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ESCA Guideline No.19

Marine Aggregate Extraction Proximity Guidelines

Disclaimer

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Document History

Document Revision Procedure:

Any party wishing to propose a change to this document should address the proposed change to the Chair of the MSG of the European Subsea Cables Association (ESCA). The MSG will then review the proposed change and consider re-convening a Technical Working Group ("TWG") to discuss the proposal. Once the MSG (and TWG, if appropriate) are satisfied, their findings and the revised document will be presented to the ESCA Executive Committee and Plenary for approval. Only when all parties have approved the changes will the document be re-issued.

All changes to this document will be recorded in the tracking table below.

Issue No.	Name	Comments	Date
1		Initial Issue	Nov 2000
2		Update	n/a
3		Update	Jun 2003
4		Revision to format	Sep 2006
5		Update for SG name change	Sep 2010
6	Peter Jamieson	Format change	Oct 2010
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8	Colin Rayman	Update	Feb 2014
9	Secretary	Re-branding to ESCA	Mar 2016
10	MSG Chairman	Periodic document review	Feb 2017
11	MSG Chairman	Revision to format	Sep 2017

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1 Executive summary

This document (referred to as the "Guidelines") provides guidance on the considerations that should be given by all stakeholders in the development of projects requiring proximity agreements between marine aggregate interests (planned applications or existing production licences) and submarine cable projects (planned or existing) in UK waters.

The Guidelines address installation and maintenance constraints to submarine cables and constraints to marine aggregate extraction operations where both interests will occupy proximate areas of seabed.

The Guidelines discuss some of the key factors determining proximity limits to be taken into account in reaching a proximity agreement.

The importance of early stakeholder consultation should be appreciated at the outset and it is recommended this is undertaken as early as possible for all new marine aggregate applications or cables.

The location of existing seabed infrastructure in close proximity to a proposed marine aggregate application could have a significant impact upon the layout or location of the application. Conversely, the location of an existing marine aggregate production licence could have a significant impact on the precise routing of a new cable installation. Discussion and stakeholder engagement are considered to be the cornerstones of generating the greatest opportunities for a successful outcome.

The Guidelines are not intended to provide a prescriptive solution on proximity.

The Guidelines identify factors to consider within risk assessments that may be used to help inform proximity discussions and agreements. The Guidelines also propose some basic principles to form the foundation of discussions on safe and appropriate solutions on a case by case basis, including potential mitigation measures.

Once the parties have agreed site-specific proximity limits, the final step in the process is the drafting of a proximity agreement with accompanying method statement, where this is considered to be required and appropriate.

It is expected that the Guidelines will provide the underlying basis upon which all stakeholders can reach a mutually acceptable proximity agreement. In the event that proximity discussions falter, an ultimate recourse in the form of a dispute resolution process is outlined.

2 Scope of the Guideline

The regulatory framework surrounding this document is based upon current UK practices. It is the consideration of the Guidelines that no proximity agreement is required where the minimum approach of the proposed/existing marine aggregate licence and planned/existing subsea infrastructure exceeds one nautical mile (1NM) (1.852km).

However, at a separation of approximately 1NM, it is considered good practice that high-level consultation is undertaken thereby ensuring that all Stakeholders are aware of each other's activities and requirements. In all instances, it should be the responsibility of the incoming party to constructively engage and consult with the existing interest(s) and such approach should align with the principles outlined in ESCA Guideline No 6.

For example, in the case of a new marine aggregate application that would fall within 1NM of existing subsea infrastructure, dialogue led by the marine aggregate developer would need to be established between the stakeholders and the consideration of the Guidelines should apply to establish mutually acceptable proximity limits.

No indicative separation distance is suggested; the Guidelines recommend that site specific minimum separation distances are determined on a case by case basis using all available information.

3 Introduction

The ever increasing development and use of the UK continental shelf has resulted in the need for greater communication and cooperation between all marine industries. One example of this is a need for cross industry endorsed guidelines on the proximity of submarine cables and marine aggregate interests.

New marine aggregate extraction operations have the potential to pose a serious threat to the integrity of an existing submarine cable system if they are undertaken in an inappropriate location, even if the cable system was buried during the installation process. Conversely, a new submarine cable installation has the potential to compromise the safe operation of an existing marine aggregate interest and sterilize valuable mineral resources if it is routed too close.

There are common interests between marine aggregate producers and cable owners in regard to safety, access to their assets and maintaining operations. Where these activities occur in relative proximity to one another (<1NM), the potential for spatial interaction means there will be a need for both parties to interact in order to ensure their respective seabed operations can take place in a safe and efficient manner.

In all instances, it should be the responsibility of the incoming party to constructively engage and consult with the existing interest(s) and such approach should align with the principles outlined in ESCA Guideline No 6.

The information supplied in the Guidelines has been compiled by a cross-sector consultation between ESCA and the BMAPA.

The Guidelines are therefore based upon the combined broad experience and knowledge base contained within the two industries.

Subject to the Disclaimer on the cover page of this document, it is the intention that the Guidelines should be used as a reference document with the aim of promoting the highest standards of construction, operability, reliability, maintainability and safety between the marine aggregate and submarine cable sectors in the event of potential co-existence in close proximity to each other.

It is very important to appreciate that the Guidelines do not provide a prescriptive solution on proximity. The optimal proximity distance will only be achieved through dialogue and agreement between the parties based upon a risk assessment process where appropriate.

It is in the interest of all Stakeholders that skilled and experienced resources should be utilised during these discussions to achieve a mutually acceptable and optimal proximity agreement. It is of the utmost importance that all Stakeholders understand and appreciate each other's requirements and safety issues. All parties should therefore enter into dialogue regarding proximity as early as possible, proactively and with open minds.

4 Key Factors Determining Proximity Limits

4.1 Submarine Cables

Submarine cables are defined as any Telecoms, Power, Interconnectors, and Export Cables.

