, published 16 May 2006<sup>3</sup>, the Secretary of State for Trade and Industry recognized that “*new gas supply infrastructure is needed to increase Great Britain’s capacity to import, store and transport gas efficiently*”. In a statement to planners released on the same day<sup>4</sup>, the Secretary of State also referred to “*the compelling economic case for speeding up planning decisions on new gas import and storage facilities*”.

Similarly, the Department for Transport’s (DfT) current review of ports policy<sup>5</sup> anticipates “high growth in certain bulk commodity traffics (notably liquefied natural gas or LNG)” and notes that the “range of potential sites for LNG imports is limited”. A report produced for the DfT as background to the discussion<sup>6</sup> noted “The new LNG port facilities on the Isle of Grain and at Milford Haven will be handling additional LNG volumes” and “There are likely to be an opportunities for ports to develop additional LNG import capacity at suitable locations, subject to securing planning permission.” This supports the applicant’s view that additional LNG importation capacity at the Isle of Grain is an appropriate response to a real national need.

### **Security And Diversity Of Gas Supply**

For UK gas customers, competition between multiple LNG and piped gas importers should lead to downward pressure on gas prices, but this requires that there is importation capacity margin at times of peak demand.

LNG regasification capacity margin is desirable because the capacity owners at the various terminals will have contracted for LNG supplies from a variety of sources, potentially including North and West Africa, Russia, Trinidad and several countries in the Middle East. Thus the UK is less exposed to technical problems or political risks at any particular LNG source, as the various competing LNG shippers put together a diversified supply portfolio to serve the UK market.

### **Infrastructure Resilience And Operational Benefits**

The addition of a second jetty will allow the terminal to increase vessel calls by approximately 60% above the combined capacity of the Phase 1 and Phase 2 Developments (i.e. up to 270 calls / year). Thus, one of the strategic

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<sup>3</sup> Source: <http://www.dti.gov.uk/files/file28954.pdf>

<sup>4</sup> Source: <http://www.gmn.gov.uk/Content/Detail.asp?ReleaseID=201736&NewsAreaID=2>

<sup>5</sup> Source: “Ports Policy – your views invited. DfT’s discussion document for the Ports Policy Review” (May 2006) at [http://www.dft.gov.uk/stellent/groups/dft\\_shipping/documents/page/dft\\_shipping\\_611693.pdf](http://www.dft.gov.uk/stellent/groups/dft_shipping/documents/page/dft_shipping_611693.pdf)

<sup>6</sup> Source: “UK Port Demand Forecasts to 2030 – Final Report by MDS Transmodal Ltd” (May 2006), at [http://www.dft.gov.uk/stellent/groups/dft\\_shipping/documents/page/dft\\_shipping\\_611699.pdf](http://www.dft.gov.uk/stellent/groups/dft_shipping/documents/page/dft_shipping_611699.pdf)

advantages of adding a second jetty is that, should one jetty be unable to operate, the majority of the terminal's capacity would remain available, as around 165 ships per year would still be able to unload across the second jetty. Whereas a malfunction on the existing single jetty would reduce UK import capacity by 12% of current annual demand (once the Phase 2 Development comes on line), the construction of a second jetty as part of Phase 3 would limit the loss of capacity due to a jetty malfunction to around 6% of current annual UK demand.

In the winter of 2005 / 2006, the availability of gas from the Isle of Grain LNG Facility was a significant contributing factor in maintaining adequate gas supplies throughout the winter and ensuring that National Grid Gas (NGG<sup>7</sup>) did not have to resort to interruption of industrial gas users, including gas-fired power stations. Construction of a second jetty would therefore represent a significant security of supply benefit through an increase in the resilience of the UK's gas supply infrastructure.

The Isle of Grain terminal is designed to be operated with Phases 1, 2 and (if approved) 3 as a single operational entity. This will allow the tanks, regasification equipment and associated processes such as gas blending<sup>8</sup> to be operated in the most efficient manner possible. By increasing the total amount of tank space and the amount of associated process equipment, integrating the Phase 3 expansion with the two earlier phases will enhance these benefits.

By contrast, a new standalone terminal elsewhere in the UK with the same capacity as Phase 3 would be expected to have lower levels of resilience and operational efficiency, to have additional environmental impacts and to be more expensive than Phase 3. The Isle of Grain terminal will benefit from higher levels of equipment resilience than would two separate terminals with the same amount of infrastructure split between them.

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<sup>7</sup> NGG is the regulated owner and operator of the UK's gas transmission network, the National Transmission System (NTS) and the regulated owner and operator of around 50% of the UK's gas distribution infrastructure, the Local Distribution Zones (LDZs). It is a subsidiary of National Grid, which is also the parent company Grain LNG and of National Grid Property Holdings Ltd, the freeholder for the wider Isle of Grain site.

