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ERVIA CCS PRE-FEED STUDY FOR GATHERING, LIQUEFACTION, TEMPORARY STORAGE AND SHIPPING OF CAPTURED CO_2

Final Report

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Glossary

Term	Definition
AACE	American Association of Cost Engineering
AGI	Above Ground Installation
ALARP	As Low As Reasonably Practicable
API	American Petroleum Institute
BGE	Bord Gáis Energy
BOG	Boil Off Gas
CAPEX	Capital Expenditure
CCGT	Combined Cycle Gas Turbine
CCR	Central Control room
CCS	Carbon Capture and Storage
CD	Chart Datum. Refers to local reference elevation on relevant Admiralty Chart. Elevation / depth values are measured with respect to Chart Datum (CD).
CEF	Connecting Europe Fund
CPF	Central Processing Facility
CRA	Corrosion Resistant Alloys
CRU	Commission for the Regulation of Utilities
CS	Carbon Steel
CSU	Commissioning and Start-Up
D&B	Design & Build
DBO	Design/Build & Operate
DBOM	Design, Build Operate & Maintain
DECC	Department of the Environment, Climate and Communications
DNV	Det Norske Veritas
ECI	Early Contractor Involvement
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
EPC	Engineering, Procurement, and Construction
EPCM	Engineer, Procure, Construct, Manage
EU	European Union
FEED	Front End Engineering Design
GNI	Gas Networks Ireland
HAZCON	HAZard CONstruction
HAZID	HAZard IDentification
HAZOP	HAZard and OPerability
HIRA	Hazard Identification & Risk Assessment
HSA	Health & Safety Authority
HSSE	Health, Safety, Security & Environment
IFI	Inland Fisheries Ireland
KOD	Knock Out Drum

LAS	Low Alloy Steels
LOPA	Layer of Protection Analysis
LPG	Liquified Petroleum Gas
MC	Mechanical Completion
MMtpa	Million Metric tonnes per annum
MTO	Material Take-Off
MV/HV	Medium Voltage/High Voltage
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Services
OJEU	Official Journal of the European Union
OPEX	Operation Cost
PCI	Project of Common Interest
PDA	Planning & Development Act
PHAST	Hazard analysis software tool developed by DNV and used for process safety management
PPP	Public Private Partnership
PSDP	Project Supervisor for the Design Process
PSL	Product Specification Level (from API 5L specification)
P&ID	Piping & Instrumentation Diagram
QRA	Qualitative Risk Assessment or Quantitative Risk Assessment
SID	Strategic Infrastructure Development
SIL	Safety Integrity Level
UK	United Kingdom
VAT	Value Added Tax
WBS	Work Breakdown Structure
WTE	Waste to Energy

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EXECUTIVE SUMMARY

Ervia is assessing how Carbon Capture and Storage (CCS), located close to large-scale CO_2 emitters can play a role in reducing Ireland's CO_2 emissions. As part of this endeavour, Ervia obtained EU Project of Common Interest ('PCI') status for both the Ervia Cork CCS Project (as a project promoter) and the Northern Lights CCS transport project (as a project partner) in 2019.

A technical feasibility study on the potential for large-scale CCS in Ireland was completed by Ervia in 2020. The study was a high-level review of available CCS technologies (carbon capture, transport and intermediate onshore storage) and considered their feasibility for use in Ireland. Two emitter cluster case studies were identified. One of these was in the Whitegate / Aghada area of Cork Harbour. The other was in Poolbeg, Dublin Port.

On the basis of the project's PCI status, part funding was subsequently obtained by Ervia under the EU's Connecting Europe Fund (CEF) to carry out a Pre-Front End Engineering Design (Pre-FEED) study of the emitter clusters identified above.

Ervia appointed RPS / Bechtel to carry out this Pre-FEED study. It has involved a detailed assessment of the key infrastructure necessary to gather gaseous CO_2, liquify it and temporarily store this liquid CO_2 at Cork Harbour and Dublin Port for subsequent loading onto ships for export.

The objective of the Pre-FEED study was to develop the design of the facilities to achieve a well-developed process design basis to enable the production of an AACE Class 4 cost estimate for each location.

This study considers receiving CO_2 from the emitters in Cork and Dublin at the battery limit of the carbon capture facilities. The carbon capture facilities at the emitter locations are not included within the scope of this study.

In Cork, the general location of ESB's Aghada Power Station was selected as a potential site for a Central Processing Facility (CPF) for liquefaction, storage, and export of CO_2 overseas via a new marine jetty. The Cork facility will cater for CO_2 captured at 3 emitter locations (Whitegate Power Station (Bord Gáis Energy), Irving Oil Whitegate Refinery (Irving Oil) and Aghada Power Station (ESB)). A new CO_2 gas gathering pipeline network will transport CO_2 from the emitters to the CPF.

It is envisaged that the new marine jetty in Cork will also be used for import of liquid CO_2. The import of CO_2 requires facilities for the regasification of liquid CO_2 for transport via a new pipeline to the Inch terminal which is the link to potential offshore permanent storage at the depleted Kinsale Head Gas Field. Separately, Ervia has carried out previous studies on the suitability of the Kinsale Head Gas Field and the associated existing infrastructure with a view to re-use in order to facilitate the long-term storage of CO_2 in the depleted Gas Field. The offshore pipeline and the facilities within the Inch Terminal are not within the scope of this study.

In Dublin, the general location of the ESB's Poolbeg Power Station was selected for a Central Processing Facility (CPF) for liquefaction, storage, and export of CO_2 overseas via a new marine jetty. The Dublin facility will cater for CO_2 captured at 3 emitter locations (Dublin Waste to Energy (WTE) Plant (Covanta), Poolbeg Power Station (ESB) and Dublin Bay Power Station (ESB)). A new CO_2 gas gathering pipeline network will transport CO_2 from the emitters to the CPF.

The design approach used for this project has been to locate the CPF and liquid CO_2 temporary storage infrastructure as close as possible to the export / import facilities. Combining these elements together has resulted in a more compact and efficient design. Considering available information, there is sufficient plot space available for a CO_2 export / import terminal in Aghada in Cork and for a CO_2 export terminal in Poolbeg.

Detailed work has been carried out during the Pre-FEED study to determine the most appropriate conditions for the liquefaction process. Medium pressure conditions (14 to 20 barg / -30^oC to -19.5^oC) have been selected on the basis of efficiency and compatibility with the Northern Lights project. (The Northern Lights project is being developed by Equinor, Shell and Total Energies. When it starts operation (planned for 2024), it will become the first ever cross-border, open-source CO_2 transport and storage network. The project will accept CO_2 (meeting a defined specification), at an onshore marine terminal in Norway. From here the CO_2 will be transported offshore via a subsea pipeline for sequestration in a subsea reservoir).

The size and number of CO_2 vessels that would be required to service the CPF in Cork and Dublin has been examined in detail in a study that was conducted by maritime specialist research and consultancy firm HR Wallingford. It has been concluded that the likely size of CO_2 vessels that will be available when the CPF starts production will be 7,500m^3. This is the size of vessel that is currently being built by Equinor for the Northern Lights project. It is expected that over the lifespan of the CPF, larger vessels will come into service.

A future vessel size of 15,000m^3 has been considered in design as this ship size is at the upper end of the range for economic medium pressure CO_2 shipping. This has been a key input to the required design capacity of liquid CO_2 storage located at the CPF. Both CPFs have been designed with liquid CO_2 storage capacity of up to 3 days production at the CPF, assuming a maximum vessel size of 15,000m^3.

Spherical tanks have been selected for temporary storage of liquid CO_2. The storage spheres reduce the hazard associated with CO_2 storage compared to use of storage 'bullets' by greatly reducing the potential leak sources, reducing maintenance and also providing a more compact footprint. The onshore temporary CO_2 storage represents a significant element of the overall project capital expenditure.

Further to the process design work, the Pre-FEED study also considered the safety requirements for the facility through a detailed HAZID and a preliminary HAZOP process. These safety studies are summarised in HAZID close out reports, HAZOP close out reports and Hazard Identification & Risk Assessment (HIRA) reports for Cork and Dublin. These reports will inform future stages of the project design to ensure that all hazards are appropriately considered for plant design and operations.

The design of the CPF control system has been developed on the basis of Ervia's requirements, which are informed by the experience of operating natural gas assets in Ireland in accordance with the requirements of the Commission for the Regulation of Utilities (CRU), particularly in respect to Safety. It is assumed that in future, CO_2 infrastructure in Ireland will also be regulated by the CRU. This approach has resulted in a number of additional measures being specified for the Ervia CCS project that could be considered unnecessary for similar infrastructure constructed outside of Ireland. This may present an opportunity for value engineering or design optimisation during detailed design. It should be stressed that value engineering does not mean a lowering of safety standards.

With respect to the pipeline routing and considering all available information, there are suitable corridors for the development of onshore CO_2 gathering networks to connect the CO_2 emitters in Cork to the CPF at Aghada and emitters in Dublin to the CPF at Poolbeg. Hydraulic simulations and analyses were performed to confirm the concept design and to determine the CO_2 pipeline sizes, their operating/design philosophy and conditions, and further to complete a flow assurance assessment in transporting of captured CO_2 in liquid and gaseous phase.

The feasibility of repurposing a 2km section of existing gas transmission pipeline for the transport of CO_2 was explored during the Pre-FEED Study. While it would be technically feasible to re-purpose existing gas transmission pipelines manufactured in accordance with I.S. 328, ISO 3183 and/or API 5L as applicable, for the transportation of gaseous CO_2, this would be subject to a detailed review of contemporary technical details and confirming asset condition with inline inspection. The section of pipeline that is potentially available was built in 1977 and is not favourably located for integration with the envisaged CO_2 gathering and delivery network. There was no practical advantage found when considering repurposing this pipeline and furthermore if used, it would introduce an area of risk intensification to the project. It was therefore ruled out during the Pre-FEED Study and the construction of a completely new dedicated pipeline provides the lowest risk to the project.

Assessments of embodied carbon (for the construction phase) and carbon footprint (for the operational phase) have been carried out. The calculated annualised embodied carbon during the construction phase for the Cork and Dublin projects is 3,477 tpa CO_2 e and 2,778 tpa CO_2 e respectively. When the cumulative carbon emissions from each plant during the operational stage (including the annualised embodied carbon from the construction stage) are compared to the total quantity of CO_2 that will be processed by the plants (and subsequently permanently sequestered), it shows that the net quantity of CO_2 sequestered per annum will be 1.22MMtpa (97.5%) and 1.71MMtpa (97.9%) for the Cork and Dublin plants respectively. These calculations are specific to the Ervia CCS project which comprises the transport, liquefaction and temporary storage of CO_2 only.

AACE Class 4 cost estimates have been developed for the Ervia CCS projects in Cork and Dublin. The estimates include all CAPital EXpenditure (CAPEX) for the CPF, pipeline, onshore temporary CO_2 storage and jetty infrastructure. All Engineering, Procurement, and Construction (EPC), through Mechanical Completion (MC), Commissioning and Start-Up (CSU) costs are included. The estimates are based on more than 90% of vendor supplied estimates for major equipment. For bulk materials, discipline engineers prepared material take-offs and benchmarking comparisons were made with real as built process plant project historical data. In addition to the key equipment costs and direct costs required for installation of equipment and materials, significant consideration was also given to indirect costs such as traffic and logistics, construction productivity costs, construction services (warehousing, material handling, maintenance of equipment & temporary facilities), scaffolding materials, craft testing & training, and construction equipment (large tools, small tools, PPE, consumables, and purchased utilities). The CAPEX estimates also considered professional services (e.g., engineering and project controls for EPC), capital spare parts, contingency and fee.

The estimate has been prepared with the rigour required to compile an AACE Class 4 estimate. Process design has been completed to a level sufficient to develop Piping and Instrumentation Diagrams (P&IDs) which have received a preliminary HAZOP. The P&IDs facilitated the development of detailed Material Take-Offs (MTOs) based on a conceptual 3D model of the plot space. Equipment datasheets were prepared and further optimised through detailed discussion with vendors for budgetary estimates.

It should be noted that there are a number of CO_2 shipping cost reports that are based on assumptions made in reference to academic papers which do not appear to have followed the same rigorous estimating process described above. This project estimate is higher in costs when compared to published information, however by comparison it seems that these reports do not fully consider the costs. The estimate costs for this project include for direct costs of equipment and materials along with miscellaneous and indirect costs which may not be adequately or fully considered by non-Engineering Procurement and Construction (EPC) practitioners. Finally, sufficient contingency has been added to the estimate which is appropriate to the level of engineering and design development.

There were a number of costs which could not be appropriately defined or priced at this stage and therefore were excluded from the CAPEX estimate. Examples of CAPEX exclusions are; abnormal subsurface conditions, unexpected underground demolition, remediation of contaminated soils, cost of electrical grid connections and owner's costs (e.g. cost of land purchase, permitting costs, environmental studies, environmental impact assessments and financing costs etc.). In addition, the current global pricing volatility and global supply chain disruptions has meant that escalation cannot be appropriately priced at this time and this has also been excluded.

A budgetary annual OPEX cost, comprising fixed and variable costs, has also been developed for both locations. The estimated total costs for each location are summarised below.

Location	Capacity (MM tpa)	CAPEX (€m)	OPEX (€m/a)
Cork	1.25	510	40
Dublin	1.75	450	41

In addition to the base case AACE Class 4 estimate, additional options and scalability was considered through a flowrate sensitivity analysis and the development of an associated Class 5 estimate. Options were developed for Cork and Dublin considering changes in flowrate of +50%, +100% and -50%.

The cost estimates produced for this project are specific to the Ervia CCS project requirements. Factors such as location, plant configuration, length of CO_2 gathering network, selection of liquefaction technology, temporary liquid CO_2 storage technology and capacity, and design of the marine jetty, all have a significant bearing on the cost estimate. Other CO_2 shipping projects cannot be directly compared unless there are significant efforts made in normalising any comparative reference projects.

A preliminary project execution plan has been developed for the project which includes consideration of procurement and contracting strategy. The Cork and Dublin projects will both individually be subject to EU procurement under the Utilities Directive. The Negotiated, Competitive Dialogue or Restricted procedures are considered to be most relevant.

The most appropriate way of allocating the contract (e.g. as a single contract or split by location, work package or both) will need to be determined through market engagement. A range of alternative contract types have been reviewed and a short-list of those that are suitable or potentially suitable options has been produced. Among these, an EPC contract form of project execution is likely to be the best fit for the Ervia CCS project and this has been assumed for the purposes of developing the project execution schedule.

The EPC contract type is generally used for large scale energy developments such as power stations, process plants, other major plants including oil, gas and chemical projects. It is particularly well suited to projects where significant process and construction engineering expertise is required, the design is determined by functionality (rather than aesthetics), there is greater focus on performance requirements and the Client does not need to control the design.

The procurement process for the EPC contractor is indicated on the project execution schedule. A key step for the project will be to complete the preliminary engineering or Front End Engineering Design (FEED) in time for preparing with the EPC tender. This approach will be an important means of reducing cost uncertainty for tendering contractor and minimising the risk of unexpected costs at construction stage. There will also be advantages in terms of refining the AACE Class 4 cost estimate that has been carried out for the Pre-FEED study which will give early foresight of expected project costs as the project design is developed.

The anticipated overall project delivery schedule for the Ervia CCS Project is approximately 7 years. Construction activities cannot start until relevant statutory approvals are in place.

The critical path on the project execution schedule is represented by the environmental and planning processes. A limited number of environmental surveys are expected to take 2 years to complete. These are among the first activities that need to be started in order to achieve project delivery within the 7 year schedule. The main environmental considerations for the project and anticipated environmental surveys are outlined in the project Health, Safety Security & Environmental (HSSE) Philosophy documents. Both an Environmental Impact Assessment Report (EIAR) and a Natura Impact Statement (NIS) are likely to be required to secure consent for this project.

Estimated durations for the statutory planning processes indicated on the project execution schedule are based on experience with similar large-scale infrastructure projects. However, there is a significant risk that delays could occur due to various factors including in particular the lack of specific CO_2 legislation in Ireland at present.

It is considered that the Strategic Infrastructure Development (SID) planning route is the best fit for the project. However, this type of infrastructure is not explicitly covered under the current definitions of SID (seventh schedule of the Planning and Development (Strategic Infrastructure) Act). It is recommended that a legislative change be sought during the review of the Planning and Development Act which is currently underway.

Ervia may wish to seek Project of Common Interest (PCI) status for the project at the next available opportunity (2023). This would enable the project to potentially avail of funding from the Connecting Europe Fund (CEF). If so, careful consideration should be given to how the project is described on the 6th PCI list. If the scope of the project does not encompass the entirety of the project, it could result in planning delays.

While the construction of CO_2 transport and storage infrastructure within existing industrial settings will in many ways be similar to other major infrastructure, such as gas transmission pipelines and the nearby power stations, CCS has its own unique features and risks. CCS is an important part of the future for the Net Zero energy transition and it will play a critical role in achieving carbon reduction targets. It will be a new type of infrastructure in Ireland and its purpose and place in society must be communicated effectively. The Pre-FEED study includes a stakeholder management philosophy which provides guidance on how a detailed stakeholder management plan for the project should be developed. Engagement with landowners and other stakeholders will start at least as soon as access to lands is required for surveys. Building a relationship with the local community and others will continue in various phases through the project planning processes, construction and into the operational stage.

The design of the Cork and Dublin CCS infrastructure for this project needed to take into account many site specific factors, particularly in relation to siting, layout and pipeline route selection. These factors have inevitably shaped the design in both locations. However, both projects essentially comprise of a CO_2 gathering network, a central processing facility designed for the Northern Lights medium pressure CO_2 specification, temporary liquid CO_2 storage and piping to loading / unloading facilities on a marine jetty.

An objective of the Pre-FEED Study was to ensure that the design of the CPFs in Cork and Dublin were replicated as much as possible. This has resulted in the plant design and plot layout in each location being almost identical which provides many advantages in the areas of safety, procurement, construction and operations. Another advantage of this approach is that there are many aspects of the project that can be readily transferred to other CCS projects which require the transportation, liquefaction, temporary storage and shipping of CO_2 from other emitter clusters in Ireland.

1 INTRODUCTION AND PROJECT SCOPE

1.1 Project Background

Ervia is assessing how Carbon Capture and Storage (CCS), located close to large-scale CO_2 emitters can play a role in reducing Ireland's CO_2 emissions. A technical feasibility study on the potential for large-scale CCS in Ireland was completed by Ervia in 2020.

Two general locations of Aghada Power Station in Cork and Poolbeg Power Station in Dublin were selected as potential sites for a Central Processing Facility (CPF) for liquefaction, storage, and export of CO_2 overseas via a new marine jetty. Further details regarding each of these are provided further below.

Ervia appointed RPS / Bechtel to carry out a Pre-FEED study that involved a detailed assessment of the key CPF, pipeline and storage infrastructure necessary to condition, compress, transport and store liquid CO_2 at the above locations for subsequent loading onto ships for export.

1.2 Project Scope

The project scope for Cork and Dublin commences at the land ownership boundary of the relevant emitters. It does not include the carbon capture facilities at each emitter. Therefore, from a design and planning perspective, the 'red line' boundary will commence at the fence line / gates of the emitters and conclude at the end of the new jetty infrastructure (see Figures 1-1 and 1-2 below for Cork and Dublin respectively).

The Cork and Dublin projects are essentially similar, with the main difference being that the Cork facility is designed to cater for the importing of liquid CO_2 for onward transportation to Inch Terminal. In a future scenario, it is envisaged that CO_2 collected from the emitters in Cork and imported from overseas, will be permanently sequestered in the former Kinsale Head Gas Field. Inch Terminal is the location from where the collected CO_2 would be pumped via an offshore pipeline for sequestration. The Pre-FEED study scope does not include the facilities at Inch which would be required for transferring collected CO_2 to the sequestration site. This is indicated by the 'red line' boundary on Figure 1-1 below.

Specific details regarding the scope of the Cork and Dublin projects are outlined below.

1.2.1 Cork

The physical extent of the project in Whitegate / Aghada, Cork comprises the infrastructure required to:

- Collect CO_2 gas that is emitted in Ireland by the Cork cluster emitters in a CO_2 gathering network. The defined emitters for the purposes of the project are:
  - BGE Whitegate Power Station,
  - ESB Aghada Power Station and
  - Irving Oil Whitegate Refinery.
- Cool and liquify CO_2 gas at a CPF in Aghada.
- Temporarily store liquified CO_2 gas adjacent to where it can be loaded onto vessels for export.
- Export liquified CO_2 overseas by vessels where it will ultimately be permanently stored below the seabed at facilities such as the Northern Lights project in Norway.
- In a future scenario, import (by vessels) of liquid CO_2 that has been captured overseas.
- Temporarily store the liquified CO_2 near Aghada.
- Regasify the liquified CO_2 at Aghada via a Regasification Facility.
- Transport the gaseous CO_2 gas to Inch Terminal from where it can then be transported to the Kinsale Head Gas Field where it can be permanently stored below the seabed.

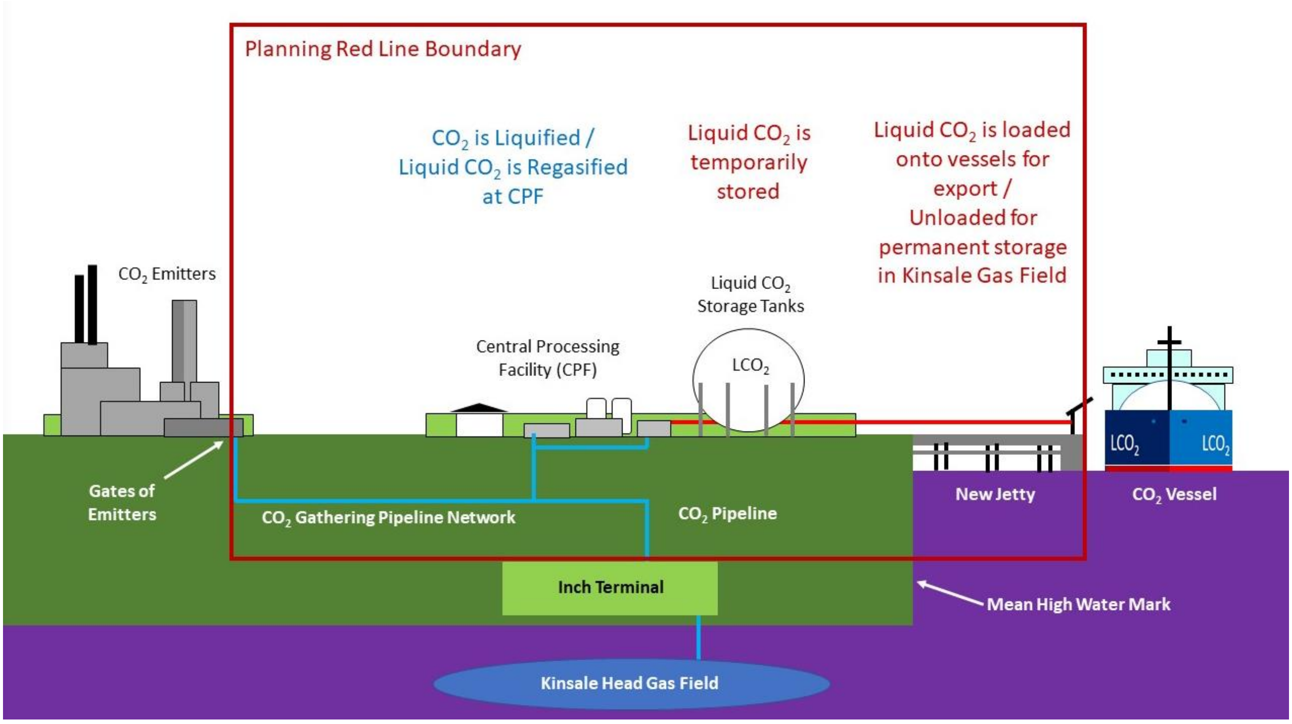


Figure 1-1 Schematic indicating key constituent parts of the Ervia Cork CCS Project

1.2.2 Dublin

The physical extent of the project in Poolbeg, Dublin comprises the infrastructure required to:

1. Collect CO_2 gas that is emitted in Ireland by the Dublin cluster emitters. The defined emitters for the purposes of the project are:
    a. Covanta Dublin Waste-To-Energy (WTE) Plant
    b. ESB Dublin Bay Power Station
    c. ESB Poolbeg Power Station
2. Cool and liquify CO_2 gas at a CPF in Poolbeg.
3. Temporarily store liquified CO_2 adjacent to where it can be loaded onto vessels for export.
4. Export liquified CO_2 overseas by vessels where it will ultimately be permanently stored below the seabed at facilities such as the Northern Lights project in Norway.

From a design and planning perspective, the project boundary is defined by the 'red line' boundary indicated on Figure 1-2 below.

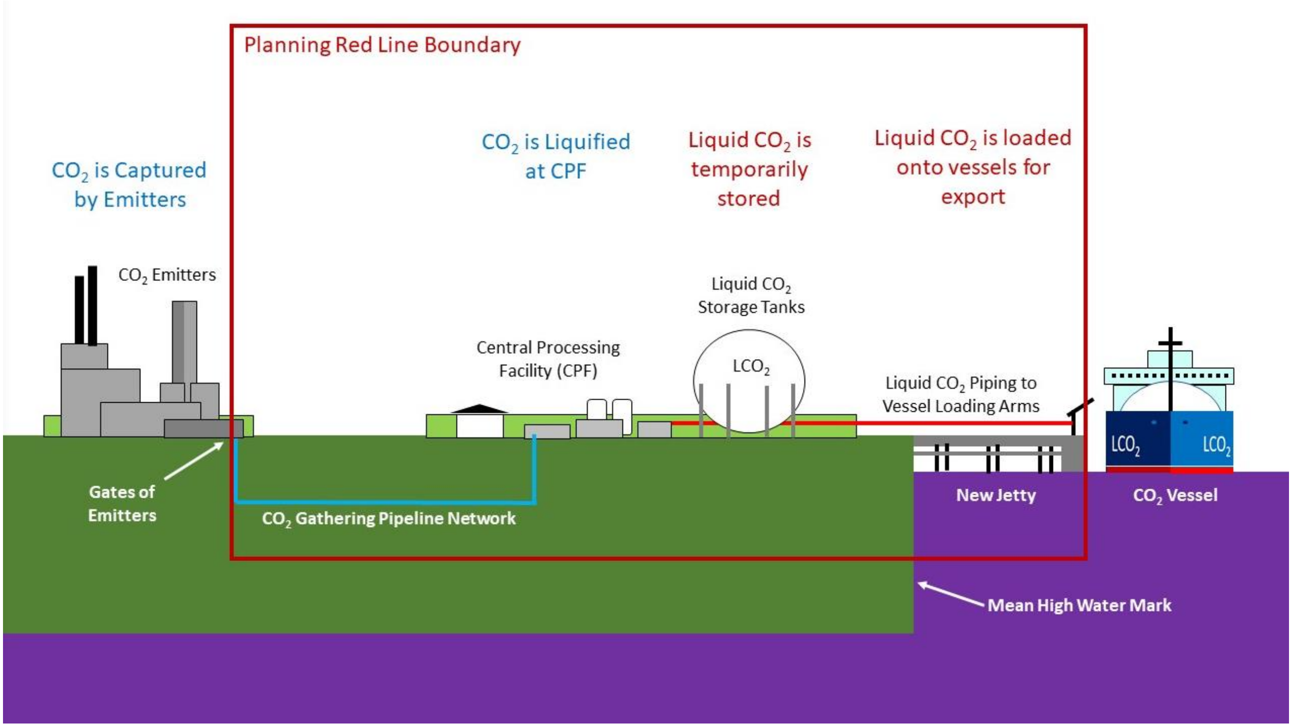


Figure 1-2 Schematic indicating key constituent parts of the Dublin CCS Project

2 DESIGN ASSUMPTIONS, CONSIDERATIONS AND FACTORS INFLUENCING DESIGN

2.1 CO_2 Specification and Conditions

2.1.1 Gathering Network

CO_2 will be gathered from emitters in a gaseous form, with a pressure of 35 bar and temperature ranging from 11 – 37^oC. The quality of CO_2 produced by emitters is very important as it relates to the integrity of the transport and storage system. It has been assumed that the CO_2 from emitters will meet the Equinor specification for the Northern Lights project. Custody metering and quality monitoring of CO_2 will take place at emitter sites.

No further treatment of CO_2 has been considered as part of pre-FEED scope (Ref. 01 & 02).

2.1.2 Temporary Storage and Export

CO_2 will be liquified at the CPF for transportation by ship at medium pressure conditions. This means that the CPF will deliver liquid CO_2 at a pressure ranging from 14 – 20 bar and a temperature ranging from -30^oC to -19.5^oC. These conditions have been selected to be compatible with the anticipated conditions required by liquid CO_2 ships (see further below). Liquid CO_2 will be temporarily stored at the CPF at these conditions until it is time for it to be loaded onto ships. The CO_2 delivery specification will be in accordance with the Equinor specification.

2.2 Shipping Studies

2.2.1 Ship Technology Survey

For ship transportation, CO_2 should be in liquid phase at pressures higher than atmospheric pressure. This is achieved through a liquefaction plant, where CO_2 is liquified and cooled to a low, medium or high-pressure specification.

Existing CO_2 carriers operate under medium pressure conditions. This maintains the CO_2 at temperatures of between -30°C and -19.5^oC and pressures of between 14bar and 20 bar. This is the best understood shipping method as these conditions have been used for over 30 years for the transport of LPG. On this basis, it has been assumed that medium pressure conditions will be used by the Ervia CCS Project. At present, these conditions can be applied to capacities up to 10,000m^3.

Export of CO_2 in liquid form will be to the Northern Lights Project in Norway. A number of other projects within Northern Europe are at earlier stages of development and therefore details of their intended operations are less readily available. However, it is considered likely that these projects will adopt similar operating philosophies to the Northern Lights project, in terms of the CO_2 conditions for transit and therefore the type of vessels likely to be used.

The exact number of operational CO_2 vessels is unknown due to some LPG vessels also operating as CO_2 vessels intermittently. However, it is expected that between 10 and 20 such vessels are in operation worldwide. Many CO_2 ships are former LPG ships, due to the similarities regarding the tank structure and piping between both cargoes. New vessels for the transportation of liquid CO_2 at medium pressure, with capacities of 7,500m^3 were commissioned for the Northern Lights project in 2021 (See Figure 2-1).

The ship loading/offloading rate is critical to the ship turnaround within the transport chain. The Northern Lights project suggests a current loading/unloading rate of 800m^3/hr.

On the basis of the above, the medium pressure conditions, capacity (7,500m^3) and loading rate (800m^3/hr) for the Northern Lights vessels have been used during the Ervia Cork CCS Pre-FEED Study.

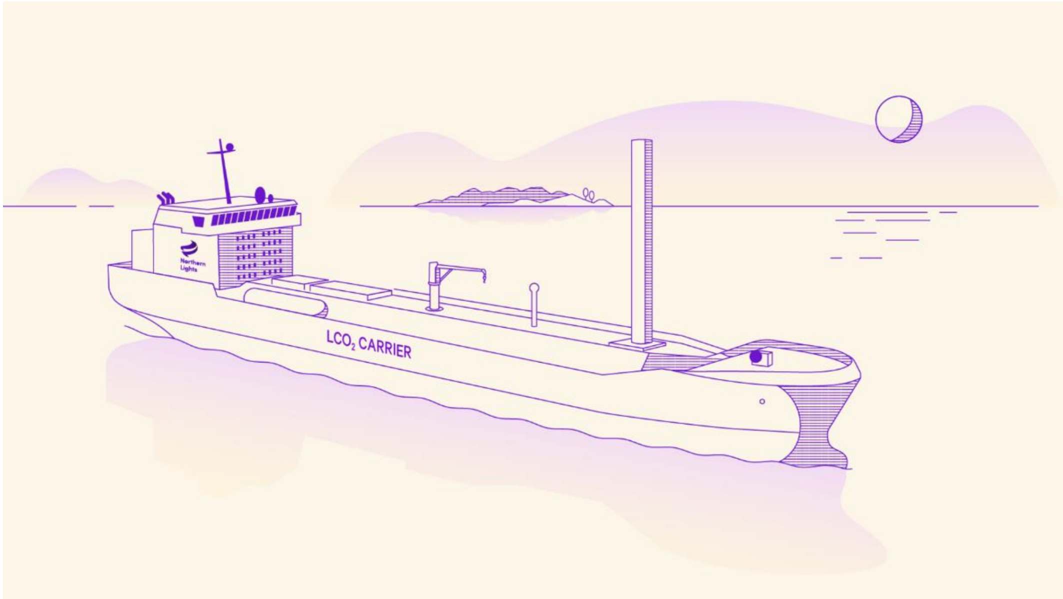


Figure 2-1 Image of Northern Lights Liquid CO_2 vessel (7,500m^3)

2.2.2 Marine Operations Study

The anticipated peak throughput of CO_2 from each CPF is shown in Table 2-1 below (see also Ref. 01 & 02).

Table 2-1 Product Throughput

Source	Import (MMtCO_2/yr.)	Export (MMtCO_2/yr.)
Cork (Aghada)	0.5	1.25
Dublin (Poolbeg)	N/A	1.75

Product for export was assumed to be produced at a steady rate throughout the year with both the Cork and Dublin plants operating for 350 days per calendar year.

The figures shown on Figure 2-1 above are considered to be the maximum throughput in each case. In the early stages of the project, the throughput of CO_2 is likely to be significantly lower.

2.2.2.1 Number and Size of Ships

Given the developing nature of the technology necessary for marine transport of liquid CO_2, it is recommended that a flexible approach based on proven technology is adopted where possible. To that end, it is suggested that initial operations with relatively low export throughput are planned to commence with vessels similar to that being built for the Northern Lights project. That is, with a capacity of 7,500m^3 and a cargo transfer rate of 800m^3/hr for liquid CO_2 under medium pressure conditions.

If, at the time the investment decision needs to be made to acquire additional vessel capacity, a larger capacity vessel is available (with the same CO_2 storage conditions) then this should undergo an economic evaluation based upon the sink terminals available, considering both compatibility and transit distance. It is considered that 15,000m^3 is a realistic short to medium term expectation for future vessel capacity.

For the Cork CCS project, the number of vessels required to transport liquid CO_2 to the Northern Lights project, at full plant capacity, is 4No. 7,500m^3 vessels or 2No. 15,000m^3 vessels.

2.2.2.2 Onshore Temporary Liquid CO_2 Storage Requirements

The sizing of the storage tanks (for export product only) at the source terminals is dependent upon the capacity of the vessels in service and the size of the storage buffer required. It is recommended that a storage buffer equivalent to 3 days of production is provided for the initial stages of operation which will provide a high level of operational flexibility to ensure that operations can proceed smoothly. Furthermore, it is recommended that the storage buffer is maintained at 3 days of production, based on the largest vessel in service, throughout the life of the project and therefore sufficient expansion capacity to account for the maximum throughput and larger vessels should be included in the development strategy

The total liquid CO_2 storage capacity needed to meet the above 3-day buffer requirement for a range of export throughput capacities is summarised on Table 2-2 below. The figures for a vessel size of 15,000m^3 and 1.25MMtCO$_2$/yr. and 1.75MMtCO$_2$/yr. correspond to the total design capacity of CO_2 storage assumed for the Pre-FEED Study for Dublin and Cork respectively (shown in bold).

Table 2-2 Liquid CO_2 storage requirements for 3 day buffer - Cork

Export throughput	Storage buffer (3 days)			
	7,500m^3		15,000m^3	
	Total storage capacity			
(MMtCO$_2$/yr.)	(m^3)	(%)	(m^3)	(%)
1.25	18,550	247	**26,050**	173
1.75	22,200	296	**29,700**	198

In summary, the Cork CPF site has been designed with a liquid CO_2 storage capacity of 26,050m^3. The Dublin CPF site has been designed with a liquid CO_2 storage capacity of 29,700m^3. It is assumed that initially, 3 storage vessels will be built on each site to cater for 3 days buffer storage for 7,500m^3 vessels.

The fourth storage vessel is future investment which would only be required should larger vessels come into service in the future.

2.3 Mechanical Design

2.3.1 Material Selection

Credible corrosion threats and material damage mechanisms are expected within the project, along with the proposed mitigations to these, have been identified in a Materials Selection Philosophy for the project (Ref. 03 & 04). The base material selection for the majority of process equipment and piping shall be carbon steel (CS). Under certain operating conditions and or environments, alternative materials shall be employed such as low alloy steels (LAS) and corrosion resistant alloys (CRA).

2.3.2 Pipelines

The primary design standard to be used for the CO_2 gathering network shall be BS8010. This standard covers various fluids including, natural gas and CO_2. It is the most comparable standard to I.S. 328 (Irish national standard for natural gas transmission pipelines), which does not cover CO_2. Both BS8010 and I.S. 328 share their key references to ISO 13263, IS/BS EN 14161 and reference ISO3183 and API 5L specifications.

2.3.3 Flow Assurance & Hydraulic Analyses

Hydraulic simulations and analyses were performed to confirm the concept design and to determine the CO_2 pipeline sizes, their operating/design philosophy and conditions, and further to complete a flow assurance assessment in transporting of captured CO_2 by pipeline in liquid and gaseous phase.

