



Portland
energy recovery
facility

Environmental statement
Addendum
SECOND ERRATUM VERSION

December 2021

**THIS SECOND ERRATUM VERSION SHOULD BE
READ TOGETHER WITH THE FIRST ERRATUM**



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Non-technical summary

Introduction

- NTS.1 In September 2020, Powerfuel Portland Limited submitted a full planning application to Dorset Council for the construction of an energy recovery facility (ERF) with ancillary buildings and works including administrative facilities, gatehouse and weighbridge, parking and circulation areas, cable routes to ship berths and existing off-site electrical substation, with site access through Portland Port from Castletown (application reference: WP/20/00692/DCC) on land within Portland Port.
- NTS.2 The application was accompanied by an environmental statement (ES) prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended; hereafter the EIA Regulations), which provides an assessment of the likely significant effects associated with its construction and operation.
- NTS.3 Dorset Council has consulted on the application and also appointed Tetra Tech to undertake a review of the ES, which ensured that the council had access to sufficient expertise to examine the ES. Representations have been submitted to Dorset Council by consultees, members of the public and other interested parties in response to the consultation on the planning application. Dorset Council has taken these representations into account in its consideration of the application.
- NTS.4 Following the consultation, the council formally requested additional information and clarification in a letter dated 30 April 2021. The council confirmed that it considers that some of the information requested constitutes 'further environmental information', and where this is the case it is requested in accordance with Regulation 25 of the EIA Regulations and Section 62(3) of the Town and Country Planning Act 1990.
- NTS.5 This report has been prepared to review the council's letter and provide the information that is considered to be 'further environmental information' under Regulation 25 of the EIA Regulations. It forms an addendum to the ES and is summarised in this non-technical summary.
- NTS.6 The review of the council's letter also identified where matters raised are considered to be clarifications, which are not formally requested under Regulation 25 and do not form 'further environmental information'. Responses to these points, and other issues raised during the consultation, are provided in stand alone documents within the submission, including the consultation response summary document (CRSD).

Further environmental information

- NTS.7 This section presents a summary of the further environmental information provided in the ES addendum and follows the structure of the main report.

District heating, electricity generation and shore power

- NTS.8 Dorset Council's letter requested further detail on the provision of district heating, including the necessary infrastructure and potential effects. This information is provided in the ES addendum, with the potential effects examined under each environmental topic heading. Further details were requested on the proposed electricity cabling, the connection to the grid and the provision of shore power. This information is also provided in the ES addendum.
- NTS.9 The letter also requested responses to the various issues relating to district heating, electricity generation and shore-based power provision raised by representations to the consultation, which are provided in the separate CRSD.
- NTS.10 Work is ongoing to identify potential heat customers and Powerfuel Portland Limited is in discussions with the Ministry of Justice to provide heating to HMP The Verne and HMP / Young Offender Institution Portland. The final route for the district heating network pipes has not yet been confirmed, but they will run within the local road network. For the purposes of the assessment, a feasible potential route has been identified where district heating network pipes could be installed to connect the prison and the young offender institution to the proposed ERF. This runs within Incline Road, Grove Road, Easton Lane, Yeates Road, New Ground and Glacis. In addition, a second potential route has been identified that runs within Main Road to the port boundary and then within Castletown. It would be open to other potential users to request a connection to the ERF using this route in the future.
- NTS.11 The installation of district heating networks within roads is very common and is governed by relevant British Standards. Two pre-insulated pipes will be installed beneath the road network: one carrying the heated water from the ERF to the heat users and one bringing the water back to the ERF to be re-heated and re-circulated. Full details will be confirmed at the detailed design and planning stage, but it is likely that the pipes will be buried around 500 mm below the ground surface in a trench around 1,500 mm wide at the top, reducing to around 1,000 mm wide at the bottom. The trench will be excavated in lengths of around 50 m to 60 m at a time to allow the pipes to be installed. It is likely that the heat exchangers will be within the existing boiler houses, so no new buildings will be needed.
- NTS.12 A new 1.75 km long cable will be installed connecting the Portland ERF substation to the Scottish and Southern Energy (SSE) supply point (the Victoria Square substation) near Lerret Road. This new cable will be buried beneath the road network in a trench around 550 mm wide and 900 mm deep. It will follow the route of Incline Road onto Main Road to the main port gate. From there, it will follow Castletown, Castle Road and Lerret Road to the substation. Subject to the grant of planning permission, SSE has been commissioned to carry out these works, including installing the cable.
- NTS.13 A new series of switchgear, converters and transformers, together with a substation, will be installed next to the existing SSE substation on the northern side of Canteen Road to provide shore power from the Portland ERF substation directly to ships berthed at the port. This new installation will be

shore power substation 1 and will be connected to the Portland ERF substation by a new 40 m long buried cable underneath Canteen Road.

NTS.14 The converters and transformers will be connected to shore power substation 2 on the Coaling Pier and shore power substation 3 on Queens Pier by buried cables running along Main Road and Dock Road, with a total combined length of around 2.2 km.

Air quality

NTS.15 The council's letter requested further information and modelling in respect of the impacts on air quality associated with the provision of shore-based power to Royal Fleet Auxiliary and cruise ships, traffic emissions on roads in Castletown leading to the site and the use of the diesel back-up generators. Further modelling was also undertaken of the cumulative impact of road and process emissions associated with the proposed development and other consented projects on designated nature conservation sites. This information is provided in the ES addendum. Additional information on the modelling of impacts at specific human health receptors, which was requested by the Environment Agency as part of the environmental permitting process, is also provided.

NTS.16 The letter also requested responses to the various air quality-related issues raised by representations to the consultation. Further information is provided in the ES addendum in relation to the baseline data used in the assessment, modelling methodologies, effects on air quality in the Boot Hill area, effects on existing air quality management areas and effects at Ocean View. The responses to the other points raised during the consultation are considered to be clarifications, so they are set out in the CRSD.

NTS.17 The additional information provided in the ES addendum on the baseline data and modelling methodologies confirmed that updating the baseline data would not change the findings of the assessment and that appropriate modelling methods were used. The additional analysis showed that there will be no significant effects on designated nature conservation sites or residential receptors as a result of the proposed development, including at HMP The Verne, Castletown, Boot Hill, existing air quality management areas and Ocean View. Similarly, there will be no significant air quality effects as a result of the provision of shore power or the use of the diesel back-up generators.

NTS.18 The installation of the district heating pipes will be carried out in accordance with standard working practices and appropriate mitigation will be put in place through a construction environmental management plan (CEMP) to minimise dust generation, as will be the case for the proposed ERF as a whole. As a result, there is no potential for significant cumulative effects on air quality.

NTS.19 The conclusions of the original ES that the proposed development will not lead to any significant residual air quality effects therefore remain valid and are unchanged by the submitted further information.

Carbon balance and greenhouse gas emissions

NTS.20 In relation to carbon balance and greenhouse gas emissions, the council's letter requested additional information on the various baseline scenarios used in the ES. This information is provided in the ES addendum. Clarification was requested on the potential ways in which carbon capture could be installed and operated at the proposed ERF in future, which is provided in a stand alone technical note. The letter also requested a response to points raised by UKWIN in its consultation response, which is provided in the separate CRSD.

NTS.21 The updated assessment first compared the carbon emissions from the proposed ERF with three alternatives:

- Sending the refuse-derived fuel (RDF) to other ERFs in the UK
- Sending the RDF to other ERFs overseas
- Sending the RDF to an ERF constructed at one of the four alternative sites allocated in the adopted Bournemouth, Christchurch, Poole and Dorset Waste Plan (2019)

NTS.22 The updated assessment found that there is relatively little difference between the proposed ERF and other ERFs in the UK or the four allocated sites. While the Portland ERF would have higher carbon emissions from transport than a plant on the allocated sites, this difference would be outweighed by the potential benefits of providing shore power. The additional transport emissions created by shipping waste to Europe are outweighed by the benefits of the more efficient district heating available at European plants. However, when both the provision of shore power and district heating are taken into account, the proposed Portland ERF would have the lowest carbon emissions of all the other existing and potential ERFs examined.

NTS.23 The carbon emissions from the proposed ERF were then compared with continuing to manage the waste under Dorset Council's existing arrangements. These were assumed to include a combination of sending waste to other ERFs in the UK, ERFs in Europe, and landfill. The benefit of the proposed Portland ERF over the current arrangements for residual waste management in Dorset was estimated to be at least 7,200 tonnes of carbon dioxide equivalent a year, even without taking account of the potential benefits that would be provided by shore power and district heating. The original ES conclusion that the proposed development will have a significant beneficial effect as a result of reduced carbon emissions compared to the baseline therefore still applies.

NTS.24 The carbon benefits associated with the provision of district heating were taken into account in both the original and updated carbon assessments, as set out above, so no further consideration is needed. The conclusions of the original assessment that the proposed development will have a significant beneficial effect through reduced carbon emissions compared to the baseline remain valid and unchanged as a result of the additional information provided in the ES addendum.

Community, health and economic effects

NTS.25 The council's letter requested additional detail relating to potential benefits or impacts on public health as a result of changes in air quality, as well as

coverage of issues raised by Public Health Dorset. This information is provided in the ES addendum. The letter also requested responses to the various health-related issues raised by representations to the consultation, which are provided in the separate CRSD.

- NTS.26 In relation to economic effects, the council's letter requested additional detail to support the assumptions that lie behind the number of additional jobs to be created. Responses to queries on the basis behind these assumptions are provided in the separate CRSD. No additional information or clarifications were requested in relation to community effects.
- NTS.27 The detailed human health risk assessment was updated to take account of the change in emissions of nitrogen dioxide, sulphur dioxide and particulate matter due to the use of shore power provided by the ERF to ships berthed at the port. The emissions of metals and dioxins will not be affected by the provision of shore power, so this part of the assessment remains unchanged.
- NTS.28 The modelling found that the offsetting of shipping emissions of particulate matter and nitrogen dioxide will lead to a negligible beneficial effect on health. For sulphur dioxide, the shipping emissions offset will be smaller and there will be a negligible adverse effect on health. The proposed development will still not lead to a single additional case of any of the relevant health conditions examined, including heart disease, heart failure and stroke. The conclusion of the original assessment that there will be no significant adverse health effects at sensitive receptors as a result of the proposed development remains valid and unchanged.
- NTS.29 The health impact assessment was updated to examine the potential for impacts on the mental health and wellbeing of the local population, the potential for impacts as a result of existing health inequalities, and the potential for impacts on inmates at HMP The Verne. The study identified several existing health inequalities in the Weymouth and Portland area that could mean people are at greater risk of health impacts, including a higher proportion of older residents, high levels of deprivation and unemployment in some areas, relatively high levels of some health conditions, and the presence of vulnerable groups such as homeless people and prison inmates.
- NTS.30 The updated assessment identified several measures to mitigate potential increases in anxiety arising from project-related activities, including ongoing engagement with local communities and wider stakeholders, periodic publication of environmental monitoring information, publishing the CEMP, providing contact points during construction, advance notification of proposed works, and specific engagement with HMP The Verne before construction. With those measures in place, the updated health impact assessment concluded that there will be no significant adverse effects on mental health and wellbeing, on existing health inequalities, or on the inmates of HMP The Verne. Health benefits will be experienced as a result of the employment created by the proposed development, both during and after construction. This could contribute to reducing some of the current health inequalities present in the area.
- NTS.31 Any construction impacts associated with the installation of the district heating works will be temporary and short term and are therefore unlikely to lead to

significant effects on the health and wellbeing of local residents and inmates at HMP The Verne. Temporary works within the local road network, similar to those undertaken during other utility works, are also not considered likely to affect local property prices. No significant cumulative community and health effects are therefore predicted. The provision of district heating was taken into account in the original economic assessment, so no further consideration is needed.

NTS.32 The conclusions of the original ES that the proposed development will not lead to any significant adverse community and health effects therefore remain valid and unchanged. The findings of the economic assessment also remain the same.

Cultural heritage

NTS.33 Dorset Council's letter requested further information on specific measures proposed to mitigate potential harm to the historic environment as a result of the proposed development, as well as assessment of the potential for effects on footpath S3/72 where it runs past the Royal Naval Cemetery. This information is provided in the ES addendum. The letter also requested responses to the various other historic environment issues raised by representations to the consultation, which are provided in the separate CRSD.

NTS.34 A framework structure and broad principles have been developed for a heritage mitigation strategy to mitigate effects on the setting of the East Weare batteries, which will be secured through a planning condition. The works proposed include scrub clearance and agreed repairs to enable E Battery East Weare (a scheduled monument and grade II listed structure) to be removed from the Historic England Heritage at Risk Register.

NTS.35 The strategy also proposes a footpath extension to allow an 'around the island' circuit of the coastal path. A new section of permissive footpath will be created through currently inaccessible parts of the secure port estate to connect to existing publicly accessible land and rights of way. Interpretation will be provided for the group of related heritage assets at East Weare (A-E batteries, the former detention camp and the undesignated World War II features). Information boards will be provided at specific viewing areas. The additional access path can be secured by planning obligation.

NTS.36 The strategy sets out five proposed stages of work for E Battery, including preliminary ecological surveys, enabling works and a condition survey, development and agreement of the proposed works and obtaining the necessary consents and licences, carrying out the main works, and maintenance and inspections. Three proposed stages of work are identified for the new permissive footpath: planning (including surveys and obtaining the necessary consents and licences), carrying out the work (including vegetation clearance, installation and repair of fences and gates, laying the path and security), and monitoring, inspection and future maintenance.

NTS.37 The removal of E battery from the Heritage at Risk Register and the provision of interpretation to allow improved public understanding of the battery will fully mitigate the slight to moderate, significant adverse effect originally predicted as a result of the proposed development. This effect will therefore be removed.

The new footpath link and associated interpretation will provide opportunities for appreciation and understanding of the group of heritage assets at East Weare, which will be a moderate, significant beneficial effect.

- NTS.38 The assessment of the potential effects on footpath S3/72 considered the quality of the experience and the value of the footpath in enabling views that allow appreciation and understanding of the cemetery and the assets relating to the military use of north east Portland. The change to the quality of the experience of the historic environment from the footpath due to changes to the view as a result of the proposed ERF will be a negligible to slight adverse effect that will not be significant. The extension of the footpath around East Weare and the repair of the battery will increase the value of the footpath as a focus for public appreciation of the wider group of heritage assets within the secure port estate. This will be a slight to moderate, significant beneficial effect.
- NTS.39 As the district heating pipes will run within the local road network, no significant effects are predicted on archaeology or built heritage as a result of their installation. It is intended that the pipes will be routed into the prisons using the existing utility ducts so the only works envisaged to the citadel scheduled monument at HMP The Verne relate to the installation of the pipes within the highway along the Glacis where it passes within the designation. Once the final routing of the pipes is confirmed, the necessary consents for any works required would be part of the future planning submissions.
- NTS.40 The measures set out in the framework heritage mitigation strategy will remove the slight to moderate, significant residual effect on the East Weare batteries scheduled monument and listed structure. A moderate, significant beneficial effect is predicted as a result of the other elements of the strategy. The assessment of the potential for effects on footpath S3/72 in relation to the historic environment concluded that the change to views as a result of the ERF will be a negligible to slight adverse effect that will not be significant. The change to the experience of the historic environment because of the extension of the footpath will be a slight to moderate, significant beneficial effect. All the other residual cultural heritage effects remain as assessed in the original ES and no significant cumulative effects are predicted as a result of the provision of district heating.

Ground conditions and water quality

- NTS.41 In relation to ground conditions, the council's letter requested additional information on the suitability of the site for the proposed development in respect of historic contamination, geology and ground stability. Information on geology and ground stability is provided in the ES addendum. Responses to the historic contamination issues raised during the consultation, which confirm that sufficient information was provided in the original ES, are set out in the CRSD. No additional information was requested in relation to effects on water quality.
- NTS.42 In addition, the council's letter requested further detail on the proposed use of existing outfalls to discharge surface water to the sea. As the flood risk assessment (FRA) and surface water drainage strategy report did not form part of the original ES, this information has been provided in a stand alone addendum to the FRA. Its key elements are summarised in the ES addendum.

The letter also requested responses to the various surface water management issues raised by representations to the consultation, which are provided in the separate CRSD.

- NTS.43 Surveys of the existing drainage outfalls and modelling found that the two eastern drainage outfalls into Balaclava Bay have enough capacity to drain the clean roof runoff from the proposed development. The northern outfall into Portland Harbour does not have enough capacity to drain the treated runoff from the roads, parking areas and service yard during more severe storms. The surface water drainage strategy was therefore revised to include a water storage tank beneath the proposed car park in the north east of the site. This means that there will be no significant increase in flood risk as a result of the proposed development and the ERF will not be at risk from flooding.
- NTS.44 A desk-based review was undertaken of available ground conditions information on slope stability at the site and within the wider Isle of Portland area to assess the potential risk to the proposed ERF. Portland has a history of landslips along the coastline and the coastal slopes to the south of the site, next to the Upper Osprey site, are the most active landslip area on Portland.
- NTS.45 However, recent landslips in that area are mainly considered to have been caused by poorly executed earthworks and failure to control water flows properly, rather than natural instability. The records of historical slope movements along the north east coast of Portland indicate a low rate of movement on the slopes above the site and suggest they are in a different setting from the areas to the south where the main landslides have occurred.
- NTS.46 Ground modelling was carried out to assess the likelihood of slope instability at the site. This found that the site in its current condition is very unlikely to be affected by deep-seated instability in the slope above. There is the potential for shallow slope movements that could block the highway at the base of the cliff, although the port does not have any records of such slips occurring in the past.
- NTS.47 Embedded retaining walls will be used in the excavation of the RDF bunker, which will prevent shallower slips from occurring and the proposed development will not increase the risk of deep-seated slips. The modelling showed that the proposed development is not likely to have a significant effect on the stability of the hillside above. Further work, including ground investigations, will be undertaken to confirm the findings of the modelling. The proposed RDF bunker excavation and embedded retaining wall will be designed to mitigate stability risks and a long term monitoring strategy will be put in place to mitigate the risk of shallow slope instability. With these measures in place, no significant effects are predicted.
- NTS.48 The district heating pipelines will be installed using shallow excavations within the existing road network. If made ground with the potential to be locally contaminated is encountered during this process, it will be managed in accordance with good practice for such utility excavations. The district heating network will be a closed loop system and will not lead to any additional outflows to the sea. The potential pipework routes will not cross any watercourses and the installation of the pipes will not increase the impermeable area of the road network. As a result, no significant cumulative ground

conditions and water quality effects are predicted from the provision of district heating.

NTS.49 The FRA addendum concluded that the proposed development will not be at risk of flooding, or increase flood risk off-site. The preliminary slope risk assessment concluded that the proposed development is not likely to lead to any significant effects on the stability of the hillside above the site. Given this, and the fact that no significant cumulative effects are predicted on ground conditions and water quality as a result of the provision of district heating, the conclusions of the original ES chapter that there will be no significant ground conditions and water quality effects remain valid and unchanged.

Landscape, seascape and visual effects

NTS.50 In relation to landscape, seascape and visual effects, the council's letter requested additional detail on the vapour plume from the stack and its visibility. A note has been prepared setting out the results of the plume visibility modelling in more detail and photomontages of the plume have been prepared on the original viewpoint photographs in accordance with relevant Landscape Institute guidance. These are provided in the ES addendum. In addition, further illustrative photomontages showing the plume in a range of weather conditions are provided in the separate design and access statement addendum.

NTS.51 The council also requested responses to the various other landscape issues raised by representations to the consultation. Further information is provided in the ES addendum on potential night-time effects, the introduction of a connection between footpaths S3/72 and S3/81 and the zone of theoretical visibility mapping. The responses to the other points raised during the consultation are considered to be clarifications and are provided in the separate CRSD.

NTS.52 The letter also requested more detail on the proposed PVC mesh that will be used on the ERF building. This is provided in full in the design and access statement addendum and is summarised in the ES addendum. In addition, the council's letter requested further interpretive background material showing the scale of the proposed ERF in the context of the port. As this material is for illustrative purposes, it is provided in the design and access statement addendum and has not been used to inform the landscape, seascape and visual effects assessment.

NTS.53 The additional plume modelling confirmed the conclusions set out in the original landscape, seascape and visual impact assessment that the plume is likely to produce only a very minor alteration to the view for a very limited number of hours per year. As a result, the assessment of visual effects on all of the receptors remains unchanged. Similarly, the additional night-time visualisations produced of the proposed development confirmed the conclusions set out within the lighting report and the landscape, seascape and visual assessment that the night-time effects of the proposed development on views will be negligible and not significant.

NTS.54 Further discussions with consultees and Tetra Tech have resulted in a proposal to create a connection between footpaths S3/72 and S3/81, which currently

end at a high security fence. The visual effects of the proposed ERF at construction and completion from this new footpath connection will be as assessed for the other rights of way: a moderate, significant adverse effect during the day-time and a negligible effect at night-time that will not be significant. Additional zone of theoretical visibility mapping is provided in the ES addendum, including public rights of way.

- NTS.55 The building will be enclosed with dark green metal cladding, which will sit behind the proposed PVC mesh. The mesh will have a 10-year warranty and is designed to resist deformation, tearing, dirt and fading. To ensure the PVC mesh camouflage remains effective throughout the ERF's lifespan, Powerfuel Portland Limited is committed to reviewing its effectiveness and structural integrity at the end of the 10-year warranty period and each year afterwards, and to replacing the wrap after a maximum of 15 years for the life of the building.
- NTS.56 The district heating network pipes will be installed below ground within the existing road network. The provision of district heating will therefore not lead to any significant cumulative landscape, seascape and visual effects beyond those already assessed in the original ES.
- NTS.57 The additional landscape, seascape and visual information and assessment has not identified any new or additional significant effects on landscape and seascape character or sensitive views. Given this, and the fact that no additional cumulative effects are predicted as a result of the provision of district heating, the conclusions of the original ES chapter remain valid and unchanged.

