EI 3635

Welfare in offshore wind study: existing practices and future opportunities

First edition

G+ Global Offshore Wind
Health & Safety
Organisation

In partnership with

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WELFARE IN OFFSHORE WIND STUDY: EXISTING PRACTICES AND FUTURE OPPORTUNITIES

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The contents of these guidelines are intended for information and general guidance only, do not constitute advice, are not exhaustive, and do not indicate any specific course of action. Detailed professional advice should be obtained before taking, or refraining from, action in relation to any of the contents of this guide, or the relevance or applicability of the information herein.

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FOREWORD/EXECUTIVE SUMMARY

As the offshore wind industry continues to mature and develop, greater attention has been brought to the welfare facilities available on offshore sites and assets. While access to welfare is a fundamental right of workers, the unique challenges of the offshore wind industry have historically led to a lack of consistency in these rights being fulfilled. The Global Offshore Wind Health and Safety Organisation (G+) commissioned Cairn Risk Consulting Ltd, an independent safety and risk consultancy supporting the energy transition, to undertake this study in collaboration with a G+ working group of industry stakeholders.

The study looked at the current state of welfare provisions and investigated the opportunities to improve welfare, both for new wind farms in development and for retrofitting of existing offshore assets. The goal of the study is to provide the basis for good practice guidelines for welfare in the offshore wind industry, to be developed in 'Phase 2' of the project.

The initial step was a Request for Information (RFI) to gather information on the welfare provisions available to the offshore wind industry and the attitudes towards them. The RFI ran from 12 May 2025 to 11 July 2025 and received 46 responses. Of these respondents, 70 % had experience using welfare offshore and 59 % had experience influencing welfare decisions.

The RFI showed that welfare provision varies widely between projects. Of the 28 workers who answered whether they felt adequately supported, 50 % said they did not, while 39 % said they did. Many responses highlighted health and safety, operational and environmental impacts caused by poor welfare, along with effects on workers' dignity and wellbeing.

Key findings of the RFI are presented in 2.3 and can be summarised as follows:

– Welfare quality varies significantly between projects. Outcomes depend on factors such as organisational attitudes and how industry guidance and national regulations are interpreted.
– There is misalignment between different industry stakeholders relating to the definition of a wind turbine generator (WTG) as a workplace or a machine, which is having a negative effect on the preparedness of projects in relation to welfare provision.
– While it is widely accepted that welfare provisions are required for workers, it is not guaranteed that welfare will be provided at the point of work particularly on offshore assets. Reliance on vessel-based welfare as the primary source, sometimes in conjunction with some form of temporary portable welfare to be brought on to the asset, was found to be the most common solution for providing welfare to offshore assets.
– Practices that are not indicative of an industry that is prioritising the provision of a good standard of welfare were reported by multiple respondents, including workers taking matters into their own hands externally off the platform, or risking dehydration and hunger in favour of making use of the facilities provided.
– Respondents also identified key challenges and suggested priority actions for improving welfare in the industry, as described in 2.4.

After reviewing the RFI results, the study examined national regulations in key offshore wind markets and reviewed current industry guidance (section 3). Welfare requirements vary, but most countries require adequate access to sanitation, washing, rest and mess. While regulations differ in detail, the core principles for employers are the same.

Some regulations established specific guidelines or requirements that should be followed, while others stopped short of establishing a duty for employers to ensure welfare is adequate. Most included some provisions that accept the limitations of applying regulations as written in challenging industries, such as offshore wind, and many apply a 'so far as is reasonably practicable' approach.

Offshore wind industry guidance from RenewableUK was reviewed, and while useful in interpreting UK regulations, it does not go into depth on welfare because of its broader scope. SafetyOn guidance for the onshore wind industry was found to be more relevant, and it was suggested as a valuable resource for offshore wind companies for how to interpret requirements around welfare. Some of its guidelines were found to be directly applicable to the offshore wind industry. The general approach, that most guidelines should be followed so far as is reasonably practicable, was found to be particularly suitable for the challenges of adapting welfare requirements offshore.

Section 4 discusses a wide range of welfare provisions, including:

- commonly used solutions that may not be best for meeting the needs of workers in the long term;
- more sophisticated options that are increasingly becoming available, and
- provisions able to meet all-welfare requirements that are not yet available, but which could set new standards for welfare offshore.

Section 4 also discusses the different implications of providing welfare on different asset types, the specific location for placing welfare facilities and how these change across life cycle phases. In all cases, the range of welfare solutions available suggests that each specific use case can be accounted for. And while more advanced or sophisticated provisions come with challenges such as logistics, design requirements and higher upfront costs, none of these challenges was found to be insurmountable.

The study concludes with recommendations for G+ in the development of good practice guidance, which will follow this study as 'Phase 2' of this project, as well as actions that the industry can take in the interim. These recommendations were:

- The study reaffirms the goal of G+ to develop good practice guidelines for welfare in the offshore wind industry, highlighting that these are both needed and requested, and that the G+ should proceed without delay.
- Issuing a letter to industry highlighting the important work and outcomes of the study, and including a call to action for industry stakeholders:
  - stakeholders are encouraged to read this report and review the findings in detail, using them as a basis upon which further research and analysis by individual projects can be undertaken;
  - review own projects, both those in development and those already existing, and determine how they could act to improve the welfare arrangements and outcomes for these projects, and
  - make full use of the accompanying self-assessment tool (EI 3635-1 *Welfare in offshore wind: self assessment tool*) to explore the different options available.

Ultimately, the results of the study have highlighted the need to improve welfare provisions in the offshore wind industry. By embracing change and innovation, these issues can be addressed and result in an industry-wide improvement of welfare provisions for workers.

ACKNOWLEDGEMENTS

Cairn Risk would like to thank the G+ welfare working group for its support and cooperation, as well as the industry members who took the time to answer the RFI and provided the data and insights that form the backbone of this study. All contributions have been greatly appreciated.

1 INTRODUCTION

1.1 BACKGROUND

The Global Offshore Wind Health and Safety Organisation (G+) is the global health and safety (H&S) organisation for offshore wind, bringing the industry together to pursue shared goals and outcomes for H&S. It is run in partnership with the Energy Institute (EI), the global professional body for the energy sector, and its members are lead operators and owners of offshore wind farms and wind turbine generator (WTG) original equipment manufacturers (OEMs).

One of the G+'s pillars is the development of good practice guidelines with the goal of sharing experience and knowledge across the offshore wind industry. It is a necessary first step in the development of these guidelines to gather information on the topic of interest and understand current industry attitudes and the state of development, particularly for topics where there is limited industry experience.

As the offshore wind industry continues to mature and develop, there has been an increase in concerns related to the welfare facilities available in offshore wind sites and on offshore assets. While assets in offshore wind are generally considered to be unoccupied, with no permanent presence of personnel in either construction or operation phases, welfare facilities and provisions are still required for the safety, dignity and wellbeing of personnel when they are present. Access to welfare is considered to be a fundamental right of workers in all industries, and there is a moral and often legal responsibility for employers to ensure that the dignity and wellbeing of workers is protected through provision of adequate welfare, with the offshore wind industry being no exception. Additionally, providing suitable welfare to workers can have other benefits to a project, such as:

- Provision of welfare goes hand in hand with protection of workers from other H&S issues, such as prevention of fatigue through adequate resting spaces and control of contamination through proper waste management and washing facilities. Ensuring workers also have access to toilet facilities can help in the management of bowel and urinary tract conditions, as well as allowing proper management of menstruation products to prevent issues such as toxic shock.
- Creating a positive working atmosphere can improve the morale of workers, showing that they are respected by making visible, positive commitments to considering their wellbeing, health and dignity.
- A workplace or industry that is known to be respectful of workers' welfare needs can be beneficial for personnel retention and recruitment. This is particularly seen in the goal of fostering a more inclusive and diverse workforce for offshore wind, which has historically been male dominated.

Challenges such as sites being spread over large areas, a mobile workforce, assets that are visited infrequently, changing needs across the life cycle of a project and logistical challenges with operating on remote assets at sea have meant that welfare provision varies across the industry. Balancing the requirement to provide welfare with the considerations of proportionate costs, design limitations, impact to operations and possible H&S issues introduced by the welfare facilities themselves has proven to be a topic of great discussion and concern among offshore wind industry leaders, developers of new projects and owners and operators of existing projects.

As a result, there has yet to be a clear, consistent industry approach to welfare. However, the industry has been exploring options for provisions in offshore wind farms, both as retrofits to improve existing facilities and for integration into new designs for the next generation of wind farms. The G+ felt it was timely to explore how welfare needs are being met in industry and to share the growing pool of experience and the knowledge of future solutions. To this end, Cairn Risk Consulting Ltd was commissioned to conduct a study into the provision of welfare facilities in the offshore wind industry, steered by a G+ working group of industry stakeholders.

1.2 STUDY GOALS AND PURPOSE

For the purposes of this study, 'welfare provisions' were defined as techniques and technologies that relate to the following four topics:

- Sanitation – referring to toilet facilities and the storage and disposal of human waste.
- Washing – referring to facilities for handwashing, showering and decontamination (where required by the nature of the activities performed).
- Rest – referring to sleeping accommodations, recreation and break areas.
- Mess – referring to provisions for subsistence and appropriate facilities for personnel to eat and drink.

Additionally, this study considered these welfare topics within the context of the following asset types:

- Offshore platforms, such as offshore substation platforms (OSPs).
- Wind turbines, including both the WTGs themselves and related foundations.
- Vessels, particularly service operation vessels (SOVs) and crew transfer vessels (CTVs) when providing welfare facilities to offshore platforms (the study was not concerned with maritime vessels in transit where existing regulation governs the provision of such facilities).
- Onshore quayside facilities, such as marshalling or assembly ports and operation and maintenance bases.

This study comprises 'Phase 1' of the G+'s welfare workstream's activities; its ultimate goal is to build the foundations for a set of good practice guidelines for welfare in the offshore wind industry, to be developed in 'Phase 2' of the project. To achieve this, this study has two main focuses:

- The current state of welfare provisions in the offshore wind industry; the study's goals are to understand the current situation regarding welfare facilities among members, and the impacts and perceptions of these existing provisions both on personnel and operations.
- A look at the future of welfare facilities, both in terms of new wind farms in development and for retrofitting of existing offshore assets to improve welfare. The study will explore what new and uncommon welfare techniques and technologies members have been actively exploring for both scenarios, and what opportunities exist but are yet to be studied in detail.

This study also aims to offer an analysis of the options that are available to help inform future development of guidance.

1.3 SCOPE

This study report includes information on:

- The results of a Request for Information (RFI) conducted as part of the study, which indicate the attitudes of those working in the offshore wind industry.
- Existing requirements, guidance and regulations for welfare in key offshore wind markets.
- Current and potential welfare provisions, with analysis of suitability across life cycle phases, H&S impacts, cost–benefit, maintenance and logistics requirements and perception within the industry.
- Suggested recommendations for G+'s next steps to continue development of the welfare topic.

This document does not include:

- Specific recommendations for what welfare provisions should or must be included in offshore wind projects. This document is a guide only, and not a standard for which compliance can be claimed.
- Identification of specific projects or assessment of how specific projects have provided (or failed to provide) welfare facilities.
- Discussion of specific brands, companies or products that are available to meet offshore wind welfare requirements, or assessment of how suitable specific products are for meeting welfare needs.

1.4 APPLICATION

The intention of this document is that it should be used as a guide by G+ members and those in the wider industry, to spread awareness and understanding of the issues surrounding welfare provision in offshore wind, to aid project owners in reviewing the provisions in practice on their own projects and to aid wind farm developers to plan for welfare provisions in future projects.

Where relevant, direct quotations from the RFI responses have been used to highlight specific points, with care taken to present these in proper context and not to misrepresent the views of the participants. While RFI responses made specific references to brands and suppliers of welfare provisions, as well as to specific projects, this report has omitted these references to remain within the scope of the project. Quotations from the RFI can be recognised, and distinguished from quotations from other published sources, by the use of 'single commas'.

When discussing the findings of the RFI, the views and opinions expressed within do not necessarily reflect those of Cairn Risk or G+. Effort has been made throughout to faithfully and without bias summarise and communicate the findings of the RFI, presenting the thoughts of stakeholders throughout the industry in a structured and balanced manner.

In addition to the report, a self-assessment tool has been developed as a companion piece, to aid organisations in their understanding and implementation of the findings of the study. The goals of this tool are to:

- Support organisations wishing to utilise the findings of this study.
- Act as a companion to this report, pointing to key findings and outcomes.

– Present options for provisions suitable to help projects make informed choices around welfare.

The tool primarily works to guide organisations through the descriptions of welfare provisions shown in section 4, highlighting where certain provisions may be suitable, what provisions are considered examples of good industry practice and pointing out potential blind spots for developers centred on the experiences reported by workers in the RFI. As with this report, the tool does not exist to tell organisations what they should or must do. It should be used as a guide only, and not as a standard by which projects can claim compliance.

Finally, as will be discussed further in this report, deficiencies have been reported in how welfare is approached across the offshore wind industry. The aim of this report is to present an accurate picture of the current state of welfare within offshore wind, ultimately to encourage discussions on how welfare can be improved for offshore workers. As such, those reading this document, particularly those who do not regularly work offshore, are encouraged to maintain an open mind.

2 OVERVIEW OF RFI

A key source of information for this study is the RFI, developed and issued to G+ members and the wider industry. While findings from the RFI are included throughout this report, this section presents an overview of the RFI itself, the key results and observations.

2.1 OVERVIEW

The RFI was based around predominantly open-ended questions, allowing recipients to respond in as much detail as they wished and to gain as much nuanced data as possible for the study.

The RFI was issued on 12 May 2025 and was live for 61 days. The final response was recorded on 11 July 2025, with 46 responses recorded in total. It was circulated across the three G+ global focal groups and distributed to member organisations directly, as well as being shared publicly on social media platforms by G+ accounts.

Responses to the RFI were kept strictly anonymous, as it was determined that participants would be more likely to provide honest feedback if they felt secure that their answers were not linked to their name or organisation. Participants were given the opportunity to voluntarily provide their contact information to be contacted for further engagement by the study.

2.2 DEMOGRAPHICS

To make best use of the data provided, the initial questions of the RFI requested some basic information about the role, experience and organisation of the participant. This allowed the study to gather the following information, with full graphs representing the demographics of the study being presented in Annex A of this document:

- The participants represented a broad range of organisation types, with the most common being operators, owners and maintenance organisations. Fewer responses were gathered from service providers, OEMs and designers.
- The majority of participants reported working on offshore wind projects in Europe, with comparatively few working in the Americas, Asia/Pacific or Africa.
- Most of the participants were experienced with the provision of welfare during operations and maintenance (O&M), while others had experience of managing welfare in the design phase and in construction and commissioning (C&C). No valuable answers were received concerning the decommissioning stage.
- 59 % of respondents reported being in positions to influence decisions for projects in relation to the design and utilisation of welfare provisions, implying relevant experience in how welfare-related decisions are made in industry.
- 70 % of respondents reported utilising welfare provisions while undertaking their role on offshore assets, implying relevant practical experience of using welfare in the industry.
- The participants' answers were heavily skewed towards the offshore assets (most notably wind turbines, followed by vessels and offshore platforms) at the expense of onshore quayside.
- The most discussed aspect of welfare by participants of the study was sanitation.

One key reason for recording the demographics of respondents was to focus the efforts of the study in the areas that are of most interest to the industry. For example, there were extremely few responses recorded regarding the decommissioning of projects, indicating that this is not an area that is of priority to the industry. This, combined with the fact that there are few materials available on welfare in the decommissioning of offshore wind farms, has resulted in decommissioning not being considered further in this study.

2.3 KEY FINDINGS

The key findings and observations of the RFI can be broken down into the following topics:

- The variability of welfare seen in the industry, which can be viewed as a scale based on how integrated and permanent provisions are on assets. See 2.3.1.
- Which parties bear the most responsibility for ensuring welfare is provided on a project. See 2.3.2.
- The various factors that can influence the degree to which welfare provisions are provided on a project. See 2.3.3.
- The prevalence of vessel-based welfare as a widespread industry practice for welfare provision. See 2.3.4.
- The various negative impacts that workers reported to their health, safety and dignity as a result of current industry practices towards welfare. See 2.3.5.

2.3.1 Variability of welfare

It is clear from the RFI responses that the availability of welfare services in the offshore wind industry can vary greatly between projects. As will be discussed throughout this report, the life cycle stage of the project, the asset being worked on and the approach or attitude taken by the companies involved all have a bearing on what degree of welfare is provided for workers.

The welfare provided on a given offshore asset within a wind project can be broadly mapped on a spectrum, summarised as the following five levels of welfare in use in offshore wind farms listed here from most to least developed:

- Integrated welfare units. These are permanently installed as a part of the asset and available whenever workers are present. These can either fulfil a single need (e.g. sanitation) or be multi-purpose welfare solutions.
- Permanent fixed welfare units. These are units that are not part of the original OEM design but are installed permanently on to assets and not removed. Space is required on the asset for these to be installed. These can either fulfil a single need (e.g. sanitation) or be multi-purpose welfare solutions.
- Temporary fixed welfare units. These are installed whenever work is required on the asset to fulfil the welfare needs of the workers and are removed when work has concluded. As such, space is required on the asset for these to be installed on each visit. These can either fulfil a single need (e.g. sanitation) or be multi-purpose welfare solutions.
- Temporary portable welfare. These are generally more rudimentary provisions, carried or lifted on to assets by workers and taken with them when work has concluded. They do not always require the need to be fixed in place and can be moved around the asset when needed. These tend to fill a single need, with multiple items being

brought on to assets (sometimes grouped together as a 'welfare box' which is brought on as standard practice with each visit).

– Vessel-based welfare. This is the option of providing no welfare on the asset itself, and relying on workers accessing the vessel that brought them to the asset for welfare provision. For responses to this RFI, this was considered as either an SOV or a CTV, which is either permanently linked/docked to the asset while work is underway or needs to be called to the asset by the workers to provide welfare. This appears to be considered a 'baseline' option for welfare offshore.

These five levels of provision should not be taken as hard rules that apply to all projects, and many respondents to the RFI identified that their projects used a mixture of different provision types, especially with regard to different types of welfare. For example, folding chairs, sealed food containers and hand gels could be brought on to a wind turbine foundation to provide washing, rest and mess facilities, while sanitation is reliant on either a camping toilet brought into the nacelle or calling on the SOV to return and accessing via a walk-to-work bridge. However, it is useful to illustrate the variability seen across the industry.

In the RFI, there were no indications that no welfare was ever offered to workers, with at least the option of vessel-based welfare being provided; however, as will be discussed in 4.1.3.2, this was noted as sometimes being equivalent to no welfare by workers.

As will be discussed throughout this report, there was a varied response from workers to the quality and effectiveness of welfare provided for offshore assets. While some workers indicated that they were happy with the level of welfare or deemed it acceptable, the results of the RFI indicate that the general opinion of workers is that offshore welfare provisions do not meet their requirements.

In the discussion of individual provisions in 4.2, this definition of levels of provision is used to help categorise the different options available to the industry.

2.3.2 Controlling welfare decisions

With the variability in welfare provisions across the industry, a key question is who is ultimately in control of providing or specifying welfare provisions on projects. The RFI asked respondents who were involved in the design stage whether their organisation had control over the decision of which welfare provisions to include, to understand where the decision to implement (or not to implement) welfare has come from.

It was highlighted in RFI responses that the project owner often has ultimate control and responsibility over welfare. It was also highlighted that contractors have a responsibility to ensure their workers' welfare needs are met. However, it was pointed out that the attitude and mindset of the project owner towards welfare heavily influences how it is implemented and what level of provision is offered to workers.

Additionally, multiple RFI responses indicated that while the inclusion of a project-wide approach to welfare was explored by the project owner, ultimately the decision was taken not to provide any specific welfare provisions. Instead, RFI respondents highlight that it is common for the project owners to include welfare provisions in employer's requirements. This then leaves the matter for individual contractors to manage, most commonly through portable temporary welfare or through reliance on vessels. In at least one response, it was highlighted by the respondent that 'minimal effort' was given to the topic of welfare by the project owner.

A common response given by designers and project owners was that, while it was their responsibility to define what the requirements were, OEMs for assets did not make sufficient allowances in their design for integrating welfare units. Therefore, they were not able to establish any welfare on the assets themselves and so had to rely on requiring contractors to bring their own solutions. This was discussed both in terms of OEMs not providing any welfare on the assets themselves and in terms of no space being allocated on assets, in particular on wind turbine foundations, transition pieces (TPs) or external working platforms (EWPs), for fixed temporary welfare units to be installed. This was reported as a constraint on efforts to implement more developed welfare provisions directly on assets and to include them earlier in the project life cycle. A quote from one project owner response reads: '[We had] very limited ability to include welfare provision in the turbine as this design is wholly within the purview of the OEM. As an owner/operator we effectively pick a specification from an available list, and fixed welfare is not on this list.'

It was also acknowledged several times in the RFI responses that older wind farms tended to be worse regarding integrated welfare, with less thought given in older designs for how workers should access the welfare provisions they require. It was accepted across multiple responses that this situation is improving, particularly with newer models of WTG and foundations, but issues were still noted by participants currently working on projects in development.

Where welfare provisions are not included into OEM designs, this can result in two possible outcomes:

– A welfare solution can be found that is suitable for assets which can be installed either for the C&C phase or during O&M.
– The perceived lack of flexibility from OEMs in allowing welfare provisions on assets is carried forward by designers and project owners, and welfare is left wholly as the responsibility of service providers and contractors. In this case, employer's requirements can be used to define minimum standards of welfare that must be set, but it was indicated in RFI responses that these are not often well defined.

To confound matters, it was reported by one RFI respondent in a service provision company operating in the O&M phase that, when querying their management for better welfare when working offshore (namely for an improvement over temporary camping toilets), they were told that the responsibility for providing more sophisticated welfare rested with the customer (in this case, the wind farm owner).

Taken as a whole, it can be seen from the RFI responses that while there is a general understanding of who is responsible for welfare provisions (the project owner to set requirements and ensure implementation, and contractors/service providers to ensure the needs of their workers are met), the reality is that several stakeholders (OEMs, owners and contractors) have controlling inputs on how these requirements are actually implemented in practice, and that misalignment between these stakeholders can be seen as a contributing factor to the perceived lack of action in improving standards of welfare that many in the industry understand is needed.

2.3.3 Influences on decisions

The RFI responses are varied as to the driving influences behind welfare-related decisions. In this section, the key factors that emerge from the RFI responses are presented.

2.3.3.1 Definition of workplace/OEM mindset

As has been discussed in the previous section, a point raised numerous times across the RFI is around whether OEMs make allowances in their designs for welfare facilities. This is considered both in the form of actually designing integrated, fixed facilities, as well as allowing sufficient space for temporary fixed welfare units to be installed.

At the crux of this issue is the discussion around whether offshore assets (in particular, WTGs) are considered as machines, or whether they constitute a workplace. If considered as machines, it is argued that there is no requirement to provide welfare on the asset itself, so long as there is sufficient welfare present (in the form of temporary welfare, or return to the SOV or CTV). In the words of an OEM respondent to the RFI, 'a person visits the machine for a task and then returns to the vessel where welfare is mainly provided.' However, if considered as a workplace under various occupational H&S regulations, then provision of welfare to the asset itself would be considered a legal requirement for projects to address.

From the RFI responses, turbine OEMs are more likely to take the former opinion that assets such as WTGs are machines. This distinction then has a keen impact on whether any welfare allowance is made on OEM-produced assets, which in effect limits the welfare that can be implemented by other parties (such as the project owner or individual contractors working on the asset), and therefore which facilities are available to workers. One respondent noted: 'Key design decisions were already constrained by OEM inputs and contractual scopes that excluded integrated welfare.' It is indicated in some responses that there can be allowances made with OEMs, with reference to 'space claims' being made for temporary welfare in WTG towers, but this appears to be limited in scope.

It was raised by one respondent that a UK wind farm was reportedly the subject of a Notice of Contravention (NoC) by the Health and Safety Executive (HSE) for the welfare provided from a jack-up vessel (JUV) with a connected gangway during construction activities on an installed turbine foundation. According to this response, the conclusion of the NoC was that offshore assets, at least during construction, should be considered workplaces, and so welfare provided via vessels must be reconsidered. Specific concerns raised by the HSE, as reported by further discussions with industry stakeholders, were (in order of priority):

– Access to sanitation, the need for which cannot be planned and so must be convenient for the worker.
– A suitable and safe location for taking breaks during the working day, which can be scheduled.
– Suitable washing facilities. In terms of showers/changing facilities, this is considered a lower priority as these can be provided on the vessel at the end of a shift, but washing after use of sanitary facilities or before eating should be readily available.

It was reported by the respondent that the HSE did not deem the connection of a JUV to provide adequate fulfilment of these needs, and that more needed to be done to meet these on the asset. This would appear to challenge the stance generally taken by OEMs and has potential implications for how welfare should be provided on offshore assets. As NoCs are not made public, Cairn Risk was unable to obtain a copy of this notice to analyse the exact context and wording further for this report and the aforementioned RFI response does not represent a formal standpoint or response from the UK HSE.

Discussion on how regulations and various industry guidance consider the definition of a workplace can be found in section 3.

2.3.3.2 Industry mindset

One issue highlighted by multiple responses to the RFI relating to initiating any change in the provision of welfare in the industry was the predominant attitude towards welfare from industry figures (notably project owners).

As has been previously discussed, the attitude of the project owner towards welfare facilities can play a significant role in how welfare is implemented early in the project life cycle and what level of provision is offered to workers.

However, it was reported that this influence is often negative for welfare outcomes, with project owners often regarding welfare as a secondary concern when compared with other aspects of a project (notably, as one respondent stated: 'All [welfare decisions are] driven by cost and value engineering'). Project owners were also seen to adopt the view that assets are not classed as workplaces (so no welfare is required on them) or treating welfare as outside their direct responsibility.

In several cases, it was reported that welfare was considered more or less an afterthought to the project, with one response stating that 'requirements were not fully defined', and another that '[welfare] was not considered for WTGs until a month before design freeze'. This contributes to a perception that provision of welfare is not considered as a serious design obligation by the industry, with one worker describing efforts as 'half-hearted steps'.

One issue highlighted by respondents was the lack of clear guidance for industry stakeholders outlining what the acceptable standards for welfare in offshore wind should be. This is one of the possible causes for the variability in welfare provisions reported by this RFI, as the lack of a unified industry approach to welfare, due to differing interpretations of minimum requirements across different jurisdictions, can allow organisations to interpret the requirements differently.

In one response, the lack of clear industry guidance was cited as a reason for lower welfare requirements being used for their current project. The respondent stressed that they cited the higher standards set on one of their previous projects in another country, demonstrating that improved welfare was possible to achieve, but instead of striving to deliver this higher standard the company in question opted to aim for the 'minimum standards' that would be 'sufficient to satisfy legal obligations'. It was highlighted specifically that a lack of 'clear regulatory or industry mandate' made it difficult to push for improved welfare standards. Further discussion of guidance and regulations applicable to offshore wind is presented in section 3.

In combination with the predominant position that temporary welfare on assets is sufficient, this presents a picture of the offshore wind industry as resistant to making improvements, reliant on 'minimum acceptable' solutions and 'what has been done before'.

It was specifically highlighted by multiple responses that pushing for improved welfare in their projects was difficult, with one describing facing 'significant resistance' and another describing it as 'a hard sell'. A key driver for this difficulty seems to be a reluctance to 'be the first' to improve welfare and adopt a better standard than has been implemented on previous projects or by other developers. According to RFI responses, comparisons with other projects with the same or worse welfare conditions are often used as justification not to improve welfare. As one put it: 'The default posture is to maintain parity with the competition, not to lead.'

As will be discussed in 2.3.3.3, there are challenges in implementing improved welfare offshore, particularly around the logistical complexity of maintaining more sophisticated provisions in remote offshore locations, which are not aided by the relative novelty of the

offshore wind industry. However, it is suggested by RFI respondents that the reliance on 'legacy practice' is at least partially due to inertia or reluctance in the industry to tackle these challenges. It is a case where high 'perceived risk […] leads to a preference for status quo solutions like SOV-based welfare, even when their limitations are well understood.' One respondent recalled being told by a line manager, when asking about welfare, 'not to open the can of worms', and then went on to say, 'We need attitude change in the industry.'

Finally, responses highlighted the disconnect between decision-makers, the realities of working offshore and the impacts that it has on workers' conditions and retention. One suggested that the focus of developers is 'on getting turbines spinning', which 'is completely reasonable from a commercial perspective, but shows a lack of understanding that retention of high-quality staff is easier when these team members feel safe and valued in the workplace'. Furthermore, another raised that 'Many of the key influencers involved in approving or rejecting welfare measures have never spent time offshore. Without direct experience, the human realities of poor welfare access […] are underappreciated.'

2.3.3.3 Design challenges and concerns

Many respondents, both project owners and operators, expressed concerns around the practicalities and logistics of implementing more involved welfare solutions in offshore settings. In particular, the topic of maintenance for sanitation services was discussed at length, with concerns raised for how toilets located permanently offshore could be reliably cleaned and maintained without exposing workers to additional risks, both in terms of biohazard exposure in handling human waste as well as increased visits offshore to maintain welfare facilities. Increasing the number of lifts required offshore was also raised as a concern, particularly considering that lifting operations are a key source of hazards within offshore wind (see EI 3584 *G+ Good practice guidelines – Governance of mechanical lifting operations in the offshore wind industry*).

In particular, it was questioned multiple times who would be responsible for keeping such a provision clean, with respondents stating 'how do you maintain a high-quality integrated asset? Who cleans it?' and '[workers] worry how clean and maintained these facilities are'. It was noted by one respondent that a barrier to improving welfare in the industry was a perception that 'technicians will never agree to clean the toilets themselves'.

For infrequently visited assets, it was raised that fixed welfare provisions could increase the frequency of required maintenance, particularly when considering toilet facilities as well as the storage of water for handwashing purposes, and so could be a disproportionate response to the issue of providing welfare offshore. This is summarised by one participant as 'Overkill – too many resources for not enough gain.' It was highlighted that any such changes would come with financial implications, including 'an increased cost... and a significant increase in service due to a service schedule of keeping the toilet clean'.

Many of these concerns were not raised to suggest that there was no possibility of implementing these changes, but rather that any changes would need to be considered and researched thoroughly for their impact to be understood. It was stressed that any future solutions would need to emphasise 'simplicity of solution' and 'ease of implementation and cost', while also managing the 'needs of the user'.

Also raised as a design barrier to improving welfare provisions is the perceived lack of flexibility with OEMs in making allowances in their designs for welfare. The need to facilitate change to design of assets in collaboration with OEMs was highlighted by several RFI respondents. Alongside this, there is the need to determine where, within the assets, space should be made for welfare provisions, which would need to be discussed and agreed by both OEMs and workers.

Finally, there was a perception among some participants that, while the industry is improving, there are currently not a lot of options for welfare provisions available that are ready to fill the gap. As put by one respondent: 'The offshore supply chain is not yet mature enough to offer off-the-shelf welfare solutions for turbine foundations.' However, other respondents disagreed, saying that better provision options were available and in use on their projects, and there were even responses directly from providers of welfare solutions. This suggests a general lack of awareness among some in the industry that solutions to the design challenges around welfare are available.

Design challenges, including requirement to make space allocations, H&S impacts and additional logistical and maintenance requirements, of individual welfare provisions will be discussed in 4.2.

2.3.3.4 Growing industry pressure

While the previous sections have generally discussed issues raised that influence industry stakeholders away from improving welfare, there were numerous responses that indicated influencing factors pushing for greater investment and consideration for welfare issues.

One of these was increased attention, pressure and focus from the regulator, specifically referring to the HSE in the UK and increased scrutiny towards practices in the offshore wind industry. The aforementioned NoC reportedly issued to a UK wind farm was again referenced by a respondent as a signal that regulators will in the future pay more attention to welfare in the industry. However, it was again stated by respondents that without either clear guidance or concrete enforcement, change would be slow, if it happened at all.

