2 Site description and Proposed Development

2.1 Introduction

2.1.1 This chapter provides a description of the Site and surrounding area. It also sets out details of the Proposed Development and provides construction and post-construction information.

2.2 The Site and wider area

2.2.1 The Site lies in the south east corner of the existing Kemsley Paper Mill approximately 600m west of the Swale Estuary and north of Milton Creek in the Borough of Swale, Kent. The entire Site is within the security fence for the Paper Mill. The main part of the Site is roughly triangular in shape and consists almost entirely of existing concrete hardstanding. The Site lies within the wider Paper Mill industrial complex which comprises a number of existing large industrial buildings, flue emission stacks, concrete hardstanding and other associated development. Figure 1.1 in Chapter 1 shows the Site location and application boundary.

2.2.2 The Site is accessed from the A249 via Swale Way and Barge Way into the Paper Mill. An internal access road provides access to the Site.

2.2.3 The Site lies immediately east of the Kemsley residential suburb of Sittingbourne with the town centre some 2.5km south of the Site. An aerial view of the Site is shown in Figure 2.1 .

2.2.4 The nearest statutory designation with regard to ecological interest is the Swale Special Protection Area and Site of Special Scientific Interest which lies approximately 280m east of the Site at its closest point. The Site is also less than 200m from the Milton Creek Local Wildlife Site. A designated Scheduled Monument 'Castle Rough' a former Medieval moated site lies approximately 240m south west of the Site. The Site lies over 7km from the North Downs Area of Outstanding Natural Beauty. All statutory designations in proximity to the Site are shown on Figure 2.2 (a-f) .

2.3 DS Smith Paper Ltd and Kemsley Paper Mill

2.3.1 DS Smith Paper Ltd (DS Smith) is a European manufacturer of recycled corrugated case materials and speciality papers. The company operate nine paper mills across Europe, with Kemsley their only mill within the UK. DS Smith have invested heavily in modernising Kemsley, which now employs around 400 people and has an annual production capacity of up to 800,000 tonnes of recycled paper/case materials.

Existing energy sources

2.3.2 The paper production process is energy intensive and requires a substantial amount of electricity and steam. The energy and steam requirements of the Kemsley Mill are provided by a range of sources, operated by either DS Smith or partner companies.

2.3.3 The power sources are:

- K1 – a gas turbine combined heat and power (CHP) plant and 6 ancillary package boilers located within the mill site which provides electricity and steam to the mill;

- K2 – a steam generator located within the mill site which uses waste plastic and sludge as a source to provide steam to the mill;

- K3 – an energy from waste plant currently under construction to be operated by Wheelabrator to the east of the main mill complex which from 2019 will provide steam to the mill.

2.3.4 It should be noted that K3 is an entirely separate proposal from the Proposed Development.

2.3.5 The K1 plant is 22 years old and is operated under a contract by E.ON (Business Heat and Power). DS Smith have assessed the condition of K1 and is aware that it will require significant investment into the gas turbine, waste heat recovery boilers and steam turbine which would not be proportional to the length of extended life achieved. If development consent is granted, by the time K4 is fully commissioned K1 will be nearly 25 years old. Moreover, K1 is oversized for its existing use, as it was sized originally to provide energy to the now redundant Sittingbourne Mill in the centre of Sittingbourne and it is therefore inefficient.

2.3.6 DS Smith therefore intends to replace the existing K1 plant with a new CHP plant to be constructed on available land adjacent to K1.

2.3.7 **Figure 2.3** shows the location of the K1-3 facilities.

2.4 The Proposed Development

2.4.1 DS Smith is seeking permission to decommission the existing gas-fired CHP Plant (K1) and build a new gas-fired CHP plant (K4) with a nominal power output of 68-73 Megawatts to be operated by DS Smith and/or other companies to supply steam and power to their existing Kemsley Paper Mill.

2.4.2 The Proposed Development will comprise a combined cycle plant fuelled by a gas turbine of 52-57 MW nominal power output, waste heat recovery boilers providing 105 MWth steam and steam turbine technology of around 16 MW nominal power output. A full list of proposed plant items is provided below:

Main plant items:

a) local equipment room and control including battery enclosure
b) a generator;
c) a gas turbine;
d) a heat recovery steam generator;
e) a 70m high heat recovery steam generator stack;
f) a turbine hall (including steam turbine);

g) a CHP pipe bridge, including pipes and cables for steam and electricity, connecting the plant with the paper mills and the existing electricity substation.
h) a dump condenser;
i) a fin fan cooler; and
j) a 35m high package boiler stack;

Ancillary plant items

k) a start transformer;
l) a fire extinguisher cabinet;
m) switchgear;
n) a block transformer;
o) a transformer;
p) a package boiler;
q) a fuel gas skid;
r) condensate pumps;
s) heat recovery steam generator chemical dosing equipment;
t) an effluent sump;
u) a condensate tank;
v) boiler water feed pumps;
w) K2 and low pressure package boiler feed pumps

2.5 Parameters

2.5.1 Whilst the final detailed design of the CHP plant is not expected to be materially different from that described in this ES, the detailed design, construction and commissioning of the CHP plant will be carried out by an experienced contractor after development consent has been granted and contracts placed with the equipment suppliers.