Natural heritage

- NTS.58 Dorset Council's letter requested additional information to be provided as required by ecological stakeholders, such as Natural England, in relation to effects on nationally and internationally designated nature conservation sites. It also requested information on the potential for management or improvement of habitat within the port below the prison. This is provided in the ES addendum. Additional assessment of the potential for marine impacts, including on designated sites, has also been carried out.
- NTS.59 An updated version of the shadow appropriate assessment report has been prepared and submitted separately in response to the council's request, as this did not form part of the original ES. The letter also requested responses to the various other ecology-related issues raised by representations to the consultation, which are provided in the separate CRSD.
- NTS.60 The findings of the additional air quality modelling were reviewed and the assessment concluded that there will be no significant effects on off-site designated nature conservation areas as a result of emissions from the proposed development and its associated traffic, either alone or combined with other developments in the area. The conclusions of the original ES therefore remain valid.
- NTS.61 The heritage mitigation works discussed above will take place within the Isle of Portland to Studland Cliffs Special Area of Conservation (SAC) and Isle of

Portland Site of Special Scientific Interest (SSSI). The potential for effects on these designated sites was therefore also examined. The habitats in the work area consist almost entirely of scrub, with small areas of grassland and bare ground. The removal of scrub to allow inspection and repair of the scheduled monument and to create the permissive footpath will not have any significant adverse effects on the designated nature conservation sites. The small grassland areas will not be affected by the works.

- NTS.62 No evidence of protected species was recorded in the works area, but the habitats present are suitable to support nesting birds and reptiles. An Ecological Clerk of Works will supervise all scrub clearance and, if a nest is found, all work will stop to establish a 5 m buffer zone around the nest. Works would only start again once birds had fledged from the nest. If removal of reptile habitat is needed, this would also be supervised by the Ecologist Clerk of Works and would use phased strimming of vegetation to move reptiles away from the areas being cleared. With these measures in place, no significant effects are predicted on protected species as a result of the heritage mitigation works.
- NTS.63 A financial contribution will be made towards off-site works to mitigate the loss of on-site habitats and provide biodiversity net gain. Several potential projects have been identified in the local area for which these funds could be used, including the creation of scrapes and monitoring of the least owl moth in the Hamm Beach area, regular cutting and management of grassland on Hamm Beach, contributions towards schemes to reintroduce grazing at sites on Portland, and contributions towards schemes for the control of scrub within the Isle of Portland SSSI.
- NTS.64 In addition, the scrub clearance works associated with the heritage mitigation will help to improve the condition of the Isle of Portland SSSI. Stock-proof fencing will be installed along the new permissive footpath, which will allow for the development of a grazing unit within the SSSI to improve its condition further. The enhancement of the footpath route will also enable vehicle access associated with management activities such as stock movement, welfare checks and habitat management. Discussions are ongoing with Natural England and Dorset Council regarding a statement of common ground for the off-site ecological enhancement works.
- NTS.65 The additional assessment of the marine environment considered the potential for effects as a result of emissions to air of several pollutants, including from ocean acidification, increased nutrient levels and deposition of mercury and dioxins. It also reviewed the potential for effects as a result of discharges to the marine environment. The assessment confirmed the original ES conclusion that the proposed ERF will not lead to any significant adverse effects on the marine environment, including designated nature conservation sites.
- NTS.66 Short sections of the potential district heating pipework route to the prisons within the road network run through the Isle of Portland to Studland Cliffs SAC and Isle of Portland SSSI. The pipework will only be installed within the carriageway and a survey will be carried out along the road verges of the stretches running through and alongside the designated areas to ensure that any particularly sensitive areas are suitably protected. A range of mitigation measures will be put in place through the CEMP for the district heating

application, including temporary fencing of the road edges, dust management and appropriate training and signage. With these measures in place, no significant cumulative natural heritage effects are predicted as a result of the provision of district heating.

NTS.67 The conclusions of the original ES that the proposed ERF will not lead to any significant residual natural heritage effects therefore remain valid and are unchanged by the submitted further information and assessment.

Traffic and transport

NTS.68 In relation to traffic and transport, Dorset Council's letter requested additional information regarding impacts on users of the England Coast Path needing to cross the road in Castletown on the route used by HGVs to access the proposed plant. It also requested further detail on opportunities to export incinerator bottom ash (IBA) by sea. This information is provided in the ES addendum. The letter also requested responses to the various other transport-related issues raised by representations to the consultation, which are provided in the separate CRSD.

NTS.69 If the IBA is exported by sea, it will be loaded into a sheeted trailer and transported to the quayside, where it will be loaded onto large dedicated vessels using a mechanical grab machine. A banksman on the quayside will assist the delivery trucks and ensure there is no conflict between the grab operations and the trucks. Once the ship has been loaded, bi-fold doors will close over the top for protection and to prevent any escape of material. Any spillage of the inert IBA would be dealt with promptly and appropriately. The process is highly regulated and all parties will need to ensure that compliance is achieved with existing legislation.

NTS.70 Powerfuel Portland Limited is in discussions with the Day Group, which operates several IBA processing plants in the UK and has extensive experience of IBA transport by sea. The Day Group has indicated that it would be willing to enter into a long term contract to enable IBA to be collected from the proposed ERF by vessel and transported to its facility at Greenwich.

NTS.71 While it is envisaged that the Day Group's Greenwich plant will be the chosen location for export of IBA by sea, there are other plants within the UK and northern Europe that are accessible by sea, including two in Avonmouth and one in Middlesbrough, one in Ireland, two in the Netherlands, two in Belgium and one in Germany.

NTS.72 The England Coast Path (a national trail) crosses the road at the Castletown / Castle Road roundabout. The crossing has dropped kerbs and an island to help people cross the road. The proposed development will lead to a maximum of 80 two-way HGV trips a day (40 in each direction). This equates to an average of one HGV every 15 minutes passing through the crossing point. This is a negligible change that will not affect the ability of users of the England Coast Path to cross the road in a safe manner.

NTS.73 The installation of the district heating pipelines within the local road network will lead to the type of minor disruption that is associated with any utility works in the highway. These will be addressed through standard measures that will be

set out in the CEMP and through road access licensing by Dorset Council. As a result, no significant cumulative traffic and transport effects are predicted to arise from the provision of district heating.

NTS.74 The conclusions of the original ES that the proposed development will not lead to any significant residual traffic and transport effects therefore remain valid and are unchanged by the submitted further information.

Waste

NTS.75 Dorset Council's letter did not request any additional information and clarification in relation to waste impacts. The provision of district heating from the proposed ERF will not increase the area's residual waste treatment capacity, so there is no potential for significant cumulative effects on waste. As a result, the original ES waste chapter remains unchanged.

World heritage site

NTS.76 Dorset Council's letter did not request any additional information and clarification in relation to impacts on the Dorset and East Devon Coast World Heritage Site (WHS). However, the assessment of effects on the WHS in the original ES was based on the conclusions of the cultural heritage and landscape, seascape and visual assessments. Any changes to the conclusions of these assessments would also be relevant to the assessment of effects on the WHS. The further information provided on these issues was therefore reviewed to determine whether any associated changes were required to the WHS assessment.

NTS.77 The additional assessment of the plume visibility confirmed the conclusions set out in the original landscape, seascape and visual impact assessment that the plume is likely to produce only a very minor change to the view for a very limited number of hours, so the effects remain as originally assessed. The assessment of night-time effects also remained unchanged by the additional information provided in the ES addendum.

NTS.78 The conclusions of the landscape, seascape and visual impact assessment that were used in the original assessment of effects on the WHS therefore remain as originally assessed and no changes are needed to the WHS assessment. In addition, no changes are needed to the WHS assessment as a result of the revised cultural heritage impacts set out above.

NTS.79 As discussed above, no significant cumulative cultural heritage or landscape, seascape and visual effects are predicted as a result of the provision of district heating. Given these conclusions, the installation of the district heating pipe network is not predicted to lead to significant cumulative effects on the WHS.

NTS.80 No changes are needed to the WHS assessment as a result of the further information provided in this ES addendum in relation to cultural heritage and landscape, seascape and visual effects. Given this, and the fact that no additional cumulative effects are predicted as a result of the provision of district heating, the conclusions of the original ES chapter remain valid and unchanged.

Other issues outside the scope of the EIA

NTS.81 Dorset Council's letter requested additional information and clarification on several issues that are outside the scope of the EIA, relating to need, planning policy, noise impacts and fire prevention. As these elements are outside the scope of the EIA, the additional information is not considered to be 'further environmental information' under Regulation 25 of the EIA Regulations and is not provided within this report. Instead, several stand alone documents have been produced to provide this information.

Conclusion

NTS.82 The only changes to the significant residual effects identified in the original ES as a result of the further environmental information provided in the ES addendum relate to cultural heritage effects. The slight to moderate, significant adverse residual effect on the East Weare batteries scheduled monument and listed structure identified in the original ES has been removed by the heritage mitigation strategy. The improved public access and interpretation and opportunities for greater appreciation and understanding of the range of assets across East Weare as a result of the measures set out in the strategy will be a moderate, significant beneficial effect. In addition, the change to the experience of the historic environment because of the new permissive path link around East Weare is predicted to result in a slight to moderate, significant beneficial effect.

NTS.83 No new or different significant residual effects have been identified for any of the other EIA topics as a result of the further environmental information. Therefore, with the exception of the above beneficial changes to the findings of the cultural heritage assessment, the conclusions of the ES remain valid and unchanged.

1 Introduction

- 1.1 In September 2020, Powerfuel Portland Limited submitted a full planning application to Dorset Council for the construction of an energy recovery facility (ERF) with ancillary buildings and works including administrative facilities, gatehouse and weighbridge, parking and circulation areas, cable routes to ship berths and existing off-site electrical substation, with site access through Portland Port from Castletown (application reference: WP/20/00692/DCC) on land within Portland Port.
- 1.2 The application was accompanied by an environmental statement (ES) prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended; hereafter the EIA Regulations), which provides an assessment of the likely significant effects associated with its construction and operation.
- 1.3 Dorset Council has consulted on the application and also appointed Tetra Tech to undertake a review of the ES, which ensured that it complied with the requirement of Regulation 4(5) of the EIA Regulations to have access to sufficient expertise to examine the ES. Representations have been submitted to Dorset Council by consultees, members of the public and other interested parties in response to the consultation on the planning application. Dorset Council has taken these representations into account in its consideration of the application.
- 1.4 Following the consultation, the council formally requested additional information and clarification in a letter dated 30 April 2021. The council confirmed that it considers some of the information requested constitutes 'further environmental information', and where this is applicable it is requested in accordance with Regulation 25 of the EIA Regulations and Section 62(3) of the Town and Country Planning Act 1990.
- 1.5 The full letter is provided in appendix 1.1 and requests additional information and clarification on the following issues:
 - Landscape
 - Health
 - Historic environment
 - Ecology
 - District heating
 - Electricity generation
 - Shore power
 - Air quality
 - Carbon balance / climate change
 - Traffic
 - Surface water discharge
 - Contaminated land / geology
 - Need
 - Jobs
 - Planning policy
 - Environmental permit

- 1.6 This document reviews the council's letter and provides the information that is considered to constitute 'further environmental information' under Regulation 25 of the EIA Regulations. It forms an addendum to the original ES and follows the ES's topic structure. It is submitted in accordance with the requirements of Regulation 25 of the EIA Regulations and should be read alongside the original ES. A non-technical summary is provided at the front of this document.
- 1.7 The review of the council's letter also identifies where matters raised are considered to comprise clarifications, which are not formally requested under Regulation 25 and do not comprise 'further environmental information'. Responses to these points, and other issues raised during the consultation, are provided in stand alone documents within the submission, including the consultation response summary document (CRSD).

2 District heating, electricity generation and shore power

Introduction

- 2.1 Dorset Council's letter requested the following additional information and clarification in relation to the provision of district heating, electricity generation and shore power by the proposed development:
- Further detail in respect of how the prison and young offender institution could be connected to a district heating system supplied from the development. This should include the required infrastructure, technical supporting information, and description of the environmental (including climate change) and economic (both for the supplier and purchaser) impacts (point 12 in the council's letter)
 - Further consideration and information in respect of relevant district heating-related issues raised through representations on the first consultation as appropriate (point 13)
 - Further clarification on how the development will be connected to the grid, and secure benefits in relation to the generation of electricity. This should include detail of how the grid connection will be constructed and the proposed cabling (point 14)
 - Further consideration and information in respect of relevant issues related to the generation of electricity raised through representations on the first consultation as appropriate (point 15)
 - Further clarification and additional detail in respect of how the shore power element of the proposal would work. This should include a response to issues raised in representations, and justification of any assumptions made in respect of modelling of carbon savings that might result (point 16)
 - Further consideration and information in respect of relevant issues related to the provision of shore-based power raised through representations on the first consultation as appropriate (point 17)
- 2.2 Powerfuel Portland Limited has prepared a district heating paper to provide the further information requested by the council in relation to the required infrastructure and technical supporting information (point 12 in the council's letter), which is submitted as a stand alone document. The additional detail in relation to the district heating proposals is summarised in this section. The potential environmental impacts of the provision of district heating are set out in the remaining sections of this report. As the district heating network does not form part of the planning application, the potential environmental impacts are considered as cumulative effects.
- 2.3 Powerfuel Portland Limited has produced a report providing further details on how the development will be connected to the grid, including the construction of the grid connection and the proposed cabling (point 14 in the council's letter) and the shore power connections (point 16). Its key elements are summarised in this section and the full report is submitted as a stand alone document.
- 2.4 Arup has prepared an updated shore power report providing further detail in respect of the benefits of the provision of shore power and the rationale behind it (point 16 in the council's letter). This detail is considered to be a clarification of

the reasoning behind the provision of shore power and its benefits, rather than the provision of 'further environmental information' under Regulation 25. The updated report is therefore submitted as a stand alone document.

- 2.5 Arup and Powerfuel Portland Limited have also provided responses to the various issues relating to district heating, electricity generation and shore-based power provision raised by representations to the consultation (points 13, 15 and 17 in the council's letter). These responses are considered to be clarifications, rather than the provision of 'further environmental information' under Regulation 25, so they are set out in the CRSD.

Further information on district heating

- 2.6 While the installation of the district heating network does not form part of the planning application, as set out in the ES the space and necessary valves to enable connection to make the heat available will be included within the plant. Work is ongoing to identify potential heat customers and Powerfuel Portland Limited is in discussion with the Ministry of Justice regarding a memorandum of understanding to provide heating to HMP The Verne and HMP / Young Offender Institution Portland.
- 2.7 The final route for the district heating network pipes has not yet been confirmed, but they will run within the local road network (comprising local authority highway land or private port road land). For the purposes of the assessment, a feasible potential route has been identified where district heating network pipes could be installed to connect the prison and the young offender institution to the proposed ERF (see appendix 2.1). This runs within Incline Road, Grove Road, Easton Lane, Yeates Road, New Ground and Glacis. In addition, a second potential route has been identified that runs within Main Road to the port boundary and then within Castletown (see appendix 2.1). It would be open to other potential users to request a connection to the ERF via this route in the future.
- 2.8 The installation of district heating networks within roads is very common and is governed by relevant British Standards, such as BS EN 13941:2019 *District heating pipes – Design and installation of thermal insulated bonded single and twin pipe systems for directly buried hot water networks*. Two pre-insulated pipes will be installed beneath the road network: one carrying the heated water from the ERF to the heat users and one bringing the water back to the ERF to be re-heated and re-circulated.
- 2.9 Full details of the installation will be confirmed at the detailed design and planning stage, but it is currently envisaged that the pipes will be buried approximately 500 mm below the ground surface in a trench approximately 1,500 mm wide at the top, reducing to approximately 1,000 mm wide at the bottom. The trench will be excavated in lengths of around 50 m to 60 m at a time to allow the pipes to be installed. It is envisaged that the heat exchangers will be located within the existing boiler houses, so no new buildings will be required.

Further information on grid connection, cabling and shore power

- 2.10 A new 33 kV substation will be built in the north west of the site, which will serve as the connection point for the development and the Scottish and Southern Energy (SSE) distribution network. This was referred to in the original application documents as the transformer compound.
- 2.11 A new 1.75 km long 33 kV cable will be installed connecting the Portland ERF substation to the SSE supply point (the Victoria Square substation) near Lerret Road. This new cable will be buried beneath the road network in a trench approximately 550 mm wide and 900 mm deep. It will follow the route of Incline Road onto Main Road to the main port gate. From there, it will follow Castletown, Castle Road and Lerret Road to the substation. Subject to the grant of planning permission, SSE has been commissioned to undertake these connection works, including the installation of the connection cable.
- 2.12 A new series of containerised switchgear, converters and transformers, alongside a further containerised substation, will be installed next to the existing SSE substation on the northern side of Canteen Road in order to provide shore power from the Portland ERF substation directly to ships berthed at the port. This new installation will form shore power substation 1 and will be connected to the Portland ERF substation via a new approximately 40 m long buried 33 kV cable underneath Canteen Road.
- 2.13 The converters and transformers will be connected to shore power substation 2 on the Coaling Pier and shore power substation 3 on Queens Pier by buried 11 kV cables running along Main Road and Dock Road, with a total combined length of approximately 2.2 km.

3 Air quality

Introduction

- 3.1 Dorset Council's letter requested the following additional information and clarification in relation to effects on air quality:
- Further information and modelling in respect of the impacts on air quality, and particularly as a result of the provision of shore-based power to Navy and cruise ships. The modelling should be accompanied by a separate document setting out the basis for any assumptions in respect of substitution for diesel fuel (point 18 in the council's letter)
 - Additional air quality modelling in respect of the emissions from traffic on the section of the A354 leading to the site (point 19)
 - Inclusion of the use of the diesel back-up generator in the cumulative (in-combination) assessment (point 20)
 - Further consideration and information in respect of relevant air quality-related issues raised through representations on the first consultation as appropriate (point 21)
 - We note that you are making some updates to your environmental permit application and request that the additional detail and assessment you are undertaking in respect of air quality, noise and fire prevention is incorporated into your planning application and EIA, so the assessment of the project is consistent across both regulatory regimes (point 35)
- 3.2 Fichtner Consulting Engineers Ltd, who undertook the air quality assessment for the original ES, has prepared a technical report to provide the further information and modelling requested in relation to the air quality impacts associated with the provision of shore-based power (including the assumptions behind the modelling; point 18 in the council's letter). The report also quantifies the cumulative impact of road and process emissions associated with the proposed development and other consented projects on national site network (NSN) nature conservation sites. The full report is contained in appendix 3.1 and its findings are summarised in this section.
- 3.3 In addition, Fichtner Consulting Engineers Ltd has provided further information in respect of traffic emissions on the roads in Castletown leading to the site and the operation of the diesel back-up generators (points 19 and 20 in the council's letter). This further information is provided in this section.
- 3.4 Fichtner Consulting Engineers Ltd has also provided responses to the various other air quality-related issues raised by representations to the consultation (point 21 in the council's letter). Further information is provided in this section in relation to the baseline data used in the assessment, the choice of dispersion models, model verification, the meteorological data used, the grid resolution used, the justification of the stack height, effects on air quality in the Boot Hill area, effects on air quality management areas (AQMAs) and effects at Ocean View.
- 3.5 In addition, typographical errors were identified in tables 18, 19 and 22 in technical appendix D2. The error noted in table 22 was the units for sulphur dioxide, which were stated to be ng/m³, whereas the concentration was

presented as $\mu\text{g}/\text{m}^3$. No other changes are needed to this table, so this has not been reproduced. However, for tables 18 and 19 there was an error in the calculation sheet and the predicted environmental concentration (PEC) was incorrectly calculated when it was assumed that each metal is emitted as per the maximum monitored by the Environment Agency. The corrected tables 18 and 19 are provided in appendix 3.2.

- 3.6 The responses to the other points raised during the consultation are considered to be clarifications and confirmations that the assessment remains valid, taking into account changes in the baseline since the original submission, rather than the provision of 'further environmental information' under Regulation 25. They are therefore set out in the CRSD.
- 3.7 As part of the environmental permit application process, the Environment Agency requested some additional information in relation to air quality, noise and fire prevention (point 35 in the council's letter). Noise and fire prevention are addressed in section 13 of this report. The additional air quality information requested by the Agency related to the modelling of impacts at specific human health receptors and Fichtner Consulting Engineers Ltd prepared a technical note to provide this. The full technical note is contained in appendix 3.3 and its findings are summarised in this section.

Baseline

- 3.8 A thorough review of baseline conditions was carried out to support the original ES. The review was undertaken using the data that were available at the time of producing the ES and included consideration of mapped background datasets, as well as local and national monitoring data. The review showed that the only local monitoring was of nitrogen dioxide (NO_2), carried out by the former Weymouth & Portland Borough Council (now Dorset Council) at a few roadside locations on the Isle of Portland. The ES included a review of the past few years of data to demonstrate if there had been any trends in the baseline concentrations.
- 3.9 As stated in technical appendix D1 to the ES, the mapped background concentration was taken from the 2017 Defra mapped background dataset. This was the dataset published at the time of production of the ES. The Defra dataset includes projections for future years, and all pollutants in the dataset are projected to decrease in the future. However, as set out in the ES, as a conservative assumption, the concentration for the year that the dataset was validated for was used, as this eliminates any potential uncertainties over anticipated trends in future background concentrations.
- 3.10 For completeness, table 3.1 presents the maximum mapped background concentrations within 5 km of the application site using the 2017 and most recently available (2018) datasets. As shown, using the 2018 dataset will result in a slight reduction in the mapped background concentration used within the assessment. However, the change is only slight and would not alter the conclusions of the assessment.