Additionally, as will be discussed in 2.3.5.2 in more detail, the desire to improve inclusivity in the industry was highlighted as a driver to influence welfare decisions, particularly to attract more women to enter the traditionally male-dominated offshore wind workforce. While improving the quality and access to welfare facilities will be a benefit to the dignity and wellbeing of all workers, it is recognised that it would have the additional benefit of increasing the uptake of roles in the industry by women, including in apprenticeships.

2.3.3.5 Cost–benefit analysis

Participants were asked if they had any experience of cost–benefit analysis (CBA) being conducted for offshore wind welfare. While many did not have any involvement in conducting CBAs for welfare, there were some noteworthy points that did emerge.

It was stressed by several respondents that there are difficulties in conducting CBAs for what welfare provisions should be included in a project. This is primarily stated as being due to the difficulty in finding the actual costs and benefits of different options, particularly for the option of 'doing nothing' (which, in this context, respondents meant using the minimum 'vessel-based welfare' route). It was also highlighted that some developers found difficulty in performing the CBA exercise where they were unsure what options, if any, were available as alternatives. As put by one respondent: '[there was] difficulty in conducting CBA as [they] are challenging at this stage since the supply chain does not exist, and a product will have to be developed.'

When CBAs were conducted, the key considerations mentioned most often were cost and practicality (both of installing welfare provisions and the logistics of maintenance). In other responses, it was highlighted that direct monetary costs of provisions were not considered as a key consideration, but instead the required changes that would need to be made to the asset and agreed with the OEM, as well as the additional time that would be required offshore to maintain any facilities, were heavily considered.

In one response, it was stated that the exercise was conducted in order to justify the decision not to install any welfare, which resulted in the project selecting no welfare provisions. This was also on a project where the influencing factor for decision-making was listed as: 'All driven by cost and value engineering.'

Despite the concerns raised by other participants on how to effectively compare the cost of welfare with the 'status quo' option of vessel-based welfare, three separate responses indicated that they had done so, and that the results had shown in favour of including welfare on assets. In one case it was just indicated that, for service and maintenance, there was an advantage to providing sanitation when compared with lost time waiting for SOVs to return to assets. For the other, which was a response by a welfare technology provider, it was indicated that their provision could pay for itself when considered against 'hidden' costs in operating vessel-based welfare, namely 'SOV fuel burn rate, unproductive technician time and unproductive turbine power'. Finally, the third response indicated their thoughts on the results of a CBA to include toilet facilities on an asset: 'My findings were that financially and morally, this is justified.'

Indications of the cost of various welfare provisions, including both direct and indirect capital and operational expenses, and using real figures where these are available, are discussed for individual welfare provisions in 4.2.

2.3.4 Use of vessel-based welfare

One of the key observations from the RFI was the widespread use of vessel-based welfare, as well as the many deficiencies of relying on this as a means of providing welfare to workers on offshore assets. In this report, discussion of vessel-based welfare as a type of provision has been included within section 4, including an analysis of the pros and cons, costs, benefits and perceptions from workers in the industry.

2.3.5 Impacts on workers

Participants who identified themselves as being users of welfare were asked to list their concerns around the welfare provisions available to them on their projects, in order to gauge the perception of these provisions in the industry. As well as addressing concerns around specific issues, a general question was asked: 'Do you feel adequately supported by the welfare provisions available to you on your projects?'

Twenty-eight of the 46 RFI respondents answered this question across the C&C or O&M sections (duplicate answers from the same participant in both C&C and O&M were only counted once). Of these, 50 % (14) answered that they did not feel adequately supported, 39 % (11) that they did and 11 % (3) gave answers that were either ambiguous or neutral (e.g. one respondent said they felt supported with respect to onshore quayside and vessels, but not on wind turbines). This reflects the variability discussed earlier in 2.3.1 and shows that welfare is not considered a settled subject among workers.

Those who answered that they did feel supported cited organisational support and engagement over welfare, for example, stating: 'We have an open culture to raise concerns, and they are taken up by the management' and 'we provide what we can and consider improvements whenever there are suggestions from staff.' Others raised that facilities were not perfect, but were as good as they could expect and suitable for the assets they worked on, stating: 'Yes, there could be improvements in the accessibility to clean toilets' and 'I think we are doing the best we can, the design of the assets do not lend themselves for

adequate welfare provisions.' Additionally, one participant raised that their current project, where toilets were provided on the WTG, was 'better than other projects I have worked on'. Finally, one respondent said they felt supported, and raised that in their opinion: 'Yes – it is not adequate to install a plumbing system on every turbine. Equally, no technician wants to empty any 'Portaloo' style welfare facility installed on a wind turbine.'

For those who gave balanced answers that could not easily be counted one way or the other, the variability across the industry was highlighted. For example, one response read: 'Project dependent. Some organisations [are] much more receptive of considerations towards matching welfare needs of employees and contractors,' while another highlighted that, 'On shore and on vessels yes. Being dropped to a turbine location with no toilet being available equals no support.'

For those who did not feel adequately supported, issues raised were primarily around the lack of perceived effort made to support their welfare requirements, and that the level of welfare provided was disproportionate to the amount of time spent on assets (described as 'currently not fit for purpose' in some cases). These results highlighted a sense of frustration among workers among several key areas:

– that concerns repeatedly raised were ignored: 'Not really. I have been pushing for improvements for some time. Industry wide we are very poor at it. Turbines have been manufactured for years yet they still don't get built with welfare in mind. People can spend 12 hours plus on them so we are forced to supply something that is better than nothing but still not sufficient';
– that requirements were only just being met: 'we fulfil standard practice, but there should be more done when people are on WTG 8-11 hours', and
– that more needs to be done by the industry: 'There has been no investment in welfare facilities on the turbines. Focus is solely on production and cost saving' and 'No, offshore welfare on all assets needs to [be] the norm. It is inhumane, undignified and would not be accepted in onshore construction.'

Ultimately, workers who felt welfare was inadequate believed that their needs could be met, but that decision-makers in the industry were choosing not to: 'There are options to have toilets installed on every turbine however bureaucracy means no one takes accountability.'

With 50 % of workers responding that they are unsatisfied by the quality of welfare provided, it was raised by several respondents that there is a connected impact to retention of skilled workers in the industry, with one stating that '[the current situation regarding welfare] leaves us with a workforce shaped not by capability – but by tolerance for avoidable hardship'. It is important therefore to understand the specific concerns unearthed by the RFI, which asked for feedback on whether welfare provisions impacted H&S, operational, environmental and sustainability concerns and the dignity and welfare of workers.

Due to the range of impacts on personnel noted in the RFI, this section will now highlight the key areas of concern that were reported.

The experiences and perceptions of workers towards individual welfare provisions will be discussed in 4.2.

2.3.5.1 Health and safety

2.3.5.1.1 Sanitation and washing

The primary concerns raised around H&S impacts of welfare provisions are around the health impacts of not having sufficient access to sanitation provisions, particularly when only

vessel-based welfare solutions were used on projects. Respondents raised that, where vessels would leave them on assets for long shifts (8-12 hours, as reported by some workers), they would have no access to sanitation.

Working without the ability to use proper toilet facilities results in workers having to make difficult choices with concerning H&S implications. These included going long periods until they can access a vessel to relieve themselves (which can have detrimental health impacts in the long term); abstaining from proper eating and drinking in order to artificially avoid needing to use a toilet (putting workers at risk of dehydration or fatigue in a physically demanding and safety-critical role) and, widely reported as a common practice, defecating or urinating over the side of assets. As well as being unsanitary, the latter point raises concerns around workers being put at unnecessary risk of falls from height by going to the edge of platforms (as well as having implications around dignity, which will be discussed in 2.3.5.2).

These were noted across multiple RFI responses, with workers saying:

– 'Not having sanitary facilities on long working days, increases the risk for not drinking sufficiently, so no need for toilet arises';
– 'Technicians who don't take the toilets for various operational reasons who then have to defecate outside the turbine, or hold it all day';
– 'Unfortunately on WTGs, personnel rarely call in vessels and refer to going over the side or using bags. In some worst cases, women not drinking so they don't have to go leading to dehydration', and
– 'Dehydration concerns due to avoiding the need to use facilities, potential medical threat, mental health, negative impact on workers population'.

Further to this issue, it was noted that many female workers do not have sufficient access to means to manage, change and dispose of sanitary products. Aside from issues of dignity and inclusion in the workforce, there are H&S concerns here that are not being addressed: 'We have female technicians who cannot deal with periods in a dignified and sanitary way.'

When sanitation provisions are provided on assets, from the RFI it appears that this is most commonly in the form of temporary portable welfare, such as 'camping toilets'. It appears to be common practice for waste to be collected in bags that are then taken back to the vessel where they are disposed. It was noted that these are an improvement over having no facilities at all, though they come with additional concerns.

It was raised by multiple workers that the requirement to handle human waste from these temporary toilets is an H&S concern. One worker reported: 'Once the camping toilet is used it has to be cleaned then you have to carry the excrement with you until back onboard the vessel,' while another said, 'Unsanitary and undignified. Have to transport own waste in a bag back to the SOV. Particularly unsanitary for female colleagues.' It was noted by one respondent that innovative technology and practice in this field could improve the situation: 'Human waste is a hazard, chemical toilets and the maintenance of same present a risk. But with improved technologies such as wet and solid waste separation the risks could be reduced. There is more risk from not having any facilities and individuals having to take matters into their own hands when nothing else is available.'

There were also concerns over the cleanliness of such temporary facilities, with it being reported that 'Sometimes when people have used the toilet they do not clean it after use,' as well as multiple cases where, as no running water was available on assets, workers were provided with wet wipes and 'cleaning pads', and 'There is no proper way to wash hands after use [of toilets].' It was noted by one respondent that an improvement to their welfare

would be to 'provide personal handwash options before eating lunch'. The lack of adequate handwashing also raises concerns around hygiene.

The previous comment about the poor condition of temporary provisions (the upkeep of which is the workers' responsibility) raises the issue of worker discipline and poor attitude towards maintaining a clean and safe working environment. This is noted in multiple responses, that workers will not want to be responsible for cleaning provisions, with one respondent saying: 'No technician wants to empty any 'Portaloo' style welfare facility installed on a wind turbine,' and another citing 'Getting buy-in from offshore technicians with the servicing and changeover of units,' as a challenge to improving welfare.

This point is especially relevant when considering the widely reported practice of workers going 'over the side'. One response cited this practice as being raised as a key factor in a CBA: 'Justification was completed stating what should happen and the cost associated with vessels going to assets so people can use the toilet. However it was also pointed out that this rarely happens as people go over the side which is against the consent orders.' Another reported that it was widespread and tolerated, if not encouraged: 'Although it was written that people should not go to the toilet over the side, this is always generally the norm (for men) and a blind eye is turned.' It could be suggested that this poor attitude among workers to keep sanitary conditions is tied to a workplace culture that does not prioritise worker wellbeing and safety and where poor practices are tolerated.

Further discussion of sanitation and washing provisions in the industry can be found in 4.2.1 and 4.2.2, respectively.

2.3.5.1.2 Personnel transfer

Related to the provision of vessel-based welfare, even when vessels are located close to the asset, it was noted by workers that having to transfer back to the vessel to use welfare facilities presents an additional safety risk. It was stated that not having any facilities on an asset would result in an 'increased number of crossing between foundation and SOV'. Personnel transfer is regarded as one of the more hazardous activities in the industry (see EI 3429 *Good practice guidelines: G+ offshore wind farm transfer*) and requiring it to access welfare could be exposing workers to unnecessary hazards: 'Potential safety issue when technician had to transfer on CTV:SOV to get access to sanitation room or to have lunch.' Furthermore, when considered with the long periods without welfare facilities that some workers experience, this activity can be carried out while under significant stress, discomfort or pain, compounding the risks taken further.

2.3.5.1.3 Rest and mess

It was reported that workers taking breaks on assets did not often have the correct facilities for safe and restful breaks. In some cases, similarly to the sanitation situation, proper facilities were dependent on a vessel being nearby when workers needed a break: 'Rest and mess facilities will depend on whether [there] is a vessel jacked up. Generally, operatives will have water and food with them on the turbine.' This was reported as being a particular issue in bad weather, when workers would have to shelter inside assets rather than on external platforms. It was reported that 'Most workers also take their lunch in the WTG which is not a very clean place to eat' and 'People sitting on floors when having breaks is the norm,' which raises concerns of both ergonomic issues from a lack of seating provisions and also food contamination (particularly considered alongside reports of a lack of handwashing facilities available). Furthermore, it was raised that there were other potentially more severe hazards involved with having no dedicated break area on assets: 'Potential risk[s] of standing near HV electrical equipment. Not adequate to eat/store water inside WTG, near electrical equipment.'

Finally, it was reported by one participant that in their organisation the actual food being eaten by workers may not be sufficient and have a long-term detrimental impact on both health and wellbeing: 'Also, food is not provided which can be difficult on shift work to buy and cook healthy food. Premade food becomes the food of choice which isn't the healthiest.'

Further discussion of rest and mess provisions in the industry can be found in 4.2.3 and 4.2.4, respectively.

2.3.5.1.4 Dignity and wellbeing

The issue of dignity and wellbeing was answered very strongly in the RFI, indicating it is a point that workers care deeply about. Almost all responses regarding dignity were surrounding the topic of sanitation and access to toilets.

The challenges of purely vessel-based welfare will be discussed further in section 4, but it was noted as a dignity and wellbeing concern that it can be difficult for workers, especially women, to call a vessel specifically to access sanitation.

Additionally, it has been discussed at length that when limited or no sanitation has been provided on an asset, and as discussed when vessels are not able to reach an asset fast enough, workers are likely to take matters into their own hands (as one response put it, 'facilities have not been provided and when you got to go, you got to go'). As well as being a concern both for H&S and the environment, it was raised repeatedly that this is a major concern for the dignity of workers, that they are put in a position by a lack of facilities where this is an option they must consider. It was also implied by several respondents that, while male workers may be more likely to take this route, female workers are more likely to deprive themselves of water ('In some worst cases, women not drinking so they don't have to go, leading to dehydration'). As stated by one respondent: 'Dignity for women and men working in remote locations offshore becomes a problem when no facilities are available.'

When temporary portable welfare provisions have been added to assets, it is generally (but not always) regarded as a step-up from reliance on vessel-based welfare. However, it is clear from the RFI responses that these are not perfect when considering the dignity of workers. Lack of privacy was highlighted, with some workers describing no allowances made to offer this, describing these facilities as 'A toilet out in the tower, no door or privacy,' and saying, 'there is no dignity if you have to go and colleagues are standing around you'.

One solution to the privacy concern often cited by respondents is the 'toilet tent', which can be erected around camping toilets to offer basic privacy when workers need to use facilities. It was noted in one response that they had been purchased to improve conditions, and in another that they were not provided but were desired. While these are an improvement over no privacy at all, workers familiar with them expressed their feeling that this was inadequate, stating: 'Setting up a makeshift tent to use the 'toilet' whilst your colleagues are in the vicinity (all in the tower base for instance) is wholly undignified,' and 'it's also not very private defecating in a tent and carry [the] waste with you.'

In general, the use of temporary portable welfare solutions for sanitation was reported as being detrimental to the dignity of workers, who described it as 'not very dignifying having to set a camping toilet up' and 'feel[ing] very much like a temporary solution just now'. As mentioned in previous sections, workers highlighted having to carry bags of waste with them until they could next use vessels as detrimental to their dignity and wellbeing, as well as proving a hazard for H&S and the environment.

As a result, it was noted by several respondents that when poor-quality provisions are made, they would rather wait for the vessels or, as discussed, resort to going over the side of assets. One worker stated: 'There's facilities, but nobody like to use it (not hygienic) so they get back to the SOV, male workers urinate over the side of the platforms,' while another said (when answering what facilities were available): 'A 'camp' toilet on a WTG, this is very basic and lack of privacy, this is improving slowly. As a woman, I choose to wait to use the toilet on a CTV. There are wipes on a WTG but no running water for any sanitation.'

The second comment raises the issues faced by women in the offshore industry. While this study did not seek to focus on the issue of increasing diversity and inclusivity in the offshore wind industry, one of the foreseen benefits of improving welfare is the impact particularly for female workers. It was highlighted numerous times throughout the RFI responses, including by female workers themselves, that current conditions are not suitable for their needs. Several responses stated that managing menstruation and sanitary products can be very difficult offshore, and it was indicated that the poor options available for sanitation provisions offshore can disproportionately impact women: 'As more women enter the industry, private areas for them to [use the] toilet or change sanitary products when on their period can be very limited.' As put by one respondent: 'By failing to provide basic, accessible, and hygienic welfare at the place of work, the industry is inadvertently excluding or discouraging participation by women and other underrepresented groups. It reinforces a working environment designed around male physiology, endurance norms, and behavioural expectations.' One respondent discussed how women in the workforce were forced to skip, swap or plan shifts around their periods, to avoid being put in the position of having to change their menstrual products when on assets. As well as impacting the dignity of workers, the lack of safe spaces to change menstrual products exposes female workers to health hazards such as toxic shock.

To conclude, workers felt that current welfare practices did not adequately protect their dignity. Workers describe feelings of 'discomfort and stress' and 'shame' around poor sanitation facilities. The term 'inhumane' was used on several occasions, and one worker summarised: 'It's not nice knowing you cannot attend sanitary needs if [you] require.'

2.4 IMPROVING THE INDUSTRY

Towards the end of the RFI, there was an optional section that allowed users to submit their opinions as to the key barriers facing the improvement of welfare provisions in the offshore wind industry, as well as the actions they thought were needed to see change.

2.4.1 Barriers

Respondents were asked what they viewed as the largest barriers to improving welfare outcomes in the industry. One of the most common points raised here was around the industry mindset. As has been discussed in 2.3.3.2, there is a perception, particularly by those who said they have used welfare, that developers have no interest in improving conditions. 'Lack of interest' was cited, as well as a '[lack of] project appetite for welfare provision'. In addition, it was again raised that there is a disconnect between those making welfare decisions and those working on assets: 'General awareness of the reality of offshore workers welfare practices. Projects are generally planned and developed by people with no or limited offshore experience (not a criticism).' This in turn fuels 'Ongoing reliance on vessel welfare provision,' also raised as a barrier to improving welfare, as it is seen as a standard industry practice that does not need to be challenged. As a result, one respondent put: 'We need attitude change in the industry.'

A contributing factor mentioned for this mindset, and indeed as a barrier to improving welfare in general, was the costs associated. One respondent noted, 'CAPEX concerns for welfare provision, e.g. additional steel for external platform, cost of welfare units, etc.,' while another said, 'As in many industries cost comes before the workforce.' However, it was indicated by others that the costs should be accepted as necessary, with one saying: 'These turbines cost into the tens of millions yet the provision of 10k worth of standardised facilities is not designed in at conception?'. Related issues around the supply chain were noted, and that until industry requirements are standardised and the supply chain rises to provide solutions that meet this standard, costs will continue to present an issue.

Additionally, as has been discussed already, perceived differences between designers, OEMs and project owners were cited as a key barrier, including the debate as to how offshore assets are defined (cited by one respondent as their first barrier: 'Defining as to whether a WTG is a place of work or a machine'). One respondent stated their opinion was that 'OEM should be proactive in supporting welfare options in the tower,' and another that 'OEM design of WTG assets is the main driver in lack of welfare,' while a response from an OEM in this section indicated that: 'Overall we believe the welfare is excellent in our projects and there is no major action needed.' Until this can be resolved, it appears that it will continue to hold up progress in improving welfare, summarised by one respondent as: 'There seems to be a battle between OEM/O&M and client, with red tape holding up improvement.'

Finally, the lack of regulatory and industry guidance was cited as a major barrier. It was cited repeatedly that there was confusion about how best to apply the current regulations to the unique situation of offshore wind, with one respondent saying, 'There needs to be further guidance that applies to the nature of offshore wind projects' and '[the] difficulty is interpreting the requirements and applying it to offshore wind projects.' Regulatory ambiguity was cited by respondents as being a key issue for tackling welfare shortfalls within the industry, with the concern being that this allows for a 'lack of project appetite to address welfare provision' and 'create[s] space for a 'lowest acceptable standard' approach, especially during early-stage design where commercial pressures dominate'. In particular, it was cited that this could be the reasoning for the industry's continued 'reliance on vessels for welfare provision'.

It was generally considered across the responses that, unless there is concrete, undeniable requirement that existing regulations on welfare apply to the offshore wind industry, and there is sufficient guidance on how the industry can meet those requirements, achieving change will be difficult. One respondent put: 'Without clearer expectations and enforcement, offshore welfare will continue to depend on the values and risk tolerance of individual developers,' while another put: 'In summary, while the spirit of existing regulations is sound, the lack of clarity, enforcement, and fit-for-purpose offshore application leaves a significant gap. The industry requires clear, cross-jurisdictional guidance and a stronger commitment to worker dignity.'

2.4.2 Actions

A number of points of action were identified by respondents, for what they would like to see happen to improve welfare in the industry.

2.4.2.1 Improved industry guidance

The first action raised is to address the issue of a lack of clarity in how to interpret welfare requirements for the offshore wind industry. 'Clear alignment by industry on welfare requirements, fully accepted by the regulators across all regions' and 'Clear guidance of

what the minimum requirements are for welfare provision on offshore wind'. Another user indicated that they would 'appreciate a comparison between national regulations,' to provide clarity for the industry (which has been provided in this document, in 3.1). Multiple times, the prospect of a good practice guidance document was raised by respondents, with one saying: 'G+ producing a good practice guide would help the industry align on the expected standards. This has been done for onshore wind already via Safety On: Practical, jurisdiction-agnostic, and clearly aligned to work phase and location. Let developers and regulators point to it.'

2.4.2.2 Increased knowledge sharing

Another action that was suggested that could be undertaken by G+ is to encourage the industry to do more towards welfare by highlighting the benefits of successful projects: 'Recognise and promote projects that go beyond minimum standards. Make worker welfare part of ESG scoring, not just HSE checklists.' Additionally, 'More knowledge sharing between offshore wind developers around welfare provision on offshore wind assets' was suggested, which could be facilitated by G+. It was thought that this could also involve promotion of suppliers of innovative welfare provisions, making the industry more aware of the emerging supply chain and improving uptake of these solutions. To improve the supply chain, it was suggested that industry bodies could 'Signal demand for modular, compliant, point-of-work welfare units. Bring in the vendors and challenge them to innovate.'

2.4.2.3 Strengthening of welfare regulations

While some respondents focused on guidance for developers from regulatory bodies, others stressed the importance of tightening regulations themselves to force improvements. One said their opinion was to 'Define welfare as a design requirement. Include welfare provision in foundation and turbine design scopes from the earliest stages. Make it non-negotiable.' While others said, 'Make it mandatory to provide sanitary [provisions] on offshore WTG.' One user called for a practical response across the industry, requesting 'Toilets on wind turbine locations. Or at least the provision of landing a portable toilet on a location while people are expected to work there. If you can get a bag of tools to a wind turbine platform then you should be able to get a portable toilet there also.' Ultimately, one user suggested that a mix of both approaches is likely required, citing that 'Maybe it needs more carrot and more stick.'

2.4.2.4 Settling of 'workplace' definition

Another key action raised was on reaching a consensus with OEMs around the provision of welfare within assets, to solve what many see as a blockage to improving welfare across the industry. One participant stated that alignment of industry standards would need to be 'integrate[d] into WTGs and offshore substation design by the OEMs'. It was suggested that '[the] regulator and G+ [should] engage with OEMs to solve the problem, not pushing operators who can only rely on retrofits.' Other participants took a stronger stance, stating: 'OEM to design in at conception. If not, to then factor provision in at contract stage. Someone needs to take accountability instead of passing the buck.'

2.4.2.5 Calls for measured actions

It was stressed by some participants that, although progress should be made to improve welfare in the industry, it should be done cautiously. The importance of considering all aspects of the problem, not just the immediate requirement and use of a facility, was highlighted by multiple respondents: 'Needs consideration not only to immediate provision but also safe management of waste products and sanitation in line with guidance and practicability' and 'Logistics is the major barrier in managing welfare (toilets offshore) and any recommendation MUST be cognisant of increased risk due to transfer of people, lifts, etc.'

Offering a stronger opinion, one respondent warned against any actions on this topic, stating: 'no action from industry bodies [is] needed.' They went on to elaborate about their concerns with increased focus on welfare:

'Our worry is that we create a big topic where there is no issue. Our employees clearly stated they are happy with what we provide. They want to use the welfare on the installation vessel and on the SOV. They will not use the welfare on the asset (transition piece or turbine). That means if we implement more on the asset it would be [a] risk for people to regularly go out and maintain [it].'

2.4.2.6 Change in industry mentality

Finally, there was a call from multiple respondents that a shift in industry mindset was required, to pay more attention to the human aspect of welfare considerations. This was raised both from a purely operational perspective, with one response noting that: 'retention of high-quality staff is easier when these team members feel safe and valued in the workplace', and also from an ethical standpoint. Developers and designers of offshore wind farms have a duty to consider the health, safety and dignity of workers on their projects, and there are aspects where this is not currently being done. One worker summarised this in calling for the industry to 'Listen to the technicians how they want it', as well as to 'Remember we are humans'. Another respondent summarised this line of thought with a call to action for the industry: 'The 'invisible worker' model must end. Every offshore WTG is a workplace. We either design for that – or we're not designing responsibly.'

3 GUIDANCE AND REGULATIONS

As discussed in 2.4.1, it was indicated in the RFI that a key barrier to improving welfare in the offshore wind industry is confusion and lack of clarity of what the requirements for welfare are. As seen in 2.4.2.1, an action raised by respondents to the RFI, viewed as key to seeing the improvements desired in the industry, is to address this lack of clarity in both national regulations and what is considered good practice for welfare. This study is a first step towards achieving this, but will need to be followed by further, carefully considered work.

The G+ is a global organisation with global reach, and the offshore wind industry is not limited to any single country or legal jurisdiction. This can present challenges to developing an industry-wide, 'one-size-fits-all' approach to the issue of welfare based solely on legal compliance. Any guidance issued should be best practice, 'region agnostic' that can be used anywhere, while also taking heed of any specific prescriptive regulations that need to be followed. As such, any industry guidance must be developed with great care to ensure the best outcomes for workers and the industry.

This section will explore both the regulations currently in force in key industry markets as well as what industry guidance is currently available that can offer direction in lieu of further output from the G+.

3.1 COMPARISON OF NATIONAL REGULATIONS FOR KEY MARKETS

A common theme in RFI responses was that current regulations do not adequately account for the realities of applying welfare requirements to the challenging conditions and constraints of offshore wind, where applying welfare regulations in the same manner they are applied on land can be impractical or impossible.

It goes without saying that legal compliance with local regulations should be of great importance to any offshore wind project, forming the baseline of expectations for protection of workers and ensuring that a project can be built and operated legally. Understandably, given the aforementioned perceived ambiguity around legal welfare requirements, it was noted by the working group and in individual responses to the RFI that an overview of relevant national regulations in key offshore wind markets would be beneficial. This is provided in the following sections, presented as an overview of the legal framework that applies in each of the key markets.

Attention is given to regulations governing the four studied welfare topics (sanitation, washing, rest and mess), focusing on the minimum legal requirements in each market. This includes points such as required numbers of individual provisions, distances between provisions and points of work, waste disposal requirements, as well as any other factors thatmay be particularly relevant for the offshore wind industry. Any differences in regulations or how they are applied between construction and operation of a workplace have also been included. While it was not possible to list every requirement for every regulation, detailed references to all legislation, specific regulations and codes of practice have been provided.

In general, this analysis has been focused on national workplace welfare regulations for which there are no obvious exclusions to offshore wind (and where they were available, legislation that mentioned offshore industries and/or offshore wind specifically). The impact of machinery legislation (including the recent EU Regulation 2023/1230, itself an update

of Directive 2006/42/CE) has not been considered in this analysis, as machinery legislation does not include provisions for welfare. Workplace welfare obligations typically arise from separate legal frameworks and broader occupational H&S regulations, which apply based on the presence of work activities rather than the classification of the asset.

Users of this document are advised to review the exact wording of regulations for markets relevant to them, rather than relying solely on the wording in this document. This analysis is accurate as of the time of publishing, and readers should make themselves aware of the applicable regulations for their region and their current revisions. Additionally, the following comparison considers only national-level regulations for each market and does not consider sub-national regulations (such as at a state or region level).

Finally, while adherence to local laws and regulations is important, organisations should be cautioned against viewing compliance as the only measure for whether they are providing effective and sufficient welfare to their workers, or indeed any other H&S concern. Focusing purely on legal compliance risks missing the bigger picture, providing solutions that, while legally acceptable, do not actually meet the needs of workers. It is here where industry guidance and best practice, as will be discussed further in 3.2, and which are the ultimate goals of the G+ for welfare, can be effective in pushing employers to go beyond a 'minimal compliance' approach.

As will be discussed later, these concepts are enshrined in several national health, safety and welfare regulations through the concept of providing measures that are 'reasonably practicable' (also referred to as reducing risk 'as low as reasonably practicable' (ALARP)). Where included, this increases the duty on employers to not just consider the minimum possible provisions to meet requirements, but instead to consider the best practicable options. These are often defined by accepted industry standards or published codes of practice, and if an employer feels they must move to a lower standard of provision, it must be justified why in order to be compliant. By this way, some national regulations push employers away from the 'minimal compliance' model.

3.1.1 United Kingdom

In the UK, general welfare requirements for workplaces are defined by the Workplace (Health, Safety and Welfare) Regulations 1992, particularly regulations 21–25. These also include the Approved Code of Practice (ACOP) 21–25, which is not legally binding but includes recommended practices to ensure compliance with the law. In the case that an employer is prosecuted for a breach of H&S law, they may be found at fault if they cannot show that the ACOP or a suitable alternative measure was followed to comply with the law. Requirements on employers are summarised in the HSE guidance INDG244 *Workplace health, safety and welfare: A short guide for managers*.

For construction sites, the Construction (Design and Management) (CDM) Regulations 2015 apply, particularly Schedule 2, which outlines minimum welfare facilities required.

Sanitary facilities. For operational sites, regulation 20 of the Workplace (Health, Safety and Welfare) Regulations 1992 states that these must be provided at readily accessible locations. ACOP 21 §203–204 outline specific recommendations for remote workplaces and temporary work sites. Remote workplaces without running water or a nearby sewer still need to provide 'enough' chemical toilets. ACOP 21 §197 recommends at least one cubicle for 1–5 workers and two cubicles for up to 25 workers who are at the workplace at the same time. If reasonably practicable, chemical toilets that have to be emptied manually should be avoided. If there is no other solution, they have to be emptied and recharged at suitable

intervals, and a deodorising agent needs to be provided. Temporary work sites need to have 'sufficient' toilets, so far as is reasonably practicable. Mobile facilities can be provided and should include, if possible, flushing toilets.

For construction sites, the CDM 2015 Regulations – Schedule 2 states that suitable sanitary facilities must be in readily accessible locations.

Washing facilities. For operational sites, regulation 21 of the Workplace (Health, Safety and Welfare) Regulations 1992 states that these must be in the immediate vicinity of every sanitary convenience and be readily accessible. They shall include showers if the nature of the work requires it. For remote workplaces without running water or nearby sewer, ACOP 21 §203–204 recommend providing enough water in containers or other means of maintaining hygiene. Temporary work sites must provide 'sufficient' toilets, so far as is reasonably practicable. Mobile facilities with, if possible, running water may be provided. ACOP 21 §197 recommends at least one washbasin for 1–5 workers and two washbasins for up to 25 workers who are at the workplace at the same time.

On construction sites, washing facilities, including showers if the nature of the work necessitates it, must be provided in readily accessible locations, so far as is reasonably practicable.

Rest facilities. For operational sites, regulation 25 of the Workplace (Health, Safety and Welfare) Regulations 1992 states that these shall be provided at readily accessible places and be equipped with tables and seating with backs for the number of workers expected to use them at the same time. ACOP 25 §225 advises seats within areas where workers do not need to wear personal protective equipment (PPE). If the workplace is not reasonably clean, a separate rest area is recommended.

For construction sites, the CDM 2015 Regulations – Schedule 2 impose the same requirements.