2.5.2 To reflect this and in accordance with the Rochdale Envelope principles a series of maximum parameters that provide the strategic framework for the Proposed Development have been designed. These parameters are the framework on which the EIA has been undertaken and in which the Proposed Development is required to come forward within.

2.5.3 At this stage the exact location of the heat recovery steam generator (HRSG) stack is not determined and could be located either at the end or in the centre of the HRSG dependent on the final technological solution i.e. whether a vertical or horizontal tubed boiler is installed in the HRSG.

2.5.4 Two site layout parameter plans have therefore been produced which reflect the potential variation in stack location and pipe bridge (but are identical in all other matters). These are provided as **Figures 2.4a&b**. The two potential stack locations have

been assessed independently in the ES as appropriate. In addition to the potential variation in stack location the layout parameter plans provide an 'envelope' in which each of the major plant items are to be located. These envelopes are larger than the maximum dimensions of the plant to allow flexibility at the final design stage as to where exactly these plant items are required to be located. This essentially consists of a 5m buffer around each major plant item.

2.5.5 The maximum dimensions of the plant (minimum with regard to stack heights) are provided in Table 2.1 and can be described as a credible "worst case" for EIA assessment purposes.

Building or structure	Maximum length (metres)	Maximum width (metres)	Maximum height (metres) (above existing ground levels)	Minimum height (metres) above existing ground levels
a) Local equipment room (including battery enclosure)	23.1	13.75	9.9	-
b) Generator	5.5	4.4	6.6	-
c) Gas turbine	16.5	8.8	9.9	-
d) Heat recovery steam generator	30.8	16.5	35.2	-
e) 70m high heat recovery steam generator stack	-	4 diameter	-	705m
f) Turbine hall (including steam turbine)	25.3	19.8	16.5	-
g) CHP pipe bridge	40.7	4.4	12	-
h) Dump condenser	16.5	13.2	8.8	-

i)	Fin fan cooler	11.55	7.15	7.7	-
j)	35m package boiler stack	-	0.68 diameter	-	35m
(k – w) All other ancillary plant		-	-	7.5	-

Table 2.1: maximum dimensions of the proposed K4 plant.

2.5.6 In addition to the above, during the construction of the Proposed Development and decommissioning of K1 the following facilities and equipment will be provided on Site:

(1) temporary construction site offices;

(2) canteen, welfare, and related support facilities;

(3) parking of construction vehicles plant and machinery or for the vehicles of construction workers (the existing main Paper Mill car park will also be utilised as required);

(4) open and covered storage of construction materials and equipment;

(5) workshops for pre-fabrication, assembly and testing of equipment

2.5.7 The construction laydown area is shown on **Figure 2.5** and consists of a rectangular area of existing hardstanding north of the proposed location of K4 (it should be noted that the laydown area shown has increased in size in comparison to that shown at the time of the S47 consultation. This increase was reflected in the plans produced as part of the S42/48 and consultation undertaken on this basis. This enlarged area simply extends further west over existing concrete hardstanding that exists in this location).

2.5.8 Two illustrative plans of the Proposed Development showing how the layout of the site is likely to look (which includes the potential variation in stack location) are provided as **Figures 2.6a&b**.

2.5.9 **Figures 2.7 -2.10** provide illustrative 3D CGI's of how K4 is likely to look (using the maximum dimensions in Table 2.1) in the context of the existing Paper Mill.

Operation of K4

2.5.10 The Proposed Development would operate by taking in clean, filtered ambient air into the compressor stage of the gas turbine. The air is compressed and passed into the combustion chamber (gas turbine) where fuel (natural gas) is mixed with the air and ignited producing hot high-pressure gases. The expanding hot gases are fed through the rotor blades of the gas turbine and converted to mechanical energy. The gas turbine in turn drives an electrical generator to produce electricity

2.5.11 With exhaust gas temperatures between 500-550°C, the exhaust from the gas turbine still contains recyclable energy in the form of heat. This energy is used to generate pressurised steam from de-mineralized water in the heat recovery steam generator (HRSG). Dependant on the load requirements further heat can be added at this point by burning additional gas in the inlet duct to the HRSG. After passing through the HRSG, the final exhaust gases are discharged through a stack into the atmosphere in accordance with emission limits of the Large Combustion Plant Directive (LCPD).

2.5.12 The steam produced in the HRSG is expanded through the steam turbine which converts thermal and pressure energy into mechanical energy and low pressure steam. The mechanical energy is in turn used to drive an electrical generator to increase the electrical output of the plant. Any power that is generated over and above that required by the Paper Mill is exported back to the National Grid via the existing substation (see Section 2.6).

2.5.13 The low pressure steam is transferred to the Paper Mill for use within the paper production process, improving overall thermal efficiency.

2.5.14 In the event the paper production process is interrupted and the steam demand is reduced, the steam is diverted to the air cooling condensers which convert the steam back to water for re-use in the thermal cycle. **Figure 2.11** provides a simplified infographic demonstrating the key CHP process.