The steady state analysis was performed for turndown flowrate and there was no flow instability observed while operating in summer or winter conditions. The transient analyses followed on from the steady state analyses that provided a framework for operating scenarios under unsteady-state conditions until stabilising into a new steady-state condition. The transient scenarios verified operations such as production ramp-up, extended shutdown/cool-down, restart, pipeline depressuring, pipeline pigging and line packing analysis. No liquid dropout occurred in the CO_2 gas pipeline network during these modes of operations.

The restart of the pipeline from shutdown/full cooldown was smooth and in a single gaseous phase. No operational challenges were observed for the ramp-up operation of the pipelines. Regular pipeline maintenance through in-line inspection is not required during normal operation from a liquid management point of view as there are no liquids predicted in the pipeline. In-line activities are only performed for inspection and inline coating procedures (if considered later) on the inner pipe wall during maintenance or for cleaning purposes of the pipeline.

2.3.4 Pipeline Crack Propagation

Pipelines are required to have adequate resistance to long running ductile fractures. Typically in gas pipelines, steel with sufficient toughness to arrest a long running ductile fractures within a minimal distance is selected, otherwise mechanical crack arrestors have to be installed with an associated increase in cost and schedule.

CO_2 can present a different challenge to natural gas when considering risk of fracture because it is typically transported in the dense or supercritical phase. For the Ervia CCS project, CO_2 will be transported in a gaseous form. Under these conditions it is acceptable to apply traditional methods, developed for natural gas pipelines, to determine the required toughness to arrest long running ductile fractures. The materials typically used for the construction of gas transmission pipelines (conforming to PSL 2 controls API 5L / ISO3183) will not be susceptible to fracture or long running tears which could be a concern for dense phase CO_2 pipelines. On this basis, crack arresters are not considered to be necessary for the Ervia CO_2 gathering network.

2.3.5 Existing Gas Pipeline Suitability

The existing gas transmission pipeline network owned and operated by Gas Networks Ireland (GNI) connects Aghada with Inch Terminal. Sections of this network are no longer used for the transportation of natural gas. One section in particular was identified as being potentially available to the Ervia CCS project (see Figure 2-2). This is a 2.165km, 600mm / 24" diameter pipeline which connects Ardrabeg AGI and Inch Terminal. It was built in 1977 as part of the original gas transmission pipeline network developed after the discovery of the Kinsale Head Gas Field which is now decommissioned.

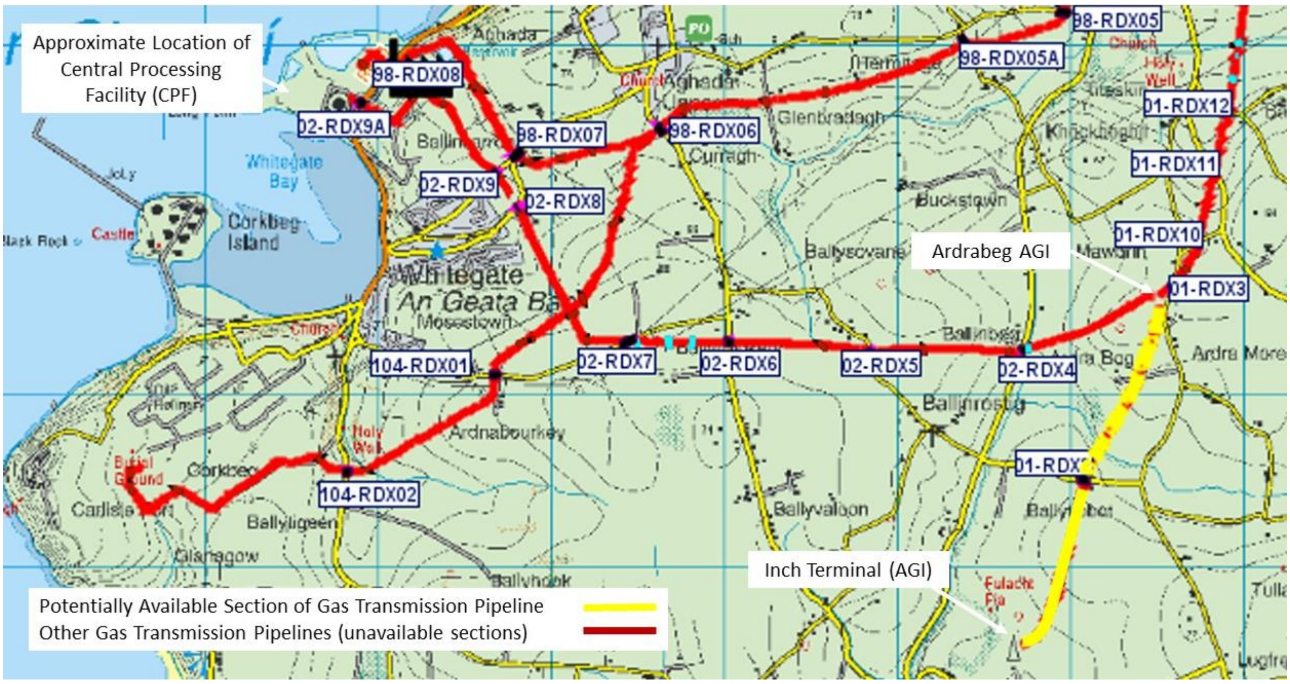


Figure 2-2 Section of existing Gas Pipeline that was considered for repurposing for CO_2 transmission

Ardrabeg AGI is located approximately 5km ('as the crow flies') from the potential site of the CPF at Aghada. In comparison, the distance from the potential site of the CPF at Aghada to Inch Terminal, is just over 5km.

The feasibility of repurposing this section of pipeline for the transport of CO_2 was explored during the Pre-FEED Study (Ref. 05). The following key conclusions were made:

- Subject to a detailed review of contemporary technical details, and confirming asset condition with inline inspection, it is technically feasible to re-purpose existing gas transmission pipelines manufactured in accordance with I.S. 328, ISO 3183 and / or API 5L as applicable for the transportation of gaseous CO_2.
- The section of pipeline that is potentially available is not favourably located for integrating with the envisaged CO_2 gathering and delivery network. Any advantage from using this section of pipeline will be completely offset by the additional length of new pipeline required to access it; the length of new pipeline required would be very similar to the length of pipeline to be repurposed.
- The Ardrabeg AGI to Inch Pipeline is over 40 years old. The residual life available from this asset is expected to be much lower than a new pipeline. For the Ervia Cork CCS project, a minimum pipeline design life of 40 years is included in the Study Basis. By not including the Ardrabeg to Inch Pipeline, any uncertainty around the condition and remaining lifespan of this asset will be removed.

3 OVERVIEW OF CORK FACILITIES

3.1 CO_2 Gathering Network

Indicative pipeline corridors have been identified based on an assessment of safety, environmental and technical constraints. These corridors are considered to be sufficiently well defined for the purposes of the pre-FEED Study. The network is comprised of four sections, each having facilities for inline inspection (pigging). These are:

- **Section 1**: Whitegate to Valve Installation.
- **Section 2**: Valve Installation to CPF;
- **Section 3**: Aghada Power Station to CPF; and
- **Section 4**: Valve Installation to Inch Terminal.

The pipeline network is indicated in yellow on Figure 3-1 below (see also Ref. 06). Field Architecture Mapping has also been produced for this CO_2 pipeline network (Ref. 07). A high-level schematic representation of the CO_2 gathering network is also shown on Figure 3-2 further below.

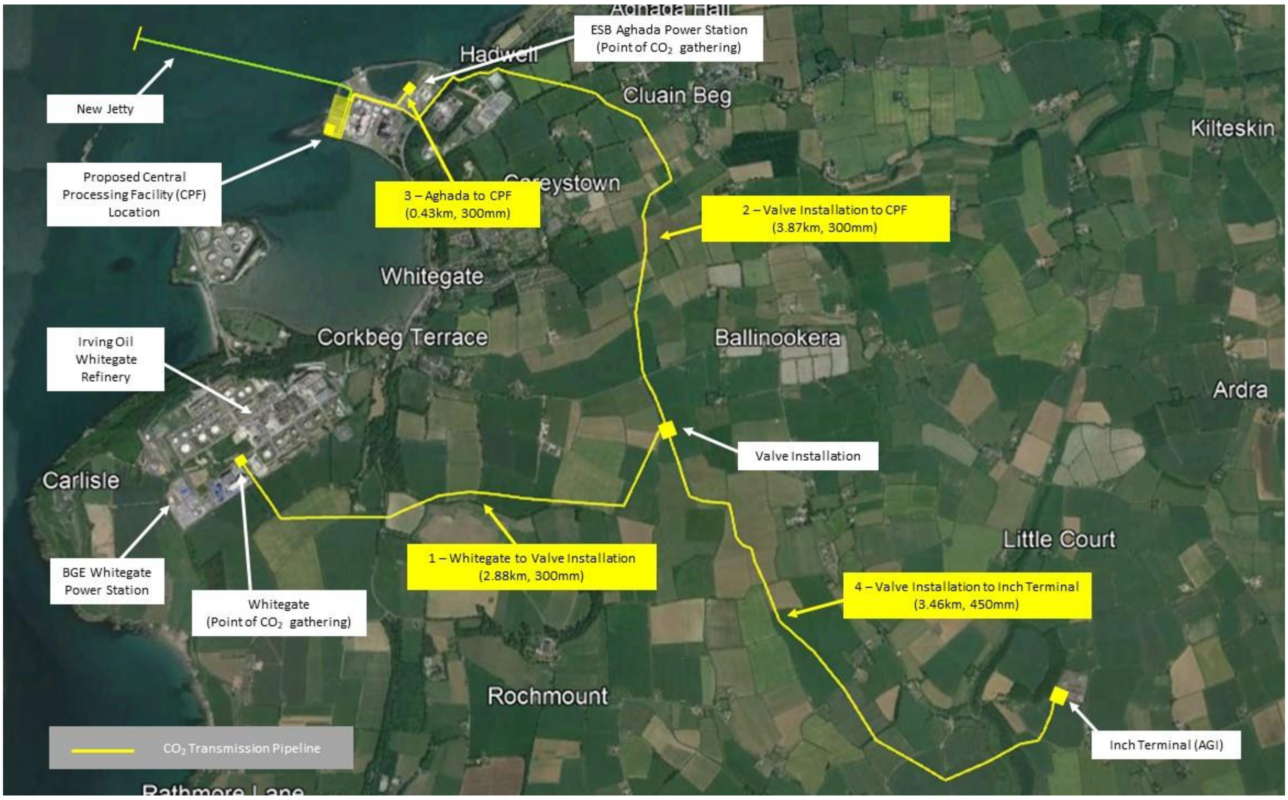


Figure 3-1 Proposed CO_2 Gathering (and Delivery) Network

The above pipeline network facilitates the gathering of CO_2 from all emitters and its delivery to the CPF. The network also facilitates delivery of CO_2 to Inch without the need for a separate delivery pipeline from the CPF to Inch Terminal. This is made possible by the incorporation of a valve installation (see further below).

Alternative pipeline corridors were considered during the Pre-FEED Study (Ref. 06). A separate delivery pipeline to Inch Terminal was also considered as part of this study, but is not preferred for reasons of capital cost and operational efficiency.

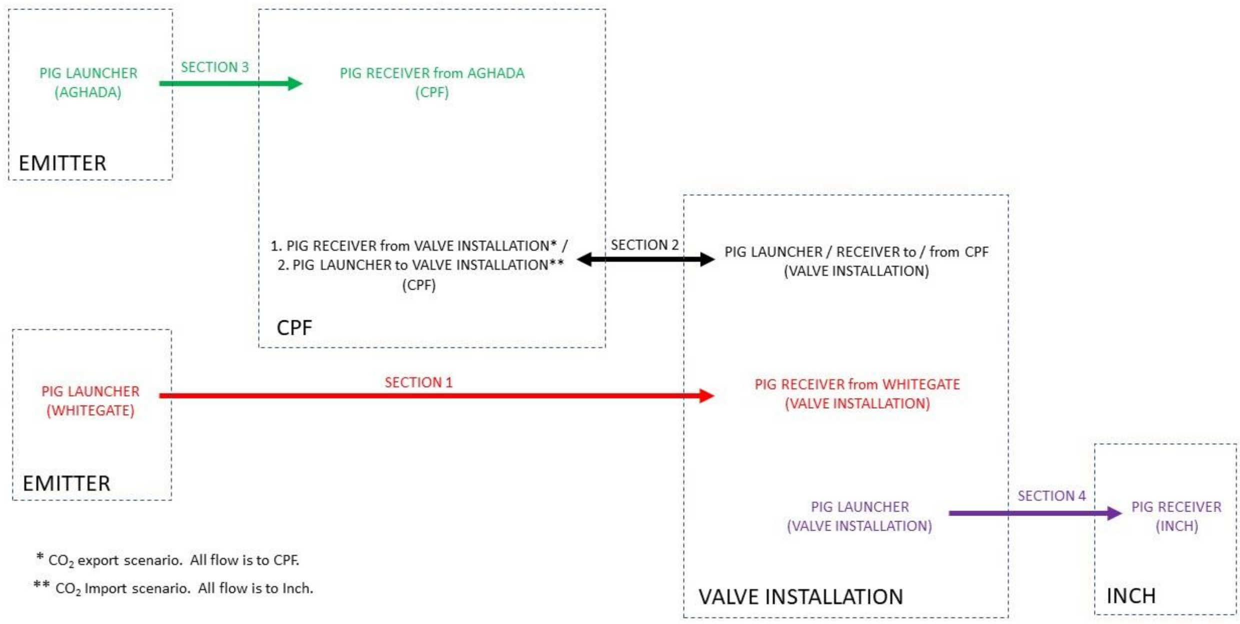


Figure 3-2 High Level Schematic Representation of CO_2 Gathering (and Delivery) Network

3.2 Central Processing Facility (CPF)

3.2.1 Plant Capacity

The CO_2 processing capacity of the plant is outlined on Table 3-1 below. The design is such that the plant will be able to operate at 50% of the maximum flowrate from the lowest emitter. The CPF is designed to operate for 350 days per year and will have a design life of 25 years.

Table 3-1 CO_2 Flowrates from Emitters

Source	CO_2 Flowrates from Source MMtpa		
	Max/Min Year 1	**Max/Min Year 2**	**Max/Min Year 3**
Whitegate Refinery	0.25/0.125	0.25/0.125	0.25/0.125
Aghada CCGT	-	0.5/0.25	0.5/0.25
Whitegate CCGT	-	-	0.5/0.25
Total (Max/Min)			1.25/0.125

Notes:

1. *Minimum total CO_2 flowrate considered to be 0.125 MMtpa (50% of maximum flowrate from lowest emitter i.e., Whitegate Refinery).*

The design capacity for regasification is 0.5 MMtpa CO_2.

Liquefaction and regasification trains will not be operating simultaneously (i.e. plant will either be in liquefaction or regasification mode).

3.2.2 Site Location

The selected site is indicated on Figure 3-3 below. This site offers an optimum balance of a range of considerations as outlined in the CPF Layout Philosophy for Cork (Ref. 08). These included:

- Availability of space where the CPF and storage elements could be consolidated onto one site plot plan adjacent to the future jetty.
- Maximising the separation distance between the CPF and local habitation.
- Avoidance as far as possible of environmental constraints and minimising potential environmental impacts.
- Technical constraints including existing utilities, in particular transmission gas pipelines and installations and MV/HV electricity lines and / or cables.

Figure 3-3 CPF site location indicating jetty and main access to the public road network

No engagement has taken place to-date with relevant landowners / stakeholders in relation to there being other potential plans for the selected site.

3.2.3 Site Layout

The CPF plot plan layout is shown on Figure 3-4 below (see also Ref. 08 and Appendix A). There are three main areas:

- Liquefaction / process area.
- Liquid CO_2 storage area, including space for 4No. spherical storage tanks.
- Utilities area (including control room, fire water storage and pumps, instrument air facilities, bottled nitrogen storage area, back-up electrical generators and fuel storage area).

In addition to the above main zones, there are the following smaller areas of note:

- Regasification area.
- Electrical substation area.

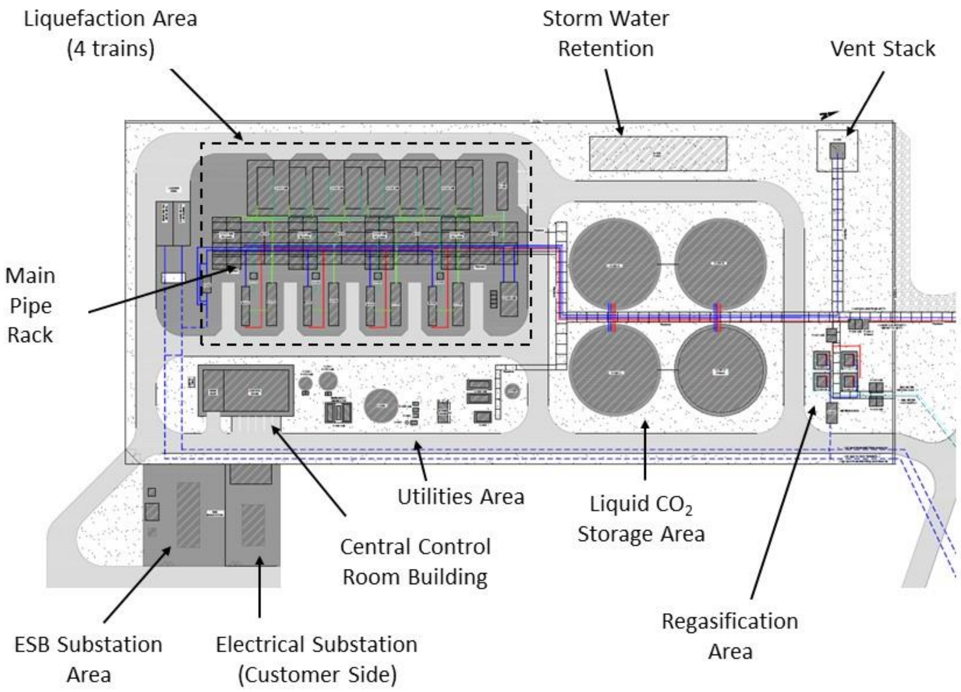


Figure 3-4 CPF Layout – Cork

Figure 3-5 3D Representation of CPF Layout - Cork

3.2.4 Process Unit Overview

3.2.4.1 Liquefaction

The Liquefaction plant is organised into 4No. parallel trains (for Phase 1, 3No. trains will be installed, with space available for a fourth train). Each liquefaction train will include a pair of screw compressors, a single external chiller unit, receiver and refrigeration compressor suction Knock Out Drum (KOD). The refrigeration train size is identical at Cork and Dublin, which will enable common maintenance and operating procedures and spare parts. Anhydrous ammonia will be used as the refrigerant primarily due to its high thermal efficiency and its Zero global warming potential.

It is envisaged that the compressors will be housed within a single portal frame type building. A refrigeration after cooler (air cooled) for each train will be located on top of the pipe rack. A pipe rack will run between the chillers and compressors in the CPF. The pipe rack will carry process and utility piping along with electrical and instrumentation cables in cable trays and will also support air coolers. The pipe rack will carry the pipes which transport inlet CO_2 gas, liquid CO_2 to storage and export, Boil Off Gas (BOG) and CO_2 vent lines and Ammonia (NH_3) vent lines which connect to the CO_2 / Ammonia vents. The pipe rack will transition to pipe sleepers outside of the liquefaction area for transportation of liquid CO2 to the storage spheres and onwards to the marine jetty.

3.2.4.2 Regasification

Regasification / vaporisation equipment is required to facilitate importing of liquid CO_2. In this scenario, liquid CO_2 would be first unloaded into the storage spheres. From here it would be regasified for sending to Inch Terminal in a gaseous form. This equipment is located as close as possible to the power station cooling water system which is envisaged as a heat source for the vaporiser package. Sea / cooling water pumps are located within the regasification area for this purpose.

3.2.5 Utilities Overview

A central area for utilities has been provided. Features of note include:

- Central Control Room (CCR) building. A two-storey blockwork / concrete Central Control Room (CCR) building is located at the south-eastern corner of the CPF site.
- A back-up generator (for essential emergency power) and fuel storage for 24 hours running.
- Utilities in this area are
  - Instrument air.
  - Nitrogen.
  - Fire water (including storage tank, electrical pumps and back-up diesel powered pumps).
  - Potable and process water.
  - Wastewater.

3.2.6 Electrical Grid Connection Compound

Based on the preliminary electrical design loads, the estimated maximum electrical demand for the site will be 19.1 MVA. It would not be feasible to provide this level of power by means of on-site generation, for reasons of capacity and reliability. Therefore, the design philosophy assumes that power supply to the site will be provided from ESB Networks / Eirgrid electricity network.

This is a very significant load and will require direct connection from ESB / Eirgrid High Voltage network. (38kV, 110kV, or 220kV).

It is envisaged that supply to site will be taken from the existing ESB Networks 220kV Long Point substation, as it is located directly adjacent to the CPF site. This is likely to have spare capacity as it serves the adjacent Aghada CCGT power station which is rated for 430MW.

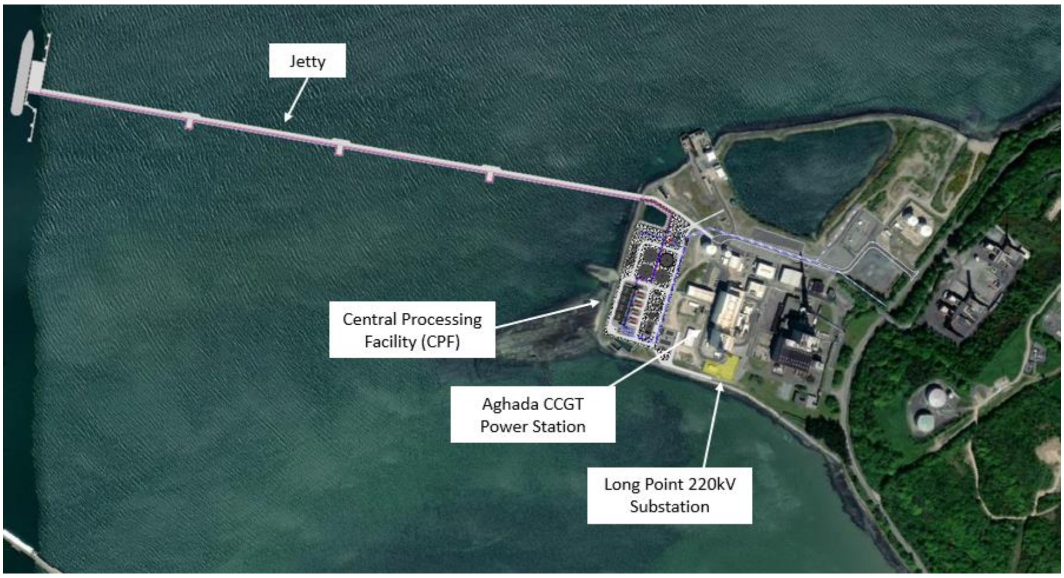


Figure 3-6 CPF site indicating location of Long Point 220kV Substation (high-lighted)

A dedicated on-site 220kV substation will be required to facilitate the incoming power supply to the site. A combined plot space of 40m x 30m (for ESB Networks substation and Ervia substation / switchgear room) has been assumed for accommodating this grid connection. Due to space limitations, this compound has been located adjacent to the south-eastern corner of the CPF site. In this location, existing traffic routes on the overall ESB site are not impacted.

The grid connection compound will include the following:

- ESB Networks substation compound (24m x 30m). Independent access to the ESB substation is provided.
- Ervia (Customer) side compound (15m x 30m) including dual customer transformers (air insulated assumed) and customer switchgear building (6m x 12m). The switchgear building faces the CCR building and can be accessed from within the CPF compound.

3.3 Liquid CO_2 Storage

The most common type of storage for LCO_2 are spherical pressure vessels and horizontal or vertical pressure vessels (bullets). Both of these options were evaluated (Ref. 09). Storage spheres were selected as they improve the overall safety of the facility as the number of pieces of equipment and associated connections is very much lower than for the equivalent storage capacity using bullets.

The CPF layout accommodates 4No. CO_2 storage spheres, each 25m in diameter, with a combined capacity that to ensure a minimum of 3 days storage buffer for maximum CPF output and for the larger vessel size (see Table 2-2 above). Initially, 3No. storage spheres would be built, with the final sphere being built later when CPF output increases and larger operating vessel size is needed.

Figure 3-7 3D Representation of CPF Layout Cork indicating Spherical Liquid CO_2 Storage Spheres

3.4 Jetty

3.4.1 Jetty Location

A new dedicated berth will be provided at Aghada adjacent to the existing berth at Whitegate Refinery, see Figure 3-8. Large crude oil tankers currently visit the Whitegate Refinery berth and there is adequate manoeuvring space and deep water available. However, dredging works will need to be carried out to -10.0m CD (Chart Datum) adjacent to and surrounding the new jetty structure to provide sufficient water depths for vessels at all stages of the tide.

Figure 3-8 Satellite image showing the Port of Cork and location of proposed Aghada jetty

3.4.2 Jetty Design

The proposed location and layout for the jetty head and access viaduct were selected on the basis of a range of considerations that are outlined in the Marine Design Philosophy (Ref. 10). These are indicated on the following figures. The design of the jetty is described in Ref. 11.

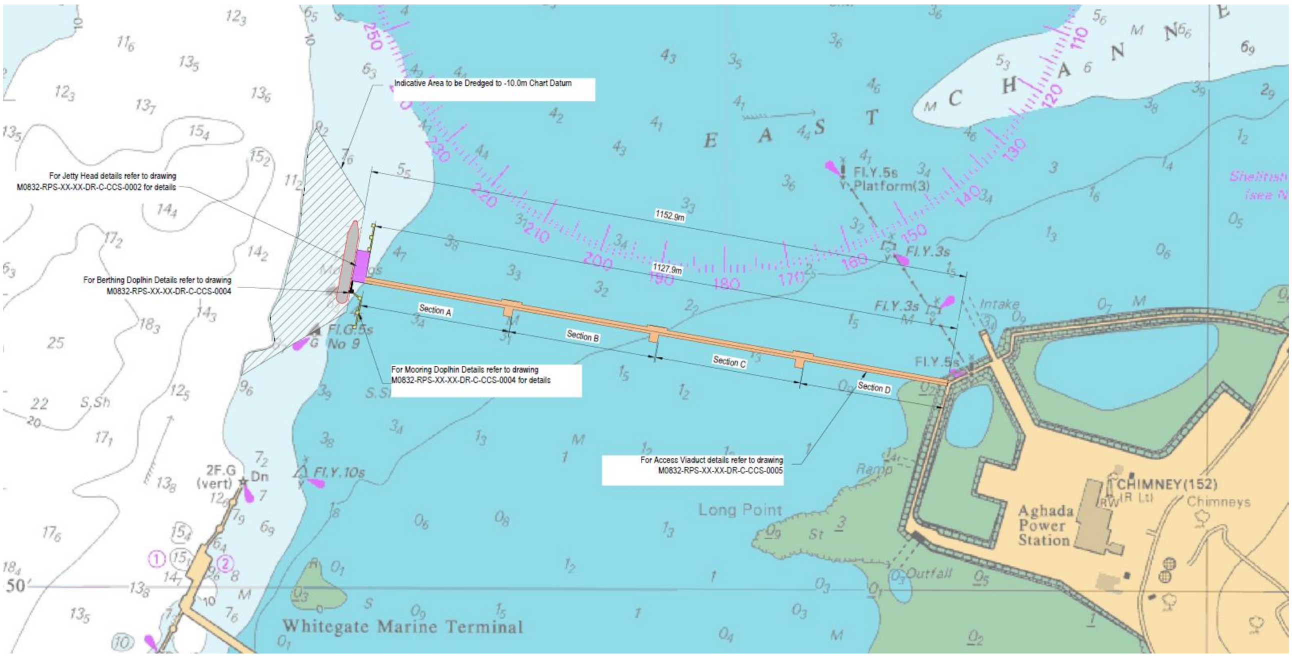


Figure 3-9 Jetty Location and Layout

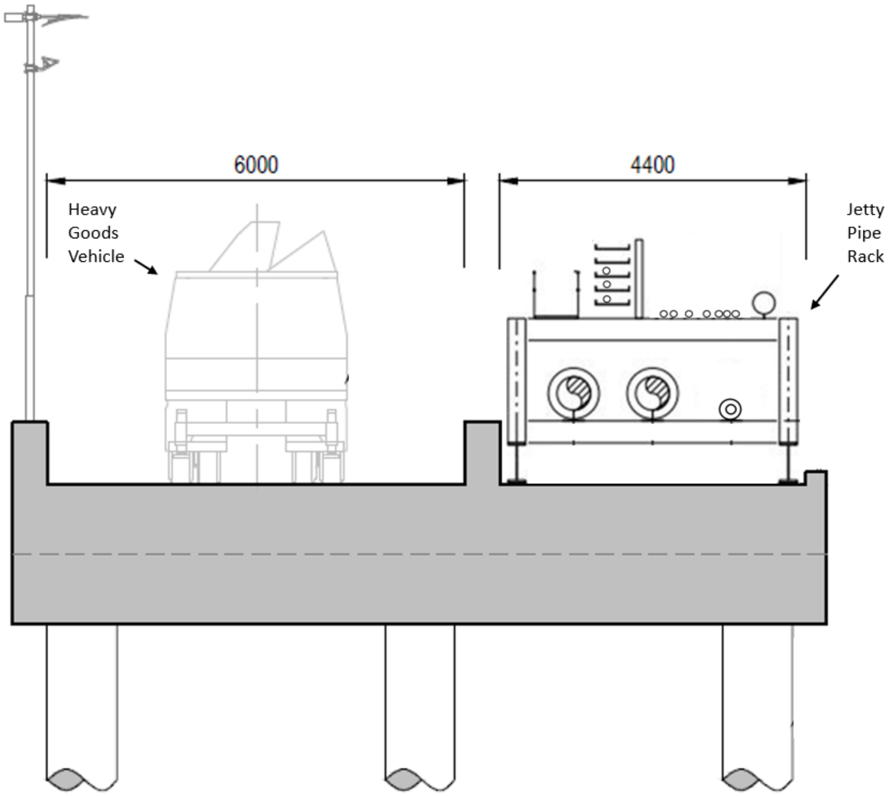


Figure 3-10 Jetty Viaduct showing Jetty Pipe Rack

3.5 Preliminary Carbon Assessments

Assessments of embodied carbon (for the construction phase) (Ref. 12) and carbon footprint (for the operational phase) (Ref. 13) were carried out during the Pre-FEED Study. The main outputs from these assessments for the Cork project are summarised in the following sections.

3.5.1 Embodied Carbon (Construction Phase)

Established coefficients for the key bulk materials to be used during the construction of the project were used to calculate the total quantity of embodied CO_2 as CO_2 equivalents (kg CO_2e). This was divided by the design life of the plant (i.e. 25 years) to convert to an annualised embodied carbon. The calculated annualised embodied carbon during the construction phase for the Cork project is 3,477 tpa CO_2 e.

3.5.2 Carbon Footprint (Operational Phase)

The carbon footprint of the project during its operational phase is built up from calculated quantities of CO_2 emitted by primary (fuel consumption, fugitive emissions), secondary (power consumption) and tertiary sources (electricity system losses, water supply, wastewater and waste disposal). Annualised embodied carbon (see above) was added to these sources to calculate the total annual quantity of CO_2 that can be attributed to the Ervia CCS project. The net quantity of CO_2 throughput per annum is calculated by subtracting this total from the total quantity of CO_2 to be processed by the facility (1.25MMtpa CO_2). This is summarised on Figure 3-11 below.

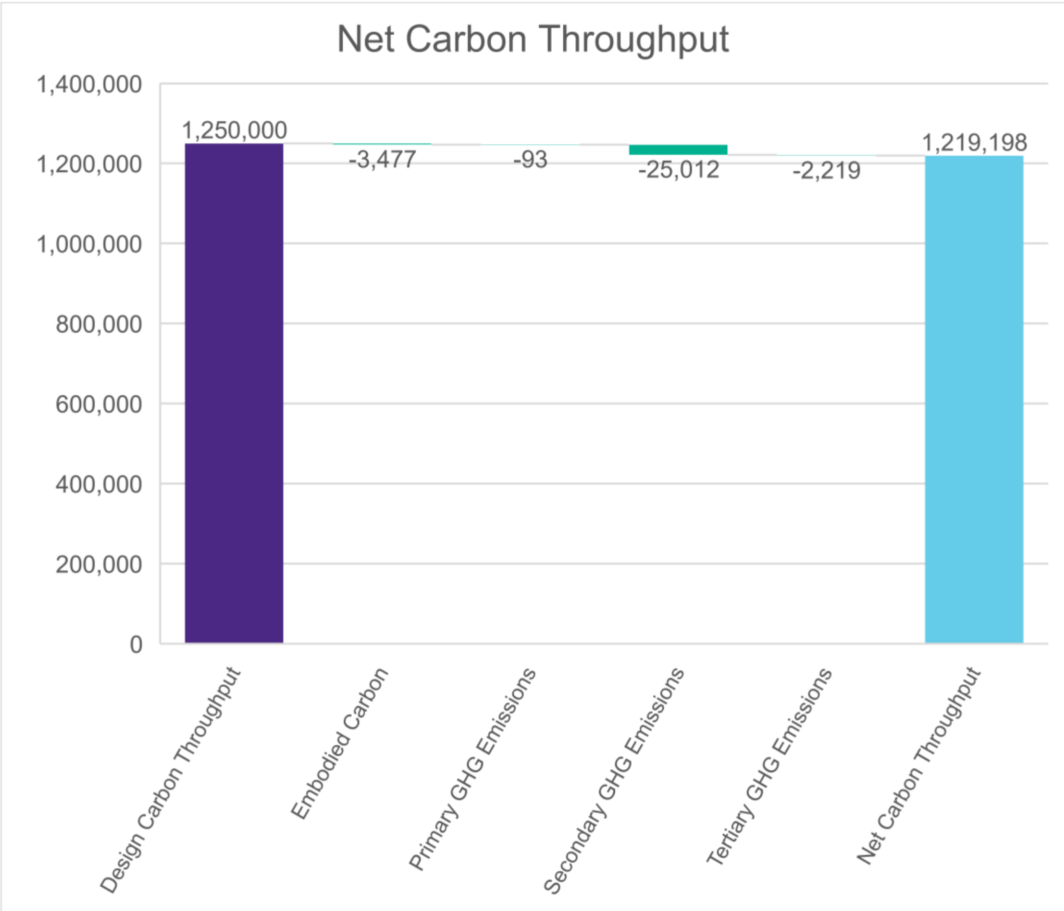


Figure 3-11 Net Sequestered Carbon (Tonnes CO_2 e / year)

It should be noted that the above calculations exclude carbon capture, shipping and final sequestration activities.

It is evident from Figure 3-11 that the additional impact of the annualised embodied carbon (i.e. from construction) to the overall carbon footprint (i.e. construction plus operation) is much lower than the impact from the operational phase. Therefore, optimising the design to reduce electricity / energy consumption is likely to have more of an impact on the overall carbon footprint for the project than sourcing of construction bulk material with low embodied carbon (during construction).

During project development, consideration should be given to the selection of equipment, technologies and processes which, through increased efficiency, reduce consumption of electricity. Furthermore, the source of electricity should be considered with a view to further reducing the carbon footprint through supply from renewable energy such as wind, solar and other non-hydrocarbon sources.

3.6 Cost Estimate

3.6.1 CAPEX

The AACE Class 4 cost estimate that was prepared for the project (Ref. 14) including the full build-up of the total CAPEX including all the direct and indirect costs and also contingency and fee is summarised below. The scope of the estimate included full Engineering, Procurement, and Construction (EPC), through Mechanical Completion (MC) and Commissioning and Start-Up (CSU). This included all capital expenditure (CAPEX) for the CPF, pipeline, onshore temporary CO_2 storage and jetty infrastructure.