Mess facilities. For operational sites, regulation 25 of the Workplace (Health, Safety and Welfare) Regulations 1992 states they shall be provided 'where meals are regularly eaten in the workplace'. ACOP 25 §225 advises also providing these if otherwise food could be contaminated, including by dust or water. Seats in working areas may be considered mess facilities if they are sufficiently clean.

For construction sites, the CDM 2015 Regulations require rest facilities which include suitable arrangements that ensure that meals can be prepared and eaten. Additionally, boiling water and drinking water must be made available in readily accessible locations.

3.1.2 Republic of Ireland

In the Republic of Ireland, general welfare requirements for workplaces are defined by the Safety, Health and Welfare at Work (General Application) Regulations 2007, particularly regulations 18–24. For construction sites, the Safety, Health and Welfare at Work (Construction) Regulations 2013 apply, particularly regulations 98–102.

Sanitary and washing facilities. For operational sites, regulation 20 of the Safety, Health and Welfare at Work (General Application) Regulations 2007 states that employers are required to provide and maintain an adequate number of washbasins and toilets, including hot and cold running water near workstations, rest rooms and showers. If the nature of the work requires it, showers shall also be provided.

For construction sites, regulation 101 of the Safety, Health and Welfare at Work (Construction) Regulations 2013 states that at least one toilet must be provided for every 20 workers, which also must be conveniently accessible at all times while workers are at the site. Washing facilities must be located such that they are conveniently accessible to mess facilities, including washbasins, hot and cold running water and, if the nature of the work requires it, showers.

Rest facilities. For operational sites, regulation 19 of the Safety, Health and Welfare at Work (General Application) Regulations 2007 states that an easily accessible rest area must be provided if the type of activity or the safety, health and welfare of employees so requires. They shall include tables with easily cleaned surfaces and seats with backs.

For construction sites, regulation 98 of the Safety, Health and Welfare at Work (Construction) Regulations 2013 states that enclosed accommodation must be provided for taking shelter or work interruptions in a conveniently accessible location where there are more than five workers, and if fewer, such arrangements shall be provided as far as is practicable. The decision whether a location is conveniently accessible shall consider any necessary transport provided to workers.

Mess facilities. For operational sites, regulation 18 of the Safety, Health and Welfare at Work (General Application) Regulations 2007 states that an adequate and accessible supply of drinking water must be provided. Additionally, facilities for boiling water and taking meals must be provided and maintained. If taking meals creates a risk to safety, health and welfare, the consumption of meals must be prohibited there, and suitable arrangements shall be provided. The same applies to construction sites under regulation 98 of the Safety, Health and Welfare at Work (Construction) Regulations 2013.

3.1.3 Germany

In Germany, general welfare requirements for workplaces are defined by the Workplace Ordinance (*Arbeitsstättenverordnung*), particularly points 4 and 5.1 of the annex. For construction sites, point 5.2 of the annex applies. Furthermore, the *Technical Rules for Workplaces* (*Technische Regeln für Arbeitsstätten* (ASR)) apply to both operational and construction sites, particularly points 4.1, 4.2 and 5.1. These are not legally binding, but if the employer implements alternative measures, they must be able to prove they provide equivalent protection.

Sanitary facilities. For operational sites, annex point 4.1 of the Workplace Ordinance states that for outdoor workplaces, the provision of mobile toilets near work premises is sufficient to meet the minimum requirements. Point 4.1 of the ASR states that the distance to sanitary facilities should not be longer than 50 m, if possible, and must not exceed 100 m. This also states that facilities have to be in the same building and should not be located where employees have to walk outside to access them. Additionally, point 4.1 of the ASR provides exact specification on the number of toilets, ventilation, layout, measurements and equipment.

For construction sites, point 4.1 of the Workplace Ordinance states that for construction sites with 'few' employees, the provision of mobile toilets near work premises is sufficient to meet the minimum requirements. The ASR 4.1 elaborates that mobile toilets are sufficient only for construction sites with up to 10 employees present at the same time. If more than 10 employees at the same time work on a construction site for longer than two consecutive weeks, non-mobile toilet rooms must be provided. The distance between mobile or non-mobile sanitary facilities and the work premises should not exceed 100 m and, if this is not possible due to the work layout, must not require an employee to take longer than 5 minutes

to access them, either by foot or by a provided vehicle.

Washing facilities. For operational sites, point 4.1 of the Workplace Ordinance states that the provision of sinks with running water and means to clean and dry the hands is sufficient to meet the minimum requirements. The ASR A4.1 states that washing facilities must be within 300 m of the workplace and the path must not lead outdoors. Additionally, the ASR A4.1 provides exact specification on the number of sinks and showers, ventilation, layout, measurements and equipment.

For construction sites, point 4.1 of the Workplace Ordinance states that the provision of sinks with running water and means to clean and dry the hands is sufficient to meet the minimum requirements. The ASR A4.1 states that employers need not provide washing facilities on site if the employees return daily to company buildings with sanitary and washing facilities or construction site accommodation with equivalent provisions. Washing facilities on construction sites should be near rest areas. The path towards the washing facilities may lead outdoors but must be protected against weather and poor visibility.

Rest facilities. For operational sites, point 4.2 of the Workplace Ordinance states that if the H&S of the workers so requires or if there are at least 10 employees, rest areas must be provided. These rest areas must be easily accessible, not in a dangerous location, be equipped with a sufficient number of tables and chairs with backrests and be separated from the work premises if the working conditions or the work premises require it. The ASR A4.2 elaborates that workplaces with increased H&S risk because of heat, cold, wetness or dust, or workplaces outside must provide rest areas. Rest areas may be used for something else as long as they are cleaned and ventilated before use as a rest area. If a rest area leads directly outdoors, employees must be protected from the wind.

For construction sites, point 5.2 of the Workplace Ordinance does not specifically mention rest areas; however, it states that an area must be provided where employees can warm themselves and are protected from climatic impacts. The ASR A4.2 states that a rest area should be provided. If on a construction site where accommodation is provided to employees, rest areas are not required as long as the accommodation can be used as a rest area.

Mess facilities. For operational sites, the Workplace Ordinance does not specify any requirements regarding mess facilities. However, the ASR A4.2 states that rest areas should provide facilities for heating or cooling food and a drinking water supply if no canteen is available.

For construction sites, point 5.2 of the Workplace Ordinance states that mess facilities and a drinking water supply must be provided. The ASR A4.2 does not specify additional requirements for construction sites. Chapter 7 of the ASR A4.2 is titled 'Deviating/additional requirements for construction sites', which can be interpreted as that the same requirements as for operational sites apply unless specified.

For both operational and construction sites, §23 of the Drinking Water Ordinance (*Trinkwasserverordnung*) states that mobile water supply systems must be sufficiently disinfected using chlorine, chlorine dioxide or other approved disinfectants or disinfection methods if this is the only way to achieve the microbiological requirements. According to §6, the microbiological requirements are that drinking water must not contain pathogens in concentrations causing concern for damage to human health. For reference, Annex 1 of the Drinking Water Ordinance specifies the specific microbiological parameters. §29 states that the frequency of inspections for drinking water quality in mobile water supply systems is determined by the public health department (*Gesundheitsamt*).

3.1.4 The Netherlands

In the Netherlands, general welfare requirements for operational and construction sites are defined by the Working Conditions Decree (*Arbobesluit*), which provides more detailed regulations under the Working Conditions Act (*Arbowet*). Particularly, Art. 3.20–3.27 apply.

Sanitation facilities. For operational and construction sites, Art. 3.24 states that a sufficient number of toilets and sinks must be installed in the vicinity of the work premises. Art. 3.26 states that all Art. from section 1 apply to construction sites as well, including Art. 3.20, 3.23, and 3.24 which are of relevance to this study.

Washing facilities. For operational and construction sites, Art. 3.23 states that a sufficient number of sinks to wash hands and face must be provided. Furthermore, if employees are exposed to dirt, dust or high temperatures that necessitate cleansing of the full body, a shower room must be provided with a sufficient number of showers and cold and hot running water.

Rest facilities. For operational and construction sites, Art. 3.20 states that a rest area must be made available to workers that is easily accessible and equipped with a sufficient number of tables and chairs.

Mess facilities. For operational sites, the Working Conditions Decree does not specify any requirements for mess facilities.

For construction sites, Art. 3.27 states that a sufficient drinking water supply must be provided. Additionally, construction sites must have a meal preparation area if the work requires it.

3.1.5 Belgium

In Belgium, general welfare requirements for workplaces are defined by the Codex on Well-being at Work – Book III – Workplaces (*Codex over het welzijn op het werk, Boek III*), particularly Art. III.1-39 to III.1-64 and Annex III.1-1, which specifically state that they do not apply for temporary or mobile construction sites. Annex III.1-1 details minimum requirements which, according to Art. III.1-40 of the Codex, shall not apply if there is a sector-specific regulation that provides social security or welfare regulations or if a risk analysis shows that alternative measures provide equivalent protection. For construction sites, Chapter V of the 'Act of 4 August 1996 on well-being of workers in the performance of their work' applies, which does not specify any welfare requirements.

Sanitation facilities. For operational sites, Art. III.1-39 and III.1-56 to III.1-57 state that toilets must be provided, including at least one toilet for every 15 employees at the workplace at the same time. Furthermore, at least one washbasin is required for every four toilets or urinals. Employees must be able to access the toilets freely.

Washing facilities. For operational sites, Art. III.1-53 states that showers must be provided with hot and cold water if the employees are exposed to excessive heat, perform highly soiling work or are exposed to hazardous substances. In this case, the minimum requirement is one shower for every six employees finishing work at the same time.

Rest facilities. For operational sites, Art. III.1-60 states that the provision of a rest area is required if, for example, employees are exposed to noise and vibration or perform work that results in high energy consumption. Art. III.1-61states that this rest area may be part of the canteen, but must be equipped with sufficient tables and chairs with backrests.

Mess facilities. For operational sites, Art. III.1-58 states that a canteen is not required if Committee's approval (Committee for Prevention and Protection at work*, Comité voor Preventie en Bescherming op het Werk*) has been obtained. A sufficient drinking water supply must be provided if the nature of the work requires it. The distribution points must be easily accessible. Annex III.1-1 states that canteens must be equipped with a sufficient number of tables and chairs with backrests and means for washing dishes, heating and storing meals and boiling water.

3.1.6 France

In France, general welfare requirements for workplaces are defined by the Labour Code (*Code du travail*), particularly Art. R4228-1 to R4228-28. For construction sites exceeding a duration of four months, Art. R4534-137 to R4534-145 apply.

Sanitary facilities. For operational sites, Art. R4228-10 to R4228-15 state that at least one toilet and one urinal is required for every 20 male workers and two toilets for every 20 female workers, taking into account the maximum number of workers present at the workplace at the same time. Additionally, toilet wastewater must be disposed of in accordance with health regulations.

For construction sites, Art. R4534-144 states that toilets complying with the requirements of Art. R4228-11 to R4228-15 must be provided to workers. However, Art. R4534-140 states that, if the nature of the site requires it, site vehicles specially fitted for this purpose may be used to ensure workers' access to toilets. Art. R4534-145 states that, if the layout of the work premises does not enable installation of toilets, these may be located near the site in clean conditions.

Washing facilities. For operational sites, Art. R4228-7 to R4228-9 state that employers must provide at least one sink for every 10 workers as well as showers if unsanitary and dirty work is carried out. Art. R4228-16 to R4228-18 state that if the provision of sinks and showers is not possible due to the layout of the work premises, an exemption may be requested from the labour inspector. However, the exemption may only be granted if the hygienic conditions are as close as possible to the aforementioned obligations.

For construction sites, Art. R4534-141 states that at least one washbasin for every 10 workers must be provided. Art. R4534-140 states that, if the nature of the site requires it, site vehicles specially fitted for this purpose may be used to ensure workers' access to showers.

Rest facilities. For operational sites, Art. R4228-25 states that if there is no allocated rest area and the nature of the work requires it, the area for eating meals must be able to be used for rest outside of mealtimes. Seats must have backrests.

For construction sites, requirements specifically for rest facilities are not stated. However, Art. R4534-142-1 states that workers must be provided with a room or similar site facilities which allow them to be accommodated in conditions that preserve their H&S in the event of adverse climatic conditions that could affect them.

Mess facilities. For operational sites, Art. R4228-19 to R4228-24 state that on a worksite with fewer than 50 employees, an area must be provided where meals can be taken in healthy and safe conditions. This meal area may be on the work premises if these are not used for the storage and use of hazardous substances.

For construction sites, Art. R4534-143 states that a sufficient supply of drinking water must be provided, and if a running water supply is not possible, a drinking water tank with a

capacity of at least 3 L per day per worker on site must be provided. Art. R4534-142 states that, if workers eat their meals on site, a meal area must be made available to them, which is equipped with a sufficient number of tables and chairs, at least one appliance for heating or cooking food and a refrigerator. However, Art. R4534-145 states that, if the layout of the work premises does not enable installation of such a meal area, it may be located near the site in equivalent conditions.

Exemptions for construction sites. Art. R4534-156 states that temporary and limited exemptions may be granted if sufficient compensatory measures are provided.

3.1.7 Denmark

In Denmark, general welfare requirements are defined by the Executive Order on the Layout of Permanent Workplaces (*Bekendtgørelse om faste arbejdssteders indretning*), particularly Chapter 11. For construction sites, the Executive Order on Building and Construction (*Bekendtgørelse om bygge- og anlægsarbejde*) applies, particularly Chapter 9. However, according to §1, these requirements do not apply if the employees start and end their daily working hours at a location other than the construction site, which may be applicable to offshore construction in case of workers moving between assets. In this case, the Executive Order on the Conditions at Alternating Places of Work (*Bekendtgørelse om betingelser for skiftende arbejdssteder*) applies, particularly Chapter 4.

Sanitation facilities. For operational sites, §43 and §47 of the Executive Order on the Layout of Permanent Workplaces state that the provision of toilets with a water flush is required.

For construction sites, §10 of the Executive Order on the Conditions at Alternating Places at Work states that access to a toilet must be provided. §11 states that this access must be provided either by establishing an indoor facility immediately close to the workplace, providing mobile units that are in so far as is reasonably practicable connected to the sewage system, or be provided at a meeting place, place of departure or similar location by the employer. The last access option is only deemed suitable if employees return to the location at suitable intervals. If this is not possible, another toilet must be provided suitably close to the workplace. Furthermore, §12 states that if the aforementioned access options are not possible due to the long-distance transport required to get to the construction site, the employer must provide access to toilets in another reasonable and safe way or by using suitable means of transport.

Washing facilities. For operational sites, §43 of the Executive Order on the Layout of Permanent Workplaces states that washrooms must be provided if, for example, the work is dirty, physically strenuous, wet or involving hazardous substances. According to §54–55, these washrooms must include a sufficient number of showers and washbasins with cold and hot running water.

For construction sites, §10 of the Executive Order on the Conditions at Alternating Places at Work states that showers must be provided if the work is dusty or soiling, involves a risk of contamination or contact with hazardous substances or exposes the employee to high temperatures or considerable physical strain. Furthermore, washbasins must be provided with, if reasonably practicable, running water, and if the health of employees requires it, with running hot water. Under §11–12, the same access options as mentioned earlier apply.

Rest facilities. For operational sites, §43 of the Executive Order on the Layout of Permanent Workplaces states that a rest area must be provided if the work necessitates it. According

to §57, this rest area must not be in work areas where there is noisy or dirty work or work involving hazardous substances being carried out.

For construction sites, the Executive Order on the Conditions at Alternating Places of Work does not specify any requirements.

Mess facilities. For operational sites, §43 of the Executive Order on the Layout of Permanent Workplaces states that a meal facility must be provided. According to §48, this facility must be in a suitable clean room with a sufficient number of tables and chairs with backrests. If more than three employees work at the workplace at the same time, a special meal area must be provided, normally located in a separate room. Additionally, there must be means for storing and heating food as well as a drinking water supply.

For construction sites, §10 of the Executive Order on the Conditions at Alternating Places at Work states that mess facilities must be provided if there are meal breaks during the work. Under §11–12, the same access options as mentioned earlier apply.

3.1.8 USA

In the USA, general welfare requirements for workplaces up to three nautical miles offshore are defined by the Occupational Health and Safety Administration (OSHA), which provides OSHA *Occupational Safety and Health standards*, of which particularly standard number 1910.141 is relevant. For construction sites up to three nautical miles offshore, OSHA Safety and Health Regulations for Construction apply, particularly standard number 1926.51. Under the Outer Continental Shelf Lands Act (OCSLA), health, safety and welfare requirements fall under the authorities of the United States Coast Guard (USCG), the Bureau of Safety and Environmental Enforcement (BSEE) and the Bureau of Ocean Energy Management (BOEM). Code of Federal Regulations (CFR) Part 285 – Renewable Energy and Alternate Uses of Existing Facilities on the Outer Continental Shelf (OCS) places a general responsibility for safety on to BSEE; however, there are no specific regulations that specify requirements for the following categories.

Sanitation and washing facilities. For operational sites, OSHA 1910.141 states that toilets and handwashing facilities must be provided with the exception of mobile crews or normally unattended workplaces as long as employees have transportation immediately available to nearby facilities. The sewage disposal method shall not endanger the health of employees. Additionally, at least one shower for every 10 employees of each sex must be provided with hot and cold running water.

For construction sites, OSHA 1926.51 states that toilets must be provided. Job sites with no sanitary sewer shall provide (if no local codes prohibit it) privies (where their use will not contaminate ground or surface water), chemical toilets, recirculating toilets or combustion toilets. However, this does not apply to mobile crews who have transportation readily available to nearby sanitation facilities. Washing facilities must be provided for employees engaged in the application of paints, coating, herbicides or insecticides, or in other operations involving contaminants which may be harmful to employees.

Rest facilities. For operational and construction sites, OSHA 1910.141 and OSHA 1926.51 do not specify if rest facilities are required.

Mess facilities. For operational sites, OSHA 1910.141 does not specifically state that mess facilities are required, but it states that if there are food service facilities, they must be maintained in clean conditions. Furthermore, employees are not allowed to consume meals in any area exposed to toxic materials.

For construction sites, OSHA 1926.51 does not specify that a meal area is required; however, it states that employees must not be allowed to consume food or beverages in a toilet room nor in any area exposed to toxic materials.

3.1.9 Japan

In Japan, general welfare requirements are defined by the Industrial Safety and Health Act (ISHA, 労働安全衛生法), which applies to both operational and construction sites. Under the ISHA, the Ordinance on Industrial Safety and Health applies, particularly Part III, which provides more detail on welfare requirements.

Sanitation facilities. Art. 23 of the ISHA states that employers must take necessary measures for sanitation, which are required to maintain the health, morals, order and lives of employees. Furthermore, Art. 628 of the Ordinance on Industrial Safety and Health states that at least one toilet must be installed for every 60 male workers and every 20 female workers who are at the workplace at the same time. Human waste must be disposed of in an appropriate manner. However, Art. 628 states that it does not apply in special workplaces where there are unavoidable reasons why the required number of toilets cannot be provided so long as a suitable number of toilets are still provided.

Washing facilities. Art. 625 of the Ordinance on Industrial Safety and Health states that employees who engage in work that has a risk of contaminating the body or clothes must be provided with facilities for washing eyes and the body, facilities for washing their clothes and facilities for changing their clothes.

Rest facilities. Art. 614 of the Ordinance on Industrial Safety and Health states that an employer must provide rest facilities outside the work area if the workplace is extremely hot, humid or cold, or emits harmful gases, vapours or dust. However, this does not apply if there are unavoidable reasons why the facilities cannot be provided. Furthermore, Art. 615 states that if employees are engaged in predominantly standing work but have frequent chances to sit, chairs must be provided. Art. 617 states that in the case of extremely sweat-inducing work, drinking water and salt must be provided.

Mess facilities. Art. 629 of the Ordinance on Industrial Safety and Health states that an employer must provide mess facilities outside the workplace if the workplace is extremely hot, humid or cold, or emits harmful gases, vapours or dust. However, this does not apply if employees do not eat within the workplace. Furthermore, Art. 630 states that the dining hall and kitchen must be separate and shall be equipped with sufficient tables and chairs, sufficient drinking water and means for meal storage. Waste must be discharged through a settling tank and must not be exposed outside the kitchen.

3.1.10 Taiwan

In Taiwan, general welfare requirements for workplaces are defined by the Occupational Safety and Health Facilities Regulations (勞動部勞動法令查詢系統), particularly Art. 318–323. For construction sites, the Standards for Construction, Safety, and Health Facilities (營造安全衛生設施標準) apply.

However, these do not specify any requirements regarding sanitation, washing, rest or mess facilities for construction sites that do not provide temporary accommodation. If temporary accommodation is provided to construction workers, Art. 172 of the Standards for Construction, Safety, and Health Facilities states that meal and sanitation facilities must be kept clean and clean water for drinking and washing must be provided.

Sanitation facilities. For operational sites, Art. 319 of the Occupational Safety and Health Facilities Regulations states that at least one toilet for every 25 male workers and one toilet for every 15 female workers at the workplace at the same time must be provided. However, this does not apply to special workplaces.

Washing facilities. For operational sites, Art. 319 states that handwashing facilities with adequate clean water must be provided. However, this does not apply to special workplaces. Furthermore, Art. 318 states that facilities for eye washing, bathing and washing must be provided if employees perform tasks that may contaminate their bodies or clothing. In workplaces contaminated with irritants, corrosive substances or toxic substances, one shower with hot and cold water must be provided for every 15 workers.

Rest facilities. For operational sites, the Occupational Safety and Health Facilities Regulations do not specify any requirements for rest facilities.

Mess facilities. For operational sites, Art. 322 states requirements for kitchens and dining rooms specifying that they are isolated, clean and equipped with tables and chairs, but it does not state that they are required to be provided. Furthermore, Art. 323 states that if meals are provided to employees, they must be clean and nutritious. Art. 320 states that sufficient drinking water must be provided, which meets drinking water quality standards and is protected from contamination.

3.1.11 Australia

In Australia, the Work Health and Safety under the Offshore Electricity Infrastructure (OEI) Act 2021 Framework applies the more general Work Health and Safety Act 2011 (WHS Act) and the Work Health and Safety Regulations 2011 to the offshore renewables industry. The OEI Act does not specify any design requirements for the four categories: sanitation, washing, mess and rest. However, Chapter 7.1.2 states that adequate facilities for the welfare of workers must be provided so far as is reasonably practicable. Furthermore, employers must consult with workers when making decisions about the adequacy of welfare facilities.

This represents a unique situation among the countries investigated in this analysis, having specific legislation governing the offshore wind industry. Additionally, the requirement to consult workers regarding welfare decisions may act as a means to ensure that the dignity and wellbeing of workers is centred in any decision-making.

3.1.12 Summary

Across these national regulations, a few key themes become noticeable. All countries at least specify that some adequate form of welfare must be provided to workers. Most countries go a step further in making specific requirements for what is considered to be adequate for sanitation, washing, mess and rest facilities, and most of these requirements are broadly comparable with one another. Reviewing the regulations shows that there is not a great deal of difference in what is required, but only that specific points differ (such as how many toilets are required, for example). While the regulations change, the principles that need to be applied by employers are constant.

Additionally, in several countries, there are different regulations cited for construction sites as for workplaces in operation. In some cases, the construction regulations provide more specific or prescriptive requirements, while in others this is reversed. With changing regulations across the life cycle of assets, as well as changing requirements for welfare, it is essential for developers to consider how welfare is being provided at each stage of the project life cycle.

When reviewing regulations, it is clear that they were often not written with the challenges of the offshore wind industry in mind. This is particularly true where specific recommendations or requirements are issued, such as a maximum distance that a worker may travel to reach a toilet. However, some flexibility and allowances can be found in the text of many of the regulations considered. This includes clauses that enable exemptions from specific regulations,or that provide different regulations for temporary or remote workplaces, outdoor work, in special cases, for mobile crews or normally unattended workplaces, or if there are unavoidable reasons why the nature of the work makes the regulations impossible or not practicable to fulfil. Additionally, in the UK and Germany, recommendations (ACOP and ASRs, respectively) act in effect as detailed requirements, but are not themselves legally binding. Therefore, if an organisation feels they must deviate from them they can, but it must be thoroughly justified why they have done so, and that the alternative measures used still provide equivalent or sufficient protection. It is essential that organisations consider carefully when to utilise these clauses, and that they are not taken as *carte blanche* to ignore requirements for welfare. This is not just to ensure that they remain in legal compliance, but also to prevent adherence to minimal compliance, which as discussed can lead projects to providing substandard levels of care. In some cases, such as the UK and Denmark, the barrier of reasonable practicability is applied and must be met in order to meet certain requirements, in an effort to prevent this outcome.

3.2 OVERVIEW OF INDUSTRY GUIDANCE

To aid in interpretation of regulations, and to provide a consistent approach for industry, non-regulatory guidance can be a valuable resource for developers. At the time of this study, there is little to no available published guidance on how to implement welfare provisions on offshore wind projects. Given the lack of specific clarity from national regulations cited by developers in the RFI, it is apparent that such guidance is required and would be of benefit to the industry as a whole. In the following sections, relevant guidance documents are presented and summarised, including documents that have been cited by RFI respondents as being used to define welfare provisions, and documents that have been found in the research for this study. Key points of interest and discussion have been included in this document from each guidance discussed and may not be exhaustive. References have been provided, and users of this document are encouraged to review the original documents themselves to understand the full context of any recommendations.

3.2.1 Wind industry guidance

3.2.1.1 RenewableUK

The only offshore wind industry-specific guidance document that was found in the research for this study is the RenewableUK *Offshore Wind and Marine Energy Health and Safety Guidelines*.

As the title suggests, this document is a broad set of guidelines on understanding and managing the risks associated with the offshore wind industry, which contains a short section on welfare. As well as considerations of the topics included in this study, this guidance document discusses ventilation, temperature, lighting, cleanliness, tidiness, working time, fatigue and workplace stress. The guidance document has been produced by a UK organisation and is focused on compliance with UK regulations, so may require additional interpretation for projects outside the UK.

Key risks (including operational and commercial risks) of not having sufficient welfare provisions in place are discussed, including risks associated with reliance on vessel-based welfare and around retention of personnel in offshore roles, mirroring many of the points raised by RFI as discussed in 4.1.3.2.

It is highlighted that welfare must be considered for all life cycle stages, but that the ability to provide welfare is often determined at the design stage. In this stage, it is stated that designers must recognise that 'a WTG is a temporary workplace' and that provisions for sanitation, washing, rest and mess must be provided so far as is reasonably practicable. This could be interpreted as taking a position on the issue of whether offshore assets can be considered workplaces, saying that for the provision of welfare and interpretation of UK laws that they should (albeit not permanently occupied ones).

However, the guidance also accepts that it is not normally practicable for all requirements that are made for onshore workplaces to be met in offshore wind, stating: 'It is not expected that there would be the same amenity of facilities or arrangements [on offshore assets] as would be provided at an onshore location.' Therefore, facilities for welfare should be provided so far as is reasonably practicable, and that the specific approach towards welfare of a project will be dependent on the circumstances of that project. The guidance goes on to make clear that design of provisions should consider the requirements for maintenance and disposal of waste associated with any provisions.

Bearing this in mind, the following provisions are noted as examples that could be suitable to meet welfare and regulatory needs in line with the demands of the industry:

– Dry toilet systems including provisions for privacy.
– Hand-cleaning provisions.
– A separate area where technicians can rest, eat and be sheltered from harsh conditions.

The guidance additionally suggests that these requirements could be combined with provisions for overnight refuge in case of crews being stranded on assets.

Finally, it is clarified that the onshore facilities that form part of projects within the offshore wind industry will not face the same challenges for design or use as with offshore assets, and so should be designed with all legally required welfare provisions. Additionally, welfare provisions on vessels are stated to be considered under relevant maritime regulations and should not differ due to their use in offshore wind.

Thus, while welfare only comprises a short section of the RenewableUK guidance, it does provide some interesting points for developers to consider. It encourages the exploration of welfare provisions beyond reliance on vessel-based welfare, while being mindful of the additional challenges that may be posed by welfare on assets.

3.2.1.2 SafetyOn

While not specifically relevant to the offshore wind industry, an often-cited guidance document by RFI respondents was the SafetyOn *Good practice guidelines for welfare in the onshore wind industry*. This last source was specifically mentioned as being used by several projects, in lieu of specific guidance for the offshore industry.

Due to the frequency of its reference in RFI responses and its comprehensive nature upon review, Annex B has been provided within this report to highlight the key areas of transferable practices from the SafetyOn guidance.

Good practice guidelines for welfare in the onshore wind industry is a relatively recent publication, released in March 2025 by SafetyOn. It outlines expectations for SafetyOn members on how to implement and manage welfare facilities in onshore wind farms, with respect to compliance with UK welfare regulations.

Despite the obvious differences between onshore and offshore wind, the key challenges with implementing welfare can be seen as equivalent. The guidance outlines the key challenges for welfare in the onshore industry as being:

– Sites covering large areas, where workers are expected to stray far from fixed welfare facilities.
– Wind farms being located in remote areas, without access to otherwise expected utilities such as plumbing or electricity.
– Fluctuation of workers over the life cycle of the project, with the O&M phase in particular consisting of mostly unoccupied assets being visited only a few times per year.
– Particular challenges for O&M teams, especially during unplanned maintenance, which are often transient and moving between remote assets where it cannot always be easily predicted how long their presence will be required.
– Requirement for personnel to work in assets, such as WTGs, which are designed with little, if any, space allocation for welfare provisions.

These challenges all apply, in similar if not to a greater extent, to the offshore wind industry, and as such it is understandable that this guidance is used as inspiration for how to make suitable welfare arrangements for offshore projects, in lieu of comprehensive offshore wind-specific guidance.

Detailed analysis of the SafetyOn guidance can be found in Annex B, but in summary the key points of interest for the offshore wind industry are:

– The overall philosophy of the guidance is that provision of welfare should go beyond the minimum legal duties, with the most effective and best quality provisions considered first, and lesser provisions only considered if an ALARP argument can be made that better provisions are not reasonably practicable.
– There are a series of absolute duties in the eyes of the UK regulator that organisations must follow, which will also be required in offshore sites.
– Many of the non-absolute guidelines represent high-level approaches towards welfare to ensure it is adequately considered. These could be considered generally good practice for the offshore wind industry and could be adopted with some adaptation where required.
– Even non-absolute welfare guidelines should not be considered as optional. Only if an ALARP argument can be made that it is not reasonably practicable to follow the guideline in full, then it can be adapted. This approach can be useful for offshore wind farms when interpreting requirements that seem impossible to implement offshore.
– Many guidelines in SafetyOn do not impose prescriptive limits on how welfare must be incorporated, but instead act as goals for how welfare ‘should’ be approached on projects. It is acknowledged where the specific challenges of the industry may prevent welfare being provided in the same way it would be on a more conventional site, and organisations are encouraged to assess the specific situations on their sites and justify their reasoning before opting for solutions that do not fully meet

regulatory expectations (this applies to non-absolute duties only, as absolute duties must be followed).

- Some guidelines provide hierarchies of provisions in order of how acceptable they are. This may prove a useful model for offshore wind, to ensure lesser provisions are only chosen if better provisions are proven to be not reasonably practicable. However, the specifics of hierarchies will need to be reviewed to ensure applicability.
- A number of guidelines provide direct goals for what welfare should achieve, and make specific reference to a regulatory document, HSE Operational Circular Construction Welfare Standards, directing companies to 'follow the guidance' or 'take account of the requirements and guidance' of the Operational Circular. If choosing to use the SafetyOn guidance as a basis for determining welfare on an offshore project, familiarity with the HSE Operational Circular is essential.

This focus on UK regulations and the stance of the UK HSE does limit the use of the SafetyOn guidance for projects that are not based in the UK, as different regulatory regimes will have different prescriptive requirements that are not covered (as explored in 3.1). However, the framework it provides, with emphasis on going above and beyond minimum standards and the use of ALARP to require developers to justify why higher-level provisions are not used, can make it a powerful tool for ensuring that welfare is being suitably provided to workers on offshore projects.