<sup>8</sup> Natural gases from different sources around the world vary in their precise chemical composition and energy content. The process of liquefying the gas into LNG also has a significant effect on the final gas composition. Gas to be supplied to the UK's National Transmission System must meet legally binding gas specifications, and LNG from many sources does not meet these criteria on arrival in the UK. Gas blending refers to a number of measures which can be taken to ensure that imported LNG does meet these characteristics, including mixing LNGs from different sources, adding nitrogen to the gas to reduce its energy content, or adding propane to the gas to boost its energy content.

All of these arguments combine to make the proposed Isle of Grain terminal expansion a highly efficient and economic way to increase total UK gas importation capacity, bringing significant security of supply and source/market diversity benefits, in a site favourably located close to the UK's largest gas markets.

## **SITE DESCRIPTION & HISTORY**

The application site is currently owned by National Grid Property Holdings Ltd, an affiliate of the applicant and a wholly owned subsidiary of National Grid, an international utility company whose core business is the management of large and complex energy networks across England and Wales. The application site forms part of a larger area of land owned by the National Grid group of companies, which was formally an oil refinery operated by BP (the Grain Site).

The land use across the Isle of Grain is predominantly agricultural and the nearest settlement to the application site is Grain village, located to the east of the proposed development. The area surrounding the Grain Site is flat and low-lying and interspersed with creeks, marshland and low tidal flats, which form part of the South Thames Estuary to the north and the Medway Estuary to the south.

The area to the eastern end of the Hoo Peninsula has a long established industrial heritage. The Grain Site was formerly a BP oil refinery, which was decommissioned in 1984. The majority of the former oil refinery is vacant and underused, and the site is predominantly flat, bare and devoid of above ground structures. Located to the south west of the proposed development is Medway Power Station, and beyond this are Thamesport Container Terminal, Foster Yeoman aggregate business and BP aviation fuel depot. Located to the east of the proposed development is Grain Power Station, beyond which is the Medway Estuary and Marshes Special Protection Area (SPA), Ramsar Site and two Sites of Special Scientific Interest (SSSI): the South Thames Estuary and Marshes SSSI and the Medway Estuary and Marshes SSSI.

## **SITE SELECTION**

The additional two LNG tanks proposed will be sited adjacent to the existing 3 LNG tanks, which are located in the north west corner of the site to preserve the development potential of the land to the south for port-related activities

and other appropriate development. Safety assessments carried out using HSE methodologies demonstrate that the addition of two tanks, associated process equipment and the new jetty will have no significant impact on permissible development types on the wider National Grid Property Holdings site.

The proposed new Jetty 8 will be located near to LNG Jetty 10 and the existing LNG transfer pipe to minimise additional land take in this area of the peninsula. The location of the proposed development close to existing LNG importation infrastructure is not only more efficient for LNG importation, it enables the land in the south west quadrant of the wider National Grid Property Holdings site, which has better access to existing road and rail infrastructure and is adjacent to existing deepwater berths, to be fully utilised for port-related developments.

## **PROPOSED DEVELOPMENT**

A plan showing the location of the proposed development is included in Figure 1. The proposals include the following activities to be concentrated in three areas and for the purposes of the ES will be known as the 'Southern Zone', the 'Central Zone' and the 'Northern Zone', as illustrated on Figure 1:

1. Demolition of an existing jetty structure (Jetty 8) including stripping and removal of the jetty approach walkway, cutting of jetty approach piles approximately 1m below current river bed level and removal of resulting piles;
2. Construction of a new jetty (New Jetty 8) in the Southern Zone comprising equipment to unload LNG from ships, berthing and mooring dolphins, emergency walkways, a jetty approach to accommodate vehicular access, an instrument control room and appropriate emergency equipment;
3. Construction of jetty approach consisting of a LNG pipe rack and vehicular access elevated above the existing Port Victoria Pier and existing sea wall. An existing internal access road will be extended to connect to the vehicular deck access via a deck access ramp;
4. Reinstatement by dredging of the existing berth box to accommodate LNG carriers;

5. Erection of equipment landwards of the existing sea wall comprising a nitrogen generator, jetty control room, diesel generator and electricity sub-station;
6. Construction of a pipeline to connect the jetty head in the Southern Zone to the existing LNG transfer pipeline corridor passing above the sea wall. This will comprise:
  - (i.) An LNG transfer pipeline corridor;
  - (ii.) A recirculation line;
  - (iii.) A vapour return pipeline;
  - (iv.) Horizontal expansion loops;
  - (v.) Support structures in the form of trestles to carry the pipeline above the existing sea wall;
  - (vi.) A concrete channel containing the pipeline and running landwards from the sea wall to the existing LNG transfer pipeline corridor; and
  - (v.) A pipeline running from the jetty to a vent stack.
7. Construction of two LNG storage tanks in the Northern Zone (Figure 1), each having a capacity of 190,000m<sup>3</sup>;
8. Installation of six submerged combustion vaporisers;
9. Construction of an associated Nitrogen facility in the Northern Zone;
10. Provision of related infrastructure including:
  - (i.) Pipe racks connecting the new tanks to the existing site pipe racks;
  - (ii.) Unloading line from the closest point of the existing above ground LNG transfer pipeline corridor to the tanks;
  - (iii.) External tank pumps;
  - (iv.) Boil off gas compressors;
  - (v.) An impounding basin;
  - (vi.) Flow meters to monitor volume of natural gas;
  - (vii.) Power connections;
  - (viii.) Provision of internal site access roads;
  - (ix.) 2.5m palisade security fence topped with barbed wire surrounding the new facilities and contiguous with the existing boundary fence; and
  - (x.) A vent stack.