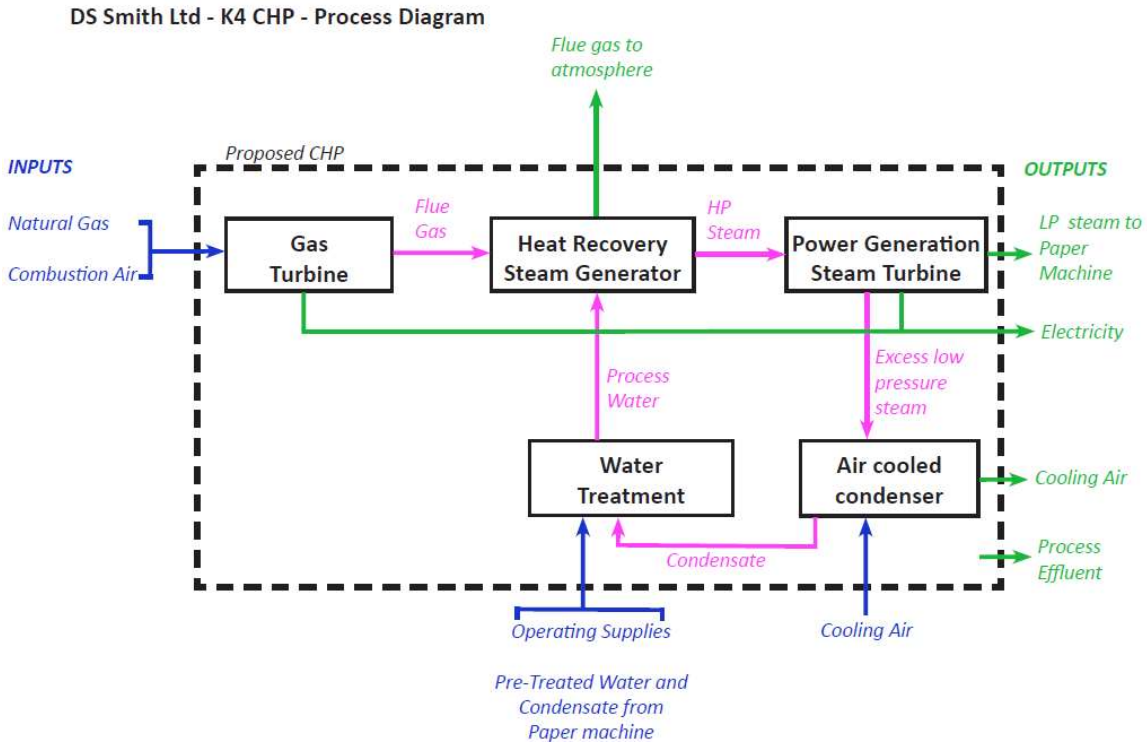

Figure 2.11: infographic showing the key stages of the CHP process.

2.5.15 In order to control corrosion in the plant the pH of the water is increased by the addition of chemical additives (a list of process chemicals currently used for K1 is provided in Table

2.2 in section 2.8.9 below). In order to safeguard the quality of all water discharged from K4 all process drains along with any waste water are collected via a dedicated drains network and flow into a dedicated sump for neutralisation by the addition of acid (if required). From here any excess water will be conveyed to the Mills existing waste water treatment facility (WWTF) and discharged under DS Smith's existing discharge permit (permit no. EPR BJ7468IC-V009) into the Swale as currently occurs for K1. The volume of water discharged from K4, by virtue of being a smaller more efficient plant than K1, will be less and will not therefore exceed the existing WWTF permit limit. The permit for the WWTF contains discharge limits for both water pH and temperature which will remain in place for K4 and subject to periodic monitoring. Both water quality and temperature from K4 is therefore safeguarded before being discharged into the Swale.

2.5.16 The planned operational mode once the Proposed Development is fully commissioned would be: K2 supplying steam, K3 supplying steam, K4 supplying the balance of the Mill steam requirements and electrical power to run the Mill operations. Any surplus electricity generated would be supplied to the national grid (see section 2.6).

2.5.17 Six package boilers from the K1 plant will be retained with a new medium package boiler proposed as part of K4.

2.5.18 In the event of a planned or unplanned shut down of any of the above steam raising plant, the package boilers will be used to supplement the Mills steam supply and support any deficit. It is expected that a minimum of 2 package boilers would be kept in 'hot standby' mode at all times to cater for any unforeseen events ensuring that steam is always available to the Mill in emergency and unplanned scenarios. Five of these low pressure boilers would be kept available to run at any given time allowing the remaining to be released for inspections and maintenance. This regime is designed to allow two paper machines to be in production if all other steam sources fail.

2.5.19 The anticipated uptime (i.e. the time in which K4 will be fully operational) for K4 alone is circa 96%.

2.6 Decommissioning of K1

2.6.1 DS Smith's intention is to decommission the K1 plant after the successful commissioning of the Proposed Development.

2.6.2 There will be a period whereby K1 and K4 will operate simultaneously during the commissioning of K4 albeit this will be intermittent and will not involve both plants operating at full capacity. Notwithstanding this, a worst case scenario has been assessed in the ES for robustness assuming that there will be a period whereby K1 and K4 will simultaneously operate at full capacity for a period of one year.

2.6.3 Post full commission of K4 it will then be necessary to fully decommission K1. In practical terms this would entail the removal of sections of the natural gas feed pipework to the redundant K1 equipment. The gas feed pipework would then be sealed by installing permanently fixed blanking devices. In addition to this, sections of the exhaust gas ducts to the Flue stack of the K1 Waste Heat Recovery Boilers would be removed and sealed. These actions effectively render the redundant K1 equipment inoperable, as they will be fully isolated from their associated fuel sources and exhaust gas paths.