3.2.2 Oil and gas industry guidance

When considering industry guidance from outside offshore wind, the oil and gas (O&G) industry has some useful comparisons, albeit with caveats. Like O&G, offshore wind projects have fixed assets offshore that must be installed, and then routinely visited for operation and maintenance. However, the O&G industry has historically made use of permanently or semi-permanently occupied assets, which offshore wind does not. The principal challenge with incorporating welfare on offshore wind assets is striking the balance between investing space and logistics into provisions that will ultimately only be used for a few weeks every year. However, on O&G assets that can be reasonably assumed to be occupied for much more of their life cycle, there is greater incentive and requirement to provide permanent, integrated welfare provisions.

This being said, guidance that could provide useful insights for the offshore wind industry is the EI 3187 *Guidelines for offshore oil and gas installations that are not permanently attended*. As the name suggests, this document presents guidance on the design of not permanently attended installations (NPAIs) and contains a section on supporting the welfare needs of workers.

As with the SafetyOn guidance, this document is primarily concerned with the UK HSE's positions and cites Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996 (DCR) and HSE *Operations Notice 82: Guidance on the provision of accommodation on offshore installations* (HSE ON 82).

The guidance draws a distinction between assets where no overnight stays on assets are ever expected, where it is possible that there may be unplanned overnight stays and when longer overnight trips are planned as part of the asset's life cycle. The first of these most closely resembles the reality of the offshore wind industry and is therefore of most relevance to this study, but there may be appropriate lessons or insights in the other cases, particularly as the industry continues to change and develop.

Where it is assumed that assets are not visited for periods of longer than a single shift, no permanent accommodation facilities are required, but there should be adequate welfare facilities for the number of workers likely to be present. These are stated in the guidance as including 'Toilet, washing facilities and basic eating facilities (e.g. microwave, clean surface and disposable plates and cutlery)', with the exception of when the working periods are short enough that these needs can be fulfilled in another location (e.g. by a nearby attendant vessel). This would appear to support the case made on many offshore wind projects that no provisions are required on assets so long as a vessel is in attendance nearby to provide welfare.

The guidance then discusses suggested operating restrictions for when there are no welfare provisions on an asset, which include:

– Avoiding dependency on helicopters as the preferred method of crew transfer.
– Limiting visits to only 'a few hours' unless welfare facilities are 'available and accessible on a marine access vessel'.
– Vessel access should be readily available ('i.e. standing by') while personnel are on the asset.
– Contingency arrangements should be in place to remove personnel from the asset should the planned vessel be required to leave or suffers a breakdown.
– Work on the asset should be conditional of 'good weather and a favourable weather forecast'.

Assuming that personnel working on an offshore wind asset that does not have suitable welfare are working under similar conditions to personnel on an NPAI in the O&G industry, these operating restrictions would appear to be equally applicable and could form the basis of good practice for when vessel-based welfare (as discussed in 4.1.3.2) is the primary welfare provision for an offshore wind project.

It is also suggested by the guidance that, even in cases where no planned overnight stays are expected on an asset, there should be some form of emergency overnight provisions in the case of crew becoming stranded on an asset. It is suggested that projects should assess the facilities that are available to workers in the case of a forced overnight stay, and 'ensure through a pragmatic study with workforce involvement that the facilities will deliver an acceptable level of capability and comfort'. As forced overnight stays on assets are not unheard of on offshore wind projects, this is a valuable lesson that should be taken into consideration.

Where overnight accommodation is required on an asset (which, as stated, does not currently occur as standard practice within the offshore wind industry), accommodation and welfare facilities fully compliant with DCR and HSE ON 82 are required. The guidance does state that 'facilities should be proportionate to the degree of attendance planned', and that at a point where planned attendance on the asset is greater than 'one or two concurrent nights', then additional facilities more in line with a permanently occupied asset would be required.

As discussed, this is not currently within the standard practice of the offshore wind industry. However, it should be ensured that, if the industry does ever move in this direction, appropriate lessons are learned from relevant industries and adequate welfare is provided to workers from the outset.

In consideration of relevant O&G industry materials for guiding welfare in offshore wind, an interesting point was made in HSE Operational Guidance Semi-permanent Circular (SPC)/ Enforcement/170, which is written to provide information on interpretation and enforcement

of the DCR. In discussing requirements for workplaces, SPC/Enforcement/170 states: 'Generally, a workplace is anywhere people work, irrespective of the time they are working there. It may be permanent or temporary.' Similar to the Operational Circular *Construction Welfare Standards* referenced in 3.2.1, SPC/Enforcement/170 is designed as guidance for HSE inspection personnel, and so must be viewed with caution by developers. However, this does provide further evidence that, considering similarity between the use cases of offshore wind assets and NPAIs, regulators such as the HSE are more likely to rule that assets such as WTGs count as workplaces while personnel are present, regardless of how often they are attended.

3.2.3 Maritime guidance

The scope of this study specifically excludes consideration of maritime vessels in transit, where existing regulation governs the provision of such facilities. However, it is important to note that, as will be discussed in 4.1.3, vessels are often utilised in offshore wind as the primary source of welfare for offshore wind assets. As such, the guidance and regulations that govern welfare on vessels also bear influence on the offshore wind industry.

Welfare requirements for vessels are well established by the International Maritime Organisation (IMO) Maritime Labour Convention, establishing a series of requirements for owners of ships (which for the purpose of the convention includes all vessels 'other than one which navigates exclusively in inland waters or waters within or closely adjacent to sheltered waters or areas where port regulations apply and, […] all ships whether publicly or privately owned, ordinarily engaged in commercial activities') to make provisions for the welfare of seafarers (among other protections). These are primarily associated with provisions for those living aboard ships in the course of their work, but would similarly also be available to workers using the vessel for welfare when they are visiting an asset.

Guidance for implementing the specific welfare requirements of the Maritime Labour Convention is presented in a guidance document prepared by the International Transport Workers' Federation (ITF) and the International Chamber of Shipping (ICS) *Guidelines for implementing the welfare aspects of the Maritime Labour Convention, 2006*. As this is not the primary focus of this study, these requirements are not reproduced here, but broadly cover the requirement to provide adequate sanitary facilities, washing rooms, rest and recreation areas and mess facilities to seafarers on board vessels. It is recommended that developers ensure that vessels involved on their projects comply with these IMO requirements, particularly if they plan on using these vessels as part of the welfare solution for their workers on assets.

4 DISCUSSION OF PROVISIONS

This section will provide an overview of welfare provisions, including those that are currently available and in use by the industry, those that have been explored by the industry but are not currently in use or are only reported infrequently and those that have been identified but which are not, to the knowledge of this study, being explored by any projects.

The first part of this section will discuss general concerns raised in the RFI around how provisions are provided on different assets under consideration by this report, as well as implications for different locations of welfare provisions within assets, while the latter parts will explore provisions available for each of the welfare topics under investigation. Within this latter section, any novel technologies or techniques will be introduced such as to inform any G+ members who were not aware of them, forming the basis for further investigations of their own.

In discussing and comparing welfare provisions in this section, it is important to note that the intention is not to present a view that one single option is best and should be adopted by the industry. It may be that for the purposes of a project a combination of multiple provisions is required, and that this would change over the life cycle of an asset. The intention of this analysis is to act as a guide to industry members and to give an overview of current and potential solutions to welfare issues to aid in project-specific decisions about welfare.

4.1 CONSIDERATIONS FOR DIFFERENT ASSETS

4.1.1 WTGs

As has been discussed in 2.2, it is clear from reviewing the results of the RFI that wind turbines (which, for the purposes of this study, included wind turbine foundations) were the main point of focus among responses. This was reasonable to expect, as they form the core of wind farms and the offshore wind industry as a whole. While individual wind turbines will only be visited for a maximum of a few days for a year during O&M, the majority of time spent by workers during O&M will be spent working on wind turbines, and so it is essential that adequate solutions for welfare can be put in place. Wind turbines also represent some of the key points of contention when discussing welfare in the offshore wind industry.

One of these points of contention is around whether offshore assets, particularly WTGs, constitute machines or workplaces, as discussed in 2.3.3.1. The crux of this point is that if defined as workplaces, it is easier to justify, if not require, welfare provisions to be placed on and accounted into the design of WTGs, meaning that the various design challenges associated with this will have to be addressed.

Most WTGs in the industry do not have any permanent or semi-permanent welfare facilities on them. The most common solutions when accessing WTGs remain vessel-based welfare, with a possible supplement of temporary portable welfare (such as camping toilets as discussed in 4.3.1.1.1). Integrated sanitation facilities, as discussed in 4.3.1.1.4, are rare if seen at all. If welfare provisions are installed on WTGs, there is increased discussion as well on where they are best located. This question is discussed further in 4.1.5.3.

Despite issues, it is clear that there is a trend of improvement, even if slow and not consistent across the industry, with reported increased use of provisions such as those discussed in

4.3.1.1.2 and 4.3.1.1.3. There are multiple cases of WTGs on existing wind farms being retrofitted with welfare, with permanent cubicle sanitation units being installed to provide a consistent source of sanitation provision to workers. This is increasingly seen as a way of bringing older assets into compliance with welfare standards, while there are greater opportunities for newer assets to be installed with welfare from the start. While news of retrofits is promising for the industry, as it suggests that welfare deficiencies are being tackled on existing projects, the preferred path forward is for welfare to be considered more in design.

4.1.2 Offshore platforms

When considering offshore platforms, most typically substations, in the RFI, similar issues are reported as for wind turbines, but they are generally compared favourably. It was reported that even when WTGs had no welfare present and had to rely on vessels, offshore substations (OSSs) had temporary or even permanent facilities. The reasoning for this appears to be that OSSs are larger and therefore able to accommodate more sophisticated welfare provisions, as well as frequently hosting more technicians than turbines, which can warrant more investment in welfare provisions. Additionally, as OSSs are often produced through bespoke design, rather than being certified products that are purchased from OEMs like WTGs, there is more flexibility for developers to make requests of what provisions be included. This can allow for space allocations to be made for temporary welfare, as well as inclusion of integrated welfare facilities in a way that is not seen in WTGs. There are multiple cases where more advanced welfare provisions that are not currently being used or in some cases even considered on WTGs, such as integrated sanitation facilities (see 4.3.1.1.4), fixed resting provisions (see 4.3.3.2), welfare habitats (see 4.3.5.3) and integrated welfare rooms (see 4.3.5.4), are reported as being in use for OSSs.

Occupancy of the OSS plays a factor in how welfare is provided. During commissioning phases, there can be intense periods of work and consistent high occupancy that are not seen in later life cycle phases. It has been reported that, even when welfare is designed into substations for O&M, the planned welfare capacity can be exceeded during commissioning. The discrepancy between the expected occupancy during C&C and the relative lack of occupancy during O&M can present a challenge for developers and designers, who must balance welfare provisions across the life cycle. In these cases, it has been reported that temporary facilities can often be brought in to make up the shortfall, as well as reliance on vessels.

Despite reports of improvements seen in substations over WTGs, there is still progress to be made and it is clear that these reports are not indicative of the entire industry. It was noted by some RFI responses that OSSs are sometimes treated in the same way as WTGs, where it is assumed that welfare is not required and vessel-based welfare is sufficient.

4.1.3 Vessels

The use of vessels for provision of welfare was widely reported in the RFI, and indeed the practice appears to be widespread in the offshore wind industry with most RFI responses containing at least some reference to workers accessing welfare facilities on vessels. In some cases, vessels provide the only welfare to workers on offshore assets, while in others they are the primary source of welfare, being supplemented by temporary portable provisions brought on to assets (such as folding chairs, camping toilets, etc.). Depending on the project arrangements, this is likely to be either an SOV or a CTV especially during commissioning

activities or in O&M, but could be another vessel type (such as a JUV) in other stages. In this arrangement, the vessel either remains accessible from the asset (via a boat landing or linked walk-to-work bridge) or can be called back to the asset by the workers.

When discussing the use of vessels, a key distinction needs to be made between discussion of the quality of welfare provisions available on vessels and the use of vessels as the primary source of welfare. This is because, when only considering the former, vessel-based welfare is present as a suitable solution to meet welfare needs of workers on offshore assets; however, considering the latter presents a different picture.

4.1.3.1 Welfare provisions on vessels

Welfare on vessels themselves is spoken highly of in responses to the RFI, with the only issues reported being around vessels acting as the primary source of welfare for an offshore asset, as will be discussed shortly.

While there is variability between different vessel types and providers (with SOVs much larger than CTVs, allowing for more sophisticated facilities), vessels tend to have good standards of facilities across sanitation, washing, rest and mess. These include permanent, clean facilities that are well maintained.

Welfare facilities on board vessels vary with size (with a difference in quality noted between SOVs and CTVs in particular), but were described by respondents to the RFI as 'have[ing] all welfare facilities on them', and being 'sophisticated solutions'. One respondent described the facilities on board an installation vessel as 'match[ing] a 3-star hotel'. They said: 'On installation vessels in 2025 you typically have single bed cabins, own private shower, a gym, a TV and games room, a great canteen. […] You have high-speed internet as well. The level of welfare during pre-assembly and installation is excellent and exceeding standards in most other industries.'

As different vessel classes can be expected to have different provisions available (with a rule of thumb being that larger vessels can host more and better welfare provisions), the change in vessel usage across a project's life cycle can impact the provisions available to workers at that stage. For example, one response stated that welfare in early construction stages (such as foundations and turbine installation) was focused around JUVs, with generally good quality of welfare available. Indeed, when assets are still under construction and may be in a state where welfare cannot yet be established, it can make more sense to rely on the vessel as the source of welfare. However, as the life cycle progresses, the type of vessels used can change, including prevalence of smaller vessels such as CTVs with more limited services.

Finally, as discussed in 3.2.3, vessels are required by the IMO Maritime Labour Convention to offer adequate welfare provisions for accommodating seafarers on board, including adequate provisions for sanitary facilities, washing rooms, rest and recreation areas and mess facilities. It is clear therefore that, considering only the quality of provisions on board, it can usually be assumed that vessels are able to meet the welfare requirements of crew using them.

4.1.3.2 Vessel-based welfare

As discussed earlier, it is widely reported that vessel-based welfare (as defined in 2.3.1) is a commonplace practice in the offshore wind industry.

There are clear advantages to utilising vessels for welfare. As discussed earlier, vessels generally have good welfare provisions already on board that are suitable for meeting workers' needs. Vessel-based welfare can be considered as an 'all-welfare solution', with a single source providing access to all requirements. Vessels also allow a method of providing welfare

to workers that does not require modifications to asset designs or extensive equipment to be brought on to the asset. Additionally, there are no additional waste management, maintenance or logistical concerns required with vessel-based welfare, aside from the standard requirements from the operation of the vessel. This can make the use of vessel-based welfare more convenient and cost-effective than the other welfare provisions that will be discussed in greater detail in 4.2, with no additional capital expenditure (CAPEX) requirements and no requirements for space claims or additional steelwork from foundation, WTG or substation OEMs. Finally, the option of vessel-based welfare is generally consistent with the definition of offshore assets (particularly wind turbines) as machines, and where the primary place of work is the vessel.

However, there are drawbacks with reliance on vessel-based welfare, which held a generally negative perception among workers who responded to the RFI. One of the main drawbacks raised by RFI respondents is that frequently vessels do not remain *in situ* on the asset they have been dropped off at. Frequently, vessels will travel between multiple assets on a wind farm, dropping off multiple teams of workers. Regarding the need for toilet facilities, one respondent said: 'In the WTG, the absence of toilets can be problematic, as CTVs and SOVs can move to other locations quite a way from the turbine.' As such, if a worker requires to use the facilities, they are required to call the vessel back to their asset. While some responses stressed that this was allowed and made it clear that workers were encouraged to call the vessel if required, others pointed out flaws in this process with some admitting that better communication may be required with workers to assure them of this.

Multiple responses highlighted that it can take hours between calling the vessel and its arrival: 'Operationally we are told we can call the SOV. I tried this in practice and it took hours.' Additionally, in some organisations, it was noted that some workers can feel pressure not to call at all. One respondent shared: 'Yes it is difficult […] to ask for a vessel to come for you only, as it takes also time to go down the WTG and the whole team needs to accommodate for you.' This participant was among others in also noting that this issue in particular impacts female technicians, who may feel additional pressure not to call for a vessel for themselves: 'Yes, technicians are reluctant to call back CTVs to use the toilet, especially difficult for female technicians.'

Furthermore, multiple responses indicated cases where vessel-based welfare is used as the sole source of welfare for long stays on assets of up to 12 hours. One respondent said: 'Operating from an SOV you have long working days (11 h) without access to sanitary equipment or washing facilities. Need to call in a vessel for need.' Even when used in conjunction with temporary portable welfare, this can create a scenario where workers are told that their place of work is the vessel and that they do not require improved facilities on the asset, but due to vessel unavailability, they are left for long stretches of time with only rudimentary welfare facilities. As one service provider stated:

'I have stressed it numerous times to my company, who say the installation of toilets on the asset is the customer's responsibility, and they are dragging their heels. Our company regards our place of work as the SOV (I work a 2/2 rotation, 12-hour days, predominantly on turbines) and state we can call the vessel whenever needs be. Complete fantasy. We have been provided camping toilets and tents at a site level. There is no company policy on the provision of standardised welfare facilities on the turbines.'

Outside the discussion of sanitation, it was highlighted in RFI responses that in cases where workers are reliant on vessel-based welfare, they are often also required to bring and eat food on the asset they are working on, despite a lack of dedicated clean eating spaces, and having no space to take proper breaks, with workers saying: 'Most workers also take their

lunch in the WTG which is not a very clean place to eat' and 'People sitting on floors when having breaks is the norm.'

The specific impacts on workers from a lack of suitable welfare have been discussed in 2.3.5, but from the RFI responses it is clear that reliance on vessel-based welfare can have negative impacts on the wellbeing of workers. 'Unfortunately on WTGs, personnel rarely call in vessels and prefer going over the side or using bags. In some worst cases, women not drinking so they don't have to go leading to dehydration. People sitting on floors when having breaks is the norm.'

As raised in 2.3.5.1, there is the additional risk imposed by reliance on vessel-based welfare by requiring workers to transfer to and from vessels whenever they require use of welfare provisions. Not only does this impose additional time constraints, but there is a potential safety risk of having to transfer back to use welfare. Personnel transfer is regarded as one of the more hazardous activities in the industry, being the subject of G+ *Good practice guidelines: G+ offshore wind farm transfer*, so requiring it to access welfare could be presenting workers to unnecessary hazards.

Taken as a whole, vessels can provide an effective solution for limited, short trips to assets where it is impractical or not possible to bring additional welfare facilities across. They additionally may be useful for providing access to provisions that are not time sensitive and do not require presence on an asset, such as access to showers or break areas at the end of shifts. However, RFI responses suggest that vessels are being relied upon too heavily to be the only or primary source of welfare. As put by one respondent: 'Many of the senior stakeholders and design authorities have no offshore experience, and struggle to appreciate why SOV-based welfare alone is insufficient. Without direct exposure to the realities of working offshore, decisions are often driven by abstract cost–benefit assumptions rather than lived operational need.'

Finally, as has been discussed previously in 2.3.3.1, the aforementioned HSE NoC on a UK wind farm was directly relating to the issue of vessel-based welfare. As relayed by the respondent, this notice stated that, 'The mere presence of a vessel alongside does not constitute suitable and sufficient welfare provision. […] Welfare must be provided at the place of work – in this case, on the turbine foundation itself. […] The situation failed to ensure immediate, dignified, and safe access to welfare for all personnel on the turbine.' Please note that here Cairn Risk is relaying the wording of the respondent, and as no copy of the NoC has been provided, it is not possible to confirm if this is the respondent's own words or the wording of the HSE. In this case, the HSE was reporting on a project under construction where a JUV was present at all times and connected through a gangway, which in fact had more readily available access to welfare than in the cases discussed earlier where vessels were not continuously on station. This calls into question the legal compliance of solely vessel-based welfare provisions as a solution in offshore wind, at least in the UK.

A summary of the pros and cons of vessel-based welfare is provided in 4.5.1.

4.1.4 Onshore quayside

As raised in 2.2, there was a strong focus on the RFI responses towards discussion of offshore assets, at the expense of discussing the onshore quayside area of the scope. Additionally, it is clear that the situation for welfare in the onshore quayside scope typically is distinct from the situation seen on turbines, offshore platforms and vessels, bearing more resemblance to a typical onshore construction site, with well-established requirements and available provisions. This is supported by the RenewableUK guidance, discussed in 3.2.1, which made

clear that onshore installations for offshore wind farms should be treated the same as any onshore workplace, with full consideration for welfare. As the subject of onshore welfare is not the subject of technical difficulty or regulator interest, this report has focused on the findings for the offshore portions of the study scope and exploring provisions that are less well understood by the industry.

In general, the welfare situation in the onshore quayside scope is considered to be good, with standard arrangements as with a construction site. However, it was indicated by several participants in the RFI that this may not always be the case, and that standards may vary depending on location.

4.2 LOCATION OF WELFARE

In the course of this study when investigating available welfare provisions, location of welfare, particularly fixed units, has had a key impact on how they are installed and maintained, what life cycle stage they are available in and how they are ultimately used. In this section, a breakdown of the main locations on offshore assets that are considered for welfare is offered.

When reviewing the location of welfare provisions, the key aspects that must be considered are:

– When in the project life cycle provisions can be installed (if installed provisions are used).
– Accessibility of provisions for workers. This is considered both in terms of proximity of assets to the point of work, physical barriers to accessing welfare and ability of all workers to have access.
– Method of installation and maintenance of welfare.

4.2.1 Inside foundation/TP

Locating welfare inside the TP or foundations of a WTG or an OSS can be advantageous if possible. The primary advantage of this location is availability throughout the life cycle of the asset. On an offshore asset during construction, workers will generally only be required to leave the vessel for work once the foundation is in place. Therefore, locating welfare within the foundation allows for welfare to be available for use by workers as early as possible in the C&C phase. As put by one respondent: 'It should be noted that a good part of the C&C phase there is no WTG present, so any welfare facilities should be accommodated on the foundation.' This presents an advantage over locating provisions within the WTG, where they will not be available until the WTG has been installed offshore, which forces the project to use alternative welfare provisions during the early construction phase.

One caveat is that depending on the foundation design chosen and whether one is used for the asset, it may be more practical to locate welfare in the TP instead of the actual foundation piece. In doing so, this would delay the point at which welfare can be provided to the asset, as the TP is installed after the main foundation, but this would still be able to provide welfare for much of the C&C phase and beyond.

As will be discussed in 4.2, a key advantage of several permanent fixed welfare options is that they can be assembled and incorporated into foundations onshore alongside other key pieces of equipment, avoiding the requirement for additional offshore lifting which would

increase the risk profile of the installation. This also ensures that they are in place from the moment the foundations or TP is installed offshore, when workers may be expected to be present and require welfare.

Another advantage of locating welfare within the foundation or TP is accessibility. Depending on the asset's specific design, the foundations or TP may be the point at which workers enter the asset, and presents an area with minimal restrictions on worker movement (such as areas where high voltage (HV) rules are in effect and access is limited). This should ensure that all workers are able to access welfare provisions. Additionally, as welfare would be located inside the foundations or TP, there should be no risk of weather conditions restricting access, as may be seen when welfare is located on an external platform. However, where this location may present a drawback is for workers located within an installed WTG, particularly where their work takes them to the upper tower sections or the nacelle. These workers would have to descend through the entire tower and then travel through the foundations or TP to use any provisions. While locating welfare in the foundations may present better accessibility for all workers, it would impose an additional waiting time for workers in these areas which, depending on the project's location, may be deemed excessive.

A key disadvantage to locating welfare within foundations is space limitations. Depending on what is offered by the foundation designer, setting aside a dedicated space for welfare may not be easy due to requirements for other equipment, or may prove an additional cost in steelwork and weight of the foundations. In discussing with developers, there is an impression that foundation designers are open to making space allowances for welfare provisions in their designs of foundations and TPs, if it is established in their employer's requirements. They are less willing, however, to integrate welfare directly into their designs, taking a similar stance as has been discussed with WTG OEMs.

Additionally, if welfare is located within the internals of the foundation or TP, performing maintenance that may involve lifting, such as changing out of waste tanks on sanitation provisions, may prove more difficult. This would be due to the requirement to bring these tanks from where the welfare is located to a point where they can be lifted via crane on to a nearby vessel for removal. This would potentially expose technicians to additional risks, including manual handling required to bring tanks up ladders, or the risk of dropped objects or suspended loads (with the spillage of waste being a potential significant consequence should the removable tank be dropped or broken). If considering locating welfare within foundations of TPs, developers should consider carefully the required logistics of maintaining the provisions and how to accommodate any required lifts.

Finally, it was raised by one RFI respondent that the increasing prevalence of 'TP-less' designs in industry proves an additional challenge to locating welfare within foundations, with concerns around the reduction in space for welfare that would normally be located in the TP. It was raised that 'The shift towards TP-less monopile foundations significantly reduced the available space and infrastructure to accommodate welfare.'

4.2.2 External placement (EWP/foundation topsides)

Another location strongly considered for welfare provisions is externally, on EWPs or on the foundation topsides of assets. This shares many of the primary advantages of location within foundations as discussed earlier, such as accessibility for most workers and the availability of welfare early in construction (as welfare can be installed as soon as there is available space on an external platform, and in some cases remain there for the rest of the life cycle).

A key advantage of locating welfare externally is for ease of performing lifting operations. This is true both in cases where logistics of the welfare provision require exchanging of components (such as emptying of waste tanks) and in cases of fixed temporary welfare, where the entire provision is removed from the asset when work is completed. Indeed, temporary fixed welfare solutions are normally designed fully with the intention of being placed on and lifted off from external locations, using either the asset's own davit crane or suitable cranes on attending vessels.

Another advantage of this location is for ease of providing a retrofitted welfare provision on existing assets. Provided space is available on the external platform or topsides of an asset, it can be as simple as lifting the welfare unit and fixing it in place, with no requirement to assemble within the foundations or WTG. However, depending on the design of the asset, this can also present a disadvantage. If the EWP or topsides have not been designed with accommodating a welfare unit in mind, then there can be space limitations which restrict the size of unit that can be installed. Additionally, including a permanent or temporary structure on the EWP will add additional weight and can present an obstruction to other operations (such as crew movement around the platform or lifting from the asset's davit crane to and from attendant vessels), which will need proper consideration.

Another disadvantage to externally located welfare is the need to consider the weather conditions on a site. This is true both in terms of the provision itself, which may require suitable Ingress Protection (IP) rating depending on how long it is intended to remain on the asset, as well as weather being a possible restriction on use of an asset. While the majority of offshore work will be planned when weather conditions are acceptable, there is always the possibility of extreme weather conditions occurring when workers are offshore. This may impose a restriction on use of externally located assets, which would prove difficult should workers be stranded on an asset for an extended period of time in poor weather.

4.2.3 Asset internals (WTG tower/nacelle and offshore substation topsides)

By locating provisions internally to the main asset, shelter from poor weather conditions is provided, as well as providing welfare as close as possible to the point where technicians can be expected to be working. However, the geometry of assets, particularly WTGs, can make this challenging to achieve in practice.

A key barrier for technicians working in the nacelle of WTGs would be the time and distance they must travel in order to access welfare if it is located below them. However, space restrictions in the nacelle make locating any substantial welfare there a difficult prospect, unless it has been designed with this in mind. This is highlighted by a response to the RFI which stated: 'One of the primary challenges in designing welfare for O&M was the strong preference from the O&M team for locating welfare facilities near the nacelle.' At least one provider of fixed cubicle sanitation units (as will be discussed in 4.2.1.1.3) has indicated that they can install their product within nacelles, using the nacelle-mounted crane to lift the unit externally up the height of the tower and bring it to the nacelle through a top- or rear-mounted hatch. It is not clear at this time how many wind turbine models have the internal space capacity to house a full-size sanitation cubicle, but as turbines are generally increasing in size, it is possible that this is an option that could become more feasible over time.

Another disadvantage that is raised around location of welfare within the nacelle is the restrictions it would place on access. As it stands, nacelles are often considered a restricted workspace, with only essential personnel allowed access. Therefore, if the only welfare in place on an asset was in the nacelle, it could potentially pose an unfair restriction on those

not given clearance to access it. As put by one respondent: 'In emergencies or adverse weather conditions, access to the nacelle may be delayed or unsafe, removing the only welfare provision on the asset. The arrangement would exclude non-WTG personnel (e.g. jack-up crews, rope access teams, or OEM specialists) from safe and dignified access to welfare, unless turbine entry is granted.' This could be resolved by allowing temporary access to the nacelle for use of welfare, or ensuring workers are accompanied when visiting the nacelle to use welfare, but would likely raise more logistical issues and increase time spent to access welfare.

Specific to WTGs, an alternative to locating welfare within the nacelle is within the tower itself. There are multiple tower sections, particularly the second and third from the base, which do not generally contain any essential systems. As such, these areas pose fewer restrictions on their use for welfare. Units could be installed either while the WTG is being assembled or, in the case of retrofits, could be assembled within the tower after its assembly offshore (this would depend on the specifics of the welfare provision and how it can be installed). Locating welfare within the tower would also act as a compromise between workers primarily located in the nacelle and those primarily in the foundation, with both having to travel to access it.

These issues of worker access should be considered when choosing to locate welfare inside any asset, including both WTGs and substations, with the location chosen to allow the most ease of access for the most personnel who can be expected at any time. It may therefore be necessary to consider multiple locations for welfare provisions in assets, to ensure all workers have reasonable access to provisions.

While there are strong benefits to locating welfare inside assets themselves, as opposed to externally or inside foundations, there are still disadvantages. Primarily, welfare located within WTGs or substation topsides would not be available until much later in C&C than welfare located on or in foundations. There can be large gaps between foundation and topside installation, where work is still required on the assets, and so where alternative welfare arrangements (such as reliance on vessels or welfare inside/on foundations) would have to be made. Welfare located in the WTG or substation would only become available towards the late construction or commissioning phase, though could remain in place throughout the project's remaining life cycle. Additionally, as with welfare located inside the foundations/TP, the logistics of maintaining units, particularly the logistics of exchanging containers for human waste, would need to be considered.

4.3 WELFARE PROVISIONS BY TOPIC

In this section, an overview is provided for each of the different welfare provisions identified over the course of this study, separated by the four welfare topics under consideration (sanitation, washing, rest and mess) and a fifth option considering provisions that can meet all welfare needs. The intention of this section is to provide an overview of what is currently available, and what may be available in the future, for meeting different welfare needs. As this report does not reference specific brands or products, by necessity some of the provisions described in the following sections in reality represent multiple products with slight differences but which share a similar philosophy or use case. In other cases, provisions refer to a technique or practice, rather than to a type of product.

For each of the provisions discussed, the following will be detailed:

- A description of the provision, including categorisation into the levels of welfare identified in 2.3.1 and an indication if the provision is currently in use or has been explored by the industry.
- Requirements imposed by using the provision, such as for additional maintenance and logistics.
- Implications of utilising the provision in different life cycle phases.
- Any potential H&S impacts.
- Perceptions from the industry of this provision, if available.
- Indication of cost vs. benefit, where possible.
- A summary of pros and cons for the welfare provision.

Before each provision is a brief description of the general requirements for that provision. This does not reflect any specific national regulation or industry guidance, but instead is an attempt to summarise the basic requirement workers should be entitled to, and so which provisions should seek to fill, regardless of where a project is located.

4.3.1 Sanitation

Discussion of provisions in the sanitation topic is further broken down into discussing housings of sanitation provisions (i.e. how a toilet is situated and transported to its place on an asset) and individual toilet technologies (i.e. how waste is handled and disposed of by the system).

In brief, the requirements of sanitation provisions should be:

- convenient, ready access to a toilet facility;
- an expectation of privacy and maintenance of dignity for the user;
- a safe and dignified space to change and/or dispose of sanitary products, and
- a safe and effective way to dispose of human waste, which minimises contact between the worker and waste.