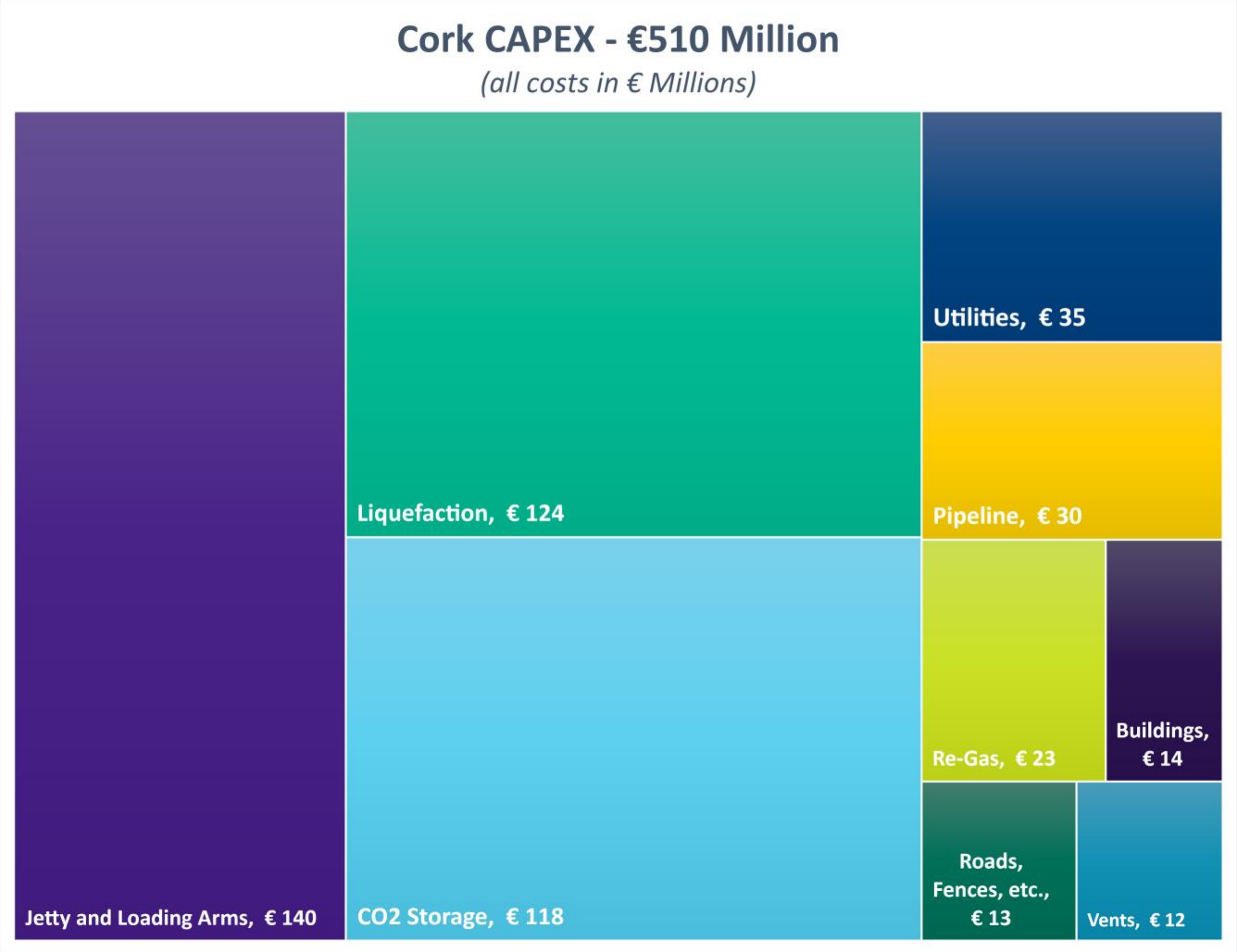
Table 3-2 CAPEX Summary

WBS	Area	Cost (€m)	% Total
B01	Buildings	11.3	3%
C00	Roads, Fences, etc...	9.9	2%
L00/1/2/3/4	Liquefaction (incl. common & all spares)	98.1	25%
M01/U01	Plant Utilities	27.8	7%
P01	CO_2 Pipeline	23.8	6%
R01	Regasification	17.8	4%
S01	Jetty and Loading Arms	110.2	28%
T01/2/3	Liquid CO_2 Storage	92.9	23%
V01	Vents (CO_2 & Ammonia)	9.3	2%
	Contingency	79.9	
	Fee	28.0	
	CAPEX	**508.9**	

There were a number of costs which could not be appropriately defined or priced at this stage and therefore were excluded from the CAPEX estimate. Examples of CAPEX exclusions are; abnormal subsurface conditions, unexpected underground demolition, remediation of contaminated soils, cost of electrical grid connections and owner's costs (e.g. cost of land purchase, permitting costs, environmental studies, environmental impact assessments and financing costs etc.). In addition, the current global pricing volatility and global supply chain disruptions has meant that escalation cannot be appropriately priced at this time and this has also been excluded.

Figure 3-12 gives an illustration of the major CAPEX cost components; this visualisation includes the contingency and fee which have been allocated across the work breakdown structures relative to the percentage (%) size of each cost component.

Figure 3-12 CAPEX Visualisation - Cork



3.6.2 OPEX

A budgetary annual OPEX cost has been developed for the project.

Variable plant operating costs consider utility and chemical consumption which has been calculated for Electricity, Water, Ammonia and Nitrogen.

For the regasification facility there is a consideration that sea water will be taken from the outfall of the Aghada CCGT. The supply of this water has been given an assumed cost; however this supply must form part of the discussions with ESB during the real estate negotiations for the plant. It may eventually be considered as an offset cost between Ervia and ESB.

Fixed Operating Costs are considered using an overall factor of 4% of total plant CAPEX. This fixed operating cost includes the following

- Staffing
- Supervision
- Staff Overheads
- Plant Maintenance including spare parts
- Plant insurances (typically 1-2% of CAPEX)

The summary of the budgetary OPEX estimate cost has been included below.

Table 3-3 Budgetary OPEX Estimate

	Cost Item	Annual Cost	Notes
Variable Plant Operating Costs	Electricity	€18,022,000	Electricity unit rate used is 0.153 Euro/kW-hr. (SEAI)
	Seawater (for regasification)	€1,000,000	Annual cost considered is €1.0 M Euro from ESB
	Potable and Utility Water	€2,000	
	Anhydrous Ammonia NH3	€3,000	
	Nitrogen	€375,000	
Fixed Plant Operating Cost Estimate	4% of capital cost	€20,355,000	
Total Annual OPEX Estimate		**€39,757,000**	

3.6.3 Flowrate Sensitivity

In addition to the base case class 4 estimate, a flowrate sensitivity analysis and associated class 5 estimate have been developed for the following scenarios:

- Flowrate increased by 50%
- Flowrate increased by 100%
- Flowrate decreased by 50%

Flowrate Sensitivity Analysis for the three scenarios noted above were performed based on an evaluation of the quantity of Refrigeration Compressors and CO_2 Spheres required for each scenario. The remainder of the estimate was developed using the appropriate process engineering industry standard of the '*6/10th Rule'* for plant capacity estimates.

Table 3-4 Class 5 Estimated Costs for Flowrate Sensitivity

Cost Particulars	Base Case	Flowrate increased by 50%	Flowrate increased by 100%	Flowrate decreased by 50%
Total Installed Cost Excluding Contingency	€429	€537	€619	€335
Contingency (*Note 1*)	€80	€150	€173	€93
Total Installed Cost (€ million)	**€509**	**€687**	**€792**	**€428**
% Change in Total Installed Cost		35%	56%	-16%

Note 1: Base case includes for 20% contingency as per the class 4 estimate methodology. For the sensitivity cases and the respective class 5 estimates, commensurate with the AACE estimate methodology an increased contingency of 30% has been applied.

4 OVERVIEW OF DUBLIN FACILITIES

4.1 CO_2 Gathering Network

An indicative pipeline corridor has been identified based on an assessment of safety, environmental and technical constraints. This corridor is approximately 1.35km long and facilitates the gathering of CO_2 from all emitters and its delivery to the CPF. It is considered to be sufficiently well defined for the purposes of the pre-FEED Study

The pipeline network is indicated in yellow on Figure 4-1 below (see also Ref. 15). Field Architecture Mapping has also been produced for this CO_2 pipeline network (Ref. 16).

Figure 4-1 Proposed CO_2 Gathering Network

4.2 Central Processing Facility (CPF)

4.2.1 Plant Capacity

The CO_2 processing capacity of the plant is outlined on Table 4-1 below. The design shall be such that each liquefaction train will be able to operate at turndown of 0.125MMtpa CO_2 which is 25% of maximum flowrate from the lowest emitter. The CPF will is designed to operate for 350 days per year and will have a design life of 25 years.

Table 4-1 CO_2 Flowrates from Source (MMtpa)

Source	CO_2 Flowrates from Source MMtpa		
	Max/Min Year 1	**Max/Min Year 2**	**Max/Min Year 3**
Covanta Dublin Waste to Energy (WTE) Plant	-	0.75 / 0.375	0.75 / 0.375
ESB Poolbeg Power Station	0.5 /0.25	0.5 /0.25	0.5 /0.25
ESB Dublin Bay Power Station	-	-	0.5 /0.25
Total (Min/Max)			0.25 / 1.75

Notes:

1. *Minimum total CO_2 flowrate considered to be 0.25 MMtpa*.

4.2.2 Site Location

The selected site is indicated on Figure 4-2 below (see high-lighted area). This site offers an optimum balance of the above considerations as outlined in the CPF Layout Philosophy for Dublin (Ref. 017). These included:

- Availability of space where the CPF and storage elements could be consolidated onto one site plot plan adjacent to the future jetty.
- Maximising the separation distance between the CPF and local habitation.
- Avoidance as far as possible of environmental constraints and minimising potential environmental impacts.
- Technical constraints including existing utilities, in particular transmission gas pipelines and installations and MV/HV electricity lines and / or cables.

Figure 4-2 Preliminary CPF Site Plan indicating jetty and main access to the public road network

No engagement has taken place to-date with relevant landowners / stakeholders in relation to there being other potential plans for the selected site.

4.2.3 Site Layout

The CPF plot plan layout is shown on Figure 4-3 below (see also Ref. 17). There are three main areas:

- Liquefaction / process area.
- Liquid CO_2 storage area, including space for 4No. spherical storage tanks.
- Utilities area (including control room, fire water storage and pumps, instrument air facilities, bottled nitrogen storage area, back-up electrical generators and fuel storage area.

In addition to the above main zones, there is an electrical substation area.

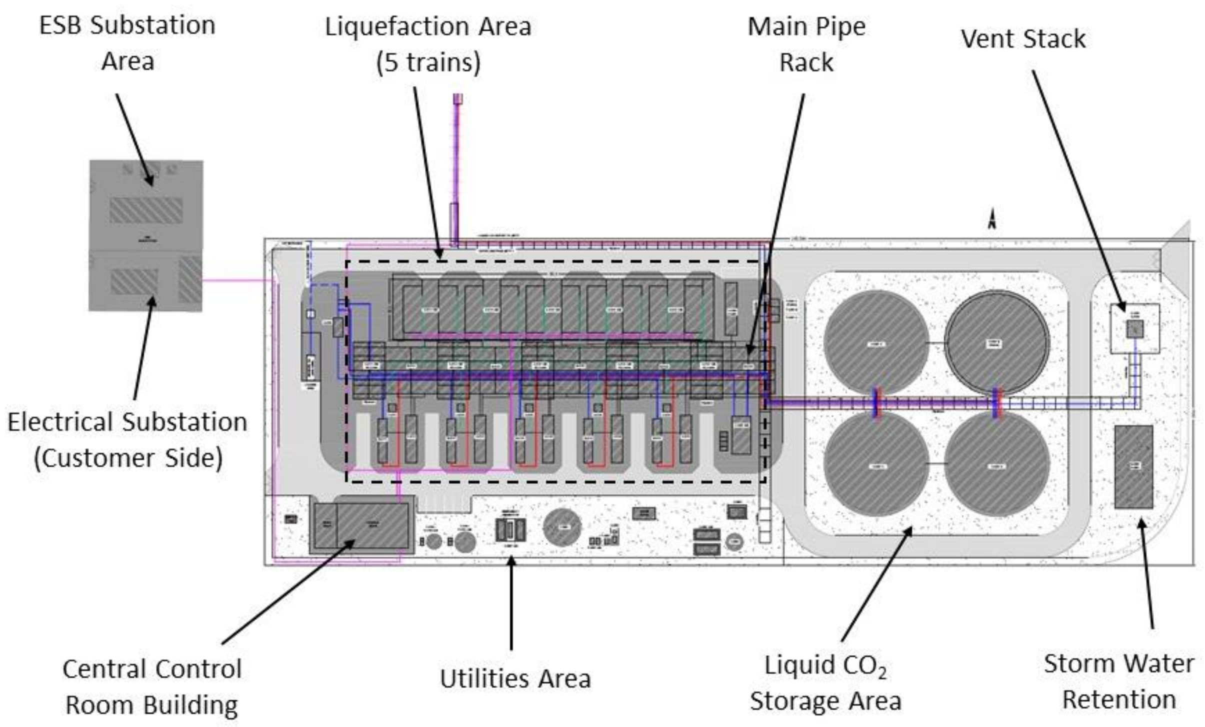


Figure 4-3 CPF Layout - Dublin

Figure 4-4 3D Representation of CPF Layout - Dublin

4.2.4 Process Unit Overview

4.2.4.1 Liquefaction

The liquefaction plant is organised into 5No. parallel trains (for Phase 1, 4No. trains will be installed, with space available for a fifth train). Each liquefaction train will include a pair of screw compressors, a single external chiller, receiver and refrigeration compressor suction Knock Out Drum (KOD). The refrigeration train size is identical at Cork and Dublin, which will enable common maintenance and operating procedures and spare parts. Anhydrous ammonia will be used as the refrigerant primarily due to its high thermal efficiency and its Zero global warming potential.

It is envisaged that the compressors will be housed within a single portal frame type building. A refrigeration after cooler (air cooled) for each train will be located on the pipe rack (see below). A pipe rack will run between the chillers and compressors in the CPF. The pipe rack will carry process and utility piping along with electrical and instrumentation cables in cable trays and will also support air coolers. The pipe rack will carry the pipes which transport inlet CO_2 gas, liquid CO_2 to storage and export, Boil Off Gas (BOG), and CO_2 vent lines and Ammonia (NH_3) vent lines which connect to the CO_2 / Ammonia vents. The pipe rack will transition to pipe sleepers outside of the liquefaction area for transportation of liquid CO2 to the storage spheres and onwards to the marine jetty.

4.2.5 Utilities Overview

A central area for utilities has been provided. Features of note include:

- Central Control Room (CCR) building. A two-storey blockwork / concrete Central Control Room (CCR) building is located at the south-eastern corner of the CPF site.
- A back-up generator (for essential emergency power) and fuel storage for 24 hours running.
- Utilities in this area are
  - Instrument air.
  - Nitrogen.
  - Fire water (including storage tank, electrical pumps and back-up diesel powered pumps).
  - Potable and process water.
  - Wastewater.

4.2.6 Electrical Grid Connection Compound

Based on the preliminary electrical design loads, the estimated maximum electrical demand for the site will be 22.6 MVA. It would not be feasible to provide this level of power by means of on-site generation, for reasons of capacity and reliability. Therefore, the design philosophy assumes that power supply to the site will be provided from ESB Networks / Eirgrid electricity network.

This is a very significant load and will require direct connection from ESB / Eirgrid High Voltage network. (38kV, 110kV, or 220kV). A dedicated on-site 220kV substation will be required to facilitate the incoming power supply to the site. The grid connection compound will be similar to that outlined above for the Cork CPF.

Supply to site will be taken from the existing 220kV Shellybanks or 220kV Poolbeg substations, as these are located adjacent to the site. There is likely to be sufficient spare capacity at these substations as they serve the adjacent power station. The existing Combined Cycle Gas Turbine (CCGT) power station has a capacity of approximately 400MW, while the older Poolbeg power station is currently not operating. It should be noted however, that it is highly likely that a new power station will be built at this site in the future. It can be expected to have a similar or larger capacity to the CCGT facility that is currently in operation

Figure 4-5 CPF site indicating location of Shellybanks 220kV and Poolbeg 220kV substations (high-lighted)

4.3 Liquid CO_2 Storage

The CPF layout accommodates 4No. CO_2 storage spheres, each 26.1m in diameter, with a combined capacity that to ensure a minimum of 3 days storage buffer for maximum CPF output and for the larger vessel size (see Table 2-2 above). Initially, 3No. storage spheres would be built, with the final sphere being built later when CPF output and operating vessel size mean it is needed.

Figure 4-6 3D Representation of CPF Layout – Dublin indicating Spherical Liquid CO_2 Storage Spheres

4.4 Jetty

4.4.1 Jetty Location

A new dedicated berth will be provided at Poolbeg to the east of the existing oil jetty. This is on the basis that Dublin Port Company is planning to carry out extensive development in this area (3FM Project) (Ref. 18) which entails replacing the existing oil jetty with a new oil jetty to the east. This will accommodate a new container terminal. Large vessels, in the context of container ships use Dublin Port. However, dredging works will need to be carried out to -10.0m CD (Chart Datum) adjacent to and surrounding the new jetty structure to provide sufficient water depths for vessels at all stages of the tide.

Figure 4-7 Satellite image showing Dublin Port and location of proposed Poolbeg Jetty

4.4.2 Jetty Design

The proposed location and layout for the jetty head and access viaduct were selected on the basis of a range of considerations that are outlined in the Marine Design Philosophy (Ref. 19). The principal considerations for Dublin are very similar to those for the Cork Jetty. The jetty location and layout are indicated on Figure 4-8 below. The design of the Poolbeg jetty is described in Ref. 20.

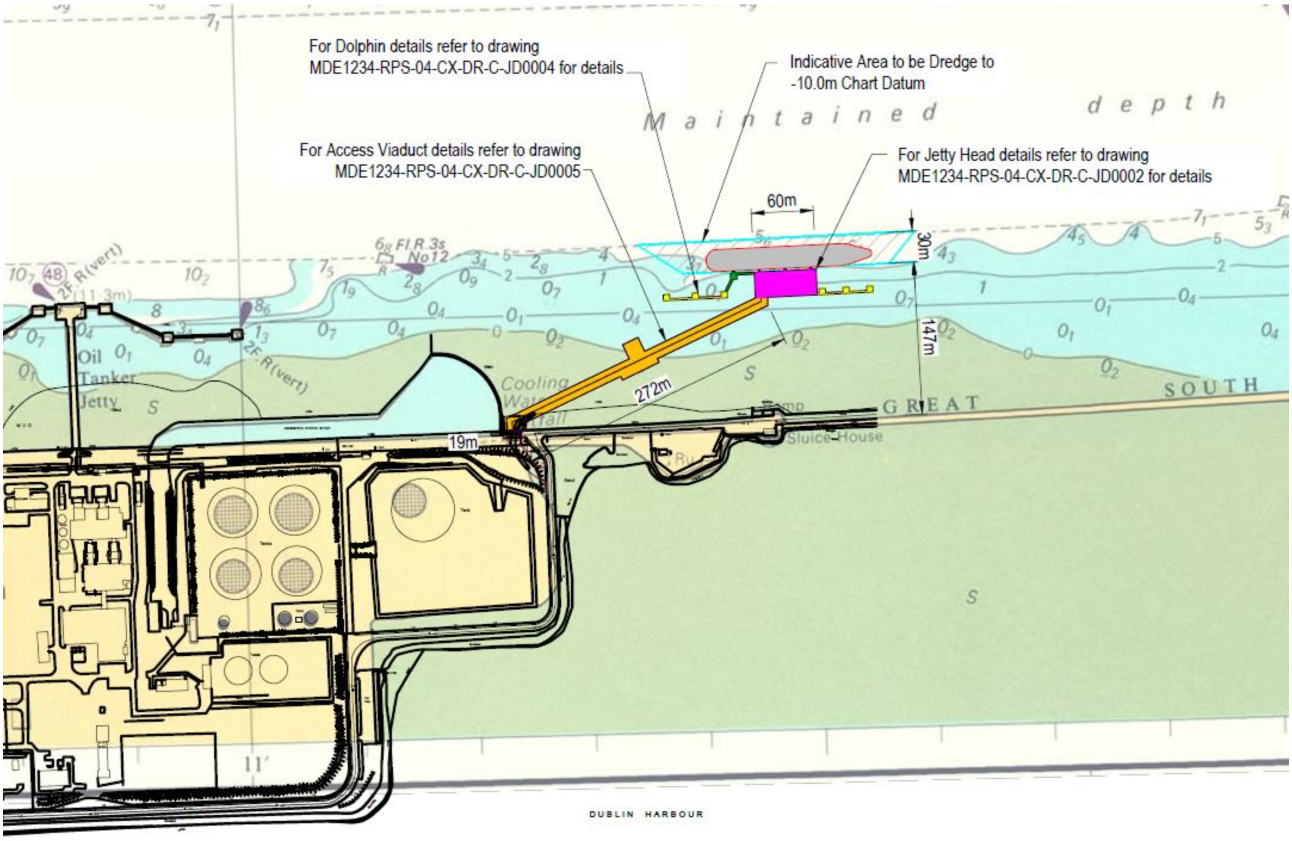


Figure 4-8 Jetty Location and Layout

4.5 Preliminary Carbon Assessments

Assessments of embodied carbon (for the construction phase) (Ref. 21) and carbon footprint (for the operational phase) (Ref. 22) were carried out during the Pre-FEED Study. The main outputs from these assessments for the Dublin project are summarised in the following sections.

4.5.1 Embodied Carbon (Construction Phase)

Established coefficients for the key bulk materials to be used during the construction of the project were used to calculate the total quantity of embodied CO_2 as CO_2 equivalents (kg CO_2e). This was divided by the design life of the plant (i.e. 25 years) to convert to an annualised embodied carbon. The calculated annualised embodied carbon during the construction phase for the Dublin project is 2,778 tpa CO_2 e.

4.5.2 Carbon Footprint (Operational Phase)

The carbon footprint of the project during its operational phase is built up from calculated quantities of CO_2 emitted by primary (fuel consumption, fugitive emissions), secondary (power consumption) and tertiary sources (electricity system losses, water supply, wastewater and waste disposal). Annualised embodied carbon (see above) was added to these sources to calculate the total annual quantity of CO_2 that can be attributed to the Ervia CCS project. The net quantity of CO_2 throughput per annum is calculated by subtracting this total from the total quantity of CO_2 to be processed by the facility (1.75MMtpa CO_2). This is summarised on Figure 4-9 below.

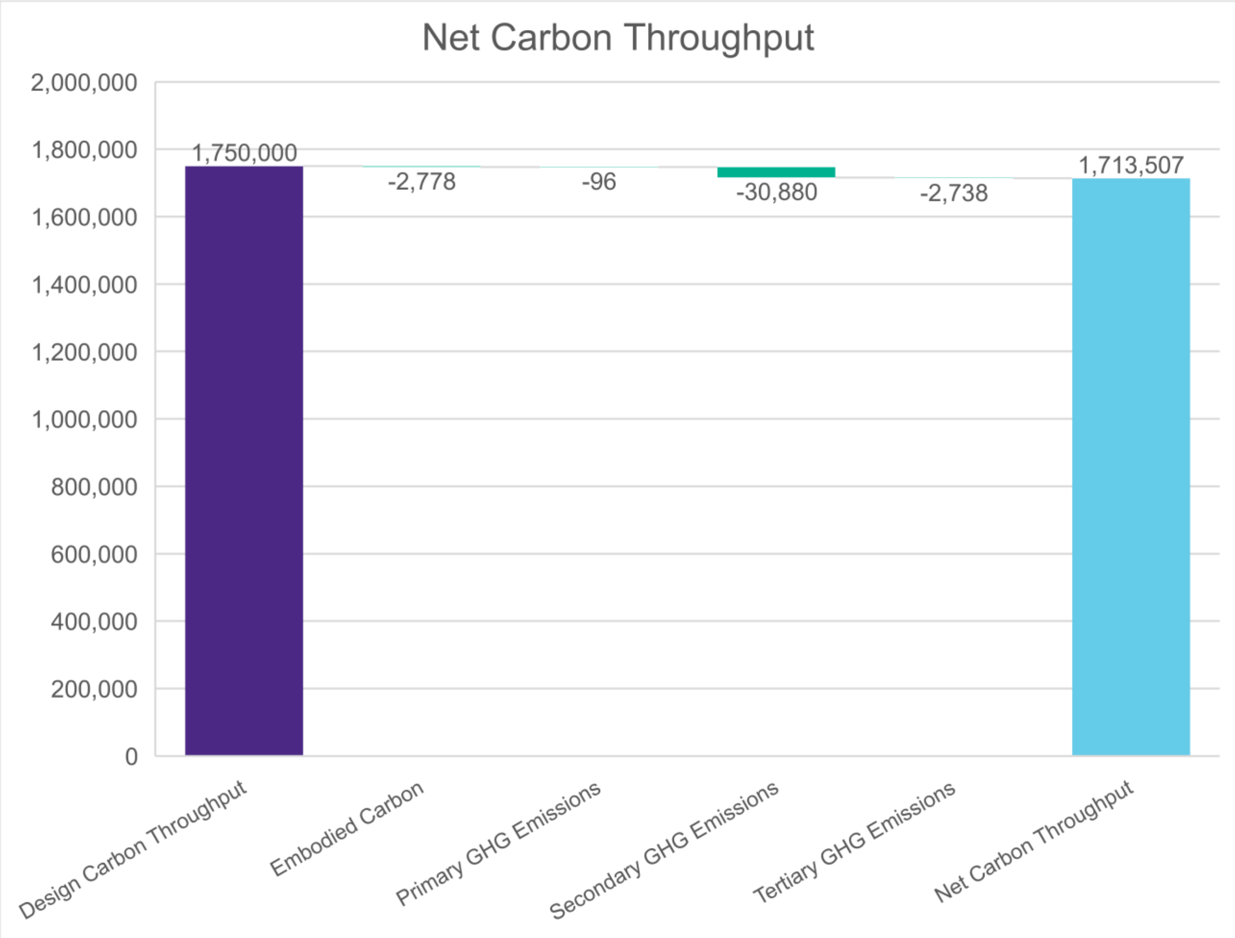


Figure 4-9 Net Sequestered Carbon (Tonnes CO_2 e / year)

It should be noted that the above calculations exclude carbon capture, shipping and final sequestration activities.

It is evident from Figure 3-11 that the additional impact of the annualised embodied carbon (i.e. from construction) to the overall carbon footprint (i.e. construction plus operation) is much lower than the impact from the operational phase. Therefore, optimising the design to reduce electricity / energy consumption is likely to have more of an impact on the overall carbon footprint for the project than sourcing of construction bulk material with low embodied carbon (during construction).

During project development, consideration should be given to the selection of equipment, technologies and processes which, through increased efficiency, reduce consumption of electricity. Furthermore, the source of electricity should be considered with a view to further reducing the carbon footprint through supply from renewable energy such as wind, solar and other non-hydrocarbon sources.

4.6 Cost Estimate

4.6.1 CAPEX

The AACE Class 4 cost estimate that was prepared for the project (Ref. 23) including the full build-up of the total CAPEX including all the direct and indirect costs and also contingency and fee is summarised below. The scope of the estimate included full engineering, procurement, and construction (EPC), through mechanical completion (MC) and commissioning and start-up (CSU). This included all capital cost (CAPEX) for the CPF, pipeline, onshore temporary CO_2 storage and jetty infrastructure

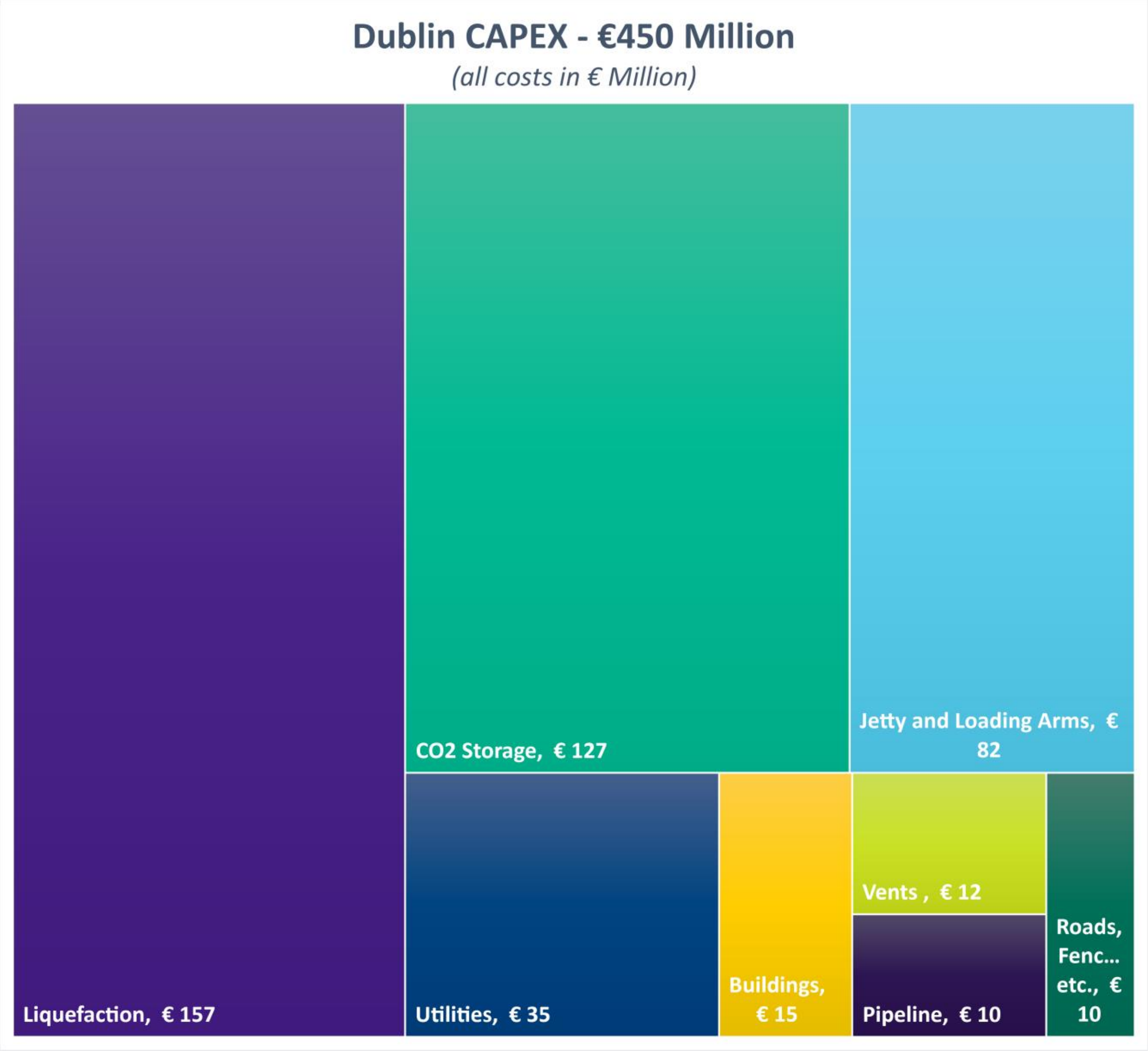
Table 4-2 CAPEX Summary

WBS	Area	Cost (€m)	% Total
P01	CO_2 Pipeline	8.0	2%
L00/1/2/3/4	Liquefaction (all incl. spares)	123.5	35%
V01	Vents (CO_2 & Ammonia)	9.3	3%
T01/2/3	Liquid CO_2 Storage	100.3	29%
S01	Jetty and Loading Arms	64.4	18%
M01/U01	Plant Utilities	27.9	8%
B01	Buildings	11.9	3%
C00	Roads, Fences, etc...	7.9	2%
	Contingency	70.4	
	Fee	24.6	
	CAPEX	**448.2**	

There were a number of costs which could not be appropriately defined or priced at this stage and therefore were excluded from the CAPEX estimate. Examples of CAPEX exclusions are; abnormal subsurface conditions, unexpected underground demolition, remediation of contaminated soils, cost of electrical grid connections and owner's costs (e.g. cost of land purchase, permitting costs, environmental studies, environmental impact assessments and financing costs etc.). In addition, the current global pricing volatility and global supply chain disruptions has meant that escalation cannot be appropriately priced at this time and this has also been excluded.

Figure 4-10 gives an illustration of the major CAPEX cost components; this visualisation includes the contingency and fee which have been allocated across the work breakdown structures relative to the percentage (%) size of each cost component.

Figure 4-10 CAPEX Visualisation - Dublin



4.6.2 OPEX

A budgetary annual OPEX cost has been developed for the project.

Variable plant operating costs consider utility and chemical consumption which has been calculated for Electricity, Water, Ammonia and Nitrogen.

Fixed Operating Costs are considered using an overall factor of 4% of total plant CAPEX. This fixed operating cost includes the following

- Staffing
- Supervision
- Staff Overheads
- Plant Maintenance including spare parts
- Plant insurances (typically 1-2% of CAPEX)

The summary of the budgetary OPEX estimate cost has been included below.

Table 4-3 Budgetary OPEX Estimate

	Cost Item	Annual Cost	Notes
Variable Plant Operating Costs	Electricity	€22,251,000	Electricity unit rate used is 0.153 Euro/kW-hr. (SEAI)
	Potable and Utility Water	€2,000	
	Anhydrous Ammonia NH3	€4,000	
	Nitrogen	€375,000	
Fixed Plant Operating Cost Estimate	4% of capital cost	€17,928,000	
Total Annual OPEX Estimate		**€40,560,000**	

4.6.3 Flowrate Sensitivity

In addition to the base case class 4 estimate, a flowrate sensitivity analysis and associated class 5 estimate have been developed for the following scenarios:

- Flowrate increased by 50%
- Flowrate increased by 100%
- Flowrate decreased by 50%

Flowrate Sensitivity Analysis for the three scenarios noted above were performed based on an evaluation of the quantity of Refrigeration Compressors and CO_2 Spheres required for each scenario. The remainder of the estimate was developed using the appropriate process engineering industry standard of the '*6/10th Rule'* for plant capacity estimates.

Table 4-4 Class 5 Estimated Costs for Flowrate Sensitivity

Cost Particulars	Base Case	Flowrate increased by 50%	Flowrate increased by 100%	Flowrate decreased by 50%
Total Installed Cost Excluding Contingency	€378	€492	€575	€286
Contingency (*Note 1*)	€70	€138	€161	€80
Total Installed Cost (€ million)	**€448**	**€630**	**€736**	**€365**
% Change in Total Installed Cost		40%	64%	-19%

Note 1: Base case includes for 20% contingency as per the class 4 estimate methodology. For the sensitivity cases and the respective class 5 estimates, commensurate with the AACE estimate methodology an increased contingency of 30% has been applied.

5 HEALTH, SAFETY, SECURITY & ENVIRONMENT (HSSE)

During the Pre-FEED stage, a number of studies and workshops were undertaken to identify risks and mitigations. These were attended by relevant personnel from the wider project team including Ervia and RPS / Bechtel. The key processes and associated outputs are summarised on Table 5-1 below. All of the processes and outputs referenced below will be developed further during FEED; they will be key reference points for the demonstration that risks are As Low as Reasonably Practicable (ALARP). Further studies shall be carried out during FEED as the design is progressed including Layer of Protection Analysis (LOPA) and Safety Integrity Level (SIL).

Table 5-1 Risk Identification Processes and Outputs

Identification	Workshop / Study Details
Process Safety Design Basis	This document (Ref. 24 & 25) sets out the Process Safety Design Basis for the Ervia Cork CCS project. It sets out the high-level design philosophies for process safety and fire & gas safety. It also describes the fire protection systems and various measures that will be used to protect personnel. The document also references how HAZID / HAZOP / SIL assessment and Qualitative / Quantitative Risk Assessment (QRA) will be used to ensure the highest standards of safety on the project.
Hazard Identification Study (HAZID)	HAZID is an identification of hazards or potential causes of harm to people, damage to property, or loss of Company reputation, with the aim of planning safeguards, control and mitigation measures, and recommending actions towards risk mitigation if the current Project proposed control measures are not deemed to be sufficient to control the hazard. A HAZID workshop for the Ervia CCS Pre-FEED Study took place over 4 days during early February 2022 and is summarised in the HAZID Report (Ref. 26 & 27). This was carried out in accordance with Gas Networks Ireland's (GNI's) HAZID, HAZOP & HAZCON Procedure HSQE/PR/146 (Ref. 28) procedure. As the project design will be developed further during FEED stage, it will be necessary to revisit the HAZID and up-date it for any significant project changes.
Hazard and Operability Study (HAZOP)	HAZOP is an analysis of a planned or existing process or operation using a structured, formal, systematic examination of the process and engineering intentions, in order to identify and evaluate hazards and problems that represent risks to personnel, the environment or equipment. A HAZOP workshop for the Ervia CCS Pre-FEED Study took place over 8 days during February and March 2022. This was carried out in accordance with GNI's HAZID, HAZOP & HAZCON Procedure HSQE/PR/146 and IEC 61882 'Hazard and Operability Studies'. The outcome of the HAZOP workshop is summarised in the Preliminary HAZOP Report (Ref. 29 & 30) and Preliminary HAZOP Close-Out Report (Ref. 31 & 32). As the project design will be developed further during FEED stage, it will be necessary to revisit the HAZOP and up-date it for any significant project changes.
Process Control & Safeguarding Philosophy	This document (Ref. 33 & 34) defines process control, process safeguarding and emergency shutdown philosophy for the Ervia Cork CCS project. It defines emergency shut down levels and breaks the overall system down in to sections, with actions identified to cater for specific scenarios.
Hazard Identification	Major Accident Hazards (MAHs) identified within the HAZID have been evaluated using a risk ranking approach and 'bow tie' analysis to determine if suitable and sufficient

and Risk Assessment (HIRA)	preventative and mitigative barriers are in place. Risk levels have been plotted on a Risk Matrix to assess their tolerability and to demonstrate if they are As Low As Reasonably Practicable (ALARP). A Hazard Identification and Risk Assessment (HIRA) report has been completed in accordance with the above (Ref. 35 & 36).
Dispersion Modelling	CO_2 consequence modelling has been carried out for the Ervia Cork CCS Project to determine indicative hazard distances from accidental releases (Ref. 37 & 38). This modelling was conducted using the industry recognised consequence modelling software package PHAST (developed by DNV) which has been validated for CO_2 dispersion modelling.
CO_2 Gathering Network Safety Separation Report	A safety separation study (Ref. 39 & 40) based on the requirements of BS 8010 (Ref. 41) has been carried out. This report considers where additional measures (increased pipeline wall thickness or impact protection) will be required based on either population density or building proximity considerations of risk. However, it has been decided that 'heavy wall pipe' shall be used in all locations of the CO_2 gathering network (Ref. 6 & 14).
Risk & Opportunity Register	An overall project 'Risk & Opportunity Register' was developed for the Pre-FEED stage and updated as the project progressed (Ref. 42). This document covers a range of categories as follows: • Safety • Technical • Environmental • Planning & Consents • Stakeholder • Economic • Commercial • Opportunities • Procurement Workshops to identify and discuss risk and opportunities took place during March and April 2022. The risk and opportunity register shall remain an integral part of the next stages of the project lifecycle as it progresses through design, construction and commissioning, operation and decommissioning.
PSDP Report	RPS was appointed by Ervia as Project Supervisor for the Design Process (PSDP) at the commencement of this Pre-FEED Study. The PSDP role is defined within the Safety, Health & Welfare at Work (Construction) Regulations (S.I. 291 of 2013). A key responsibility of the PSDP is the coordination of designers and the compilation of design risk assessments by designers. Key design decisions and residual risks are recorded for passing on to the PSDP and designers of the next phase of design (FEED). As the design progresses through FEED, this record shall be updated and subsequently passed on to the Project Supervisor for the Construction Stage (PSCS). The high-level objective of this process is to ensure that safety risks are clearly communicated across disciplines, all the way through design and construction, and ultimately back to the Client on project completion, for the operational stage. A PSDP Report (Ref. 43 & 44) has been completed which details the key design decisions made during the Pre-FEED design process. The PSDP Report includes a Design Risk Assessment which includes details of residual risks that will need to be considered at the FEED stage.