The United Nations Convention on the Law of the Sea (UNCLOS) 1982 provides updated and increased protection to all submarine cables and pipelines (rather than only telecommunications cables as previously defined in the original 1885 Convention). The UNCLOS principles relating to submarine cables, as understood by ESCA, can be summarised as follows, noting that for a definitive understanding the reader should refer directly to UNCLOS:

- Freedom to lay, maintain, and repair cables on and off the continental shelf
- Obligations on nations to impose criminal and civil penalties for intentional or negligent injury to cables
- Special status for ships laying and repairing cables (as defined in Rule 10 of the International Rules for the Prevention of Collisions at Sea and more generally in Article 79 of UNCLOS)
- Indemnification for vessels which sacrifice anchors or fishing gear to avoid damage to cables
- Obligations on owners with new cables that are laid over existing cables and pipelines to indemnify repair costs for any damage caused

Further specific provisions regarding submarine cables are contained within Articles 58 and Articles 79.

In the case of submarine cables, The Crown Estate's consent is required for all cables that cross the seabed within 12 nautical miles of the UK coastline. This consent is recognition of The Crown Estate's proprietary interests as the seabed owner. Outside of 12NM, although generally there is no obligation to report routes within 200NM of the coast, it is considered to represent good practice. However, the permission of The Crown Estate is required for the full length of export cables as these are considered ancillary to renewable generation, the rights to which are vested with The Crown Estate under the 2006 Energy Act. It is also prudent to consider obligations as to the requirement for a marine licence from the Marine Management Organisation or equivalent marine licensing authority.

<u>Installation and protection</u>

Modern installation practices can be divided into three classes as follows:

1. Cables are surface laid by a cable-laying vessel, and burial is carried out in a post-lay mode using a separate vessel and trenching/jetting equipment spread.
2. Cables are laid and buried in a simultaneous operation with burial equipment being towed by the cable laying vessel or barge, in the case of a plough or burial sled, or operated from the laying vessel where a self-propelled ROV is utilised. Variations on the theme include the use of a jetting leg (also known as an injector) deployed from an anchored barge; this is a shallow water burial tool used for single and bundled cables with the capability to achieve deep burial in appropriate conditions, or post lay cable ploughing – a modification of the oil and gas sector's umbilical and pipeline ploughing methods. The latter techniques are however not widely used, as a number of significant difficulties may exist.
3. As for B above, with a separate vessel opening a pre-cut trench. The cable is then positioned into the trench on laying. This however is not a common method of operation, as considerable scope exists for difficulties in co-ordination of the two vessels working together in this way, for accurate positioning of the cable and for maintaining an open trench.

In the modern era cable protection is achieved by burial into the seabed, wherever possible, with a wide range of sophisticated subsea cable burial tools available to cope with the diversity of soil types that exist.

Where burial is not achievable, due to unsuitable seabed material (e.g. bedrock, very heavy clay or boulders) or where another cable or pipeline is already in place), a number of protective sleeves, ducting and jacket systems have been developed. These are applied to the cable at the surface and laid to the seabed as part of the laying process.

Additionally and where long sections of unsuitable seabed are encountered, rock placement is often the most time efficient and rugged form of protection. Whilst very efficient, rock placement is a costly exercise and is often subject to environmental permitting restrictions. Cable burial depth is a complex topic and often the subject of commercial debate. The use of a risk based approach to determining the optimum cable burial depth using a 'Burial Protection Index' has been widely adopted in recent times. This approach assesses the level of protection afforded by the site-specific soil conditions and the threat level posed by third party interactions such as fishing gear and ship's anchors.

<u>Fault identification, recovery and repair</u>

Submarine cables have been suffering faults from the outset of their 160+ year history and so the need to restore a system quickly has always been paramount. Stakeholders in a discussion on proximity limits between submarine cables and marine aggregate interests are advised to develop and agree safe and appropriate solutions on a case by case basis to determine how much sea room is actually needed to efficiently and safely execute a cable repair, including the consequences of redeployment on agreed proximity limits.

The experience acquired in repairing submarine cables has evolved into a recognised set of maintenance and repair processes and procedures. In order to assist all sectors in understanding the interactions and impacts, four key determinants of sea room required by a cable ship are:

- Fault location;

- Cable recovery;
- Cable repair; and
- Re-deployment

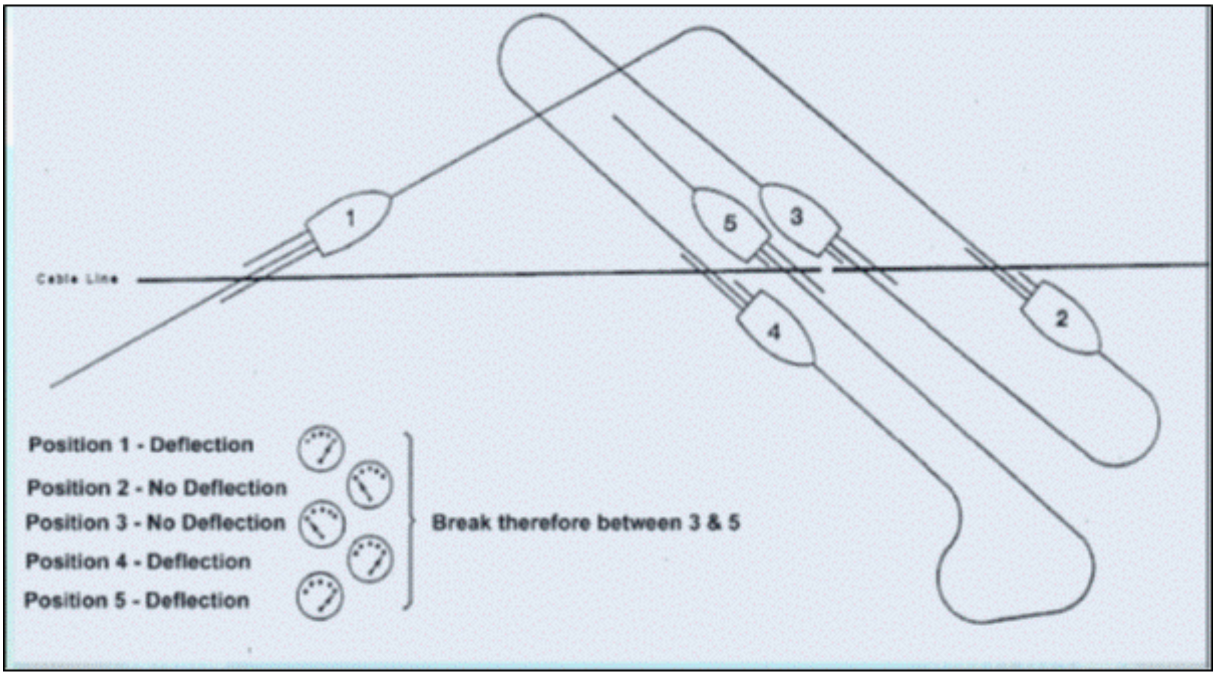

Figure 1 - The process of determining fault location through the use of trailed electrodes. (Internal Document, GMSL, 2011)