11. Temporary lay down area located in the Northern Zone for the construction phase of LNG storage tanks and associated plant; and
12. Temporary lay down area located in the Central Zone for the construction phase of the New Jetty 8 and associated works.

### **Demolition Of Existing Jetty**

The existing Jetty 8 approach and jetty head will be removed in a controlled manner in the following stages:

- Stripping and removal of jetty approach walkway;
- Cutting of the jetty approach piles 1m below ground level; and
- Removal by crane of the resulting piles.

### **New Jetty 8**

The new Jetty 8 will be constructed between the existing Jetty 8 approach to the west, and Jetty 9 to the east on the north bank of the Medway Estuary. It will comprise a pier approximately 140m in length leading to the jetty head, a solid platform approximately 43m long and 41m wide. This will be designed to receive LNG carrier vessels transporting LNG from overseas. The jetty will have associated offshore and onshore processing equipment to facilitate the transfer of LNG from the carriers to the LNG transfer pipeline.

### **LNG Transfer Pipeline**

To receive the LNG from the new Jetty 8 and transfer it to the existing Grain LNG processing site, a length of above ground LNG transfer pipeline will be constructed from the new Jetty 8 and connecting into the existing LNG transfer pipeline. The pipeline will be walled within a concrete channel, 7m wide and 2m high along its length.

### **LNG Storage Tanks**

The capacity of the LNG process plant is being maximised to store and process the increased volumes of LNG being imported and transferred from the new Jetty 8. This will require the construction of an additional 2 storage tanks.

Each tank will be 48.7m high with a diameter of 87.4m and have a capacity of 190,000m<sup>3</sup>. The minimum distance between the tanks (centre to centre) will be 127.5m.

Associated with the tanks will be processing equipment necessary for the conversion of LNG to natural gas. This will be located adjacent to the two LNG storage tanks. The key piece of processing equipment associated with the two new tanks will be addition of 6 vaporisers that are necessary to convert the LNG at a temperature of minus 160°C into natural gas at 6°C

### **Nitrogen Facility**

The variable nature of the receiving LNG results from the various locations around the globe from which it is sourced. So that it can be accepted into the UK supply system, LNG needs to have uniform characteristics and this is achieved through the introduction of nitrogen gas obtained from separation of nitrogen from atmospheric air. A nitrogen ballasting plant is an integral part of the LNG process.

## **CONSTRUCTION**

The principal contractor will be required to develop a Health and Safety Plan, a Construction Environmental Management Plan (CEMP) and detailed plans / procedures showing how they will implement the agreed mitigation measures set out in this ES and work in accordance with National Grid's environmental management policies and requirements.

To minimise disturbance and impacts on the receiving environment during demolition and construction works, the CEMP will detail the practical measures required to ensure that legislative and regulatory requirements are met and best practice, as outlined in Pollution Prevention Guidelines, Codes and Standards, is implemented. It will cover all main construction activities including site clearance, piling, and construction of the proposed development.

Construction of the proposed development will be carried out in accordance with health and safety legislation, applicable standards and design codes. The requirements of the Management of Health and Safety at Work Regulations, 1992, the Construction (Design and Management) Regulations, 1994 and the Construction (Health, Safety and Welfare) Regulations, 1996 will be adhered to.

The proposed development is anticipated to be under construction for 3 to 4 years, commencing on site in Spring 2007. Construction and demolition works

will occur in phases and there will be periods during which it will be necessary to continue construction works 24 hours a day.

During the construction phase, additional equipment will be temporarily required on site including a concrete batching plant; two construction compounds; three tower cranes and an access route for construction traffic across the application site from the B2001. It is proposed to utilise a combination of road, rail and sea transport to bring in plant, materials and equipment. The procurement of materials and their transport to the site are a matter for the appointed Principal Contractor to confirm. However, within this ES, the following scenarios have been assessed for the construction of the new section of LNG transfer pipeline and the construction of the 2 new storage tanks:

- Scenario 1: All bulky materials by road (A228/B2001) with concrete batching on-site;
- Scenario 2: All bulky materials by sea or rail (e.g. Thamesport, Foster Yeoman and B2001) with concrete batching on-site.

A number of temporary facilities will be required during the construction phase of the project, including:

- contractors' compound including temporary offices;
- storage areas for materials, fuels, plant and equipment;
- pre-fabrication area for piles and steelwork;
- emergency back-up electricity supply;
- waste management facilities;
- car parking facilities; and
- welfare facilities.

## **CURRENT OPERATION**

The existing Grain LNG Importation Facility is used for the importation and processing of natural gas in liquid form from overseas, which supports the energy supply network of the region and the UK. The principle operational processes associated with the Grain Importation Facility are as follows:

- Importation and reception of LNG (including vessel movements);

- Storage of LNG; and
- Export of natural gas.