2.6.4 In terms of dismantling, the decommissioned components of K1 would be separately evaluated at a future date once K4 is fully operational. It is envisaged that some major components could be sold (e.g. Gas Turbine and Steam Turbine). It is likely that the remaining components would be demolished, recycled or scrapped.

2.6.5 It should be noted that the decommissioning will not involve the 6 existing package boilers (see section 2.6) which will be retained and used in the event of planned or unplanned shutdown of K2, K3 or K4 to supplement the Mills steam supply and support any deficit.

2.7 Ancillary facilities and services tie-ins

2.7.1 K4 is largely a replacement of the existing K1 and therefore requires the same tie-ins to ancillary facilities and services as K1. It is proposed that K4 will tie-in to the existing services and facilities such that no off-site infrastructure is required. **Figure 2.12** shows the location of the required ancillary facilities and services within the Paper Mill which K4 will connect into. No ancillary construction activities are required to facilitate the tie-ins required and all physical tie-ins will take place within the red line boundary of the Site. Further details are provided below:

Gas Supply

2.7.2 K4 will be connected to the existing gas station (e) as shown on **Figure 2.12**. K4 will include its own gas conditioning equipment.

Electricity

2.7.3 K4 will be connected to the existing DNO 132kV grid connection (i) as shown on Figure 2.12 for both the import of power (in the event of planned or unplanned shutdown) and export of electricity via the cable tray for electrical connection to the 33kV switch yard to grid connection point.

Process water

2.7.4 Process water for the Paper Mill is extracted off site and piped to the site via the Sonora pipeline whereby it is stored in open lagoons located immediately south of K4**.** From here the water is abstracted by the process water pumping station (g) and transposed to the water treatment plant (f) whereby it will be used for the operation of K4. Process water for the site is regulated under EA permit 9/40/02/0021/GR. As a smaller more efficient plant K4 will use less water than K1 and thereby remain within the existing permit limits.

Water treatment plant

2.7.5 The existing K1 water treatment plant (WTP) will be replaced (c) as illustrated on **Figure 2.12**). Feed water from the new WTP (f) (a new water treatment plant is currently under construction; planning not required but under building regulations) will be used for K4 to supply demineralised water. The pH of the water is increased by the addition of alkaline chemicals in order to control corrosion in the plant.

Process water drainage

2.7.6 Any excess water from the K4 process will be collected via a dedicated drains network and flow into a dedicated sump for neutralisation where necessary. From here any excess water will be conveyed using existing drainage facilities to the Mills existing waste water treatment facilities (WWTF) (j) as shown on **Figure 2.12** and discharged under DS Smith's existing discharge permit (permit no. EPR BJ7468IC-V009) into the Swale as currently occurs for K1. The volume of water discharged from K4, by virtue of being a smaller more efficient plant than K1, will be less and will not therefore exceed the existing WWTF permit limit.

Surface water outfall

2.7.7 There will be no increase in impermeable area as a result of the Proposed Development. All surface water run-off will continue to be conveyed into the existing surface water drainage network and discharge at an existing outfall (k) as shown on **Figure 2.12.**

Facility control room

2.7.8 K4 will be connected to and controlled from the existing K1 control room (l) identified in **Figure 2.11**. This will continue to use the existing foul sewer mains connection. Potable water will be taken from the existing site distribution system as shown on **Figure 2.12**.

Package boilers

2.7.9 The 6 existing package boilers (b) as shown on **Figure 2.12** will be retained and used in the event of planned or unplanned shutdown of K2, K3 or K4 to supplement the Mills steam supply and support any deficit.

2.8 Construction of the Proposed Development

Building materials

2.8.1 The construction materials required will be those normally associated with a development of this nature, including:

- Concrete
- Concrete reinforcement including high yield ribbed, hot-rolled bars complying with BS 4449 Strength Grade B500C and mild steel plain, hot-rolled bars complying with BS 4482 Strength Grade 250;
- Cement
- Bricks
- Bitumen
- Exposed structural steelwork grade: S355 JO/S355 J2

- Galvanised steel corrugated panels & galvanised steel sheets;

2.8.2 Building materials will need to be imported to the Site. Any spoil that is generated from the Proposed Development will be re-used on-site. Any contaminated spoil will be removed to an appropriately licensed landfill for disposal, albeit the likelihood of contamination being present on the site is considered low. This has been confirmed in the contamination report submitted in support of the application (see Chapter 8).

2.8.3 Construction materials delivered to the Site will be controlled through a specific construction method statement and incorporated in the CEMP (Appendix 2.1). Areas for storage of materials will be allocated and appropriate storage facilities (containers and bunds) will be utilised.

Employment

2.8.4 It is anticipated that the construction of K4 will employ between 150-200 people during its peak construction period (an estimated 6 month period). Employment during the rest of the construction and commissioning/decommissioning period is anticipated to average 100 construction related staff.

Working hours

2.8.5 Construction activities will be undertaken during normal construction working hours of 07:00 and 19:00 on weekdays and 07:00 to 16:00 on Saturdays and Sundays. No continuous 24-hour activities are envisaged at this stage. Chapter 5 (Air quality) and Chapter 7 (Noise) demonstrate that Sunday working on the Site will not result in significant detriment to local residents in noise amenity terms or the capacity of the local road network.

