

Demolition and Construction Stage

There are no residual significant beneficial environmental effects that have been identified associated with the demolition and construction stage.

The following residual significant adverse environmental effects have been identified during the construction stage:

- Potential significant effect relating to evening and night-time demolition and construction noise, which is temporary and reversible;
- Potential significant effect relating to demolition and construction road traffic noise, which is temporary and reversible; and
- Significant effects relating to regional landfill void capacity from hazardous waste.

Operational Stage

The following residual significant beneficial environmental effects for the operational development stage have been identified:

- Employment creation and expansion of port activities; and
- Increased volume of cruise ship passengers and crew disembarking benefiting the local economy.

The following residual significant adverse environmental effects for the operational development have been identified relating to the seascape, landscape and visual amenity of the area. These only relate to the maximum worst-case scenario of a fully assembled FLOW device and two Excellence Class cruise vessels docked alongside the wharfs. These effects would be temporary and reversible:

- Change to the intensity and scale of operations at existing landscape features with effects on some parts of the seascape and landscape character;
- Damage to the perceived rural character and tranquillity of some areas of the seascape and landscape;
- Changes to the setting and visual amenity of the coastline for some receptors; and
- Changes to skyline for some receptors.

21. Summary of Significant Residual Effects



Day-time visualisation of Scenario Two, including 2 Excellence Class cruise vessels and FLOW device fully assembled (maximum worst-case)

21 Residual Effects and Summary

21.1 Introduction

21.1.1 This chapter summarises the additional mitigation measures, the enhancement measures and the residual effects identified in the technical assessments of ES Volume 1 (Chapters 6-19).

21.2 Mitigation

21.2.1 As set out in Chapter 2: EIA Process and Methodology, the aim of an EIA is to identify, develop measures to avoid, offset or reduce the significant adverse environmental effects of a project and to enhance any beneficial effects.

21.2.2 Within each of the technical assessments, the need for additional mitigation measures has been considered in respect of likely significant adverse effects as far as reasonably possible. In addition, opportunities for environmental enhancement have been explored where practicable.

21.2.3 The proposed mitigation and enhancement measures outlined in this chapter are in addition to the embedded design elements and construction best practice measures set out in earlier chapters (Chapter 3: Alternatives and Design Evolution, Chapter 4: Proposed Development Description and Chapter 5: Demolition and Construction Description). For the purposes of the technical assessments, it is assumed that embedded mitigation measures set out in these chapters are implemented and therefore form part of the proposed development.

21.2.4 Table 21.1 presents a summary of the additional mitigation measures that have been identified through the EIA process, categorised under the following stages:

- Demolition and construction; and
- Operation.

21.2.5 Reference should be made to individual technical assessments for full details.

Table 21.1: Summary of Proposed Additional Mitigation		
Topic	Proposed Additional Mitigation	Delivery mechanism
Demolition and Construction		
Marine Water and Sediment Quality	None proposed	N/A
Marine Ecology	• Use of a Marine Mammal Observer(s) during impact piling and demolition using a hydraulic hammer/breaker.	Secured by marine licence conditions
Marine Archaeology	A Written Scheme of Investigation (WSI) will be prepared to ensure appropriate mitigation measure are in place to reduce adverse impacts. WSI to include: • No Archaeological Exclusion Zones (AEZs) have been recommended at this time, however temporary AEZs could be implemented if material of archaeological interest is identified during further surveys or works. • Assessment level (1b) recording of the extant wreck 2003 along the eastern side of the Western Wharf prior to any construction, demolition or dredging works beginning. • Recovery and recording of the anchors identified during the walkover along the western side of the Western Wharf. • Implementation of an Archaeological Watching Brief during clearance and/or pUXO investigation works, and during the periods of the capital dredging phase where works are located	Secured by marine licence conditions – including WSI

Table 21.1: Summary of Proposed Additional Mitigation		
	within the areas of the former King’s and Empire Wharfs and the areas of geoarchaeological features 7001 and 7002. • If required, an archaeological diver/ROV survey as part of the archaeological watching brief to further investigate any targets of archaeological potential that are identified during the pUXO investigation stage. • Implementation of a bespoke Protocol with awareness training during UXO/seabed clearance/dredging operations to ensure that any archaeological finds are reported via the Retained Archaeologist to Historic England and the Cornwall Historic Environment Record (HER). • Unexpected discoveries should be reported through a bespoke Protocol for Archaeological Discoveries alongside awareness training • A programme of Stage 3 palaeoenvironmental assessment on boreholes WA-VC04 is recommended. It is recommended that radiocarbon dating of the peat deposits should be undertaken. This would comprise the dating of the initiation of peat formation across the proposed development, and the final interval of peat formation within the proposed development. • Should peat be encountered during further surveys or dredging/construction activities, it should be recovered, sampled and archaeologically assessed.	
Heritage	A limited programme of archaeological works would be undertaken to allow any remains to be investigated and recorded if required (leading to preservation by record should remains be encountered). The scope of any archaeological works will be agreed with consultees prior to commencement.	Secured by planning condition
Transport	None	N/A
Noise and Vibration	None	N/A
Air Quality	None	N/A
Climate	None	N/A
Material Resource and Waste	A Site Waste Management Plan would be produced prior to the demolition and construction stage and would ensure suitable management of construction, demolition, excavation and dredging waste, preventing (where practicable) and minimising waste arising and maximising waste re-use and recycling as per the waste hierarchy. The SWMP will be based on the outline SWMP (Technical Appendix 17.2), which outlines the mitigation measures that would be implemented at the demolition and construction stage, including: • Set waste objectives and targets for the development, including targets for diversion of waste from landfill • A Materials Management Plan (MMP) will be produced prior to works starting on site to ensure material is effectively managed and adhere to the MMS. • A Waste Manager would be appointed by the contractor to ensure effective management of waste. Roles and responsibilities should be assigned for waste management. • All waste leaving site will be reused, recycled, or recovered where possible to avoid disposal at landfill as far as practicably possible. • All construction staff would be provided with training regarding the waste management procedures, for example via toolbox talks.	Secured by marine licence and planning conditions