LNG is formed from natural gas by a super-cooling processes known as “cryogenic cooling”. This compresses and liquefies the natural gas allowing its efficient transportation because the volume of liquid is considerably less than that of gas. LNG is transported by sea in purpose-built vessels (LNG carriers). LNG carriers already visit the existing Jetty 10 on the north bank of the Medway Estuary. LNG is offloaded and pumped to the LNG storage tanks and process plant some 3.3km distance by means of an existing above transfer pipeline serving Jetty 10. LNG is stored in LNG storage tanks located at the LNG storage and processing site. When required, LNG is pumped from the storage tanks and converted back into natural gas (through a process called “vaporisation”). It is then fed into the existing high pressure natural gas pipeline that connects the LNG process plant to the UK gas National Transmission System (NTS). The NTS is a distribution system of high pressure pipelines, buried underground, which transport gas from the main coastal terminals, which receive LNG imports, to the consumer.

With the Phase 2 works complete, the existing LNG jetty, constructed as part of Grain Phase 1, will be operating at its maximum capacity and able to receive up to 165 vessel calls per year. The consented Phase 2 works will increase the Importation Facility’s capacity from 3.3 million tonnes per year (mtpa) of gas as LNG (4% of current UK demand) to 9.8 mtpa, or around 12% of annual UK demand.

## **PROPOSED OPERATION**

The operation and maintenance of the proposed LNG storage tanks and new Jetty 8 will utilise similar processes and procedures to those existing at the Grain LNG Importation Facility with the exception of an increased volume of LNG being processed through the development.

A strategic advantage of adding a second jetty is that, should one jetty be damaged, much of the terminal’s capacity would remain available as up to 165 ships per year would still be able to unload across the second jetty. Whereas a malfunction on the existing Jetty 10 would reduce UK import capacity by 12% of annual demand (once the Phase 2 Development is complete). Thus, the construction of a second jetty as part of Phase 3 limits

the loss of capacity due to a jetty malfunction to around 6% of annual UK demand.

Once the construction of the proposed new jetty (Jetty 8) is complete, the Facility will be able to receive up to 270 vessel calls per year, increasing throughput by approximately 50% to 15 mtpa per year, capable of satisfying 18% of UK demand.

## **ENVIRONMENTAL MANAGEMENT**

The principal contractor will be required to develop and implement a Health and Safety Plan (HSP), Construction Environmental Management Plan (CEMP) and detailed Plans and Procedures on the design and construction of the project, having regard to the environmental impacts and mitigations identified in this ES. Implementation of the HSP, CEMP and associated procedures will be monitored and audited to ensure that the environment is suitably protected before and during construction and commissioning.

A comprehensive set of environmental and operational procedures has been developed to operate the LNG Importation Facility. These will be reviewed and amended to take account of the changes proposed to the operation of the site. Procedures that will be revised will include the site Environmental Emergency Response Plan.

## **ECOLOGY**

An assessment was undertaken to establish the effects of the proposed development on the ecology of the application site and the ecology and integrity of the surrounding area in terms of nature conservation.

The Isle of Grain has an agricultural and industrial heritage. However, agricultural land use practices have been declining over the decades and this has resulted in a decline in the conservation value of the area. The resultant effect is the colonisation and encroachment of scrub across the grasslands and the infilling of many of the ditches characteristic of the grazing marshes.

The Isle of Grain and the estuary still retain some of their interesting fauna and flora. This has been recognised by the inclusion of parts of the Isle of Grain in the Medway Estuary and Marshes Special Protection Area (SPA), Ramsar Site and Special Scientific Interest (SSSI) and the South Thames Estuary and Marshes SPA, Ramsar Site and SSSI.

Consequently, an ecological survey of the application site was undertaken in March 2006, which was supplemented with existing ecological data pertinent to the application site that has been collected from 1991 onwards.

With regard to flora present on the application site, the ecological survey data identified the potential for one nationally scarce plant species: Divided Sedge (*Carex divisa*) to be present and if found, effective mitigation measures would be implemented to ensure the species is not compromised by the proposed development.

The proposed development comprises activities both on land and on the foreshore therefore the potential impact on benthic estuarine, terrestrial and freshwater invertebrates was considered. The loss of intertidal mud is predicted to be minimal and there is expected to be no effects of construction and operational elements of the proposed development on benthic invertebrates. The application site was considered to have potential for a range of terrestrial and freshwater invertebrate species such as grasshoppers and bush-crickets (Orthoptera); spiders (Araneae); beetles (Coleoptera) and dragonflies. A number of nationally rare and nationally vulnerable invertebrate species have been recorded in the vicinity of the application site and may potentially be present on the application site. However, it is considered that the integrity of invertebrate populations would not be significantly affected by the proposed development.

Fauna that were considered to potentially be present in low numbers included Common Lizard, Grass Snakes, and Adder. There are no water bodies such as ponds within the application site although Great Crested Newts and Water Voles are known to be present in water bodies in the near vicinity.