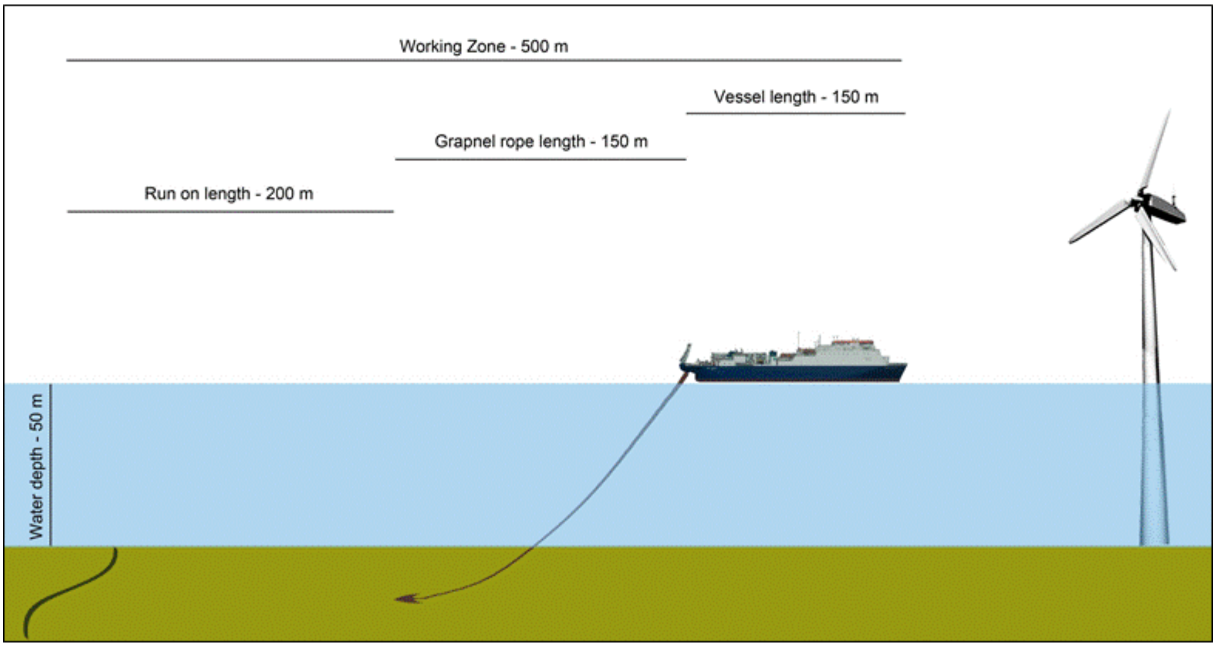

Figure 2 - Indicative distances required within the Working Zone when conducting cable recovery with grapnels in 50m depth of water (ESCA Guideline No 6)

Water depth (metres)	Layback (metres)	Run on (metres)	Length of Grapnel Rope (metres)	Remarks
5	20	30	30	Grapnel rope length ±3 times the depth of water up to 200m depth of water. Depths of water greater than 200m are not considered here but a grapnel rope length in the order of (depth of water + 30%) would be appropriate
10	30	30	40	
20	40	30	50	
30	70	30	90	
40	100	30	120	
50	140	30	150	
100	240	30-40	250-300	
150	360-400	30-40	400-450	
200	500-550	30-40	600-650	

Table 1 - Indicative base case grapnel operation distances (ESCA Guideline No 6 2012)

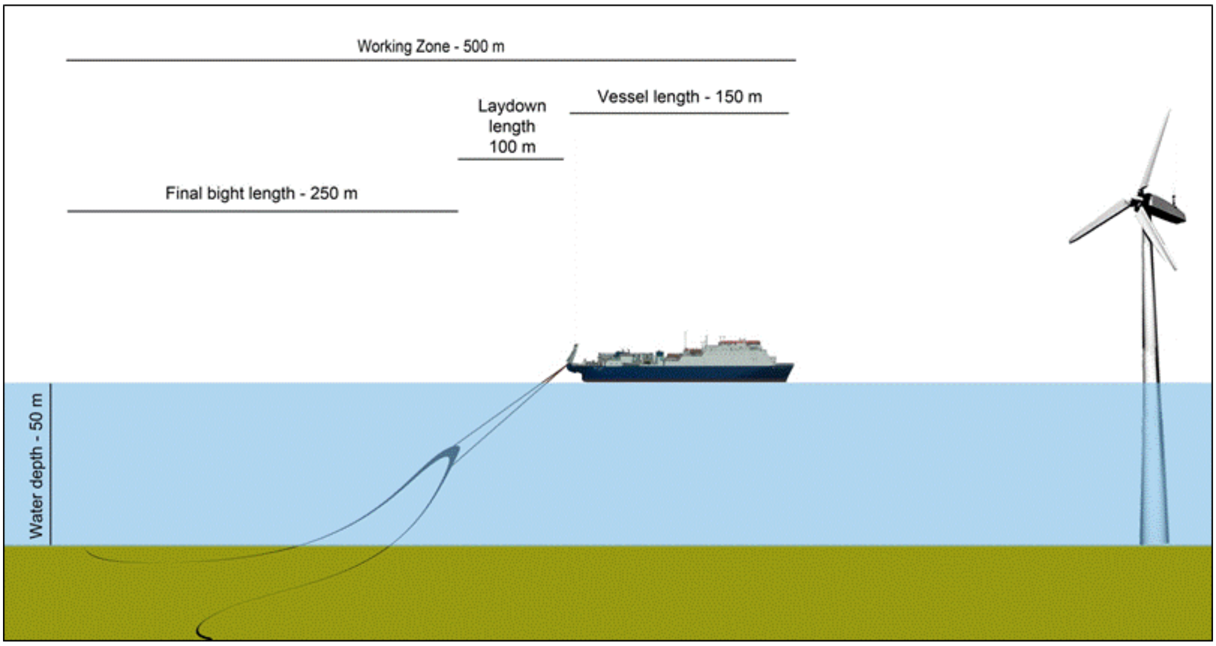

Figure 3 - Indicative distances of cable line within the Working Zone when deploying a final bight to the seabed in 50m depth of water