Safety Integrity Level (SIL) allocation	Once the design has been sufficiently developed during FEED, any significant consequence hazards shall be examined further in a SIL allocation process (e.g. a Layer of Protection Analysis (LOPA)).

6 LEGISLATIVE OVERVIEW

6.1 Relevant Statutory Approvals

The legislative and approvals requirements for the Ervia CCS project are outlined in detail in the Legislative and Approvals Philosophy document (Ref. 45 & 46). These are summarised on Figure 8-1 below. Those statutory processes that would be the responsibility of Ervia fall within the solid red lines. The processes identified outside the red lines will be the responsibility of others, but Ervia will need to engage with the relevant organisations who will be responsible.

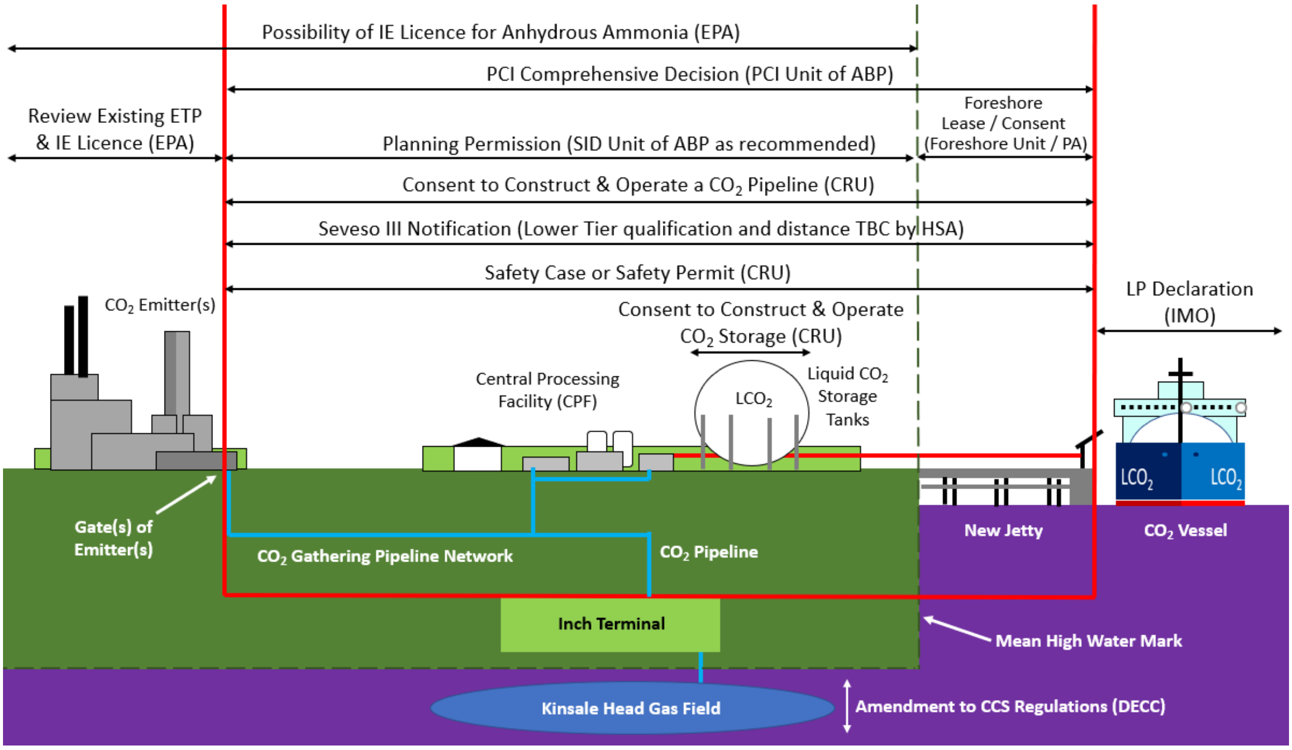


Figure 6-1 Schematic of Key Legislative Approval Requirements for the Cork CCS Project

6.2 Recommendations in relation to Statutory Processes

- It is recommended that strengthened policy in relation to CCS is sought in advance of any legislative changes. While the inclusion of Action 126 of the recently published Annex of Actions to the Climate Action Plan is to: *"Establish a framework for analysis of the potential for CCS deployment for Ireland including assessment of the environmental, technical, and financial factors"* is helpful along with the proposed output to develop *"a framework for analysis of CCS potential for Ireland, including feasibility in electricity and cement sectors"* by Q4 2022, a clear policy objective to develop CCS and its associated collecting infrastructure is a critical first step on the legislative approvals journey.
- Owing to the fact that the storage of CO_2 in a storage site in part or in whole is currently not permitted under the CCS Regulations and that at present there is no area of Irish territory that would be free to be used for CO_2 storage, the CCS Regulations need to be amended by the Department of the Environment, Climate and Communications (DECC) in the first instance.
- Consideration must be given to the optimum consenting route for the subject application. The Strategic Infrastructure Development (SID) planning route would appear to be the 'best fit' for the project. However, only the new dedicated jetty aspect of the project appears to meet a relevant SID type of development. Owing to the fact that it would be preferable to seek a singular planning consent for the project, and given that the collecting infrastructure aspects of the project other than the new

jetty are not listed in the Seventh Schedule, it is recommended that a legislative change is sought to this aspect of the Planning & Development Act (PDA). The current review of the PDA that is underway (due to be completed in September 2022), provides a possible opportunity to seek this amendment.

- Connecting Europe Fund (CEF) funding will be available for projects that are recognised as having Project of Common Interest (PCI) status. The next group of PCI projects will be determined in 2023 and will form the 6th PCI list. If Ervia wishes to seek PCI status for this project, it is recommended that careful consideration be given to how the project is described for the 6th PCI list. If the scope of the project does not encompass the entirety of the infrastructure required for the project, it could hamper the project in the future.
- There is currently no Safety Framework for CO_2 in place in Ireland similar to that which is in place for natural gas and consultation with the Commission for the Regulation of Utilities (CRU) is recommended in order to facilitate the establishment of such a framework.
- For each of the emitter sites, it is recommended that early consultation takes place with the Health & Safety Authority (HSA) in order to secure their technical advice in relation to the relevant Seveso III notification distances. The quantity of ammonia stored at each site was limited to that permitted for a Lower Tier site per the Seveso III Directive. This would need monitoring throughout the design in case inventory increases.
- Both an Environmental Impact Assessment Report (EIAR) and a Natura Impact Statement (NIS) are likely to be required to secure consent for this project.

6.3 Environmental

It should be assumed that an EIAR and NIS will be required for this project. These documents form a central part of each of the statutory planning processes. The main environmental constraints for the Ervia CCS projects in Cork and Dublin are summarised on environmental constraints mapping (Ref. 47 & 48). The principal environmental factors identified for consideration and relevant guidance regarding how environmental assessments should be made in relation to these are outlined in the HSSE Philosophy (Ref. 49 & 50).

Early consultation with the Environmental Protection Agency (EPA), National Parks and Wildlife Services (NPWS), Inland Fisheries Ireland (IFI) and other relevant organisations is recommended. This will enable the identification / confirmation of all environmental issues and constraints.

A summary of the anticipated type and, where possible, duration of environmental surveys that will be required for this project are outlined in the HSSE Philosophy. In many cases, these can be carried out within a 1 year period or less. However, it is expected that in some cases, e.g. birds, relevant statutory bodies and subject matter experts are likely to specify survey durations in excess of 1 year. Delays in starting these critical environmental surveys will have a direct impact on the overall project schedule. These surveys and the overall environmental and planning processes are on the overall project critical path (see Section 9 below). Therefore, early engagement with statutory bodies as recommended above is very important to the timely delivery of the project.

7 STAKEHOLDER ENGAGEMENT

Proactive communication and engagement are essential to support acceptance and engagement and to build trust for any development project. This process of engaging with stakeholders needs to start in advance of planning and is also an integral part of the planning process. Engagement will continue in different forms through the project design and planning stages all the way through construction, operation and eventual decommissioning.

The key elements of stakeholder management relating to CCS are outlined in the Stakeholder Management Philosophy (Ref. 51 & 52). An indicative roadmap of the level and type of stakeholder engagement required at each stage of the project process to support successful project delivery is shown on Figure 7-1 below.

Landowner and Community Engagement
Proactive Media Engagement

Engagement with Statutory Bodies/Industry

Pre-FEED	FEED	Environmental Assessments	Planning Application	Planning/ Statutory Approvals Process	Construction	Operation	Decommissioning
• Stakeholder Management Philosophy • Engagement with statutory stakeholders, industry (key emitters) and internal stakeholders (Gas Networks Ireland).	• Appointment of Community/ Landowner Liaison • Establish project information service • Stakeholder Engagement Strategy including mapping • Communications Plan • Media Relations Strategy • Project messaging • Engagement with community and key emitters • Public consultation and stakeholder workshop(s) • PCI 'Concept for Public Participation'	• Preliminary engagement with affected landowners • Consistent engagement with community, industry and statutory bodies. • Non-statutory public consultation • Publication of findings • Consultation Report	• Ongoing Landowner engagement to gain support • Statutory consultation process (open, transparent, accessible) • Publication of findings. • Oral Hearing	• Engagement and consultation with landowners and communities • Engagement with industry/key emitters	• Procurement of construction contracts • Social Investment • Continued community/ landowner engagement	• Social Investment • Routine Commercial Relationship Management • Routine Operational Relationship Management • Planned maintenance activities communications • Emergency Response • Unplanned maintenance communications	• Engagement with statutory agencies (e.g. CRU) • Engagement with planning authority • Continued informing of community stakeholders • Continued relevant engagement with landowners.

Figure 7-1 Stakeholder Management Roadmap for Ervia CCS Project

8 PROJECT EXECUTION PLAN AND SCHEDULE

8.1 Procurement and Contracting Strategy

8.1.1 Procurement

The current EU Procurement Directive that applies to Ervia is Directive 2014/25/EU '*on procurement by entities operating in the water, energy, transport and postal services sectors'* i.e. the Utilities sector. It is often referred to as the Utilities Directive. The guidelines in the Directive are incorporated into Ervia Procurement Policy Document PD/02 Policy.

8.1.1.1 EU Thresholds

Contracts with a monetary value above the procurement threshold level are advertised through the Official Journal of the European Union (OJEU). Thresholds (exclusive of VAT) above which advertising of contracts in OJEU is obligatory for utility authorities, applicable from 1 January 2022 are as follows:

- Goods or Services greater than **€431,000**
- Works greater than **€5,382,000** and
- Social and other Specific Services greater than **€1,000,000**

The combined value of the works (including materials, equipment and contracting services) will be well in excess of the €5,382,000 Works threshold. The value of each of the main project elements (CPF, Jetty and CO_2 gathering network) will also be well in excess of the €5,382,000 Works threshold. Many of the material items required for the project will also cost in excess of the €431,000 threshold for goods or services. As a result, it will be a requirement that contracts are advertised though the OJEU.

8.1.1.2 Procurement Procedures

Alternative procurement procedures have been reviewed (see Ref. 53 & 54). Procedures considered to be relevant to this project are listed on Table 8-1 below.

Table 8-1 Summary of Relevant Procurement Procedures

Procedure	Applicability to CCS Project	Comments
Negotiated Procedure with Prior Call for Competition (Regulation 46)	**Yes**	Flexible, 2 stage procedure with option for negotiation.
Competitive Dialogue (Regulation 47)	**Possible**	Intended for when Ervia has not yet identified the solution or solutions which are capable of meeting its needs. This scenario is unlikely – but it may be used in a scenario where contractor is involved early to develop the preferred solution (Early Contractor Involvement (ECI)).
Restricted Procedure (Regulation 45)	**Possible**	Two stage procedure. Pre-qualification may reduce evaluation burden, however no negotiation permitted.

8.2 Contracting Strategy

The contract strategy determines the level of integration of design and construction for a given project and should support the main project objectives in terms of risk allocation, delivery, cost etc. Two key aspects of contracting strategy have been explored for the Ervia CCS Project: Contract Split and Contract Type.

8.2.1 Contract Split

Examples of how the works elements of the Ervia CCS Project could be contracted are outlined on Table 8-2 below. These should be considered with the Work Breakdown Structure (WBS) (Ref. 53 & 54). Market engagement will be important for determining the optimum sub-division of work packages for the Ervia CCS Project.

Table 8-2 Options for CCS Contract Split

Option	Option A	Option B	Option C	Option D
Contract Top Level Description	• Single Contract	• Two Contracts divided by Location	• Multiple Contracts by Work Package e.g., structured around WBS	• Multiple Contracts by Location and Work Package
Contract Content	• All Work Packages across Cork and Dublin sites	• Cork Site • Dublin Site	• Pipeline • Process • CO_2 Storage • Marine • Pipeline • Utilities • Site infrastructure (buildings/underground utilities etc.)	• Hybrid of option B&C, with separate contracts for each Work Package by Location
Benefits	• Single Party Contract – procurement is more straight forward • Single point of responsibility-coordination all with contractor • Benefits of scale of economies	• Reduced reliance on single party	• Reduced reliance on single party	• Reduced reliance on single party
Risks	• Single point of failure	• Multiple Contracts – procurement is more complex • Coordination risks introduced • Increased management complexity	• Multiple Contracts – procurement is more complex • Coordination risks increases • Increased management complexity	• Multiple Contracts – procurement is more complex • Coordination risks increases • Increased management complexity

8.2.2 Contract Type

Alternative contract types have been reviewed (see Ref. 53 & 54). Table 8-3 below summarises the contract types that are considered to be suitable or potentially suitable for this project.

Table 8-3 Summary of Relevant Contract Types

Contract Type	Summary	Suitability for Ervia CCS Project
Design & Build (D&B)	This type of contract is suitable for projects where the design is complex and where the contractor has the specialist skills to carry out the detailed design, or where there is value to be offered by the contractor in the design process.	**Potentially suitable**
Design/Build & Operate (DBO) / **Design, Build Operate & Maintain (DBOM)**	This type of contract is suitable for projects where the design is complex and where the contractor has the specialist skills to carry out the detailed design, or where there is value to be offered by the contractor in the design process and where the contractor can operate and maintain the finished works on behalf of the employer.	**Potentially suitable**
Engineer, Procure, Construct (EPC) / Turnkey	EPC contracts provide the most suitable framework for projects where significant engineering expertise is required, the design is determined by functionality (rather than aesthetics), there is greater focus on performance requirements and the Employer does not need to control the design. This method is generally used for large scale energy and resources developments such as power stations, process plants, other major plants, oil and gas projects, and the delivery of mining infrastructure.	**Deemed suitable**
Engineer, Procure, Construct, Manage (EPCM)	The EPCM approach is used by clients who have the expertise and experience to manage the progress of the project and the size of the balance sheets, and to retain the cost and schedule risk of the project (rather than pay the risk premium to transfer the risk under an EPC contract).	**Deemed suitable**
Public Private Partnership PPP)	PPP is used where the Employer wishes to use the expertise and resources of the private sector to implement public infrastructure. PPPs are usually complex and are intended to deliver infrastructure or services over a long period of time.	**Potentially suitable**

8.3 Logistics Strategy

Key logistical considerations associated with the construction of the proposed CO_2 transport, liquefaction, storage and export / import facilities at Cork have been outlined in the Preliminary Project Execution Plan (Ref. 53 & 54).

8.4 Next Steps for Project Execution Plan

Further evaluation is required in order to find the appropriate balance of all of the main issues including:

- **Risk Management**: What is the most appropriate allocation of project risk for Ervia?
- **Constraints**: What are the main constraints (safety, environmental, technical, stakeholder etc.?) All of these key constraints have been identified during the Pre-FEED Study. How will Ervia identify and manage these constraints?
- **Scope**: Are Ervia's requirements for this project fully clear? These may not be fully confirmed until detailed design stage.

- **Timing**: When is infrastructure required? The timing of the construction of the CCS infrastructure downstream of emitters needs to be coordinated with the development of carbon capture facilities. What can Ervia do now to ensure that the right conditions are in place to support CCS development in Ireland?
- **Funding**: What are the requirements? When will there be a national CCS policy that would encourage or underpin funding and investment in CCS in Ireland?
- **Resources**: Are the requisite specialist skills available to Ervia in-house or do they need to be to be outsourced?
- **Supply Chain**: What type of market (i.e. contractors) is being targeted? What is the expected level of competition? etc. Are there contractors available and sufficiently interested in this project who can build it to the high standards required by Ervia?

Some actions can be progressed independently of selecting the preferred procurement approach or contracting strategy. These include:

1. Engage with CO_2 emitters in relation to the anticipated time frame for the development of the carbon capture infrastructure that will feed the Ervia CCS Project. Greater certainty in relation to this will be essential for building confidence in the overall likely project programme, with a direct impact on the likely engagement from the market in relation to the project.
2. Engagement with relevant stakeholder (ESB) regarding the selected site for the CPF and jetty.
3. Initiate formal discussion with ESB Networks regarding the electrical grid connection for the CPF. This will enable relevant timelines on the Project Execution Schedule to be confirmed.
4. Develop scope and specification for marine site investigations. Start process for a Foreshore Licence application to carry out the required marine site investigations works.
5. Carry out a high-level scoping assessment to identify the key environmental constraints that are likely to be important to the environmental assessment of the project at statutory planning stages. Identify any environmental surveys that need to be carried out over a period of years e.g. bird surveys and aquatic surveys. It is often essential to gather environmental data over 1 or two years to sufficiently inform the Environmental Impact Appraisal Report that will support the statutory planning applications.
6. Carry out a gap analysis in relation to the overall CCS supply chain in Ireland, Europe and globally.

Other actions can only happen as the project progresses. These include:

7. Engagement with the market in relation to capacity and capability to deliver the Ervia CCS Project.
8. Confirm CO2 pipeline routes followed by detailed surveys of utilities that are crossed.

9 PROJECT SCHEDULE

A high-level Project Execution Schedule has been developed for the project (see Ref. 53 & 54 and Appendix B). The schedule has been developed on the assumption that the EPC route (or similar) will be used for the Project. This approach will entail a project implementation phase to ensure that even during the procurement process, critical path elements are progressed in parallel.

The overall schedule duration, including the public spending code approval process, through to the start of the operational phase is approximately 7 years. The critical path for the project execution schedule is outlined briefly below:

- Appointment of Technical Adviser to support Ervia in advance of the appointment of an EPC Contractor in the key areas of procurement and preparation of statutory applications.
- Development of a Detailed Project Brief and Procurement Strategy.
    - A Detailed Project Brief will be developed on the basis of the Pre-FEED study and engagement with relevant organisations, including the landowner of the preferred CPF site. The Detailed Project Brief will facilitate progression of the environmental aspects of the project including defining a project envelope for assessment purposes.
    - The development of a Procurement Strategy during this period will happen in parallel with market sounding and prequalification processes. It will be completed prior to issuing the tender for the EPC contract.
    - Procurement of a consultant / contractor to carry out the preliminary engineering / Front End Engineering Design (FEED) work. Preliminary design / FEED will be completed before the issue of the EPC tender.
- Early engagement with relevant statutory bodies and consultees which will happen in parallel with scoping the EIAR and associated environmental surveys. As stated above, some environmental surveys need to take place over an extended period. It has been assumed that the longest of these will be 2 years. However, subject to engagement with bodies such as the National Parks & Wildlife Service (NPWS), there is a possibility that some of these surveys might need to take place over a longer period. Therefore, environmental surveys are clearly on the critical path.
- The EIAR will be a key part of each of the statutory applications and is therefore on the project critical path. Work on the EIAR will start after approximately 1 year of environmental survey work has been completed. This will ensure that where required, seasonal factors will be factored into environmental surveys where this is relevant.
- The appointment of the EPC Contractor is indicated as taking place after the tender evaluation, Ervia approval and a public spending code approval. A period of 6 months has been allowed for public spending code approval.
- Once the EPC Contractor has been appointed, detailed design will start and procurement activities will also get under way. It is assumed that during the preliminary design / FEED stage, initial engagement will have taken place with relevant vendors. This will have the benefit of preparing vendors in advance of the detailed design stage which will result in shorter delivery timelines for long lead items.
- Once the EIAR is completed, a period of 8 weeks has been allowed for compiling the statutory applications.
- A period of 9 months, plus a further 6 weeks for an oral hearing process, has been assumed for the duration of the planning processes. A further period of 3 months has been assumed for the final assessment of the applications by the relevant statutory bodies after oral hearing. The statutory processes are therefore on the project critical path.
- It has been assumed that no works can commence on-site until the relevant statutory consents and permissions are in place. Once permissions are in place, construction work can start. It is envisaged that all works will be completed within a period of 27 months, including a 3-month mobilisation period.
- Procurement of plant and materials will be the responsibility of the EPC Contractor and is programmed to take place during the detailed design phase. Long lead items are programmed to be in place in advance of and during the construction phase.

- Start of operation is programmed to take place approximately 6.5 years after the start of the procurement process for a Technical Adviser by Ervia.

10 VALUE ENGINEERING OPPORTUNITIES

A number of opportunities for reducing the overall project cost through 'Value Engineering' were identified during the Pre-FEED Study. These included:

- Combining the CPF and liquid CO_2 storage in one location adjacent to the jetty. This reduces the overall plot space, length of piping to jetty and facilitates more efficient operation of the overall site.
- Selection of ammonia as a refrigerant. Ammonia has the following advantageous features
  - It has relatively low capital and operating cost
  - Ammonia has high energy efficiency. Better heat transfer therefore allows for equipment with lower heat transfer area. High latent heat of vaporisation.
  - Ammonia has zero global warming and zero ozone depletion potential. Other refrigerants like propane and ethane have global warming potentials of 3.3 and 6 respectively.
  - Ammonia is less flammable than other refrigerants like propane and ethane.
- Use of power station cooling water outfall as the primary source of heat for CO_2 regasification at the Cork CPF.
- Selection of carbon steel as the preferred material generally. This means that stainless steel or exotic alloys, which are more expensive, will only be used in specific areas of the project where they are needed.
- The CPF site includes plot space for 4No. liquid CO_2 storage tanks. It is envisaged that 3No. of these would be built to begin with. The fourth will only be built when required by larger vessels.
- The design of the CO_2 gathering network in Cork avoids the need for a separate pipeline from the CPF to Inch terminal. The network will therefore cost less to build and operate.
- Temporary pig launching / receiving installations have been specified. This means that CAPEX for these items is kept to a minimum.

Further opportunities for Value Engineering during FEED are summarised below.

- The refrigeration train size has been selected to enable the plant capacity to increase as the emitters come on-line. If the plant was designed just for the final capacity, a smaller number of larger capacity trains with different compressors can be considered which may reduce the CAPEX and OPEX.
- The design includes the facility for automatic start-up for most of the primary plant at the CPF (compressors and pumps). This feature of the design could be reviewed at FEED stage. There are opportunities to reduce the overall complexity of the control system and associated CAPEX while maintaining the same high standard of safety. Any such changes to the design would be fully explored and further developed on the basis of future HAZOP processes.
- An optimisation could be considered for the isolation philosophies with a view to optimising the number of valves, thereby reducing the overall CAPEX.
- The onshore storage capacity has been specified to ensure that liquid CO_2 ships are filled quickly on arrival. It may be more economical to invest in additional shipping capacity such that onshore storage is reduced. Ships would be expected to be on the jetty for longer and so berthing arrangements may need to be reviewed for this scenario.
- CO_2 transport and storage facilities at Cork and Dublin are designed to cater to ship sizes of 7,500m^3 with partial investment as below to cater to ship sizes of 15,000m^3. During FEED the provision of these future facilities can be re-evaluated as CAPEX may be reduced if considering only a 7,500m^3 vessel.

  1. Storage capacity and loading lines are sized based on a ship size of 7,500m^3. Storage capacity is based on 3 days production + parcel size of 7,500m^3. Plot space will be kept for additional storage capacity required for ship size of 15,000m^3 + 3 days of production.
  2. Existing BOG compressor package for ship size of 7,500 m^3 with design margin is considered adequate for a ship size of 15,000 m^3. This will be verified during FEED.

3. Plot space provided for one additional loading pump required for ship size of 15,000m^3.
4. Plot space provided for 2 additional loading arms required for ship size of 15,000m^3.

- During the Pre-FEED study, Dublin Port published its 3FM Project which includes the development of a new container terminal at the location of the existing oil jetty at Poolbeg. The existing oil jetty will be demolished and a new oil jetty / berth constructed to the east. These plans resulted in the preliminary design of a new jetty further to the east to cater for CO_2 export being included in the Pre-FEED study. There may be opportunities to explore sharing facilities at the new oil jetty / berth. The progress of Dublin Port's 3FM project should be monitored and it is recommended that engagement take place to explore potential synergies. These could result in significant positive impacts on overall project costs.
- The design of the CO_2 gathering network in Cork has assumed that heavy wall pipe will be used throughout (> 10km). Unlike Dublin, this pipeline network is located mainly within a rural context with low population density. There will be scope for reducing the extent of heavy wall pipe in Cork, which would have the effect of a modest reduction in CAPEX. This opportunity does not apply to the Dublin gathering network which is much shorter (approximately 1.35km) and located within an industrial area and for much of its length heavy wall pipe is specified for reasons of proximity to occupied buildings.
- The quantity of ammonia stored at each site has been limited to that permitted for a Lower Tier site per the Seveso III Directive. This measure will have a positive impact on overall project costs during construction and operation. It needs to be monitored throughout the design in case inventory increases.
- As the percentage of renewable electricity dispatched on the grid grows, it can be expected that gas fired or other thermal power stations will be dispatched less. Therefore, if there are opportunities to connect other CO_2 emitters to the CO_2 gathering network, these could be considered with the view to maximising CPF throughput. The cost of operating the CPF will be minimised when throughput is maximised. The design of the CPF and associated infrastructure can be reviewed during the next phases of design to ensure that there is scope to avail of additional throughput that would balance any drop in output from emitters already identified.
- The Ervia CCS project must be developed in parallel with the carbon capture facilities at emitter sites. There are likely to be opportunities for achieving value engineering gains by coordinating and collaborating with the designers of these facilities. Opportunities may arise also during the procurement and construction stages because the complete CCS supply chain will need to be in place before capture and transportation / liquefaction / storage facilities can commence operation.

As technology is developing for this nascent industry, a technology review of operating plants should be considered when commencing each further stage of design. There may also be an introduction of standardisation for equipment and design specifications in CO_2 transport and storage facilities which could have a major impact on CAPEX and OPEX.

Some examples of development in the industry are listed below for future consideration.

- Consider low pressure shipping of CO_2 for export and import. This would have an impact on CAPEX with reduced costs of storage but may lead to increased OPEX for liquefaction.
- Consider on-ship regasification rather than on shore. Reduce plot space and plant CAPEX and OPEX for regasification.
- Consider a floating Carbon Collection, Storage and Offloading (CCSO) unit in place of the CPF and onshore facilities.

11 RISK AND RISK MANAGEMENT

An overall project ‘Risk & Opportunity Register’ was developed for the Pre-FEED stage and updated as the project progressed (Ref. 42). Workshops to identify and discuss risk and opportunities took place during March and April 2022.

The risks and opportunities identified for the project which are considered to have the most significant potential impacts are summarised on Table 11-1 and Table 11-2 below.

Table 11-1 Project Risks with Most Significant Potential Impact

No.	Risk	Context	Cause / Effect	Consequence	Mitigation Measure / Action(s)
1	**Emitters do not invest in carbon capture infrastructure during the envisaged timeline for delivery of the transportation and storage infrastructure.**	Major infrastructure will be required at each emitter site to capture carbon. This project assumes that the carbon capture element of the overall project will be the responsibility of emitters. The associated costs are large and will have a bearing on the overall project viability. Currently, there is no incentive for emitters to invest in carbon capture infrastructure as the alternative cost associated with participating in the Emissions Trading scheme (ETS) is lower. Without commitments from emitters, there will be no case for developing a transportation and storage system.	Lack of direction and support from central government that would serve to coordinate efforts across the industry to deliver CCS. Lack of a national business model for CCS in Ireland.	Delay in realising CCS - impact on schedule. Emitters do not develop carbon capture facilities which would mean that transport and storage infrastructure would not be feasible.	Develop a project specific Stakeholder Management Plan. Ongoing and proactive engagement with CCGT operators and other emitters. Contribute wherever possible to the development of a coherent government policy on CCS in Ireland. Engagement at EU, National and local level to high-light the risk that CCS cannot be achieved without greater certainty and clear direction from a coherent government policy in this area. Engagement with potential project partners and contractors. Comprehensive technical and economic studies to be carried out for whole CCS supply chain including carbon capture facilities, pipelines and storage facilities. These studies should seek to provide a manageable number of clear conclusions and recommendations that will give clear direction to regulators and legislators. This will facilitate developing the necessary policies for CCS at government level. Benchmarking with countries which have ongoing CCS projects. e.g.: Northern Endurance project (Equinor and BP), HyNet North West (Eni). These projects also have well developed project definition and branding which serves to build project momentum. Similar can be achieved in Ireland for clusters such as the Ervia Cork & Dublin clusters. By keeping up to date with CCS developments in UK and Europe (as well

No.	Risk	Context	Cause / Effect	Consequence	Mitigation Measure / Action(s)
					as further afield), the status of CCS as envisaged for the Ervia CCS project will be clearer. 'Next of a Kind' technologies will be more readily deployed than 'First of a Kind' and will be more economically feasible.
2	**CCS is not commercially viable for development of Transport & Storage infrastructure**	The commercial viability of the transport and storage network will depend on there being sufficient revenue from emitters. If emitters are unable to commit to using the CO_2 transport and storage network, its commercial viability will be impacted negatively. The rate of use of the CO_2 network will be proportional to the rate of dispatch of the power station emitters.	There is no recognised national business model for CCS in place in Ireland. This can impact negatively in a number of ways: 1. Emitters do not commit to using the network due to lower alternative cost of participating in Emissions Trading Scheme (ETS) 2. Delayed / phased installation of Carbon Capture infrastructure by emitters. A transport and storage network will need to be in place for the first emitter to come on-line. If full-scale carbon capture at emitters is phased, this could impact on the commercial viability of the transport and storage network. It could also result in significant changes to the design of the transport and storage infrastructure which would also then need to be phased. 3. Lack of commercial commitments from emitters in relation to the volume of CO_2 to be transported and stored. The rate of dispatch of generators on the Electricity Grid will have	If the rate of CO_2 production and capture at emitter sites is uncertain or variable, there will be impacts on the technical and commercial feasibility of the transportation and storage network. Project may not be commercially viable. Programme delays until right commercial conditions are in place.	Develop a project specific Stakeholder Management Plan. Ongoing and proactive engagement with CCGT operators and other emitters. Securing large scale emitter(s) will be important to the overall economy of the CO_2 transportation, processing network. Engagement at EU, National and local level to high-light the risk that CCS cannot be achieved without greater certainty and direction. A clear government policy for CCS should provide greater certainty. Engagement with potential project partners and contractors. Comprehensive technical and economic studies to be carried out for whole CCS supply chain including carbon capture facilities, pipelines and storage facilities. These studies should seek to provide a manageable number of clear conclusions and recommendations that will give clear direction to regulators and legislators. Examine CCS business models in UK and Europe to learn what has been done in these jurisdictions to address these commercial challenges. Explore options for government support for 'contracts for differences' i.e. government support to bridge the gap between anticipated revenue from

No.	Risk	Context	Cause / Effect	Consequence	Mitigation Measure / Action(s)
			an impact on the volume of CO_2 that will need to be transported and stored. Higher rates of dispatch of generators will improve the commercial viability of the CCS infrastructure.		projected quantities of CO_2 for transportation and what will be economically feasible to support the required investment in the associated transportation, shipping & export infrastructure. Any supports of this kind would necessarily arise from a clear government policy for CCS and be manifested within the context of a Regulated Asset Base for CCS. Continue to engage with industrial CO_2 emitters who could potentially feed into the CO_2 clusters already identified, particularly where these may already be a focus of government policy for carbon abatement and / or where they may not be as variable as power station emitters (which will be increasingly subject to the level of renewable energy generation).
3	**Major local concerns emerge, leading to objections to the project at planning stages.**	Gaps in information provision and inadequate/ineffective local consultation result in local people feeling disenfranchised and developing negative attitudes to the project, ultimately culminating in objections and / or protestor actions.	Lack of a coherent and appropriate stakeholder strategy. Information about the project is not communicated properly. Sources of information emerge that are not reliable, but are trusted by members of the community. Misinformation is propagated about the project.	Delays to project at planning stages. Potential for onerous planning conditions. Increased project cost. Lasting difficulties in relation to stakeholder engagement.	Appoint an experienced stakeholder management team with relevant project experience. Develop a project specific Stakeholder Management Plan. Identify all relevant stakeholders in the local area and engage with these in accordance with the Stakeholder Management Plan. Establish an ongoing communication channel / dialogue with stakeholders from an early stage. Identify key concerns of all stakeholders and develop the project with these in mind. Ensure that key concerns are addressed within the project planning processes.

No.	Risk	Context	Cause / Effect	Consequence	Mitigation Measure / Action(s)
4	**Planning requirements and regulations for CO_2 transportation and storage in Ireland are not fully developed.**	The existing regulatory system in Ireland does not yet adequately cover the envisaged carbon capture and storage infrastructure for this project. This project will be first of its kind in Ireland.	Gaps in Irish planning / regulatory system.	There is potential for regulatory / legislative gaps to lead to delays in overall project delivery. There is potential for changes to statutory planning process(es) during the design and planning stages of the project that could result in project changes or delays to achieving all relevant permissions and consents. There is also potential in this scenario for inappropriate or conflicting statutory planning conditions to be imposed on the project due to lack of	Engage with carbon capture emitters to develop a coherent, industry specific lobby group to engage with government. Engagement at EU level. Engagement with relevant statutory planning and consent bodies and government departments. Policy and best practice review of other EU countries. Participation in ongoing legislation consultation processes. Develop project design and approach to environmental planning issues of the highest standard and in accordance with best international practice. This will serve to minimise the risk from planning / regulatory changes. Develop an integrated and coherent planning strategy for the project.
5	**Major accident occurs somewhere within the global CCS industry.**	The CO_2 industry is nascent and no plants are currently in operation globally. Should there be a major uncontrolled release resulting in multiple fatalities in this, the early stages of the industry, the social and societal impact of such an event would be damaging to the industry as a whole and likely cause a complete re-evaluation of the industry.	A major safety incident could happen for a number of reasons. In this emerging industry there is relatively little industry knowledge in the operation of carbon capture or carbon liquefaction and storage plants. Operator error or incorrect design could potentially lead to a major safety incident.	The CO_2 industry would lose public support and permitting of new plants would become unlikely due to local stake holder objections.	Carry out review of appropriate scale of the CCS facilities planned by Ervia having regard to the current market conditions and anticipated developments. Maintain a watching brief on CCS projects in UK and Europe especially, but also globally. Continue engagement with relevant industry bodies including UKCCSRC Ongoing participation in industry and academic events relating to CCS.