It is thought that the proposed development would have a neutral impact on fish populations.

The dominant species group is birds although the application site does not provide breeding habitat for any species listed on Annex 1 of the EU Birds Directive. However, it was noted that a pair of Peregrine held territory on the Grain Power Station (to the northeast of the application site) and regularly foraged over the application site. Three species (Skylark, Linnet and Reed Bunting) placed on the Red List of Birds of Conservation Concern<sup>9</sup>, species

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<sup>9</sup> Gregory, R.D., Wilkinson, N.I., Noble, D.G., Robinson, J.A., Brown, A.F., Hughes, J., Proctor, D.A., Gibbons, D.W. and Galbraith, C.A. (2002). The population status of birds in the United Kingdom, Channel Islands and Isle of Man: an analysis of conservation concern 2002-2007. *British Birds* 95: 410-450.

whose breeding population or range has contracted by 50% or more in the preceding 25 years, occurred in close proximity to the application site. These species are also listed as UK Biodiversity Action Plan (UK BAP) Priority Species. It is considered however, that the breeding population of these species would not be significantly affected by any habitat loss caused by the proposed development.

Appropriate mitigation measures will be implemented during the construction phase to minimise adverse impacts resulting from construction disturbance and land take. Following the implementation of the appropriate mitigation measures it is considered that there will be some negative effects on Great Crested Newts, reptiles, breeding birds and Water Voles, however there will be no long-term negative effect on species or habitats, or the integrity of the Medway Estuary SPA.

During the operation phase, the Strategic Ecological Plan will be implemented. This has been developed in consultation with English Nature and is applicable to the Grain Site including the application site and will promote the site for all species of nature conservation value identified and would offset the potential disturbance effects associated with the proposed development. As a result, this will have a positive effect for the species and habitats present.

It is concluded that the proposed development would not have an adverse or negative effect on the integrity of the SPA, either alone or in combination with another development or developments.

## **LANDSCAPE & VISUAL**

A landscape and visual assessment of the proposed development evaluated the impact of the changes as a result of the development on surrounding landscape character, upon views in the landscape and on visual amenity.

The landscape surrounding the application site is characterised by the flat topography and expansive skylines. The exposed open character of the landscape is dominated in the southeast by the massing and scale of the existing industrial facilities and infrastructure. The most dominant existing feature is Grain Power Station and the associated chimney, electricity transmission lines and pylons. These transmission lines and pylons cross the flat topography and serve to visually define the edge of the industrialised

area. Many features within these developments protrude well above the skyline and, as a consequence, are dominant relative to many other features in the landscape, such as trees and residential developments although the proposed development is remote from major settlements and residential development.

The landscape character area identified as being directly affected by the proposed development is characterised as Degraded Industrial Land. The proposed development would lead to the introduction of elements that are not uncharacteristic when set within the receiving landscape, and existing landscape character and quality would be maintained. The sensitivity of this landscape is assessed as being low and the magnitude of change as a result of the proposed development is assessed as being negligible. Therefore the overall significance of the residual effects on landscape character area is assessed as being negligible.

There would be indirect impacts on the landscape character of the North Kent Marshes Special Landscape Area caused by the proposed development. The proposed development would lead to the introduction of new elements that may be prominent but would not be uncharacteristic when set within the attributes of the receiving landscape. Although the proposed development may have an effect on this area of recognised landscape character, the existing landscape quality would be maintained. The sensitivity of this landscape is assessed as being medium and the magnitude of change is assessed as being minor. Therefore the overall significance of the residual effects on this designated area is assessed as being minor

Significant visual effects are only likely to be experienced by those sensitive receptors in close proximity to the proposed development. The effects on these sensitive receptors at night time may be exacerbated by lighting the proposed development during the dark hours. However, the proposed development would generally be seen in the context of and against a background of similar industrial developments also with 24 hour lighting and therefore it is anticipated that lighting of the proposed development would not add significantly to the baseline.

By siting the proposed development in an area where industrial structures are already a recognisable characteristic feature, the resultant significant effects in landscape and visual terms would be very limited and very localised.

Therefore it is concluded that the proposed development should be acceptable in this location.

## **ARCHAEOLOGY**

The impact of the proposed development upon archaeological and built heritage resources was reviewed using assessments comprising desk-based appraisals including information from English Heritage, the Kent Sites and Monuments Record, and an analysis of old maps, supported by results of archaeological investigations and site walkovers. The most recent assessment was undertaken in 2006 and the study area comprised the application site.

No known resources would be affected by the proposed development. Two Saxon coins have been found by chance adjacent to the western perimeter, of the application site in the Northern Zone although their exact location is uncertain, as is their significance.

There is potential to effect Victoria Pier, a built heritage resource, as a result of obscuring its historical setting arising from the construction of the new Jetty 8. The proposed development also has the potential to have an impact upon previously unrecorded archaeology. However, following the implementation of the mitigation strategy, the effect of the proposed development upon any known or hitherto unrecorded archaeological resources would be negligible.