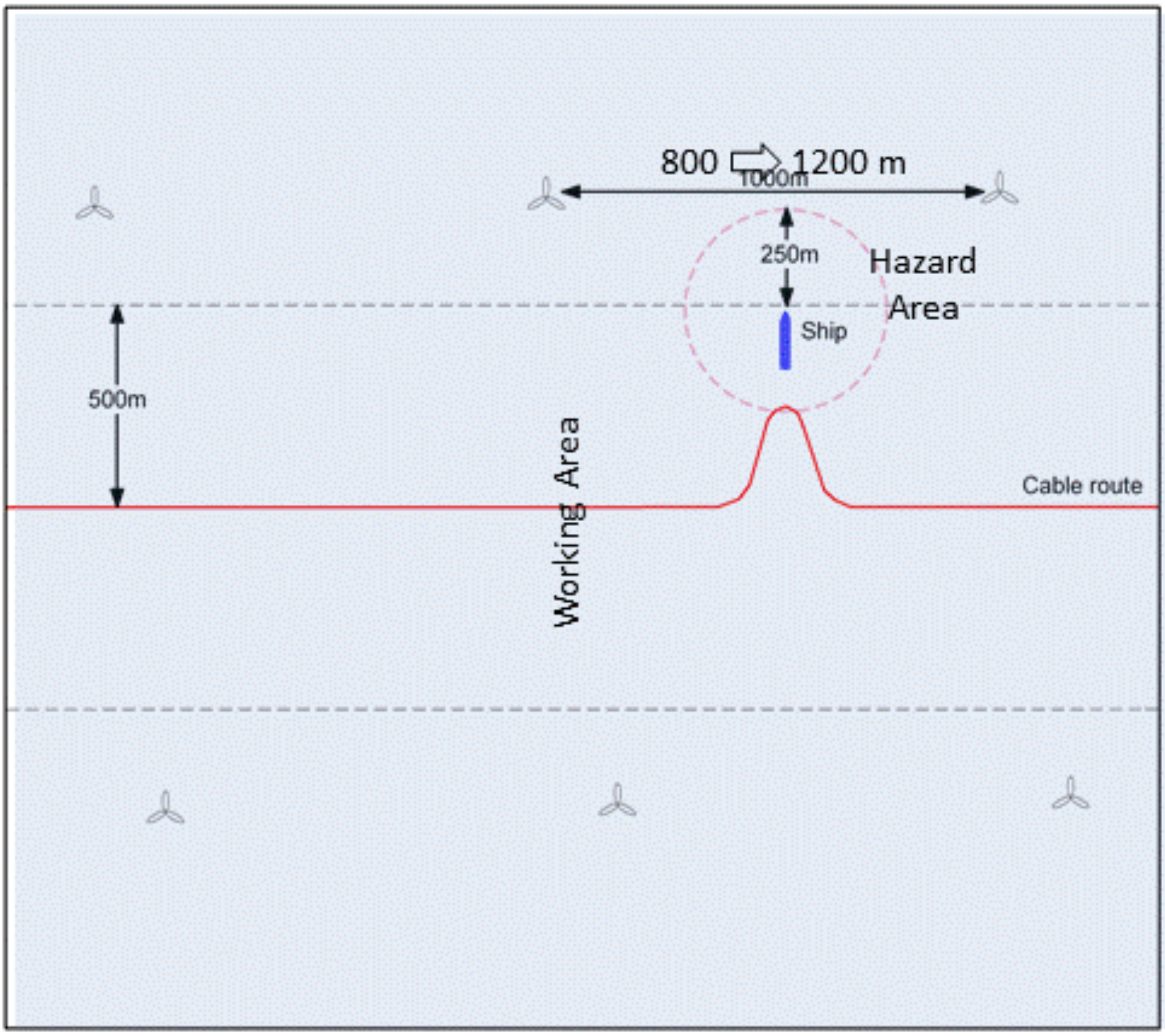

Figure 4 - Vessel operation on the extent of the Working Zone when deploying a final bight

There is an obvious threat to cable security as a result of a direct impact during marine aggregate extraction operations. There is also a potential indirect threat to cable security as a result of such operations as a consequence of local changes to the sediment transport environment which may give rise to the exposure of previously buried cable/s. These effects can happen during the actual operations or potentially after the operations have taken place.

4.2 Aggregate Extraction

There are currently (2017) over 70 aggregate extraction production licences around the coast of England and Wales, and their distribution – both individually and within the wider regions and their sub-regions – reflects the discrete and localised geographic distribution of the commercially viable geological deposits that are able to be exploited.

The commercial rights to extract marine sand and gravel are awarded to an operator(s) on an exclusive basis by The Crown Estate, in their capacity as seabed owner out to 12NM and mineral owner(s) out to 200NM. However, extraction is only able to take place once the operator has secured a marine licence (environmental consent) from a government regulator – the Marine Management Organisation in English waters and Natural Resources Wales in Welsh waters.

The total production licence area extends to 942km2 (2017), which equates to around 0.15% of the UK continental shelf. A further 1136km2 (2017) of seabed is currently subject to exclusive option for marine aggregate extraction – either as prospecting areas or as applications areas where marine licences are being actively sought.

With suitable material only located in certain areas it is essential that production, application and prospecting areas are able to be exploited to their full potential.

Therefore, in terms of minimising the potential for interaction with cable infrastructure, the key issues that need to be considered include:

- Risk to dredger integrity & personnel safety through direct interaction during production operations: dredging, drifting (with pipe/drag-head down), anchoring;
- Resource constraint/sterilisation – factor of cable route/zones (including potential for redeployment of bights following repair) relative to resource, coupled with risk based on proximity/protection;
- Operational dredging constraint - factor of cable route/zones relative to resource, coupled with risk based on proximity/protection.

This guidance considers that the physical interaction between the two assets, and the potential consequences to their mechanical integrity and ongoing operation represent the principle risks arising from any direct interaction between the two activities.