4.3.1.1 Sanitation types

4.3.1.1.1 Camping/portable toilets

(a) *Description*

A number of terms were used throughout the RFI to refer to lightweight, portable units which just consist of the toilet itself, including ‘portable toilets’, ‘mobile toilets’ and ‘camping toilets’ as well as several brand names. These are temporary portable provisions, which can be carried or lifted on to assets without being fixed in place, and removed when work is complete, differentiating them from more sophisticated toilet cabin/cubicle facilities that must be assembled on or lifted on and off assets. These devices generally are quite rudimentary dry ‘bucket’ or ‘bag’ toilets that are non-flushable, and where waste is often collected in a bag that must be emptied after every use. Depending on the specific product, chemicals are sometimes used to break down waste and reduce odours. Camping toilets are sometimes provided with tents for additional privacy for workers using the facilities, mimicking a toilet cubicle and lending them the name ‘tented toilet’. Camping toilets are sometimes included in ‘welfare kits’ as described in 4.2.5.2. In this capacity, it was indicated by one respondent that the UK HSE considered temporary tented camping toilets as an acceptable provision of welfare. It was clarified by the respondent that this was not viewed by the HSE as a long-term solution for the industry, but instead as a short-term improvement over solely vessel-based

welfare. This is reporting solely on the wording of the respondent; the RFI response does not necessarily represent a formal standpoint or response from the UK HSE.

(b) *Maintenance and logistics requirements*

In terms of logistics and maintenance, camping toilets are relatively light on requirements. They must be lifted or carried on to assets with each visit, though as they are generally lightweight and portable this is not a major concern. However, these toilets often must be set up prior to use, and then emptied and cleaned after each use. After emptying, waste must be carried by workers until they are able to dispose of it on the vessel. Consumables for use of camping toilet (including spare bags, any chemicals required, sanitisers, etc.) must also be brought with workers on to the asset and kept in good stock on vessels.

(c) *Life cycle implications*

Camping toilets represent a welfare provision suitable for all life cycle phases, with the caveat that there must be an enclosed space (i.e. inside the WTG, substation or foundation) where the toilet can be erected and used safely.

(d) *H&S impacts*

The main H&S impacts from the use of camping toilets are around the requirement to handle human waste. As these are quite rudimentary devices, waste is simply collected in plastic bags that must be carried by the worker until they have an opportunity to dispose of them properly back on the vessel. This presents a high risk of spillage or loss of containment of human waste.

(e) *Perceptions from the industry*

The perception of camping toilets by workers is mixed. They are generally seen as an improvement of vessel-based welfare, in the sense that they allow an option for use on the asset when a vessel is not available (which, as discussed, is quite prevalent).

However, generally there is a poor perception of camping toilets as a cheap, temporary solution, with them being seen as a 'backup' option to supplement vessel-based welfare or when other welfare was not available, such as 'When it was too windy to crane over a portable toilet'. Workers describe camping toilets as 'very basic' and 'unhygienic'. One described them as: 'Not quite adequate enough. There is no real sanitation. Once the camping toilet is used it has to be cleaned then you have to carry the excrement with you until back onboard the vessel.' In some cases, camping toilets are considered by workers as not preferable to waiting for the vessel to return. This in particular was a view shared by female workers who felt that the use of camping toilets was not an improvement and did not provide an adequate standard of privacy or dignity, or an adequate space for managing periods.

It was highlighted that the waste removal and cleaning process for these toilets can be undignified and unhygienic, with workers describing having to carry bags of their own waste around with them after use. One worker stated: 'Unsanitary and undignified. Have to transport own waste in a bag back to the SOV.'

Workers also expressed dissatisfaction with how these solutions had to be set up for each use: 'This had to be built before use so wasn't hardly used. Also difficult to use when you are in dire need' and 'We have been supplied with a tented toilet facility which is totally

inadequate as it needs to be carried on to the turbine on every trip.' Likewise, while the provision of tents is seen by workers as an improvement over no privacy being offered at all, they are not highly regarded.

(f) *Cost–benefit indication*

In terms of cost vs. benefit, the costs of an individual camping toilet for a team visiting an asset represent a trivial CAPEX investment, with an additional small operational expenditure (OPEX) for upkeeping the device, replacing it if it becomes too worn and replacing the consumables. There are no additional costs associated with utilising camping toilets, including no requirement for space allocations or allowances from OEMs that would increase costs. It could also be argued that use of camping toilets represents a reduction in OPEX for projects, as it may reduce the requirement for vessels travelling to collect personnel to use welfare.

(g) *Summary of pros and cons*

In summary, the pros and cons of camping toilets are:

Pros	**Cons**
A cost-effective solution to provide sanitation provision on assets that does not rely on transfer to vessels	A rudimentary provision, with concerns raised by workers around safety, hygiene and dignity of use
Convenience from a design perspective, as there are no requirements to modify assets to accommodate welfare	Due to these concerns, camping toilets do not provide a provision that all workers are able to use, as the RFI reports that some workers would prefer to still wait for vessels
Allows for workers to use provisions anywhere on assets, setting up the toilet where it is most convenient for them	Does not provide means of safe or dignified method of changing sanitary products
In at least one case, reportedly recognised by the HSE as a suitable alternative to reliance on vessel-based welfare	Reportedly viewed by the HSE as a temporary solution, and not one that will be accepted as a long-term solution by the regulator

4.3.1.1.2 Temporary cubicle sanitation units

(a) *Description*

Temporary cubicle sanitation units refer to toilet cubicles that must be lifted on to the asset at the beginning of a period of work, and are lifted off when the work has been completed. The exact function of them will differ based on the provider or exact product, but they generally take the form of traditional chemical toilets, as one would find on a construction site or at an outdoor event, with a suitable lifting frame or attachment points. Some models include handwashing and/or flushable toilet provisions, while others rely on hand sanitisers and chemical flushing.

Temporary cubicle sanitation units are differentiated from the permanent fixed cubicle toilets discussed in the next section as they are generally not suited for long-term installation on an asset, but for fixed periods of work. The entire unit generally must be lifted off the

asset and taken to a vessel or onshore to be emptied and maintained. This is also when consumables (such as toilet paper, any chemicals used, etc.) and any batteries (for lighting, etc.) are changed and restocked. These provisions fall under the category of temporary fixed and are currently in use in the industry. Exact models will vary, but a single cubicle unit can generally be considered as having dimensions approximate to 1 m × 1 m × 2 m. Due to the requirement for lifting on and off assets, they are only suitable for locating on external platforms rather than inside assets.

(b) *Maintenance and logistics requirements*

In terms of upkeep and logistics, temporary cubicle units do not have any requirement to be maintained on assets, as instead this can be carried out on a vessel or onshore as the unit is removed at the conclusion of work. It is assumed that there may be some minor cleaning required to keep units in usable condition, but this requirement is less when compared to permanently installed units. However, this does mean that use of this provision puts additional lifting requirements on a project, as they must be lifted on to assets with each visit and removed at the end of a working period or when it is time for them to be emptied or changed out. These lifts may not be possible in high wind conditions, which can limit the use of these units. Due to the size of cubicles, and the requirement to bring them on and off assets often, it is a requirement for personnel using these provisions to access assets through a large vessel such as an SOV. This is particularly true where multiple crews are visiting assets, each requiring a sanitation unit to be lifted on, as there must be adequate deck space for a vessel to accommodate them all. As these units are not designed for long-term installation on an asset, they may be susceptible to wear and tear and require replacement over long use periods. However, depending on the model chosen, maintaining and replacing units may be the responsibility of the provider and not the project.

(c) *Life cycle implications*

Temporary cubicle units are suitable for all life cycle stages, assuming there is an asset able to support them (i.e. from the point at which a foundation or TP with a platform is installed). These units can be useful for construction or commissioning phases when the number of personnel on an asset can fluctuate, as the number of units installed can be increased to meet periods of increased demand without permanently modifying the asset. To this end, some providers have offered grouped units with multiple cubicles attached together.

(d) *H&S impacts*

The main H&S impact of these provisions is the requirement for additional lifting. Units must be lifted via crane on to each asset at the beginning of work and removed from the asset at the end of work or when they require emptying.

This introduces additional hazards of dropped objects and swinging loads. The risk posed by lifting operations is compounded by the requirement for lifting units that contain human waste when they are removed from assets. Units loaded with waste may present dynamic loads due to moving liquids within them, and combine the risk of dropping a unit with a large loss of containment of hazardous human waste on the asset or the vessel.

(e) *Perceptions from the industry*

Perceptions of temporary sanitation cubicles are mixed. Provision of any sanitation on assets is

generally seen as an improvement, though there is a noted reluctance among some workers to use provisions, with concerns around their cleanliness when aboard. As temporary units are emptied and maintained off the asset, these concerns are not as keenly felt as with more permanent facilities as the responsibility for upkeep is passed to the supplier. Concerns were raised around the increase in lifting operations and logistics required for these units, with respondents raising 'Minor complexity in installation/removal logistics […] coordination for removal/replacement of temporary unit' and 'Massive increase in lifting operations required' as issues. Another operational concern of these units cited was an 'increase in deck space required' posing an additional restriction on their usage. The issue of waste removal and cleanliness for these units was also raised, with one respondent citing 'Waste removal, increase the potentiality of spillage [and] potential conflict in case of lack of proper/cleaned facilities' as concerns. While seen as an improvement over more rudimentary solutions such as camping toilets, some workers expressed dissatisfaction with both: 'Portable toilets as well as camping toilets. Neither have been a great success.'

(f) *Cost–benefit indication*

In terms of cost, rental models are common for temporary cubicles with the supplier being responsible for providing units and replacements to suit the needs of the projects. Overall costs are low for the client, but it was indicated that exact figures would vary greatly depending on the size of the project, the number of units and the length of contract (with ad hoc support coming at a higher rate than a long-term contract). An important factor in considering costs for temporary units is that, as opposed to permanent units that would need to be installed on every asset in a wind farm, a project would only need to acquire as many temporary units as needed by the number of working crews they have active at any time. This can serve to make them an attractive option despite their drawbacks, with a project only paying for units when they are needed.

Other cost considerations include productive time lost due to the requirement to lift units on and off at the beginning and end of each working day on an asset, additional complexities in lifting operations caused by obstruction due to location of units and additional costs associated with ensuring there is adequate space on external platforms for units to be stationed as well as deck space on transfer vessels which, depending on the use case, may need to transport multiple cubicle units on any given trip offshore.

(g) *Summary of pros and cons*

In summary, the pros and cons of temporary cubicle sanitation units are:

Pros	**Cons**
Generally low costs per unit available on rental model, with opportunities to save costs by only requiring as many units as there are assets that will be occupied at any given time (as opposed to requiring one unit per asset as is seen in other provisions)	Concerns raised by some workers around hygiene of cubicle units, and reluctance to keep them maintained
Flexible option, with additional facilities being added when required by busy working periods, provided there is space	Requirement to lift units on and off assets with each visit introduces additional H&S risks and logistical concerns

Majority of maintenance and cleaning carried out onshore by supplier, minimal requirement from offshore workers	Requirement for adequate space on external platforms or topsides of assets for units to be placed. Potential for external placement of units to cause additional obstruction to operations
Allows for workers to use provisions on the asset they are working, as opposed to requiring transfer to a vessel	
Dependent on the specific model, but handwashing facilities can potentially be included in the unit	
Improvement for worker dignity. Provides private space for workers to change sanitary products	

4.3.1.1.3 Permanent cubicle sanitation units

(a) *Description*

Permanent cubicle sanitation units refer to toilet cubicles that are not part of the original OEM design, but are installed on an asset with the view of long-term usage, if not for the entire life cycle of the asset. These units are differentiated from the previously discussed temporary models as they are designed for long-term integration into the asset. This type of welfare is an example of permanent fixed welfare and is currently in use in the industry.

There is some variety in the types of permanent cubicle toilets that can be installed on offshore wind assets. They can be either purchased as fully assembled units, or in 'flat-pack' and assembled *in situ*, and can be designed either for installation on an external platform or for use inside foundations, OSSs or WTGs. Multiple different models of permanent welfare have been installed on wind farms in recent years, being used to retrofit major offshore wind farms currently in operation. When used for retrofits, this necessitates offshore lifting to install the units, whereas if incorporated from early in the design of the asset they can be installed onshore. For use during construction, it is possible that depending on the number of personnel expected to be on board the asset at any given time, one single unit may not be sufficient (particularly in the case of OSSs during commissioning).

There are also a number of options available regarding how waste is stored and disposed of, though generally this type of unit is more likely to utilise an option allowing removable waste containers, as the cubicle itself will remain in place once installed. Handwashing and water flushing are included in some models, with water for these functions being refilled by crews when they visit the asset. In models without these functions, hand sanitisers, wipes and chemical flushing are often used. In at least one model on the market right now, there is provision for hot water for handwashing. Cubicles also come equipped with lighting, with power requirements being met by changeable batteries. Finally, as stated previously, cubicle-based solutions provide a private and dignified space for using the toilet and changing sanitary products.

(b) *Maintenance and logistics requirements*

Regarding logistics and maintenance, there is a requirement that permanently installed facilities are cleaned and maintained by the crews using them. Depending on the product and arrangement with the supplier, any specialist maintenance may require the supplier's

personnel to attend the asset. Requirement for removal of human waste will depend on toilet technology in use, though as stated permanent solutions tend more towards removable containers with minimal handling requirements. For some models, water must be brought on board assets by the workers to refill flushing and handwashing capabilities (with assurances made that water for handwashing is clean and fit for purpose). This has been indicated to require no more than a single 25 L standard water canister per unit. For all models, workers will need to ensure consumables are restocked.

(c) *Life cycle implications*

Permanent toilet facilities can be suitable at any life cycle stage, depending on where they are installed. If installed inside foundations or on external platforms, they can be utilised from as soon as those areas are accessible during construction. However, if installed internally to WTGs or OSSs, then they can only be accessed when those parts of the asset are installed, so from the later C&C stages through to O&M.

(d) *H&S impacts*

There are minimal H&S impacts of utilising this provision type. Additional lifting is only required when installing units (which as stated can be performed onshore, or can be broken down into multiple smaller lifts for unassembled models), when bringing water on to the asset if required by the system, or when changing out waste containers. The specifics of how often this must occur or the difficulty of the lifts will vary based on the toilet technology used by that model. Concerns for handling of human waste likewise are very dependent on this but with permanent facilities tending towards sealed changeable tank systems the risks are reduced.

(e) *Perceptions from the industry*

For units permanently fixed on to assets, the requirement to keep units clean and fit for purpose falls to offshore workers and would become a part of their regular duties when visiting assets. As mentioned previously, there is a noted reluctance of workers to maintain cubicle facilities, as well as concerns around using them when they have not been properly cleaned or maintained. However, there are indications that this is not the case for all workers. In one case where these units have been installed, it was noted that approximately half of the offshore workforce had these concerns and did not want to be responsible for cleaning the toilets, while the other half saw it as an improvement over no on-asset welfare, and that cleaning was a necessary trade-off. These solutions have generally been considered favourably, particularly by workers who would wish to see them on their own projects. One worker, in answering what welfare provisions they were aware of that could be explored, said: 'Fixed toileting facilities as shown recently on a number of sites in the UK.' While another answered, 'A fixed facility would be ideal.' A further respondent indicated that these should be viewed as an end goal for development of welfare for their project, stating: 'Portable toilets are currently being explored, I think this could be expanded on to see a more permanent solution for the future.'

(f) *Cost–benefit indication*

It has been indicated that both purchase and rental models are seen for permanent cubicle welfare units, with the latter having a view towards long-term agreements with developers that include service and maintenance contracts. As discussed previously, exact prices for

developers vary greatly depending on the size of the project, the number of units and the length of contract. However, figures provided to the RFI indicated that purchase prices for a single unit could start at approximately £5 000, while rental prices were indicated as starting at approximately £20 per unit per day for a single unit, with economies of scale taking effect for larger quantities. It should be noted that these figures are indicative of information provided to the study anonymously and may not be representative of all suppliers.

As discussed in 2.3.3.5, it has been indicated that direct CBA can be difficult to perform with welfare, as it is difficult to quantify exactly what the costs of providing or not providing a given solution are. However, it was indicated through RFI responses that investment in high-quality welfare early in the project, such as permanent toilet facilities, could present savings across the life cycle of an asset: 'Higher design and integration cost; savings over life cycle if shared with O&M.' Entire life cycle savings could include reduction in fuel usage for transfer vessels, increase in productive time due to removing delays to access welfare and retention of high-quality staff.

Other, non-direct costs of utilising this provision include cost and trouble to allow a space requirement on the asset, either on an external platform or an internal space, and any potential obstructions caused by the provision for the normal operation of the asset.

(g) *Summary of pros and cons*

In summary, the pros and cons of permanent cubicle sanitation units are:

Pros	**Cons**
Represent a much higher quality of provision than is otherwise available. This includes removable waste without direct handling, running water and flushable toilets being available	There is a requirement to keep any permanent facilities maintained to avoid them falling into disrepair. This puts an additional responsibility on workers during offshore visits, who may be reluctant to take this on
An improvement for worker dignity, providing private space for workers to change sanitary products	Higher CAPEX in comparison to less sophisticated alternatives that are more accepted in industry
Relatively low costs comparative to overall cost of assets, which can prove cost-effective as early investment over project life cycles	Dependent on location, units can form significant obstruction to other operations such as lifting, and require a space allocation inside or outside the asset, which must be factored into design

Dependent on the specific model or supplier, but can combine handwashing provision with some models allowing hot water washing	Depending on jurisdiction, a single unit on foundations may not be compliant with regulators. This would depend on the number of people expected to use the asset and distance workers are required to travel. It is possible that multiple units could be required, particularly in construction, which would require more space and increase costs
Flexibility on location, models are available which can be built *in situ*, lifted on to assets, located internally or designed for external placement. Suitable across life cycle phases and on retrofits	
Becoming a more common option in industry, adopted by several major developers	

4.3.1.1.3 Integrated sanitation units

(a) *Description*

Integrated sanitation units are toilets that are a permanent feature of assets that are integrated as part of an OEM design. This would include the toilet itself and the surrounding cubicle or room being designed into the asset from the start, regardless of the specific toilet technology used. While there is evidence of the use of integrated sanitation facilities being used on OSSs, there is no indication that any WTG OEM currently integrates welfare into the design of their assets, nor that foundation designers tend to include welfare into their designs (with the exception of substation foundations). However, there are indications that these options are being explored.

(b) *Maintenance and logistics requirements*

Exact maintenance or logistics requirements for integrated sanitation, including requirement for handling waste and additional lifting, depend on the specific product and technology chosen by the OEM. With systems integrated into the asset, it is possible for the design of waste removal to be considered from conception rather than being an additional requirement added on to the asset with associated concerns (as is the case where a third-party welfare product is used as per the previously described provisions).

Often raised when discussing integrated welfare is the possibility for direct disposal of sewage into the sea, as this would remove the requirement for welfare units to be emptied manually, removing one of the key logistics barriers to welfare use. Current standards defined by IMO International Convention for the Prevention of Pollution from Ships (MARPOL) Annex IV prohibit the dumping of untreated sewage from stationary vessels (which would apply to stationary offshore assets). However, it is possible that OEMs could include some level of waste treatment on assets to render waste as effectively harmless, or otherwise developers could seek an exemption from local environmental protection authorities based on the estimated number of visits an asset would receive over its lifetime (which for a WTG would be relatively low compared with a permanently occupied asset). Additionally, it has been raised that, while fully plumbed integrated sanitation services would require a potable water source for washing, filtered seawater could potentially be used for non-potable purposes (e.g. flushing) to improve the quality of provision. This represents an area for further exploration by service providers and OEMs, to determine if there is a viable use case to limit the maintenance and logistical burden of welfare.

(c) *Life cycle implications*

The availability of integrated welfare in the project life cycle would depend on which asset it is integrated to. Welfare integrated into foundations would be available from earlier in the construction phase, once the welfare has been installed and commissioned. Welfare integrated into the WTG/OSS would not be available until later, when these assets have been installed and the welfare brought into commission. How quickly welfare is available also depends on the design from OEMs, who could specify that integrated sanitation be one of the first parts of an asset installed to support the remainder of the construction phase. One additional life cycle consideration for integrated sanitation is the number of provisions that would need to be provided, to match the number of personnel expected in each life cycle phase. It has been indicated that, on OSSs, only a small number of toilets are provided on the asset. It may be that a small number of permanent facilities could be designed to match expected use in O&M, with more temporary measures (as described previously) used to supplement in C&C.

(d) *H&S impacts*

There are few immediate H&S concerns with the use of integrated welfare on assets, both in practice in OSSs and in theory with WTGs. Potential sources of risk would depend upon the waste-handling technique employed and the likelihood of a loss of containment bringing workers into contact with biohazardous human waste. Additionally, if permanently integrated provisions were not maintained properly and allowed to fall into disrepair, there are sanitation and hygiene concerns that could present H&S risks.

(e) *Perceptions from the industry*

As there are currently few integrated sanitation units in assets, it is difficult to assess the perception of these in industry. Reference was made in the RFI to 'very small permanent welfare facilities on [offshore substation]' and 'Permanent [offshore substation] toilets designed in'. As has been discussed before, there is a notable reluctance from some workers to maintain welfare, even when permanent toilets were designed into an asset. This is illustrated by the comment that integrated facilities were 'never used due to maintenance'. It was highlighted by numerous RFI responses that integration of welfare into assets, particularly into WTGs, would be a preferable solution to the current welfare issues in the industry. Reasons include that it would help ensure standard access to welfare across projects and prevent issues that arise with developers having to retrofit assets with welfare.

(f) *Cost–benefit indication*

Regarding cost, it is difficult to accurately predict the cost to OEMs to include welfare aboard their assets, particularly as it would depend on the type and quality of welfare designed. It is highly likely that the cost of welfare would be incorporated into the overall cost of the assets, including service and maintenance contracts, and passed on to the developers.

From the perspective of developers, this would increase the cost of key assets such as WTGs, but there would then be no need for developers to provide welfare provisions on the asset or rely on vessel-based welfare. The exception to this is in the period before welfare units are commissioned on the asset, or if additional welfare was required to meet higher periods of demand such as commissioning.

(g) *Summary of pros and cons*

In summary, the pros and cons of integrated sanitation units are:

Pros	**Cons**
Fully integrated welfare can be incorporated into OEM designs, including requirements for logistics and maintenance, reducing the risk of interfaces with third-party components (e.g. creating lifting obstructions)	Integrated welfare is potentially less flexible than non-integrated options, with only a fixed number of provisions available. To accommodate for larger numbers of workers, additional provisions may need to be brought on board assets
There is an opportunity to create very high-quality welfare provisions, surpassing what is currently available and allowing for standardisation of welfare across industry	Potential for permanently integrated facilities to fall into disrepair with poor maintenance
Welfare integrated into assets would be available throughout the lifetime of the asset from the point where it is commissioned	Lack of motivation from OEMs to integrate welfare into designs, particularly on WTGs, is noted throughout RFI
An improvement for worker dignity, providing private space for workers to change sanitary products	Welfare facilities would not be available until they are commissioned on the asset. In the case of WTGs or OSS topsides, this would not provide welfare during the early construction phase
	Would likely result in an increase in the cost of assets being passed on to developers

4.3.1.2 Sanitation technologies

4.3.1.2.1 Composting toilets

(a) *Description*

Composting toilets refer to sanitation devices that use a mixture of biological and chemical processes in isolated containers to break down waste. Onshore, they can be found in use in the mining and forestry industries as a solution suitable for remote locations. Composting toilets represent an explored technology for offshore wind, but not one that is currently in use. As described in this section, they would be classed as either integrated, permanent fixed or temporary fixed welfare. Multiple developers reported investigating composting toilets, specifically a kind used in the mining industry to provide remote access to welfare in harsh underground conditions, but ultimately were not able to progress with the option.

(b) *Maintenance and logistics requirements*

A key maintenance and logistics benefit from composting toilets is the frequency they would require waste to be collected and emptied. It was indicated that some composting toilets can go up to 12 months without the waste being removed and the biological components replaced. When they do require changing, it is possible for modular storage tanks and pump

systems to be employed to empty waste tanks, or for the entire unit to be exchanged. This represents a significant improvement over other technologies that may require changing each day or after each period of work on an asset.

(c) *Life cycle implications*

A key drawback for composting toilets is that, particularly the units that were under investigation, had a requirement for frequent usage, as often as daily use, in order to provide a consistent input of waste to maintain biological integrity of the composting system. As such, this makes composting toilets unsuitable for use in the O&M phase on assets which are infrequently visited. However, it does present a use case for the construction phase particularly for OSSs, which can have periods of frequent usage of multiple people while equipment is installed and commissioned.

(d) *H&S impacts*

There are minimal H&S impacts of using composting toilets, assuming that the biological components and waste storage are well isolated. The limited requirement for emptying means that workers will rarely, if ever, come into contact with waste. One consideration is the units under investigation were relatively large and heavy, and so would require a large lift to place on to the asset and to remove in case of maintenance or exchange. However, if incorporated into a design from conception, these could be installed onshore to reduce risk.

As this is a provision in exploration, there are limited experiences of workers to draw upon. However, from discussion with developers, the indications were that this could be a suitable product for offshore usage under the right circumstances. One barrier to this is that the main provider of these provisions was not experienced with the offshore industry and so was not well placed to offer solutions. While obvious challenges with use on infrequently visited assets during O&M were raised, a potential use case was identified for during commissioning campaigns.

(e) *Cost–benefit indication*

Cost figures for this technology were not available. However, as they are not common in the offshore wind industry, it is likely that some modifications would be required to adapt them for use offshore, which could increase costs. While that could potentially increase CAPEX for each unit, the OPEX would be comparatively low, with minimal servicing and maintenance of units required.

(f) *Summary of pros and cons*

In summary, the pros and cons of composting toilets are:

Pros	**Cons**
Minimal servicing and maintenance requirements, with handling of human waste restricted to once per year	Composting toilets are untested in the offshore wind environment, with it being unclear how practical it would be to adapt them for use offshore

Reduction in requirement to perform lifting operations in support of provision	Limited use cases due to the requirement for daily uses, making them unsuitable for most assets and applications in offshore wind
Potential use case for periods of high personnel headcount on assets	

4.3.1.2.2 Liquid cassette toilets

(a) *Description*

Liquid cartridge or cassette toilets (the two terms appear to be used interchangeably) refer to a solution for sanitation where a removable and replaceable storage tank is included with the unit to collect waste. These cartridges often contain chemicals to break down waste and prevent odours. The exact specifications of these tanks vary depending on the specific product, but are suitable for multiple uses (approximately 30 in at least one case noted) before being emptied. Tanks are designed to be lifted manually to a point where they can be attached to a crane, either directly or by being placed in a lifting bag and lifted off the asset. Cassettes are designed to be durable and resistant to impact, to reduce the likelihood of loss of containment during changing. Depending on the arrangement with the supplier of the toilet, waste from cassettes can either be disposed of in a vessel's bio-waste system, or taken to shore where the cassette is taken by the supplier for cleaning and exchange. These systems are in use currently in the offshore wind industry, with a number of major wind farms having retrofitted existing assets to utilise them. Depending on how they are housed, they would be classed as either integrated, permanent fixed or temporary fixed welfare.

(b) *Maintenance and logistics requirements*

In terms of logistics, the main requirement is that waste cassettes are emptied periodically, which requires additional lifts. The exact frequency of exchanges will vary with the frequency of use and the exact specifications of system, but can be assumed to at least take place once every campaign of work on an asset. Multiple providers of this technology have indicated that cleaning and maintenance of the cartridges is handled by them, so workers are only required to bring them to shore.

(c) *Life cycle implications*

This provision is suitable for any life cycle phase, provided there is a suitable housing available.

(d) *H&S impacts*

In terms of H&S impacts of utilising liquid cartridge/cassette systems, there is a requirement for semi-frequent (depending on usage) lifting of dynamic loads, which in the case of dropped objects could result in a loss of containment of human waste. However, these lifts are relatively small in weight, and the tanks are designed to be sealed and resist impact to reduce the likelihood of a loss of containment. Other than the replacement process, there is minimal requirement for workers to be exposed to human waste.

(e) *Perceptions from the industry*

This option is viewed by workers offshore as an improvement over rudimentary provisions such as the camping toilet in terms of waste removal, by removing the need for 'Unsanitary

and undignified' bags. It was noted by one user who conducted an analysis of this system: 'Waste handling via cassette system; manageable but needs clear process.'

(f) *Cost–benefit indication*

It is difficult to assess costs for specific toilet technologies, as they are tied to the type of housing they are provided with. However, it can be said that liquid cartridge/cassette systems are becoming more common in the industry with multiple providers available, which has the potential to result in overall lowering costs. Other than a requirement for additional time for lifts and deck space for spent/replacement cartridges, there are minimal additional costs with this system.

(g) *Summary of pros and cons*

In summary, the pros and cons of liquid cassette toilets are:

Pros	**Cons**
Waste is contained to an isolated tank, reducing contact between workers and biohazards	Requires a process to be maintained, with tracking of when the cartridge requires emptying
Limited requirement for additional work or maintenance outside exchanging of cartridges	Risk of loss of containment still present, as is risk introduced by additional lifts
Becoming an established technology in offshore wind, resulting in acceptance of use and more defined practices	

4.3.1.2.3 Dry cassette toilets

(a) *Description*

Dry cassette toilets are a novel technology and have been explored as a solution for offshore wind, but are not currently known to be in use in any projects. These operate similarly to the previous provision, where waste is collected in a removable container for ease of collection and to isolate it from the user. Where dry cassette systems differ is that they operate with a dry plastic bag. When the toilet is 'flushed', the toilet's mechanism twists the section of bag containing the waste and pushes it down into the cassette, where it is compressed and sealed. Chemicals can be added before flushing to solidify any liquid waste and reduce odours. After a set number of 'flushes', the material runs out and the cassette is full, at which point it can be emptied. The cassette is opened and the lining, a biohazard bag, is removed with the waste contained. A new lining and set of bags must then be loaded into the toilet before it can be used again. Depending on how the technology is implemented, they could be utilised in either integrated, permanent fixed, temporary fixed welfare or temporary portable welfare.

(b) *Maintenance and logistics requirements*

There are limited maintenance and logistical challenges for dry cassette toilets. The primary requirement is to remove the filled cassettes, and to keep the bags and lining replenished, as well as the chemicals used to solidify and deodorise waste. Additionally, the system requires

a power source in the form of a battery which can be changed out when it is depleted. The full waste collection bags need to be carried or lifted off the asset and taken to shore to be disposed of, though as they are not contained in a solid tank or container, it is a much lighter lift. Additionally, as the system is designed to solidify and compress waste, lifts should be simpler as there should be no liquids to make a dynamic load.

(c) *Life cycle implications*

This provision is suitable for any life cycle phase, provided there is a suitable housing available.

(d) *H&S impacts*

There are no obvious H&S concerns from this technology. Primarily, this is because contact with human waste is kept to a minimum, and there are no dynamic or heavy lifts required in the use of the system. One possible concern is that due to waste being handled in a bag as opposed to a solid tank or container, this may increase the risk of a loss of containment due to a failure of the integrity of the waste liner. However, as the waste should be solidified, there is reduced likelihood of a spillage as would be seen in a liquid cassette system, and this concern could also be addressed by utilising a crate or other container for lifting.

(e) *Perceptions from the industry*

This option has been discovered from research, and so there are no direct perceptions from the industry that can be applied. As waste is separated from the user, this would potentially be seen as a benefit by workers; however, it is possible that the lack of liquid flushing or the requirement to manually add chemicals to solidify liquid waste may be off-putting to workers.

(f) *Cost–benefit indication*

As this is a novel technology, it is difficult to gauge exact costs. The toilet technology itself has a retail price of approximately £1 400, which consists of the toilet itself and none of the accompanying structures that would be included in a full solution. As this technology is untested in the offshore wind industry, there is an additional element of project risk that would need to be taken into consideration if this was implemented. Additionally, the requirement for consumables (particularly the bags that the provision needs to function) would be a low but consistent OPEX for a project.