Table 11-2 Project Opportunities with Most Significant Potential Impact

No.	Risk	Context	Cause / Effect	Consequence	Mitigation Measure / Action(s)
1	**Early engagement with key Stakeholders (Statutory, Third party, Community & Public)**	Early engagement with stakeholders ensures that relevant stakeholders have sufficient time to understand the need for the project and its main features. Stakeholders will also have the opportunity to provide feedback to the developer on emerging plans and to contribute to the project in positive ways.	Early engagement will give a better understanding of the statutory requirements. It will also facilitate inputting to policy development for CCS in Ireland. There will be an advantage to the project in communicating the contribution that CCS can make to achieving Ireland's overall Carbon reduction targets. Early engagement will ensure that issues of importance to the local communities affected by the project can be addressed within the project design.	Reduced potential for unforeseen issues arising during the planning processes which could impact negatively on the overall project programme. While there would be additional effort and cost associated with early engagement with stakeholders, if correctly timed and targeted, this investment will very significantly mitigate the risk of major opposition to the project and consequent delays and much larger costs.	Engage with Government and the industry to support the development of a clear National Policy for CCS in Ireland. Develop coherent project Stakeholder Management Plan including early engagement with relevant statutory bodies.
2	**Opportunity to learn from other CCS projects from UK, Europe and further afield.**	There are other CCS projects in UK, Europe and further afield that are further ahead than the Ervia CCS project.	By conducting a detailed case study on international CCS projects and identifying key aspects which could apply to the Ervia CCS project, lessons will be learned that will benefit the project.	Reduced potential to make significant mistakes during the project planning and implementation stages. Reduced costs. Reduced commercial risk where project can take advantage of 'Next of a Kind' technologies.	Maintain a watching brief on CCS projects in UK and Europe especially, but also globally. Continue engagement with relevant industry bodies including UKCCSRC Ongoing participation in industry and academic events relating to CCS.
3	**Opportunity of phasing of construction in line with output from emitters.**	The timing for the construction of carbon capture infrastructure at emitter sites is not known. Emitters within CO_2 clusters may develop carbon capture at different times. In order for the CO_2 supply chain to be complete, there is a need for (at least some) carbon capture	By considering options for matching the scale of CO_2 transport, processing and export facilities to the projected quantities of captured CO_2 that will be available over time, there is an opportunity to stage the development and investment in CPF	Reduced initial capital and operational costs. Improved business case during initial operational stages.	Engage with emitters in relation to their plans for carbon capture.

No.	Risk	Context	Cause / Effect	Consequence	Mitigation Measure / Action(s)
		facilities to be in place when the CO_2 gathering network, processing and export facilities to be in place.	infrastructure. While the CPF is designed to cater for the maximum output from specific emitters, some modular elements can be built later e.g. compressor trains and spheres.		
4	**Approval process for Dublin and Cork can be run in Parallel (Single team to make the planning/consents application).**	Use one team to prepare statutory planning permission and consents processes to ensure consistency across the applications. The development of applications for planning permission and other statutory consents is qualitative in nature. The full scope, content and focus of applications evolves during the course of a project.	A legal team will be engaged to review the applications as they are developing, with the intention of ensuring that perfect applications are made. There would be more work involved if separate teams were involved, also with the risk of potentially conflicting perspectives. Where a single team is involved, the risk of applications diverging or differing in content or quality is reduced or eliminated.	Reduced cost. There are likely to be programme advantages also.	Develop Preliminary Project Execution Plan. Review capacity within Ervia to manage these activities. Engage with the market to assess interest, capability and capacity of firms who can deliver these services.
5	**Construction of Cork and Dublin can be done simultaneously.**	By sequencing the works in each location, it will be possible to build both CPF facilities together. This can streamline the overall construction process. It is envisaged that the construction of one CPF will lead the other, but construction of both will be underway at the same time.	Sequencing the construction of both CPFs in parallel will facilitate maximising the value from available resources. It will also ensure that any lessons learned during the construction process on 'Site A' can be applied to 'Site B'. For example, by sequencing the works, pre-fabrication of major components for the CPF such as pipe racks can be done at one location.	There will be advantages in terms of greater construction efficiency, overall quality control and reduced cost.	Develop Preliminary Project Execution Plan. Engage with the market to determine capabilities and capacities of relevant contractors in Ireland, Europe and globally.

Appendix A
CPF Layouts

ITEM NO.	DESCRIPTION	SIZE (All sizing in metres U.N.O.)
	Temporary Pig Receiver	TBC
	Temporary Pig Receiver	TBC
V-1101	Inlet Gas Filter	TBC
E-1111	CO2 Chiller (L11.5m x W2.3m x H3.0m)	L 11.5 x W 2.3 x H 3.0
E-1121		
E-1131		
E-1141		
V-1112	Receiver	Inner Ø 2.8 x L 11.2 T/T
V-1122		
V-1132		
V-1142		
V-1111	Refrigeration Compressor Suction KOD	Inner Ø 2.1 x L 2.9 T/T
V-1121		
V-1131		
V-1141		

ITEM NO.	DESCRIPTION	SIZE (All sizing in metres U.N.O.)
X-1111 A/B	Refrigeration Compressor Package	L 12.2 x W 4.9
X-1121 A/B		
X-1131 A/B		
X-1141 A/B		
E-1112	Refrigeration Compressor Aftercooler	L 12.0 x W 7.0
E-1122		
E-1132		
E-1142		
V-1301	Refrigerant Storage Drum	Inner Ø 3.0 x L 12.5 T/T
P-1301	Refrigerant Storage Drum Pump	TBC
V-1201 A~D	CO2 Storage	Ø 25.2
P-1201 A/B/C	CO2 Export Pump (C future Export Pump)	TBC
P-1411 A/B	CO2 Sendout Pump	TBC
X-1411 A-D	Vaporiser Package	L 3.3 x W 2.7
X-1412	CO2 Metering Skid	TBC

ITEM NO.	DESCRIPTION	SIZE (All sizing in metres U.N.O.)
P-1412 A/B		TBC
P-1413 A/B	Sea Water Return Pump	TBC
X-1201 A/B	BOG Compressor Package	TBC
K-1501	Vent Stack -CO2	TBC
K-1502	Vent Stack - NH3	
Q-1601	Storm Water Retention Sump	L 40 x W 10 x D 2
P-1601	Storm Water Retention pump	TBC
T-1701	Utility Water Tank	Ø 4.5 x H 5.7
P-1701 A/B	Utility Water Tank Pump	TBC
T-1702	Potable Water Tank	Ø 3.0 x H 8.1
P-1702 A/B	Potable Water Tank Pump	TBC
T-1801	Fire Water Tank	Ø 9.0
P-1801 A/B	Jockey Fire Water Pump	TBC
P-1802	Electric Driven Fire Water Pump	TBC
X-1801	Diesel Driven Fire Water Pump Package	TBC

ITEM NO.	DESCRIPTION	SIZE (All sizing in metres U.N.O.)
X-1901 A/B	Air Compressor and Drier Package	Plot space L 14 x W 5200
V-1901	Instrument Air Receiver	Inner Ø 3.5 x H 12.0
X-1902	Nitrogen Cylinder Rack	TBC
X-1001 A/B	Emergency Generators	L 4.7 x W 1.8 x H 2.2

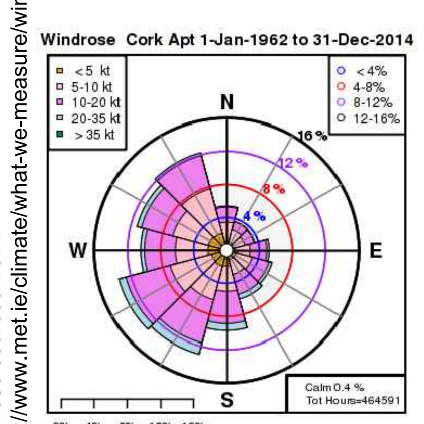
LEGEND

(light grey)	Roadway area
(dark grey)	Hardstanding area
(hatched)	Building / Equipment
(dotted)	Permeable area

LEGEND

LINE	COMPONENT	STATE
Blue	CO2	CO2 GAS
Red	CO2	CO2 LIQUID
Black	AMMONIA	
Black	AMMONIA	COLD
Green	AMMONIA	HOT
Cyan	COOLING WATER	COLD
Dark teal	COOLING WATER	HOT
Magenta	MV Cable	6.6kV

- - - - - Below Ground
——— Above Ground



Wind rose sourced from:
https://www.met.ie/climate/what-we-measure/wind

Client

ervia

European Commission

General Notes

(i) Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors from the use of these files, either by human error by the recipient, listing of the un-dimensioned measurements, compatibility with the recipients software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.

(ii) DO NOT SCALE, use figured dimensions only.

(iii) This drawing is the property of RPS, it is a project confidential classified document. It must not be copied used or its contents divulged without prior written consent. The needs and expectations of client and RPS must be considered when working with this drawing.

(iv) Information including topographical survey, geotechnical investigation and utility detail used in the design have been provided by others.

(v) All Levels refer to Ordnance Survey Datum, Malin Head.

Rev	Date	Drn / Chk	Amendment / Issue	App
P03	22/06/22	BC / CB	Issue for Pre-FEED	CB
P02	22/03/22	NL / CB	Issue for Review & Comment	CB
P01	25/01/22	NL / IV	Issue for Review & Comment	CB

rps BECHTEL

Model File Identifier

Scale N.T.S @ A1 @ A3

Created on 25/01/2022

Sheets 01 of 1

Project ERVIA CCS PRE-FEED STUDY

Title PRELIMINARY CPF PLOT PLAN LAYOUT CORK

File Identifier MDE1234-RPS-00-CX-DR-C-CA0001

Status S3

Rev P03

R:\MDE1234 - ERVIA CCS Study\8.0 Drawings\CA\MDE1234-RPS-03-CX-DR-C-CA0001.dwg

ITEM NO.	DESCRIPTION	SIZE (All sizing in metres U.N.O.)
	Pig Receiver	TBC
V-2101	Inlet Gas Filter	TBC
E-2111	CO2 Chiller	L 11.5 x W 2.3 x H 3.0
E-2121		
E-2131		
E-2141		
E-2151		
V-2112	Receiver	Inner Ø 2.8 x L 11.2 T/T
V-2122		
V-2132		
V-2142		
V-2152		
V-2111	Refrigeration Compressor Suction KOD	Inner Ø 2.1 x L 2.9 T/T
V-2121		
V-2131		
V-2141		
V-2151		

ITEM NO.	DESCRIPTION	SIZE (All sizing in metres U.N.O.)
X-2111 A/B	Refrigeration Compressor Package	L 12.2 x W 4.9
X-2121 A/B		
X-2131 A/B		
X-2141 A/B		
X-2151 A/B		
E-2112	Refrigeration Compressor Aftercooler	L 12.0 x W 7.0
E-2122		
E-2132		
E-2142		
E-2152		
V-2301	Refrigerant Storage Drum	Inner Ø 3.0 x L 12.5 T/T
P-2301	Refrigerant Storage Drum Pump	TBC
V-2201 A~D	CO2 Storage	Ø 26.0
X-2201 A/B	BOG Compressor Package	TBC
K-2501	Vent Stack - CO2	TBC
K-2502	Vent Stack - NH3	TBC
Q-2601	Storm Water Retention Sump	TBC
P-2601	Storm Water Retention pump	TBC
T-2701	Utility Water Tank	Ø 4.5 x H 5.7
P-2701 A/B	Utility Water Tank Pump	TBC

ITEM NO.	DESCRIPTION	SIZE (All sizing in metres U.N.O.)
T-2702	Potable Water Tank	Ø 3.0 x H 8.1
P-2702 A/B	Potable Water Tank Pump	TBC
T-2801	Fire Water Tank	Ø 9.0
P-2801 A/B	Jockey Fire Water Pump	TBC
P-2802	Electric Driven Fire Water Pump	TBC
X-2801	Diesel Driven Fire Water Pump Package	TBC
X-2901 A/B	Air Compressor and Drier Package	Plot space L 14 x W 5200
V-2901	Instrument Air Receiver	Inner Ø 3.5 x H 12.0
X-2902	Nitrogen Cylinder Rack	TBC
X-2001 A/B	Emergency Generators	L 4.7 x W 1.8 x H 2.2

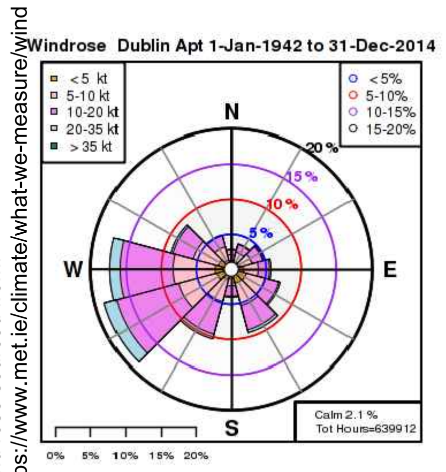
LEGEND

LINE	COMPONENT	STATE
(blue)	CO2	CO2 GAS
(red)	CO2	CO2 LIQUID
(black)	AMMONIA	
(black)	AMMONIA	COLD
(green)	AMMONIA	HOT
(magenta)	MV Cable	6.6kV

- - - - - Below Ground
——— Above Ground

LEGEND

	Roadway area
	Hardstanding area
	Building / Equipment
	Permeable area



Client

ervia

European Commission

General Notes
(i) Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors from the use of these files, either by human error by the recipient, listing of the un-dimensioned measurements, compatibility with the recipients software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.
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(v) All Levels refer to Ordnance Survey Datum, Malin Head.

Rev	Date	Drn	Chk	Amendment / Issue	App
P03	22/03/22	BC	CB	Issue for Pre-FEED	CB
P02	22/03/22	NL	CB	Issue for Review & Comment	CB
P01	25/01/22	NL	IV	Issue for Review & Comment	CB

rps
BECHTEL

Model File Identifier

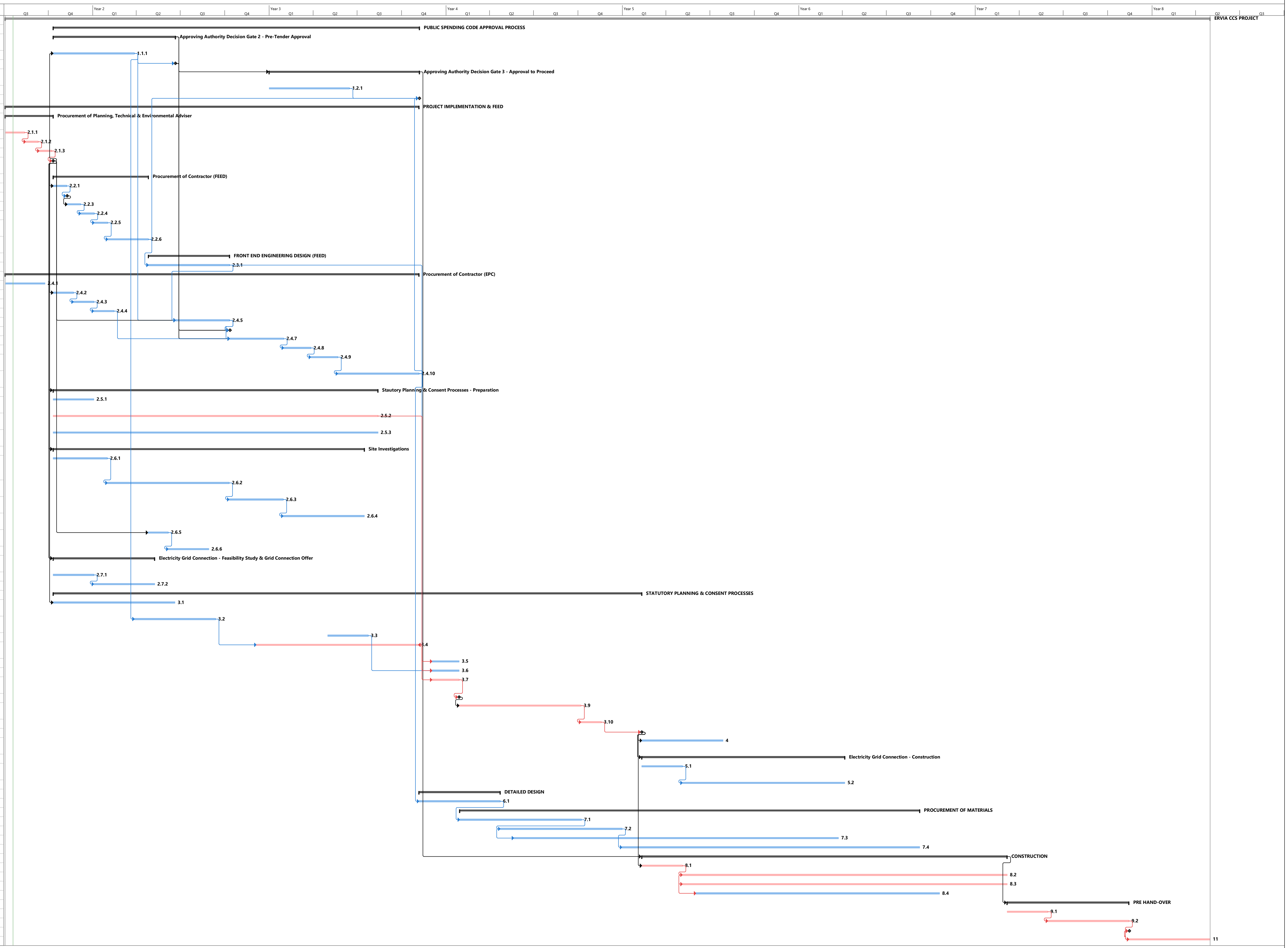
Scale N.T.S @ A1 @ A3
Created on 25/01/2022
Sheets 01 of 1

Project: ERVIA CCS PRE-FEED STUDY
Title: PRELIMINARY CPF PLOT PLAN LAYOUT DUBLIN

File Identifier: MDE1234-RPS-03-DX-DR-C-CA0001
Status: S3
Rev: P03

Appendix B
Project Execution Schedule

ID	Task Name	Duration
0	**ERVIA CCS PROJECT**	**1781 days**
1	**1 PUBLIC SPENDING CODE APPROVAL PROCESS**	**542 days**
2	**1.1 Approving Authority Decision Gate 2 - Pre-Tender Approval**	**181 days**
3	1.1.1 Detailed Project Brief and Procurement Strategy	6 mons
4	1.1.2 Gate 2 Pre Tender Approval	1 day
5	**1.2 Approving Authority Decision Gate 3 - Approval to Proceed**	**223 days**
6	1.2.1 Final Business Case	6 mons
7	1.2.2 Gate 3 Approval to Proceed	1 day
8	**2 PROJECT IMPLEMENTATION & FEED**	**612 days**
9	**2.1 Procurement of Planning, Technical & Environmental Adviser**	**71 days**
10	2.1.1 Tender Package	6 wks
11	2.1.2 Tender process (Tendering)	4 wks
12	2.1.3 Tender process (Tender Evaluation)	4 wks
13	2.1.4 Appoint Planning, Technical & Environmental Adviser	1 day
14	**2.2 Procurement of Contractor (FEED)**	**141 days**
15	2.2.1 Compile Tender Documents (Tender)	4 wks
16	2.2.2 Tender Issue	1 day
17	2.2.3 Tender process (Tendering)	4 wks
18	2.2.4 Tender process (Tender Evaluation)	4 wks
19	2.2.5 Ervia review and approval of recommended contractor(s)	4 wks
20	2.2.6 Public Spending Code Approval Process (Provisional Timeline Indicated)	3 mons
21	**2.3 FRONT END ENGINEERING DESIGN (FEED)**	**120 days**
22	2.3.1 Preliminary Design	24 wks
23	**2.4 Procurement of Contractor (EPC)**	**612 days**
24	2.4.1 Market Sounding & Engagement	12 wks
25	2.4.2 Compile Tender Documents (PQQ)	6 wks
26	2.4.3 Pre-Qualification Process	6 wks
27	2.4.4 Pre-Qualification Evaluation	6 wks
28	2.4.5 Compile Tender Documents (Tender)	16 wks
29	2.4.6 Tender Issue	1 day
30	2.4.7 Tender process (Tendering)	16 wks
31	2.4.8 Tender process (Tender Evaluation)	8 wks
32	2.4.9 Ervia review and approval of recommended contractor(s)	8 wks
33	2.4.10 Public Spending Code Approval Process (Provisional Timeline Indicated)	6 mons
34	**2.5 Stautory Planning & Consent Processes - Preparation**	**480 days**
35	2.5.1 Consultation with relevant landowners (CPF sites, Emitters)	12 wks
36	2.5.2 Scope & Initiate Long Term Environmental / Ecological Surveys	24 mons
37	2.5.3 Develop Stakeholder Management Plan & Public Consultation Process	24 mons
38	**2.6 Site Investigations**	**460 days**
39	2.6.1 Preparation of Documentation for Foreshore Licence Application (including AA Screening and potentially NIS)	4 mons
40	2.6.2 Foreshore Licence Application for Marine Site Investigations	9 mons
41	2.6.3 Procurement of Marine SI Contractor (PQQ & Tender Stages)	16 wks
42	2.6.4 Marine Site Investigations (Geophysical & Geotechnical)	6 mons
43	2.6.5 Procurement of Terrestrial SI Contractor (Geophysical & Geotechnical)	6 wks
44	2.6.6 Terrestrial Site Investigations	12 wks
45	**2.7 Electricity Grid Connection - Feasibility Study & Grid Connection Offer**	**150 days**
46	2.7.1 Application for Grid Connection Feasibility Study	12 wks
47	2.7.2 Request Grid Connection Offer from ESB Networks	18 wks
48	**3 STATUTORY PLANNING & CONSENT PROCESSES**	**870 days**
49	3.1 Engage with Statutory Bodies (ABP, CRU, MARA, EPA etc.)	9 mons
50	3.2 Environmental Screenings - AA, EIA (preparation of NIS if required)	6 mons
51	3.3 Submit Maritime Area Consent application to MARA	12 wks
52	3.4 Environmental Impact Assessment Report (EIAR) (including Scoping)	12 mons
53	3.5 Submit CRU consent	8 wks
54	3.6 Submit Foreshore Lease Application	8 wks
55	3.7 Submit Final PCI File & Final Planning Application to ABP	8 wks
56	3.8 Statutory Applications Submitted	0 days
57	3.9 Planning Process (Including Statutory Public Consultation Periods,	9 mons
58	3.10 Evaluation & Oral Hearing(s)	6 wks
59	3.11 Statutory Planning Consents in place	0 days
60	4 EPA Industrial Emissions Licence Review Process (with ESB)	6 mons
61	**5 Electricity Grid Connection - Construction**	**300 days**
62	5.1 Ervia review and approval of Grid Connection Offer	3 mons
63	5.2 Delivery of Grid Connection by ESB Networks	12 mons
64	**6 DETAILED DESIGN**	**120 days**
65	6.1 Detailed Design	6 mons
66	**7 PROCUREMENT OF MATERIALS**	**680 days**
67	7.1 Vendor packages	9 mons
68	7.2 Tendering Process	9 mons
69	7.3 Delivery of Long Lead Items	24 mons
70	7.4 Delivery of Other Items	22 mons
71	**8 CONSTRUCTION**	**540 days**
72	8.1 Mobilisation & Enabling Works	3 mons
73	8.2 Central Processing Facility (CPF)	24 mons
74	8.3 Jetty	24 mons
75	8.4 Pipeline	18 mons
76	**9 PRE HAND-OVER**	**180 days**
77	9.1 Pre-Commissioning	12 wks
78	9.2 Commissioning	24 wks
79	**10 START OF OPERATION**	**1 day**
80	**11 HAND-OVER**	**24 wks**



Ervia CCS Pre-FEED Study

Critical	Critical Progress	Split	Manual Task	Finish-only	Baseline	Baseline Milestone	Summary Progress	Manual Summary	External Tasks	Inactive Task	Inactive Summary
Critical Split	Task	Task Progress	Start-only	Duration-only	Baseline Split	Milestone	Summary	Project Summary	External Milestone	Inactive Milestone	Deadline

Appendix C
Document Register

Project Name: Ervia CCS Study

GNI/Ervia Tender Reference 19/038 - 001
RPS Project Number: MDE1234

Legend
Issued for Ervia Review
Final

Master Document Register

SHEET 1 of 3 - General (XX)

File Reference #REF!
File Location \\dubl-wp-f01\Work_Water\MDE1234 - ERVIA CCS Study\1.0 Submission\Appendix Q - Document Register
Date 25/02/2022

Document Type	Project Code	Originator	Element/ Volume	Level / Location Code	Type Code	Role Code	Classification	Number	Status Code	BIM No.	GNI No	Document Code	Number	Current Revision	Prelimin Design Doc. No.	Document Title	2D/3D Civil/Revit/Plant	Responsible	File Location	Issue Date	Comments
	General - Volume 00																				
Project Management	MDE1234	RPS	00	XX	QA	Z		0001		MDE1234-RPS-00-XX-QA-Z-0001				S1 P01		RPS Project Quality Plan				S0 P02: 27/06/2022	27/06/2022: Issued to Ervia
Action Tracker-RAD Log																MDE1234 Cork CCS Project Action RFI Decision Risk Log					
Risk & Opportunities Register	MDE1234	RPS	00	XX	RD	Z		RD0002		MDE1234-RPS-00-XX-RD-Z-RD0002				S3 P01		Risk & Opportunities Register				S3 P01: 30/06/2022	30/06/2022: Issued to Ervia for Pre-FEED
BIM	MDE1234	RPS	00	XX	RP	Z				MDE1234-RPS-00-XX-RP-Z-				P01.01 13/10/2021		BIM Execution Plan (BEP)				N/A	Not Issued to Ervia
Feedback Comments																N/A			See Cork Handover File	21/07/2022	Ervia Feedback and RPS responses are saved in a separate folder on the Cork handover file. Feedback is organised into relevant scope sub-folders
Minutes																N/A			See Cork Handover File	Various Dates	Meeting minutes saved in separate folder on Cork handover file
Weekly Reports																MDE1234 - Ervia CCS Pre-FEED Study - Weekly Report XX-XX_XX_202X				Weekly	Weekly Reports are saved in a separate folder in Cork handover file
Master Document Register	MDE1234	RPS	00	XX	RD	Z	RD	0001		MDE1234-RPS-00-XX-RD-Z-0001						Master Document Register			\\dubl-wp-f01\Work_Water\MDE1234 - ERVIA CCS Study\1.0 Submission\Appendix Q - Document Register	09/07/2021	Draft created for Tender.

Deliverables	**Deliverables**																				
	Element a)	**Volume 01 - Basis of Design and Philosophy Documents**																			

	Element b)	**Volume 02 - Combined Layout, Schedules, Models and Diagrams - General Site Layout, Flow Assurance and Asset Register**																			

	Element c)	**Volume 03 - Design Pack Development for Compression, Conditioning and Liquefaction**																			

	Element d)	**Volume 04 - Design Pack Development for the Pipeline to Jetty, Temporary Storage and Vessel Transport activities**																			

	Element e)	**Volume 05 - Development of the Safety Processes**																			

	Element f)	**Volume 06 - Commercial and Financial**																			

	Element g)	**Volume 07 - Final project report**																			
	MDE1234	RPS	07	XX	RP	Z		0003		MDE1234-RPS-07-XX-RP-Z-0003						Project HSSE plan				09/07/2021	Draft created for Tender.

Project Name: Ervia CCS Study

GNI/Ervia Tender Reference 19/038 - 001

RPS Project Number: MDE1234

Legend
Issued for Ervia Review
Final

Master Document Register

SHEET 2 of 3 - Cork (CX)

File Reference #REF!
File Location \\dubl-wp-f01\Work_Water\MDE1234 - ERVIA CCS Study\1.0 Submission\Appendix Q - Document Register
Date 25/02/2022

Document Type	Project Code	Originator	Element/ Volume	Level / Location Code	Type Code	Role Code	Classification	Number	Status Code	BIM No.	Current Revision	Document Title	Issue Date	Comments
	General - Volume 00													