Pollutant	2017 dataset (as used in ES; $\mu\text{g}/\text{m}^3$)	2018 dataset (most recently available dataset; $\mu\text{g}/\text{m}^3$)	Difference % change from 2017
NO ₂	22.01	21.97	- 0.2%
Oxides of nitrogen (NO _x)	35.09	33.78	- 3.7%
Particulate matter (as PM ₁₀)	14.74	14.19	- 3.7%
Particulate matter (as PM _{2.5})	8.68	7.94	- 8.5%
Ammonia (NH ₃)	0.82	0.82	0

Table 3.1: Comparison of 2017 and 2018 datasets
Notes: Maximum concentration within 5 km of the application site

- 3.11 The review of the local monitoring data focused on the data presented in the annual status report that was available at the time the ES was produced (the Weymouth & Portland Borough Council 2019 Annual Status Report). This included the bias adjusted annual mean monitoring data up to the end of 2018. Dorset Council has since published the annual monitoring data for the whole of 2019, 2020 and January 2021 (date accessed: 17.06.21). These data were only used for model verification purposes. The effect of any change in baseline concentration between 2018 and 2019 is discussed further with reference to the model verification below.
- 3.12 The baseline concentrations used in the ecology assessment were taken from the Air Pollution Information System (APIS) website, which includes mapped background concentrations of NO_x and sulphur dioxide (SO₂) on a 1 km x 1 km spatial resolution and NH₃, nitrogen deposition and acid deposition on a 5 km x 5 km spatial resolution. This is calculated as a rolling average three-year concentration and is updated on a periodic basis. The latest update was published in March 2021 and has been updated to the three-year average for 2017 to 2019.
- 3.13 The previous shadow appropriate assessment and ES used the data available at the time of submission, which was the three-year average from 2016 to 2018. The baseline data were presented in technical appendix D1 of the ES, but were only drawn upon in the shadow appropriate assessment. As part of the updated shadow appropriate assessment, a review of the APIS dataset has been carried out. This has shown that, using the latest three-year average data, the background concentration is slightly greater than that used in the original shadow appropriate assessment. The updated shadow appropriate assessment uses the most recent available data.

Dispersion modelling of process emissions

Choice of model

- 3.14 Modelling of process emissions from the ERF to support the ES was carried out using the ADMS software package (version 5.2). There have been no updates to the modelling software since the original modelling was carried out. This is an industry standard model that is routinely used for modelling of emissions from similar projects to the satisfaction of the Environment Agency and local authorities. The model can be used to account for the varying terrain and surface roughness around the proposed development. In addition, the ADMS model can be used to quantify whether a plume is likely to be visible and its length. It was therefore an appropriate model to use in the assessment of the proposed development.

Meteorological data

- 3.15 Modelling was carried out using five years of weather data from Portland meteorological site for the years 2014 to 2018. These were the most recent complete years of meteorological data that were available when the ES was produced. Five years of weather data were used in line with Environment Agency guidelines to ensure that interannual variability in weather conditions was accounted for. The use of more recent weather data (i.e. from 2019 and 2020) is not expected to change the conclusions of the ES.

Grid resolution

- 3.16 Modelling was carried out to determine the impact of process emissions from the ERF across a grid. The resolution of the grid was chosen to balance the computational time while ensuring that the grid was suitable to capture the peak impacts. The grid resolution used was 60 m, with a stack height of 80 m. It is common practice that the grid resolution is at least 1.5 times the stack height, which would be 120 m by 120 m. The chosen grid size was half this and is therefore considered to be appropriate. Changing the grid resolution is not expected to change the conclusions of the ES.

Justification of stack height

- 3.17 A stack height assessment was carried out and presented within technical appendix D2 of the ES. The stack height assessment considered the operation of the ERF in isolation to ensure that the stack height is appropriate for the building configuration. As set out in technical appendix D2 of the ES, the stack height was chosen based on the change in the angle of the slope at the Isle of Portland to Studland Cliffs Special Area of Conservation (SAC). Including existing emissions from road and shipping (or the back-up diesel generators) would not change the justification for the stack height.

Dispersion modelling of road emissions

Choice of model

- 3.18 Modelling of road emissions to support the ES was carried out using the ADMS Roads software package (version 5.0). There have been no updates to the modelling software since the original modelling was carried out. This is an industry standard model that is routinely used for modelling emissions from road traffic for similar projects to the satisfaction of local authorities.

Model verification

- 3.19 It is best practice to verify the model output against local monitoring data. To do this, ideally the meteorological data, traffic data and monitoring data should all be from the same period. However, as set out in technical appendix D2 of the ES, at the time of the assessment monitoring data from the former Weymouth & Portland Borough Council were not available for the same period as the traffic data (2019). In lieu of this, the model was verified using the 2019 baseline traffic flows and meteorological and monitoring data from 2018. This was considered the most appropriate approach, given that the baseline monitoring of traffic was

carried out in the beginning of 2019, and it is considered unlikely that traffic flows would be significantly different from 2018 levels.

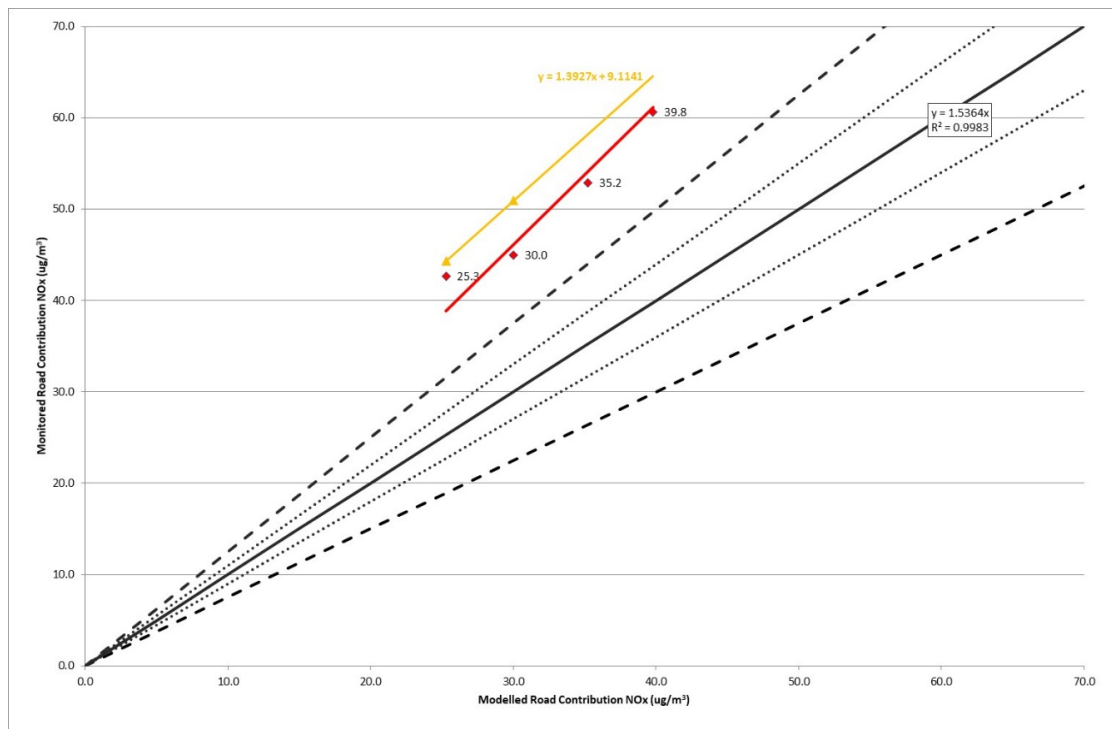
3.20 Table 3.2 presents the data for 2018 and 2019 for those sites that were used for the roads model verification process.

Site	2018 (as used in ES; $\mu\text{g}/\text{m}^3$)	2019 (annual mean bias adjusted; $\mu\text{g}/\text{m}^3$)	Difference % change from 2018
Boot Hill (367541,78471)	39.6	Not available	-
10: Rodwell Road (367542,78548)	32.8	36	9.8%
32: Portmore Gardens (367528,78554)	31.8	33	3.8%
51: Rodwell Inn (367550,78485)	36.3	27	-25.6%

Table 3.2: 2018 and 2019 NO₂ data for sites used in roads model verification
Notes: Data from 2019 sourced from the Dorset Council website.

3.21 As shown in table 3.2, at sites 10 and 32 the monitored NO₂ concentration in 2019 was higher than in 2018, but at site 51 the monitored concentration was lower than in 2018. However, monitoring at site 51 was based on seven months of data and the annual mean concentration stated on Dorset Council’s website does not match well with the monitoring data. As a result, it is not possible to accurately compare monitored to modelled concentrations at this site.

3.22 The following graph shows the comparison of monitored against modelled road NO_x, as set out in graph 5 of technical appendix D3 of the original ES. In addition, the analysis comparing the 2019 data has also been included. As shown, the verification factor using the 2019 monitoring data would be slightly lower than used for the purposes of the ES. Therefore, this would result in lower road traffic impacts than set out in the ES; however, the change is relatively small and this would not change the conclusions of the road emissions assessment presented in the ES.



Impacts on air quality from traffic on the roads in Castletown leading to the site

- 3.23 As set out in chapter 4 of the ES, the assessment of the impact of emissions was carried out using industry standard guidance from the Institute of Air Quality Management (IAQM) and EPUK. The contribution from the proposed development was calculated and compared to the air quality assessment levels (AQAL) for the protection of human health. In line with the stated assessment methodology, where the contribution from the proposed development was predicted to be greater than 0.5% of the AQAL, additional consideration was made of the baseline concentration and the predicted impact where the AQALs apply.
- 3.24 The impact of traffic associated with the proposed development was screened out from detailed assessment, as the change in vehicle numbers did not exceed the criteria (i.e. the change in HGV numbers is not expected to exceed 100 per day). Although not presented in the ES or its technical appendices, the impacts at receptors in Castletown close to the proposed development were calculated. Figures 1 and 2 of technical appendix D2 to the ES included the locations of these receptors. Tables 3.3 and 3.4 below set out the combined impacts of traffic and process emissions associated with the proposed development.

Receptor	ERF ($\mu\text{g}/\text{m}^3$)	Future baseline roads ($\mu\text{g}/\text{m}^3$)	With development roads ($\mu\text{g}/\text{m}^3$)	Impact of proposed development ($\mu\text{g}/\text{m}^3$)	As % of AQAL	Magnitude of change descriptor
R1	0.18	15.45	15.77	0.50	1.2%	Negligible
R2	0.18	15.51	15.84	0.51	1.3%	Negligible
R3	0.18	15.49	15.80	0.49	1.2%	Negligible
R4	0.18	15.29	15.58	0.47	1.2%	Negligible
R5	0.18	15.09	15.36	0.45	1.1%	Negligible
R6	0.18	15.14	15.41	0.45	1.1%	Negligible
R7	0.17	15.40	15.67	0.44	1.1%	Negligible
R8	0.17	15.54	15.81	0.44	1.1%	Negligible
R9	0.17	15.64	15.90	0.43	1.1%	Negligible
R10	0.17	17.99	18.28	0.46	1.1%	Negligible
R11	0.17	24.39	24.77	0.55	1.4%	Negligible
R12	0.17	21.69	21.86	0.34	0.9%	Negligible
R13	0.17	17.32	17.50	0.35	0.9%	Negligible
R14	0.16	15.37	15.53	0.32	0.8%	Negligible
R15	0.16	14.29	14.43	0.30	0.7%	Negligible
R16	0.15	13.83	13.96	0.28	0.7%	Negligible
R17	0.13	12.35	12.39	0.17	0.4%	Negligible
R18	0.12	14.74	14.90	0.28	0.7%	Negligible

Table 3.3: NO₂ impact at receptors in Castletown in 2023 (worst case roads modelling scenario)

Notes:

Assumes no change in fleet composition – i.e. 2017 emission factors for opening year of 2023.

Assumes background concentration does not reduce from mapped 2017 background concentration.

Receptor	ERF ($\mu\text{g}/\text{m}^3$)	Future baseline roads ($\mu\text{g}/\text{m}^3$)	With development roads ($\mu\text{g}/\text{m}^3$)	Impact of proposed development ($\mu\text{g}/\text{m}^3$)	As % of AQAL	Magnitude of change descriptor
R1	0.18	12.12	12.23	0.29	0.7%	Negligible
R2	0.18	12.14	12.26	0.30	0.7%	Negligible
R3	0.18	12.15	12.25	0.28	0.7%	Negligible
R4	0.18	12.09	12.19	0.28	0.7%	Negligible
R5	0.18	12.04	12.13	0.27	0.7%	Negligible
R6	0.18	12.07	12.16	0.27	0.7%	Negligible
R7	0.17	12.17	12.26	0.26	0.7%	Negligible
R8	0.17	12.23	12.32	0.26	0.7%	Negligible
R9	0.17	12.29	12.38	0.26	0.7%	Negligible
R10	0.17	13.23	13.33	0.27	0.7%	Negligible
R11	0.17	15.90	16.04	0.31	0.8%	Negligible
R12	0.17	14.98	15.05	0.24	0.6%	Negligible
R13	0.17	13.11	13.17	0.23	0.6%	Negligible
R14	0.16	12.31	12.36	0.21	0.5%	Negligible
R15	0.16	11.88	11.93	0.21	0.5%	Negligible
R16	0.15	11.71	11.75	0.19	0.5%	Negligible
R17	0.13	11.21	11.23	0.15	0.4%	Negligible
R18	0.12	12.03	12.09	0.18	0.4%	Negligible

Table 3.4: NO₂ impact at receptors in Castletown in 2023 (best case roads modelling scenario)
Notes:
Assumes fleet changes in line with projections – i.e. 2023 emission factors from Defra’s emissions factor toolkit.
Assumes background concentration does not reduce from mapped 2017 background concentration.

- 3.25 As shown in tables 3.3 and 3.4, the combined impact of emissions from traffic associated with the proposed development and process emissions from the ERF is a maximum of 1.4% of the AQAL if it is conservatively assumed that the UK vehicle fleet mix does not change from 2017 levels (the base year of the emissions factor toolkit). However, if it is assumed that the fleet changes in line with projections (i.e. a turnover of older HGVs with new vehicles and a take-up of electric vehicles), the maximum impact is 0.8% of the AQAL. In both instances, in accordance with the matrix in figure 4.1 of the ES, the magnitude of change is described as negligible because the contribution from the proposed development is 1% (i.e. between 0.5% and 1.5%) and the total concentration including background sources is less than 94% of the AQAL.
- 3.26 Based on the matrix, the magnitude of change for an impact of 1% of the AQAL would be described as ‘slight adverse’ if the total concentration was between 95-102% of the AQAL and ‘moderate adverse’ if the total concentration was greater than 103% of the AQAL. It should be noted that the magnitude of change descriptor should be used with professional judgement to determine the significance of the effect, taking into account factors such as the uncertainty in the modelling and extent of impacts.
- 3.27 The predicted total concentration at the most impacted receptor in Castletown (R11) is 25 $\mu\text{g}/\text{m}^3$ (0.17 + 24.77 $\mu\text{g}/\text{m}^3$), which equates to 62% of the AQAL, assuming no change in fleet from the 2017 composition. Although the local operations at the port have not been specifically included within the modelling, the mapped background data will account for these emissions (albeit averaged over the 1 km grid square).
- 3.28 The impact from operations at the port would need to increase NO₂ levels by 13.2 $\mu\text{g}/\text{m}^3$ for the impact of the proposed development to be described as

slight adverse, or $16.4 \mu\text{g}/\text{m}^3$ for the impact of the proposed development to be described as moderate adverse. It is considered that there is little risk of the impact of operations at the port increasing pollution levels in this area by this amount, particularly as if they were to be close to the AQAL Dorset Council should have declared an AQMA due to potential exceedances of the AQAL and no declaration has been made.

Impacts on air quality in the Boot Hill area

- 3.29 The modelling of road traffic emissions in the original ES specifically considered the impact of the proposed development within the Boot Hill area, where elevated NO_2 concentrations have been monitored. While this area has not been declared an AQMA, as a conservative approach the IAQM and EPUK screening threshold for an AQMA was applied. The modelling only considered the impact of emissions from vehicles. As explained in technical appendix D3, the contribution of process emissions from the ERF will be extremely small in the Boot Hill area, so it was not considered necessary to provide a combined impact assessment of process and traffic emissions on this area.
- 3.30 To substantiate this, reference has been made to modelling used in the human health risk assessment (HHRA), which formed technical appendix G of the original ES, and data used to create the contour plots presented in the additional air quality information (see appendix 3.1). The modelling for the HHRA covered a much wider area to ensure that impacts within Weymouth were quantified (albeit they were very small), due to the large population present in this area. The modelling for the HHRA predicted the contribution of NO_2 from the ERF to be $<0.06\%$ of the AQAL. This additional contribution would not alter the conclusions of the assessment presented in the original ES and the effect on the Boot Hill area is considered not to be significant.
- 3.31 The original modelling did not include the Boot Hill area as a street canyon. However, the verification has been carried out using data from the monitoring sites in this area. If the area was modelled as a canyon, it is likely that the modelled road contribution NO_x would have been higher, resulting in a lower verification factor. In terms of the impacts at receptors, while the modelled impact would be higher, this increase in modelled impact would be balanced out by the lower verification factor. Therefore, it is likely that the results would be broadly similar. This is not expected to change the conclusions of the ES that the effect of the proposed development on the Boot Hill area is not significant.

Impacts on AQMAs

- 3.32 As set out in technical appendix D1 of the original ES, the closest AQMA to the proposed development is in Dorchester, over 15 km to the north of the site. The Dorchester AQMA is located along the B3150 in the centre of the town. It is unlikely that any vehicles associated with the proposed development would pass through this area and the contribution from the ERF would be miniscule. As such, the impact of the proposed development on this AQMA was not considered further.
- 3.33 The Chideock AQMA lies to the west of the proposed development, along the A35. As set out in technical appendix A (scoping) of the original ES, the HGV routing breakdown set out in ES chapter 11 (traffic and transport) confirms that

the additional HGV movements on the wider Dorset road network will be below the levels that would trigger the requirement for detailed analysis. Only eight of the 80 HGV trips are predicted to be along the A35 westbound. For this reason, the impact of the proposed development on any AQMA was scoped out from the assessment.

Impacts at Ocean View

3.34 As part of the consultation response, reference was made to the underestimation of potential impacts of emissions from the ERF at Ocean View, as this is a high rise development and the assessment considered the impact at ground level. The Ocean View development is located approximately 1 km to the west of the proposed development. The dispersion model has been re-run with a series of receptors at heights to represent each floor of the Ocean View development. The results are set out in table 3.5.

Height (m)	Annual mean NO ₂ impact	
	µg/m ³	as a % of AQAL
0	0.17	0.4%
3	0.17	0.4%
6	0.17	0.4%
9	0.17	0.4%
12	0.18	0.4%
15	0.18	0.4%
18	0.18	0.4%
21	0.18	0.5%
24	0.18	0.5%
27	0.19	0.5%
30	0.19	0.5%
33	0.19	0.5%
36	0.20	0.5%
39	0.20	0.5%
42	0.21	0.5%
45	0.21	0.5%
48	0.22	0.5%

Table 3.5: Impact of process emissions at height at the Ocean View development

3.35 As shown in table 3.5, there will be a very slight increase in concentrations at height at the Ocean View development. However, the change in impact is marginal. Applying the matrix set out in figure 4.1 of the original ES, the magnitude of change would be described as negligible irrespective of the total concentration. Therefore, the inclusion of receptors at height at the Ocean View development does not change the conclusion of the ES that the proposed development will not have a significant effect on air quality.

Impacts on air quality from the provision of shore-based power

3.36 As set out in the original ES, the proposed development will facilitate the provision of shore power to ships in the port. These are currently required to use onboard engines to provide power, which are a source of emissions. The impacts presented in the original ES, and this ES addendum, are worst case because they are based on the impact of the proposed development without allowing for the offset of emissions that would result from the ships no longer needing to use onboard engines to provide power when in the port.

- 3.37 A technical study has been carried out to quantify the impact of the emissions from the ships that will no longer be emitted as the electricity generated from the onboard engines would be provided by the ERF. This contribution has then been subtracted from the contribution of the ERF to determine the net change, allowing for the offset. The assumptions behind the modelling and the full results are provided in appendix 3.1. The modelling considered the impact of emissions from cruise ships, which are berthed for less than a day each, and two Royal Fleet Auxiliary ships, which are berthed on a longer term basis.
- 3.38 The onboard engines are typically powered by fuel oil and result in emissions of NO_x, SO₂, PM₁₀ and PM_{2.5}. The impact of all other emissions will not be affected by the provision of shore power and will be as set out in the original ES.
- 3.39 The analysis has shown that, for particulate matter, there will be a net benefit associated with the proposed development at all points across the modelling domain. This is because the impact of emissions from the engines, which would no longer be needed, is higher than the impact of emissions from the ERF. The reductions in annual mean particulate matter concentrations were up to -0.01 µg/m³ on land and ranged from -0.01 µg/m³ to -0.2 µg/m³ at sea. The greatest reductions were predicted closest to where the ships are berthed. This beneficial effect will be negligible and not significant.
- 3.40 For NO₂ and SO₂, there will be a net benefit for the majority of the area. Where there is a net increase, the increase will be extremely small. The largest increase is predicted to be 0.05 µg/m³ on land and 0.15 µg/m³ at sea for both pollutants. This is still a reduction in impact from the operation of the ERF with no provision of shore power. It should also be noted that the modelling has made a very conservative assumption that the majority of the onboard generators are modern, and as such the emissions would be lower than for older generators. If less conservative assumptions were used, and the emissions from onboard generators were assumed to be higher, the net change would show a greater benefit from the proposed development.
- 3.41 Both the beneficial effects from the reduction in emissions and the adverse effects from the increase will be negligible and not significant. As a result, the overall conclusion of the ES that the proposed development will not lead to any significant effects on air quality remains valid.