Waste

2.8.6 For all phases of the Proposed Development there will be a Principal Contractor who will be charged with responsibility for management and co-ordination of all waste streams during decommissioning and construction. This will involve responsibility for the waste segregation, storage and collection of waste on-site.

2.8.7 Section 33 of the Environmental Protection Act (EPA) 1990 deals with the treatment, storage and disposal of waste. Section 34 of the EPA deals with "Duty of Care" and covers all those who produce or handle wastes from demolition, earthworks and construction activities, who are obligated to ensure its safekeeping, best practice management, transport and subsequent recovery or disposal.

2.8.8 The Waste (England and Wales) Regulations 2011 (amended in 2012 and 2014) clarify the requirements for waste prevention programmes and Waste Management Plans, and provide further detail on the "Duty of Care" as mentioned in the EPA 1990.

2.8.9 All waste generated during construction and/or demolition with be dealt with in accordance with these legislative requirements.

Accident and disaster mitigation

2.8.10 The construction of the Proposed Development will be undertaken by Costain Group Plc a well-established engineering company and well experienced in general health, safety and disaster mitigation during the construction of complex developments. This will be overseen by E.ON who have successfully implemented a number of similar CHP plants across the UK and Europe.

2.8.11 By way of example an extensive suite of legislative requirements and codes of practice and guidance are in place to avoid accidents and disasters during construction. This includes but is not limited to the those listed below:

- Construction (Design and Management) Regulations 2015;
- Control of Pollution Act 1974;
- Control of Substances Hazardous to Health Regulations 2002;
- Environmental Protection Act 1990;
- Health and Safety at Work Act 1974;
- Environment Agency – Pollution Prevention Guidance notes; and
- HSE – Codes of Practice and Guidance Notes.

2.8.12 In light of the above it is considered that the risk of accidents during the construction of the Proposed Development will be comprehensively controlled and mitigated as far as is reasonably possible in accordance with UK legislation.

2.8.13 It is therefore considered that the risk of a major accident or disaster is as low as reasonably practical. Compliance with this legislation and guidance will form part of any contract made by DS Smith with the appointed construction contractor. These Regulations and their requirements are furthermore included in the draft Construction Environmental Management Plan provided as **Appendix 2.1.**

Construction Environmental Management Plan (CEMP)

2.8.14 The draft DCO requirements include the production of a Construction Environmental Management Plan (CEMP) (**Appendix 2.1**). The CEMP would include the following items amongst others:

- A table showing the objectives, expected results, activities, and responsibilities required;
- The broad plan of the phasing of the work and its context within the whole project;
- Baseline levels for noise, vibration and dust monitoring;

- Threshold and action levels for noise, vibration and dust to warn of activities that may require particular care and control;
- Details of prohibited or restricted operations (for example locations, hours of operation etc.);
- Arrangements for the implementation of the CEMP and environmental monitoring, including responsibilities, the role of environmental authorities, and participation of stakeholders;
- A monitoring and supervision plan;
- A response plan in the event of accidents or otherwise unexpected events and potential risk register;
- Details regarding delivery / removal of materials and plant;
- Locations and protocol with regard to material storage and compounds;
- Reference to ground conditions and remedial measures and/or mitigation associated with ground contamination if necessary;
- Contact details during normal working hours and emergency contact details outside these hours;
- The provision for reporting, public liaison, and prior notification for particular construction related activities;
- A mechanism for the general public to register complaints and the procedures for responding to such complaints;
- Reference to management of material resources and waste.

Construction traffic

2.8.15 It is assumed that many of the construction staff vehicle movements will take place at the beginning and end of each day. The HGV deliveries are assumed to be spread across the day and will be timed, where possible, to avoid the peak traffic flow periods (i.e. from 08:00 to 09:00 and 17:00 to 18:00). During construction, it is estimated there will be an average of 100 staff on site with a peak of up to 200 staff on site during the early groundworks and foundation works period.

2.8.16 It is estimated that construction of K4 will generate an average of 25 to 30 HGV deliveries per day (average of 50 to 60 HGV movements per day) throughout the 20 month construction period. During the early groundworks and foundation works period, this could peak at up to 40 HGV deliveries per day (up to 80 HGV movements per day).

2.8.17 Construction workers will be provided with allocated parking areas within the Site and the use of public transport and car sharing will be encouraged.

2.8.18 Construction traffic will also be managed through a Construction Traffic Management Plan, which will include:

- A routing strategy for construction HGVs to ensure they approach the Application Site via the strategic road network
- Wheel washing facilities
- Peak time restrictions for HGVs where possible
- Controls governing the movement of large loads

2.9 Post construction

Site operating hours

2.9.1 At this stage it is anticipated that K4 will become fully operation in the summer/autumn of 2021 with the commissioning/decommissioning period of K4/K1 anticipated to commence approximately 6 months before this date.

2.9.2 Once fully commissioned during regular operation the plant will be operated / manned 24 hours a day 365 days per year. The operational shift pattern will be mornings, afternoons & night shifts with approximately 4 staff on each shift.

Lighting

2.9.3 The final detailed design of the CHP plant is not yet completed and as such, at this stage there is no detail available to identify either where luminaires will be installed (exactly) or the exact typology of luminaire (including size, spacing, etc.).