(g) *Summary of pros and cons*

In summary, the pros and cons of dry cassette/cartridge toilets are:

Pros	**Cons**
Solution provides minimal contact with human waste, or a requirement to handle dynamic loads of liquid waste	Novel technology untested in offshore wind environment which could carry project risks
No requirement for heavy lifts in the changing of cassettes	Reliance on consumables which presents consistent OPEX
Relatively low-cost, innovative solution	Potential for loss of containment during changeout of waste bags

4.3.1.2.4 Incinerator toilets

(a) *Description*

Incinerator toilets, as the name would suggest, incinerate waste to reduce the necessity to handle biohazardous material. This is powered by either a natural gas, diesel or electric system, which can reduce waste to a small quantity of ashes that can be easily removed and disposed of when the collection tray is full. These provisions are in use in industry and can be found in integrated or permanent fixed welfare.

(b) *Maintenance and logistics requirements*

Incinerator toilets can be quite intensive to install and maintain. They require a vent stack to be installed alongside them to allow flue gases from the incineration process to escape safely, which can involve extensive modifications to the asset in which they are being installed. Additionally, they require a consistent supply of fuel, so either a power connection must be made available on the asset (potentially requiring connection to a temporary generator if power is not available on the asset at the point of use), or it is required to store and transport fuel for the operation of the toilet. In the latter case, this can involve having to consider fuel either being stored full time on the asset or being carried to the asset with each visit by workers. The requirement to handle waste from the provision is limited, as liquid waste is separated and recycled by the system and solid waste is reduced to ashes that need only to be emptied infrequently. A logistical drawback of incinerator toilets is that it is understood that the electrical models, which do not have the same concerns regarding fuel usage, consume a large quantity of energy to operate and can take hours to fully dispose of waste. This can limit their use potential when there are larger groups of workers on an asset.

(c) *Life cycle implications*

Due to the requirement for the toilets to be installed with modifications to the asset, and the requirement for a suitable fuel source, incinerator toilets are more suitable for the O&M phase or the latter stages of construction.

(d) *H&S impacts*

The primary concern from an H&S perspective of incinerator toilets is the introduction of hazardous materials to the asset, notably the gas or diesel fuel sources if those models are chosen. It was indicated by one developer that, when considering incinerator toilets, they ruled out the use of gas-powered options as their introduction would, by the developer's safety rules, class the cubicle as a confined space. Electrical models do not have the same concern, although the heating element used to incinerate waste could itself become a source of fire if it came into contact with any flammable materials (such as through a failure or misuse of the system).

(e) *Perceptions from the industry*

Incinerator toilets, while effective at removing the handling requirement of human waste, do not generally have a good perception and were not well considered in the RFI. Key issues raised by developers included: 'the long 'flush' times, the requirement for a permanent vent through the WTG, and the need for permanent power (there will be no power during C&C phase).' Workers also noted that smell can be an issue when using incinerator toilets, noting: 'when it burns after use it smells like [excrement] in the whole tower.'

(f) *Cost–benefit indication*

In terms of cost, incinerator toilets can retail for approximately £3 000–4 000, which does not include the cost of any other accompanying structures that would be included in a full solution. The CAPEX for an incinerator toilet provision also includes the requirement to modify the asset with a vent system, which can make it a costly option compared with alternatives. There are additional OPEX considerations including the cost of fuel, either hydrocarbon or electricity, required to operate the system. The main benefit to an incinerator system is the lack of expense required for disposal or treatment of any waste produced.

(g) *Summary of pros and cons*

In summary, the pros and cons of incinerator toilets are:

Pros	**Cons**
Reduction in waste management, to the point where only a small quantity of ashes needs to be removed and disposed of. Minimises contact with human waste and risk of loss of containment	Complex system, requirement for modifications to be made to asset to allow for venting and energy/fuel usage can make this a costly and difficult-to-integrate option compared with alternatives
	The long 'flush' times reported can hinder the usability of this option, particularly for large groups of workers
	Possibility to introduce a source of fire to assets, from flammable components and fuels
	Concerns raised over the user experience, notably bad smells, which were reported in the RFI

4.3.2 Washing

In brief, the requirements of washing provisions should be:

- Effective means of cleaning soiled hands and arms following use of sanitary provisions, prior to eating meals and after performing any particularly dirty work. Depending on the legislation being followed, this may include the requirement for soap and hot water or separate facilities for each use.
- Means for further washing, up to and including showering facilities in the case of dirty work that requires it. It should be noted that this requirement has not been considered in the following analysis. This is because:
  - There were no indications in the RFI or in research that workers in offshore wind required access to showering facilities on assets as standard, and no provisions for showers on assets were identified as in use or under consideration.
  - As discussed in 4.1.3.2 on vessel-based welfare, many vessels contain showering facilities, which would be available to workers at the conclusion of shifts and so would likely meet the requirement for showering.

4.3.2.1 Hand sanitiser/wipes

(a) *Description*

Hand sanitiser and sanitising wipes are widely reported as being provided to workers to meet handwashing requirements. It is reported that both 'light' and 'heavy' duty wipes are provided to allow workers to sufficiently clean their hands after they become soiled. These represent a form of temporary portable welfare, being brought with workers on to assets with each visit. As discussed in 3.1, multiple regulatory regimes specify that running water and soap be provided as the preferred means of washing. Therefore, additional justification may be required to show that hand sanitiser and wipes are able to sufficiently meet the needs of workers to prevent contamination from dirty work, after using toilet facilities and to clean themselves before eating, as well as showing that providing running water would not be reasonably practicable. Hand sanitisers and wipes are sometimes included in 'welfare kits' as described in 4.2.5.2. In this capacity, it was indicated by one respondent that the UK HSE considered these as an acceptable provision of welfare. It was clarified by the respondent that this was not viewed by the HSE as a long-term solution for the industry, but instead as a short-term improvement over solely vessel-based welfare. The above is reporting solely on the wording of the respondent; the RFI response does not necessarily represent a formal standpoint or response from the UK HSE.

(b) *Maintenance and logistics requirements*

There are minimal logistical or maintenance challenges with providing workers with sanitiser and wipes, the main one being ensuring they are kept well stocked, and that spent wipes are properly gathered and disposed of. There are no life cycle-related restrictions with this provision.

(c) *H&S impacts*

The only H&S-related concern with the use of sanitisers and hand wipes is that they may not be as effective as proper handwashing with soap and running water to remove contaminants from workers, particularly after dirty work where hands can become soiled or oily. Despite antibacterial properties, in some cases, reliance on gels may not be sufficient to ensure hands are clean enough after dirty work to allow for safe eating.

(d) *Perceptions from the industry*

Reliance on hand gel and sanitising wipes is perceived by workers as basic, but generally sufficient, with the provision being described as 'basic cleaning equipment such as wipes and sanitiser'. There are concerns that they are not as effective for proper handwashing, but as few offshore wind farms employ more sophisticated provisions, there is limited ability to compare experiences.

(e) *Cost–benefit indication*

Hand sanitisers and wipes represent a cost-effective option, with supplies being able to be purchased in bulk and stored on vessels, with minimal ongoing costs other than keeping a steady supply available.

(f) *Summary of pros and cons*

In summary, the pros and cons of hand sanitisers/wipes are:

Pros	**Cons**
Prevalent in use in the offshore wind industry, widely accepted by workers and service providers	Represent a basic solution, not able to provide as effective a clean as running water and soap. It is less clear how effective they are for cleaning hands following dirty work, or to clean hands prior to eating
Cheap and easy to deploy	Many regulations specifically require running water, including hot water with soap. As such, it is unclear how compliant reliance on these provisions can be
Generally able to satisfy requirement to disinfect hands after use of toilets or before consuming food	
In at least one case, reportedly recognised by the HSE as a suitable alternative to reliance on vessel-based welfare	

4.3.2.2 Large containers/IBCs stored on assets

(a) *Description*

An option that has been explored for welfare in offshore wind but has not been implemented is the provision of large water containers, such as 1 000 L intermediate bulk containers (IBCs). Provision of IBCs would serve to place a large quantity of potable water on an asset to serve as a source of running water for washing. This provision would likely need to be used in conjunction with other solutions for washing, such as sanitation units, welfare habitats or portable handwashing stations. This is because a container of water on its own does not provide a fully effective means of washing hands without a basin, soap, drainage system and means of controlling temperature. These would be considered either temporary fixed or permanent fixed welfare, depending on the exact use case if they are brought on and off assets with each visit or if they are installed on an asset and only replaced when the water requires changing.

(b) *Maintenance and logistics requirements*

The key logistics and maintenance requirements for IBCs would be the requirement to lift them on and off assets when they required replacement. While empty containers would be relatively light, a full IBC would weigh upwards of 1 tonne and constitute a significant lift, and containers made of heavier materials (such as steel tanks) could be expected to be heavier. The time between changes would vary depending on the length of time between visits to the asset, the conditions in which the water is being stored and the amount of water being used by workers in a single visit. Additional requirements would be placed on workers to monitor the quality of water stored for long periods on assets, or otherwise develop processes for determining when IBCs require replacement. Water storage would need to be kept in correct conditions to ensure water remained potable and in good condition for use for washing, including shielding from sunlight, temperature management and management of any additives. Guidelines for potable water storage and use in offshore industries are set

out in Offshore Energy UK *Guidelines for Environmental Health for Offshore Installations: Guidelines Addendum Potable Water Management*.

(c) *Life cycle implications*

Use of large containers is suitable for all life cycle phases, presuming that there is a suitable location on the asset for containers to be stored. Due to the limitations on long-term storage of water, this provision may be less suitable for infrequently visited assets during O&M.

(d) *H&S impacts*

The primary concerns for H&S around the use of large water storage tanks such as IBCs are the requirement for additional heavy lifts and the possibility of water becoming contaminated and presenting a health risk to workers. An often-cited concern when considering water being stored on assets is microbial contaminations such as *legionella*. In order to prevent microbial growth, stored water would need to be carefully managed. The Offshore Energy guidance indicates that water stored at below 20 °C or above 60 °C is effective at preventing *legionella* growth, as well as designing systems to prevent stagnation and the use of biocides to purify stored water. This would impose additional logistical and maintenance burdens on the provision.

Another concern is that the storage of large quantities of water could present an additional safety risk in the event of a loss of containment, which could result in internal equipment, particularly electronics, becoming damaged or put in an unsafe state. Suitable bunding for any water storage would therefore likely be required as a control measure, as is done for any other equipment containing stored fluids (such as transformers).

(e) *Perceptions from the industry*

As this solution is not currently in use, there are no testimonies from workers to give an idea of the perception of this provision in industry. However, at least one response to the RFI made reference to IBCs, raising concerns about the practicality of the solution: 'Where washing is concerned, if an intermediate bulk container was incorporated into the welfare design, based on the number of visits to the asset in a year, there is a potential health risk e.g. Legionnaires' disease.'

(f) *Cost–benefit indication*

The actual cost of a single standard IBC of potable water is relatively trivial, being available from £100 to £1 000, with a multitude of different options. Other, more sophisticated containers would increase the price of this provision and also vary greatly in cost. The real cost of this provision would be in the requirement for frequent cycling, transport and refilling of containers. There would additionally be costs in making space allocations on assets for water storage, as well as deck space for vessels transporting them.

(g) *Summary of pros and cons*

In summary, the pros and cons of large containers/IBCs stored on assets are:

Pros	**Cons**
Ensures that running water is always present on asset in sufficient quantities for washing requirements. Can form a suitable source of running water for other provisions	Without any additional provisions, this would not provide a full solution to washing requirements (as this would need a basin, soap, drainage, etc.)
The cost of obtaining basic IBCs would likely be relatively low	Without additional infrastructure, would be unable to provide hot water for handwashing
	Risks of large spillages damaging the asset
	The cost of obtaining more sophisticated storage containers as well as storing, maintaining and transporting them would need to be considered
	Additional processes and equipment required to monitor water and manage the changing process
	Potential H&S risk of mismanagement in long-term storage leading to contaminated water
	Frequent changing of water to prevent contamination may render water storage in large quantities ineffective as a solution

4.3.2.3 Water bottles/tanks transported with workers

(a) *Description*

An alternative to large water containers permanently on assets is the provision of smaller water bottles or tanks, such as 25 L jerrycans of either plastic or metal. These are brought on by workers for each shift, either carried or lifted depending on the means of personnel access, and constitute temporary portable welfare. These are currently in use in industry, though there is potential for their use to be expanded. Jerrycans can serve as a portable source of running water, though not as large as provided by an IBC, which can be used directly to wash hands or in conjunction to provide water for another provision. Multiple permanent cubicle toilet unit providers have indicated that their products require handwashing water to be changed out with each visit, and that 25 L jerrycans, which are in some cases already used on assets, are adequate to meet this need. Direct use of jerrycans or small water tanks for handwashing faces a similar barrier as discussed previously, as they do not provide a fully effective means of washing hands without a basin, soap, drainage system and means of controlling temperature. However, some models contain taps or pumps that could facilitate easier handwashing.

(b) *Maintenance and logistics requirements*

There are minimal maintenance or logistics requirements for this provision. Workers would need to bring an appropriate number of tanks with them for each visit, filled on the vessel or onshore. This would potentially necessitate an additional lifting of equipment on to the asset, but no significantly heavy lifts. As containers are used for potable water, there is a requirement to keep them clean and in good condition, but as they are not stored on assets this is a minimal requirement.

(c) *Life cycle implications*

This is a provision suitable for all life cycle stages, with no significant issues or restrictions.

(d) *H&S impacts*

In terms of H&S, the main impact of this provision would be if tanks were not being adequately maintained or water was allowed to go stagnant if left for long periods, increasing the risk of microbial infection such as *legionella*. Additionally, small-sized bottles would impose an additional manual handling requirement on workers, with associated risks.

(e) *Perceptions from the industry*

Use of this provision was not widely reported in the RFI, with one reference to 'Bottle[s] of water lifted/stored inside WTG'. It is understood from further discussions that requiring workers to bring small storage containers of potable water on to assets would not be a significant deviation from standard working practices. While there is potential for a greater quality of handwashing to be provided over use of hand gels and wipes, the actual usability of the provision would have to be considered for workers to adopt it (such as considering water temperature, etc.).

(f) *Cost–benefit indication*

Small water tanks present a low-cost solution to providing handwashing on assets, with minimal CAPEX and OPEX considerations. The primary issue is if they provide an effective enough solution to support their use over hand wipes and sanitising gels, and if additional provisions are required alongside them to function.

(g) *Summary of pros and cons*

In summary, the pros and cons of water bottles/tanks transported with workers are:

Pros	**Cons**
Effective method of ensuring there is adequate water on an asset whenever personnel are present. Can form a suitable source of running water for other provisions	Without any additional provisions, this would not provide a full solution to washing requirements (as this would need a basin, soap, drainage, etc.)

The cost of obtaining, filling and maintaining tanks or jerrycans would be small	Without additional infrastructure, would be unable to provide hot water for handwashing
	Requires additional equipment to be brought on to the asset with each visit

4.3.2.4 Portable handwashing stations

(a) *Description*

Portable handwashing stations refer to a number of provisions that are effectively portable taps and basins. Models are either freestanding or can be affixed to a wall, and consist of a tap, basin, soap/gel dispenser, water and power source. They are often intended for food preparation or medical uses in remote or temporary facilities, and so are able to provide a high quality of handwashing in challenging environments. Models vary, but it is possible to find versions that operate without plumbing or mains electricity, and that can offer hot water. Water sources, in the absence of plumbing, can be provided by connecting the provision to external water tanks, ~15–25 L, with a separate tank required for collecting used water from the basin. Power can be provided either by batteries or by connection to the asset through a junction box (in the case of models that require a mains electricity source). These are not currently in use in offshore wind and, to the knowledge of this study, are not currently being explored by any projects. Depending on if they were permanently fixed to an asset or if they were lifted temporarily for when work is underway, they would be classed as either temporary fixed or permanent fixed welfare. This also would determine whether they are permanently 'set up', so only requiring fresh water be connected on each visit, or if they would need to be lifted on to the asset and assembled by workers before use.

(b) *Maintenance and logistics requirements*

In terms of maintenance and logistics, aside from the requirement for space allocation, the primary concerns would be around lifting the unit and replacement water on to the asset. Maintaining the water source for portable handwashing stations would also require regularly replacing potable water and removing stored used water, which would then need to be lifted back to vessels where it could likely be entered into onboard water management systems. As there are currently no models for this provision that are designed for offshore wind, frequent replacement of components or units may be necessary if they are not suited to harsh offshore conditions. Models that operate with power sources, such as those capable of producing hot water, would require maintenance of batteries or connection to the asset's power system.

(c) *Life cycle implications*

There are no specific life cycle restrictions on the use of this provision, provided there is space to set up and use a unit. Based on a comparison of commercially available units, an approximate footprint of 0.5 m × 0.5 m × 1 m would be required to accommodate a unit. If installed on or inside foundations of an asset, units could be utilised through the entire life cycle, whereas if installed internally to WTGs or OSSs, they would be limited to use in later-stage C&C and in the O&M phase.

(d) *H&S impacts*

There are no major H&S concerns, other than a requirement for additional lifts to be performed, and that mismanagement of water (such as long-term storage of potable water in stagnant conditions, or use of greywater instead of potable) could result in contamination and microbial infections such as legionella. There is also the risk of operating running water in close proximity to electrical components, though certified products should be designed with this in mind.

(e) *Perceptions from the industry*

As this provision is not currently being explored for offshore use, there are limited experiences to draw upon to understand how they may be perceived by workers. Similar technology to portable handwashing stations is currently in use integrated into temporary or permanent sanitation units, which are well received by users.

(f) *Cost–benefit indication*

From research of available models, the cost to purchase individual units can vary from £100 to £1 000 depending on specifications, with some being available on a rental basis instead. While these costs are relatively low for an effective solution, it should be considered that this is only for provision of handwashing and no other welfare, and that for larger crews multiple units per asset may be required. As this technology is untested in the offshore wind industry, there is an additional element of project risk that would need to be taken into consideration if this was implemented.

(g) *Summary of pros and cons*

In summary, the pros and cons of portable handwashing units are:

Pros	**Cons**
Units designed to meet the requirements for handwashing, including a basin, running water, drainage and (depending on the option selected) hot water	Novel technology (for offshore wind) that is untested in this application, which could carry project risks
Low upkeep requirements, main requirement being to maintain water tanks and manage power sources (if required)	Units are limited in size, and so dependent on the size of crews offshore multiple units may be required, or higher usage may require multiple changes of water per asset trip
Cost-effective option to supplement washing facilities available on assets and/or vessels	If used on a temporary basis (i.e. taken to the asset with each visit and taken away at end), then an increased number of offshore lifts would be required with each visit
	Requires water to be lifted on to the asset, and waste water to be removed, with each visit

4.3.2.5 Combination of washing with toilets

(a) *Description*

As has been discussed in previous sections, multiple temporary and permanent welfare units are available on the market, particularly sanitation units, which allow for handwashing as part of the same provision. Combined sanitation/washing provisions are in use in the industry, and consist of temporary fixed or permanent fixed welfare provisions. These generally require small (~15–25 L) water tanks to be brought on to the asset and connected to the tap and basin in the toilet units, with some even having hot water capabilities. There is an advantage to providing washing in combination with sanitation, as one of the primary washing requirements is for workers to be able to wash after using toilets. However, this also provides a limitation as it means workers who need to wash without needing the toilet (such as prior to eating or after dirty work) still need to visit sanitation facilities. Additionally, as toilet cubicles are designed to be efficient in their use of space, the basins provided are often small and so may not be suitable for more intensive washing jobs, such as washing of oil or grease from forearms, for example.

(b) *Maintenance and logistics requirements*

Maintenance of combined washing/sanitation units requires cleaning of the combined unit, as well as restocking the water provisions as has been discussed previously.

(c) *Life cycle implications*

Life cycle phase suitability is dependent on the type of sanitation unit, where it is able to be located and what restrictions are in place for its use.

(d) *Perceptions from the industry*

There were no specific comments in the RFI indicating a preference for whether washing facilities should be integrated with sanitation or separated; however, it can be observed that movement towards less temporary or rudimentary provisions is well received by workers.

(e) *Cost–benefit indication*

The primary cost–benefit point of combining washing with sanitation facilities is that it in effect covers two requirements with one provision, reducing the requirement for the project to acquire additional welfare provisions. Specific points will depend on the type of sanitation welfare that is combined with washing.

(f) *Summary of pros and cons*

In summary, the pros and cons of combined washing and sanitation provisions are:

Pros	Cons
Improved efficiency in combining handwashing with toilet facilities, as these must often be used together anyway	If the only washing provided on the asset is combined with sanitation, it requires all workers to wash their hands in the sanitation cubicle for all purposes, including washing prior to rest or when workers are dirty. Sanitation washing basins may not be sufficient for these tasks
Reduces the requirement for dedicated handwashing provisions to be installed on the asset	Combined use may impact the effectiveness of the sanitation unit, limiting its availability and consuming the water supply

4.3.3 Rest

In brief, the requirements of rest provisions should be:

– A safe and clean space for workers to take a break from working.
– To allow workers the opportunity to sit down and rest before resuming work.
– To allow workers the opportunity to eat and drink during breaks (provisions for preparing food, eating and drinking are discussed in 4.2.4 on mess).

4.3.3.1 Portable resting provisions

(a) *Description*

It was reported that as a form of temporary portable welfare in use in the offshore wind industry, workers are provided with rest equipment they can use when taking their breaks on assets. These can include folding chairs and tables, as well as cushions, which are lifted on and off assets with each visit. These are sometimes provided as part of 'welfare kits' as described in 4.3.5.2. In this capacity, it was indicated by one respondent that the UK HSE reportedly considered these as an acceptable provision of welfare. It was clarified by the respondent that this was not viewed by the HSE as a long-term solution for the industry, but instead as a short-term improvement over solely vessel-based welfare.

(b) *Maintenance and logistics requirements*

Maintenance and logistics requirements for portable furniture provisions are low, requiring only that they be lifted on and off assets with each visit, and that the provisions themselves are well maintained and replaced when required.

(c) *Life cycle implications*

As a provision, they are suitable for any life cycle phase provided there is an enclosed space where they can be erected for breaks. While these provisions can be set up on external platforms, it is dependent on the weather conditions during the visit.

(d) *H&S impacts*

In terms of H&S, the main concern with these provisions is that, while the requirement for a break and seating is met, there is no provision for a safe space to take a break. This results in workers taking breaks in whatever space they can find on assets, potentially exposing them to unhygienic conditions in their break. This is a particular concern considering breaks are often used as an opportunity to eat as well. There are additional concerns, depending on where equipment is set up and what work is being undertaken, of workers being exposed to dust, toxic materials or HV equipment during their breaks.

(e) *Perceptions from the industry*

Provision of equipment for breaks on assets is considered as an improvement over no welfare being provided at all, where workers have reported 'People sitting on floors when having breaks is the norm' if there is no vessel available to take them for a break. However, even if seating is provided, the issue of no dedicated resting area being provided is still present: 'No dedicated place for rest/having lunch in WTG. Potential safety issue if not possible to have lunch outside of WTG (weather). Potential risk of standing near HV electrical equipment.'

(f) *Cost–benefit indication*

In terms of cost, providing portable furniture for each crew visiting an asset is likely to be of a trivial cost for a project, and there is a clear benefit over provision of no welfare at all. The only drawback is that the provision does not provide a safe space for workers to rest on an asset, which means it does not comprise a complete provision.

(g) *Summary of pros and cons*

In summary, the pros and cons of portable rest provisions are:

Pros	**Cons**
Represents an improvement over no rest provisions being provided on assets at all	Does not meet requirements to have a dedicated safe place to rest
Fulfils the requirement of allowing workers to sit, and provisions with tables allow for workers to eat as well	Risks exposing workers to potentially hazardous conditions while resting
Convenient and cheap short-term solution to improve welfare outcomes. Minimal requirements for maintenance or logistics	
In at least one case, reportedly recognised by the HSE as a suitable alternative to reliance on vessel-based welfare	

4.3.3.2 Fixed resting provisions

(a) *Description*

This option incorporates rest provisions, such as tables, chairs, food preparation areas, etc., that are built into assets as permanent features, rather than being temporary equipment brought in while workers are present. This can represent either permanent fixed welfare, if furniture for resting is installed after the asset is constructed, or as integrated welfare if

it is part of the OEM design. Provisions can comprise either entire dedicated rooms or just inclusion of fixed furnishings as part of the asset. There are indications that fixed welfare is in use in the offshore wind industry, primarily for OSSs and in rare cases for WTGs, but that it is an area worthy of further exploration. One respondent to the RFI confirmed that rest provisions are sometimes provided by WTG OEMs, though that these can be quite basic, stating: 'We have had seating (just seats) in the tower sections, specified by customers, it is typically sold project specific.'

(b) *Maintenance and logistics requirements*

Provision of rest spaces or furnishings within the asset has advantages in terms of logistics as they do not require additional lifts to bring equipment on board with each visit. However, depending on the extent of provisions, there will be additional requirements to maintain any rooms or spaces used for rest to keep them clean and fit for purpose. Inclusion of dedicated rest spaces in an asset will require involvement from the OEM, either to include the welfare as part of the design or to make a space allocation for it.

(c) *Life cycle implications*

The availability of fixed rest provisions in the project life cycle depends on which asset it is integrated to. Welfare located inside foundations is available from earlier in the construction phase, while spaces inside the WTG/OSS would not be available until later, when these assets have been installed.

(d) *H&S impacts*

There are no obvious H&S concerns with fixed rest provisions being included in an asset, depending on how it is included. If welfare takes the form simply of furniture built into workspaces, then this would not meet the requirement for rest spaces to be a separate and safe space, as workers may still be exposed to dirt, dust, toxic materials or HV equipment during their breaks. However, if a dedicated rest room is provided in the asset, then this would be more likely to meet the requirement and reduce H&S concerns. With any dedicated rooms, keeping them maintained and fit for purpose would be a high priority, particularly if their intended use includes food preparation.

(e) *Perceptions from the industry*

As fixed rest provisions are rarer to come across, it is difficult to gauge worker perceptions in the industry towards them. At least one RFI response highlighted that they had 'No issue with [offshore substation] where all welfare rooms are available.' One user indicated that rest rooms were provided and were seen as the primary source of welfare, with vessels being used as a backup if capacity of the platform was exceeded: 'We have […] rest rooms for the capacity of the platform and where this is exceeded, we have ensured that the supporting vessel stay on station to offer additional support if required.'

(f) *Cost–benefit indication*

Costs for fixed rest provisions in assets will vary depending on the quality of provisions, with simple furnishings being less of an expense (and likewise less of an effective provision) than full rest rooms. Where these are integrated into OEM designs, the costs are likely to be incorporated into the overall cost of the assets and passed on to project developers.

(g) *Summary of pros and cons*

In summary, the pros and cons of fixed resting provisions are:

Pros	Cons
Provision of welfare on the asset, reducing the need to transfer back to a vessel	If a separate room is not included, does not meet requirements to have a dedicated safe place to rest, which risks exposing workers to potentially hazardous conditions while resting
Can fulfil the requirement of allowing workers to sit, and provisions with tables allow for workers to eat as well	Potentially a costly option, depending on the space required on assets to accommodate
Minimal requirements for maintenance or logistics once installed	
If rest rooms are provided, fulfils the requirement for a separated, safe space for workers to rest on the asset	

4.3.4 Mess

In brief, the requirements of mess provisions should be:

– That workers are provided with sufficient sustenance and hydration throughout their working day.
– That workers be given the opportunity to prepare and eat food in a safe and hygienic manner (provisions for workers to rest while eating food are discussed in 4.2.3 under rest).

4.3.4.1 Cold food and hot flasks taken on to asset

(a) *Description*

A key distinction for how mess is treated in the offshore wind industry is whether workers are given the opportunity to prepare hot food on assets, or if they are limited only to what they can bring with them when transferring. A common provision is for workers to be provided with cold food and pre-heated flasks (containing coffee, tea, soup, etc.) that are prepared on vessels or onshore bases, and to have no means of preparing food on assets. It appears to be variable between projects and organisations whether food is provided for personnel, or whether they are responsible for providing their own. This represents an example of temporary portable welfare and is in use in the industry.

(b) *Maintenance and logistics requirements*

There are no major logistical or maintenance challenges with this provision, other than ensuring there are facilities on vessels/onshore bases for cold meals or hot flasks to be prepared, and that these are stored in suitable containers to be brought on to assets. This may be more practicable on larger vessels such as SOVs than smaller vessels such as CTVs that will have more limited facilities to prepare food.

(c) *Life cycle implications*

There are no limitations to how this provision is offered across life cycle phases.

(d) *H&S impacts*

There are no major H&S concerns with this provision. Hot flasks may prove a risk of burning if they are spilled, or prepared at too hot a temperature, but this is a minor concern. Additionally, workers have raised that particularly when food is not provided by the company and staff have to prepare themselves, there are limited suitable healthy options available. As one respondent put it: 'Food is not provided which can be difficult on shift work to buy and cook healthy food. Premade food becomes the food of choice which isn't the healthiest.' Finally, this provision operates on the assumption that workers will be eating on assets. If no suitable location has been provided for them to eat, then this creates additional concerns for contamination, of both the food and of the area being used as a temporary mess area.

(e) *Perceptions from the industry*

Perception of this provision by workers is mixed. In some cases, it is accepted as being standard practice. However, it has also been indicated by workers that, especially when combined with a lack of adequate rest areas on assets, lack of or limited access to hot food can be detrimental to workers' dignity and morale. This is exacerbated when working in cold or wet conditions.

(f) *Cost–benefit indication*

Regarding cost, this provision requires minimal investment, particularly if the responsibility to provide food is placed on workers. If food is provided, this would constitute a small but consistent OPEX and would need to be accounted for in operating budgets, fluctuating with the number of staff and length of time offshore.

(g) *Summary of pros and cons*

In summary, the pros and cons of cold food and hot flasks being provided on assets are:

Pros	**Cons**
Cost- and time-effective, as time is not spent by personnel preparing food on the asset, as this can be done on the vessel or on the onshore base ahead of time	Impact on morale due to being limited to cold food, particularly on long working days in poor conditions on assets
There are no significant H&S impacts from preparing food or from bringing cooking equipment on to assets	Limitations on what food staff can provide for themselves without cooking facilities. This can make it difficult to ensure proper nutrition
	Requires personnel to eat on the asset, which unless there is a dedicated space provided allows for potential contamination and H&S concerns

4.3.4.2 Portable cooking appliances

(a) *Description*

It has been reported that on some projects, where workers are expected to take food breaks on assets, they are able to bring cooking appliances on to the asset, such as microwaves, kettles, portable grills, camp stoves, etc., and use these to prepare hot food. This expands the range of meals that workers are able to prepare for themselves offshore, as they are not restricted to what can be eaten cold or brought in flasks. In some cases, these appliances are provided by the employer, while on others it appears they are provided by workers themselves. This represents an example of temporary portable welfare and is in use in the industry.

(b) *Maintenance and logistics requirements*

Introduction of cooking appliances creates additional logistical concerns for projects. Firstly, appliances will generally require a source of electricity, whether this is a temporary generator already in use on the asset, a portable battery or connection to the asset's power system. Especially if provided by the employer, appliances must be regularly maintained, including cleaning, portable appliance testing (PAT) and ultimate replacement. Equipment additionally must be brought on and off assets at the beginning and end of shifts, requiring additional lifts or added weight in lifts offshore. Additionally, if portable cooking appliances are used, then there is an expectation that workers are preparing food as well as eating on assets. Therefore, it must be considered if there is a safe and suitable location for workers to use appliances and prepare food.

(c) *Life cycle implications*

In terms of life cycle phase, this provision is only suitable where the asset is built to a point where there is a sheltered space to cook/heat food (such as when TP or tower is erected).

(d) *H&S impacts*

One reason cited for not allowing workers to bring cooking appliances on to assets is perceived H&S risks. The most notable of these is that appliances and the act of cooking introduce an unnecessary source of electrical and fire hazards to assets. This is especially true if appliances are provided by workers and are not properly maintained, and if there is no dedicated space on the asset for workers to prepare food. There have been reports of workers using portable grills or stoves in the nacelle of WTGs, where there is sensitive equipment as well as sources of oil and grease that could exacerbate a fire from misuse of cooking equipment. Additionally, if workers are encouraged to prepare food on assets, and there are no suitable locations provided, then this creates additional concerns for contamination, of both the food and of the area being used as a temporary mess area. Finally, as has been mentioned previously, there are concerns as to the quality of food that can be prepared and eaten on assets, and workers having limited choices, particularly if they must provide food themselves.