4.3 Risk to Submarine Cables in close proximity to Marine Aggregate Interests

Direct damage to submarine cables by vessels undertaking aggregate extraction

The UK's marine aggregate fleet comprises 27 purpose-built marine aggregate extraction vessels, operating around the clock, 360 days-a-year.

At the heart of the extraction process are powerful electric pumps which, on large vessels, are capable of drawing up to 2,600 tonnes of sand and gravel an hour from water depths of up to 60m.

Two types of dredging technique are employed:

Static dredging involves a vessel anchoring over a deposit and is effective in working thick, localised reserves

Trailer dredging requires the dredger to trail its pipe along the seabed at speeds of up to 1.5 knots, and is ideal for working more evenly distributed deposits, as shown in figure 5.

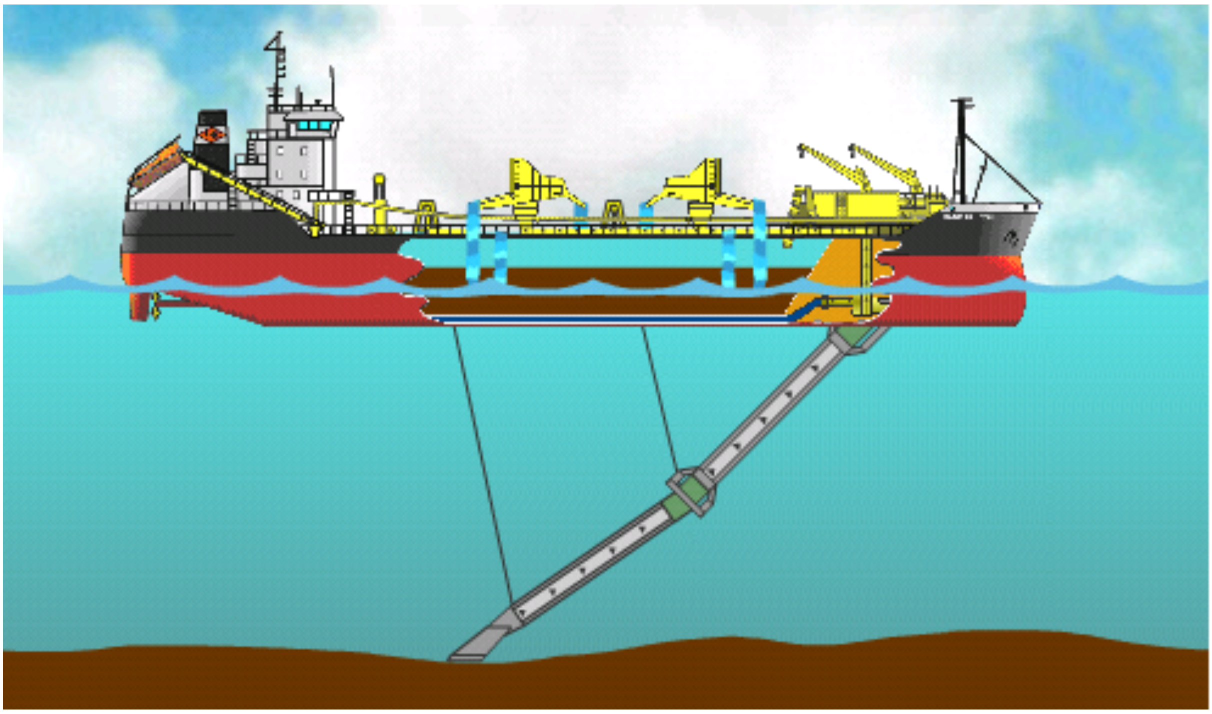

Figure 5 - A Typical Trailing Suction Hopper Dredger

While dredging operations are taking place, the draghead (the interface between the dredge pipe and the seabed) will remove a cut of sediment approximately 2 metres wide and up to 0.5 metres deep. The operation of these vessels therefore has the potential to pose a significant threat to the security of submarine cable systems if they are allowed to occur in inappropriate locations. To ensure this does not happen, in the UK marine aggregate extraction is restricted to licensed areas, with the location of operations monitored through a 'black box' dredge monitoring system.

Most marine aggregate extraction takes place in relatively shallow water (<50m), where submarine cables will normally be armoured and/or buried. However, as mentioned above, the sheer size, power and mass of some extraction equipment is usually sufficient to damage a heavily armoured submarine cable should physical contact be made while dredging is underway.

Given the regulatory controls in place for UK marine aggregate operations, the potential for direct interaction with cable systems while licensed extraction operations are underway is considered to be very limited. However, should the dredging vessel lose power, there is the potential for the dredge gear to be dragged over the surface of the seabed as the vessel drifts with the tide. Under these circumstances, the vessel could potentially drift outside of its licensed area towards adjacent cable infrastructure. While the draghead is considered unlikely to interact with a buried cable in these circumstances, a greater potential risk could be posed by the deployment of the anchor as the crew look to regain control of the vessel. Under these circumstances it may be more appropriate to put in place emergency procedures that require the vessel to drift beyond any cable infrastructure before trying to regain control where it is considered safe to do so.

Dredging operations will normally be aligned so they occur tide-parallel. Where the extraction operations are taking place in parallel to a cable route, the potential for direct interaction can be significantly reduced. Under these circumstances, and subject to the appropriate risk assessment, it may be appropriate to consider reduced proximity distances. However, where the activities have the potential to interact across tide, it may be necessary to consider enhanced proximity distances in order to safeguard the cable infrastructure and minimize the risk to the dredging vessel.

A review of the proposed extraction equipment, frequency and sediment type being dredged together with the nature of extraction operations relative to the cable location should quickly indicate if there is the potential for cause for concern.