2.9.4 Lighting will however be minimal and implemented using British Standard EN12464-2:2014 Lighting - Lighting of Work Places, Outdoor Works. Adherence to this BS will ensure that any nuisance or disturbance associated with operational lighting installations will be minimised as far as is practicable. Contemporary lighting schemes minimise light spill and reduce lateral and vertical light spill from the source. Therefore, disturbance / nuisance to visual receptors are not considered likely to result in a significant adverse effect particularly in the context of the Mill and the existing external lighting.

Maintenance of the plant

2.9.5 The information below outlines the maintenance requirements that will be applicable to the main plant items associated with K4 once operational. In general, major maintenance involves replacing a small number of wearing components of the main plant items for new or refurbished components however, wholesale or major replacement of plant items is not carried out during planned maintenance. K4 also has a number of auxiliary plant items however, due to the relatively simple nature and short duration of maintenance interventions of such plant, it is not considered necessary to provide details of such activities.

Gas Turbine

2.9.6 In general each year there will be a planned gas turbine outage either for minor or major maintenance. The yearly minor maintenance is followed by a major maintenance every 3 - 4 years depending on the operating hours per year. The length of the outages varies between 2 - 3 days for the minor maintenance up to 3 - 4 weeks for the major maintenance. Maintenance of the gas turbine will be carried out on-site by an appointed contractor with a small number of wearing components being removed from site for repair or refurbishment. Major maintenance will typically involve up to 10 – 15 technicians being based at the site for the duration of the maintenance period.

HRSG

2.9.7 The HRSG will be inspected and maintained on a yearly basis and typically takes 2 - 7 day in parallel to the planned gas turbine outages. Maintenance of the HRSG will be carried out by an appointed contractor and typically involves up to 10 technicians being based at the site for the duration of the maintenance period.

Steam Turbine

2.9.8 The steam turbine has typical inspection interval of 5 years for minor inspection and 10 years for major inspection. The length of the outages varies between 1 week for the minor maintenance up to 2 - 3 weeks for the major maintenance. Maintenance of the steam turbine will be carried out on-site by an appointed contractor with a small number of wearing components being removed from site for repair or refurbishment. Major maintenance will typically involve up to 10 – 15 technicians being based at the site for the duration of the maintenance period.

Auxiliary Boilers and Medium Pressure Boiler

2.9.9 The auxiliary boilers and medium pressure boiler will be inspected on a yearly basis and typically takes 5 days. Inspection and resulting maintenance of the auxiliary boilers and medium pressure boiler will be carried out by an appointed contractor and typically involves up to 5 technicians being based at the site for the duration of the maintenance period.

2.9.10 The gas turbine and steam turbine minor and major inspections along with maintenance of other plant items such as transformers, circuit breakers and auxiliary plant will be carried out in parallel to the respective equipment by appointed contractors.

2.9.11 The above maintenance activities will normally be planned on a long-term basis by the operations and maintenance team and will take place to coincide with gas turbine maintenance activities and typically conducted in the summer months and/or in the yearly planned shutdown of the customer plant which is typically during Christmas time. Typically for a consolidated major maintenance outage including the gas turbine, steam turbine, HRSG, auxiliary boilers / medium pressure boiler & auxiliary plant there will be a maximum of 45 – 50 technicians based on the site in addition to the regular operations and maintenance team.

2.9.12 The scope and nature of the proposed maintenance activities related to K4 over its operational lifetime has been considered by each technical author of the ES assessments and scoped out on the basis that it is unlikely to result in significant environmental effects.

Management of risk and disasters

2.9.13 The risk of major accidents related to the operation of gas turbines is well understood and low when proper management and operational procedures are employed.

2.9.14 The operation of the existing K1 facility is governed by a number of legislative instruments intended to minimise as far as is reasonably possible the risk of accidents/disasters. As a replacement of K1, K4 will be required to operate under the same regulatory regime.

2.9.15 For reference a list of relevant legislation that an operational CHP power plant is required to satisfy is outlined below:

- Health and Safety At Work Act 1974 - lays down wide-ranging duties on employers to ensure the 'health, safety and welfare' at work of all their employees, as well as others on their premises, including temps, casual workers, the self-employed, clients, visitors and the general public.

- Confined Spaces Regulations 1997 – sets a requirement to manage access to areas which are substantially enclosed (though not always entirely), and where serious injury can occur from hazardous substances or conditions within the space or nearby (e.g. lack of oxygen).

- Dangerous Substances and Explosive Atmospheres Regulations 2002 - Requires an operator to identify DSEAR areas and implement a process for the equipment and working within those areas.

- Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016 - This Regulation covers both electrical and nonelectrical equipment and requires the operator to ensure that all equipment used in DSEAR zoned areas is ATEX rated

- The Regulatory Reform (Fire Safety) Order 2005 - Requires the operator to carry out a fire safety risk assessment and implement and maintain a fire management plan.

- Gas Safety (Management) Regulations 1996 – Requires an operator to control the potential hazards from gas mains failures and mitigate the risks from major pipeline incidents.

- Pressure Equipment Regulations 2016 – prohibits the use of pressure equipment until it has been demonstrated that it has undergone a declaration of conformity, it is safe and designed & manufactured to sound engineering practices. Covers the requirement to demonstrate that written schemes of examination, the safe operating limits of pressure systems, and that the systems are safe under those

conditions. Requires operators to maintain and keep records of the examination of pressure systems.