	MDE1234	RPS	00	XX	RD	Z		RD0002	S0	MDE1234-RPS-00-XX-RD-Z-RD0002	S3 P01	Risk & Opportunities Register	S3 P01: 30/06/2022	30/06/2022: Issued to Ervia for Pre-FEED
Deliverables	**Deliverables**													
	Element a)	**Volume 01 - Basis of Design and Philosophy Documents**												
	MDE1234	RPS	01	CX	RP	Z		0001		MDE1234-RPS-01-CX-RP-Z-0001	S3 P03	Study Basis	S3 P01: 29/09/2021 S3 P02: 17/12/2021 S3 P03: 05/04/2022	29/09/2021: Issued to Ervia for Review and comment. 05/10/2021: Ervia review comments received. 17/12/2021: Issued for final approval. 05/04/2022: Issued for Pre-FEED
	MDE1234	RPS	01	CX	RP	Z		0002		MDE1234-RPS-01-CX-RP-Z-0002	S3 P01	FEED Basis of Design	S3 P01: 27/06/2022	27/06/2022: Issued for Pre-FEED 11/07/2022: No further comments
	MDE1234	RPS	01	CX	RP	Z		0003		MDE1234-RPS-01-CX-RP-Z-0003	S3 P04	Process and Utilities Design Philosophy	S3 P01: 05/11/2021 S3 P02: 20/12/2021 S3 P03: 19/01/2022 S3 P04: 23/03/2022 S3 P05: 08/04/2022	05/11/2021: Draft issued for Ervia review. 15/11/2021: Ervia feedback comments received. 20/12/2021: Issued for final approval. 22/12/2021: Ervia feedback re. misc. items & formatting. 19/01/2022: S3 P03 Issued 20/01/2022: No further comments. 23/03/2022: S3 P04 Issued for Pre-FEED 08/04/2022: S3 P05 Re-Issued for Pre-FEED
	MDE1234	RPS	01	CX	RP	Z		0004		MDE1234-RPS-01-CX-RP-Z-0004	S3 P02	Proces Control and Safeguarding Philosophy	S3 P01: 24/01/2022 S3 P01: 16/02/2022 S3 P02: 24/03/2022	24/01/2022: Issued to Ervia for Review and Comment 16/02/2022: Ervia feedback comments received. 24/03/2022: S3 P02 Issued for Pre-FEED
	MDE1234	RPS	01	CX	RP	Z		0005		MDE1234-RPS-01-CX-RP-Z-0005	S3 P02	Pipeline Design Philosophy	S3 P01: 02/03/2022 S3 P01: 30/03/2022 S3 P02: 22/04/2022	02/03/2022: S3 P01 issued for Ervia review 30/03/2022: Ervia feedback comments received 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	01	CX	RP	Z		0006		MDE1234-RPS-01-CX-RP-Z-0006	S3 P02	Material Selection Philosophy	S3 P01: 23/12/2021 S3 P02: 25/03/2022	23/12/2021: Issued to Ervia for Review and comment. 10/01/2022: No comments. 25/03/2022: S3 P02 Issued for Pre-FEED
	MDE1234	RPS	01	CX	RP	Z		0007		MDE1234-RPS-01-CX-RP-Z-0007		Flow Assurance Philosophy		Included in: MDE1234-RPS-02-CX-RP-Z-RP0002
	MDE1234	RPS	01	CX	RP	Z		0008		MDE1234-RPS-01-CX-RP-Z-0008	S3 P03	Marine Design Philosophy	S3 P01: 19/01/2022 S3 P01: 21/01/2022 S3 P02: 18/02/2022 S3 P02: 24/02/2022 S3 P03: 21/03/2022	19/01/2022: Issued to Ervia for Review and Comment 21/01/2022: Ervia feedback comments received 18/02/2022: S3 P02 Issued 24/02/2022: Ervia feedback comments received 22/03/2022: S3 P03 Issued for Pre-FEED
	MDE1234	RPS	01	CX	RP	Z		0009		MDE1234-RPS-01-CX-RP-Z-0009	S3 P02	Health, Safety, Security and Environmental Philosophy	S3 P01: 07/06/2022 S3 P02: 21/06/2022	07/06/2022: Issued to Ervia for Review and Comment 21/06/2022: Issued for Pre-FEED
	MDE1234	RPS	01	CX	RP	Z		0010		MDE1234-RPS-01-CX-RP-Z-0010	S3 P03	Operations and Maintenance Philosophy	S3 P01: 17/02/2022 S3 P02: 25/03/2022 S3 P03: 24/05/2022	17/02/2022: Issued to Ervia for Review and comment. 25/03/2022: S3 P02 Issued for Ervia Review 24/05/2022: Issued for Pre-FEED
	MDE1234	RPS	01	CX	RP	Z		0011		MDE1234-RPS-01-CX-RP-Z-0011	S3 P02	Process Safety Design Basis	S3 P01: 04/02/2022 S3 P01: 16/02/2022 S3 P02: 13/05/2022 S3 P03: 03/06/2022	04/02/2022: Issued to Ervia for Review and Comment 16/02/2022: Ervia feedback comments received. 13/05/2022: S3 P02 Issued for Pre-FEED 03/06/2022: S3 P03 Issued foe Pre-FEED
	MDE1234	RPS	01	CX	RP	Z		0012		MDE1234-RPS-01-CX-RP-Z-0012	S3 P02	Power Generation and Electrical Systems Philosophy	S3 P01: 12/04/2022 S3 P01: 28/04/2022 S3 P02: 11/05/2022	12/04/2022: Issued to Ervia for Review and Comment 28/04/2022: Ervia feedback comments recieved 11/05/2022: S3 P02 Issued for Pre-FEED
	MDE1234	RPS	01	CX	RP	Z		00013		MDE1234-RPS-01-CX-RP-Z-00013	S3 P02	Communications & Control Philosophy	S3 P01: 02/02/2022 S3 P01.1: 04/03/2022 S3 P01.1: 25/03/2022 S3 P02: 08/04/2022	02/02/2022 Issued to Ervia for Information. 04/02/2022: S3 P01.1 Issued 25/02/2022: Ervia Feedback comments received 08/04/2022: S3 P02 Issued for Pre-FEED
	MDE1234	RPS	01	CX	RP	Z		0014		MDE1234-RPS-01-CX-RP-Z-0014	S3 P02	Stakeholder Management Philosophy	S3 P01: 19/11/2021 S3 P02: 01/04/2022	19/11/2021: Issued to Ervia for Review and comment. 01/04/2022: S3 P02 Issued for Pre-FEED
	MDE1234	RPS	01	CX	RP	Z		0015		MDE1234-RPS-01-CX-RP-Z-0015	S3 P03	Legislative Approvals Philosophy	S3 P01: 24/12/2021 S3 P01: 05/01/2022 S3 P02: 01/04/2022 S3 P03: 27/05/2022	24/12/2021: Issued to Ervia for Review and comment. 05/01/2022: Ervia feedback comments received. 01/04/2022: S3 P02 Issued for Pre-FEED 27/05/2022: S3 P03 Issued for Pre-FEED
	MDE1234	RPS	01	CX	RP	Z		0016		MDE1234-RPS-01-CX-RP-Z-0016	S3 P03	RAM (Reliability, Availability, Maintainability) Study	S3 P01: 25/02/2022 S3 P02: 22/04/2022 S3 P03: 10/06/2022	25/02/2022: Issued to Ervia for review and comment. 22/04/2022: Issued to Ervia for Pre-FEED 10/06/2022: Issued for Pre-FEED
	MDE1234	RPS	01	CX	RP	Z		0017		MDE1234-RPS-01-CX-RP-Z-0017		Liquefied Carbon Storage Philosophy		Included in: MDE1234-RPS-04-CX-RP-Z-RP0005
	MDE1234	RPS	01	CX	RP	Z		0018		MDE1234-RPS-01-CX-RP-Z-0018	S3 P02	Project Execution Plan	S3 P01: 18/05/2022 S3 P02: 30/06/2022	18/05/2022: Issued to Ervia for Review and Comment 23/06/2022: No further comments 30/06/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	01	CX	RP	Z		0019		MDE1234-RPS-01-CX-RP-Z-0019	S3 P02	CPF Layout Philosophy	S3 P01: 27/01/2022 S3 P01: 07/02/2022 S3 P02: 24/03/2022 S3 P02: 08/04/2022 S3 P03: 22/06/2022	27/01/2022: Issued to Ervia for Review and comment. 07/02/2022: Ervia Feedback comments received 24/03/2022: S3 P02 Issued for Pre-FEED 08/04/2022: Ervia feedback comments received 22/06/2022: S3 P03 Issued for Pre-FEED
	MDE1234	RPS	01	CX	CA	Z		0001		MDE1234-RPS-01-CX-CA-Z-0001	S0 P06	Building Proximity Distance	S0 P06	Dated 07/04/2022 Issued with final document package
	Element b)	**Volume 02 - Combined Layout, Schedules, Models and Diagrams - General Site Layout, Flow Assurance and Asset Register**												
												Constraints Mapping (GIS) :		
	MDE1234	RPS	02	CX	DR	Z	AG	0100		MDE1234-RPS-02-CX-DR-Z-AG0100	S3 P01	Gas Transmission and Electricity Networks Cork	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z	AG	0101		MDE1234-RPS-02-CX-DR-Z-AG0101	S3 P01	Environmentally Designated Areas Cork	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z	AG	0102		MDE1234-RPS-02-CX-DR-Z-AG0102	S3 P01	Ground Conditions Bedrock Cork	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z	AG	0103		MDE1234-RPS-02-CX-DR-Z-AG0103	S3 P01	Groundwater Aquifire Vulnerability Cork	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z	AG	0104		MDE1234-RPS-02-CX-DR-Z-AG0104	S3 P01	Ground Conditions Soils Cork	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z	AG	0105		MDE1234-RPS-02-CX-DR-Z-AG0105	S3 P01	Flood Zones and Waterbodies Cork	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z	AG	0106		MDE1234-RPS-02-CX-DR-Z-AG0106	S3 P01	Development Planning Cork	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z	AG	0107		MDE1234-RPS-02-CX-DR-Z-AG0107	S3 P01	Road Network Cork	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z	AG	0108		MDE1234-RPS-02-CX-DR-Z-AG0108	S3 P01	Aerial Photography Cork	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z	AG	0109		MDE1234-RPS-02-CX-DR-Z-AG0109	S3 P01	OS Map Cork	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z	AG	0110		MDE1234-RPS-02-CX-DR-Z-AG0110		Not used		
	MDE1234	RPS	02	CX	DR	Z	AG	0111		MDE1234-RPS-02-CX-DR-Z-AG0111		Not used		
	MDE1234	RPS	02	CX	DR	Z	AG	0112		MDE1234-RPS-02-CX-DR-Z-AG0112	S3 P01	Proposed Routes OS Map Cork	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
												Field Architecture Mapping (GIS) :		
	MDE1234	RPS	02	CX	DR	Z		0000		MDE1234-RPS-02-CX-DR-Z-0000	S3 P01	CO2 Gathering Network Field Architecture Maps (GIS) Key Map - Cork	S1 P01: 27/01/2022 S3 P01: 22/04/2022	27/01/2022: S1 P01 issued to Ervia for review. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z		0001- Sheet 1 of 8		MDE1234-RPS-02-CX-DR-Z-0001- Sheet 1 of 8	S3 P01	CO2 Gathering Network Field Architecture Maps (GIS)	S1 P01: 27/01/2022 S3 P01: 22/04/2022	27/01/2022: S1 P01 issued to Ervia for review. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z		0002- Sheet 2 of 8		MDE1234-RPS-02-CX-DR-Z-0002- Sheet 2 of 8	S3 P01	CO2 Gathering Network Field Architecture Maps (GIS)	S1 P01: 27/01/2022 S3 P01: 22/04/2022	27/01/2022: S1 P01 issued to Ervia for review. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z		0003- Sheet 3 of 8		MDE1234-RPS-02-CX-DR-Z-0003- Sheet 3 of 8	S3 P01	CO2 Gathering Network Field Architecture Maps (GIS)	S1 P01: 27/01/2022 S3 P01: 22/04/2022	27/01/2022: S1 P01 issued to Ervia for review. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z		0004- Sheet 4 of 8		MDE1234-RPS-02-CX-DR-Z-0004- Sheet 4 of 8	S3 P01	CO2 Gathering Network Field Architecture Maps (GIS)	S1 P01: 27/01/2022 S3 P01: 22/04/2022	27/01/2022: S1 P01 issued to Ervia for review. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z		0005- Sheet 5 of 8		MDE1234-RPS-02-CX-DR-Z-0005- Sheet 5 of 8	S3 P01	CO2 Gathering Network Field Architecture Maps (GIS)	S1 P01: 27/01/2022 S3 P01: 22/04/2022	27/01/2022: S1 P01 issued to Ervia for review. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z		0006- Sheet 6 of 8		MDE1234-RPS-02-CX-DR-Z-0006- Sheet 6 of 8	S3 P01	CO2 Gathering Network Field Architecture Maps (GIS)	S1 P01: 27/01/2022 S3 P01: 22/04/2022	27/01/2022: S1 P01 issued to Ervia for review. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z		0007- Sheet 7 of 8		MDE1234-RPS-02-CX-DR-Z-0007- Sheet 7 of 8	S3 P01	CO2 Gathering Network Field Architecture Maps (GIS)	S1 P01: 27/01/2022 S3 P01: 22/04/2022	27/01/2022: S1 P01 issued to Ervia for review. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z		0008- Sheet 8 of 8		MDE1234-RPS-02-CX-DR-Z-0008- Sheet 8 of 8	S3 P01	CO2 Gathering Network Field Architecture Maps (GIS)	S1 P01: 27/01/2022 S3 P01: 22/04/2022	27/01/2022: S1 P01 issued to Ervia for review. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	CX	DR	Z		0003		MDE1234-RPS-02-CX-DR-Z-0003		CO2 Gathering Network Model		Included in : MDE1234-RPS-02-CX-RP-Z-RP0001
	MDE1234	RPS	02	CX	RP	Z	RP	0001		MDE1234-RPS-02-CX-RP-Z-RP0001	S3 P01	CO2 Gathering Network Flow Assurance and Hydraulic Analyses	S3 P01: 06/05/2022	06/05/2022: Issued for Pre-FEED
	MDE1234	RPS	02	CX	RP	Z	RP	0002		MDE1234-RPS-02-CX-RP-Z-RP0002	S3 P02	CO2 Gathering Network Safety Separation Study report	S3 P01: 02/03/2022 S3 P02: 21/04/2022	02/03/2022: S3 P01 issued for Ervia review 21/04/2022: Issued for Pre-FEED
	MDE1234	RPS	02	CX	CA	M	CA	0001		MDE1234-RPS-02-CX-CA-M-CA0001	S0 P02	Pipeline Wall Thickness Calculation	S0 P02	Dated 23/02/2022 Issued with final document package
	MDE1234	RPS	02	CX	CA	M	CA	0002		MDE1234-RPS-02-CX-CA-M-CA0002	S0 P02	CO_2 Pipeline Inventory Calculation	S0 P02	Dated 24/02/2022 Issued with final document package
	Element c)	**Volume 03 - Design Pack Development for Compression, Conditioning and Liquefaction**												
	~~MDE1234~~	~~BEC~~	~~03~~	~~CX~~	~~RP~~	~~Z~~	~~RP~~	~~0001~~		~~MDE1234-BEC-03-CX-RP-Z-RP0001~~		~~Overall carbon footprint assessment for operational phase~~		Document number changed to MDE1234-BEC-03-CX-CA-Z-CA0014
	MDE1234	BEC	03	CX	RP	Z	RP	0002		MDE1234-BEC-03-CX-RP-Z-RP0002	S3 P02	Preliminary Civil, Structural & Buildings Design	S3 P01: 23/03/2022 S3 P02: 05/05/2022	23/03/2022: Issued to Ervia for review and comment. 05/05/2022: Issued for Pre-FEED 30/05/2022: No further comments
	MDE1234	BEC	03	CX	RP	Z	RP	0003		MDE1234-BEC-03-CX-RP-Z-RP0003	S3 P02	Ammonia Refrigeration Compressors Selection	S3 P01: 08/04/2022 S3 P02: 22/04/2022	08/04/2022: Issued to Ervia for review and comment 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	BEC	03	CX	CA	Z	CA	0001		MDE1234-BEC-03-CX-CA-Z-CA0001	S3 P02	Process Simulation Model	S3 P01: 01/12/2021 S3 P02: 24/12/2021	01/12/2021 Issued to Ervia for review and comment. 24/12/2021: Issued to Ervia for Information.
	MDE1234	BEC	03	CX	CA	Z	CA	0002		MDE1234-BEC-03-CX-CA-Z-CA0002	S3 P03	Heat and Material Balance for CCS Liquefaction & Regasification Facility	S3 P01: 18/11/2021 S3 P02: 17/12/2021 S3 P03: 25/02/2022	18/11/2021 Issued to Ervia for review and comment. 17/12/2021 Re-issued to Ervia for information. 25/02/2022 S3 P03 Issued
	MDE1234	BEC	03	CX	CA	Z	CA	0003		MDE1234-BEC-03-CX-CA-Z-CA0003	S3 P02	Utility Summary	S3 P01: 17/12/2021 S3 P02: 17/02/2022 S3 P02: 07/03/2022	17/12/2021 Issued to Ervia for Information. 17/02/2022: Issued to Ervia for Information 07/03/2022: Ervia Feedback comments recieved
	~~MDE1234~~	~~RPS~~	~~03~~	~~CX~~	~~CA~~	~~Z~~	~~CA~~	~~0004~~		~~MDE1234-RPS-03-CX-CA-Z-CA0004~~		Preliminary flare/vent sizing, including relief and blowdown scenarios		Covered in: MDE1234-BEC-03-CX-CA-Z-CA0006
	MDE1234	BEC	03	CX	CA	Z	CA	0005		MDE1234-BEC-03-CX-CA-Z-CA0005	S3 P01	Embodied carbon assessment for construction phase	S3 P01: 24/06/2022	24/06/2022: Issued to Ervia for Pre-FEED
	MDE1234	BEC	03	CX	CA	Z	CA	0006		MDE1234-BEC-03-CX-CA-Z-CA0006	S3 P03	Relief Load Summary	S3 P01: 02/02/2022 S3 P02: 16/03/2022 S3 P03: 19/04/2022	02/02/2022 Issued to Ervia for Information. 16/03/2022: Issue for Pre-FEED. 19/04/2022: Re- Issued for Pre-FEED 18/05/2022: No further Comments
	MDE1234	BEC	03	CX	CA	Z	CA	0007		MDE1234-BEC-03-CX-CA-Z-CA0007	S3 P01	Refrigerant Suction KO Drum Calculation	S3 P01: 15/02/2022	15/02/2022 Issued to Ervia for Information. 08/03/2022: No further Comments
	MDE1234	BEC	03	CX	CA	Z	CA	0008		MDE1234-BEC-03-CX-CA-Z-CA0008	S3 P02	Receiver Calculation	S3 P01: 15/02/2022 S3 P02: 21/02/2022	15/02/2022 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 08/03/2022: No further Comments
	MDE1234	BEC	03	CX	CA	Z	CA	0009		MDE1234-BEC-03-CX-CA-Z-CA0009	S3 P02	Refrigerant Storage Drum Calculation	S3 P01: 15/02/2022 S3 P02: 21/02/2022	15/02/2022 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 08/03/2022: No further Comments
	MDE1234	BEC	03	CX	CA	Z	CA	0010		MDE1234-BEC-03-CX-CA-Z-CA0010	S0 P01	Surface Water Management	S0 P01	Dated 11/02/2022 Issued with final document package
	MDE1234	BEC	03	CX	CA	Z	CA	0011		MDE1234-BEC-03-CX-CA-Z-CA0011	S3 P01	Instrument Air Receiver Calculation	S3 P01: 15/02/2022	15/02/2022 Issued to Ervia for Information. 08/03/2022: No further Comments
	MDE1234	BEC	03	CX	CA	Z	CA	0012		MDE1234-BEC-03-CX-CA-Z-CA0012	S1 P02	PDP Piping Quantities	S1 P02	Dated 24/04/2022 Document issued for information
	MDE1234	BEC	03	CX	CA	Z	CA	0014		MDE1234-BEC-03-CX-CA-Z-CA0014	S3 P02	Overall carbon footprint assessment for operational phase	S3 P01: 24/06/2022 S3 P02: 15/07/2022	24/06/2022: Issued to Ervia for Pre-FEED 27/06/2022: Ervia feedback comment received 15/07/2022: S3 P02 re-issued for Pre-FEED.

MDE1234	BEC	03	CX	SH	Z	SH	0002		MDE1234-BEC-03-CX-SH-Z-SH0002	S3 P03	Main Equipment List (MEL)	S3 P01: 02/02/2022 S3 P02: 16/02/2022 S3 P03: 05/04/2022	02/02/2022 Issued to Ervia for Information. 16/03/2022: S3 P02 Issued 05/04/2022: Issued for Pre-FEED 12/05/2022: No further comments
MDE1234	BEC	03	CX	SH	Z	SH	0003		MDE1234-BEC-03-CX-SH-Z-SH0003	S3 P02	Electrical load list	S3 P01: 16/02/2022 S3 P01: 22/02/2022 S3 P02: 22/06/2022	16/02/2022 Issued to Ervia for Information. 22/02/2022 Ervia feedback comments received 22/06/2022: Issued for Pre-FEED
MDE1234	BEC	03	CX	SH	Z	SH	0004		MDE1234-BEC-03-CX-SH-Z-SH0004	S3 P02	Preliminary I/O count	S3 P02: 25/04/2022	25/04/2022: Issued for Pre-FEED 30/05/2022: No further comments
MDE1234	RPS	03	CX	SH	Z	SH	0005		MDE1234-RPS-03-CX-SH-Z-SH0005		Preliminary Civils materials take-offs		Included in MDE1234-RPS-03-CX-RP-Z-0002
MDE1234	RPS	03	CX	SP	Z	SP	0001-V1101		MDE1234-RPS-03-CX-SP-Z-SP0001-V1101	S3 P02	Process Engineering Equipment Datasheet - Inlet Gas Filter - V1101	S3 P01: 17/12/2021 S3 P02: 21/02/2022	17/12/2021 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 09/03/2022: No Further Comments
MDE1234	RPS	03	CX	SP	Z	SP	0002-E1111		MDE1234-RPS-03-CX-SP-Z-SP0002-E1111	S3 P02	Process Engineering Equipment Datasheet - CO2 Chiller - E1111 / E1121 / E1131 / E1141	S3 P01: 17/12/2021 S3 P02: 21/02/2022	17/12/2021 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 09/03/2022: No further Comments
MDE1234	RPS	03	CX	SP	Z	SP	0003-V1111		MDE1234-RPS-03-CX-SP-Z-SP0003-V1111	S3 P02	Process Engineering Equipment Datasheet - Refrigerant Compressor Suction KOD - V1111 / V1121 / V1131 / V1141	S3 P01: 17/12/2021 S3 P02: 21/02/2022 S3 P02: 08/02/2022	17/12/2021 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 08/03/2022: No further comment
MDE1234	RPS	03	CX	SP	Z	SP	0004-X1111		MDE1234-RPS-03-CX-SP-Z-SP0004-X1111	S3 P02	Process Engineering Equipment Package Datasheet - Refrigerant Compressor Package - X1111 A/B / X1121 A/B / X1131 A/B / X1141 A/B	S3 P01: 17/12/2021 S3 P02: 21/02/2022	17/12/2021 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 09/03/2022: No Further Comments
MDE1234	RPS	03	CX	SP	Z	SP	0005-E1112		MDE1234-RPS-03-CX-SP-Z-SP0005-E1112	S3 P02	Process Engineering Equipment Datasheet - Refrigeration Compressor Aftercooler - E1112 / E1122 / E1132 / E1142	S3 P01: 17/12/2021 S3 P02: 21/02/2022	17/12/2021 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 09/03/2022: No Further Comments
MDE1234	RPS	03	CX	SP	Z	SP	0006-V1112		MDE1234-RPS-03-CX-SP-Z-SP0006-V1112	S3 P03	Process Engineering Equipment Datasheet - Receiver - V1112 / V1122 / V1132 / V1142	S3 P01: 17/12/2021 S3 P02: 21/02/2022 S3 P03: 11/03/2022	17/12/2021 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 11/03/2022:S3 P03 Issued 06/04/2022: No Further Comments
MDE1234	RPS	03	CX	SP	Z	SP	0007-V1301		MDE1234-RPS-03-CX-SP-Z-SP0007-V1301	S3 P03	Process Engineering Equipment Datasheet - Refrigerant Storage Drum - V1301	S3 P01: 17/12/2021 S3 P02: 21/02/2022 S3 P03: 11/03/2022	17/12/2021 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 11/03/2022:S3 P03 Issued 06/04/2022: No Further Comments
MDE1234	RPS	03	CX	SP	Z	SP	0008-X1411		MDE1234-RPS-03-CX-SP-Z-SP0008-X1411	S3 P04	Process Engineering Equipment Datasheet - Vaporiser Package - X1411	S3 P01: 17/12/2021 S3 P02: 24/01/2022 S3 P03: 11/03/2022 S3 P04: 04/04/2022	17/12/2021 Issued to Ervia for Information. 24/01/2022: Updated and reissued for information 11/03/2022: S3 P03 Issued 04/04/2022: S3 P04 Issued 06/04/2022: No further Comments
MDE1234	RPS	03	CX	SP	Z	SP	0009-X1901		MDE1234-RPS-03-CX-SP-Z-SP0009-X1901	S3 P02	Process Engineering Equipment Package Datasheet - Air Compressor and Drier Package - X1901 A/B	S3 P01: 17/12/2021 S3 P02: 21/02/2022	17/12/2021 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 09/03/2022: No Further Comments
MDE1234	RPS	03	CX	SP	Z	SP	0010-X1902		MDE1234-RPS-03-CX-SP-Z-SP0010-X1902	S3 P02	Process Engineering Equipment Datasheet - Nitrogen Cylinder Rack - X1902	S3 P01: 17/12/2021 S3 P02: 21/02/2022	17/12/2021 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 09/03/2022: No Further Comments
MDE1234	RPS	03	CX	SP	Z	SP	0012-K1501		MDE1234-RPS-03-CX-SP-Z-SP0012-K1501	S3 P02	CO2 Vent Stack	S3 P01: 27/01/2022	27/01/2022 Issued to Ervia for Information. 17/05/2022: No further comments
MDE1234	RPS	03	CX	SP	Z	SP	0013-IA Rec		MDE1234-RPS-03-CX-SP-Z-SP0013-IA Rec	S3 P02	Process Engineering Equipment Datasheet - Instrument Air Receiver - V1901	S3 P01: 17/12/2021 S3 P02: 21/02/2022 S3 P02: 08/02/2022	17/12/2021 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 08/03/2022: No further comment
MDE1234	RPS	03	CX	SP	Z	SP	0014-Ut Wt Tnk		MDE1234-RPS-03-CX-SP-Z-SP0014-Ut Wt Tnk	S3 P02	Process Engineering Equipment Datasheet - Utility Water Tank - T1701	S3 P01: 17/12/2021 S3 P02: 21/02/2022	17/12/2021 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 09/03/2022: No Further Comments
MDE1234	RPS	03	CX	SP	Z	SP	0015-Pot Wt Tnk		MDE1234-RPS-03-CX-SP-Z-SP0015-Pot Wt Tnk	S3 P02	Process Engineering Equipment Datasheet - Potable Water Tank - T1702	S3 P01: 17/12/2021 S3 P02: 21/02/2022	17/12/2021 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 09/03/2022: No Further Comments
MDE1234	BEC	03	CX	SP	Z	SP	0011		MDE1234-BEC-03-CX-SP-Z-SP0011	S3 P01	Process Engineering Equipment Datasheet- Pump	S3 P01: 28/01/2022	28/01/2021 Issued to Ervia for Information. 09/03/2022: No Further Comments
MDE1234	BEC	03	CX	SP	Z	SP	0012		MDE1234-BEC-03-CX-SP-Z-SP0012	S3 P03	Process Engineering Equipment Datasheet- CO2 Vent Stack	S3 P01: 27/01/2022 S3 P03: 21/02/2022 S3 P03: 04/04/2022	28/01/2021 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 04/04/2022: S3 P03 Issued 17/05/2022: No further Comments
MDE1234	BEC	03	CX	SP	Z	SP	0018		MDE1234-BEC-03-CX-SP-Z-SP0018	S3 P01	Process Engineering Equipment Datasheet- Ammonia Vent Stack	S3 P01: 04/04/2022	04/04/2022: Issued to Ervia for Information 17/05/2022: No further Comments
MDE1234	BEC	03	CX	SP	Z	SP	0016-T1801		MDE1234-BEC-03-CX-SP-Z-SP0016-T1801	S3 P02	Process Engineering Equipment Datasheet- Fire Water Tank	S3 P01: 02/02/2022 S3 P02: 21/02/2022	02/02/2022 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 09/03/2022: No Further Comments
MDE1234	BEC	03	CX	SP	Z	SP	0017- X-1412		MDE1234-BEC-03-CX-SP-Z-SP0017- X-1412	S3 P02	Process Engineering Equipment datasheet - C02 Metering Skid	S3 P01: 10/02/2022 S3 P02: 21/02/2022	10/02/2022 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 09/03/2022: No Further Comments
MDE1234	BEC	03	CX	DR	M	PSFD	0001		MDE1234-BEC-03-CX-DR-M-PSFD0001	S3 P03	Process Safeguarding Flow Diagrams- Central Processing Facility Refrigeration System	S3 P01: 24/01/2022 S3 P01: 17/02/2022 S3 P02: 11/03/2022 S3 P03:25/03/2022	24/01/2022 Issued to Ervia for Information. 17/02/2022: Ervia feedback comment received 11/03/2022: S3 P02 Issued 25/03/2022: S3 P03 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PSFD	0002		MDE1234-BEC-03-CX-DR-M-PSFD0002	S3 P03	Process Safeguarding Flow Diagrams- Central Processing Facility Refrigerant Storage System	S3 P01: 24/01/2022 S3 P01: 17/02/2022 S3 P02: 11/03/2022 S3 P03:25/03/2022	24/01/2022 Issued to Ervia for Information. 17/02/2022: Ervia feedback comment received 11/03/2022: S3 P02 Issued 25/03/2022: S3 P03 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PSFD	0003		MDE1234-BEC-03-CX-DR-M-PSFD0003	S3 P02	Process Safeguarding Flow Diagrams- Central Processing Facility Regasification	S3 P01: 24/01/2022 S3 P01: 17/02/2022 S3 P02: 11/03/2022	24/01/2022 Issued to Ervia for Information. 17/02/2022: Ervia feedback comment received 11/03/2022: S3 P02 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PFD	0000		MDE1234-BEC-03-CX-DR-M-PFD0000	S3 P03	Process Flow Diagrams - Legend & Symbols Sheet	S3 P01: 17/11/2021 S3 P02: 24/12/2021 S3 P03: 10/03/2022	17/11/2021 Issued to Ervia for review and comment. 24/11/2021- Ervia feedback comments received 24/12/2021: S3 P02 issued. 10/03/2022: S3 P03 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PFD	0001		MDE1234-BEC-03-CX-DR-M-PFD0001	S3 P05	Process Flow Diagrams - Refrigeration / Liquefaction	S3 P01: 17/11/2021 S3 P02: 24/12/2021 S3 P03: 24/01/2022 S3 P04: 10/03/2022 S3 P05: 25/03/2022	17/11/2021: Issued to Ervia for review and comment. 24/11/2021: Ervia feedback comments received 24/12/2021: S3 P02 issued. 24/01/2022: S3 P03 Issued 10/03/2022: S3 P04 Issued 25/03/2022: S3 P05 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PFD	0002		MDE1234-BEC-03-CX-DR-M-PFD0002	S3 P05	Process Flow Diagrams - Refrigerant Storage System	S3 P01: 17/11/2021 S3 P02: 24/12/2021 S3 P03: 24/01/2022 S3 P04: 10/03/2022 S3 P05: 25/03/2022	17/11/2021: Issued to Ervia for review and comment. 24/11/2021: Ervia feedback comments received 24/12/2021: S3 P02 issued. 24/01/2022: S3 P03 Issued 10/03/2022: S3 P04 Issued 25/03/2022: S3 P05 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PFD	0003		MDE1234-BEC-03-CX-DR-M-PFD0003	S3 P04	Process Flow Diagrams - Regasification	S3 P01: 17/11/2021 S3 P02: 24/12/2021 S3 P03: 24/01/2022 S3 P04: 10/03/2022	17/11/2021: Issued to Ervia for review and comment. 24/11/2021: Ervia feedback comments received 24/12/2021: S3 P02 issued. 24/01/2022: S3 P03 Issued 10/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PFD	0004		MDE1234-BEC-03-CX-DR-M-PFD0004	S3 P04	Process Flow Diagrams - CO2 Collection Pipeline Network	S3 P01: 17/11/2021 S3 P02: 24/12/2021 S3 P03: 24/01/2022 S3 P04: 10/03/2022	17/11/2021: Issued to Ervia for review and comment. 24/11/2021: Ervia feedback comments received 24/12/2021: S3 P02 issued. 24/01/2022: S3 P03 Issued 10/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PFD	0005		MDE1234-BEC-03-CX-DR-M-PFD0005	S3 P04	Process Flow Diagrams - CO2 Export Pipeline	S3 P01: 17/11/2021 S3 P02: 24/12/2021 S3 P03: 24/01/2022 S3 P04: 10/03/2022	17/11/2021: Issued to Ervia for review and comment. 24/11/2021: Ervia feedback comments received 24/12/2021: S3 P02 issued. 24/01/2022: S3 P03 Issued 10/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	UFD	0001		MDE1234-BEC-03-CX-DR-M-UFD0001	S3 P03	Utility Flow Diagrams - Instrument Air & Nitrogen	S3 P01: 17/11/2021 S3 P02: 24/01/2022 S3 P03: 11/02/2022	17/11/2021 Issued to Ervia for review and comment. 24/11/2021- Ervia feedback comments received 24/01/2022: S3 P02 Issued 11/02/22: S3 P03 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	UFD	0002		MDE1234-BEC-03-CX-DR-M-UFD0002	S3 P04	Utility Flow Diagrams - Storm Water Drain	S3 P01: 17/11/2021 S3 P02: 24/01/2022 S3 P03: 11/02/2022 S3 P04: 10/03/2022	17/11/2021 Issued to Ervia for review and comment. 24/11/2021- Ervia feedback comments received 24/01/2022: S3 P02 Issued 11/02/22: S3 P03 Issued 10/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	UFD	0003		MDE1234-BEC-03-CX-DR-M-UFD0003	S3 P03	Utility Flow Diagrams - Potable & Utility Water	S3 P01: 17/11/2021 S3 P02: 24/01/2022 S3 P03: 11/02/2022	17/11/2021 Issued to Ervia for review and comment. 24/11/2021- Ervia feedback comments received 24/01/2022: S3 P02 Issued 11/02/22: S3 P03 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	UFD	0004		MDE1234-BEC-03-CX-DR-M-UFD0004	S3 P02	Utility Flow Diagrams - Fire Water Pumps & Tanks	S3 P01: 17/11/2021 S3 P02: 24/01/2022	17/11/2021 Issued to Ervia for review and comment. 24/11/2021- Ervia feedback comments received 24/01/2022: S3 P02 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	UFD	0005		MDE1234-BEC-03-CX-DR-M-UFD0005	S3 P04	Utility Flow Diagrams - Vent Stack & Header	S3 P01: 17/11/2021 S3 P02: 24/01/2022 S3 P03: 11/02/2022 S3 P04: 10/03/2022	17/11/2021 Issued to Ervia for review and comment. 24/11/2021- Ervia feedback comments received 24/01/2022: S3 P02 Issued 11/02/22: S3 P03 Issued 10/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	E		0001		MDE1234-BEC-03-CX-DR-E-0001	S3 P03	Control system architecture drawing	S3 P01: 02/02/2022 S3 P02: :22/04/2022	02/02/2022 Issued to Ervia for Information. 21/04/2022: Issued for Pre-FEED 10/06/2022: Re-Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	Z	MSD	0001		MDE1234-BEC-03-CX-DR-Z-MSD0001	S3 P02	Material Selection Diagrams - Refrigeration / Liquefaction	S3 P01: 20/12/2021 S3 P02: 04/04/2022	20/12/2021: S3 P02 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	Z	MSD	0002		MDE1234-BEC-03-CX-DR-Z-MSD0002	S3 P02	Material Selection Diagrams - Refrigerant Storage System	S3 P01: 20/12/2021 S3 P02: 04/04/2022	20/12/2021: S3 P02 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	Z	MSD	0003		MDE1234-BEC-03-CX-DR-Z-MSD0003	S3 P02	Material Selection Diagrams - Regasification	S3 P01: 20/12/2021 S3 P02: 04/04/2022	20/12/2021: Issued to Ervia for review and comment. 04/04/2022: S3 P02 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	Z	MSD	0004		MDE1234-BEC-03-CX-DR-Z-MSD0004	S3 P02	Material Selection Diagrams - CO2 Collection Pipeline Network	S3 P01: 20/12/2021 S3 P02: 04/04/2022	20/12/2021: Issued to Ervia for review and comment. 04/04/2022: S3 P02 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	Z	MSD	0005		MDE1234-BEC-03-CX-DR-Z-MSD0005	S3 P02	Material Selection Diagrams - CO2 Export Pipeline	S3 P01: 20/12/2021 S3 P02: 04/04/2022	20/12/2021: Issued to Ervia for review and comment. 04/04/2022: S3 P02 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	Z	MSD	0006		MDE1234-BEC-03-CX-DR-Z-MSD0006	S3 P02	Material Selection Diagrams - Instrument Air & Nitrogen	S3 P01: 20/12/2021 S3 P02: 04/04/2022	20/12/2021: Issued to Ervia for review and comment. 04/04/2022: S3 P02 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	Z	MSD	0007		MDE1234-BEC-03-CX-DR-Z-MSD0007	S3 P02	Material Selection Diagrams - Storm Water Drain	S3 P01: 20/12/2021 S3 P02: 04/04/2022	20/12/2021: Issued to Ervia for review and comment. 04/04/2022: S3 P02 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	Z	MSD	0008		MDE1234-BEC-03-CX-DR-Z-MSD0008	S3 P02	Material Selection Diagrams - Cooling, Potable & Utility Water	S3 P01: 20/12/2021 S3 P02: 04/04/2022	20/12/2021: Issued to Ervia for review and comment. 04/04/2022: S3 P02 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	Z	MSD	0009		MDE1234-BEC-03-CX-DR-Z-MSD0009	S3 P02	Material Selection Diagrams - Fire Water Pumps & Tanks	S3 P01: 20/12/2021 S3 P02: 04/04/2022	20/12/2021: Issued to Ervia for review and comment. 04/04/2022: S3 P02 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	Z	MSD	0010		MDE1234-BEC-03-CX-DR-Z-MSD0010	S3 P02	Material Selection Diagrams - Vent Stack & Header	S3 P01: 20/12/2021 S3 P02: 04/04/2022	20/12/2021: Issued to Ervia for review and comment. 04/04/2022: S3 P02 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PID	0000 (Sheet 1 of 3)		MDE1234-BEC-03-CX-DR-M-PID0000 (Sheet 1 of 3)	S3 P04	Piping & Instrumentation Diagram Symbols And Legends	S3 P01: 24/01/2022 S3 P01: 29/01/2022 S3 P02: 09/02/2022 S3 P03: 03/03/2022 S3 P04: 11/03/2022	24/01/2022 Issued to Ervia for Information. 29/01/2022 Ervia Feedback comments recieved 09/02/2022 S3 P02 Issued 03/03/2022 S3 P03 Issued 11/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PID	0000 (Sheet 2 of 3)		MDE1234-BEC-03-CX-DR-M-PID0000 (Sheet 2 of 3)	S3 P04	Piping & Instrumentation Diagram Symbols And Legends	S3 P01: 24/01/2022 S3 P01: 29/01/2022 S3 P02: 09/02/2022 S3 P03: 03/03/2022 S3 P04: 11/03/2022	24/01/2022 Issued to Ervia for Information. 29/01/2022 Ervia Feedback comments recieved 09/02/2022 S3 P02 Issued 03/03/2022 S3 P03 Issued 11/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PID	0000 (Sheet 3 of 3)		MDE1234-BEC-03-CX-DR-M-PID0000 (Sheet 3 of 3)	S3 P04	Piping & Instrumentation Diagram Symbols And Legends	S3 P01: 24/01/2022 S3 P01: 29/01/2022 S3 P02: 09/02/2022 S3 P03: 03/03/2022 S3 P04: 11/03/2022	24/01/2022 Issued to Ervia for Information. 29/01/2022 Ervia Feedback comments recieved 09/02/2022 S3 P02 Issued 03/03/2022 S3 P03 Issued 11/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PID	0001		MDE1234-BEC-03-CX-DR-M-PID0001	S3 P04	Piping & Instrumentation Diagram Central Processing Facility Inlet Gas Filter	S3 P01: 24/01/2022 S3 P01: 29/01/2022 S3 P02: 09/02/2022 S3 P03: 03/03/2022 S3 P04: 11/03/2022	24/01/2022 Issued to Ervia for Information. 29/01/2022 Ervia Feedback comments recieved 09/02/2022 S3 P02 Issued 03/03/2022 S3 P03 Issued 11/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PID	0002		MDE1234-BEC-03-CX-DR-M-PID0002	S3 P04	Piping & Instrumentation Diagram Central Processing Facility C02 Chiller	S3 P01: 24/01/2022 S3 P01: 29/01/2022 S3 P02: 09/02/2022 S3 P03: 03/03/2022 S3 P04: 11/03/2022	24/01/2022 Issued to Ervia for Information. 29/01/2022 Ervia Feedback comments recieved 09/02/2022 S3 P02 Issued 03/03/2022 S3 P03 Issued 11/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PID	0003		MDE1234-BEC-03-CX-DR-M-PID0003	S3 P04	Piping & Instrumentation Diagram Compressor KOD and Refrigeration Compressor Package	S3 P01: 24/01/2022 S3 P01: 29/01/2022 S3 P02: 09/02/2022 S3 P03: 03/03/2022 S3 P04: 11/03/2022	24/01/2022 Issued to Ervia for Information. 29/01/2022 Ervia Feedback comments recieved 09/02/2022 S3 P02 Issued 03/03/2022 S3 P03 Issued 11/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PID	0004		MDE1234-BEC-03-CX-DR-M-PID0004	S3 P04	Piping & Instrumentation Diagram Central Processing Facility Compressor Aftercooler and Receiver	S3 P01: 24/01/2022 S3 P01: 29/01/2022 S3 P02: 09/02/2022 S3 P03: 03/03/2022 S3 P04: 11/03/2022	24/01/2022 Issued to Ervia for Information. 29/01/2022 Ervia Feedback comments recieved 09/02/2022 S3 P02 Issued 03/03/2022 S3 P03 Issued 11/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PID	0005		MDE1234-BEC-03-CX-DR-M-PID0005	S3 P04	Piping & Instrumentation Diagram Central Processing Facility Refrigerant Storage Drum & Pump	S3 P01: 24/01/2022 S3 P01: 29/01/2022 S3 P02: 09/02/2022 S3 P03: 03/03/2022 S3 P04: 11/03/2022	24/01/2022 Issued to Ervia for Information. 29/01/2022 Ervia Feedback comments recieved 09/02/2022 S3 P02 Issued 03/03/2022 S3 P03 Issued 11/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PID	0006		MDE1234-BEC-03-CX-DR-M-PID0006	S3 P04	Piping & Instrumentation Diagram Central Processing Facility Sea Water Pump	S3 P01: 24/01/2022 S3 P01: 29/01/2022 S3 P02: 09/02/2022 S3 P03: 03/03/2022 S3 P04: 11/03/2022	24/01/2022 Issued to Ervia for Information. 29/01/2022 Ervia Feedback comments recieved 09/02/2022 S3 P02 Issued 03/03/2022 S3 P03 Issued 11/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PID	0007		MDE1234-BEC-03-CX-DR-M-PID0007	S3 P04	Piping & Instrumentation Diagram Central Processing Facility C02 Sendout Pump & Vaporiser Package	S3 P01: 24/01/2022 S3 P01: 29/01/2022 S3 P02: 09/02/2022 S3 P03: 03/03/2022 S3 P04: 11/03/2022	24/01/2022 Issued to Ervia for Information. 29/01/2022 Ervia Feedback comments recieved 09/02/2022 S3 P02 Issued 03/03/2022 S3 P03 Issued 11/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PID	0008		MDE1234-BEC-03-CX-DR-M-PID0008	S3 P04	Piping & Instrumentation Diagram Vent stack	S3 P01: 24/01/2022 S3 P01: 29/01/2022 S3 P02: 09/02/2022 S3 P03: 03/03/2022 S3 P04: 11/03/2022	24/01/2022 Issued to Ervia for Information. 29/01/2022 Ervia Feedback comments recieved 09/02/2022 S3 P02 Issued 03/03/2022 S3 P03 Issued 11/03/2022: S3 P04 Issued for Pre-FEED