4.4 Impacts to submarine cables caused by movement of sediment due to aggregate extraction

It is widely accepted that marine aggregate extraction has the potential to change the transport of seabed sediments as a result of local modifications to the hydrodynamic regime present. If dredging operations occur too close to submarine cables there is the potential for the exposure or even suspension of previously buried cables to occur. The degree to which sediment transport may be modified following an extraction operation will depend on the following factors:

- General wave and current activity in the area. The stronger the wave activity and current the more likely sediment transport will be;
- Depth of water. The shallower the water the stronger the effect of waves and currents and the more likely sediment transport will be;
- The prevailing wave and current regime. Established sediment transport patterns may increase or decrease the impact of extraction;
- Nature of seabed geology and mobile surface sediments. Fine sands and silts will be more likely to be affected by local hydro-dynamic changes than coarser sand and gravels;
- The relationship between the local hydrodynamic processes and the sediment resource that is being dredged. If the seabed sediments are highly mobile, then a dredged depression may result in increased levels of sediment transport as the depression is naturally filled – a process that may draw sand away from buried cables located up-drift of a dredging area, reducing their levels of protection. Conversely, the dredging process may actively remove sediment from the system which would otherwise maintain the burial depths of cables located down-drift of a dredging area, resulting in the cables becoming exposed over time. In more stable seabed sediments (such as relict coarse sands and gravels), the dredged depression can be expected to naturally remain, and the local alterations to hydrodynamic processes are unlikely to be sufficient to further mobilize the remaining seabed sediments
- The volume of aggregate to be removed relative to the spatial extent of the area being dredged. In general, the greater the volume of aggregate to be removed per unit area, the greater the potential change to local bathymetry. This in turn will directly influence the scale and risk of potential changes to the local hydrodynamic processes and the associated sediment transport regime.

It is therefore difficult to be specific with regard to a 'safe distance', however it is generally considered that any aggregate extraction zone outside of 1NM (1.852km) will have a minimal impact upon a submarine cable.

4.5 Stakeholder Consultation

It is vital that all sectors engage with each other from the outset of the development process, regardless of which sector the developer is from and who owns the existing infrastructure/zone.

In terms of the lead party, it should be the responsibility of the incoming party to constructively engage and consult with the other existing interest(s) and such approach should align with the principles outlined in ESCA Guideline No 6.

This engagement will facilitate appropriate proximity agreements and should continue throughout the consenting process and through the operational lifetime of the asset as illustrated in the below project cycle overview (Figure 6).

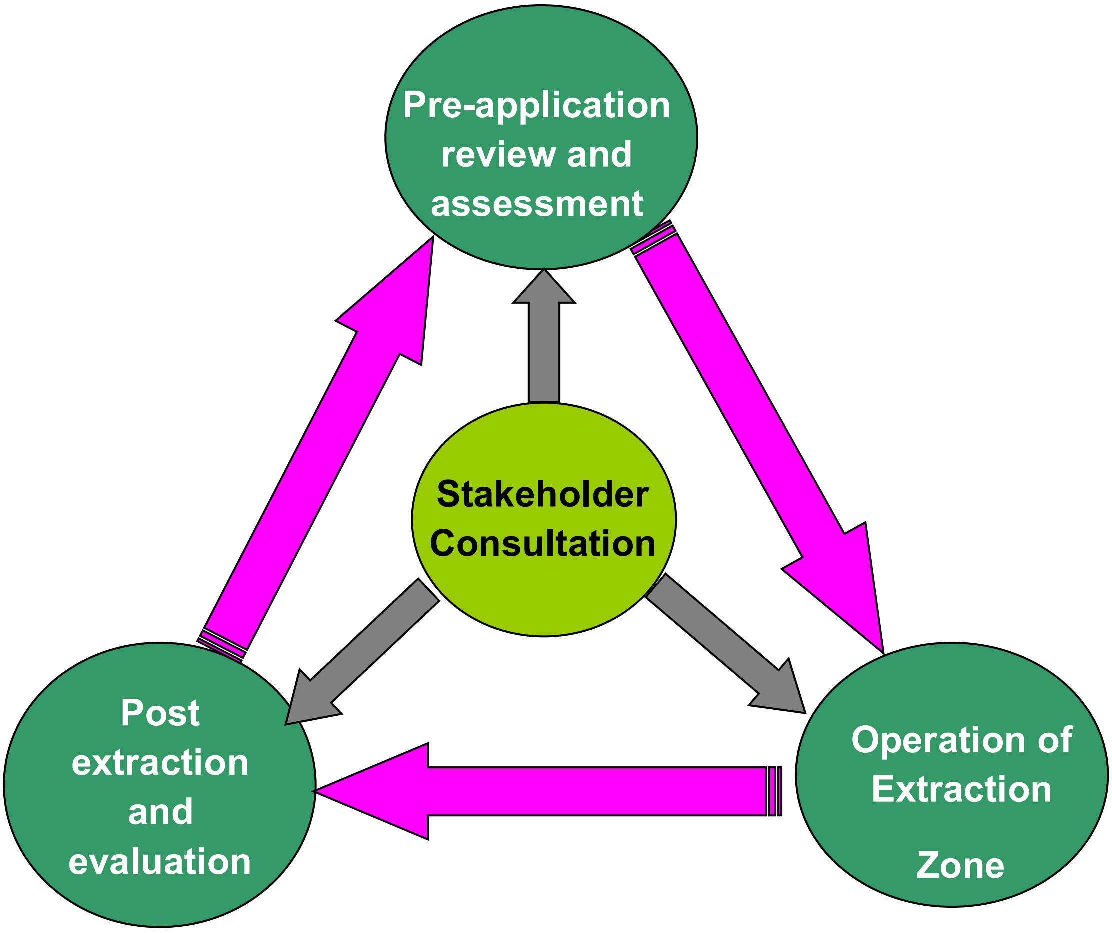

Figure 6 - Example of stakeholder consultation in all phases of the project lifecycle for a marine aggregate development

Stakeholder engagement should commence as soon as is practicable following the award of a new marine aggregate option or through the development process for a new cable route and continue with all stakeholders, throughout the process, until the new project is fully commissioned or operational.

4.6 Process For Determining Site Specific Proximity Limits

A generic set of limiting distances cannot be derived for all cable / aggregate extraction zone proximity scenarios without recourse to a large number of caveats and exceptions. The recommended approach is to use the principles of a holistic risk based process for determining site specific proximity limits. This allows consideration of a range of external influences, both those beyond the control of the parties and those internal influences that can be affected by the parties.

Once the parties have agreed site-specific proximity limits, the final step in the process is the drafting of a proximity agreement with accompanying method statements.