- Supply Of Machinery (Safety) Regulations 2008 – Requires operators to ensure all equipment complies with the relevant standards and risk assessments when supplied to site.

- European Commission Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields - Design specifications for all electrical equipment to be utilised in the completed CHP installation shall be compliant with Council Recommendation 1999/519/EC or harmonised EMF standards.

- Control of Electromagnetic Fields at Work Regulations 2016 –The management of Electro Magnetic Fields during installation, commissioning and ongoing maintenance shall conform to these regulations. The CEMFAW Regulations contain a schedule which introduces limits, explains the effects of EMFs and provides details of safety conditions which must be met.

- Ionising Radiations Regulations 2017 (IRR17) – these regulations impose duties on employers to protect employees and other persons against ionising radiation arising from work with radioactive substances and other sources of ionising radiation. Certain duties are also imposed on employees.

2.9.16 It is noted that the proposed development does not fall within the scope of EU legislation 2012/18/EU (control of major-accident hazards involving dangerous substances) or Council Directive 2009/71/Euratom (Community framework for the nuclear safety of nuclear installations) and does not fall within the consultation zones of any major accident hazard site with Hazardous Substance Consent.

2.9.17 Compliance with this legislation and guidance identified will form part of any contract made by DS Smith with the appointed operator of K4.

2.9.18 In light of the above it is considered that the risk of accidents from the proposed development will be comprehensively controlled and mitigated as far as is reasonably possible in accordance with UK legislation in existence at the time of operation.

2.9.19 It is therefore considered that the risk of a major accident or disaster is as low as reasonably practical.

Anticipated annual resource consumption

2.9.20 At this stage the exact annual resource consumption of K4 is unknown however as a smaller more efficient plant its resource consumption will be less than that of K1 and therefore less than that shown in Table 2.2 below.

Resources consumed	Quantity
Natural gas	Total Gas Consumed (MWh ncv) 2017 = 1,587,831
Process water	2017 = 982,826 M^3
Process chemicals	Sulphuric acid = 652.90 tonnes in 2016 Caustic soda = 616.78 tonnes in 2016 Sodium bisulphate = 11.79 tonnes in 2016 Optisperse HP3100 = 1.65 tonnes in 2016 Steamate NA0840 = 4.8 tonnes in 2016 Cortrol OS6501= 2.05 tonnes in 2016

Table 2.2: annual resource consumption of K1.

Environmental Permit

The Environmental Permitting (England and Wales) Regulations 2016

2.9.21 In accordance with Schedule 1 of the EPR 2016, an Environmental Permit will be required to operate an installation in which combustion activities of over 50 megawatts thermal rated capacity are carried out. This is required in addition to a DCO granted by the SoS. The Proposed Development cannot legally operate without the relevant permit.

2.9.22 The Environmental Permitting Regulations (EPR) aims to prevent or minimise pollution from new and existing installations which come under the regime through an integrated permitting system. An Environmental Permit (EP) sets conditions and requirements in order to prevent or reduce emissions to air, water and land and limit waste and noise generated. Conditions on the prevention of accidents, efficient use of energy / resources and decommissioning of plant are also set.

2.9.23 Under the regime the operator has to demonstrate that the design and choice of technology is Best Available Technology (BAT) which minimises impacts to the environment.

2.9.24 The Environment Agency (EA) is the competent authority for environmental permitting in England. Prior to issuing an Environmental Permit the EA must be satisfied that the installation will not cause adverse effects on the environment. Monitoring and auditing ongoing compliance with the terms of the Environmental Permit issued is undertaken and enforced by the Environment Agency.

2.9.25 DS Smith has an existing Environmental Permit for the operation of K1 (permit no. EPR/BJ7395IG) and has entered into formal discussions with the EA regarding the Environmental Permit for the Proposed Development. It is currently envisaged the existing K1 environmental permit will be varied (Major Variation) to include the new K4 CHP plant however, ongoing discussions with the EA are required to confirm this.

2.10 Decommissioning K4

2.10.1 The operational lifetime of K4 from the commencement of operation in 2021 is unknown at this stage however the CHP plant will be decommissioned at the end of its useful life.

2.10.2 In order to facilitate decommissioning, many of the structures and equipment for the development will be made of materials suitable for recycling as far as is practicable.

2.10.3 An investigation will be undertaken into ground conditions and the water environment at the time of decommissioning to ensure that conditions remain as assessed in this ES prior to construction of the Proposed Development. Plant equipment, where possible, will be dismantled and, if necessary, decontaminated on site, followed by inspection and if necessary further decontamination once the equipment has been removed from position and before it has been removed from site . Buildings and facilities which cannot be re-used will be demolished with all materials recycled or disposed of following Duty of Care.

2.10.4 Infrastructure dedicated to the facility will be removed or taken out of use if no further immediate use is required for it on the Site. Disconnection of site services, whether partial or complete will be considered before dismantling work commences on Site.

2.10.5 Despatch of equipment from Site whether as a saleable asset, e.g. as spare parts to other power generation facilities, or as scrap, will be accompanied by a Certificate of Decontamination.