Cumulative air quality impacts on NSN nature conservation sites

- 3.42 The original assessment considered the impact of road and process emissions and screened out the need for further consideration of the cumulative impact with other development at NSN nature conservation sites because the total impact of process and road traffic emissions associated with the proposed development was predicted to be less than 1% of the relevant assessment levels. The NSN sites that have the potential to be impacted by cumulative road traffic and process emissions are Chesil and The Fleet SAC and Isle of Portland to Studland Cliffs SAC.
- 3.43 The original dispersion modelling included all the cumulative developments, as the trips associated with these were incorporated in the predicted 2023 traffic flows for both the future baseline and 'with development' scenarios. The change in impact between the future baseline and 'with development' scenarios

was predicted. However, results were not presented to show the cumulative change in impact from the 'do nothing' scenario for 2023 that did not include the trips associated with the cumulative developments.

- 3.44 The detailed modelling was updated and the 'do nothing' scenario run using the same ADMS Roads 5.0 model as was used for the original assessment. All inputs relating to meteorological data and dispersion site parameters were the same. The difference between the 'with development' and 'do nothing' scenarios was then calculated to determine the cumulative impact of emissions from the proposed development (the ERF and associated traffic) and other cumulative projects. This focused on the impacts of traffic-related emissions for which there is an assessment level set for the protection of ecosystems: NO_x, NH₃ and nitrogen deposition. The full modelling results are provided in the technical report in appendix 3.1 and summarised here.
- 3.45 For Chesil and The Fleet SAC, the modelling shows that the impact of the proposed development alone on annual mean NO_x levels is predicted to be less than 1% of the critical level within 2 m of the road. The cumulative impact with other developments is predicted to be much greater, at more than 5% of the critical level within 50 m of the road. The total concentration of NO_x is predicted to exceed the critical level within 3 m of the road. However, this exceedance is predicted to occur as a result of other cumulative schemes and the additional contribution from the proposed development will not significantly change the distance at which exceedances of the critical level are predicted (i.e. less than 1 m). The impacts are predicted to be less than 70% of the critical level by 11 m from the road in both the future baseline and 'with development' scenarios.
- 3.46 In relation to NH₃, the modelling shows that the impact of the proposed development alone is predicted to be less than 1% of the critical level within 1 m of the road. The cumulative impact with other developments is predicted to be much greater, at more than 8% of the critical level within 50 m of the road. The total concentration of NH₃ is predicted to exceed the critical level within 3 m of the road. However, as for NO_x, this exceedance is predicted to occur as a result of the cumulative schemes and the additional contribution from the proposed development will not significantly change the distance at which exceedances of the critical level are predicted (less than 1 m). The impacts are predicted to be less than 70% of the critical level by 9 m from the road in both the future baseline and 'with development' scenarios.
- 3.47 The impact of the proposed development alone on nitrogen deposition at Chesil and The Fleet SAC is predicted to be less than 2% of the critical load level within 4 m of the road. The greatest source of emissions to nitrogen deposition is NH₃ from road traffic emissions. The cumulative impact with other developments is predicted to be much greater, at 18% of the critical load level at 50 m from the road. The total concentration is predicted to be very similar for the future baseline and 'with development' scenarios. This demonstrates that the majority of the increase in deposition is due to the cumulative developments.
- 3.48 For the Isle of Portland to Studland Cliffs SAC, the modelling shows that the impact of the proposed development alone on annual mean NO_x levels is predicted to be less than 1% of the critical level within 13 m of the road. Again, the cumulative impact with other developments is predicted to be much greater, at more than 3% of the critical level within 50 m of the road. However, the total

concentration is predicted to be well below the critical level at all distances from the road.

- 3.49 In relation to NH₃, the modelling shows that the impact of the proposed development alone is predicted to be more than 1% of the critical level for lichen sensitive communities along the transect from the road, but less than 1% of the critical level for non-lichen sensitive communities at a distance greater than 4 m from the road. The cumulative impact with other developments is again predicted to be much greater, at more than 6% of the critical level for lichen sensitive communities and 2% of the critical level for non-lichen sensitive communities within 50 m of the road. However, the total concentration is predicted to be below the critical level for lichen sensitive communities within a few metres of the road.
- 3.50 The impact of the proposed development alone on nitrogen deposition at the Isle of Portland to Studland Cliffs SAC is predicted to be less than 1 kgN/ha/year within 4 m of the road. The cumulative impact with other projects is predicted to be much greater, at 3 kgN/ha/year at 50 m from the road. The total concentration is predicted to be very similar for the future baseline and 'with development' scenarios, which again illustrates that the majority of the increase in deposition is due to the cumulative developments.
- 3.51 Further discussion of the above impacts is provided in section 9 of this report on natural heritage and the updated shadow appropriate assessment, which is submitted as a stand alone document because the original did not form part of the ES.

Impacts on air quality from the diesel back-up generators

- 3.52 As set out in the original ES, the proposed development includes diesel back-up generators. These would only be used when the ERF is offline and when power is not available from the grid to provide power for the ERF. These generators are required to ensure that the ERF can be safely shut down in the event that the grid connection is not available, and will normally only need to operate for testing and maintenance purposes. To ensure that the diesel generators will function if required, they will be regularly started for testing purposes and will operate for approximately 30 minutes every two weeks, or 13 hours per year. This is less than 0.2% of the time that the ERF would be running.
- 3.53 The greatest impacts will generally occur when the atmosphere is stable, which is usually during the early mornings. Testing of the engines would typically occur within standard working hours (08:00-17:00), i.e. generally outside the worst case conditions for dispersion. The diesel generators would be located on the shore side of the main building, with a short stack. Therefore, the emissions from the generators will be limited to a very small area close to the building, away from any areas of public or ecological exposure and well away from where the impacts from the ERF would occur. This will not lead to a significant effect on the local environment.

Impacts on air quality at specific human health receptors

- 3.54 The original air quality assessment in the ES was based on the maximum predicted impact at any grid point using all five years of weather data. Impacts

were presented for the point of maximum impact, noting that this occurred at sea. The total concentration (the PEC) was also presented, which was calculated as the contribution from the ERF and the contribution from background sources. For some pollutants, additional analysis was carried out to determine the maximum concentration from process emissions on land and at any area identified as containing residential properties. These residential properties included HMP The Verne.

3.55 To satisfy the requirement of the Environment Agency for information on impacts at specific human health receptors, as part of the 'duly making' checks for the environmental permit application a short technical note was submitted (see appendix 3.3). This presented the impact at a number of residential properties, including HMP The Verne. As this was produced for permitting, no reference was made to the assessment methodology used in the ES and the magnitude of change was not set out. The results were presented for those impacts for which process emissions at the point of maximum impact were greater than 1% of the AQAL.

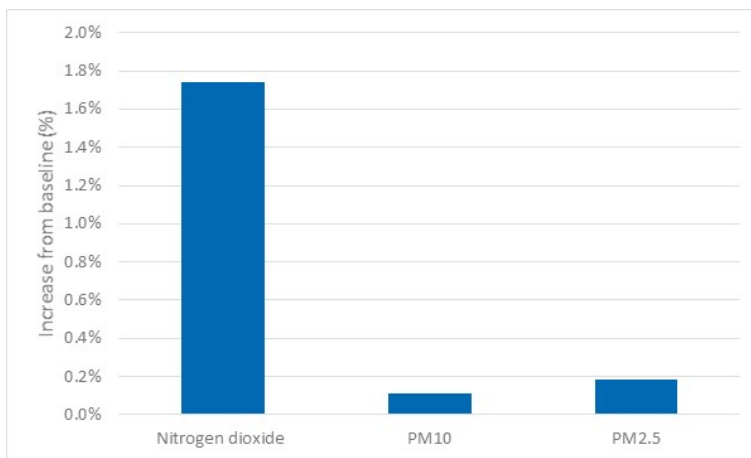
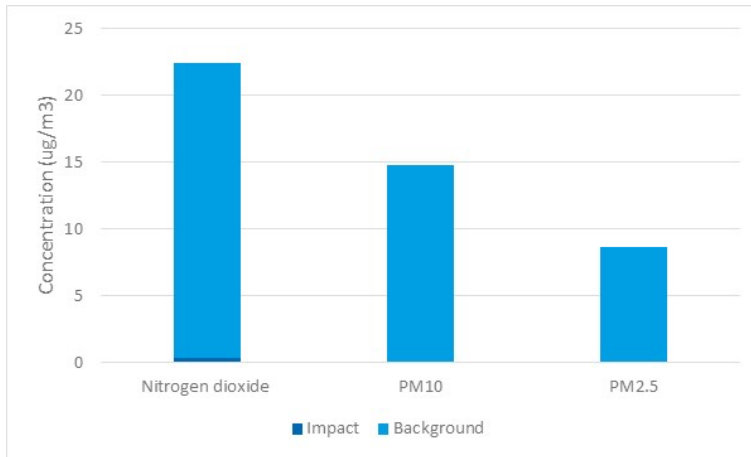
3.56 In summary, at the maximum impacted receptor:

- The impact of annual mean NO₂ emissions is predicted to be 0.97% of the AQAL and the PEC is predicted to be 56% of the AQAL. On this basis, the magnitude of change can be described as negligible
- The impact of annual mean volatile organic compound (VOC) emissions is predicted to be 0.92% of the AQAL for benzene, and the PEC is predicted to be 6.3% of the AQAL for benzene. On this basis, the magnitude of change can be described as negligible. This conservatively assumes that the entire VOC emissions consist only of benzene
- The impact of annual mean VOC emissions is predicted to be 2.05% of the AQAL for 1,3-butadiene and the PEC is predicted to be 6.1% of the AQAL for 1,3-butadiene. On this basis, the magnitude of change can be described as negligible. This conservatively assumes that the entire VOC emissions consist only of 1,3-butadiene
- The impact of annual mean cadmium emissions is predicted to be 1.8% of the AQAL if it is assumed that the entire cadmium and thallium emissions consist of only cadmium, and 0.15% of the AQAL if the ERF was to perform similarly to other ERFs. On this basis, the magnitude of change can be described as negligible
- The impact of short term NO₂ and SO₂ emissions is predicted to be greater than 10% of the AQAL if it is assumed that the ERF operates at the half-hourly emission limit value set in the Industrial Emissions Directive. However, if it is assumed that the ratio between short term and long term emissions would be the same as in the Industrial Emissions Directive, taking into account the lower emissions limit value introduced by the Waste Incineration BREF, the impact would be less than 10% of the AQAL. On this basis, the magnitude of change can be described as negligible

3.57 The maximum impacted receptor in all cases is R4, which is used in the technical note to represent HMP The Verne. The AQALs have been set to protect human health and account for vulnerable populations. The impact of

emissions from the ERF at HMP The Verne is very small and is assessed as negligible and not significant.

3.58 For completeness, the following graphs show the baseline concentrations of NO₂, PM₁₀ and PM_{2.5} at HMP The Verne and the additional contribution from the ERF to demonstrate that the change in impact is minimal. This assumes that the ERF continually operates at the proposed emission limits, when in reality the ERF will be offline for periods of maintenance and will operate below the emission limits to ensure compliance with the environmental permit. This also conservatively assumes that the entire emissions of particulate matter consist only of PM₁₀ or PM_{2.5}.



3.59 The additional modelling prepared by Fichtner Consulting Engineers Ltd in response to the Environment Agency's request confirms that there will be no significant adverse air quality effects at sensitive receptors in the vicinity of the proposed ERF as a result of process emissions from the plant.

Assessment of effects associated with the provision of district heating

3.60 The installation of the district heating pipes will be undertaken in accordance with standard working practices and appropriate mitigation will be put in place through a construction environmental management plan (CEMP) to minimise dust generation, as will be the case for the proposed ERF as a whole. As a result, there is no potential for significant cumulative effects on air quality to arise from the provision of district heating.

Conclusions

- 3.61 The additional air quality information and assessment has not identified any significant effects on sensitive human or ecological receptors in the vicinity of the proposed ERF. Given this, and the fact that no significant cumulative effects are predicted as a result of the provision of district heating, the conclusions of the original ES chapter that there will be no significant air quality effects remain valid and unchanged.

4 Carbon balance and greenhouse gas emissions

Introduction

- 4.1 Dorset Council's letter requested the following additional information and clarification in relation to carbon balance and greenhouse gas emissions:
- Additional information on the baseline scenarios requested by the council. These should have particular reference to points raised through the consultation on the robustness of the carbon balance scenarios set out in the current version of the ES. Additional clarification should also be provided in respect of the approach to carbon capture for the facility itself, and the circumstances under which it might be installed and operated (point 22 in the council's letter)
 - A report has been submitted by UKWIN, which makes a variety of technical points in relation to the suitability of the proposed technology and the robustness of some of the claims made in respect of its effectiveness and environmental benefits. An assessment should be made of the technical points made in this report, and an appropriate response should be provided in respect of the issues raised (point 23)
- 4.2 Fichtner Consulting Engineers Ltd, who undertook the carbon balance and greenhouse gas emissions assessment for the original ES, has prepared an updated assessment report to provide the additional information on the baseline scenarios requested by the council (point 22 in the council's letter). This replaces the original assessment that formed technical appendix E to the ES, with amendments from the original shown as track changes. The full report is contained in appendix 4.1 and its findings are summarised in this section.
- 4.3 Fichtner Consulting Engineers Ltd has prepared a technical note providing clarification of the potential approach to carbon capture at the proposed development (point 22). As this is a clarification of the potential ways in which carbon capture could be installed and operated at the proposed ERF in the future, it is not considered to comprise 'further environmental information' under Regulation 25. The technical note is therefore submitted as a stand alone document.
- 4.4 Fichtner Consulting Engineers Ltd has also reviewed the UKWIN report and produced a response to the issues raised (point 23 in the council's letter). As this forms a response to consultee comments, it is considered to be a clarification rather than the provision of 'further environmental information' under Regulation 25. The response is therefore contained within the CRSD.

Alternative assessment scenarios

- 4.5 As requested by Dorset Council, the carbon emissions from the proposed ERF have been compared with four alternatives:
- Sending the refuse-derived fuel (RDF) to other ERFs in the UK
 - Sending the RDF to other ERFs overseas

- Sending the RDF to an ERF constructed at one of the four alternative sites allocated in the adopted Bournemouth, Christchurch, Poole and Dorset Waste Plan (2019)
 - Continuing to manage the waste under Dorset Council's existing arrangements
- 4.6 This updated assessment replaces the assessment in paragraphs 5.36 to 5.51 of the original ES chapter 5: Carbon balance and greenhouse gas emissions. It focuses on the treatment of waste generated in Dorset.

Portland ERF

- 4.7 The proposed ERF is 60 km from Canford Magna mechanical biological treatment (MBT) plant, which currently produces around 82,600 tonnes of RDF per year. Considering the other main conurbations in Dorset, the proposed ERF is a similar distance away from Poole and Bournemouth, but only 20 km from Dorchester. This suggests that Dorset waste would travel around 55 km on average to the site. In order to present a fair comparison, the carbon emissions for the proposed ERF have been calculated using this distance, rather than the 160 km used in the comparison with landfill emissions. This gives waste transport emissions of 673 tonnes of carbon dioxide equivalent (tCO₂e) per year. All other emissions are unchanged from the original assessment.

Other ERFs

- 4.8 The direct carbon emissions from combusting waste are the same whether it is combusted at Portland or elsewhere. This means that, from a carbon perspective, the only differences between ERFs at different locations are the impacts from transporting waste and any differences in the carbon displaced by generating power or heat. These differences are set out below for the different ERFs and then the results for all the ERFs are presented in a single table for comparative purposes.

Existing UK ERFs

- 4.9 The primary focus of this part of the assessment is on RDF produced at the Canford Magna MBT plant. The remaining waste for the proposed ERF could come from a wider catchment area in Dorset, which could be closer to or further away from the alternative ERF. Two existing ERFs and one that will shortly be operational have therefore been compared with the proposed ERF.
- 4.10 Marchwood ERF is the closest alternative and is currently used by Dorset Council. It is 47 km from Canford Magna, 50 km from Bournemouth and 80 km from Dorchester, which means that waste would be transported around 50 km on average, giving waste transport emissions of 612 tCO₂e per year. According to its 2019 annual report to the Environment Agency, the Marchwood ERF exported 582 kwh/te of waste processed. It is unclear what the net calorific value (NCV) of this waste was but, given that Marchwood ERF treats residual household waste, it is likely to be around 10 MJ/kg, which is consistent with the NCV for the proposed ERF in the maximum capacity case. This gives an efficiency of 20.95%.

- 4.11 Lakeside ERF near Slough is currently used by Bournemouth, Christchurch and Poole (BCP) Council for waste from Poole. It is around 145 km away from Bournemouth and Canford and 181 km from Dorchester, which means that waste would be transported around 150 km on average, giving waste transport emissions of 1,836 tCO₂e per year. Lakeside ERF did not report its power generation to the Environment Agency in 2019. However, according to its application for R1 status in 2014, it has a net electrical efficiency of 23.5%, which means that it would be expected to export 16.4 MWe when processing the same waste as the proposed ERF.
- 4.12 The Bridgwater gasification plant is currently under construction and will have a capacity of around 112,000 tonnes per year. Bridgwater is included in the future Dorset baseline section below, rather than this section, because it is not large enough to be a direct alternative to the proposed Portland ERF. Once it is operational, the Bridgwater plant is expected to receive waste from Canford Magna, although this would be replaced by the proposed Portland ERF if consented. Bridgwater is around 120 km from Canford Magna, which gives waste transport emissions of 1,469 tCO₂e per year for 182,640 tonnes of waste. This figure is included for direct comparative purposes with the proposed Portland ERF, as the Bridgwater plant will not actually be able to process this much waste. According to its environmental permit decision document, the Bridgwater plant has a net electrical efficiency of 22.14%, which means that it would be expected to export 15.44 MWe if it could process the same waste as the proposed ERF.

Other ERFs in Europe

- 4.13 Comparing the carbon emissions for waste exported to ERFs in Europe is complex, because there are several significant uncertainties in relation to transport emissions, the type of electricity displaced and the potential for exporting heat. If the RDF was exported to Europe from Southampton, the road transport distance would be similar to that for the proposed development, so it is assumed that the road transport emissions would be identical (612 tCO₂e). Shipping 183,000 tonnes of RDF from Southampton to Rotterdam is estimated to generate 834 tCO₂e per year, while shipping the RDF to Gothenburg would generate 2,387 tCO₂e per year.
- 4.14 The type of electricity displaced depends on the country the RDF is sent to. However, overall it is likely that generation of electricity from RDF in Europe would lead to a reduction in fossil fuel generation similar to that in the UK. The main difference between the proposed Portland ERF and facilities in Europe relates to heat export. More European plants are connected to district heating systems than UK plants and many are connected to extensive systems with multiple heat sources and users. Therefore, there is more potential for heat displacement for European plants. It has been assumed that European plants export three times as much heat as is assumed for the proposed Portland ERF, giving a heat efficiency of 9.84%. It has also been assumed that the European plants have the same electrical efficiency as Portland, but that this would be reduced by the additional heat export, giving an electrical efficiency of 20.3%.
- 4.15 It should be noted that European ERF plants, particularly those linked to district heating schemes, are likely to be running at capacity with significant quantities of waste still being sent to landfill. This means that burning UK waste in these

plants means that some other European waste is not being burned and is probably being landfilled. This factor has not been taken into account.

Other ERFs in Dorset Waste Plan

- 4.16 The assessment assumed that an ERF constructed on one of the alternative sites in the Dorset Waste Plan would be identical to the proposed Portland ERF. This meant that the only differences, in carbon terms, would be the distance travelled to deliver waste, the potential for exporting heat and the potential for exporting power directly to users. It did not take into account whether such a facility would be deliverable on the other sites.
- 4.17 The Eco Sustainable Solutions site in Parley has some potential for district heating, but no specific heat users have been identified. It is 10-15 km from Poole and Bournemouth, 50 km from Dorchester and 16 km from Canford Magna MBT plant. This suggests that Dorset's waste would travel around 15 km on average, releasing 184 tCO₂e per year.
- 4.18 The Canford Magna, Poole site has the potential to supply district heating to Magna Business Park, but no specific heat users have been identified. The site already includes the MBT plant, so the RDF produced by this plant could be processed in an ERF with no transport emissions. The site is 10-15 km from Poole and Bournemouth and 40 km from Dorchester. Allowing for zero transport for the RDF already present, this suggests that Dorset waste would travel around 10 km on average, releasing 122 tCO₂e per year.
- 4.19 The Mannings Heath Industrial Estate, Poole site has the potential to supply district heating within the industrial estate, but no specific heat users have been identified. The site is 10 km from the centres of Poole and Bournemouth, 40 km from Dorchester and 6 km from Canford Magna MBT plant. This suggests that Dorset waste would travel around 10 km on average, releasing 122 tCO₂e per year.
- 4.20 The Binnegar Environmental Park in East Stoke does not have any potential district heating customers. It is 20-30 km from Dorchester, Poole and Bournemouth and around 24 km from Canford Magna MBT plant. This suggests that Dorset waste would travel around 25 km on average, releasing 306 tCO₂e per year.

Results for alternative ERFs

- 4.21 The results for the different ERFs are set out in table 4.1. For the proposed ERF, three cases are shown:
- Base case (export of electricity to grid only)
 - With shore power (SP)
 - With shore power and district heating (SP + DH)
- 4.22 These are then presented in order of net emissions, showing the difference from the base case.