MDE1234	BEC	03	CX	DR	M	PID	0009		MDE1234-BEC-03-CX-DR-M-PID0009	S3 P04	Piping & Instrumentation Diagram CO2 Collection Pipeline Network (From Whitegate Refinery & CCGT)	S3 P01: 24/01/2022 S3 P01: 29/01/2022 S3 P02: 09/02/2022 S3 P03: 03/03/2022 S3 P04: 11/03/2022	24/01/2022 Issued to Ervia for Information. 29/01/2022 Ervia Feedback comments recieved 09/02/2022 S3 P02 Issued 03/03/2022 S3 P03 Issued 11/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PID	0010		MDE1234-BEC-03-CX-DR-M-PID0010	S3 P04	Piping & Instrumentation Diagram CO2 Collection Pipeline Network (Valving Station)	S3 P01: 24/01/2022 S3 P01: 29/01/2022 S3 P02: 09/02/2022 S3 P03: 03/03/2022 S3 P04: 11/03/2022	24/01/2022 Issued to Ervia for Information. 29/01/2022 Ervia Feedback comments recieved 09/02/2022 S3 P02 Issued 03/03/2022 S3 P03 Issued 11/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PID	0011		MDE1234-BEC-03-CX-DR-M-PID0011	S3 P04	Piping & Instrumentation Diagram CO2 Export Pipeline	S3 P01: 24/01/2022 S3 P01: 29/01/2022 S3 P02: 09/02/2022 S3 P03: 03/03/2022 S3 P04: 11/03/2022	24/01/2022 Issued to Ervia for Information. 29/01/2022 Ervia Feedback comments recieved 09/02/2022 S3 P02 Issued 03/03/2022 S3 P03 Issued 11/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	PID	0012		MDE1234-BEC-03-CX-DR-M-PID0012	S3 P04	Piping & Instrumentation Diagram CO2 Collection Pipeline Network (From Aghada CCGT)	S3 P01: 24/01/2022 S3 P01: 29/01/2022 S3 P02: 09/02/2022 S3 P03: 03/03/2022 S3 P04: 11/03/2022	24/01/2022 Issued to Ervia for Information. 29/01/2022 Ervia Feedback comments recieved 09/02/2022 S3 P02 Issued 03/03/2022 S3 P03 Issued 11/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	03	CX	DR	M	BFD	0001		MDE1234-BEC-03-CX-DR-M-BFD0001	S3 P01	Overall Block Flow Diagram	S3 P01: 31/01/2022	31/01/2022 Issued to Ervia for Information.
MDE1234	RPS	03	CX	DR	C	CA	0001		MDE1234-RPS-03-CX-DR-C-CA0001	S3 P02	Preliminary CPF Plot Plan Layout - Cork	S3 P01: 27/01/2022 S3 P01: 07/02/2022 S3 P02: 22/06/2022	27/01/2022: Issued to Ervia for Review and comment. 07/02/2022: Ervia Feedback comments received 22/06/2022: S3 P02 Issued for Pre-FEED
MDE1234	RPS	03	CX	DR	C	SL	0001		MDE1234-RPS-03-CX-DR-C-SL0001	S3 P02	Preliminary CPF Site Plan - Cork	S3 P01: 27/01/2022 S3 P01: 07/02/2022 S3 P02: 22/06/2022	27/01/2022: Issued to Ervia for Review and comment. 07/02/2022: Ervia Feedback comments received 22/06/2022: S3 P02 Issued for Pre-FEED
MDE1234	RPS	03	CX	DR	Z	WBS	0001		MDE1234-RPS-03-CX-DR-Z-WBS0001		Preliminary CPF Layout Work Breakdown Structure - Cork - Sheet 1 of 2		Preliminary project execution plan
MDE1234	RPS	03	CX	DR	Z	WBS	0002		MDE1234-RPS-03-CX-DR-Z-WBS0002		Preliminary Jetty Layout Work Breakdown Structure - Cork - Sheet 2 of 2		Preliminary project execution plan
MDE1234	RPS	03	CX	DR	C	CD	0001		MDE1234-RPS-03-CX-DR-C-CD0001		Preliminary equipment foundation design		CAD Files included with final client delivery package
MDE1234	RPS	03	CX	DR	C	CD	0002		MDE1234-RPS-03-CX-DR-C-CD0002		Preliminary buildings design		CAD Files included with final client delivery package
MDE1234	BEC	03	CX	DR	E	SHD	0002		MDE1234-BEC-03-CX-DR-E-SHD0002	S3 P02	SIS Shutdown Heirarchy	S3 P01: 02/02/2022 S3 P01: 17/02/2022 S3 P02:23/03/2022	02/02/2022 Issued to Ervia for Information. 17/02/2022: Ervia Feedback comments received 23/03/2022: S3 P02 Issued for Pre-FEED
Element d)	**Volume 04 - Design Pack Development for the Pipeline to Jetty, Temporary Storage and Vessel Transport activities**												
MDE1234	HRW	04	CX	RP	Z	RP	0001		MDE1234-HRW-04-CX-RP-Z-RP0001	S3 P01	Marine Operations Study Report	S3 P01: 07/03/2022 S3 P02: 13/06/2022	07/03/2022: Issued for Pre-FEED 13/06/2022: Re-issued for Pre-FEED
MDE1234	HRW	04	CX	RP	Z	RP	0002		MDE1234-HRW-04-CX-RP-Z-RP0002	S3 P01	CO2 Ship Technology Survey Report	S3 P01: 07/03/2022 S3 P02: 13/06/2022	07/03/2022: Issued for Pre-FEED 13/06/2022: Re-issued for Pre-FEED
MDE1234	RPS	04	CX	RP	Z	RP	0003		MDE1234-RPS-04-CX-RP-Z-RP0003	S3 P02	Cork Gas Pipeline Suitability Report	S3 P01: 02/03/2022 S3 P01: 23/03/2022	02/03/2022: S3 P01 issued for Ervia review 23/03/2022: Ervia feedback comment received
MDE1234	RPS	04	CX	RP	Z	RP	0004		MDE1234-RPS-04-CX-RP-Z-RP0004		Cork Pipeline Flow Assurance Study report		Report no longer required. Refer to MDE1234-RPS-04-CX-RP-Z-RP-0003
MDE1234	RPS	04	CX	RP	Z	RP	0005		MDE1234-RPS-04-CX-RP-Z-RP0005	S3 P02	Liquid CO2 Storage Study	S3 P01: 23/12/2021 S3 P02: 08/04/2022	23/12/2021: Issued to Ervia for Review and comment. 10/01/2022: ERVIA Feedback comments received 08/04/2022: S3 P02 Issued to Ervia for Pre-FEED
MDE1234	RPS	04	CX	RP	Z	RP	0006		MDE1234-RPS-04-CX-RP-Z-RP0006	S3 P02	Pipeline Crack Propagation Study	S3 P01: 25/02/2022 S3 P01: 10/03/2022 S3 P02: 25/03/2022	25/02/2022: issued to Ervia for review and comment. 10/03/2022: Ervia feedback comment received 25/03/2022: Issued for Pre-FEED
MDE1234	RPS	04	CX	RP	Z	RP	0008		MDE1234-RPS-04-CX-RP-Z-RP0008	S3 P02	Emissions List - Cork	S3 P01: 17/02/2022 S3 P01: 04/03/2022 S3 P02: 21/03/2022	17/02/2022: Issued to Ervia for review and comment. 04/03/2022: Ervia feedback comments received 21/03/2022: S3 P02 Issued for Pre-FEED
MDE1234	BEC	04	CX	SP	Z	SP	SP0002		MDE1234-BEC-04-CX-SP-Z-SP0002	S3 P02	Process Engineering Equipment Package Datasheet - BOG Compressor Package - X1201 A/B	S3 P01: 17/12/2021 S3 P02: 21/02/2022	17/12/2021 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 09/03/2022: No further comments
MDE1234	BEC	04	CX	SP	Z	SP	SP0004 - V1201		MDE1234-BEC-04-CX-SP-Z-SP0004 - V1201	S3 P02	Process Engineering Equipment Package Datasheet - CO2 SPHERE - V1201 A/B/C	S3 P01: 02/02/2022 S3 P02: 21/02/2022	02/02/2022 Issued to Ervia for Information. 21/02/2022: S3 P02 Issued 09/03/2022: No further comments
MDE1234	BEC	04	CX	SP	Z	SP	SP0005-X-1202/1203/1204		MDE1234-BEC-04-CX-SP-Z-SP0005-X-1202/1203/1204	S3 P02	Process Engineering Equipment Package Datasheet - Loading/Unloading Arm Datasheet	S3 P01: 10/02/2022 S3 P01: 17/02/2022 S3 P02: 21/02/2022	10/02/2022 Issued to Ervia for Information. 17/02/2022: Ervia feedback comments received 21/02/2022: S3 P02 Issued 09/03/2022: No further comments
MDE1234	BEC	04	CX	DR	M	PFD	0001		MDE1234-BEC-04-CX-DR-M-PFD0001	S3 P03	Process Flow Diagram (PFD) - Storage & Ship Loading System	S3 P01: 17/11/2021 S3 P02: 24/12/2021 S3 P03: 24/01/2022	17/11/2021 Issued to Ervia for review and comment. 24/11/2021- Ervia feedback comments received 24/12/2021: S3 P02 issued. 24/01/2022: S3 P03 Issued for Pre-FEED
MDE1234	BEC	04	CX	DR	M	MSD	0001		MDE1234-BEC-04-CX-DR-M-MSD0001	S3 P02	Material selection diagrams - Storage and Ship Loading	S3 P01: 20/12/2021 S3 P02: 04/04/2022	20/12/2021: Issued to Ervia for review and comment. 04/04/2022: S3 P02 Issued for Pre-FEED
MDE1234	BEC	04	CX	DR	M	PID	0001		MDE1234-BEC-04-CX-DR-M-PID0001	S3 P04	Piping & Instrumentation Diagram CO2 Spheres & Export Pump	S3 P01: 24/01/2022 S3 P01: 29/01/2022 S3 P02: 09/02/2022 S3 P03: 03/03/2022 S3 P04: 11/03/2022	24/01/2022 Issued to Ervia for Information. 29/01/2022 Ervia Feedback comments recieved 09/02/2022 S3 P02 Issued 03/03/2022 S3 P03 Issued 11/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	04	CX	DR	M	PID	0002		MDE1234-BEC-04-CX-DR-M-PID0002	S3 P04	Piping & Instrumentation Diagram Boil Off Gas Compressor Package	S3 P01: 24/01/2022 S3 P01: 29/01/2022 S3 P02: 09/02/2022 S3 P03: 03/03/2022 S3 P04: 11/03/2022	24/01/2022 Issued to Ervia for Information. 29/01/2022 Ervia Feedback comments recieved 09/02/2022 S3 P02 Issued 03/03/2022 S3 P03 Issued 11/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	BEC	04	CX	DR	M	PID	0003		MDE1234-BEC-04-CX-DR-M-PID0003	S3 P04	Piping & Instrumentation Diagram Central Processing Facility- Liquid CO2 Loading Arm	S3 P01: 24/01/2022 S3 P01: 29/01/2022 S3 P02: 09/02/2022 S3 P03: 03/03/2022 S3 P04: 11/03/2022	24/01/2022 Issued to Ervia for Information. 29/01/2022 Ervia Feedback comments recieved 09/02/2022 S3 P02 Issued 03/03/2022 S3 P03 Issued 11/03/2022: S3 P04 Issued for Pre-FEED
MDE1234	RPS	04	CX	RP	Z	RP	0007		MDE1234-RPS-04-CX-RP-Z-RP0007	S3 P02	Preliminary Jetty Layout Philosophy - Cork	S3 P01: 18/02/2022 S3 P01: 21/02/2022 S3 P02: 01/04/2022	18/02/2022: Issued to Ervia for review and comment. 21/02/2022: Ervia feedback comment received 01/04/2022: S3 P02 Issued for Pre-FEED
MDE1234	RPS	04	CX	DR	C	CA	0001		MDE1234-RPS-04-CX-DR-C-CA0001	S3 P01	Preliminary Jetty Layout - Cork (M0832-RPS-XX-XX-DR-C-SK01)	S3 P01: 24/01/2022	Issued as Appendix in MDE1234-RPS-04-CX-RP-Z-RP0007
MDE1234	RPS	04	CX	DR	C	CA	0002		MDE1234-RPS-04-CX-DR-C-CA0002	S3 P01	Preliminary Jetty Head Details - Cork (M0832-RPS-XX-XX-DR-C-SK02)	S3 P01: 24/01/2022	Issued as Appendix in MDE1234-RPS-04-CX-RP-Z-RP0007
MDE1234	RPS	04	CX	DR	C	CA	0004		MDE1234-RPS-04-CX-DR-C-CA0004	S3 P01	Preliminary Access Viaduct Details - Cork (M0832-RPS-XX-XX-DR-C-SK04)	S3 P01: 24/01/2022	Issued as Appendix in MDE1234-RPS-04-CX-RP-Z-RP0007
MDE1234	BEC	04	CX	DR	E	SLD	0001		MDE1234-BEC-04-CX-DR-E-SLD0001	S3 P02	Single Line Diagrams (SLDs)	S3 P01: 18/02/2022 S3 P01: 21/02/2022 S3 P02: 08/04/2022	18/02/2022: Issued to Ervioa for review and comment. 21/02/2022: Ervia feedback comment received 08/04/2022: S3 P02 Issued for Pre-FEED 13/05/2022: No further comments
MDE1234	BEC	04	CX	DR	M	PSFD	0001		MDE1234-BEC-04-CX-DR-M-PSFD0001	S3 P02	Process Safeguarding Flow Diagrams- Central Processing Facility Storage &Ship Loading	S3 P01: 24/01/2022 S3 P01: 17/02/2022 S3 P02: 11/03/2022	24/01/2022 Issued to Ervia for Information. 17/02/2022: Ervia feedback comment received 11/03/2022: S3 P02 Issued for Pre-FEED
MDE1234	RPS	04	CX	RP	Z	RP	0009		MDE1234-RPS-04-CX-RP-Z-RP0009	S3 P02	Jetty Design Report - Cork	S3 P01: 05/05/2022 S3 P02: 10/06/2022	05/05/2022: Issued to Ervia for review and comment. 10/06/2022: Issued for Pre-FEED
MDE1234	RPS	04	CX	DR	C	JD	0001		MDE1234-RPS-04-CX-DR-C-JD0001	S3 P02	Jetty Layout Plan - Cork	S3 P02: 13/04/2022	13/04/2022: Issued as Appendix MDE1234-RPS-04-CX-RP-Z-RP0009
MDE1234	RPS	04	CX	DR	C	JD	0002		MDE1234-RPS-04-CX-DR-C-JD0002	S3 P02	Jetty Pile and Beam Layout Plan - Cork	S3 P02: 13/04/2022	13/04/2022: Issued as Appendix MDE1234-RPS-04-CX-RP-Z-RP0009
MDE1234	RPS	04	CX	DR	C	JD	0003		MDE1234-RPS-04-CX-DR-C-JD0003	S3 P02	Jetty Elevation and Sections	S3 P02: 13/04/2022	13/04/2022: Issued as Appendix MDE1234-RPS-04-CX-RP-Z-RP0009
MDE1234	RPS	04	CX	DR	C	JD	0004		MDE1234-RPS-04-CX-DR-C-JD0004	S3 P02	Berthing Dolphin Layout and Sections	S3 P02: 13/04/2022	13/04/2022: Issued as Appendix MDE1234-RPS-04-CX-RP-Z-RP0009
MDE1234	RPS	04	CX	DR	C	JD	0005		MDE1234-RPS-04-CX-DR-C-JD0005	S3 P02	Access Viaduct Pile and Beam Layout Plan	S3 P02: 13/04/2022	13/04/2022: Issued as Appendix MDE1234-RPS-04-CX-RP-Z-RP0009
MDE1234	RPS	04	CX	DR	C	JD	0006		MDE1234-RPS-04-CX-DR-C-JD0006	S3 P02	Access Viaduct Elevation and Sections	S3 P02: 13/04/2022	13/04/2022: Issued as Appendix MDE1234-RPS-04-CX-RP-Z-RP0009
Element e)	**Volume 05 - Development of the Safety Processes**												
MDE1234	RPS	05	CX	RP	Z	RP	0001		MDE1234-RPS-05-CX-RP-Z-RP0001	S3 P02	HAZID Report	S3 P01: 25/03/2022 S3 P02: 06/05/2022	25/03/2022: Issued to Ervia for Review and Comment 06/05/2022: Issued for Pre-FEED
MDE1234	RPS	05	CX	RP	Z	RP	0002		MDE1234-RPS-05-CX-RP-Z-0002	S3 P02	Hazard Identification and Risk Assessment (HIRA) Report	S3 P01: 20/05/2022 S3 P02: 17/06/2022	20/05/2022: Issued to Ervia for Review and Comment 17/06/2022: Issued for Pre-FEED
MDE1234	RPS	05	CX	RP	Z	RP	0003		MDE1234-RPS-05-CX-RP-Z-0003	S3 P02	Gas Dispersion Study Report	S3 P01: 20/05/2022 S3 P02: 17/06/2022	20/05/2022: Issued to Ervia for Review and Comment 17/06/2022: Issued for Pre-FEED
MDE1234	RPS	05	CX	RP	Z	RP	0004		MDE1234-RPS-05-CX-RP-Z-0004	S3 P02	Preliminary HAZOP Report	S3 P01: 19/04/2022 S3 P02:20/05/2022	19/04/2022: Issued to Ervia for Review and Comment 20/05/2022: Issued for Pre-FEED
MDE1234	RPS	05	CX	RP	Z	RP	0005		MDE1234-RPS-05-CX-RP-Z-0005	S3 P01	Preliminary HAZOP Close-Out Report	S3 P01: 20/05/2022	20/05/2022: Issued for Pre-FEED
MDE1234	RPS	05	CX	RP	Z	RP	0006		MDE1234-RPS-05-CX-RP-Z-0006	S3 P02	HAZID Close Out Report	S3 P01: 20/05/2022 S3 P02: 10/06/2022	20/05/2022: Issued for Pre-FEED 10/06/2022: Re-issued for Pre-FEED
Element f)	**Volume 06 - Commercial and Financial**												
MDE1234	RPS	06	CX	RP	Z	RP	0001		MDE1234-RPS-06-CX-RP-Z-RP0001	S3 P02	Cost Estimate Methodology	S3 P01: 18/02/2022 S3 P02: 24/06/2022	18/02/2022: Issued to Ervia for Review and Comment. 24/06/2022: Issued to Ervia for Pre-FEED
MDE1234	RPS	06	CX	RP	Z	RP	0002		MDE1234-RPS-06-CX-RP-Z-RP0002	S3 P01	Cost Estimate Report	S3 P01: 30/06/2022 S3 P02: 20/07/2022	30/06/2022: Issued to Ervia for Pre-FEED 20/07/2022: Issued to Ervia for final Pre-FEED
MDE1234	RPS	06	CX	RP	Z	RP	0003		MDE1234-RPS-06-CX-RP-Z-RP0003		Project Execution Schedule Report		
MDE1234	RPS	06	CX	SH	Z	SH	0001		MDE1234-RPS-06-CX-SH-Z-SH0001	S3 P02	Project Execution Schedule		Appendix to Project Execution Plan
Element g)	**Volume 07 - Final project report**												
MDE1234	RPS	07	XX	RP	Z		0001		MDE1234-RPS-07-XX-RP-Z-0001	S3 P01	Final Report (Cork & Dublin)	S3 P01: 30/06/2022 S3 P02: 20/07/2022	30/06/2022: Issued to Ervia for review. 14/07/2022: Ervia feedback received 20/07/2022: Issued to Ervia for Pre-FEED
MDE1234	RPS	07	XX	PP	Z		0001		MDE1234-RPS-07-XX-PP-Z-0001	S3 P01	Final Report Presentation (Cork & Dublin)	S3 P01: 12/07/2022 S3 P02: 20/07/2022	12/07/2022: Issued to Ervia for review 14/07/2022: Ervia feedback received 20/07/2022: Issued to Ervia for Pre-FEED
MDE1234	RPS	07	CX	RP	Z		0002		MDE1234-RPS-07-CX-RP-Z-0002	S3 P01	PSDP Report	S3 P01: 22/06/2022 S3 P02: 08/07/2022	22/06/2022: Issued to Ervia for Review and Comment 08/07/2022: Issued for Pre-FEED

Project Name: Ervia CCS Study

GNI/Ervia Tender Reference 19/038 - 001

RPS Project Number: MDE1234

Legend: Issued for Ervia Review (yellow); Final (green)

Master Document Register

SHEET 3 of 3 - Dublin (DX)

File Reference #REF!
File Location \\dubl-wp-f01\Work_Water\MDE1234 - ERVIA CCS Study\1.0 Submission\Appendix Q - Document Register
Date 25/02/2022

Document Type	Project Code		Element/ Volume	Level / Location Code	Type Code	Role Code	Classification	Number	Status Code	BIM No.	Current Revision	Document Title	Issue Date	Comments
	General - Volume 00													
	MDE1234	RPS	00	XX	RD	Z		RD0002	S0	MDE1234-RPS-00-XX-RD-Z-RD0002	S3 P01	Risk & Opportunities Register	S3 P01: 30/06/2022	30/06/2022: Issued to Ervia for Pre-FEED
Deliverables	**Deliverables**													
	Element a)													
	MDE1234	RPS	01	DX	RP	Z		0001		MDE1234-RPS-01-DX-RP-Z-0001	S3 P02	Study Basis - Dublin	S3 P01: 17/12/2021 S3 P02: 05/04/2022	17/12/2021: Issued for final approval. 05/04/2022: Issued for Pre-FEED
	MDE1234	RPS	01	DX	RP	Z		0002		MDE1234-RPS-01-DX-RP-Z-0002	S3 P01	FEED Basis of Design	S3 P01: 27/06/2022	27/06/2022: Issued for Pre-FEED 11/07/2022: No further Comments
	MDE1234	RPS	01	DX	RP	Z		0003		MDE1234-RPS-01-DX-RP-Z-0003	S3 P04	Process and Utilities Design Philosophy	S3 P01: 20/12/2021 S3 P02: 19/01/2022 S3 P03: 23/03/2022 S3 P04: 08/04/2022	20/12/2021: Issued for final approval. 22/12/2021: Ervia feedback re. misc. items & formatting. 19/01/2022: S3 P02 Issued. 20/01/2022: No further comments. 23/03/2022: S3 P03 Issued for Pre-FEED 08/04/2022: S3 P04 Re-Issued for Pre-FEED
	MDE1234	RPS	01	DX	RP	Z		0004		MDE1234-RPS-01-DX-RP-Z-0004	S3 P02	Proces Control and Safeguarding Philosophy	S3 P01:24/03/2022 S3 P02: 08/04/2022	24/03/2022: Issued to Ervia for Pre-FEED 08/04/2022: Re-Issued for Pre-FEED
	MDE1234	RPS	01	DX	RP	Z		0005		MDE1234-RPS-01-DX-RP-Z-0005	S3 P01	Pipeline Design Philosophy	S3 P01: 22/04/2022	22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	01	DX	RP	Z		0006		MDE1234-RPS-01-DX-RP-Z-0006	S3 P01	Material Selection Philosophy	S3 P01: 25/03/2022	25/03/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	01	DX	RP	Z		0007		MDE1234-RPS-01-DX-RP-Z-0007		Flow Assurance Philosophy		Included in: MDE1234-RPS-02-DX-RP-Z-RP0002
	MDE1234	RPS	01	DX	RP	Z		0008		MDE1234-RPS-01-DX-RP-Z-0008	S3 P01	Marine Design Philosophy	S3 P01: 21/03/2022	21/03/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	01	DX	RP	Z		0009		MDE1234-RPS-01-DX-RP-Z-0009	S3 P01	Health, Safety, Security and Environmental Philosophy	S3 P01: 21/06/2022	21/06/2022: Issued for Pre-FEED
	MDE1234	RPS	01	DX	RP	Z		0010		MDE1234-RPS-01-DX-RP-Z-0010	S3 P02	Operations and Maintenance Philosphy	S3 P01: 25/03/2022 S3 P02: 24/05/2022	25/03/2022: Issued to Ervia for eview and Comment 24/05/2022: Issued for Pre-FEED
	MDE1234	RPS	01	DX	RP	Z		0011		MDE1234-RPS-01-DX-RP-Z-0011	S3 P01	Process Safety Design Basis	S3 P01: 13/05/2022 S3 P02: 03/06/2022	13/05/2022: Issued for Pre-FEED 03/06/2022: Re-Issued for Pre-FEED
	MDE1234	RPS	01	DX	RP	Z		0012		MDE1234-RPS-01-DX-RP-Z-0012	S3 P01	Power Generation and Electrical Systems Philosophy	S3 P01: 13/05/2022	13/05/2022: Issued for Pre-FEED
	MDE1234	RPS	01	DX	RP	Z		0013		MDE1234-RPS-01-DX-RP-Z-0013	S3 P01	Communications & Control Philosophy	S3 P01: 08/04/2022	08/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	01	DX	RP	Z		0014		MDE1234-RPS-01-DX-RP-Z-0014	S3 P01	Stakeholder Management Philosophy	S3 P01: 01/04/2022	01/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	01	DX	RP	Z		0015		MDE1234-RPS-01-DX-RP-Z-0015	S3 P02	Legislative Approvals Philosophy	S3 P01: 01/04/2022 S3 P02: 27/05/2022	01/04/2022: Issued to Ervia Pre-FEED 27/05/2022: S3 P02 Issued for Pre-FEED
	MDE1234	RPS	01	DX	RP	Z		0016		MDE1234-RPS-01-DX-RP-Z-0016	S3 P02	RAM (Reliability, Availability, Maintainability) Study	S3 P01: 22/04/2022 S3 P02: 10/05/2022	22/04/2022: Issued to Ervia for Pre-FEED 10/05/2022: Re-issued for Pre-FEED
	MDE1234	RPS	01	DX	RP	Z		0017		MDE1234-RPS-01-DX-RP-Z-0017		Liquefied Carbon Storage Philosophy		Included in: MDE1234-RPS-04-CX-RP-Z-RP0005
	MDE1234	RPS	01	DX	RP	Z		0018		MDE1234-RPS-01-DX-RP-Z-0018	S3 P01	Project Execution Plan	S3 P01: 30/06/2022	30/06/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	01	DX	RP	Z		0019		MDE1234-RPS-01-DX-RP-Z-0019	S3 P02	CPF Layout Philosophy	S3 P01: 27/01/2022 S3 P01: 07/02/2022 S3 P02: 24/03/2022 S3 P02: 08/04/2022 S3 P02: 22/06/2022	27/01/2022: Issued to Ervia for Review and comment. 07/02/2022: Ervia Feedback comments received 24/03/2022: S3 P02 Issued for Pre-FEED 08/04/2022: Ervia feedback comments received 22/06/2022: S3 P03 Issued for Pre-FEED
	Element b)													
												Constraints Mapping (GIS) :		
	MDE1234	RPS	02	DX	DR	Z	AG	0150		MDE1234-RPS-02-DX-DR-Z-AG0150	S3 P01	Gas Network Dublin	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0151		MDE1234-RPS-02-DX-DR-Z-AG0151	S3 P01	Environmentally Designated Areas Dublin	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0152		MDE1234-RPS-02-DX-DR-Z-AG0152	S3 P01	Ground Conditions Bedrock and Soils Dublin	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0153		MDE1234-RPS-02-DX-DR-Z-AG0153	S3 P01	Groundwater Aquifire Vulnerability Dublin	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0154		MDE1234-RPS-02-DX-DR-Z-AG0154	S3 P01	Electricity Network Dublin	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0155		MDE1234-RPS-02-DX-DR-Z-AG0155	S3 P01	Flood Zones and Waterbodies Dublin	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0156		MDE1234-RPS-02-DX-DR-Z-AG0156	S3 P01	Development Planning Dublin	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0157		MDE1234-RPS-02-DX-DR-Z-AG0157	S3 P01	Road Network Dublin	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0158		MDE1234-RPS-02-DX-DR-Z-AG0158	S3 P01	Aerial Photography Dublin	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0159		MDE1234-RPS-02-DX-DR-Z-AG0159	S3 P01	OS Map Dublin	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0160		MDE1234-RPS-02-DX-DR-Z-AG0160		Not used		
	MDE1234	RPS	02	DX	DR	Z	AG	0161		MDE1234-RPS-02-DX-DR-Z-AG0161	S3 P01	Proposed Routes OS Map Dublin	S1 P02: 03/12/2021 S3 P01: 22/04/2022	03/12/2021: Issued to Ervia for Review and comment. 22/04/2022: Issued to Ervia for Pre-FEED
												Field Architecture Mapping (GIS) :		
	MDE1234	RPS	02	DX	DR	Z		0000		MDE1234-RPS-02-DX-DR-Z-0000	S3 P01	CO2 Gathering Network Field Architecture Maps (GIS) Key Map - Dublin	S1 P01: 27/02/2022 S1 P01: 17/02/2022 S3 P01: 22/04/2022	27/01/2022: S1 P01 issued to Ervia for review. 17/02/2022: Ervia feedback comments received 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z		0001- Sheet 1 of 2		MDE1234-RPS-02-DX-DR-Z-0001- Sheet 1 of 2	S3 P01	CO_2 Gathering Network Field Architecture Maps (GIS)	S1 P01: 27/02/2022 S1 P01: 17/02/2022 S3 P01: 22/04/2022	27/01/2022: S1 P01 issued to Ervia for review. 17/02/2022: Ervia feedback comments received 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z		0002- Sheet 1 of 2		MDE1234-RPS-02-DX-DR-Z-0002- Sheet 1 of 2	S3 P01	CO_2 Gathering Network Field Architecture Maps (GIS)	S1 P01: 27/02/2022 S1 P01: 17/02/2022 S3 P01: 22/04/2022	27/01/2022: S1 P01 issued to Ervia for review. 17/02/2022: Ervia feedback comments received 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	RP	Z	RP	0001		MDE1234-RPS-02-DX-RP-Z-RP0001	S3 P01	CO_2 Gathering Network Sizing and Flow Assurance Study report	S3 P01: 06/05/2022	06/05/2022: Issued for Pre-FEED
	MDE1234	RPS	02	DX	RP	Z	RP	0002		MDE1234-RPS-02-DX-RP-Z-RP0002	S3 P01	CO_2 Gathering Network Safety Separation Study report	S3 P01: 21/04/2022	21/04/2022: Issued for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0150		MDE1234-RPS-02-DX-DR-Z-AG0150	S3 P01	Gas Network Dublin	S3 P01: 03/12/2021	03/12/2021: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0151		MDE1234-RPS-02-DX-DR-Z-AG0151	S3 P01	Environmentally Designated Areas Dublin	S3 P01: 03/12/2021	03/12/2021: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0152		MDE1234-RPS-02-DX-DR-Z-AG0152	S3 P01	Ground Conditions Bedrock and Soils Dublin	S3 P01: 03/12/2021	03/12/2021: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0153		MDE1234-RPS-02-DX-DR-Z-AG0153	S3 P01	Groundwater Aquifire Vulnerability Dublin	S3 P01: 03/12/2021	03/12/2021: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0154		MDE1234-RPS-02-DX-DR-Z-AG0154	S3 P01	Electricity Network Dublin	S3 P01: 03/12/2021	03/12/2021: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0155		MDE1234-RPS-02-DX-DR-Z-AG0155	S3 P01	Flood Zones and Waterbodies Dublin	S3 P01: 03/12/2021	03/12/2021: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0156		MDE1234-RPS-02-DX-DR-Z-AG0156	S3 P01	Development Planning Dublin	S3 P01: 03/12/2021	03/12/2021: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0157		MDE1234-RPS-02-DX-DR-Z-AG0157	S3 P01	Road Network Dublin	S3 P01: 03/12/2021	03/12/2021: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0158		MDE1234-RPS-02-DX-DR-Z-AG0158	S3 P01	Aerial Photography Dublin	S3 P01: 03/12/2021	03/12/2021: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0159		MDE1234-RPS-02-DX-DR-Z-AG0159	S3 P01	OS Map Dublin	S3 P01: 03/12/2021	03/12/2021: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0161		MDE1234-RPS-02-DX-DR-Z-AG0161	S3 P01	Proposed Routes OS Map Dublin	S3 P01: 03/12/2021	03/12/2021: Issued to Ervia for Pre-FEED
	MDE1234	RPS	02	DX	DR	Z	AG	0164		MDE1234-RPS-02-DX-DR-Z-AG0164		CO2 Gathering Network Field Architecture Maps (GIS) Key Map - Dublin		Document AG0164 renamed for Client Issue as MDE1234-RPS-02-DX-DR-Z-0000.
	Element c)													
	MDE1234	RPS	03	DX	RP	Z	RP	0001		MDE1234-RPS-03-DX-RP-Z-RP0001		Overall carbon footprint assessment for operational phase		Document number changed to MDE1234-BEC-03-CX-CA-Z-CA0014
	MDE1234	RPS	03	DX	RP	Z	RP	0002		MDE1234-RPS-03-DX-RP-Z-RP0002	S3 P01	Preliminary Civil, Structural & Buildings Design	S3 P01: 05/05/2022	05/05/2022: Issued for Pre-FEED
	MDE1234	BEC	03	DX	RP	Z	RP	0003		MDE1234-BEC-03-DX-RP-Z-RP0003	S3 P02	Ammonia Refrigeration Compressors Selection	S3 P01: 08/04/2022 S3 P02: 22/04/2022	08/04/2022: Issued to Ervia for review and comment 22/04/2022: Issued to Ervia for Pre-FEED
	MDE1234	BEC	03	DX	CA	Z	CA	0001		MDE1234-BEC-03-DX-CA-Z-CA0001	S3 P01	Process Simulation Basis	S3 P01: 02/02/2022	02/02/2022 Issued to Ervia for Information.
	MDE1234	BEC	03	DX	CA	Z	CA	0002		MDE1234-BEC-03-DX-CA-Z-CA0002	S3 P02	Heat and Material Balance for CCS Liquefaction Facility	S3 P01: 02/02/2022 S3 P01: 22/02/2022 S3 P02: 25/02/2022	02/02/2022 Issued to Ervia for Information. 22/02/2022 Ervia feedback comment received 25/02/2022 S3 P02 Issued
	MDE1234	BEC	03	DX	CA	Z	CA	0003		MDE1234-BEC-03-DX-CA-Z-CA0003	S3 P02	Utility Summary	S3 P01: 11/01/2021 S3 P02: 17/02/2022 S3 P02: 04/03/3033	11/01/2021 Issued to Ervia for Information. 17/02/2022: Issued to Ervia for Information 04/03/3033: Ervia Feedback comments received
	MDE1234	BEC	03	DX	CA	Z	CA	0004		MDE1234-BEC-03-DX-CA-Z-CA0004		Preliminary flare/vent sizing, including relief and blowdown scenarios		Covered in: MDE1234-BEC-03-DX-CA-Z-CA0006
	MDE1234	BEC	03	DX	CA	Z	CA	0005		MDE1234-BEC-03-DX-CA-Z-CA0005	S3 P01	Embodied carbon assessment for construction phase	S3 P01: 24/06/2022	24/06/2022: Issued to Ervia for Pre-FEED
	MDE1234	BEC	03	DX	CA	Z	CA	0006		MDE1234-BEC-03-DX-CA-Z-CA0006	S3 P02	Relief Load Summary	S3 P01: 16/03/2022 S3 P02: 19/04/2022	16/03/2022: Issue for Pre-FEED. 19/04/2022: Issued for Pre-FEED 08/04/2022: No Further Comments
	MDE1234	BEC	03	DX	CA	Z	CA	0011		MDE1234-BEC-03-DX-CA-Z-CA0011	S3 P01	Instrument Air Receiver Calculation	S3 P01: 21/02/2022 S3 P01: 08/03/2022	21/02/2022 Issued to Ervia for Information. 08/03/2022: No further comments
	MDE1234	BEC	03	DX	CA	Z	CA	0007		MDE1234-BEC-03-DX-CA-Z-CA0007	S3 P01	Refrigerant Suction KO Drum Calculation	S3 P01: 21/02/2022 S3 P01: 08/03/2022	21/02/2022 Issued to Ervia for Information. 08/03/2022: No further comments
	MDE1234	BEC	03	DX	CA	Z	CA	0008		MDE1234-BEC-03-DX-CA-Z-CA0008	S3 P01	Receiver Calculation	S3 P01: 21/02/2022 S3 P01: 08/03/2022	21/02/2022 Issued to Ervia for Information. 08/03/2022: No further comments
	MDE1234	BEC	03	DX	CA	Z	CA	0009		MDE1234-BEC-03-DX-CA-Z-CA0009	S3 P01	Refrigerant Storage Drum Calculation	S3 P01: 21/02/2022 S3 P01: 08/03/2022	21/02/2022 Issued to Ervia for Information. 08/03/2022: No further comments
	MDE1234	BEC	03	DX	CA	Z	CA	0010		MDE1234-BEC-03-DX-CA-Z-CA0010	S0 P01	Surface Water Management	S0 P01	Dated 11/02/2022 Issued with final document package
	MDE1234	BEC	03	DX	CA	Z	CA	0012		MDE1234-BEC-03-DX-CA-Z-CA0012	S1 P02	PDP Piping Quantities	S1 P02	Dated 24/04/2022 Document issued for information
	MDE1234	BEC	03	DX	CA	Z	CA	0014		MDE1234-BEC-03-DX-CA-Z-CA0014	S3 P02	Overall carbon footprint assessment for operational phase	S3 P01: 24/06/2022 S3 P02: 15/07/2022	24/06/2022: Issued to Ervia for Pre-FEED 27/06/2022: Ervia feedback comment received 15/07/2022: S3 P02 reissued to Ervia for Pre-FEED