2.10.6 Dismantling of equipment shall be subject to the same conditions and control of works as required by relevant HS&E legislation. Work will be conducted under permits to work and also certificates of safety, if deemed necessary by the working environment.

2.10.7 The Site will be left in a safe manner. Trenches, pits and excavations shall be made safe by suitable back-fill, or access denied by suitable fencing and notices coupled with adequate regular site inspections.

2.10.8 Buildings and facilities which are to remain in place for other commercial or industrial purposes will be cleaned thoroughly internally and externally to avoid any potential risk of pollution. If these buildings or facilities are to continue for activities for which the Environmental Permit is no-longer required a suitable programme of reconstruction and timescale for completion will be agreed with the Environment Agency to achieve the best environmental outcome and to minimise waste.

2.10.9 In the event of a definitive cessation of all activities a full site closure plan will accompany the surrender of the site licences to the relevant regulatory bodies and consultees. Details of the decommissioning will be included in the Site Closure Plan which is included in part of the application for the amended Environmental Permit.

2.11 Alternatives and Primary Mitigation

Alternatives

2.11.1 The K1 plant is 22 years old and will require significant investment into the gas turbine, waste heat recovery boilers and steam turbine both to extend its operational life but also require modification to meet the Industrial Emissions Directive (IED). The IED comes into force in 2020 and sets stricter emission limits for industry. Moreover, K1 is oversized for its existing use, having been sized originally to also provide energy to the now redundant Sittingbourne Mill in the centre of Sittingbourne, and it is therefore inefficient.

2.11.2 In light of this DS Smith began investigating other long term energy solutions for the Paper Mill including a benchmarking exercise with Aschaffenburg Mill in Germany who has recently commissioned a new CHP plant.

2.11.3 Initial investigations were undertaken by Parsons Brinckerhoff on behalf of DS Smith who assessed a number of potential options for the mill. Various technological solutions for the Site were considered but primarily focused around either investing in and modifying the existing K1 facility or constructing a new CHP plant. CHP technology was considered to be the most feasible option both in terms of reliability, flexibility, cost and emissions.

2.11.4 In light of the significant cost involved in modifying and upgrading K1, and given it is oversized for its need and therefore inefficient, the construction of a new CHP plant was the preferred option and moreover the more financially viable.

2.11.5 Notwithstanding this, in the absence of securing permission for K4, DS Smith would be forced to invest in and modify K1. Gas fired CHP has a significant benefit on electricity costs for the mill and the paper industry in general and imported electricity from the grid would not be an option due to the significant cost differential. The future baseline in the absence of the Proposed Development is therefore a modified K1 (see section 3.8 Chapter 3).

2.11.6 Having decided on the best solution for the Paper Mill DS Smith then went out to tender and received an expression of interest from five energy companies.

2.11.7 The other key alternative considered by DS Smith as part of the Proposed Development was the location of the new CHP plant (K4).

2.11.8 DS Smith in the early stages of the K4 project considered the following key factors for location of the new K4 facility:

- Location of the steam and other key tie ins to the Mill operations
- Location of tie-ins required for a new CHP plant
- Aesthetics in terms of location

2.11.9 The location for K4 was limited to the land within and around the Paper Mill owned by DS Smith. Locations around the Paper Mill for K4 including the northern and western sides of the mill were considered.

2.11.10 These were disregarded due to landscape and visual impact in terms of visibility and existing character. Locating K4 in these locations would introduce stacks in locations where there are no existing stacks and moreover would act to extend the existing line of built development of the mill. Furthermore, these locations would require greater infrastructure works to connect both K4 to its required tie-ins but also K4 to the Mill.

2.11.11 The proposed location of K4 next to K1 was therefore chosen on the basis that it would result in the least construction work in terms of ancillary infrastructure but moreover it would relate best to the layout of the mill, located in an area where stacks are already a characteristic feature. Additionally development in this location would be almost entirely

on existing hardstanding and result in the least obtrusive extension to the mill in landscape and visual terms.

Primary Mitigation

2.11.12 EIA is an iterative process, and the findings of the current EIA have helped to inform the design of the Proposed Development in order to minimise impacts on the environment.

2.11.13 The design of the Proposed Development has therefore taken into account measures to avoid significant adverse effects where possible. Details of the 'primary' mitigation measures embedded in the design of the Proposed Development are summarised in Table 2.1 below:

Topic	Issue	Design Amendment resulting from ES
Air Quality	Ambient concentrations of nitrogen dioxide and carbon monoxide and effects on sensitive receptors	Pollutants from the combustion of gas need to emit at sufficient height to ensure that pollutant concentrations are acceptable by the time they reach ground level. The stack also needs to be high enough to ensure that releases are not within the aerodynamic influence of nearby buildings, or else wake effects can quickly bring the undiluted plume down to the ground. An HRSG stack height of 70m is proposed following a series of atmospheric dispersion modelling simulations to predict the ground-level concentrations with the stack at different heights. A 70m stack will mitigate any significant effect on sensitive receptors from the developments emissions. Atmospheric modelling demonstrated that the 35m package boiler stack would be sufficient to ensure ground level concentrations would be within statutory limits.

2.11.14 Where additional 'secondary' mitigation measures are required to further mitigate the impact of the Proposed Development on the environment these are discussed and documented in each relevant topic chapter, which clarify the extent to which the potential significance of each adverse effect will be offset by the mitigation measures proposed.