The overall process is outlined below:

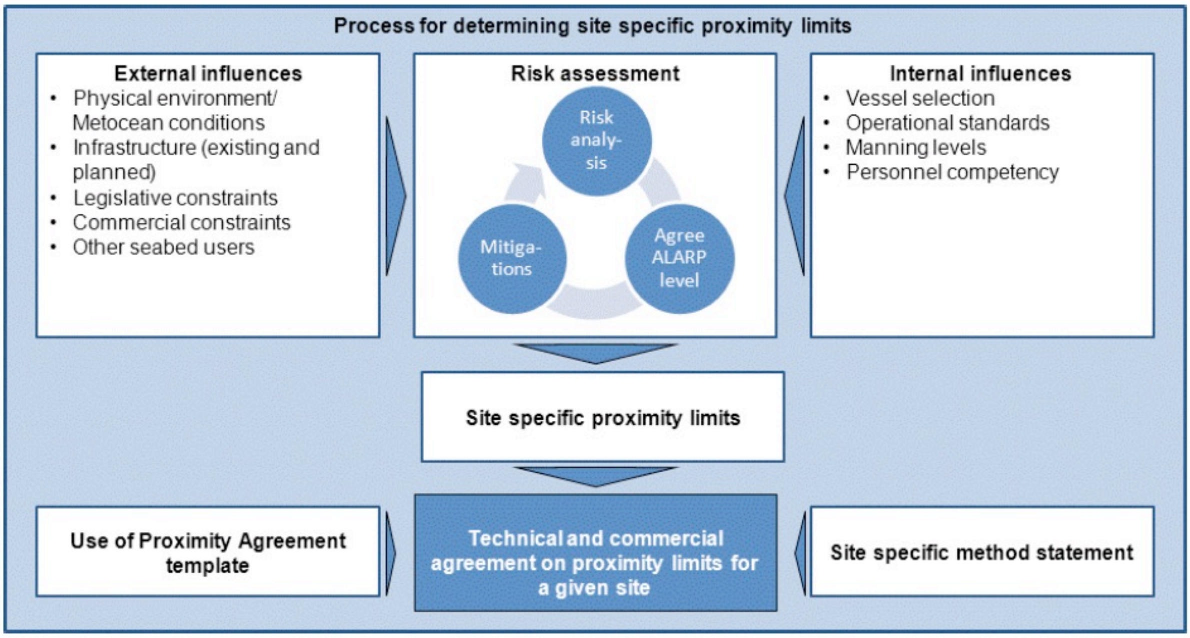

Figure 7 - Process for determining site-specific proximity limits and drafting a proximity agreement

Risk to personnel and the influence of Health and Safety Executive (HSE) and Merchant Shipping legislation and regulation is considered to be included under external influences in the diagram above, as well as risks included in operational standards under internal influences.

Personnel risk is properly governed by detailed legislation and is therefore outside the scope of the Guidelines. However, it should be noted that Safety Of Life At Sea is one of the primary drivers for adopting sensible proximity agreements and serves to underpin every decision process for either risk assessment or mitigation selection and application.

4.7 Risk Assessment

In order to come to a site-specific agreement between the parties involved it will usually be necessary to undertake a risk assessment during discussions on proximity agreements. This is achieved by applying the cyclic approach embedded in the process, as illustrated below.

The risk assessment should include an analysis of all relevant site specific influences (external and internal), examples of which are given in Figure 7 above. In order to provide a sensible basis for discussion, risks need to be assessed realistically.

In terms of the lead party, it should be the responsibility of the incoming activity to constructively engage and consult with the other existing interest(s) to help inform this process and such approach should align with the principles outlined in ESCA Guideline No 6.

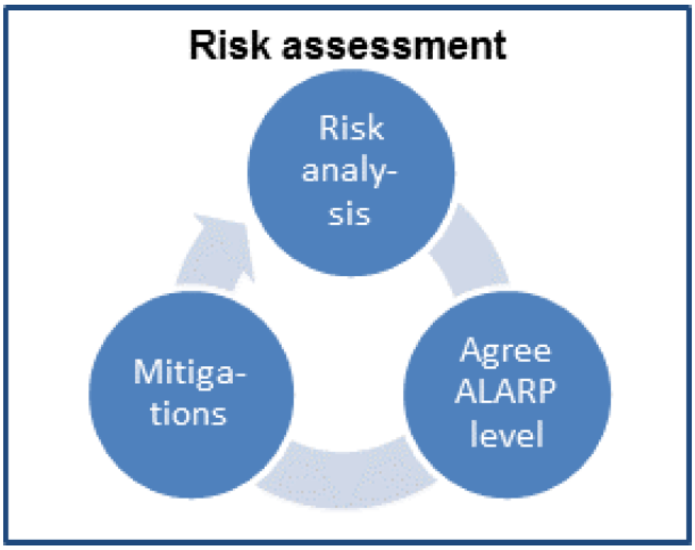

Figure 8 - Cyclic approach to risk assessment

Safe separation is required for both existing and proposed interests to ensure the continuance of reasonable, timely and cost effective availability to maintain cable assets and to allow safe and efficient marine aggregate production operations. The requirements of each stakeholder are however likely to vary depending on the site-specific circumstances.

In order for the involved parties to reach agreement it will be necessary to determine the As Low As Reasonably Practicable ("ALARP") risk level that is acceptable to each Stakeholder. This will be site-specific and the appetite for risk is likely to vary.

The various site-specific issues should be carefully analysed in respect of risk impact, and a mutually acceptable ALARP level of risk agreed. Consideration of the acceptable risks will then allow informed discussions on the potential mitigations and lead to site-specific proximity limits.

It should be appreciated from the outset by all parties that no activity is ever entirely free from risk. Companies and regulators do however require that safety risks are reduced to levels that are ALARP.

The technique associated with this often encompasses the use of a Risk Severity Analysis to try to quantify the issues.