ERF	Transport (tCO ₂ e)	Heat offset (tCO ₂ e)	Power offset (tCO ₂ e)	Direct emissions (tCO ₂ e)	Net emissions (tCO ₂ e)	Difference from base case (tCO ₂ e)
Marchwood	1,381	0	-40,807	89,751	50,325	1,570
Portland (base case)	1,442	0	-42,438	89,751	48,755	0
Binnegar	1,075	0	-42,438	89,751	48,388	-367
Parley	953	0	-42,438	89,751	48,265	-490
Canford Magna	892	0	-42,438	89,751	48,204	-551
Mannings Heath	892	0	-42,438	89,751	48,204	-551
Lakeside	2,605	0	-45,770	89,751	46,586	-2,169
Portland + SP	1,442	0	-48,012	89,751	43,182	-5,573
Gothenburg	3,826	-11,190	-39,534	89,751	42,853	-5,902
Rotterdam	2,275	-11,190	-39,534	89,751	41,302	-7,453
Portland + SP + DH	1,442	-4,144	-47,043	89,751	40,006	-8,749

Table 4.1: Comparison of ERF options

4.23 Table 4.1 shows that there is relatively little difference between the UK options. While the Portland ERF (base case of exporting electricity to the grid only) has higher emissions than the other sites in the Dorset Waste Plan, this difference is compensated for by the potential benefits of shore power. Similarly, while the additional transport emissions for shipping waste to Europe are outweighed by the benefits of district heating, the final Portland ERF option incorporating both shore power and district heating has the lowest emissions of all the compared scenarios.

Existing management of Dorset's waste

4.24 As set out in chapter 12 of the original ES, Dorset's residual local authority collected waste (including Bournemouth, Christchurch and Poole) is currently sent outside the county for energy recovery (109,984 tonnes in 2018) or disposal to landfill (51,344 tonnes in 2018). Sending the local authority collected residual waste to the proposed development, together with enough commercial waste from within Dorset to use up spare capacity at the plant, has been assumed for the purposes of the assessment to divert waste from the following three routes:

- 20,000 tonnes of waste sent to ERFs in the UK. It has been assumed that half the waste is sent to Marchwood and half to Lakeside
- 80,000 tonnes of RDF sent to ERFs in Europe. It has been assumed that the waste goes to a plant in the Netherlands
- 82,000 tonnes of waste sent to landfill in the UK (101,912 tonnes in the maximum case). This is considered in the main assessment of the original ES chapter

4.25 These three routes have been combined to form a new baseline, which is compared with the proposed development in table 4.2.

Parameter	Tonnes CO ₂ e per year (nominal capacity)	Tonnes CO ₂ e per year (maximum capacity)
Baseline (existing Dorset waste management)		
Releases from landfill gas	37,099	45,001
Transport of waste and outputs to landfill	443	546
Offset of grid electricity from landfill gas engines	-4,986	-6,048
Total landfill emissions	32,556	39,500
Transport of waste to and outputs from alternative ERFs	1,217	1,211
Offset of heat from alternative ERFs	-4,901	-4,433
Offset of grid electricity with alternative ERF generation	-22,057	-19,952
Emissions from the alternative ERFs	49,141	41,385
Total alternative ERF emissions	23,400	18,211
Total baseline emissions	55,957	57,711
Proposed ERF		
Transport of waste to and outputs from the ERF	1,442	1,582
Offset of grid electricity with ERF generation	-42,438	-42,438
Emissions from the ERF	89,751	83,562
Total ERF emissions	48,755	42,705
Net benefit of the proposed ERF	7,202	15,006
Net benefit with shore power, 2024	11,840	19,644
Net benefit with shore power, 2045	12,775	20,579
Table 4.2: Summary comparison with existing management of Dorset's waste		

4.26 In summary, the benefit of the proposed Portland ERF over the current residual waste management approaches for Dorset's waste is estimated to be around 7,200 tCO₂e per year, increasing to 15,000 tCO₂e per year in the maximum case with lower NCV waste. It should also be noted that these calculations do not take account of the additional benefits that would be provided by shore power from the proposed Portland ERF, which would displace a further 4,500 to 5,500 tCO₂e per year, or the potential benefit of district heating, which would displace around a further 3,000 tCO₂e per year.

4.27 The sensitivity of these results to the grid displacement factor for electricity and the landfill gas capture rate has been considered, based on the assumption that the grid displacement factor for all electricity generated by all plants is the same. The full results are set out in appendix 4.1, but in summary it was found that there is a benefit for all landfill gas capture rates and grid displacement factor combinations except for a scenario with a very high landfill gas capture rate with no export of power to ships. This is a very unlikely combination of circumstances.

Future management of Dorset's waste

4.28 Once the Bridgwater ERF is operational, it is understood that the RDF from Canford Magna will be transported to Bridgwater rather than to Europe. Therefore, an alternative baseline has been considered for Dorset's waste where 80,000 tonnes per year of RDF is sent to the Bridgwater ERF rather than Europe. This future baseline is compared with the proposed development in table 4.3.

Parameter	Tonnes CO ₂ e per year (nominal capacity)	Tonnes CO ₂ e per year (maximum capacity)
Baseline (future Dorset waste management)		
Releases from landfill gas	37,099	45,001
Transport of waste and outputs to landfill	443	546
Offset of grid electricity from landfill gas engines	-4,986	-6,048
Total landfill emissions	32,556	39,500
Transport of waste to and outputs from alternative ERFs	1,201	1,195
Offset of heat from alternative ERFs	0	0
Offset of grid electricity with alternative ERF generation	-23,628	-21,373
Emissions from the alternative ERFs	49,141	41,385
Total alternative ERF emissions	26,714	21,207
Total baseline emissions	59,271	60,707
Proposed ERF		
Transport of waste to and outputs from the ERF	1,442	1,582
Offset of grid electricity with ERF generation	-42,438	-42,438
Emissions from the ERF	89,751	83,562
Total ERF emissions	48,755	42,705
Net benefit of the proposed ERF	10,516	18,002
Net benefit with shore power, 2024	15,154	22,640
Net benefit with shore power, 2045	16,089	23,575
Table 4.3: Summary comparison with future baseline management of Dorset's waste		

- 4.29 In summary, the benefit of the proposed Portland ERF over the future residual waste management approaches for Dorset's waste is estimated to be around 10,500 tCO₂e per year, increasing to 18,000 tCO₂e per year in the maximum case with lower NCV waste. It should also be noted that these calculations do not take account of the additional benefits that would be provided by shore power from the proposed Portland ERF, which would displace a further 4,500 to 5,500 tCO₂e per year, or the potential benefit of district heating, which would displace around a further 3,000 tCO₂e per year.

Lifetime benefit

- 4.30 The lifetime benefit of the proposed ERF compared to the baseline of sending waste to landfill remains as originally assessed in paragraph 5.34 of the ES at around 62,000 tCO₂e based on an illustrative, conservative calculation. The lifetime benefit compared to the current baseline for Dorset's waste has also now been calculated and is estimated to be 157,548 tCO₂e, with a net benefit in each year. The original ES conclusion that the proposed development will have a significant beneficial effect as a result of reduced carbon emissions compared to the baseline therefore remains valid and unchanged.

Assessment of effects associated with the provision of district heating

- 4.31 The carbon benefits associated with the provision of district heating were taken into account in both the original and updated carbon assessments, as set out above, so no further consideration is required.

Conclusions

- 4.32 The updated carbon assessment has shown that the Portland ERF scenario incorporating both shore power and district heating would have lower carbon emissions than both the UK and European alternatives. The updated

assessment also confirmed that the proposed Portland ERF would lead to carbon savings when compared to the existing and potential future management of Dorset's waste. The original ES conclusion that the proposed development will have a significant beneficial effect as a result of reduced carbon emissions compared to the baseline remains valid and unchanged.

5 Community, health and economic effects

Introduction

- 5.1 Dorset Council's letter requested the following additional information and clarification in relation to effects on health:
- Additional detail responding to issues in respect of potential benefits or impacts upon public health as a result of changes in air quality. In particular, this should address outstanding issues raised by Public Health Dorset (point 5 in the council's letter)
 - Further consideration and information in respect of relevant health-related issues raised through representations on the first consultation as appropriate (point 6)
- 5.2 In addition, the following additional information and clarification was requested in relation to economic effects:
- Additional detail to support the assumptions that lie behind the stated number of additional jobs created (point 33 in the council's letter)
- 5.3 No additional information or clarifications were requested in relation to community effects.
- 5.4 ERM, who undertook both the human health risk assessment (HHRA) and health impact assessment (HIA) for the original ES, has prepared addenda to these documents to provide the further information requested by the council in relation to the potential benefits or impacts on public health due to changes in air quality and to address the issues raised by Public Health Dorset (point 5 in the council's letter). The full addenda reports are contained in appendices 5.1 (HHRA) and 5.2 (HIA) and their findings are summarised in this section.
- 5.5 ERM has also provided responses to the various other health-related issues raised by representations to the consultation (point 6 in the council's letter). These responses are considered to be clarifications, rather than the provision of 'further environmental information' under Regulation 25, so they are set out in the CRSD.
- 5.6 ERM also undertook the economic assessment and has provided responses to queries on the basis behind the assumptions relating to the number of additional jobs created by the proposed development (point 33 in the council's letter). These responses are considered to be clarifications, rather than the provision of 'further environmental information' under Regulation 25, so they are set out in the CRSD.

Human health risk assessment

- 5.7 As discussed in section 3, the air quality assessment has been updated to take into account the net change in emissions of NO_x, NO₂, PM₁₀, PM_{2.5} and SO₂ due to the use of shore power provided by the ERF to ships berthed at the port. The results of the updated air quality assessment have been used to update the HHRA. The emissions of metals and dioxins will not be affected by the provision

of shore power, so only the assessment of health effects associated with changes in NO₂, PM₁₀, PM_{2.5} and SO₂ has been updated.

- 5.8 The updated assessment shows that the exposure of the population to PM_{2.5} will decrease compared to the existing baseline, as a consequence of the proposed ERF providing shore power and the associated reduction in emissions from ships berthed at the port. Using the same method to calculate years of life lost as in the original HHRA, this results in a gain of 2.0 years of life distributed across the whole of the exposed population. While those in the highest exposure group would gain the most, the results averaged across the exposed population give a gain of approximately 32 minutes per person per year, or 16.5 hours gained throughout the 30-year lifetime of the plant.
- 5.9 The decreased exposure to PM₁₀ compared to the existing baseline as a result of the provision of shore power and associated reduction in shipping emissions will lead to a negligible improvement in the health of the local population. This will not be significant, and the changes in health will not be discernible in the population, but there will be an overall reduction in the incidence of all the health indicators considered for this pollutant. This reduction ranges from -0.00020 cases of cardiovascular mortality per year to -0.0070 cases of cardiovascular admissions to hospital per year.
- 5.10 Overall, there will be a net decrease in NO₂ concentrations, although the change will be negligible. This decreased exposure overall, compared to the existing baseline as a result of the provision of shore power, will lead to a negligible improvement in the health of the local population that will not be significant. The changes in health will not be discernible in the local population, but there will be an overall reduction in the incidence of all the health indicators considered for this pollutant. This reduction ranges from -0.0011 cases of cardiovascular mortality per year to -0.022 admissions to hospital due to ischaemic heart disease.
- 5.11 Unlike the other pollutants, there is still predicted to be a negligible adverse effect on health as a result of increased exposure to SO₂ compared to the existing baseline. However, this will not be significant and will not lead to an additional case of any of the health outcomes considered over the 30-year lifetime of the proposed development. The annual increase in cases ranges from 0.00058 cerebrovascular admissions to hospital to 0.0087 cardiovascular admissions.
- 5.12 Overall, the health effects associated with emissions of NO₂, SO₂, PM₁₀ and PM_{2.5} from process emissions, transport and the provision of shore power will be negligible and not significant.

Health impact assessment

- 5.13 The HIA addendum took account of the findings of the updated air quality assessment and HHRA and addressed the following topics that were raised by stakeholders during the consultation:
- Potential for differential or disproportionate impacts on the mental health and wellbeing of the local population

- Potential for differential or disproportionate impacts as a result of existing health inequalities within the local population
 - Potential for impacts on the resident 'static' inmate population at HMP The Verne
- 5.14 The study identified several existing health inequalities in the Weymouth and Portland area that could mean people are more susceptible to health impacts, including a higher proportion of older residents, high levels of deprivation and unemployment in some areas, relatively high levels of some health conditions, including depression, hypertension, diabetes and cancer, and the presence of vulnerable groups, including prison inmates and homeless people. The assessment followed the structure of the original HIA, although social capital and accidents and trespass were not assessed because they were sufficiently covered in the original assessment and no further potential issues were identified.
- 5.15 As discussed in section 3, the air quality modelling shows that there will be no significant health effects on the occupants of HMP The Verne as a result of the proposed development, either from increased traffic or operational emissions, as changes in the concentrations of all pollutants will be negligible and not significant.
- 5.16 The updated HIA states that, while there is currently no evidence directly linking waste disposal facilities to negative health effects, it is understood that the perceived air quality risk can lead to effects on anxiety levels and mental wellbeing. It is therefore important that engagement and ongoing communication are undertaken with local communities to minimise this. A local liaison group will be established, which will meet on a regular basis to discuss the operation of the ERF and any potential issues or queries from members of the local community. It will provide a forum for community stakeholders to be informed and consulted regarding site operations and procedures.
- 5.17 Measures that will be put in place through the framework CEMP (see technical appendix C of the original ES) to minimise construction noise will ensure that there will be no significant health effects on the occupants of HMP The Verne during construction. To reduce anxiety associated with construction activities, it will be important that engagement and ongoing communication are undertaken, including establishing a contact point to report any noise disturbance.
- 5.18 The updated HIA notes that consistent heightened noise levels can affect the health of local people through stress, annoyance and a decreased sense of wellbeing. The updated noise assessment confirmed that the proposed development will not generate significant operational noise, as levels will be controlled through the design of the building and the site layout. The low levels of operational traffic mean that no significant traffic noise effects are predicted. The updated HIA confirms that no significant adverse effects are predicted on health and wellbeing as a result of noise.
- 5.19 The risk to the health of local communities, particularly those of an older demographic or experiencing other health inequalities, may rise as a result of increased HGV movements on the local road network. During construction, as set out in the framework CEMP, the contractor will be responsible for liaising with the local community to ensure that there is awareness of when and what

HGV deliveries will be required and to identify any constraints or mitigation required to address the specific needs of the community. However, the worst case scenario of an additional 80 HGV movements per day (40 each way) during and post-construction equates to an average of one additional HGV every 15 minutes and the traffic and transport assessment confirms that there will be negligible effects on pedestrian severance, delay and amenity. As a result, it is not expected that traffic associated with the proposed development will exacerbate mental health issues or current health inequalities within the local communities.

- 5.20 The updated HIA states that the visual presence of industry can lead to feelings of dissatisfaction, as well as stress, anxiety and concern. As the proposed development is located in an industrial port that is not accessible to the public, where there is already constant activity, and construction works will be temporary, no significant effects are predicted on local mental health and wellbeing, including at HMP The Verne. The design of the building has been carefully considered to minimise visual impacts and no significant adverse effects are predicted on population health and wellbeing post-construction as a result of changes to views.
- 5.21 Health benefits will be experienced for the duration of the employment generated by the proposed development, both during and post-construction, and would be most beneficial to those currently experiencing socio-economic deprivation, economic inactivity or unemployment within the area. Opportunities to target employment within these sections of the community should be maximised wherever possible. In addition to income and improved socio-economic status, health benefits such as delayed mortality, decreased illness and improved wellbeing can be experienced by those employed during the operational phase and will be of longer term benefit. This could contribute to reducing some of the current health inequalities present in the area.
- 5.22 The updated HIA sets out recommendations for ongoing engagement with local communities and wider stakeholders and concludes that advance visibility, engagement and ongoing liaison should mitigate potential increases in anxiety arising from project-related activities. It highlights that mitigation measures will be integrated into the building design, the CEMP and construction management planning to minimise the potential for adverse effects on health and wellbeing. This will include the publication of the CEMP, adoption of contact mechanisms during construction and advance notification of proposed works.
- 5.23 In advance of construction, specific engagement will be undertaken with HMP The Verne to minimise the potential for adverse effects on health and wellbeing. In particular, this will address the potential for anxiety over proposed construction activities. The proposed development will be subject to strict regulatory controls and the requirement for ongoing monitoring of various activities, including emissions. To reduce potential anxiety, consideration should be given to the periodic publication of environmental monitoring data that local communities, and wider stakeholders, can access via the project website.

Assessment of effects associated with the provision of district heating

- 5.24 The main potential health impacts associated with the provision of district heating relate to noise during installation, particularly at HMP The Verne given

that it is envisaged that the district heating pipes will be connected into the prison. Consideration and control of vibration impacts will be required during installation, due to the close proximity of the road network to dwellings. There is also the potential for concern around access to the nearby healthcare facilities, as the installation of pipes within local road networks could lead to disruption during the works. It is therefore important that engagement and ongoing communication are undertaken to reduce anxiety associated with these construction activities, including establishing a contact point to report disturbance.

- 5.25 As discussed above, the presence of construction works can lead to feelings of dissatisfaction, as well as stress, anxiety and concern. In this case, the construction impacts will be short term and temporary and are therefore unlikely to lead to significant effects on the mental health and wellbeing of local residents and inmates at HMP The Verne. Temporary works within the local road network, similar to those undertaken during other utility works, are also not considered likely to affect local property prices. No significant cumulative community and health effects are predicted as a result of the provision of district heating.
- 5.26 The provision of district heating was taken into account in the original economic assessment, so no further consideration is required.

Conclusions

- 5.27 The additional information and assessment provided in the updated HHRA and HIA did not identify any significant health effects. Given this, and the fact that no significant cumulative effects are predicted as a result of the provision of district heating, the conclusions of the original ES chapter that there will be no significant adverse community and health effects remain valid and unchanged. The findings of the economic assessment also remain the same.

6 Cultural heritage

Introduction

- 6.1 Dorset Council's letter requested the following additional information and clarification in relation to cultural heritage effects:
- Further detail and assessment in respect of specific mitigation measures proposed to mitigate potential harm caused to the historic environment from the proposal, which should have regard to impacts on the setting of designated heritage assets. Proposals for mitigation should include the consideration of a footpath link on Port land immediately beneath the prison (point 7 in the council's letter)
 - Assessment of potential impacts on footpath S3/72, which runs past the Royal Naval Cemetery, in relation to the potential impacts on the historic environment (point 8)
 - Further consideration and information in respect of relevant historic environment-related issues raised through representations on the first consultation as appropriate (point 9)
- 6.2 Terence O'Rourke Ltd, who undertook the cultural heritage assessment for the original ES, has prepared a framework heritage mitigation strategy outlining the proposed contents and broad principles for heritage mitigation, which provides the further information requested by the council in relation to specific mitigation measures to mitigate potential harm to the historic environment (point 7 in the council's letter). The framework heritage mitigation strategy is contained in appendix 6.1 and its key elements are summarised in this section. In addition, Terence O'Rourke Ltd has assessed the potential impacts on footpath S3/72 in relation to the historic environment (point 8 in the council's letter). The assessment is contained in this section.
- 6.3 Terence O'Rourke Ltd has also provided responses to the various other historic environment issues raised by representations to the consultation (point 9 in the council's letter). These responses are considered to be clarifications, rather than the provision of 'further environmental information' under Regulation 25, so they are set out in the CRSD.

Further mitigation measures to address cultural heritage effects

- 6.4 The framework document in appendix 6.1 sets out the structure and broad principles for a heritage mitigation strategy to mitigate effects on the setting of the East Weare batteries, which will be secured through a planning condition. The works proposed include scrub clearance and agreed repairs and removal of risk factors to enable E Battery East Weare (a scheduled monument and grade II listed structure) to be removed from the Historic England Heritage at Risk Register. Appropriate public presentation of the monument will also be provided, allowing curated visits only.
- 6.5 The strategy also proposes a footpath extension to allow an 'around the island' circuit of the coastal path by creating a new section of permissive footpath through currently inaccessible parts of the secure port estate to connect to existing publicly accessible land and rights of way. The path will be fenced and

will be wide enough to allow access for maintenance vehicles and ongoing management of the Isle of Portland Site of Special Scientific Interest (SSSI). The additional access path can be secured by planning obligation.

- 6.6 Interpretation will be provided for the group of related heritage assets at East Weare (A-E batteries, the former detention camp and the undesignated World War II features). Information boards will be provided at specific viewing areas, one relating to E battery and one allowing clear views of the wider group of assets. The boards will be designed to integrate with the existing interpretation in the area, such as the Portland stone features at the Fancys Farm open space at the top of Incline Road.
- 6.7 Five proposed stages of work are identified for E battery: preliminary surveys to determine the vegetation clearance required to allow access for surveyors and provide an initial assessment of potential ecological issues; enabling works and a condition survey, including determining the vegetation clearance required, obtaining any necessary ecological licences and carrying out the full condition survey; development and agreement of the proposed works, scheduled monument consent application to Historic England and obtaining any further ecological licences; undertaking the main works; and annual maintenance and five-yearly inspections of the battery. Further information on the potential for ecological effects and associated mitigation is provided in section 9 of this ES addendum.
- 6.8 Three proposed stages of work are identified for the new permissive footpath: the planning stage, including confirming ecological surveys, producing documentation and obtaining necessary consents and licences; undertaking the works, including vegetation clearance, installation / repair of fences and gates, path treatments and security; and monitoring, inspection and future maintenance. Further information on the potential for ecological effects and associated mitigation is provided in section 9 of this ES addendum.
- 6.9 The mitigation strategy that will be produced based on the framework at appendix 6.1 is focused on the E battery above the site at East Weare, which is both a scheduled monument and listed at grade II. The proposed works of vegetation clearance and repair will allow the removal of the monument from the national Heritage at Risk Register. In addition, the provision of interpretation of the battery, both individually and as part of the wider group of defences across East Weare, will enable improved public appreciation and understanding of the monument. The slight to moderate, significant adverse effect of the proposed ERF as a result of the changed qualities and character of the setting predicted in chapter 7 of the original ES will therefore be fully mitigated, removing the predicted significant adverse residual effect.
- 6.10 Other elements of the strategy relate to the connecting of footpaths S3/72 and S3/81 by creating a fenced section of new permissive path through the secure port estate, linking together the sections of the public footpath and coastal path around East Weare. The new path will provide a sequence of new vantage points, allowing views across East Weare and improved appreciation of the range of military features, their setting and the connections between them. The path will also allow a full circuit of The Verne Citadel and create new publicly accessible views of the east side of the fortress, above the cliff face. The provision of an integrated programme of interpretation will enable improved

public appreciation and understanding of the assets and of their shared functional and historic setting on the coastline below the citadel.