## **TRANSPORTATION**

The effect of the construction and operation phase of the proposed development on the environment in relation to transport was assessed. The assessment considered both the impact of construction traffic on the A228 / B2001 routes, and the permanent operation of the proposed development.

It was concluded that in the long term the project will result in a small increase in the number of vehicles on the A228 and B2001.

The main transport impact will be during the construction phase of the proposed development, and as a worst case scenario, it was assumed that up to 400 construction workers would be present during this phase and all equipment, materials and site personnel would arrive by road. However the additional number of vehicle trips is not considered significant.

The increase in construction related traffic, in particular the increase in heavy goods vehicles during periods of intense construction activity, has the potential to impact on accidents and safety along the A228 between Christmas Lane roundabout and the proposed development.

The total number of vehicle movements associated with the construction of the proposed development could be reduced by using alternative transportation modes for material delivery such as rail and sea, if they are viable.

A Travel Plan will be developed to maximise opportunities for reducing single occupancy car trips to the construction site.

In conclusion it is demonstrated that the proposed development will have no major negative transport impacts in either the short, medium or long term.

## **MARINE TRANSPORT**

The proposed development is expected to have a negligible impact on recreational users of the Medway. The anticipated marine transport impacts on commercial users of the Thames and Medway estuaries were assessed by means of a marine traffic study and a manoeuvring study. Impacts on vessels using the neighbouring Thamesport container terminal and the Foster Yeoman aggregates facility were a particular focus of these studies.

The addition of a second LNG unloading berth will increase the capacity of the LNG facility from around 165 LNG carrier calls per year to a maximum of 270 calls per year. As a consequence of this increase in LNG traffic, the majority of commercial vessels using the Medway will experience a small increase in round trip transit times from the Sunk Pilot Boarding Area to the Medway berths and back. Transit times are expected to increase on average by about one to five minutes, and the maximum increase, affecting a small minority of vessels, is expected to be ten to fifteen minutes. The impact of these increases is considered to be negligible or minor in the context of Sunk-berth-Sunk transit times of typically 7-9 hours (plus time on the berth) and what could be expected due to traffic growth at any port. They should be entirely manageable operationally and not a cause for concern.

The presence of an LNGC on Jetty 8 will necessitate the use of one more tug than is currently used during all arrivals and departures from the Foster Yeoman aggregates facility but will not significantly effect manoeuvring times.

Vessels departing from Thamesport will be required to adopt a revised route, entailing manoeuvring time increases of up to 10 minutes. In some wind and tide conditions, an additional tug may be required. The recommended changes to manoeuvring strategies are expected to effectively mitigate the identified manoeuvring impacts such that residual impacts are minor.

In the worst case, for vessels departing Thamesport, the 10 minute increase in manoeuvring time will add to the maximum predicted increase in transit time, 5 minutes, to give a total of 15 minutes. This cumulative delay is again considered to be minor in the context of typical Sunk-berth-Sunk transit times and total journey times ranging from 12 hours to several weeks.

The overall conclusion of the marine traffic and manoeuvring assessment is that, with appropriate operational practices, all of the Isle of Grain berths can be operated safely and efficiently following the redevelopment of Jetty 8 as an LNG berth.

## **NOISE & VIBRATION**

The potential noise and vibration impacts likely to arise from both the construction and operation of the proposed development were considered at a number of noise sensitive locations, including the SPA / Ramsar / SSSI sites to the north and west and the nearest inhabited properties, Harvest Cottages, located 800m from the proposed development.

Similarly to the transportation assessment, the construction noise assessment was based on a worst-case scenario assuming that up to 400 construction workers would be present during this phase and all equipment, materials and site personnel would arrive by road.

It is concluded that the residual impact of noise as a result of construction activities at local houses will be minor negative and temporary in nature.

Construction traffic has the potential to disturb people living close to the A228 / B2001 but this will be temporary inconvenience. There will be no impacts from vibration from construction operations on local houses.

Noise limits for new equipment have been specified and noise levels resulting from the operation of the expanded LNG Importation Facility will result in an insignificant impact according to BS4142. There will be a marginal increase in background noise at Harvest Cottages. However, this change would not be discernable to local residents.

There will be minimal traffic generated by the operation of the proposed development, consequently, noise and vibration effects from the operation of the proposed development is concluded as negligible.

## **AIR QUALITY**

The emissions to air and their impacts on the surrounding air quality and climate that may arise during the construction, commissioning and operational phases of the proposed development were considered.

Construction activities will give rise to temporary nuisance issues through potential dust generation. The principal contractor will employ adequate dust reduction measures to prevent wind erosion and local pollution where necessary.

In addition, based on the worst-case scenario that up to 400 construction workers would be present during this phase and all equipment, materials and site personnel would arrive by road, vehicle emissions will also give rise to localised deterioration in air quality although again this will be temporary in nature.

The residual impact of both the combustion emissions from vehicle and plant exhausts and dust arising from construction activities is anticipated to be a short-term minor negative impact.