(e) *Perceptions from the industry*

The perception among workers is that the opportunity to be able to cook and heat food on assets is welcome, as it allows a greater variety of options and the opportunity to enjoy hot meals while working in challenging conditions.

(f) *Cost–benefit indication*

If provided by employers, the cost of appropriate portable appliances for each crew needs to be considered. If food is provided, this would need to be accounted for in operating budgets and would increase with the number of staff and length of time offshore.

(g) *Summary of pros and cons*

In summary, the pros and cons of portable cooking appliances are:

Pros	**Cons**
Allows workers to prepare their own hot food, improving morale and quality of food eaten at breaks	Additional logistics and maintenance required to provide, transport and maintain portable appliances and prevent further risks
	If no suitable place for use of appliances or preparation of food is provided, this risks exacerbating hazards, including contamination of food

4.3.4.3 Hydration

(a) *Description*

It has been widely reported that adequate drinking water is provided on offshore wind projects, to meet the needs of workers. The most common method for this to be provided is reported as provision of individual bottles of water and water flasks to workers, as well as larger 'Bottle[s] of water lifted/stored inside WTG'. This represents temporary portable welfare and is in use in the industry.

(b) *Maintenance and logistics requirements*

There are no major logistical concerns around providing bottled water to workers, other than enough must be provided for every worker on each day of work, that they must be lifted or carried on to assets with each visit and that both unused and emptied bottles must be removed from assets at the conclusion of work. Collecting used bottles is particularly important, to prevent assets contributing to ocean pollution and to stop them from becoming a source of hazards on assets.

(c) *Life cycle implications*

Water can be provided to workers across the offshore wind life cycle phase.

(d) *H&S impacts*

Provided that water bottles are either filled from a potable source, or provided in sealed containers, and there is enough for all workers, no H&S risks from provision of water are anticipated. The previously mentioned Offshore Energy UK guidance contains information on the proper storage and management of drinking water, which should be taken into consideration.

(e) *Perceptions from the industry*

Drinking water is provided as a standard requirement for employees, and this provision is widespread across the industry. There were no worker testimonies that indicated water was not being provided offshore, with the closest reference being that when insufficient toilet facilities are provided, it is not uncommon for some workers to withhold from adequate hydration.

(f) *Cost–benefit indication*

Provision of adequate drinking water to workers is widely viewed as a project necessity that can easily be done in a cost-effective manner. Provision of drinking water ensures that workers are well hydrated on shifts, and there are no obvious drawbacks.

4.3.5 All-welfare solutions

4.3.5.1 Vessel-based

Vessel-based welfare as a solution for providing all-welfare needs to an offshore asset is discussed at length in 4.1.3.2.

In summary, the pros and cons of vessel-based welfare are:

Pros	Cons
A solution requiring limited upfront costs or investment on offshore assets, beyond what was already required to bring workers to the asset, which can provide all welfare requirements (sanitation, washing, rest and mess)	Unless the vessel is permanently docked or in proximity to the asset, welfare is in effect not being provided to workers
Convenience from a design perspective, as no modifications to the asset are required and there are no additional requirements for maintenance, logistics or handling waste outside what was already required for the vessel	Specifically for use of sanitation, where requirement cannot be planned or predicted and convenience of access is required, significant delays to access provisions can make this solution unsuitable

Pros	Cons
A well-established and accepted practice by industry that workers are familiar with. Workers generally have a favourable perception of facilities on vessels	Additional burden is placed on the worker to have to call in the vessel, which they may be reluctant to do. Specifically for sanitation purposes, it has been reported that workers will not call in the vessel and instead take matters into their own hands, resulting in unacceptable outcomes
	There is generally poor perception of this provision among workers, who do not view it as being considerate of their needs and a sign of lack of care for welfare needs by employers
	Reportedly, recent action by UK HSE has indicated that reliance on vessel-based welfare is not acceptable or compliant with UK regulations, even in cases where the vessel is constantly docked with the asset

4.3.5.2 Welfare kits

(a) *Description*

When temporary welfare is being brought on to assets, it has been reported that this is done so in the form of 'welfare kits' or 'welfare boxes'. These kits are described as being collected together by workers or provided to them by their employers, and are not available for purchase as a collected kit (though that may prove to have some value as a product to offshore wind companies). They represent temporary portable welfare in use in the industry. Welfare kits typically can include:

- A portable camping toilet with tented privacy screen.
- Sanitising gel and hand wipes.
- Food and bottled water provided for the day (as well as any cooking appliances provided, if any).
- Folding tables, chairs and/or cushions, for use during breaks.

It was also reported that these kits can be combined with overnight emergency provisions, such as emergency rations, blankets, sleeping bags, etc. in case of workers being stranded on assets. It was indicated by one respondent to the RFI that the UK HSE, upon inspection of an offshore wind site, reportedly considered the kits and their contents as an acceptable provision of welfare. The kits were reported to contain 'table, chairs, portable toilet/privacy screen, emergency rations/overnight equipment', and they went on to say '[welfare kits] meet the requirements. HSE inspection confirmed this and they confirmed that the welfare was suitable/sufficient however did state that industry needs to do more.' It was clarified by the respondent that this was not viewed by the HSE as a long-term solution for the industry, but instead as a short-term improvement over solely vessel-based welfare. The above is reporting solely on the wording of the respondent; the RFI response does not necessarily represent a formal standpoint or response from the UK HSE.

(b) *Maintenance and logistics requirements*

The requirement to maintain a welfare kit will depend on its contents, but collecting the various welfare equipment that will be required by workers for an asset visit into a single container can present advantages for logistics. This includes requiring only a single lift on and off the asset and allowing for easier tracking of provisions by regularly storing all equipment together. Processes can be put in place to ensure the contents of the kit are checked and confirmed prior to any visits.

(c) *Life cycle implications*

There are no specific life cycle restrictions on the use of welfare kits, beyond the restrictions imposed already by their contents.

(d) *H&S impacts*

There are no specific H&S concerns with packaging welfare together, but individual components of welfare boxes may contain concerns (such as the hygiene concerns that have been reported concerning portable toilets).

(e) *Perceptions from the industry*

There are few specific references by workers to welfare kits that allow the study to gauge their perception. In general, provision of welfare on the asset as opposed to reliance on a vessel is welcomed by workers, but the quality of those provisions can be called into question.

(f) *Cost–benefit indication*

Regarding cost, the specifics of any analysis will depend on the exact contents of the welfare kits. However, if it has been determined that temporary portable welfare is to be used on a project (which already is cost-effective in terms of minimal CAPEX and OPEX), there is no reason why collecting the equipment for convenience and practicality should not be done.

(g) *Summary of pros and cons*

In summary, the pros and cons of welfare kits are:

Pros	**Cons**
Provision of welfare equipment on assets is often preferable to reliance on vessel-based welfare	Relies ultimately on temporary portable welfare measures, which as discussed in the sections for individual components can often be ill-suited to meeting the welfare needs of workers offshore
A practical measure to combine welfare into one box for ease of transportation	
Aids in ensuring that a standard pack of welfare equipment is brought with every asset visit to meet welfare requirements	
Possibility for an offshore wind-specific welfare kit to be produced to standardise equipment	

4.3.5.3 Welfare habitats

(a) *Description*

Welfare habitats for offshore wind are a relatively new solution that have been explored as either temporary fixed or permanent fixed welfare for offshore wind assets. There is some evidence that these have been utilised for OSSs in some form, being installed on topsides during busy periods of C&C and then removed at the conclusion of work, but it does not appear as if their use is widespread in the industry. Their use for WTGs has been the subject of investigation by multiple developers, with providers of welfare products investigating how best to meet these needs.

Welfare habitats, also referred to as 'welfare containers', 'welfare pods', 'welfare cabins' or 'all-inclusive welfare', represent a containerised solution for welfare in offshore wind, inspired by welfare trailers or cabins that are seen in remote onshore construction sites, and in the onshore wind farm industry. Exact designs vary, but examples have been seen based around retrofitted standard DNV 10 ft or 12 ft shipping containers, or otherwise having similar space requirements, but sizes could vary depending on manufacturers. Weight of units is something that would also vary by manufacturer and contents of each habitat, but it was indicated that they could weigh up to 2 tonnes, and they would be incorporated on to asset foundations, TPs or EWPs. The goal of welfare habitats would be to include all provisions for sanitation, washing, rest and mess that are required. Typical units could contain:

- Cubicle toilets, with waste management systems similar to permanent fixed toilets already available in the industry. Multiple toilets could be included if required and space allowed.
- Basins for handwashing with tank-fed running water.
- Small kitchenette with sink for food preparation, with options for powering cooking appliances.
- Heating/cooling systems for temperature control.
- Seating area with a table.
- Space for PPE storage (if space restrictions allow).
- Drying/changing rooms or showers (if required and space restrictions allow).

Exact provisions included would be dependent on the models available, requirements of the project and the space that can be made available to accommodate the asset. Power requirements for containers would vary based on designs, with options including diesel generators, connection to the asset's power system, solar panels or a combination of options. Depending on the use case, welfare habitats would require their containers to be rated for exposure to offshore conditions, either for short term if only used for specific work campaigns on larger assets, or long-term exposure if intended for placement for the entire lifetime of an asset. It is mentioned in the RenewableUK guidance on welfare that, if suitable, welfare provisions could be combined with those for overnight refuge on assets. While not specifically mentioned by any product developers, this is an area that could be explored to increase the potential functionality of habitats.

(b) *Maintenance and logistics requirements*

Incorporating a welfare habitat on to an asset would be a considerable adjustment for logistics and maintenance. Individual components of the habitat, such as toilets, power systems, water source, climate control and furniture, would need to be maintained, possibly requiring further

offshore lifts if requiring replacement. In the worst case, faults could require replacement of the entire unit constituting a major offshore lift, but use of modular components which can be easily removed and replaced could ease this. Additionally, the external space requirement for a welfare habitat could place additional limitations or obstructions for other lifting operations.

The sanitation provision as part of the habitat would need to be managed, with specific logistics dependent on the technology being utilised. Most habitat designs would likely utilise cassette-based systems with a removable waste tank, that would require lifting and exchanging when full. Additionally, depending on specific designs, the water sources used for the habitats would likely require regular changing, at least with every visit, unless designed in such a way as to allow for long-term storage of large quantities of water. Finally, in order for facilities to be fit for purpose, regular cleaning by offshore wind personnel would be required as part of their standard duties.

(c) *Life cycle implications*

Welfare habitats represent a solution that could be suitable for all life cycle phases, provided that there is sufficient space available on the asset for them to be placed. If incorporated into an asset design early, they could be installed onshore during fabrication. However, if retrofitted on to an existing asset or intended for short-term use, they would require suitable lifting points and constitute a substantial lift.

(d) *H&S impacts*

In terms of H&S, the only concerns would be the additional lifts required in order to maintain the provisions, which depending on design could be kept to a minimum. Additionally, the inclusion of any cooking appliances as permanent fixtures of the asset, as well as possibly diesel generators (if required), could present additional risks of electrocution or fire. Finally, as with any welfare provision intended for long-term use, if regular maintenance was neglected then the unit may pose a danger to health from dirt or contamination.

(e) *Perceptions from the industry*

As this is not a widespread provision, with only one report being obtained by this study of their use on an OSS, it is difficult to gauge workers' perceptions of all-inclusive welfare habitats. There is a noted reluctance, as has been mentioned already, from workers to have a requirement to clean or maintain any facilities permanently installed on assets. However, it has been indicated that this reluctance may be because it is not standard practice currently, and that other workers would appreciate the benefits offered by more expansive provisions. In RFI follow-up discussions with developers who have investigated these options, as well as product suppliers currently developing solutions for the industry, there was definite enthusiasm for the potential of welfare habitats. Numerous references were made to 'all-inclusive' solutions for welfare as being something to strive towards in the industry, a long-term goal for new projects, to ensure that all welfare needs can be achieved on the asset with no requirement for vessels. These solutions were praised for being 'Fully independent unit at point-of-work; usable regardless of turbine status' and 'meet[ing] all welfare needs without dependency on other systems'. An additional benefit noted was that 'there will be an environmental/cost upside in that teams can be left on the location for a full shift without the SOV needing to sail back.' It was acknowledged that this would come at 'High upfront cost' and 'design integration burden', but that it could represent the 'Gold standard' for welfare offshore, and be a solution that 'sets benchmark for the industry'.

(f) *Cost–benefit indication*

It is difficult to assess exact costs, as this provision is not yet widely available in the industry. It has been indicated that each welfare habitat would be a sizeable investment for a project, with prices estimated at approximately £20 000–25 000 for a single unit. While this does not account for any economies of scale across large projects, it would still represent a large investment if required on every offshore asset. Not only considering the direct CAPEX of the units, there may also be the additional costs of ensuring a space accommodation on the EWP or TP for the unit to be located.

(g) *Summary of pros and cons*

In summary, the pros and cons of welfare habitats are:

Pros	**Cons**
Would meet all welfare needs on an asset with no requirement for workers to transfer back to vessels during their visit, including dignified and sanitary toilet provisions, multiple points for handwashing, dedicated space for food preparation and for workers to rest, and possibly changing and storage facilities if available. Could be considered as a 'best in class' or 'gold standard' welfare provision	Comparative to other welfare options, represents a more expensive CAPEX expenditure and potentially requires more expansive design considerations
Takes an established approach utilised by the onshore wind industry, adapted for offshore usage	External location requires personnel to go outside to access welfare
Opportunities to minimise lifting, including installation during onshore fabrication and use of modular components	Introduces new systems and equipment to asset to be maintained
	Less suitable for retrofitting to some existing projects due to large size requirement

4.3.5.4 Integrated welfare rooms

(a) *Description*

Integrated welfare rooms represent the highest level of welfare that could be available on offshore wind assets. Like other integrated welfare solutions, these would be designed into assets by OEMs, either OSSs, foundations or WTGs. To the knowledge of this study, this is a solution that is not being actively explored by OEMs, with the exception of dedicated welfare rooms incorporated into some OSS designs. Specific designs of integrated welfare rooms vary, but would in effect be the same as welfare cabins seen in onshore construction (or the welfare habitats described in 4.2.5.3), but integrated into the design of the asset rather than being transported to a site or retrofitted to the asset.

Typical units could contain:

- Cubicle toilets, with waste management systems similar to permanent fixed toilets already available in the industry. Multiple toilets could be included if required and space allowed.
- Basins for handwashing with tank-fed running water.
- Small kitchenette with sink for food preparation, with options for powering cooking appliances.
- Heating/cooling systems for temperature control.
- Seating area with a table.
- Space for PPE storage (if space restrictions allow).
- Drying/changing rooms or showers (if required and space restrictions allow).

(b) *Maintenance and logistics requirements*

Exact maintenance or logistics requirements for integrated welfare rooms, including requirement for handling waste, provision of power and water and additional lifting for component exchange, would depend on the specific product and technology chosen by the OEM/supplier. An advantage over retrofitted solutions however is that, with provisions integrated into the asset, it is possible for the logistics of use to be considered from conception rather than being an additional requirement added on to the asset (as is the case where a third-party welfare product is used as per the previously described provisions). This could include, as discussed previously, utilising filtered seawater for non-potable purposes or direct disposal of sewage into the sea (via a small treatment plant). Additionally, power requirements for integrated welfare rooms could likely be drawn from the asset itself, reducing requirement for management of batteries, solar panels or generators. As discussed previously, this represents an area for further exploration by service providers and OEMs, to determine if there is a viable use case here to limit the maintenance and logistical burden of welfare.

(c) *Life cycle implications*

The availability of integrated welfare in the project life cycle would depend on which asset it is integrated to. Welfare integrated into foundations would be available from earlier in the construction phase, once the welfare has been installed and commissioned. Welfare integrated into the WTG/OSS would not be available until later, when these assets have been installed and the welfare brought into commission. How quickly welfare is available also depends on the design from OEMs, who could specify that welfare rooms be one of the first parts of an asset installed to support the remainder of the construction phase. One additional life cycle consideration for integrated welfare is balancing the size of provisions with the number of personnel expected in each life cycle phase. It has been indicated that, on OSSs, only small facilities are actually integrated into the asset to support the O&M phase, with vessels or temporary facilities (such as temporary toilet cubicles as discussed in 4.2.1.1.2 or welfare habitats as discussed in 4.2.5.3) used in C&C.

(d) *H&S impacts*

H&S impacts of integrated welfare rooms do not differ greatly from those already discussed regarding welfare habitats, with the additional point that risks from integrated welfare would be considered into the design of assets from the outset. Key points of risk could include

handling of human waste, long-term storage of water for washing, potential introduction of fire and electrocution risks from cooking appliances and sanitation and hygiene concerns that could present H&S risks if permanently integrated provisions were not maintained properly and allowed to fall into disrepair.

(e) *Perceptions from the industry*

There have been few direct references or testimonies regarding integrated welfare rooms, with the only discussion of them being in regard to OSSs. Reference was made in the RFI to 'very small permanent welfare facilities on [offshore substation]' and that '[the offshore substation] was provided with sufficient facilities'. As has been discussed before, there is a notable reluctance from some workers to maintain welfare, even when permanent toilets were designed into an asset. This is illustrated by the comment that integrated facilities were 'never used due to maintenance'. It was highlighted by numerous RFI responses that integration of welfare into assets, particularly into WTGs, would be a preferable solution to the current welfare issues in the industry, and additionally that including access to all provisions on an asset could be viewed as a 'Gold standard', which would allow for all welfare needs to be achieved on an asset with no requirement for vessels.

(f) *Cost–benefit indication*

From the perspective of developers, integration of full welfare rooms would increase the cost of key assets. However, as has been discussed regarding integrated sanitation, there would then be no need for developers to provide welfare provisions on the asset or rely on vessel-based welfare, allowing for costs to be reduced elsewhere. The exception to this is in the period before welfare units are commissioned on the asset, or if additional welfare was required to meet higher periods of demand such as commissioning.

(g) *Summary of pros and cons*

In summary, the pros and cons of integrated welfare rooms are:

Pros	**Cons**
Fully integrated welfare can be incorporated into OEM designs, including requirements for logistics and maintenance, reducing the risk of interfaces with third-party components (e.g. creating lifting obstructions)	Integrated welfare is potentially less flexible than other options, with only a fixed number of provisions available. To accommodate for larger numbers of workers, such as during construction, additional provisions may need to be brought on board assets

Would meet all welfare needs on an asset with no requirement for workers to transfer back to vessels during their visit, including dignified and sanitary toilet provisions, multiple points for handwashing, dedicated space for food preparation and for workers to rest and possibly changing and storage facilities if available. Could be considered as a 'best in class' or 'gold standard' welfare provision	Potential for permanently integrated facilities to fall into disrepair with poor maintenance
There is an opportunity for OEMs to innovate very high-quality welfare provisions, surpassing what is currently available, allowing standardisation of welfare across industry	Introduces new systems and equipment to the asset to be maintained
Welfare integrated into assets would be available throughout the lifetime of the asset from the point where it is commissioned	A lack of motivation from OEMs to integrate welfare into designs, particularly on WTGs, is noted throughout RFI
	Welfare facilities would not be available until they are commissioned on the asset. In the case of WTGs or OSS topsides, this would not provide welfare during the early construction phase
	Would likely result in an increase in the cost of assets being passed on to developers

5 RECOMMENDATIONS AND CONCLUSIONS

5.1 RECOMMENDATIONS FOR G+

As part of the conclusion to this study, G+ has requested that recommendations be made for what its next steps and priorities should be for the next phase of the welfare workstream.

A high-level recommendation of this study is that the G+ should proceed in developing good practice guidance for welfare in the offshore wind industry. This is already a goal for the welfare workstream and will comprise 'Phase 2' of the workstream's activities. This study serves as evidence that such guidance is both required and requested.

The good practice guidance should establish clear expectations for what a proportional response to the challenges of welfare provision looks like and help settle the issue that perceived regulatory ambiguity is seen as a driver behind the lack of industry motivation to improve welfare outcomes. It is recommended that an international approach to guidelines be taken, avoiding extensive reference to any single national regulation or legislation. While there are limitations inherent in trying to apply a 'one-size-fits-all' approach to guidance, focusing on welfare as a principle rather than strict focus on compliance with a single legal framework may prove more applicable to the global offshore wind industry. Taking this approach should ensure that the aforementioned lack of clarity around regulations and requirements for welfare cited by developers can be addressed, achieving a common understanding of welfare expectations.

The second recommendation for G+ following this study centres on immediate action that should be taken. A key takeaway from the RFI is that 50 % of the workers polled did not feel adequately supported by welfare on their projects, and a number of inadequate practices are being reported as commonplace. While good practice guidance should eventually offer clear expectations and help to alleviate the situation in the coming years, there is a concern that industry-wide change will still take time to manifest itself. Additionally, it has been noted that there are concerns from developers that increasing action by regulators on welfare may force them to act before any industry guidance can be published. There are concerns that disjointed, 'kneejerk' reactions to enforcement from individual developers and projects will not benefit the industry as a whole and will detract from the unified consensus-driven approach desired by G+ and its members. Therefore, it is recommended that G+ takes the following actions in response to this study:

- That accompanying the publication of this study report, the G+ issues a dedicated communication to industry spreading awareness to any stakeholder not already aware of current welfare practices and outcomes, or the issues they pose. This should include distribution of this report and the accompanying self-assessment tool, with encouragement for all stakeholders to familiarise themselves on the findings of the study.
- This communication should also serve as a call to action for industry stakeholders, including both organisations with existing projects and those with projects in development, to review their projects and consider how they can begin improving conditions in anticipation of formal guidance, as outlined in 5.2. This split in the call to action is to recognise the different priorities and opportunities available for projects in operation and those in development, with the latter having the greatest opportunity to improve the industry.

5.2 ACTION FOR INDUSTRY

As has been discussed in 5.1, it is recommended that G+ issues a call to action to industry stakeholders as part of its response to this study. The following action is put to industry stakeholders, for how best to respond to the findings of this study in order to improve welfare in the offshore wind industry.

To bridge a perceived gap in knowledge across the industry as to what welfare provisions are available and possible in offshore wind, all relevant industry stakeholders should firstly read this report, consider the findings and work to understand the challenges and the opportunities around improving welfare conditions for workers. The end goal of understanding the report is for stakeholders to be informed and empowered to make welfare decisions on their projects, in order to move the industry forward and bring about better outcomes for workers and projects. This report should not be considered the end of discussion on welfare, but rather as a baseline of understanding, and a basis upon which future research by organisations, including contacting suppliers of welfare provisions and development of new and innovative solutions, can be carried out.

Once familiar with the findings of this report and the wider challenges and opportunities around welfare in offshore wind, stakeholders should undertake reviews of the welfare arrangements currently in place or planned on their own projects. This study highlighted a variance in how welfare is provided across the industry, so organisations should challenge their current assumptions around what is possible in the provision of welfare. For projects already in construction or operation, the goal of this review should be to understand the welfare arrangements currently in use on their projects, if these are adequate or how they could be improved upon. For projects still in development, developers are called upon to recognise the opportunity they are presented with to make the biggest impact to welfare outcomes, both for their individual projects and across the industry. The focus of review should be on opportunities to consider welfare across all the life cycle phases of the future project, and what design decisions could be taken now to better facilitate improved welfare outcomes. Reviews should be aided by the understanding gained from the findings of the study, and organisations should make full use of the accompanying self-assessment tool to compare the different options that are available to them.

5.3 CONCLUSIONS

This study has been produced following the successful issuing and receipt of an industry-wide RFI, as well as engagement directly with industry stakeholders and publicly available information, in order to build a picture of the current status and development of welfare provisions in the offshore wind industry.

From the RFI, which had 46 respondents, there were a number of key findings that formed the basis of this study, and a number of conclusions can be drawn about how welfare provisions for sanitation, washing, rest and mess are provided across the offshore wind industry.

Firstly, it is clear that the standards and provisions available for welfare are highly variable and dependent on a number of factors. This can be dependent on the attitude and mindset of the organisations in charge of the project, how requirements from industry guidance and national regulations are interpreted and how the interfaces between the project owner, designers and OEMs have been managed, among other factors.

It is clear that the quality of welfare provisions can vary significantly. From 28 workers who responded to whether they felt adequately supported by welfare on their projects (across both C&C and O&M phases), 50 % (14) answered that that they did not feel adequately supported, while 39 % (11) stated that they did.

Five different levels of welfare provisions were defined by the RFI results, based around where the welfare provisions are located with respect to the offshore asset and how permanent they are considered to be. These were found to range from fully integrated welfare units that are part of the OEM design, to portable welfare that is brought by workers on to assets whenever required, to 'vessel-based welfare' where welfare needs of workers are handled by a nearby vessel.

While it appears to be widely accepted that welfare provisions are required for workers, it is not guaranteed that welfare will be provided at the point of work, particularly on offshore assets. Reliance on vessel-based welfare as the primary source, sometimes in conjunction with some form of temporary portable welfare to be brought on to the asset, was found to be the most common solution for providing welfare to offshore assets.

It was found that vessel-based welfare and temporary portable welfare solutions (such as portable camping toilets) were often not considered adequate by workers, who raised a number of H&S, operational, environmental, dignity and wellbeing concerns throughout the RFI. A lack of adequate welfare provisions was found to contribute towards workers urinating and defecating off the sides of assets (which the RFI found to be a widespread practice in the industry), as well as avoiding proper nutrition and hydration to avoid needing to use sanitation facilities. Outcomes for female workers in particular were found to be lacking, with concerns raised that current welfare provisions often did not take their needs sufficiently into account. Concerns were raised that there is a disconnect between those making decisions around welfare and those using welfare, which contributes to the continued reliance on vessel-based welfare even when it has been found to be insufficient.

A key barrier raised by respondents as blocking the improvement of welfare in the industry was around disagreements in the interfaces between designers, project owners and OEMs over who is responsible for making allowances for welfare in design. It was raised by operators and service providers that they did not have the ability to improve on welfare beyond the current standard practices due to restrictions on space on assets. Project owners and designers, in turn, pointed to inflexibility of OEMs in allowing space in their designs, who often do not consider provision of welfare part of their responsibilities. It was found that resolving this issue is a high priority for the industry, so that provisions can be considered earlier in the design phase of projects.

Other key challenges raised by the RFI around improving the quality of welfare on projects included:

- A lack of clear requirements for developers as to what they need to provide and what they are able to provide.
- Concerns over how the logistics of installation and maintenance of welfare units (in particular the removal and disposal of human waste and long-term storage of water).
- Concerns around the requirement for increased lifting operations and offshore working as a result of welfare provisions.
- The lack of clarity on the state of the supply chain for offshore wind welfare provisions.

A number of actions for the industry were identified by RFI participants to improve the provision of welfare in offshore wind. These included:

- Producing industry-wide guidance on how to interpret regulations on welfare, and how to incorporate welfare into projects.
- Improving knowledge sharing among projects on how welfare challenges are being addressed, including sharing information around the emerging supply chain of welfare solutions.
- Potentially tightening regulations or enforcement by the regulators, to force developers to consider welfare more seriously.
- Mediating between developers and OEMs to find a solution where welfare can be widely incorporated into designs of new wind farms.
- Considering the human aspect of welfare and focusing on how to embrace innovation and challenges to improve outcomes for them.

As part of this study, a comparison of national regulations for welfare in key offshore wind markets was undertaken, to understand how requirements varied across different markets and to resolve some of the regulatory ambiguity that is reported in industry. It was found that welfare requirements do vary across markets, but are broadly comparable, with the principle being that welfare in the form of adequate access to sanitation, washing, rest and mess facilities is always required. This highlights that the key principles underlying welfare requirements are universal, that workers are protected and given adequate facilities to work safely and with dignity. While the regulations change, the principles that need to be applied by employers are constant.

Some regulations stopped at establishing a duty for employers to ensure welfare is adequate, while others established specific guidelines or requirements that should be followed. Many regulations however did take some account for workplaces where fulfilling requirements may be challenging, by either offering exemptions to specific requirements, or by establishing a requirement for 'reasonable practicability'. The UK and Germany were found to have produced extensive codes of practice, ACOPs and ASRs, respectively, which although not legally binding present a detailed list of requirements for employers, deviation from which requires extensive justification. It was highlighted that, in summary, while legal compliance is of course important to any project, organisations should be wary of following a 'minimal compliance' approach to welfare, and instead strive to offer the best provisions as are reasonably practicable.

A review of guidance was undertaken as well, to understand what is currently available to offshore wind organisations to aid them in interpreting requirements for welfare. The only offshore wind-specific guidance on welfare found by the study was by RenewableUK, which sets out high-level recommendations and guidance for how to approach welfare. Most importantly, it establishes that offshore assets such as WTGs should be considered as temporary workplaces, and so should have welfare provisions present on them. However, it also makes clear that, in line with the UK regulatory understanding of reasonable practicability, it cannot be expected that provisions on offshore assets will match the level of those found onshore.

SafetyOn *Good practice guidelines for welfare in the onshore wind industry* was extensively discussed, as both a model for future offshore wind good practice guidelines and a valuable resource for offshore wind companies for how to interpret requirements around welfare. A number of guidelines were found to be directly applicable to the offshore wind industry and could be adopted as good practice. Additionally, while some specific aspects would need to be adapted for use in the offshore industry, the general methodology of the guidance, that most guidelines should be followed so far as is reasonably practicable, was found to be particularly suitable for the challenges of adapting welfare requirements offshore. Limitations of the guidance were found to be the reliance on compliance with UK regulatory frameworks,

which may limit some of the application for non-UK based projects.

Following this, there was an extensive discussion of welfare provisions for the offshore wind industry, and how welfare can be provided on different assets and in different life cycle phases. These included discussing provisions currently widely used across the industry that may not be best for meeting the needs of workers long term, sophisticated provisions that are increasingly becoming more available to the industry and provisions able to meet all-welfare requirements that are not yet available, but which could set new standards for welfare offshore. For each provision discussed, there was analysis of the use cases, suitability of the provision across life cycle phases, logistics and maintenance concerns, any H&S impacts, an overview of industry perceptions, indication of the cost vs. benefit of the provision and a summary of pros and cons. While more advanced or sophisticated provisions come with greater challenges, such as different logistical challenges, design requirements and higher costs when compared with current provisions, no challenges were found to be insurmountable. The options discussed have been presented in an interactive self-assessment tool, which has been produced as a companion to this report to aid organisations in exploring the welfare provisions currently available to the industry, as well as what may be available in the future.

Recommendations have been made to G+, for what the next steps in this workstream should be to continue the drive for improving standards of welfare in the industry.

– The study reaffirms the goal of G+ to develop good practice guidelines for welfare in the offshore wind industry, highlighting that these have been requested by respondents to the RFI, and that it is clear they are required to improve conditions in the industry. This will comprise 'Phase 2' of the workstream's activities.
– There is a concern that the challenges highlighted in this study may not be able to wait until formal good practice guidelines are published by G+. As such, more immediate responses to this study were suggested. This centres around G+ issuing a communication to industry, highlighting the important work of the study and encouraging stakeholders to familiarise themselves with the findings, and issuing a call to action for industry stakeholders to review the welfare arrangements and outcomes on their own projects, to understand how they can begin improving conditions in anticipation of formal guidance. Emphasis is placed on projects that are still in development, which have the greatest opportunity to implement the findings of the study.

Finally, the following action should be taken by industry stakeholders in response to the findings of this study:

– In order to bridge the current apparent gaps in understanding as to what is available and possible in regard to welfare provisions in offshore wind, stakeholders are encouraged to read this report and review the findings in detail, using them as a basis upon which further research and analysis by individual projects can be undertaken.
– Once familiar with the findings of this report, stakeholders should then begin to review their own projects, both those in development and those already existing, in light of the report findings, and determine how they could act to improve the welfare arrangements and outcomes for these projects. It is recommended that stakeholders make full use of the accompanying self-assessment tool to compare the different options that are available to them. Emphasis is again placed on projects in development to undertake this review, considering how decisions made at this stage can improve welfare outcomes through the entire life cycle of their projects.