- 6.11 The group of heritage assets at East Weare includes both the scheduled monuments and listed buildings and a number of non-designated assets (see figures 7.1-7.3 in the original ES and figure 1 attached to the framework strategy in appendix 6.1). In accordance with figure 7.4 of the original ES, these range from high to low importance. The alteration to the significance of the heritage assets at East Weare because of the enhanced public access and new opportunities for appreciation and understanding of the assets and their setting will be a small to medium change to assets of high to low importance, which will result in a long term, moderate, significant beneficial effect.

Impacts on public footpath S3/72

- 6.12 Footpath S3/72 currently leads up to the port security fence (new ES figures 9.46 and 9.47 in appendix 8.2 show the boundaries of the port estate). It was formerly known as Cemetery Road and followed a route around the base of the natural escarpment, straightened and embanked at some points, and opening out to the levelled area at the Royal Naval Cemetery. The cemetery was established in 1876 by the War Office to serve both the garrison at The Verne Citadel and the Royal Navy using the harbour refuge. It was transferred to Admiralty in 1907 and remained part of the naval base until it closed. It is owned by the Ministry of Defence, is still in use and is maintained by the Commonwealth War Graves Commission.
- 6.13 There is a series of open areas and vantage points on the west portion of the path that allow extensive views across the residential areas to the north, the harbour and breakwaters, Osprey Quay and the marina, Portland Beach Road and the coastline beyond; and closer views of The Verne Citadel above (see the photographs in figure 7.10 of the original ES). For much of its length to the east once beyond the cemetery, views are largely obscured by the scrub growth closely bordering the path.
- 6.14 The requested assessment of the potential effects on the footpath relating to the historic environment concerns the quality of the experience and the value of the footpath in enabling views that allow appreciation and understanding of the cemetery itself and the assets relating to the military use of the north east part of Portland. These are, *inter alia*, The Verne Citadel and the harbour within the breakwaters. The only one of the group of batteries at East Weare that can currently be seen from the path is E battery, which is largely obscured by vegetation. These views are a minor element of the significance of the designated and non-designated assets, which range from high to low importance.
- 6.15 The change to the quality of the experience of the historic environment from the footpath as a result of visual changes because of the proposed ERF development will be a negligible magnitude of change to assets of high to low importance, which will result in a long term, negligible to slight adverse effect that will not be significant.
- 6.16 The extension of the footpath around East Weare and the clearance and presentation of E battery, with some controlled curated public access, will

increase the value of the footpath as the focus for public appreciation of the wider group of assets within the secure port estate. The change to the quality of the experience of the historic environment as a result of the extension completing the circuit around the island will be a small magnitude of change to assets of high to low importance, which will result in a long term, slight to moderate, significant beneficial effect.

Assessment of effects associated with the provision of district heating

- 6.17 As the district heating pipes will run within the local road network, no significant effects are predicted on archaeology or built heritage as a result of their installation. It is intended that the pipes will be routed into the prisons using the existing utility ducts, so it is not envisaged at this stage that works would be required to the listed structures or the citadel scheduled monument at HMP The Verne, with the exception of the installation of the pipes within the highway along the Glacis where it passes within the scheduled monument designation. Once the final routeing of the pipes is confirmed, the necessary consents for any works required would be part of the future planning submissions.

Conclusions

- 6.18 The measures set out in the detailed heritage mitigation strategy to be developed based on the framework (appendix 6.1) will remove the slight to moderate, significant adverse residual effect on the East Weare batteries scheduled monument and listed structure. The other elements of the strategy, relating to the improved public access and interpretation and opportunities for greater appreciation and understanding of the range of assets across East Weare, are predicted to result in a moderate, significant beneficial effect.
- 6.19 The assessment of the potential for effects on footpath S3/72 in relation to the historic environment concludes that the change to the experience of the historic environment from the footpath as a result of the visibility of the ERF development will be a negligible to slight adverse effect that will not be significant. The change to the experience of the historic environment because of the extension of the footpath around East Weare is predicted to result in a slight to moderate, significant beneficial effect.
- 6.20 All the other residual cultural heritage effects remain as assessed in the original ES and no additional significant cumulative effects are predicted as a result of the provision of district heating.

7 Ground conditions and water quality

Introduction

- 7.1 Dorset Council's letter requested the following additional information and clarification in relation to ground conditions effects:
- Further information in respect of suitability of the site to accommodate the proposed development in terms of historic contamination, geology and ground stability (point 29 in the council's letter)
- 7.2 In addition, the following additional information and clarification was requested in relation to surface water discharge:
- Further detail in respect of the acceptability of the sea outfall, addressing the comments of Dorset Council Flood Risk Management Team explaining how the issues raised will be addressed and overcome (point 27 in the council's letter)
 - Further consideration and information in respect of relevant surface water management issues raised on the first consultation as appropriate (point 28)
- 7.3 No further information was requested in relation to effects on water quality.
- 7.4 Arup, who undertook the ground conditions assessment for the original ES, has produced a report to provide the further information requested by the council on geology and ground stability (point 29 in the council's letter). The full report is contained in appendix 7.1 and its findings are summarised in this section. Arup has also provided responses to the historic contamination issues raised by representations to the consultation, which confirm that sufficient information was provided in the original ES. These responses are considered to be clarifications, rather than the provision of 'further environmental information' under Regulation 25, so they are set out in the CRSD.
- 7.5 Awcock Ward Partnership (AWP), who prepared the original flood risk assessment (FRA) and surface water drainage strategy, has produced an addendum to the FRA demonstrating that, subject to additional attenuation, the surface water runoff from the site can be drained via existing outfalls to Balaclava Bay and Portland Harbour (point 27 in the council's letter). Its key elements are summarised in this section and, as the FRA and surface water drainage strategy report did not form part of the original ES, the FRA addendum is submitted as a stand alone document.
- 7.6 AWP has also provided responses to the various surface water management issues raised by representations to the consultation (point 28 in the council's letter). These responses are considered to be clarifications, rather than the provision of 'further environmental information' under Regulation 25, so they are set out in the CRSD.

Further detail on surface water drainage

- 7.7 Surveys of the existing drainage outfalls and hydraulic modelling have been undertaken to determine the capacity of the outfalls and the peak flow rates for

up to a 1-in-100 year storm, including a 40% allowance for climate change. This confirmed that the two eastern drainage outfalls into Balaclava Bay have sufficient capacity to drain the clean roof runoff from the proposed development. However, the northern outfall into Portland Harbour was only found to have sufficient capacity to drain the treated runoff from the roads, parking areas and service yard for up to a 1-in-2 year storm.

- 7.8 Beyond this, the network would become overwhelmed and up to 230 m³ of flood volume would occur in the event of a 1-in-100 year storm. It is considered that the 1-in-2 year storm capacity would drain the first flush from a storm with a greater return period, thereby reducing the risk of pollution from overland exceedance flows. The surface water drainage strategy has been revised to include an offline geo-cellular attenuation tank beneath the proposed car park in the north east of the site, which can provide up to 230 m³ of water storage. The FRA addendum therefore concludes that the proposed drainage system will ensure that there will be no significant increase in flood risk as a result of the proposed development and the ERF will not be at risk from flooding.

Suitability of the site in relation to geology and ground stability

Introduction

- 7.9 A desk-based review was undertaken of available ground conditions information on slope stability at the site and within the wider Isle of Portland area to assess the potential risk to the proposed ERF. The development site is relatively flat and sits at approximately 7 m above Ordnance datum (AOD). It is bordered to the south west by a hillside that rises inland to approximately 140 m AOD. The hillside comprises an upper steep escarpment of limestone / sandstone over a shallower slope formed of landslip deposits over the underlying bedrock, with a slope angle of around 8 degrees. Towards the base of the hillside, the slope steepens to a gradient of around 30 degrees.

Geology

- 7.10 As discussed in the original ES, ground investigations were carried out on site by RPS in 2009. The ground conditions on site were recorded to comprise a layer of made ground, approximately 5-8 m thick, marine gravel deposits in the north east corner of the site and a weathered zone of Kimmeridge Clay in the north of the site resting above the Kimmeridge Clay bedrock. While site-specific investigations have not been undertaken on the adjacent hillside, historical British Geological Society borehole logs on the slope indicate the thickness of landslip deposits to be at least 5 m, with some boreholes recording up to 13 m. Evidence from neighbouring sites indicates the presence of a disturbed zone at the top of the Kimmeridge Clay that is associated with historical landslips.

Historical slope stability

- 7.11 Very slow natural movements occur within the colluvium⁽¹⁾ along the slopes. The movement is understood to be aided by coastal erosion, which removes some of the weight at the toe of the slope. The stability of the natural slopes is

¹ Colluvium is material that accumulates at the foot of a steep slope as a result of natural weathering and degradation.

considered to be controlled by the slope angle of the upper surface of the Kimmeridge Clay and the presence of water within the slope. There are considered to be three possible modes of slope failure:

- Deep-seated slumps within the colluvium and fill material
- Along soft clays on the interface between the Kimmeridge Clay and overlying colluvium
- Reactivation of very deep-seated rotational failures through the Kimmeridge mudstone, at depths below the colluvium / Kimmeridge Clay interface

- 7.12 The Isle of Portland has a history of landslips, with records of slips along the coastline from 1665 to the present day. On the slopes to the west of the site, there are records of four landslips with a well defined deep-seated shallow circular form. Individual shallow movements have been recorded at rates of between 3.5-9 mm per year in the last 50 years. The development of the harbour resulted in extensive cut and fill at the base of the slope and the dredging of the harbour entrances also removed weight from the toe of the slope.
- 7.13 The only slips indicated to be immediately above the development site were recorded in the 1600s. However, it should be noted that the exact location of these slips is not precisely known and they were just recorded in this general area of the coast. In this part of the Isle of Portland, undercutting of the toe of the slope by sea erosion is considered to be a predominant control on the slope movements. However, because the development site at the base of the slope is formed from reclaimed land, it will be protecting the slope from coastal erosion.
- 7.14 The coastal slopes to the south of the site, adjacent to the Upper Osprey site, are the most active landslide area on the Isle of Portland. The largest landslide occurred in 1792 following a period of high rainfall and comprised a massive, deep-seated slip. Several more recent failures have occurred in this area, which are predominantly considered to be as a result of poorly executed earthworks and a failure to control water flows properly, rather than due to the natural instability of the slope.
- 7.15 Surface movement monitoring was undertaken along the north east coast of Portland between 1977 and 1988. The results indicate that shallow movements were occurring on the slopes to the west of the site and deep-seated movements were occurring on the slopes to the south. While the survey points on the slope above the site were limited in number, they indicate a low rate of movement in this area. The records of historical slope movements along the north east coast of the Isle of Portland suggest that the slopes above the site are in a different setting from the areas to the south where the main landslides have occurred.
- 7.16 No site-specific monitoring data are available for the slope above the site. However, the Environment Agency's annual LiDAR elevation data have been examined to identify indications of relative displacement. A comparison of available data over 12 years from 1998 to 2010 did not identify any consistent differential movement in any areas of the slope above the site. Anecdotal evidence from Portland Port also indicates that there has been no record of any

recent slope movements adjacent to the site, with recent slope movements only recorded on the slopes to the north and to the south at Upper Osprey.

- 7.17 The former rail embankment that runs along the side of the site at the toe of the slope has been in place for over 100 years and does not appear to have been affected by any large scale slope movements directly above the site.

Slope assessment

- 7.18 Ground modelling was undertaken to enable an assessment of the likelihood of slope instability at the site. It was based on a series of assumptions, full details of which are provided in appendix 7.1. Software was used to explore potential failure surfaces and changes to the factor of safety that may occur in the future.
- 7.19 A 'global factor of safety' is the ratio of the forces resisting movement to the forces causing movement. A slope with a factor of safety of less than 1.0 would be unstable. Many natural slopes have a factor of safety between 1.0 and 1.2 and can be considered marginally stable, i.e. they may become unstable under certain conditions such as sustained wet weather. A factor of safety in the range between 1.3 and 1.5 is commonly sought for newly engineered slopes.
- 7.20 Without detailed information on the stratigraphy, geotechnical properties of each soil layer and groundwater conditions, the absolute factor of safety cannot be calculated with certainty. However, for existing slopes, the relative change in the factor of safety can be considered. For example, if a slope is thought to be marginally stable, but with no evidence of recent instability, implementing drainage to increase the factor of safety by 0.1 may be considered acceptable, rather than targeting a particular absolute factor of safety. The assessment therefore considered the likely relative changes in the factor of safety of the slope over time.
- 7.21 An analysis was carried out of the current situation with the existing made ground in place. This indicated that the stability of the slope above the site is likely to be marginal, primarily due to the presence of the disturbed zone at the top of the Kimmeridge Clay. This is consistent with the evidence of progressive creep movements that affect the shallow surface soils. The rate of movement is potentially a few millimetres a year. However, it is likely that the rate of movement accelerates during wet weather and at some time in the future this may lead to a sudden shallow slope movement, which is likely to be along pre-existing shear surfaces within the upper 5 m of the slope. Such a movement could result in debris at the toe of the slope that could affect or partially block the highway, although it should be noted that the port does not have records of such slips occurring in the past.
- 7.22 However, the buttressing effect of the made ground at the toe of the slope significantly increases the factor of safety of deeper slips that could affect the development site itself. This means that the site in its current condition is very unlikely to be affected by deep-seated instability in the slope above.
- 7.23 The potential of the proposed excavation of the RDF bunker at the base of the slope to affect stability was then analysed. The following assumptions were made for the assessment:

- The excavation will not be carried out using battered slopes, but with a robust embedded retaining wall that will form part of the permanent structure
- The retaining wall will extend to at least -8 m OD (the maximum envisaged excavation depth) and will prevent any slip circles above this level
- Any reduction in slope stability would therefore be primarily due to the loss of weight at the toe of the slope

7.24 This analysis showed that the slip circles would need to go much deeper within the undisturbed Kimmeridge Clay to pass beneath the embedded retaining wall and the factor of safety is significantly higher than is expected for shallow slips on the slope above the site. The embedded retaining walls will prevent shallower slips from occurring. The excavation will result in a significant removal of weight at the toe of the slope, which will reduce the factor of safety of potential deep-seated failures passing beneath the embedded retaining walls from 2.5 to 1.8.

7.25 However, the removal of weight will only return the site to the original state of stress before it was filled for the development of the port. After construction of the proposed ERF buildings and structures over the pit area, the total weight at the toe of the slope is likely to be similar to, or more than, the existing. The width of the excavation (20 m) perpendicular to the slope is very narrow in relation to the potential slip circle indicated in the model. The deeper slips that have been recorded historically to the west and south of this area have been at least 80 m to 100 m wide, suggesting that a very narrow, elongated slip is highly unlikely. The actual factor of safety would therefore be much higher than the 1.8 indicated by the analysis, because of the considerable 3D effects of such an elongated slip. However, as discussed in paragraph 7.19, even a factor of safety of 1.8 would not normally be of concern and is considered likely to be acceptable.

7.26 Further ground investigations will be undertaken to confirm the assumptions made in the assessment, as follows:

- Position boreholes, likely to be on the former railway line, to confirm the thickness of colluvium and the nature of the disturbed zone on the slope (assuming it is practicable to access the slope)
- Position boreholes at the toe of the slope, on the edge of the highway, to confirm ground conditions in this zone
- Position boreholes across the development site to confirm the thickness of made ground, presence of marine gravels, absence of a disturbed zone and absence of shear surfaces within the underlying Kimmeridge Clay
- Borehole techniques should be designed to allow detailed logging of the soils, in particular evidence of existing polished shear surfaces
- Laboratory testing to explore effective stress parameters, including residual shear strengths
- Install piezometers in the boreholes at discrete depths to confirm piezometric profiles
- Install inclinometers on the former railway and on the side of the highway to confirm current depths and rates of any slope movement. These can

be maintained during operation of the facility to provide early warning of any change in the rate of movement

7.27 The engineering process will include the following:

- Based on the results of the ground investigations, a detailed slope stability assessment will be undertaken to confirm the assumptions presented in the preliminary assessment. This should include consideration of potential non-circular slip surfaces
- Design of the proposed excavation and embedded retaining wall with consideration of the potential for destabilisation of the adjacent slope
- Developing a long term monitoring strategy to mitigate the risk of shallow slope instability on the development, including potential blockage of the highway

7.28 While the above further work will be undertaken to confirm the assumptions used in the preliminary assessment, it is concluded that the proposed development is unlikely to have any significant effects on the stability of the hillside above the site.

Assessment of effects associated with the provision of district heating

7.29 The potential for ground conditions effects as a result of the installation of the district heating pipelines is the same as was assessed for the installation of the electricity cables in the original ES. The pipeline routes will require shallow linear excavations within the existing road network. During this process, made ground with the potential to be locally contaminated may be encountered and this would be managed in accordance with good practice for such utility excavations. As a result, no significant cumulative effects are predicted.

7.30 The provision of district heating will not result in any additional outflows to the sea because it is a closed loop system. There is therefore no potential for significant cumulative effects on coastal water quality. As the pipes will be within the local road network, there will be no increase in the impermeable surface area. The identified potential pipework routes will not cross any watercourses, so there is also no potential for significant cumulative effects on surface water quality.

Conclusions

7.31 The FRA addendum concluded that the proposed development will not be at risk of flooding, or increase flood risk off-site. The preliminary slope risk assessment concluded that the proposed development is not likely to lead to any significant effects on the stability of the hillside above the site. Given this, and the fact that no significant cumulative effects on ground conditions and water quality are predicted as a result of the provision of district heating, the conclusions of the original ES chapter that there will be no significant ground conditions and water quality effects remain valid and unchanged.

8 Landscape, seascape and visual effects

Introduction

- 8.1 Dorset Council's letter requested the following additional information and clarification in relation to landscape, seascape and visual effects:
- Additional detail and assessment in relation to the vapour plume from the stack and its visibility. This should include additional photomontages and / or visualisations that show the likely plume in different meteorological conditions (point 1 in the council's letter)
 - Further interpretive background in relation to the scale of the development, and its context in relation to the existing port (point 2)
 - More detail of the proposed PVC coating, its durability, and potential issues in respect of degradation during the design life of the facility (point 3)
 - Further consideration and information in respect of relevant landscape issues raised through representations on the first consultation as appropriate (point 4)
- 8.2 Fichtner Consulting Engineers Ltd, who undertook the plume visibility modelling for the original ES, has prepared a technical report setting out the results of the plume visibility modelling in greater detail, which is contained in appendix 8.1. This is additional information to the previous plume visibility modelling report that formed technical appendix J4 of the ES.
- 8.3 Terence O'Rourke Ltd, who undertook the landscape, seascape and visual impact assessment for the original ES, has prepared photomontages of the plume on the original viewpoint photographs for viewpoints 8 (Ferry Bridge), 9 (Sandsfoot Castle), 11 (White Horse Hill) and 12 (National Trust car park at Ringstead Bay) (point 1 in the council's letter). These are provided in appendix 8.2 as new ES figures 9.38 to 9.41, and further text in relation to the assessment of the visual effects of the plume is set out in this section.
- 8.4 In addition to the photomontages produced for the landscape, seascape and visual impact assessment, which were prepared in accordance with relevant Landscape Institute guidance, further illustrative photomontages showing the plume in a variety of meteorological conditions are provided in the design and access statement addendum prepared by Terence O'Rourke Ltd. This also contains Fichtner Consulting Engineers Ltd's plume visibility modelling and graphically illustrates the results.
- 8.5 Further interpretive background material showing the scale of the proposed ERF in the context of the port and other nearby large structures and features (point 2 in the council's letter) is provided in the design and access statement addendum prepared by Terence O'Rourke Ltd. This material is for illustrative purposes and has therefore not been used to inform the assessment of landscape, seascape and visual effects, so it is not reproduced in this document.
- 8.6 More detail on the proposed PVC mesh (point 3 in the council's letter) is provided in the design and access statement addendum prepared by Terence O'Rourke Ltd and is summarised in this section.

8.7 Terence O'Rourke Ltd has also provided responses to the various other landscape, seascape and visual effects issues raised by representations to the consultation (point 4 in the council's letter). Further information is provided in this section in relation to potential night-time effects, the introduction of a connection between footpaths S3/72 and S3/81, and the zone of theoretical visibility (ZTV) mapping. The responses to the other points raised during the consultation are considered to be clarifications, rather than the provision of 'further environmental information' under Regulation 25, so they are set out in the CRSD.

Plume visibility

8.8 Further information is provided in new ES figures 9.38 to 9.41 (see appendix 8.2) to illustrate the plume at its maximum visible length on a non-cloudy day of 187.89 m, with the wind direction coming from the south west (the predominant wind direction). This maximum length of visible plume would only have been visible once within the last five years, for a period of one hour in February 2016.

8.9 The original plume visibility modelling report produced by Fichtner Consulting Engineers Ltd, which formed technical appendix J4 to the ES, stated that the maximum percentage of hours in a year with any visible plume would be 1.5%, and that the average percentage of hours in a year over the five years between 2014 and 2018 with any visible plume would be 0.6%. These figures included all plumes on cloudy and non-cloudy days, and the unusual weather conditions experienced during the 'Beast from the East' and 'Storm Emma'.