The main source of atmospheric emissions at the Southern Zone area during normal operation will be exhaust emissions from ships docked at the jetty whilst unloading. However, these emissions are not anticipated to cause a significant degradation of local air quality.

The most significant emission with the potential to impact on local air quality as a result of operational activities is NO<sub>2</sub>. Whereas, CO<sub>2</sub> is generated in the combustion gases these are not significant, as the results of the modelling study indicate that none of the UK National Air Quality Objectives (NAQO's) will be exceeded as a result of the proposed development.

The residual impact of combustion gases, including CO<sub>2</sub>, and dust arising from operation is therefore classified as moderate negative at a local level. No residual impacts will result from nitrogen deposition on vegetation or ecosystem.

## **WATER RESOURCES**

The effect of construction and operational activities associated with the proposed development on the surrounding water environment was considered.

The area has an industrial heritage with previous contaminative uses across it although the area is now considered to be 'in equilibrium' and does not therefore represent significant risks to identified receptors, such as other hydrological or ecological receptors.

The key potential effects were considered to be groundwater (water below the ground surface) contaminated as a result of previous land uses and encountered during the construction phase. Material encountered during excavation works that has the potential to be contaminated will be disposed of in accordance with the relevant regulation and good practice (as will contaminated groundwaters), removing the potential source of contamination.

In addition to the potential impacts on groundwater identified above, construction activities have the potential to create sediment surface runoff that, if not controlled, can enter watercourses and surface waters, impacting upon the ecology and water quality. As a mitigation measure, the principal contractor will be required to adopt good practice measures to control sediment runoff and prevent damage to aquatic ecology of the ditches. These mitigation measures will include silt traps or grips and working restrictions around sensitive locations. Overall construction impacts on the surrounding water environment are concluded as being minor negative, short term and local in nature.

During both the construction and operational phase there is the potential for accidental spillages to impact the underlying groundwater and surface water hydrology. This will be prevented through good site practices and environmental management procedures that will be formalised in the Construction Environmental Management Plan (CEMP) to be developed by the principal contractor and the operational Environmental Management Plan to be developed by the applicant or plant operator. In addition, site containment and control measures will be implemented to ensure emergency situations are managed appropriately. The residual impact resulting from any abnormal operations will be minor, long term and local.

## **SOILS, GROUNDWATER AND CONTAMINATION**

The potential soils, groundwater and contamination impacts relate primarily to the construction phase where activities on site, such as the proposed auger piling, could recreate pathways for potentially contaminated groundwater to move into the drainage ditches on site. The drainage systems on site are designed to capture any water and through a series of interceptors remove any contamination before returning the water to the estuary.

As auger piling will create waste solid deposits there is also a possibility that construction workers could encounter contaminated soils. This will be controlled by the use of a CEMP. The removal of any contaminated soils will remediate the site by removing this contaminated source. After measures to control any contamination the impacts are assessed as being Minor and generally temporary and local in nature.

## **CUMULATIVE IMPACTS**

The residual impact of the proposed development in combination with the residual impacts of other major developments within the vicinity of the proposed development was assessed. In particular the assessment considered effects that are:

- Spatial: giving rise to effects over a large area or giving rise to effects on areas of special environmental sensitivity;
- Temporal: giving rise to effects over a longer period of time; or
- Incremental: increasing the significance of predicted effects due to interactions with other development under review.

The following projects were identified for consideration within the cumulative assessment:

- Additional Liquid Natural Gas Storage Tanks at Isle of Grain (Phase 2 Development);
- Phase 2 Nitrogen facility;
- Grain Combined Cycle Gas Turbine Power Station;
- BritNed UK - Netherlands Interconnector;
- Isle of Grain BP Wind Farm;

- The Isle of Grain Drainage and Wetland Area Phase 1;
- Canvey Island LNG Facility; and
- The London Gateway container port, Shell Haven.

When construction phases of one or more projects coincide with one another the significance of the cumulative residual impacts depends on the characteristics of the overlapping projects and the duration of the overlap. A number of major developments have been identified within the immediate vicinity of the application site that are likely to result in cumulative impacts on the environment during the construction phase of the proposed development, assuming a worst-case scenario.

Many of these impacts, such as nuisance and disturbance impacts, construction noise and vibration, air quality will be controlled and minimised through the implementation of construction best practices, that can be effectively delivered by means of a formalised CEMP by the principal contractor. It was concluded that potential cumulative construction impacts will be short-term in nature and of minor negative impact.

It should be noted that the cumulative assessment presents a worst-case scenario. In reality, the construction phases are not likely to all coincide but potentially overlap for relatively short periods, thus reducing the significance of the cumulative residual impacts.

During the operation of the proposed development, cumulative impacts are both positive and negative. In conclusion, the overall potential operational cumulative impact is considered to be long-term, minor negative. Furthermore, the minor negative cumulative operational impact should be considered in the context of overriding national importance of secure and diverse energy supply from these predominantly energy related projects. In particular the proposed development is an essential adjunct to the operation of the Phase 2 Development and any adverse cumulative impacts should therefore be weighted against the combined significant benefits of the Phase 2 Development and the proposed development.