MDE1234	BEC	03	DX	DR	E	SHD	0002		MDE1234-BEC-03-DX-DR-E-SHD0002	S3 P01	SIS Shutdown Heirarchy	S3 P01: 23/03/2022	23/03/2022: Issued to Ervia for Pre-FEED 06/04/2022: No further comments
MDE1234	BEC	03	DX	SH	Z	SH	0002		MDE1234-BEC-03-DX-SH-Z-SH0002	S3 P02	Main Equipment List (MEL)	S3 P01: 16/03/2022 S3 P02: 05/04/2022	16/03/2022: Issued for Ervia information 05/04/2022: Issued fot Pre-FEED 12/05/2022: No Further comments
MDE1234	BEC	03	DX	SH	Z	SH	0003		MDE1234-BEC-03-DX-SH-Z-SH0003	S3 P02	Electrical load list	S3 P01: 22/06/2022 S3 P02: 22/06/2022	22/06/2022: Issued for Pre-FEED
MDE1234	BEC	03	DX	SH	Z	SH	0004		MDE1234-BEC-03-DX-SH-Z-SH0004	S3 P01	Preliminary I/O count	S3 P01: 25/04/2022	25/04/2022: Issued for Pre-FEED 30/05/2022: No further comments
MDE1234	RPS	03	DX	SH	Z	SH	0005		MDE1234-RPS-03-DX-SH-Z-SH0005		Preliminary Civils materials take-offs		Included in MDE1234-RPS-03-CX-RP-Z-0002
MDE1234	BEC	03	DX	SP	Z	SP	0001-V-2101		MDE1234-BEC-03-DX-SP-Z-SP0001-V-2101	S3 P01	Process Engineering Equipment Datasheet - Inlet Gas Filter - V2101	S3 P01: 21/02/2022	21/02/2022: Issued to Ervia for Review and comment. 09/03/2022: No further Comments
MDE1234	BEC	03	DX	SP	Z	SP	0002-E-2111		MDE1234-BEC-03-DX-SP-Z-SP0002-E-2111	S3 P01	Process Engineering Equipment Datasheet - CO2 Chiller - E2111 / E2121 / E2131 / E2141/ E2151	S3 P01: 21/02/2022	21/02/2022: Issued to Ervia for Review and comment.
MDE1234	BEC	03	DX	SP	Z	SP	0003-V2111		MDE1234-BEC-03-DX-SP-Z-SP0003-V2111	S3 P01	Process Engineering Equipment Datasheet - Refrigerant Compressor Suction KOD -V2111 / V2121 / V2131 / V2141 / V2151	S3 P01: 21/02/2022	21/02/2022: Issued to Ervia for Review and comment. 08/03/2022: No further comments
MDE1234	BEC	03	DX	SP	Z	SP	0004-X-2111		MDE1234-BEC-03-DX-SP-Z-SP0004-X-2111	S3 P01	Process Engineering Equipment Package Datasheet - Refrigerant Compressor Package - X2111 A/B / X2121 A/B / X2131 A/B / X2141 A/B / X2151 A/B	S3 P01: 21/02/2022	21/02/2022: Issued to Ervia for Review and comment. 09/03/2022: No further Comments
MDE1234	BEC	03	DX	SP	Z	SP	0005-E-2112		MDE1234-BEC-03-DX-SP-Z-SP0005-E-2112	S3 P01	Process Engineering Equipment Datasheet - Refrigeration Compressor Aftercooler - E2112 / E2122 / E2132 / E2142 / E2152	S3 P01: 21/02/2022	21/02/2022: Issued to Ervia for Review and comment. 09/03/2022: No further Comments
MDE1234	BEC	03	DX	SP	Z	SP	0006-V-2112		MDE1234-BEC-03-DX-SP-Z-SP0006-V-2112	S3 P02	Process Engineering Equipment Datasheet - Receiver - V2112 / V2122 / V2132 / V2142 / V2152	S3 P01: 21/02/2022 S3 P02: 11/03/2022	21/02/2022: Issued to Ervia for Review and comment. 11/03/2022: S3 P02 Issued 06/04/2022: No further comments
MDE1234	BEC	03	DX	SP	Z	SP	0007-V-2301		MDE1234-BEC-03-DX-SP-Z-SP0007-V-2301	S3 P02	Process Engineering Equipment Datasheet - Refrigerant Storage Drum - V2301	S3 P01: 21/02/2022 S3 P02: 11/03/2022	21/02/2022: Issued to Ervia for Review and comment. 11/03/2022: S3 P02 Issued 06/04/2022: No further comments
MDE1234	BEC	03	DX	SP	Z	SP	0009-X-2901		MDE1234-BEC-03-DX-SP-Z-SP0009-X-2901	S3 P01	Process Engineering Equipment Package Datasheet - Air Compressor and Drier Package - X2901 A/B	S3 P01: 21/02/2022	21/02/2022: Issued to Ervia for Review and comment. 09/03/2022: No further Comments
MDE1234	BEC	03	DX	SP	Z	SP	0010-X-2902		MDE1234-BEC-03-DX-SP-Z-SP0010-X-2902	S3 P01	Process Engineering Equipment Datasheet - Nitrogen Cylinder Rack - X2902	S3 P01: 21/02/2022	21/02/2022: Issued to Ervia for Review and comment. 09/03/2022: No further Comments
MDE1234	BEC	03	DX	SP	Z	SP	0012		MDE1234-BEC-03-DX-SP-Z-SP0012	S3 P02	Process Engineering Equipment Datasheet -Vent Stack	S3 P01: 21/02/2022 S3 P02: 04/04/2022	21/02/2022: Issued to Ervia for Review and comment. 04/04/2022: S3 P02 Issued 17/05/2022: No further comments
MDE1234	BEC	03	DX	SP	Z	SP	0013		MDE1234-BEC-03-DX-SP-Z-SP0013	S3 P01	Process Engineering Equipment Datasheet - Instrument Air Receiver - V2901	S3 P01: 21/02/2022	21/02/2022: Issued to Ervia for Review and comment. 09/03/2022: No further Comments
MDE1234	BEC	03	DX	SP	Z	SP	0014		MDE1234-BEC-03-DX-SP-Z-SP0014	S3 P01	Process Engineering Equipment Datasheet - Utility Water Tank - T2701	S3 P01: 21/02/2022	21/02/2022: Issued to Ervia for Review and comment. 09/03/2022: No further Comments
MDE1234	BEC	03	DX	SP	Z	SP	0015		MDE1234-BEC-03-DX-SP-Z-SP0015	S3 P01	Process Engineering Equipment Datasheet - Potable Water Tank - T2702	S3 P01: 21/02/2022	21/02/2022: Issued to Ervia for Review and comment. 09/03/2022: No further Comments
MDE1234	BEC	03	DX	SP	Z	SP	0016		MDE1234-BEC-03-DX-SP-Z-SP0016	S3 P01	Process Engineering Equipment Datasheet - Fire Water Tank- T2801	S3 P01: 21/02/2022	21/02/2022: Issued to Ervia for Review and comment. 09/03/2022: No further Comments
MDE1234	BEC	03	DX	SP	Z	SP	0018		MDE1234-BEC-03-DX-SP-Z-SP0018	S3 P01	Process Engineering Equipment Datasheet - Ammonia Vent Stack - K-2502	S3 P01: 04/042022	04/04/2022: Issued to Ervia for Review and comment. 17/05/2022: No further comments
MDE1234	BEC	03	DX	DR	M	PFD	0000		MDE1234-BEC-03-DX-DR-M-PFD0000	S3 P02	Process Flow Diagrams - Legend & Symbols Sheet	S3 P01: 07/01/2022 S3 P02: 10/03/2022	07/01/2022: Issued to Ervia for information. 10/03/2022: S3 P02 Issued
MDE1234	BEC	03	DX	DR	M	PFD	0001		MDE1234-BEC-03-DX-DR-M-PFD0001	S3 P04	Process Flow Diagrams - Refrigeration / Liquefaction	S3 P01: 07/01/2022 S3 P02 : 31/01/2022 S3 P03: 10/03/2022 S3 P04: 25/03/2022	07/01/2022: Issued to Ervia for information. 31/01/2022: S3 P02 Issued 10/03/2022: S3 P03 Issued 25/03/2022: S3 P04 Issued
MDE1234	BEC	03	DX	DR	M	PFD	0002		MDE1234-BEC-03-DX-DR-M-PFD0002	S3 P04	Process Flow Diagrams - Refrigerant Storage System	S3 P01: 07/01/2022 S3 P02 : 31/01/2022 S3 P03: 10/03/2022 S3 P04: 25/03/2022	07/01/2022: Issued to Ervia for information. 31/01/2022: S3 P02 Issued 10/03/2022: S3 P03 Issued 25/03/2022: S3 P04 Issued
~~MDE1234~~		~~03~~	~~CX~~	~~DR~~	~~M~~	~~PFD~~	~~0003~~		MDE1234--03-CX-DR-M-PFD0003		NOT USED		
MDE1234	BEC	03	DX	DR	M	PFD	0004		MDE1234-BEC-03-DX-DR-M-PFD0004	S3 P03	Process Flow Diagrams - CO2 Pipeline Collection Network	S3 P01: 07/01/2022 S3 P02: 31/01/2022 S3 P03: 10/03/2022	07/01/2022: Issued to Ervia for information. 31/01/2022: S3 P02 Issued 10/03/2022: S3 P03 Issued 25/03/2022: S3 P04 Issued 06/05/2022: No Further Comments
~~MDE1234~~		~~03~~	~~CX~~	~~DR~~	~~M~~	~~PFD~~	~~0006~~		MDE1234--03-CX-DR-M-PFD0006		NOT USED		
MDE1234	BEC	03	DX	DR	M	UFD	0001		MDE1234-BEC-03-DX-DR-M-UFD0001	S3 P02	Utility Flow Diagrams - Instrument Air & Nitrogen	S3 P01: 07/01/2022 S3 P02: 11/02/2022	07/01/2022: Issued to Ervia for information. 31/01/2022: S3 P02 Issued
MDE1234	BEC	03	DX	DR	M	UFD	0002		MDE1234-BEC-03-DX-DR-M-UFD0002	S3 P03	Utility Flow Diagrams - Storm Water Drain	S3 P01: 07/01/2022 S3 P02: 11/02/2022 S3 P03: 10/03/2022	07/01/2022: Issued to Ervia for information. 31/01/2022: S3 P02 Issued 10/03/2022: S3 P03 Issued
MDE1234	BEC	03	DX	DR	M	UFD	0003		MDE1234-BEC-03-DX-DR-M-UFD0003	S3 P02	Utility Flow Diagrams - Potable and Utility Water	S3 P01: 07/01/2022 S3 P02: 11/02/2022	07/01/2022: Issued to Ervia for information. S3 P02: S3 P02 Issued
MDE1234	BEC	03	DX	DR	M	UFD	0004		MDE1234-BEC-03-DX-DR-M-UFD0004	S3 P01	Utility Flow Diagrams - Fire Water Pumps & Tanks	S3 P01: 07/01/2022	07/01/2022: Issued to Ervia for information.
MDE1234	BEC	03	DX	DR	M	UFD	0005		MDE1234-BEC-03-DX-DR-M-UFD0005	S3 P03	Utility Flow Diagrams - Vent stack & Header	S3 P01: 07/01/2022 S3 P02: 11/02/2022 S3 P03: 10/03/2022	07/01/2022: Issued to Ervia for information. S3 P02: S3 P02 Issued S3 P03: S3 P03 Issued
MDE1234	BEC	03	DX	DR	M	BFD	0001		MDE1234-BEC-03-DX-DR-M-BFD0001	S3 P01	Overall Block Flow Diagram	S3 P01: 31/01/2022	31/01/2022: Issued to Ervia for information.
MDE1234	BEC	03	DX	DR	E		0001		MDE1234-BEC-03-DX-DR-E-0001	S3 P02	Control system architecture drawing	S3 P01: 21/04/2022 S3 P02: 10/06/2022	21/04/2022: Issued for Pre-FEED 10/06/2022: Re-Issued for Pre-FEED
MDE1234	BEC	03	DX	DR	Z	MSD	0002		MDE1234-BEC-03-DX-DR-Z-MSD0002	S3 P01	Material Selection Diagrams - Refrigerant Storage System	S3 P01: 04/04/2021	04/04/2021: Issued to Ervia for Pre-FEED.
MDE1234	BEC	03	DX	DR	Z	MSD	0004		MDE1234-BEC-03-DX-DR-Z-MSD0004	S3 P01	Material Selection Diagrams - CO2 Collection Pipeline Network	S3 P01: 04/04/2021	04/04/2021: Issued to Ervia for Pre-FEED.
MDE1234	BEC	03	DX	DR	Z	MSD	0006		MDE1234-BEC-03-DX-DR-Z-MSD0006	S3 P01	Material Selection Diagrams - Instrument Air & Nitrogen	S3 P01: 04/04/2021	04/04/2021: Issued to Ervia for Pre-FEED.
MDE1234	BEC	03	DX	DR	Z	MSD	0007		MDE1234-BEC-03-DX-DR-Z-MSD0007	S3 P01	Material Selection Diagrams - Storm Water Drain	S3 P01: 04/04/2021	04/04/2021: Issued to Ervia for Pre-FEED.
MDE1234	BEC	03	DX	DR	Z	MSD	0008		MDE1234-BEC-03-DX-DR-Z-MSD0008	S3 P01	Material Selection Diagrams - Cooling, Potable & Utility Water	S3 P01: 04/04/2021	04/04/2021: Issued to Ervia for Pre-FEED.
MDE1234	BEC	03	DX	DR	Z	MSD	0009		MDE1234-BEC-03-DX-DR-Z-MSD0009	S3 P01	Material Selection Diagrams - Fire Water Pumps & Tanks	S3 P01: 04/04/2021	04/04/2021: Issued to Ervia for Pre-FEED.
MDE1234	BEC	03	DX	DR	Z	MSD	0010		MDE1234-BEC-03-DX-DR-Z-MSD0010	S3 P01	Material Selection Diagrams - Vent Stack & Header	S3 P01: 04/04/2021	04/04/2021: Issued to Ervia for Pre-FEED.
MDE1234	BEC	03	DX	DR	M	PID	0000 (Sheet 1 of 3)		MDE1234-BEC-03-DX-DR-M-PID0000 (Sheet 1 of 3)	S3 P03	Piping & Instrumentation Diagram Symbols And Legends	S3 P01: 11/02/2022 S3 P02: 04/03/2022 S3 P03: 11/03/2022	11/02/2022: Issued to Ervia for information. 04/03/2022: S3 P02 Issued 11/03/2022: S3 P03 Issued
MDE1234	BEC	03	DX	DR	M	PID	0000 (Sheet 2 of 3)		MDE1234-BEC-03-DX-DR-M-PID0000 (Sheet 2 of 3)	S3 P03	Piping & Instrumentation Diagram Symbols And Legends	S3 P01: 11/02/2022 S3 P02: 04/03/2022 S3 P03: 11/03/2022	11/02/2022: Issued to Ervia for information. 04/03/2022: S3 P02 Issued 11/03/2022: S3 P03 Issued
MDE1234	BEC	03	DX	DR	M	PID	0000 (Sheet 3 of 3)		MDE1234-BEC-03-DX-DR-M-PID0000 (Sheet 3 of 3)	S3 P03	Piping & Instrumentation Diagram Symbols And Legends	S3 P01: 11/02/2022 S3 P02: 04/03/2022 S3 P03: 11/03/2022	11/02/2022: Issued to Ervia for information. 04/03/2022: S3 P02 Issued 11/03/2022: S3 P03 Issued
MDE1234	BEC	03	DX	DR	M	PID	0001		MDE1234-BEC-03-DX-DR-M-PID0001	S3 P03	Piping & Instrumentation Diagram Central Processing Facility Inlet Gas Filter	S3 P01: 11/02/2022 S3 P02: 04/03/2022 S3 P03: 11/03/2022	11/02/2022: Issued to Ervia for information. 04/03/2022: S3 P02 Issued 11/03/2022: S3 P03 Issued
MDE1234	BEC	03	DX	DR	M	PID	0002		MDE1234-BEC-03-DX-DR-M-PID0002	S3 P03	Piping & Instrumentation Diagram Central Processing Facility C02 Chiller	S3 P01: 11/02/2022 S3 P02: 04/03/2022 S3 P03: 11/03/2022	11/02/2022: Issued to Ervia for information. 04/03/2022: S3 P02 Issued 11/03/2022: S3 P03 Issued
MDE1234	BEC	03	DX	DR	M	PID	0003		MDE1234-BEC-03-DX-DR-M-PID0003	S3 P03	Piping & Instrumentation Diagram Compressor KOD and Refrigeration Compressor Package	S3 P01: 11/02/2022 S3 P02: 04/03/2022 S3 P03: 11/03/2022	11/02/2022: Issued to Ervia for information. 04/03/2022: S3 P02 Issued 11/03/2022: S3 P03 Issued
MDE1234	BEC	03	DX	DR	M	PID	0004		MDE1234-BEC-03-DX-DR-M-PID0004	S3 P03	Piping & Instrumentation Diagram Central Processing Facility Compressor Aftercooler and Receiver	S3 P01: 11/02/2022 S3 P02: 04/03/2022 S3 P03: 11/03/2022	11/02/2022: Issued to Ervia for information. 04/03/2022: S3 P02 Issued 11/03/2022: S3 P03 Issued
MDE1234	BEC	03	DX	DR	M	PID	0005		MDE1234-BEC-03-DX-DR-M-PID0005	S3 P03	Piping & Instrumentation Diagram Central Processing Facility Refrigerant Storage Drum & Pump	S3 P01: 11/02/2022 S3 P02: 04/03/2022 S3 P03: 11/03/2022	11/02/2022: Issued to Ervia for information. 04/03/2022: S3 P02 Issued 11/03/2022: S3 P03 Issued
MDE1234	BEC	03	DX	DR	M	PID	0008		MDE1234-BEC-03-DX-DR-M-PID0008	S3 P03	Piping & Instrumentation Diagram Vent stack	S3 P01: 11/02/2022 S3 P02: 04/03/2022 S3 P03: 11/03/2022	11/02/2022: Issued to Ervia for information. 04/03/2022: S3 P02 Issued 11/03/2022: S3 P03 Issued
MDE1234	BEC	03	DX	DR	M	PID	0009		MDE1234-BEC-03-DX-DR-M-PID0009	S3 P03	Piping & Instrumentation Diagram CO2 Collection Pipeline Network (From Dublin Waste to Energy & ESB Dublin Bay Power Station)	S3 P01: 11/02/2022 S3 P02: 04/03/2022 S3 P03: 11/03/2022	11/02/2022: Issued to Ervia for information. 04/03/2022: S3 P02 Issued 11/03/2022: S3 P03 Issued
MDE1234	BEC	03	DX	DR	M	PID	0010		MDE1234-BEC-03-DX-DR-M-PID0010	S3 P03	Piping & Instrumentation Diagram - Dublin CO2 Pipeline Network (From Poolbeg Power Station to CPF)	S3 P01: 11/02/2022	11/02/2022: Issued to Ervia for information.
MDE1234	RPS	03	DX	DR	M	CA	0001		MDE1234-RPS-03-DX-DR-M-CA0001	S3 P02	Preliminary CPF Plot Plan Layout - Dublin	S3 P02: 22/06/2022	22/06/2022: Issued for PreFEED
MDE1234	RPS	03	DX	DR	M	SL	0001		MDE1234-RPS-03-DX-DR-M-SL0001	S3 P02	Preliminary CPF Site Plan - Dublin	S3 P02: 22/06/2022	22/06/2022: Issued for PreFEED
MDE1234	RPS	03	DX	DR	Z	WBS	0001		MDE1234-RPS-03-DX-DR-Z-WBS0001		Preliminary CPF Layout Work Breakdown Structure - Dublin - Sheet 1 of 2		Preliminary project execution plan
MDE1234	RPS	03	DX	DR	Z	WBS	0002		MDE1234-RPS-03-DX-DR-Z-WBS0002		Preliminary Jetty Layout Work Breakdown Structure - Dublin - Sheet 2 of 2		Preliminary project execution plan
MDE1234	RPS	03	DX	DR	C	CD	0001		MDE1234-RPS-03-DX-DR-C-CD0001		Preliminary equipment foundation design		CAD Files included with final client delivery package
MDE1234	RPS	03	DX	DR	C	CD	0002		MDE1234-RPS-03-DX-DR-C-CD0002		Preliminary buildings design		CAD Files included with final client delivery package
MDE1234	BEC	03	DX	DR	M	PSFD	0001		MDE1234-BEC-03-DX-DR-M-PSFD0001	S3 P02	Refrigeration System	S3 P01: 11/03/2022 S3 P02: 25/03/2022	11/03/2022: Issued to Ervia for information 25/03/2022: S3 P02 Issued 06/05/2022: No further comments
MDE1234	BEC	03	DX	DR	M	PSFD	0002		MDE1234-BEC-03-DX-DR-M-PSFD0002	S3 P02	Refrigerant Storage System	S3 P01: 11/03/2022 S3 P02: 25/03/2022	11/03/2022: Issued to Ervia for information 25/03/2022: S3 P02 Issued
Element d)													
MDE1234	HRW	04	DX	RP	Z	RP	0001		MDE1234-HRW-04-DX-RP-Z-RP0001	S3 P01	Marine Operations Study Report	S3 P01: 07/03/2022 S3 P02: 13/06/2022	07/03/2022: Issued for Pre-FEED 13/06/2022: Re-Issued for Pre-FEED
MDE1234	HRW	04	DX	RP	Z	RP	0002		MDE1234-HRW-04-DX-RP-Z-RP0002	S3 P01	CO2 Ship Technology Survey Report	S3 P01: 07/03/2022 S3 P02: 13/06/2022	07/03/2022: Issued for Pre-FEED 13/06/2022: Re-Issued for Pre-FEED
MDE1234	BEC	04	DX	RP	Z	RP	0003		MDE1234-BEC-04-DX-RP-Z-RP0003		Dublin Pipeline Flow Assurance Study report		Report no longer required. Refer to MDE1234-RPS-04-DX-RP-Z-RP-0003
MDE1234		04	DX	RP	Z	RP	0004		MDE1234--04-DX-RP-Z-RP0004		Not used		
MDE1234	BEC	04	DX	RP	Z	RP	0005		MDE1234-BEC-04-DX-RP-Z-RP0005	S3 P01	Liquid CO2 Storage Study	S3 P01: 08/04/2022	08/04/2022: Issued to Ervia for Pre-FEED
MDE1234	BEC	04	DX	RP	Z	RP	0006		MDE1234-BEC-04-DX-RP-Z-RP0006	S3 P01	Pipeline Crack Propagation Study	S3 P01: 25/03/2022	25/03/2022: Issued to Ervia for Pre-FEED
MDE1234	BEC	04	DX	RP	Z	RP	0008		MDE1234-BEC-04-DX-RP-Z-RP0008	S3 P01	Emissions List - Dublin	S3 P01: 21/03/2022	21/03/2022: Issued to Ervia for Pre-FEED
MDE1234	RPS	04	DX	RP	Z	RP	0009		MDE1234-RPS-04-DX-RP-Z-RP0009	S3 P01	Jetty Design Report - Dublin	S3 P01: 10/06/2022	10/06/2022: Issued for Pre-FEED
MDE1234	BEC	04	DX	SP	Z	SP	0002		MDE1234-BEC-04-DX-SP-Z-SP0002	S3 P01	Process Engineering Equipment Package Datasheet - BOG Compressor Package - X2201 A/B	S3 P01: 21/02/2022	21/02/2022: Issued to Ervia for Review and comment. 09/03/2022: No further comments
MDE1234	BEC	04	DX	SP	Z	SP	0004		MDE1234-BEC-04-DX-SP-Z-SP0004	S3 P01	Process Engineering Equipment Package Datasheet - CO2 SPHERE - V2201 A/B/C	S3 P01: 21/02/2022	21/02/2022: Issued to Ervia for Review and comment. 09/03/2022: No further comments
MDE1234	BEC	04	DX	SP	Z	SP	0005		MDE1234-BEC-04-DX-SP-Z-SP0005	S3 P01	Process Engineering Equipment Package Datasheet - Loading/Unloading Arm Datasheet- X-2022/ 2203 / 2204	S3 P01: 21/02/2022	21/02/2022: Issued to Ervia for Review and comment. 09/03/2022: No further comments
MDE1234	RPS	04	DX	RP	Z	RP	0007		MDE1234-RPS-04-DX-RP-Z-RP0007	S3 P01	Preliminary Jetty Layout Philosophy - Dublin	S3 P01: 01/04/2022	01/04/2022: Issued to Ervia for Pre-FEED
MDE1234	RPS	04	DX	DR	C	CA	0001		MDE1234-RPS-04-DX-DR-C-CA0001	S3 P01	Preliminary Jetty Layout - Cork (M0832-RPS-XX-XX-DR-C-SK01)	S3 P01: 24/01/2022	Issued as Appendix in MDE1234-RPS-04-CX-RP-Z-RP0007
MDE1234	RPS	04	DX	DR	C	CA	0002		MDE1234-RPS-04-DX-DR-C-CA0002	S3 P01	Preliminary Jetty Head Details - Cork (M0832-RPS-XX-XX-DR-C-SK02)	S3 P01: 24/01/2022	Issued as Appendix in MDE1234-RPS-04-CX-RP-Z-RP0007
MDE1234	RPS	04	DX	DR	C	CA	0004		MDE1234-RPS-04-DX-DR-C-CA0004	S3 P01	Preliminary Access Viaduct Details - Cork (M0832-RPS-XX-XX-DR-C-SK04)	S3 P01: 24/01/2022	Issued as Appendix in MDE1234-RPS-04-CX-RP-Z-RP0007
MDE1234	BEC	04	DX	DR	M	PFD	0001		MDE1234-BEC-04-DX-DR-M-PFD0001	S3 P03	Process Flow Diagram (PFD) - Storage & Ship Loading System	S3 P01: 07/01/2022 S3 P02 : 31/01/2022 S3 P03: 10/03/2022	07/01/2022: Issued to Ervia for information. 31/01/2022: S3 P02 Issued 10/03/2022: S3 P03 Issued
MDE1234	BEC	04	DX	DR	M	MSD	0001		MDE1234-BEC-04-DX-DR-M-MSD0001	S3 P01	Material selection diagrams - Storage and Ship Loading System	S3 P01: 04/04/2021	04/04/2021: Issued to Ervia for Pre-FEED.

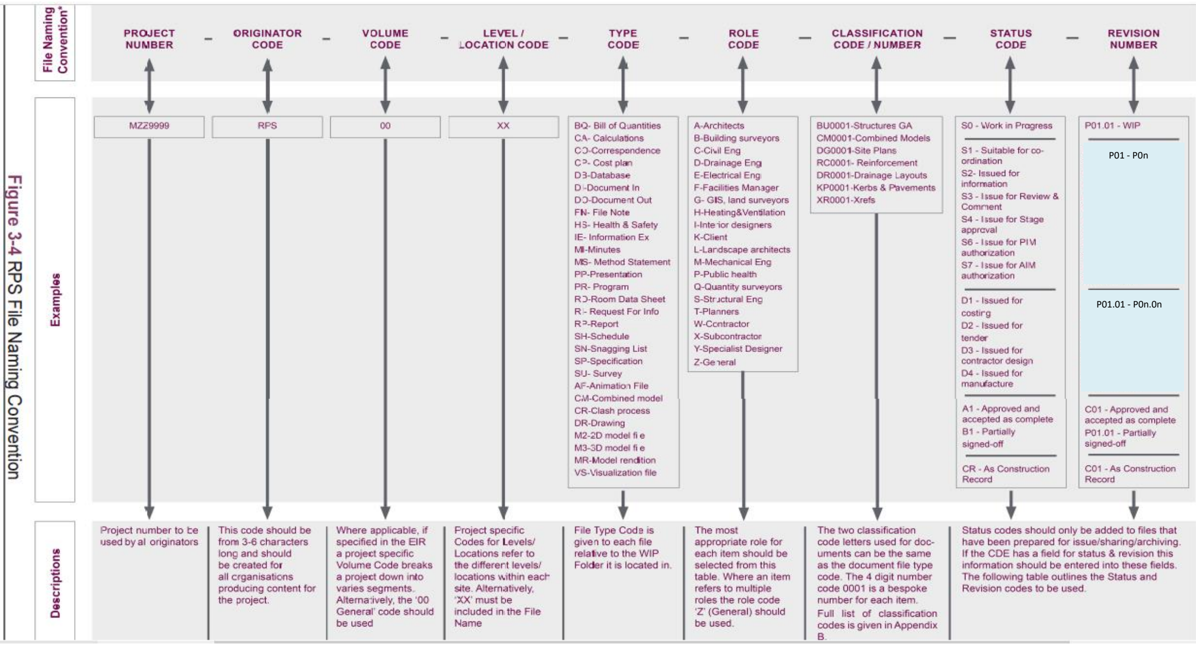
MDE1234	BEC	04	DX	DR	M	PID	0001		MDE1234-BEC-04-DX-DR-M-PID0001	S3 P04	Piping & Instrumentation Diagram Central Processing Facility CO2 Spheres & Export Pump	S3 P01: 11/02/2022 S3 P02: 04/03/2022 S3 P03: 11/03/2022 S3 P04: 25/03/2022	11/02/2022: Issued to Ervia for information. 04/03/2022: S3 P02 Issued 11/03/2022: S3 P03 Issued 25/03/2022: S3 P04 Issued
MDE1234	BEC	04	DX	DR	M	PID	0002		MDE1234-BEC-04-DX-DR-M-PID0002	S3 P03	Piping & Instrumentation Diagram Central Processing Facility-Boil Off Gas Compressor Package	S3 P01: 11/02/2022 S3 P02: 04/03/2022 S3 P03: 11/03/2022	11/02/2022: Issued to Ervia for information. 04/03/2022: S3 P02 Issued 11/03/2022: S3 P03 Issued
MDE1234	BEC	04	DX	DR	M	PID	0003		MDE1234-BEC-04-DX-DR-M-PID0003	S3 P03	Piping & Instrumentation Diagram Central Processing Facility-Liquid CO2 Loading System	S3 P01: 11/02/2022 S3 P02: 04/03/2022 S3 P03: 11/03/2022	11/02/2022: Issued to Ervia for information. 04/03/2022: S3 P02 Issued 11/03/2022: S3 P03 Issued
MDE1234	BEC	04	DX	DR	E	SLD	0001		MDE1234-BEC-04-DX-DR-E-SLD0001	S3 P01	Single Line Diagrams (SLDs)	S3 P01: 08/04/2022	08/04/2022: Issued to Ervia for Pre-FEED 13/05/2022: No further comments
MDE1234	BEC	04	DX	DR	M	PSFD	0001		MDE1234-BEC-04-DX-DR-M-PSFD0001	S3 P02	Process Safeguarding Flow Diagrams- Central Processing Facility Storage &Ship Loading	S3 P01: 11/03/2022 S3 P02: 25/03/2022	11/03/2022: Issued to Ervia for Information. 25/03/2022: S3 P02 Issued 06/05/2022: No further comments
MDE1234	RPS	04	DX	RP	Z	RP	0009		MDE1234-RPS-04-DX-RP-Z-RP0009	S3 P01	Jetty Design Report - Dublin	S3 P01: 10/06/2022	10/06/2022: Issued for Pre-FEED
MDE1234	RPS	04	CX	DR	C	JD	0001		MDE1234-RPS-04-CX-DR-C-JD0001	S3 P01	Jetty Layout Plan - Cork	S3 P01: 23/05/2022	23/05/2022: Issued as Appendix in MDE1234-RPS-04-DX-RP-Z-RP0009
MDE1234	RPS	04	CX	DR	C	JD	0002		MDE1234-RPS-04-CX-DR-C-JD0002	S3 P01	Jetty Pile and Beam Layout Plan - Cork	S3 P01: 23/05/2022	23/05/2022: Issued as Appendix in MDE1234-RPS-04-DX-RP-Z-RP0009
MDE1234	RPS	04	CX	DR	C	JD	0003		MDE1234-RPS-04-CX-DR-C-JD0003	S3 P01	Jetty Elevation and Sections	S3 P01: 23/05/2022	23/05/2022: Issued as Appendix in MDE1234-RPS-04-DX-RP-Z-RP0009
MDE1234	RPS	04	CX	DR	C	JD	0004		MDE1234-RPS-04-CX-DR-C-JD0004	S3 P01	Berthing Dolphin Layout and Sections	S3 P01: 23/05/2022	23/05/2022: Issued as Appendix in MDE1234-RPS-04-DX-RP-Z-RP0009
MDE1234	RPS	04	CX	DR	C	JD	0005		MDE1234-RPS-04-CX-DR-C-JD0005	S3 P01	Access Viaduct Pile and Beam Layout Plan	S3 P01: 23/05/2022	23/05/2022: Issued as Appendix in MDE1234-RPS-04-DX-RP-Z-RP0009
MDE1234	RPS	04	CX	DR	C	JD	0006		MDE1234-RPS-04-CX-DR-C-JD0006	S3 P01	Access Viaduct Elevation and Sections	S3 P01: 23/05/2022	23/05/2022: Issued as Appendix in MDE1234-RPS-04-DX-RP-Z-RP0009

Element e)													
MDE1234	RPS	05	DX	RP	Z	RP	0001		MDE1234-RPS-05-DX-RP-Z-RP0001	S3 P01	HAZID Report	S3 P01: 06/05/2022	06/05/2022: Issued for Pre-FEED
MDE1234	RPS	05	DX	RP	Z	RP	0002		MDE1234-RPS-05-DX-RP-Z-RP0002	S3 P01	Hazard Identification and Risk Assessment (HIRA) Report	S3 P01: 17/06/2022	17/06/2022: Issued for Pre-FEED
MDE1234	RPS	05	DX	RP	Z	RP	0003		MDE1234-RPS-05-DX-RP-Z-RP0003	S3 P02	Gas Dispersion Study Report	S3 P01: 24/06/2022	24/06/2022: Issued for Pre-FEED
MDE1234	RPS	05	DX	RP	Z	RP	0004		MDE1234-RPS-05-DX-RP-Z-RP0004	S3 P01	Preliminary HAZOP Report	S3 P01: 20/05/2022	20/05/2022: Issued for Pre-FEED
MDE1234	RPS	05	DX	RP	Z	RP	0005		MDE1234-RPS-05-DX-RP-Z-RP0005	S3 P01	Preliminary HAZOP Close-Out Report	S3 P01: 23/06/2022	23/06/2022: Issued for Pre-FEED
MDE1234	RPS	05	DX	RP	Z	RP	0006		MDE1234-RPS-05-DX-RP-Z-RP0006	S3 P02	HAZID Close Out Report	S3 P01: 20/05/2022 S3 P02: 10/06/2022	20/05/2022: Issued for Pre-FEED 10/06/2022: Re-Issued for Pre-FEED
Element f)													
MDE1234	BEC	06	DX	RP	Z	RP	0001		MDE1234-BEC-06-DX-RP-Z-RP0001	S3 P01	Cost Estimate Methodology	S3 P01: 24/06/2022	24/06/2022: Issued for Pre-FEED
MDE1234	BEC	06	DX	RP	Z	RP	0002		MDE1234-BEC-06-DX-RP-Z-RP0002	S3 P01	Cost Estimate Report	S3 P01: 30/06/2022 S3 P02: 20/07/2022	30/06/2022: Issued to Ervia for Pre-FEED 20/07/2022: Issued to Ervia for final Pre-FEED
MDE1234	BEC	06	DX	RP	Z	RP	0003		MDE1234-BEC-06-DX-RP-Z-RP0003		Project Execution Schedule Report		
MDE1234	RPS	06	DX	SH	Z	SH	0001		MDE1234-RPS-06-DX-SH-Z-SH0001		Project Execution Schedule		Appendix to Project Execution Plan
Element g)													
MDE1234	RPS	07	XX	RP	Z		0001		MDE1234-RPS-07-XX-RP-Z-0001	S3 P02	Final Report (Cork & Dublin)	S3 P01: 30/06/2022 S3 P02: 20/07/2022	30/06/2022: Issued to Ervia for review 14/07/2022: Ervia feedback received 20/07/2022: Issued to Ervia for Pre-FEED
MDE1234	RPS	07	XX	PP	Z		0001		MDE1234-RPS-07-XX-PP-Z-0001	S3 P02	Final Report Presentation (Cork & Dublin)	S3 P01: 12/07/2022 S3 P02: 20/07/2022	12/07/2022: Issued to Ervia for review 14/07/2022: Ervia feedback received 20/07/2022: Issued to Ervia for Pre-FEED
MDE1234	RPS	07	DX	RP	Z		0002		MDE1234-RPS-07-DX-RP-Z-0002	S3 P01	PSDP Report	S3 P01: 08/07/2022	08/07/2022: Issued for Pre-FEED

Ervia CCS Pre-FEED Study

BIM File Naming Convention

30/01/2021



Location:
Groupnet
BIM Technical Services Standard C04
Figure 3-4 RPS File pg 22
MGZ9996RP1008

BIM Document No.

Project Code	Originator Code	Volume Code	Location Code	Type Code	Role Code	Classification	Number
MDE1234	RPS						

Status Code	Revision No.

Example Code Output: MDR1234-RPS-01-CX-RP-Z-001 S3 P01

Project Code

MDE1234	Ervia CCS Pre-Study Project

Originator Code

RPS	
BEC	Bechtel
HRW	HR Wallingford
ARC	ARC

Volume Code

01	Scope A. Basis of Design and Philosophy Documents
02	Scope B. Combined Layout, Schedules, Models and Diagrams - General Site Layout, Flow Assurance and Asset Register
03	Scope C. Design Pack Development for Compression, Conditioning and Liquefaction
04	Scope D. Design Pack Development for the Pipeline to Jetty, Temporary Storage and Vessel Transport activities
05	Scope E. Development of the Safety Processes
06	Scope F. Commercial and Financial
07	Scope G. Final Project Report

Location Code

XX	General
CX	Cork
DX	Dublin

Type Code - Examples:

RP	Report
DR	Drawing
SH	Schedule
(Refer to main table above)	

Role Code - Examples:

C	Civil
E	Electrical & Instrumentation
M	Mechanical
Z	General
(Refer to main table above)	

Classification Code (Drawings Only)

AG	Mapping	**DG**	General Drawing	**FO**	Fibre Optic	**MD**	Mechanical Details	**TW**	Temporary Works
CA	Civil Arrangement	**ELD**	Engineering Line Diagram	**HZ**	Hazardous Area	**MTO**	Material Take Off	**WI**	Welding Isometric
CD	Civil Details	**EU**	Equipment Layout	**IC**	Instrumentation Connection	**PA**	Planning	**PID**	Piping & Instrument Diagram
DA	Ducting Arrangement	**FM**	Field Manual	**MA**	Mechanical Arrangement	**SLD**	Single Line Diagram	**QA**	Quality
PFD	Process Flow Diagram	**UFD**	Utility Flow Diagrams	**HMB**	Heat & Mass Balance	**MSD**	Material Selection Diagram	**JD**	Jetty Design

Number (000 series)

0001
0002
0003
000n+1
etc.