8.10 The additional plume visibility modelling report provided in appendix 8.1 states that, in an average year, the percentage of daylight hours with any visible plume when the cloud cover is not high (seven to eight oktas²) would be 0.55% (24.2 hours). The plume would be obscured by cloud on cloudy days. Excluding the 'Beast from the East' and 'Storm Emma', which were abnormal weather events, the maximum percentage of hours with any visible plume would be 0.51% (22.2 hours).

8.11 While the plume would be visible for an average of 24.2 hours per year, its length would not be consistent for the entire duration, which will change the visual impact it will have from the various locations being considered. Therefore, the number of daylight hours the plume would be visible has been broken down by plume length, as follows:

- 0-20 m in length: 6.4 hours (6.2 hours excluding the 'Beast from the East' and 'Storm Emma')
- 20-50 m in length: 7.4 hours (6.6 hours excluding the 'Beast from the East' and 'Storm Emma')
- 50-100 m in length: 6.4 hours (5.8 hours excluding the 'Beast from the East' and 'Storm Emma')
- 100-200 m in length (although it should be noted that the maximum predicted length was 187.89 m for one hour in February 2016): 4.0 hours (3.6 hours excluding the 'Beast from the East' and 'Storm Emma')

² A unit used to express the extent of cloud cover, equal to one-eighth of the sky.

- 8.12 These results confirm the conclusions set out in the original landscape, seascape and visual impact assessment that the plume is likely to produce only a very minor alteration to the view for a very limited number of hours. As a result, the visual effects for each of the receptors set out in the tables from paragraphs 9.128 to 9.143 of the ES chapter remain as originally assessed.

Night-time effects

- 8.13 Following discussions with Dorset Council and Tetra Tech, night-time baseline photographs and photomontages are provided as new ES figures 9.42 to 9.45 from viewpoints 9 (Sandsfoot Castle) and 12 (National Trust car park at Ringstead Bay).
- 8.14 The proposals will see the introduction of an ERF that will have associated external lighting, including aviation warning lighting on the stack. Lighting on the roof will only be required when maintenance is taking place and will be controlled via a switch, so the roof will not be illuminated for most of the time. The site lighting has been designed in accordance with best practice guidance and will be warm white to minimise the potential for effects on bats using the area.
- 8.15 The stack will be lit in accordance with Civil Aviation Authority and Ministry of Defence requirements. Although this will be located at the top of the stack, there are already lights at the top of The Verne, on the highest point of the Isle of Portland, associated with the prison and the satellite dish, that are clearly visible from Ringstead Bay and Sandsfoot Castle. The traffic lights at the entrance to The Verne, which alternate between green, amber and red, are also clearly visible from Sandsfoot Castle. These are significantly higher than the light at the top of the stack. The lighting will be seen in the context of the existing lighting at the port and has been designed to have minimal light spill.
- 8.16 The lighting report submitted in support of the planning application included light spill calculations. The calculations show that there will be zero light spill measured vertically 11 m from the eastern site boundary into Balaclava Bay and zero light spill measured vertically at 16 m from the western site boundary towards the cliff face. Incline Road is bounded by a cliff face and steep hill to the west. The light spill above the height of the columns (5 m) will be zero, so direct light spill into the SSSI and SAC will be limited by the cliff face. The council's consultation response requested that the light columns be no higher than 6 m in the car park and service yard. Arup has therefore adjusted the light columns to 6 m along the access road and service yard and 5-6 m in the car park.
- 8.17 The night-time visualisations confirm the conclusions set out within the lighting report and within the assessment tables from paragraphs 9.128 to 9.143 of the original ES chapter that the night-time effects at completion will be negligible and not significant.

Introduction of footpath connection

- 8.18 The table at paragraph 9.135 of the original ES chapter assesses the visual effects from public rights of way S3/68, S3/70, S3/72 and S3/81. Following submission of the application, further discussions with the consultees and Tetra Tech have resulted in a proposal to create a connection between footpaths

S3/72 and S3/81, which are currently dead ends culminating in a high security fence. The visual effects as a result of the proposed ERF at construction and completion from this new footpath connection will be as assessed for the other rights of way: a medium magnitude of change and a moderate, significant adverse effect. The night-time effects will be negligible adverse and not significant.

ZTV mapping

- 8.19 The Coe Design report commissioned by Stop Portland Waste Incinerator suggested that it would be helpful to provide ZTVs at a closer distance of 1.5 km from the site and to include the public rights of way. ES figures 9.16 and 9.17, which provided the original ZTVs, are therefore replaced with the updated versions in appendix 8.2 (now figures 9.16 and 9.17 revision A) that include public rights of way, the Rodwell Trail and the England Coast Path. New figures 9.46 and 9.47 in appendix 8.2 provide additional ZTVs for a 1.5 km study area.
- 8.20 Figures 9.46 and 9.47 show the England Coast Path and illustrate that the majority of this route lies outside the ZTV. The figures illustrate the coastal margin, which the National Trails website³ describes as an area to the seaward side of the trail that the public has the right to explore away from the path. The website goes on to state that *“although you have the right to explore away from the path please use common sense – the England Coast Path includes land that is steep, unstable and not readily accessible. Just because the map says you can go there doesn’t mean it is safe to do so.”*
- 8.21 Although the coastal margin covers the whole of the land between the England Coast Path to Balaclava Bay and Portland Port, including the Inner Breakwater, the reality is that large areas of this are not accessible. Portland Port has a secure area where public access is not permissible, and HMP The Verne is not accessible (other than the Jailhouse Café). This makes large areas of the coastal margin inaccessible in close proximity to the proposed ERF. This is illustrated on figures 9.46 and 9.47, showing which areas are not accessible to the general public within the coastal margin.

Additional detail on the proposed PVC mesh

- 8.22 To create a water-tight envelope, the building will be enclosed using a sheet metal cladding, which will be fixed back with cladding rails to the steel frame. It is proposed that this cladding will be dark green to create a suitable backdrop colour. The proposed PVC mesh will then be installed on a sub-frame that is spaced slightly off the surface of the façade and securely fixed to the steel frame. The fabric will be attached to the building using a tensioned system with aluminium profiles. Should the mesh need to be temporarily removed, for example for maintenance, the dark green cladding would ensure that the building remained recessed within the landscape.
- 8.23 The PVC mesh is provided with a 10-year warranty. It is designed with a high tenacity base cloth to prevent deformation and top coatings to prevent elongation and tearing and provide resistance to dirt and UV fading. These will help to enhance the material’s durability, protect it from environmental and

³ https://www.nationaltrail.co.uk/en_GB/trails/england-coast-path-south-west/.

chemical influences, repel dirt and intensify colours and image depth. To ensure that the PVC mesh camouflage remains effective throughout the ERF's lifespan, Powerfuel Portland Limited is committed to reviewing its effectiveness and structural integrity at the end of the 10-year warranty period and each year afterwards, and to replacing the wrap after a maximum of 15 years for the life of the building.

Assessment of effects associated with the provision of district heating

- 8.24 The district heating network pipes will be installed below ground within the existing road network. As a result, the provision of district heating will not lead to any significant cumulative landscape, seascape and visual effects beyond those already assessed in the original ES.

Conclusions

- 8.25 The additional landscape, seascape and visual information and assessment has not identified any new or additional significant effects on landscape and seascape character or sensitive views. Given this, and the fact that no additional cumulative effects are predicted as a result of the provision of district heating, the conclusions of the original ES chapter remain valid and unchanged.

9 Natural heritage

Introduction

- 9.1 Dorset Council's letter requested the following additional information and clarification in relation to natural heritage effects:
- Additional information as required by Natural England and other ecological stakeholders to address the outstanding issues raised in respect of nationally / internationally designated sites raised through the initial consultation. This should include consideration of legal points that have been raised in respect of the robustness of the shadow Habitats Regulations Assessment (HRA) (point 10 in the council's letter)
 - Further consideration and information in respect of general ecology-related issues raised through representations on the first consultation as appropriate, including the potential for management or improvement of habitat within the port below the prison site (point 11)
- 9.2 Dorset Environmental Records Centre (DERC), which provided information on statutory and non-statutory wildlife sites for the original ES, has provided further information on the distribution of selected species within the Isle of Portland to Studland Cliffs SAC, the Chesil and The Fleet SAC and the Isle of Portland SSSI. DERC's report is contained in appendix 9.1.
- 9.3 Terence O'Rourke Ltd, who undertook the assessment of effects on off-site natural heritage for the original ES, has provided additional assessment of effects on off-site designated nature conservation sites, including as a result of the framework heritage mitigation strategy discussed in section 6, and proposals for the management of habitat within the port (points 10 and 11 in the council's letter). This further information is set out in this section and a phase 1 habitat survey of the heritage mitigation area is provided in appendix 9.2. In addition, ABPmer has prepared a technical note providing additional assessment of the potential for marine impacts, including on designated sites (point 10 in the council's letter). The full technical note is provided in appendix 9.3 and its findings are summarised in this section.
- 9.4 Terence O'Rourke Ltd also prepared the original shadow appropriate assessment and has now produced an updated version providing the additional information requested by Natural England and other ecological stakeholders (point 10 in the council's letter). As the shadow appropriate assessment did not form part of the original ES, the updated report is submitted as a stand alone document.
- 9.5 Terence O'Rourke Ltd has also provided responses to the various other ecology-related issues raised by representations to the consultation, including the legal points raised in respect of the shadow appropriate assessment (points 10 and 11 in the council's letter). These responses are considered to be clarifications, rather than the provision of 'further environmental information' under Regulation 25, so they are set out in the CRSD.

Effects on off-site designated nature conservation sites

Effects from emissions to air on ecological receptors

- 9.6 The findings of the additional air quality modelling of the proposed ERF alone discussed in section 3 are analysed in detail in the stand alone updated shadow appropriate assessment. This demonstrates that, at all NSN sites, where the impact exceeds 1% of the long-term or 10% of the short-term critical level or load, the PECs will remain below the lower end of the relevant critical level or load. The exception is for nitrogen deposition on Chesil and The Fleet SAC, which is assessed in detail in the updated shadow appropriate assessment. The original ES conclusion that there will be a negligible magnitude of change on sites of high (or international) importance remains valid and unchanged, meaning that there will be no significant effects on any of the NSN sites.
- 9.7 The findings of the additional air quality modelling have also been reviewed in terms of the potential for effects on the Isle of Portland SSSI, which forms part of the Isle of Portland to Studland Cliffs SAC. The SSSI boundary also extends beyond the SAC boundary. As discussed above, the updated shadow appropriate assessment concludes that there will be no significant effects on the interest features of the SAC as a result of the operation of the ERF. As set out in the original ES, the SSSI has additional invertebrate interest features that are not covered by the shadow appropriate assessment. However, a records search undertaken by DERC has not identified any notable invertebrates within areas of the SSSI that sit outside the boundary of the SAC. In areas of the SSSI where elevated rates of nitrogen deposition, or increased concentrations of NH₃ and NO_x are predicted to occur, the impacts have been assessed and the conclusions of the ES that there will be no significant effects on species associated with the SSSI remain unchanged.
- 9.8 The original ES also examined the potential for effects on marine designated nature conservation sites and sites with marine elements, including Studland to Portland SAC, Chesil and The Fleet SAC / SSSI, Chesil Beach and The Fleet Special Protection Area (SPA) / Ramsar site, Portland Harbour Shore SSSI, Chesil Beach and Stennis Ledges Marine Conservation Zone (MCZ), South of Portland MCZ and Purbeck Coast MCZ, as a result of discharges to the marine environment. As discussed in more detail below, a review of the potential for effects on the marine environment by ABPmer has confirmed that deposition from stack emissions and discharges to the marine environment do not pose a risk of significant effects to these designated sites. The conclusions of the original ES remain unchanged.
- 9.9 The additional air quality modelling discussed in section 3 in relation to the potential cumulative effects of road traffic along the local road network has also been examined in detail in the updated shadow appropriate assessment. This concludes that there will be no significant effects from the cumulative emissions on NSN sites, which confirms the conclusion of the original ES.
- 9.10 An assessment for the potential for cumulative effects on the parts of the Isle of Portland SSSI that are adjacent to the roads used to access the proposed ERF has also been undertaken. The habitat of this part of the SSSI is shown as maritime cliffs and slopes on the Magic website (<https://magic.defra.gov.uk>). The critical load for coastal scrub habitat within the SSSI given on the APIS

website (<http://www.apis.ac.uk>) is 10-20 kgN/ha/year. APIS also states that sensitive bryophytes and lichens may be present in W22 scrub with the SSSI. NO_x critical levels are set at the standard levels for the protection of all vegetation.

- 9.11 For the grid reference 369459,74251, APIS gives maximum background levels of nitrogen deposition of 14.1 kgN/ha/year. The maximum NH₃ concentration is 0.71 µg/m³ and the maximum NO_x concentration is 35.33 µg/m³. The air quality modelling shows that the impacts of road traffic (combined with the emissions from the ERF) will be localised, with the highest concentrations of NH₃ and rates of nitrogen deposition occurring within 5 m of the road. The greatest source of these emissions is from road traffic. Levels of NO_x will exceed the relevant critical load with or without the proposed development.
- 9.12 Unit 33 of the Isle of Portland SSSI is currently largely covered by dense scrub. A 2016 report undertaken by DERC looked at the distribution of scrub within the Isle of Portland SSSI⁽⁴⁾. The report found that W22 scrub has spread across virtually all of Verne Common (Unit 33). Scrub coverage in 1997 was mapped at 11.28 ha of scattered scrub and 11.83 ha of dense scrub. By 2014, the scattered scrub had developed into dense scrub, with 22.79 ha of dense scrub recorded.
- 9.13 The report confirms that no stands of species-rich scrub or bryophyte-rich scrub are known to be present in Unit 33. This unit supports the largest stand of W22 scrub within the SSSI. DERC's 2021 report (see appendix 9.1) confirms that there are no records of scarce or notable lower plants or insects occurring in the 150 m strip of the SSSI that runs along the southern edge of the application boundary.
- 9.14 W22 scrub is widespread across lowland Britain and occurs on mesotrophic soils. As demonstrated by the 2016 DERC study, this scrub community has spread rapidly across Unit 33, and the changes in rates of nitrogen deposition predicted as a result of the proposed development are not considered likely to have an adverse impact on this habitat.
- 9.15 The absence of scarce and notable lower plants in this part of the SSSI means that localised changes in NH₃ concentrations will not have an adverse impact on the interest features of the SSSI. The localised changes in NO_x concentrations are also not considered to be significant. Localised concentrations of NO_x are likely to decrease over the medium to long-term with the progressive electrification of cars, vans and HGVs and the move towards the use of shore power by ships within Portland Harbour. The conclusion of the original ES that there will be no significant cumulative effects on the SSSI therefore remain unchanged.

Effects associated with the framework heritage mitigation strategy

- 9.16 The framework heritage mitigation strategy discussed in section 6 includes proposals for the removal of existing scrub around E Battery East Weare to allow for the repair and ongoing maintenance of this scheduled monument. The

⁴ Edwards, B., 2016, *A review of the current status of scrub on the Isle of Portland*. Report of Dorset Wildlife Trust. Portland Living Landscapes Project. DERC Report.

phase 1 habitat survey of the heritage mitigation area (see appendix 9.2) found that the habitats consist almost entirely of scrub, with a small pocket of calcareous grassland and short perennial vegetation, together with bare ground and the battery structures. The majority of the access paths and the buildings are covered in, and surrounded by, dense scrub that is typical of the East Weare cliffs and consistent with the Isle of Portland SSSI description in areas away from the man-made building and made ground around it. Bramble and ivy dominate over areas of hardstanding and tracks. Ruderal species, including nettle, dominate in features such as the gun battery ditch, where nutrients are washed down and concentrate.

- 9.17 The NVC scrub community W22 forms part of the suite of NVC communities that comprise the Annex 1 habitat vegetated sea cliffs of the Atlantic and Baltic coasts. The coastal scrub habitats are also mentioned in the SSSI citation. Small scale removal of above ground growth to facilitate inspection and repair of the monument will not have any significant effects on the interest features of the protected sites. The proposed heritage mitigation works include scrub clearance to gain access to the gun battery and the cutting of a 2.5 m wide path through the largely blackthorn scrub to link up the existing footpaths.
- 9.18 The limited areas of calcareous grassland and short perennial habitats have formed where scrub cannot grow. Calcareous grassland is a priority habitat and also forms part of the designation for the Isle of Portland SSSI. While important, it is unlikely that this habitat will be impacted by the proposed clearance works because it is only present in areas that do not require clearance to facilitate access or repair the gun battery. In the long term, it is likely that scrub clearance at the site will increase the quality and extent of the calcareous grassland habitat present, creating an overall enhancement for biodiversity (see below). The short perennial habitats will also be retained and not impacted by the works.
- 9.19 No evidence of protected species was recorded during the walkover survey, but the habitats present are suitable to support species such as dormice, nesting birds and reptiles. However, the desk study conducted as part of the original ES did not return any records of dormice and they are not thought to be present on Portland. The presence of dormice has therefore been ruled out and they are not considered further.
- 9.20 The scrub provides habitat suitable for a wide range of nesting bird species. To protect nesting birds during the works, all scrub clearance should either be undertaken between October and February, outside of the nesting season, or should be preceded by a nesting bird check by an experienced ecologist. In this instance, it would be possible to identify nests by a search prior to clearance commencing. An Ecological Clerk of Works (ECoW) would supervise all scrub clearance and, if a nest is found, all work would stop to establish a 5 m buffer zone around the nest. Works would only recommence once birds had fledged from the nest.
- 9.21 Scrub edges, areas of grassland and short perennial vegetation provide suitable habitats for reptiles and there are records of common lizard and slow worm from within 1 km of the survey area. The majority of vegetation clearance will be within areas of dense scrub that are not suitable for reptiles. However, small areas of reptile habitat may require clearance and these can be identified on the ground with the ECoW. Removal of these habitats, if required, would be carried

out under the ECoW's supervision using the 'strim and push' method. This involves a search by the ECoW and phased strimming of vegetation to ensure reptiles move away first through disturbance from a high cut. A low cut is then made at least 30 minutes later to make the habitat unsuitable prior to full clearance.

- 9.22 With the above measures in place, the ecological effects of the heritage mitigation works on the Isle of Portland SSSI and protected species using the area will be negligible and not significant.

Proposals for habitat management within the port

- 9.23 The original ES identified impacts from the loss of on-site open mosaic habitat as a result of the proposed development, and there is also the need to deliver biodiversity net gain in accordance with policy requirements. A Biodiversity Plan has been agreed with the Dorset Natural Environment Team (DNET) covering on-site mitigation measures to be incorporated into the scheme (as set out in the original ES) and a financial contribution towards relevant local projects off-site.

- 9.24 A key principle of net gain is that the gains are additional to the conservation measures that would have occurred regardless to ensure good practice and avoid double-counting. Several potential projects have been identified in the local area where funds could be used to implement projects that deliver measures specifically targeted at species or habitats that are beyond the scope of the measures identified by Natural England for the protection of the Isle of Portland SSSI. These may include the following:

- Creation of scrapes and monitoring of least owl (a moth species) within grassland between the A354 and the shore of Portland Harbour (Hamm Beach area)
- Regular cutting and management of grassland on Hamm Beach
- Contributions towards schemes to reintroduce grazing at sites on the Isle of Portland including, if possible, 'Portland' breed sheep
- Contributions towards schemes for the control of scrub within the Isle of Portland SSSI
- Additional fencing costs beyond those required for the heritage mitigation strategy (see below)

- 9.25 As discussed above, the framework heritage mitigation strategy includes for the removal of existing scrub around E Battery East Weare. These works would contribute towards the objective of moving Unit 33 of the Isle of Portland SSSI towards favourable recovering status. The strategy also includes the creation of a new permissive footpath through currently inaccessible parts of the secure port estate to connect to existing rights of way. The path will be fenced and will be approximately 2.5 m wide to allow access for maintenance vehicles and future management of the SSSI. Parts of the fencing proposed along the footpath route will be stock-fencing. This will run along the southern boundary of the footpath extension, bisecting Unit 33. Fencing will also be installed on the northern (port) side of the footpath route. While this will be a different specification from the stock-proof fence, it would still serve to contain grazing animals if they are introduced north of the footpath at a future date.

- 9.26 The fence line will run along the entire length of the footpath extension and beyond, along the existing public footpath to the cemetery wall. If the current southern boundary of the cemetery is not stock-proof, the fencing will extend along this until it reaches the access gates. The installation of a stock-proof fence will provide a boundary to allow for the development of one of three grazing units planned for Unit 33 in the future. The heritage works will only provide some of the fencing required to create the grazing units. The enhancement of the footpath route will facilitate vehicle movements associated with management activities such as stock movement, welfare checks and habitat management.
- 9.27 Discussions are ongoing with Natural England and DNET regarding a statement of common ground for the off-site ecological enhancement works.

Potential marine impacts

- 9.28 The additional assessment examined the potential for effects on the marine environment as a result of increased emissions to air of SO₂, CO₂, NO_x, NH₃, mercury and dioxins. It also reviewed the potential for effects as a result of discharges to the marine environment.

SO₂ and CO₂

- 9.29 Seawater has a high buffering capacity and no localised changes in pH would be expected as a result of deposition of SO₂ or CO₂ into the marine environment. This capacity is used elsewhere as part of flue gas desulphurisation processes for major coal-fired power stations that involve much larger quantities of SO₂ than will be emitted by the Portland ERF with no localised effects on pH. While anthropogenic releases of CO₂ contribute to ocean acidification at a global scale, the contribution of CO₂ from the proposed ERF will be negligible in a global context. It should also be noted that, as set out in section 4 of this ES addendum, the proposed ERF will lead to lower carbon emissions than other alternative methods of waste management. The contribution to ocean acidification as a result of emissions from the ERF is therefore assessed as negligible and not significant.