## **Conclusion**

The ES concludes that with the mitigation measures proposed the environmental effects of the proposed development will be acceptable in any event. The proposed development will also be important in the context of the

efficient operation of the existing Grain LNG Importation Facility and the security of the UK's gas supply.

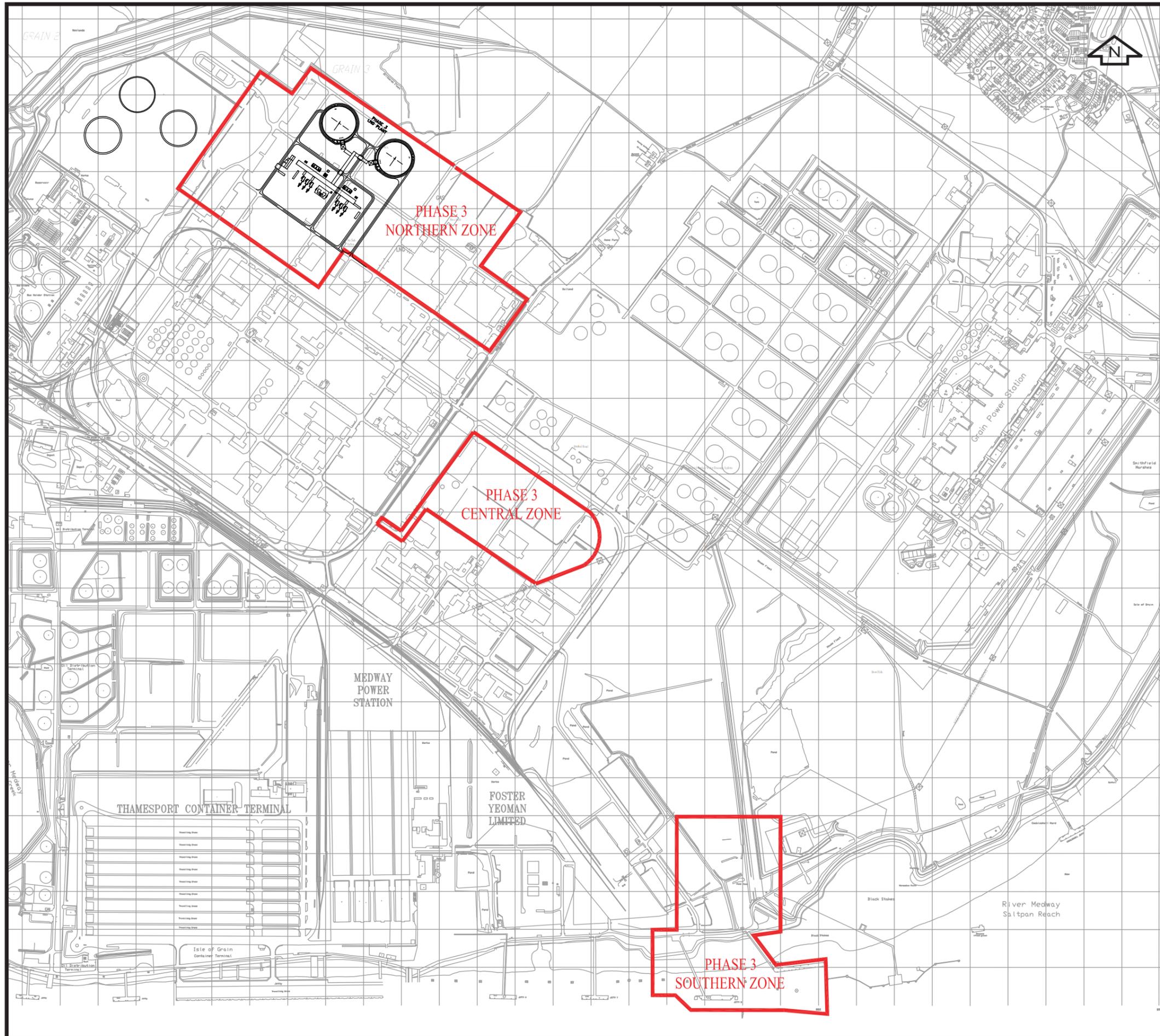
## **FURTHER INFORMATION**

The Environmental Statement and Non Technical Summary is available for viewing by the public during normal working hours at the Planning Department of Medway Council. Comments on the planning application should be forwarded to Medway Council at the address below:

Medway Council Planning Department  
Compass Centre  
Chatham Maritime  
Chatham  
Kent ME4 4YH

Additional copies of the Non Technical Summary are available free of charge and copies of the full Environmental Statement can be purchased at a charge of £175 (for Volumes I & Volume II each) available from:

Environmental Perspectives  
24 Bruton Place  
London  
W1J 6NE



**nationalgrid**

**environmentalperspectives**

Environmental Planning Consultants  
24 Bruton Place London W1J 6NE  
T: 020 7529 1530 F: 020 7491 9654  
www.environper.com

**FIGURE 1**

**Red Line Area and Zoned Areas**

**Not to scale - August 2006  
Revision A**

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