Ultimately, the results of the study have highlighted the common lack of adequate welfare provisions in the offshore wind industry. It is clear that welfare considerations are often not given the attention they are due, and the results are that workers face substandard conditions compared with other industries. It is only by embracing change and innovation that these issues can be addressed, resulting in an industry-wide improvement of welfare provisions for workers.

As a final note for this study, it is important to return to one of the initial requests made in this report. The aim of this report was to present an accurate picture of the current state of welfare within offshore wind, ultimately to encourage discussions on how welfare can be improved for offshore workers. As such, when reflecting on the findings of this study, it is requested that readers, particularly those who do not regularly work offshore, do so while maintaining an open mind, focusing on what will be best for both workers and the industry going forward.

ANNEX A
DEMOGRAPHICS OF RFI RESPONSES

A.1 RESPONSE QUALITY

In total, the RFI received 46 responses from 12 May 2025 until 11 July 2025. The trend for number of responses over time is shown in Figure A1.

Before the RFI was launched, it was difficult to predict the number of responses that would be received and therefore it was difficult to select a target number of responses to receive within the timeframe for the RFI to be considered successful. As such, the results were qualitatively assessed in terms of their value and detail, to determine if the RFI had received enough responses within the allowed timeframe (~2 months) to be closed.

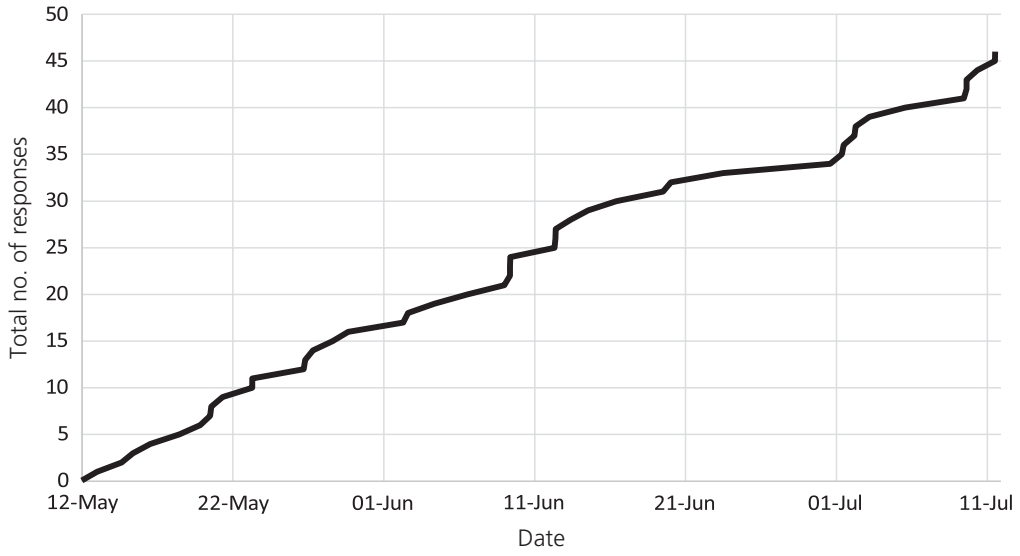

Figure A1: Number of responses over course of RFI

Based on the goals of the RFI to understand the welfare provisions, both in use and potential future provisions, and understand the perceptions of these from those in the industry, responses were considered valuable to the study if they met the following criteria:

– Did the response define an in use or potential welfare solution?
– Did the entry give an opinion on a welfare solution?

Additionally, it was considered if responses were sufficiently detailed for the study, in terms of how many questions were answered and how much information was provided in each answer, as receiving a high number of low-detail responses would prove difficult to process and draw meaningful conclusions from.

From the 46 received responses, it was determined that 39 (85 %) were valuable to the study, of which 23 were detailed as well. This means that 50 % of the total responses received were both detailed and valuable. This is summarised in Table A1.

Table A1: Value and detail of RFI responses

Detailed and valuable		Detailed, but not valuable	
23	50 %	0	0 %
Valuable, but not detailed		**Neither detailed nor valuable**	
16	35 %	7	15 %
39/46 (85 %) responses were considered valuable for study			

A.2 DEMOGRAPHICS

As well as determining the value of the responses received, it was important to consider the demographics of the participants in the study, to ensure that a broad spectrum of stakeholders across the offshore wind industry was able to contribute to the study. As such, a series of questions were asked at the beginning of the RFI, with participants encouraged to select as many answers as were applicable to describe their organisations and the projects they were experienced with. The following sections will show the results of these questions for the RFI and discuss any implications this may have for the study.

A.2.1 Organisation types

The first question asked was 'Which option(s) best describe your organisation's role within the offshore wind industry?', the results of which are shown in Figure A2.

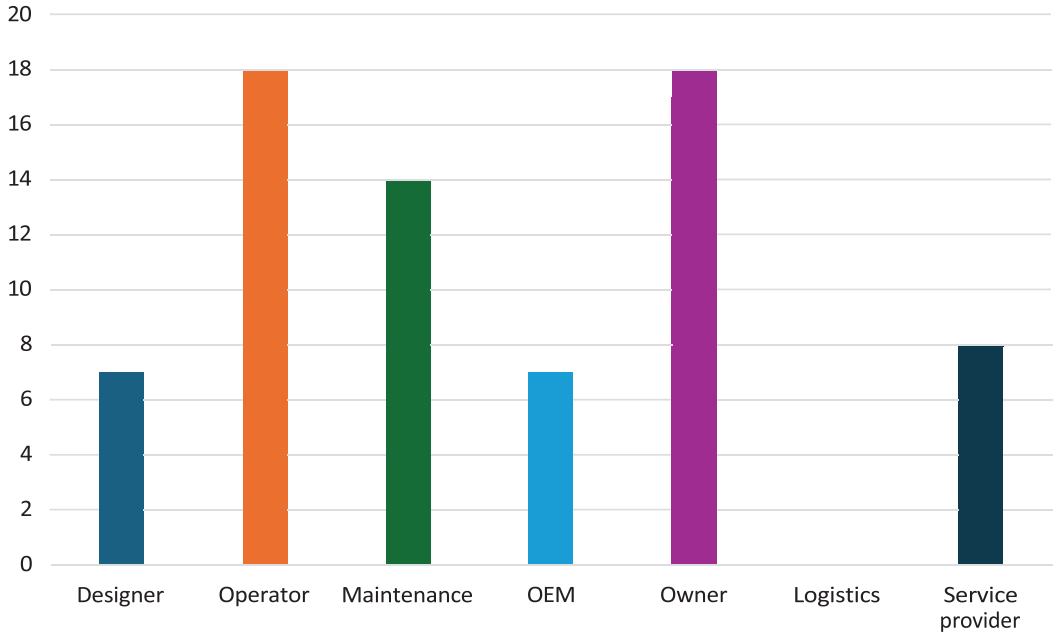

Figure A2: Which option(s) best describe your organisation?

It can be seen that the RFI was able to reach a broad range of organisation types, with the most common being operators, owners and maintenance.

There were no responses that identified themselves as being 'logistics', and relatively fewer responses from service providers, OEMs and designers, which may prove to show a gap in the results.

A.2.2 Geography

The second question asked was 'Which geographical regions do your offshore wind projects cover?', with the results shown in Figure A3.

The geographical spread of responses is very concentrated on Europe, with very few responses highlighted as based on experience with offshore wind in the Americas, Asia-Pacific or Africa. This raises the potential for the results of the RFI to be biased or centred on the experience of European wind farms and might not be universal for the global offshore wind industry.

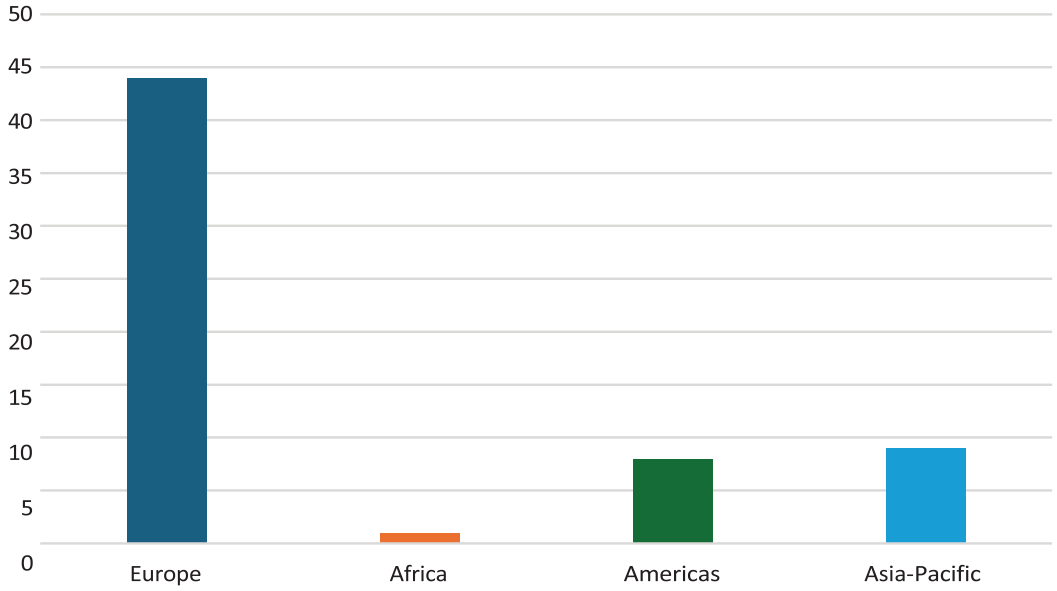

Figure A3: Which geographical regions do your offshore wind projects cover?

A.2.3 Oil and gas experience

The third question asked was 'Are you familiar with welfare provisions in the offshore wind industry, or in other industries (e.g. offshore oil and gas)?', with the results shown in Figure A4.

The reasoning behind this question was to understand if the respondents of the RFI would be answering based purely on their offshore wind experience, or if there would be experience drawn from other industries.

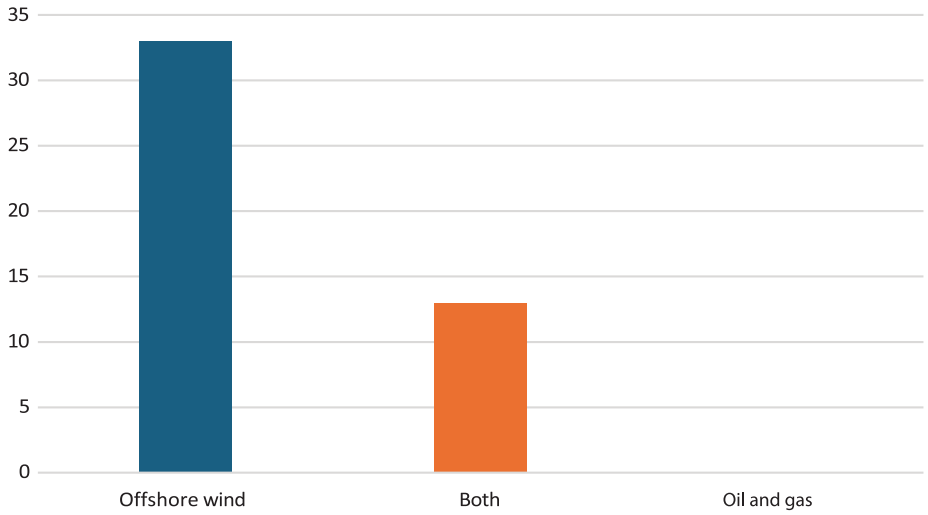

Figure A4: Are you familiar with welfare provisions in the offshore wind industry, or in other industries (e.g. offshore oil and gas)?

While the majority of respondents drew from experience just in the offshore wind industry, ~28 % of participants have experience in the O&G industry, which may provide additional relevant experience for the RFI.

A.2.4 Assets

The fourth question asked was 'Which assets within the offshore wind industry are you most familiar with the provision of welfare facilities on?', with the results shown in Figure A5.

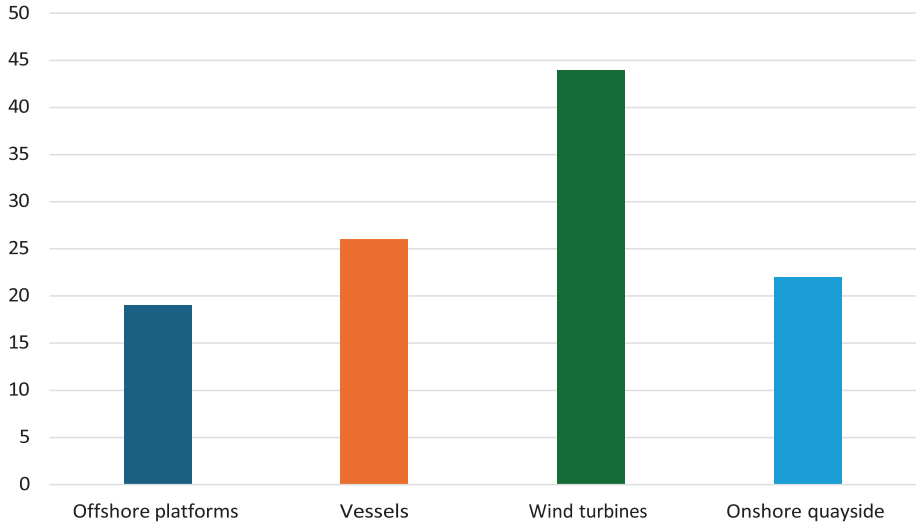

Figure A5: Which assets within the offshore wind industry are you most familiar with the provision of welfare facilities on?

While there was a spread of responses relevant to each of the four assets being considered for this study, indicating a suitable number of responses on each asset, there was a clear

preference for answers relevant to wind turbines. Almost all (44 of 46) respondents indicated that they were familiar with welfare provisions on wind turbines.

Additionally, despite multiple respondents indicating that their responses were relevant to onshore quaysides, when reviewing individual responses, it can be seen that the focus of detailed responses in the RFI is heavily skewed towards the 'offshore' assets, for wind turbines in particular, followed by vessels and offshore platforms, at the expense of onshore quayside. This however was anticipated prior to the RFI, as the offshore portion of the industry is where the highest challenge in providing welfare is experienced.

While the intention in providing 'vessels' as a standalone option on the RFI was to differentiate between welfare provisions on vessels and the provisions available on wind turbines, it was not anticipated how intertwined these two assets are. As a result, many responses discussing wind turbines are also relating to vessels, and vice versa.

A.2.5 Welfare topic

The fifth question asked was 'Which aspects of welfare in offshore wind are you familiar with?', with the results shown in Figure A6.

All four welfare topics introduced by this RFI were discussed by the respondents, with Figure A6 indicating a slight preference for discussion of sanitation. However, upon reviewing the actual submitted answers to the RFI, it became clear that this is the most discussed aspect of the welfare issue.

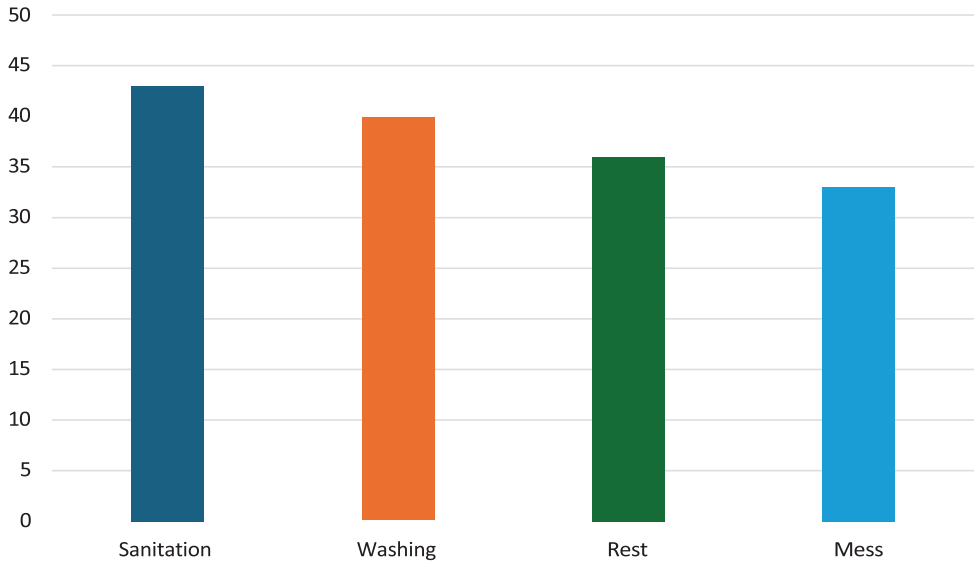

Figure A6: Which aspects of welfare in offshore wind are you familiar with?

A.2.6 Life cycle stages

The sixth question asked was 'During which stages of the offshore wind project life cycle do you have experience with welfare provisions?', with the results shown in Figure A7.

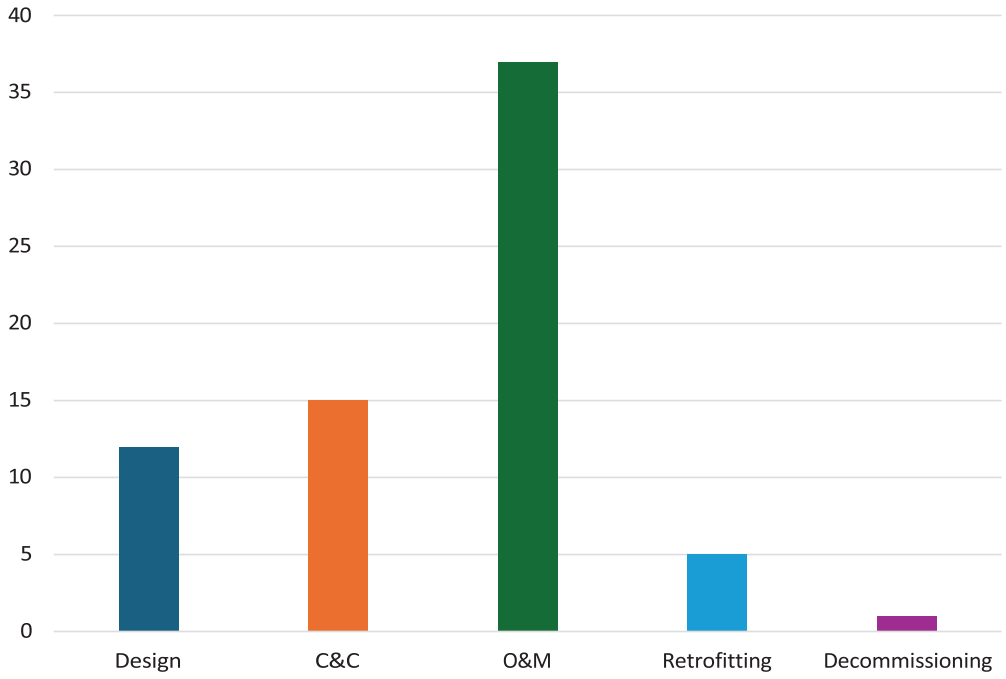

Figure A7: During which stages of the offshore wind project life cycle do you have experience with welfare provisions?

A majority of respondents indicated that they are experienced with the O&M life cycle phase in offshore wind. Twenty-six respondents selected to only answer questions on the O&M phase. As a result, there is a focus in the results of the RFI to discuss the O&M phase, but within this there are areas where the discussion is relevant for other phases as well. This was expected and aligns with the long-term exposure of O&M personnel to offshore assets and the use of welfare provisions.

Conversely, only two responses were given relevant to the decommissioning phase. However, many instances were noted of potential issues when removing welfare facilities from offshore platforms, and the interface with biohazards this requires.

A.2.7 Experience as decision-maker or user

The final questions participants were asked prior to proceeding to the actual RFI were 'In your role, do you influence decisions for projects in relation to the design and utilisation of welfare provisions?' and 'Do you utilise welfare provisions while undertaking your role on offshore assets?' This was to establish whether the participant was in a position to influence decisions in relation to welfare provisions (i.e. a 'decision-maker'), and whether the participant was an experienced user of welfare provisions in the offshore wind industry (i.e. a 'user' of welfare). For the former, it was stressed that this did not refer solely to the 'final decision-makers' on welfare, but anyone involved in the decision-making process. It was possible for participants to answer 'yes' to both questions, as it is possible for someone to be a decision-maker who is also in a position of using welfare in their role.

These questions were considered important as not only do they provide crucial context for the differing experience levels between participants in the RFI, but also allow for potential

understanding of any discrepancies between the perceptions and experiences of those who make decisions and those who use welfare. In order for this study to achieve its goals, it was necessary that the RFI responses have good representation from both 'decision-makers' and 'users' of welfare, to capture both the high-level project concerns and the actual experiences of personnel on site. As can be seen from Figure A8 and Figure A9, this was achieved, indicating that the results of the RFI, particularly with regard to actual experience of utilising welfare provisions, are grounded in actual experience.

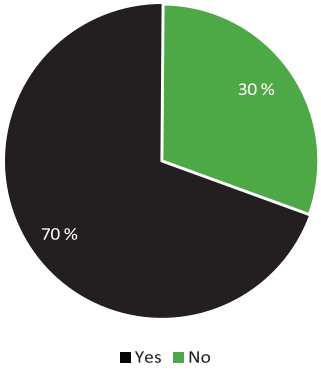

Figure A8: Do you utilise welfare provisions while undertaking your role on offshore assets?

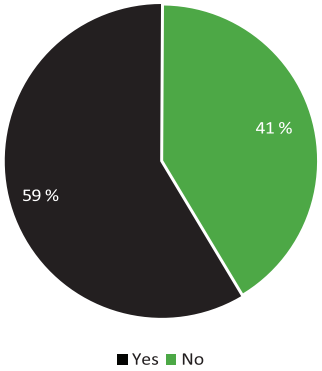

Figure A9: In your role, do you influence decisions for projects in relation to the design and utilisation of welfare provisions?

ANNEX B
TRANSFERABLE LEARNINGS FROM SAFETYON ONSHORE GUIDANCE

The following annex provides additional, detailed analysis of the SafetyOn guidance, including highlighting specific guidelines that are particularly applicable or could be transferable to the offshore wind industry.

The overall philosophy of the SafetyOn guidance can be seen from the first three guidelines, reproduced as follows:

– Guideline 1: 'Wind companies must comply with all relevant legal duties and should take account of regulatory guidance.'
– Guideline 2: 'Wind companies should go beyond the guidelines in this GPG and other relevant good practice, wherever reasonably practicable.'
– Guideline 3: 'Where a wind company considers that a non-absolute guideline cannot be met, they should assure themselves that it would not be reasonably practicable.'

These guidelines not only set clear expectations for developers that they must ensure their legal duties for welfare are being met, but also establish that where possible guidelines should be exceeded, rather than only striving for minimum level of acceptance. The principle of ALARP is also raised in these guidelines to push developers to go beyond simple compliance in providing welfare on their projects. In particular, the third guideline acts to prevent complacency in the industry, by creating a high barrier before provision of welfare in line with a guideline is discounted as not possible or practicable.

The SafetyOn guidance, as it is based on UK HSE regulations around welfare and is specifically designed for use by UK companies, makes a distinction between absolute duties that employers are legally required to follow (in the form of 'must' statements), and guidance that employers 'should' follow in order to meet their obligations. In the latter, it is made clear that this does not mean that these guidelines are optional, and that deviations from them must be taken only if risk is reduced ALARP and if there is adequate documented justification (as established by Guideline 3). Most of the guidelines in the document are 'should' statements, with the following exceptions (alongside Guideline 1):

– Guideline 13: 'Wind companies must provide suitable, sufficient and readily accessible sanitary conveniences.'
– Guideline 14: 'Wind companies must provide sufficient sanitary conveniences for the number of people at work.'
– Guideline 19: 'Wind companies must provide separate rooms containing sanitary conveniences for men and women, except where each convenience is in a separate lockable room or cubicle.'
– Guideline 28: 'Wind companies must provide or make available suitable and sufficient rest rooms or rest areas at readily accessible places.'

Many of the 'should' guidelines in the SafetyOn guidance are high level, about how the industry should approach the welfare topic and ensure it is considered throughout the project life cycle. These could be considered generally good practice for the offshore wind industry and could be adopted, with some adaptation where required. These include but are not limited to:

- Guideline 5, that companies should ensure consultation and communication with their workforce on welfare.
- Guideline 7, that companies should liaise with WTG manufacturers to influence development of welfare in the industry.
- Guidelines 8, that companies should apply the same principles and expectations to both new and existing sites.
- Guideline 9, that welfare should be planned for and designed on all projects.
- Guideline 38, that companies should encourage, and improve systems for, feedback and learning from welfare incidents.

Guideline 8 in particular marks an interesting case of applicability for offshore. At first glance this would appear to be impractical guidance for offshore sites, as older projects will likely have smaller footprints of installed assets offshore, and so will physically limit what can be done in terms of welfare provision in a way that may not be apparent onshore. However, the text of the guidance recognises that there will be practicability differences between new and existing sites, such that different considerations will need to be made for ALARP arguments around provision of welfare (with expectations on new projects being higher). This does not excuse older projects from needing to meet baseline requirements for welfare, with the guidance explicitly stating that there are 'no 'grandfather rights' exemptions' to provision of welfare, but recognises that there will be different solutions enacted for existing and newer sites.

Other guidelines are set out in the SafetyOn guidance which do not impose prescriptive limits on how welfare should be incorporated, but instead act as goals for how welfare 'should' be approached on projects. Examples of this include:

- Guideline 10: 'Wind companies should minimise travel distances/times to welfare facilities.'
- Guideline 12: 'Wind companies should design welfare facilities to facilitate their being kept clean and in good condition.'
- Guideline 15: 'Wind companies should ensure that workers do not have any significant delay or wait to use sanitary conveniences.'
- Guideline 18: 'Wind companies should take usability into account when selecting or designing portable toilets and associated supplies and equipment.'
- Guideline 21: 'Wind companies should take dignity considerations into account when selecting or designing facilities.'
- Guideline 30: 'Wind companies should have regard to equality, diversity and inclusion in the provision of welfare.'
- Guideline 35: 'Wind companies should take account of how facilities may in practice be used beyond their design intents, and what the HSW implications may be.'

With Guideline 15 in particular, it is again acknowledged where the specific challenges of the industry may prevent welfare being provided in the same way it would be on a more conventional site, in strict compliance with regulatory guidance (e.g. the practicalities of workers descending from their place of work in a WTG to the point welfare is provided). However, it is stated that 'Wind companies should assess the specifics of the situation and justify and document the rationale for solutions that do not fully meet the expectations,' again reiterating the importance of considering the intentions behind providing welfare, that needs of workers are adequately met, rather than focus on strict adherence to 'minimum compliance' standards.

The methodology of starting with the highest goals for provision of welfare, and only moving to a lower level of provision upon acceptance that providing welfare at that level would not be reasonably practicable, is repeated throughout the guidance. Another key example is Guideline 17: 'Wind companies should take account of this hierarchy of suitability for toilet types (from most to least preferred),' referring to the following hierarchy:

1. Toilet with an effective means for flushing with water connected to a sewerage drainage system.
2. Toilet with an effective means of flushing with water connected to a suitable collection system that is emptied mechanically.
3. Toilet within mobile welfare van or trailer.
4. Waterless appliances (chemical, gel, cassette, cartridge or bagged systems). These 'camping' type solutions can be portable, free-standing or within a popup tent-like enclosure.

Here, an established hierarchy is presented for acceptable levels of welfare provision in order of preference, with the intention being that companies 'should aim to provide the most preferred option and only move down the hierarchy if they can demonstrate that this would not be reasonably practicable'. This sort of guideline provides a clear guide to the industry on an order of preference of solutions to a given welfare topic, allowing developers to assess their own projects and choose the most suitable solution while ensuring that those with the best outcomes for welfare are considered first.

In terms of applicability to offshore wind, this particular guideline is also an illustrative example of a methodology that would be beneficial to improving welfare standards in the offshore wind industry, but where the specifics may need to be reviewed for any formal offshore wind-specific guidance. This hierarchy was clearly developed with onshore facilities in mind, hence the reference to 'mobile welfare van or trailer' that would not be seen offshore. As has been discussed in 4.2.1, when considering the available means of sanitation provision currently available in the offshore wind industry, the majority lie at the bottom end of this hierarchy. As such, if future offshore wind industry-specific guidance wishes to replicate this guideline, the levels of technology that are referenced could be more aligned with what is actually available offshore, to be more practical to developers. That is not to say that published guidance should only refer to what is currently available, and not be used as a way to encourage the raising of welfare standards in the industry. For example, guidance can offer a realistic overview of the hierarchy of acceptability for sanitation provisions, while also including options currently not seen in industry that are aspirational (such as fully plumbed, flushable toilets integrated into assets), as a way to encourage developers, OEMs and welfare service providers to explore these options.

In addition to these guidelines that provide direct goals for what welfare should achieve, contained within the guidance document are a number of guidelines that make specific reference to a regulatory document, HSE Operational Circular *Construction Welfare Standards*. Guidelines 25, 26, 27 and 29 refer directly to this document, directing companies to 'follow the guidance' or 'take account of the requirements and guidance' in the HSE Operational Circular for the topics of washing, drinking water, changing rooms and lockers and facilities for rest and eating.

This Operational Circular has been produced by the UK regulator as guidance for HSE personnel inspecting sites rather than direct industry guidance for developers, but contains valuable insights into how welfare requirements in the UK can be interpreted. SafetyOn takes note that the circular is intended as guidance for HSE personnel inspecting sites rather than direct industry guidance for developers and cautions developers from viewing this

as a prescriptive list of requirements that can be met in order to achieve compliance. The HSE circular notably has not been produced with any offshore industry in mind, and so the guidance and requirements it contains for these topics may be difficult to achieve in an offshore wind setting. The circular also contains a mixture of absolute 'must' requirements, as well as 'should' guidance. As discussed previously, while 'should' statements are not absolute duties, they are not optional either. Before choosing not to follow a point of guidance raised in the HSE circular, it must be justified that following it would not be practicable, and an ALARP argument made that the provisions used in place are adequate. If choosing to use the SafetyOn guidance as a basis for determining welfare on an offshore project, familiarity with the HSE Operational Circular is essential.

ANNEX C
ABBREVIATIONS

ACOP	Approved Code of Practice
ALARP	As low as reasonably practicable
ASR	*Technische Regeln für Arbeitsstätten* (Technical Rules for Workplaces)
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
C&C	Construction and commissioning
CAPEX	Capital expenditure
CBA	Cost–benefit analysis
CDM	Construction (Design and Management) Regulations 2015
CFR	Code of Federal Regulations
CTV	Crew transfer vessel
DCR	Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996
EI	Energy Institute
ESG	Environmental, social and governance
EWP	External working platform
FISA	Forest Industry Safety Accord
G+	Global Offshore Wind Health and Safety Organisation
GPG	Good practice guidance
H&S	Health and safety
HSE	Health and Safety Executive
HSW	Health, safety and welfare
HV	High voltage
IBC	Intermediate bulk container
ICS	International Chamber of Shipping
IMO	International Maritime Organisation
IP	Ingress protection
ISHA	Industrial Safety and Health Act
ITF	International Transport Workers' Federation
JUV	Jack-up (installation) vessel
MARPOL	International Convention for the Prevention of Pollution from Ships
MLC	Maritime Labour Convention
NoC	Notice of Contravention
NPAI	Not permanently attended installations
O&G	Oil and gas
O&M	Operations and maintenance

OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
OEI	Offshore Electricity Infrastructure
OEM	Original equipment manufacturer
OEUK	Offshore Energy UK
OPEX	Operational expenditure
OSHA	Occupational Safety and Health Administration
OSP	Offshore substation platform
OSS	Offshore substation
PAT	Portable appliance testing
PPE	Personal protective equipment
RFI	Request for Information
SOV	Service operation vessel
SPC	Semi-permanent circular
TP	Transition piece
TUC	Trades Union Congress
USCG	United States Coast Guard
WTG	Wind turbine generator

ANNEX D
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