NO_x and NH₃

- 9.30 In considering the potential for deposition of NO_x and NH₃ in the marine environment, it is important that the changes in concentrations of these pollutants in the air are examined in the context of concentrations of nitrogen in marine waters. As set out in chapter 4 of the original ES, the baseline concentrations of NO₂ and NH₃ in the air in the local area are 22 µg/m³ and <1 µg/m³ respectively. The process contribution from the ERF to ground level concentrations of NO₂ and NH₃ will be very small at less than 1 µg/m³ for NO₂ and negligible for NH₃.
- 9.31 In contrast, background concentrations of nitrogen in seawater, primarily as nitrate, are many orders of magnitude greater. For example, sampling by the Environment Agency in Weymouth Bay⁽⁵⁾ indicated that the winter total nitrogen concentration between 2010 and 2017 was between 0.1 and 0.5 mg/l

⁵ https://environment.data.gov.uk/water-quality/view/sampling-point/SW-50034657?_all=true.

(equivalent to 100-150 mg/m³). This is roughly four orders of magnitude greater than the concentrations in the air. On this basis, the negligible process contribution from the ERF will not materially contribute to nutrient concentrations in the adjacent marine waters and there will be no significant effects on eutrophication. There is therefore no increased risk to marine features such as seagrass that would potentially be sensitive to increases in dissolved nitrogen and no potential for significant effects on any of the marine designated sites in the area.

Mercury

- 9.32 Baseline data on the concentrations of mercury in seawater in Portland Harbour are available from Environment Agency monitoring⁶ for between 2000 and 2010. Over this period, the majority of the 94 recorded values for dissolved mercury were <0.01 µg/l, with a few values recorded as 0.01 µg/l and single values recorded as 0.03 and 0.06 µg/l. This compares to a marine environmental quality standard (EQS) of 0.05 µg/l as an annual average and 0.07 µg/l as a maximum allowable concentration, as established by the EU Priority Substances Directive 2008/105/EC.
- 9.33 Modelling was carried out to estimate the potential contribution that deposition from emissions to air by the proposed ERF will make to concentrations of mercury in seawater. It was based on the following conservative assumptions:
- Using the same 5 km x 5 km study area as the HHRA as a basis for the main area of sea where impacts from the ERF will be experienced, the modelling domain covers approximately 4,000 ha of sea
 - The annual worst case potential loading for mercury was calculated on the assumption that all modelled ground concentrations of mercury are deposited within the marine environment
 - The background concentration of mercury in seawater was assumed to be 0.005 µg/l (50% of the <0.01 µg/l value typically recorded), in accordance with accepted modelling methods where recorded values are below the limit of detection
 - The volume of seawater within the 4,000 ha area was estimated based on an average water depth of 5 m, which is likely to be conservative over the modelling domain
 - A daily tidal exchange volume (the proportion of water that is exchanged within the 5 km x 5 km area with each tide) of 0.1 was assumed based on the average exchange rate coefficient for mixed estuaries, which is likely to be conservative for more open coastal waters, including Portland Harbour
- 9.34 The daily average worst case potential input of mercury into the 4,000 ha area of sea surrounding Portland Harbour is 1,720 mg (approximately one-fifth of a teaspoon over an area of 40 km² of sea). It is estimated that this would increase the background concentration of mercury in seawater to 0.00508 µg/l, which is a change of less than 2%. Ambient concentrations of mercury will remain at around 10% of the saline EQS value and this marginal increase in ambient

⁶ https://environment.data.gov.uk/water-quality/view/sampling-point/SW-50044494?_all=true.

concentration as a result of worst case aerial deposition of mercury is assessed as not significant.

- 9.35 Within the marine environment, some mercury will adsorb to organic particles and sediment within the water column, meaning it may deposit within local marine sediments. The potential risk of accumulation of mercury within local sediments was modelled for the same 4,000 ha area, based on the worst case assumption that all modelled ground concentrations of mercury are deposited within the modelled area. The modelling estimated that worst case deposition of mercury as a result of the proposed ERF would increase the sediment concentration of mercury by 112 ng/kg of sediment (dry weight) per year. This equates to 0.09% of the interim sediment quality guideline (ISQG) of 0.13 mg/kg set to protect sea life⁽⁷⁾.
- 9.36 Based on the above, the proposed ERF will not lead to significant risks to any of the marine designated sites or shellfish and fish populations from increased mercury emissions, either as a result of risks to marine water quality standards or sediment contamination. There are also no increased risks associated with the human consumption of local fish or shellfish.

Dioxins

- 9.37 In the marine environment, dioxins will strongly adsorb to organic particles and sediments within the water column and may deposit within local marine sediments. Dissolved concentrations in the water column will be negligible. The potential risk of accumulation of dioxins within local sediments was modelled for the same 4,000 ha area, based on the worst case assumption that all emissions of dioxins are deposited within the modelled area. The modelling estimated that worst case deposition of dioxins as a result of the proposed ERF would increase the sediment concentration of dioxin by 0.013 ng/kg of sediment (dry weight) per year. This equates to 1.5% of the ISQG of 0.85 ng/kg set to protect sea life⁽⁸⁾. This is a highly conservative estimate because it assumes that all dioxins emitted to air will deposit locally, whereas in reality only a small proportion will be deposited.
- 9.38 Based on the above, no significant risks are predicted to any of the marine designated sites or shellfish and fish populations from increased dioxin emissions as a result of sediment contamination. There are also no increased risks associated with the human consumption of local fish or shellfish and no significant effects are predicted on fish or shellfish-related businesses and employment.

Discharges to the marine environment

- 9.39 As set out in the original ES, no process effluent or foul water discharges are proposed to the marine environment from the ERF, as these waste streams will be discharged to the wastewater sewer network. The area's wastewater is treated at Weymouth Wastewater Treatment Works and discharged to the sea

⁷ Canadian Council of Ministers of the Environment, 1999, *Canadian Sediment Quality Guidelines for the Protection of Aquatic Life – Mercury*.

⁸ Canadian Council of Ministers of the Environment, 2001, *Canadian Sediment Quality Guidelines for the Protection of Aquatic Life – Polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/Fs)*.

around 1 km offshore, west of Portland Harbour. The effluent from the proposed ERF will be a minor component of the overall discharge from the treatment works. As a result, no significant risks are predicted to the marine environment or designated marine nature conservation sites and there will be no increased risks associated with sea bathing.

- 9.40 The original ES provided details of how incinerator bottom ash (IBA) will be handled and further information is provided in section 10 of this ES addendum. This will form part of the ERF's environmental permit issued by the Environment Agency and will ensure that risks to the environment, including the marine environment, are adequately managed. Any mitigation and monitoring requirements will be incorporated within the ERF's environmental management system, which will ensure that risks to designated sites or the wider marine environment from spillages or leaks of IBA can be effectively managed. As a result, no significant effects are predicted on the marine environment.

Assessment of effects associated with the provision of district heating

- 9.41 Short sections of the potential district heating pipework route to HMP The Verne and HMP / Young Offender Institution Portland within Incline Road, New Ground and Glacis run through the Isle of Portland to Studland Cliffs SAC and Isle of Portland SSSI. The pipework will only be installed within the carriageway, and an ecological survey for lower plants will be undertaken along the road verges of the stretches running through and alongside the SAC / SSSI to ensure that any particularly sensitive areas are suitably protected.
- 9.42 As part of the CEMP for the district heating application, the following mitigation measures will be required:
- Heras fencing will be installed along the edge of the sections of the road that run through the SAC / SSSI to prevent machinery from leaving the carriageway within the designated area and to prevent verges and roadside areas being used for stockpiling / laydown
 - Dust management measures, such as wetting down of works areas, dust sheeting or fencing, will be used when the works pass through or near the SAC / SSSI
 - A pollution event strategy will be prepared to avoid spillage or ingress of hazardous substances into the SAC / SSSI
 - A toolbox talk and appropriate signage will be provided to make workers aware of their responsibilities and ecologically sensitive areas
- 9.43 With these measures in place, no significant cumulative natural heritage effects are predicted as a result of the provision of district heating.

Conclusions

- 9.44 The additional natural heritage information and assessment has not identified any significant effects on off-site designated nature conservation sites, either terrestrial or marine, as a result of the proposed ERF. Given this, and the fact that no significant cumulative effects are predicted as a result of the provision of district heating, the conclusions of the original ES chapter that the proposed development will not lead to any significant residual natural heritage effects remain valid and unchanged.

10 Traffic and transport

Introduction

- 10.1 Dorset Council's letter requested the following additional information and clarification in relation to traffic and transport effects:
- Further clarification in respect of opportunities to export incinerator bottom ash (IBA) by sea, including the identification of specific sites that could accept the material when transported using this method (point 24 in the council's letter)
 - Additional information in respect of the expected impacts (if any) of users of the Coast Path needing to cross the road in Castletown on the route used by HGVs to access the proposed plant (point 25)
 - Further consideration and information in respect of relevant transport-related issues (including in respect of traffic modelling and baseline and future baseline conditions) raised through representations on the first consultation as appropriate (point 26)
- 10.2 Powerfuel Portland Limited has produced a paper to provide additional detail in relation to the export of IBA by sea (point 24 in the council's letter). Its key elements are summarised in this section and the full paper is submitted as a stand alone document.
- 10.3 Awcock Ward Partnership (AWP), who undertook the assessment of traffic and transport effects for the original ES, has examined the potential impacts of additional HGV traffic on the ability of users of the England Coast Path to cross the road in Castletown (point 25 in the council's letter). The additional discussion of the potential impacts is provided in this section.
- 10.4 AWP has also provided responses to the various other transport-related issues raised by representations to the consultation (point 26 in the council's letter). These responses are considered to be clarifications, rather than the provision of 'further environmental information' under Regulation 25, so they are set out in the CRSD. The only exception is in relation to table 11.3 of ES chapter 11: traffic and transport, in which a transposition error was identified. The corrected table is provided in this section and replaces table 11.3 of the ES.

Export of IBA by sea

- 10.5 If the IBA is exported by sea it will be loaded into a sheeted trailer and transported to the quayside, where it will be loaded onto large dedicated vessels using a mechanical grab machine. Prior to the vessel berthing, details of the berth will be approved by the Harbour Master of the port, with specific note of the tidal range and height of the quay in relation to the position and reach of the ship-based materials handler to access the cargo on the quay.
- 10.6 The ship's master will oversee the ship operations, supported by a materials handler operator on the vessel. All crew will be qualified and trained as appropriate to their rank and responsibilities onboard. A banksman on the quayside will assist the delivery trucks and maintain the safe operation of the exclusion zone where the mechanical grab will operate. To ensure grab

operations do not conflict with the delivery trucks, the banksman will communicate with the materials handler operator on the vessel.

- 10.7 The management of the quayside operation remains the responsibility of the port. This includes carrying out the necessary risk assessment regarding the movement of trucks and the load-bearing capacity of the quay. Once the vessel has been loaded, bi-fold doors will close over the top for protection and to prevent any escape of material. Any spillage of the inert IBA would be dealt with promptly and appropriately. The process is highly regulated and all parties will need to ensure that compliance is achieved with existing legislation.
- 10.8 Powerfuel Portland Limited is in discussions with the Day Group, which operates several IBA processing plants and has extensive experience of IBA transport by sea. The Day Group has indicated that it would be willing to enter into a long term contract to enable IBA to be collected from the proposed ERF by vessel and transported to its facility at Greenwich.
- 10.9 While it is envisaged that the Day Group's Greenwich plant will be the chosen location for export of IBA by sea, there are other plants within the UK and northern Europe that are accessible by sea, including two in Avonmouth and one in Middlesbrough, one in Ireland, two in the Netherlands, two in Belgium and one in Germany.

Impacts of additional HGV traffic on users of the England Coast Path in Castletown

- 10.10 The England Coast Path (a national trail) crosses the road at the Castletown / Castle Road roundabout and the Ramblers has raised concerns about the impact of development traffic on this crossing, referring to an increase in HGV movements of 200% at Castletown. As set out in ES chapter 11: traffic and transport and the transport assessment (TA) in technical appendix L of the original ES, the proposed development will lead to a maximum of 80 two-way HGV trips per day (40 in each direction).
- 10.11 The higher increases in traffic quoted in the Ramblers' response are due to potential traffic generation from already permitted development at the port that may occur in the future, independent of the proposed ERF. The path crossing the road at Castletown has dropped kerbs and an island, which will aid pedestrians crossing on the path. In addition, it is important to note that the HGV movements associated with the proposed ERF will equate to an average of one HGV every 15 minutes passing through this crossing point. This is considered to be a normal level of interaction with traffic and is significantly less than that already experienced on Portland Beach Road. An average increase in HGV movements of one every 15 minutes is a negligible change that will not affect the ability of users of the England Coast Path to cross the road in a safe manner.

Corrected table 11.3: Baseline traffic flows

- 10.12 As identified above, a transposition error was made in table 11.3 of ES chapter 11: traffic and transport. This related to the PM peak inbound and annual average daily traffic (AADT) inbound traffic flows. The transposition error did not

affect the traffic modelling or the impact assessment. A replacement table 11.3 is provided below.

Link ref	Link	AM peak		PM peak		AADT	
		Outbound	Inbound	Outbound	Inbound	Outbound	Inbound
1	Castletown (at port access)	14	38	40	16	333	333
2	A354 Portland Beach Road	789	669	626	828	8,732	9,238
3	A354 Portland Road (south of Foord's Corner Roundabout)	809	590	958	1,014	10,904	9,898
4	A354 Buxton Road (north of Foord's Corner Roundabout)	422	330	515	455	5,782	4,844
5	A354 Buxton Road (Boot Hill)	1,142	643	738	912	11,602	9,596
6	A354 Weymouth Way (south of Granby Roundabout)	673	643	566	639	7,646	7,911
7	A354 Weymouth Relief Road (south of Stadium Roundabout)	1,058	1,283	1,297	1,021	14,533	14,218
8	B3157 Granby Way	746	853	731	1,395	9,115	13,872
9	B3156 Portland Road	590	809	1,014	958	9,898	10,904

Table 11.3: 2017 and 2019 baseline traffic flows

Assessment of effects associated with the provision of district heating

10.13 The installation of the district heating pipelines within the local road network will lead to the type of minor disruptive impacts that are associated with any utility works in the highway. These will be addressed through standard measures that will be set out in the CEMP and through road access licensing by Dorset Council. As a result, no significant cumulative traffic and transport effects are predicted to arise from the provision of district heating.

Conclusions

10.14 The additional assessment of the potential for impacts on users of the England Coast Path as a result of increased HGV traffic has not identified any potentially significant effects. Given this, and the fact that no significant cumulative effects are predicted as a result of the provision of district heating, the conclusions of the original ES traffic and transport chapter remain valid and unchanged. No significant residual traffic and transport effects are predicted as a result of the proposed development.

11 Waste

Introduction

- 11.1 Dorset Council's letter did not request any additional information and clarification in relation to waste impacts.

Assessment of effects associated with the provision of district heating

- 11.2 The provision of district heating from the proposed ERF will not increase the area's residual waste treatment capacity, so there is no potential for significant cumulative effects.

Conclusions

- 11.3 As no additional information and clarification was requested in relation to waste impacts, and no significant cumulative effects are predicted as a result of the provision of district heating, the original ES waste chapter remains valid and unchanged.

12 World heritage site

Introduction

- 12.1 Dorset Council's letter did not request any additional information and clarification in relation to impacts on the Dorset and East Devon Coast World Heritage Site (WHS). However, the assessment of effects on the WHS in the original ES was based on the conclusions of ES chapters 7: cultural heritage and 9: landscape, seascape and visual effects. Any changes to the conclusions of these chapters would also be relevant to the assessment of effects on the WHS. The further information provided above in sections 6 (cultural heritage) and 8 (landscape, seascape and visual effects) has therefore been reviewed to determine whether any associated changes are required to the assessment of effects on the WHS.

Consideration of the potential for additional effects on the WHS

- 12.2 Terence O'Rourke Ltd, who undertook the landscape, seascape and visual impact assessment for the original ES, has prepared a number of additional photomontages as part of this ES addendum (see appendix 8.2). These show the plume on the original viewpoint photographs for viewpoints 8 (Ferry Bridge), 9 (Sandsfoot Castle), 11 (White Horse Hill) and 12 (National Trust car park at Ringstead Bay), which form new ES figures 9.38 to 9.41. Night-time photomontages have also been prepared from viewpoints 9 and 12, which form new ES figures 9.43 and 9.45.
- 12.3 The additional assessment of the plume visibility in section 8 of this ES addendum has confirmed the conclusions set out in the original landscape, seascape and visual impact assessment that the plume is likely to produce only a very minor alteration to the view for a very limited number of hours. There is no change to the effects as originally assessed. The assessment of night-time effects has also remained unchanged.
- 12.4 The conclusions of the landscape, seascape and visual impact assessment that were used in the original assessment of effects on the WHS therefore remain as originally assessed and no changes are required to the WHS assessment. In addition, no changes are required to the WHS assessment as a result of the revised cultural heritage impacts assessed in section 6 of this ES addendum.

Assessment of effects associated with the provision of district heating

- 12.5 The consideration of the potential for cumulative cultural heritage effects as a result of the provision of district heating in section 6 of this ES addendum did not predict any significant effects on archaeology or built heritage as a result of the installation of the district heating pipes within the road network. Similarly, section 8 of the ES addendum concluded that the provision of district heating will not lead to any significant cumulative landscape, seascape and visual effects beyond those already assessed in the original ES. Given these conclusions, no significant cumulative effects are predicted on the WHS as a result of the provision of district heating.

Conclusions

- 12.6 No changes are required to the WHS assessment as a result of the further information provided in this ES addendum in relation to cultural heritage and landscape, seascape and visual effects. Given this, and the fact that no additional cumulative effects are predicted as a result of the provision of district heating, the conclusions of the original ES chapter remain valid and unchanged.

13 Other issues outside the scope of the EIA

- 13.1 Dorset Council's letter requested the following additional information and clarification in relation to need, planning policy and the environmental permit, which are issues outside the scope of the EIA:
- Further clarification and explanation in respect of potential alternative treatment facilities within three hours' drive by road, in respect of the need for the capacity the facility provides. Further detail in respect of likely sources of the RDF proposed to be managed should be provided, which should have regard to existing contracts for the management of RDF that are in place with competing facilities (point 30 in the council's letter)
 - Further detail in respect of the potential impacts (or lack of) your proposal upon the potential delivery of an RDF operation at Eco-Sustainable Solutions, should the planning authority be minded to grant planning permission for it (point 31)
 - Further detail in respect of the impact of the development on the future process of RDF in mainland Europe, and future issues surrounding exporting UK waste to these facilities. The information provided should include discussion of the likely differences in respect of overall efficiency between the proposed plant and those plants in mainland Europe for which it may compete in relation to future feedstock (point 32)
 - It would be useful if you could provide your comment and perspective in respect of representations received on the way in which you have interpreted planning policies as set out in your supporting statement (point 34)
 - We note that you are making some updates to your environmental permit application, and request that the additional detail and assessment you are undertaking in respect of air quality, noise and fire prevention is incorporated into your planning application and EIA, so the assessment of the project is consistent across both regulatory regimes (point 35)
- 13.2 Powerfuel Portland Limited has produced a waste need paper providing commentary on the likely sources of the RDF for the proposed development, including in relation to potential alternative facilities within three hours' drive, existing contracts, the export of RDF to facilities in mainland Europe, and the potential impacts on the delivery of an RDF operation at Eco Sustainable Solutions (points 30-32 in the council's letter). As waste need is outside the scope of the EIA, the waste need paper is submitted as a stand alone document.
- 13.3 Terence O'Rourke Ltd, who prepared the original planning supporting statement, has prepared a supplemental planning supporting statement addressing the applicant's interpretation of planning policies (point 34 in the council's letter). As the planning supporting statement did not form part of the original ES, the supplemental planning supporting statement is submitted as a stand alone document.
- 13.4 As part of the environmental permit application process, the Environment Agency requested some additional information in relation to air quality, noise and

fire prevention (point 35 in the council's letter). The additional information relating to air quality has been provided in section 3 and appendix 3.3.

- 13.5 The Environment Agency requested a more detailed noise assessment in line with British Standard 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*. This has been prepared by Arup and assessed the potential for effects on residential properties to the west of the site and on the north west side of the harbour at Wyke Regis, HMP The Verne, Portland Hospital and Portland Marina as a result of operational noise from the proposed ERF. It confirmed that there would be no significant adverse effects at any of the sensitive receptors. As the noise report did not form part of the original ES, the new report is submitted as a stand alone document.
- 13.6 The Environment Agency also requested clarification of the location of the sensitive receptors referred to in the fire prevention plan submitted as part of the environmental permit application. The fire prevention plan was not submitted as part of the original planning application but, for completeness, the original report and the additional drawings showing the receptors' locations are now submitted as a stand alone document.

14 Conclusions

- 14.1 This ES addendum has provided the further environmental information formally requested by Dorset Council on 30 April 2021 under Regulation 25 of the EIA Regulations in relation to the proposed Portland ERF. Matters raised in the council's letter that are considered to comprise clarifications, rather than further environmental information, have been addressed in stand alone documents within the submission, including a CRSD.
- 14.2 The only changes to the significant residual effects identified in the original ES as a result of the further environmental information provided in this ES addendum relate to cultural heritage effects. The slight to moderate, significant adverse residual effect on the East Weare batteries scheduled monument and listed structure identified in the original ES has been removed by the heritage mitigation strategy. The improved public access and interpretation and opportunities for greater appreciation and understanding of the range of assets across East Weare as a result of the measures set out in the strategy will be a moderate, significant beneficial effect. In addition, the change to the experience of the historic environment because of the new permissive path link around East Weare is predicted to result in a slight to moderate, significant beneficial effect.
- 14.3 No new or different significant residual effects have been identified for any of the other EIA topics as a result of the further environmental information. Therefore, with the exception of the above beneficial changes to the findings of the cultural heritage assessment, the conclusions of the ES remain valid and unchanged.