4.8 Potential mitigation measures to support reaching agreement

Before decisions are made regarding proximity other solutions should be considered to potentially mitigate or reduce the impact. Such mitigation measures may influence a proximity agreement. Examples of potential mitigation measures include:

- If there is an existing cable traversing a potential aggregate extraction licence, the application could be modified to include exclusion zones of a suitable proximity distance to protect the cable infrastructure. The exclusion zones would be reflected in the activities marine licence and the supporting dredge management plan for the site;
- If there is an existing marine aggregate licence on the preferred route of a new cable, the route may be modified to, divert the proposed cable around the licence area, to minimise the potential for resource sterilisation or operational constraints;
- Negotiated outcomes whereby both parties offer compromise solutions on cable routes, proximity distances, and operational/resource constraints to minimise or reduce the potential impact of any interaction;
- Provision of additional spare cable for stock and other wet plant in case of repair;
- Undertake appropriate surveys to identify exact location of “in service” and “out of service” cables as required;
- Agreement on site-specific methodologies for repair adjacent to marine aggregate interests in order to facilitate safe operations while repairs are underway and to minimise the future potential for further resource and operational constraints following cable redeployment; and
- Agreement of contingency procedures for dredging vessels in the event that they lose power, which require the vessel to drift beyond any cable infrastructure before trying to regain control through emergency anchoring where it is considered safe to do so.

This list is not exhaustive and, depending upon circumstances, additional mitigations could also be developed by the parties through mutually acceptable operational (and other) procedures involving the aggregate operator and the cable owner / marine repair contractor etc.

5 Proximity Agreement

When site-specific proximity limits have been agreed, a bilateral proximity agreement with accompanying method statement can then be drafted based on a standard template and these guidelines. Such a proximity agreement should be based on the format and spirit of existing cable crossing and proximity agreements in common use throughout both industries, where appropriate.

It is recommended that where possible, finalisation of planning of cable routeing or marine aggregate extraction zones should not be undertaken until such time as Proximity Agreements and the requirements therein have been properly reviewed, discussed and agreed at least in principle, with the marine aggregate operator, the cable owner and any affected maintenance providers.

Survivability of agreements is essential to the parties' interests, and elements of the proximity agreement may need to be shared with The Crown Estate in their capacity as the seabed owner (12NM) and marine mineral owner (200NM), and Government regulators/marine planning authorities, as considered appropriate.

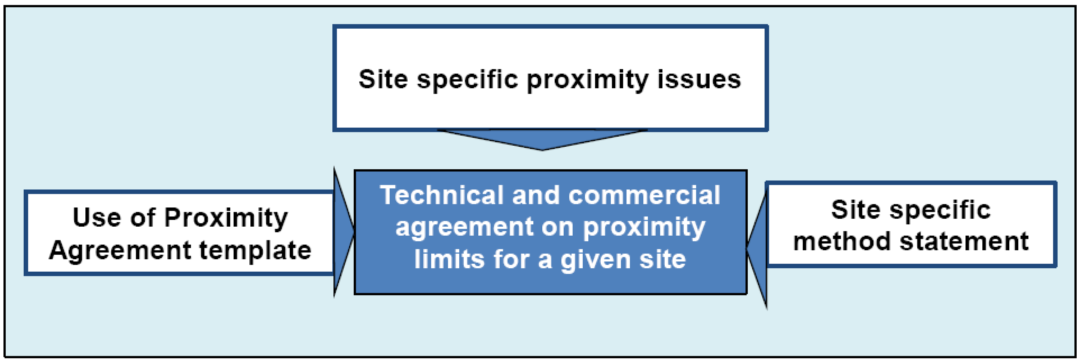

Figure 9 - The drafting of a site-specific Proximity Agreement and Method Statement

5.1 Proximity agreement recommendation

The recommended approach is to use the principle of a bilateral proximity agreement for each specific scenario.

It is recommended that the following key elements should be included in such a proximity agreement:

- Clauses to define the liabilities and rights of both parties;
- The exclusion/inclusion of consequential losses;
- Details of financial compensation arrangements for each party where applicable relating to specific arrangements;
- Clearly defined limits of the area to which the proximity agreement applies;
- Details of how the work would be carried out (including cable installation, cable repairs and marine aggregate production operations), to include method statements provided by the party carrying out the work and accepted by the other party as suitable prior to work proceeding, it is recommended that installation procedures be included in the agreement;
- Future operation requirements of both assets. This should include the method by which notification of operations by each party is given to the other;
- Definition of the expiry/survival of the agreement (for example, at the decommissioning and/or recovery of the cable asset or the cessation of marine aggregate extraction operations and the relinquishment of the associated commercial interest); and
- Provision of representatives from one party to the other party's operations and their rights, obligations and limitation of authority.

5.2 Site specific method statement

A method statement is an essential part of any proximity agreement. The following is an example task checklist for undertaking cable repair works which the parties can use as a basis for drafting a site-specific method statement. It is not intended to be an exhaustive list of items to be included by prescription but should prompt evaluation of the most useful and relevant issues for consideration. This approach and the principles contained within this example could be adapted to apply to cable installation or the development of dredge management plans.

There needs to be reciprocity with respect to method statements for operation of assets across both industries.

Pre requirement for a repair

- Delivery of all as-laid positions of infrastructure – lat/longs, geodetic datums, cable burial, rock placements, licence area limits, active dredge zone limits etc.;
- Emergency 24/7 contact procedures including escalations, details of any field-specific VHF communication channels and details of site engineers;
- Historical metocean data on currents and sediment movement to inform marine providers (may not be available - especially during the O & M phase);
- Establish notification requirements during operations, i.e., daily reports, notice of seabed interaction, surface vessel activity, etc.;
- Purchase of additional expendable gear, e.g., additional cable, cable joints (should preferably be agreed upon during early discussions);
- Establish additional manning requirements, e.g., additional reps, marine warranty surveyors, anchor watch crews, etc.; and
- Establish bridging documents, as appropriate.

Pre-repair

- Consider installation of local position reference systems;
- Consider temporary cessation of any extraction works nearby;
- Establish preferred subcontractors in area for guard boats, tugs, other support vessels;
- Up to date metocean data;
- Distribution list from all parties for notifications during repair ops;
- Boarding requirements of any additional personnel;
- DP trials nearby repair site to establish all systems functioning correctly; and
- Coordination meeting and confirmation of communication lines (shore project management).

During repair

- Daily activity reporting;
- Dependent on communication plan within proximity agreement, notifications when works are expected to be seabed intrusive; and
- Assistance in enforcing 1NM exclusion zone around repair vessel for other marine traffic.

Post repair

- Sharing of revised infrastructure location data; and
- Post repair review meeting / Lessons Learnt exercise to feed back improvements to the process or relevant industry contacts.

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