Table 21.1: Summary of Proposed Additional Mitigation		
	- All excavations and dredging would be carefully monitored by a suitably qualified person to ensure that any potentially contaminated material is identified and segregated, if encountered. If any potentially contaminated material is encountered, it will be segregated from clean/inert material, tested, and classified as either non-hazardous or hazardous and further classified as clean, inert, non-hazardous, or hazardous prior to disposal. - Waste materials generated at the site compound would be stored in suitable receptacles in designated areas. - Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) would also be segregated and would be stored in appropriate receptacles (in suitably bunded areas, where required). - On-site segregation of waste materials would be carried out to increase opportunities for off-site reuse, recycling, and recovery. This will ensure that the majority of construction materials are either recyclable or recoverable – it is anticipated that the following waste types, at a minimum, would be segregated: concrete, rock, timber. - All waste contractors collecting waste from the site would hold a valid waste carriers licence and every movement of waste off site will be accompanied by a waste transfer note complying with Duty of Care requirements. - Construction wastes would be taken to suitably permitted/licenced waste facilities for processing and segregation, recycling, recovery and/or disposal. - All waste leaving the site would be recorded and copies of relevant documentation maintained, such as waste transfer notes, for a minimum of two years. Hazardous waste consignment notes would be retained for a minimum of three years. - Mandatory digital waste tracking is to be implemented, in accordance with the Resources and Waste Strategy for England, in April 2025 (and therefore during the demolition and construction stage of the proposed development). This will require all waste management contractors to adhere to these requirements once implemented. In addition to the SWMP, opportunities to reduce dredge, excavation and demolition waste would be used as outlined below. Dredge Waste A total of 643,000 m³ of dredge material is estimated to arise. The project aims to reuse resources where feasible, particularly with regard to the handling of dredged material and demolished concrete. Of the 643,000 m³, a minimum of approximately 65,000 m³ of dredged rock can be recovered and reused for land reclamation behind the Western Wharf. Of the remaining dredged material that will be disposed of at sea, a further 70,000 m³ could be rock material and may also be suitable for re-use on site (depending on its suitability and further testing). This has been further investigated within the BPEO Assessment (ES Volume 2: Technical Appendix 5.3). Excavation waste A total of 36,840 m³ of excavated waste would arise from excavation of the central causeway. This material is assumed to be contaminated and hazardous and may be suitable for treatment at an appropriately permitted treatment facility. Any material not suitable for treatment will be disposed of at landfill.	

Table 21.1: Summary of Proposed Additional Mitigation		
	Demolition Waste A total of 21,220 m³ of demolition waste would arise from the demolition of the Northern Arm and Western Wharf and the anticipated waste routes. It is assumed that 50% of demolished material from the Northern Arm will be reused in the land reclamation behind the Western Wharf (10,610 m³) and that 20% off waste would be recycled off-site (4,244 m³), with the remaining 6,366 m³ requiring disposal at landfill. In addition, the existing Western Wharf consists of timber, which is currently in poor condition. 684 m³ is assumed to be hazardous and will be removed from site and sent to an appropriate facility for disposal other than landfill. Demolition of on-site buildings A small number of buildings will be demolished on site. It is anticipated that some of these buildings contain asbestos. Warehouses 54, 55 and 56 contain an asbestos cement clad steel frame and the roofs of buildings 45 and 478 may consist of an asbestos cement sheeting. The demolition of warehouses 54, 55, 56 and 68 would generate approximately 506 m³ of waste arisings. It is assumed that 476 m³ of waste would be recycled, 2 m³ would be reused off-site, 12 m³ would be sent to non-hazardous landfill and 17 m³ would be sent to hazardous landfill. Construction Waste A total of 24,299 m³ of construction waste is expected to arise from the proposed development based on RICS Whole life carbon assessment, 2023. A 100% recovery rate has been assumed for these wastes as they can be easily segregated and sent offsite for recovery.	
Landscape, Seascape and Visual	None	N/A
Socio-economics	None	N/A
Operational Development		
Marine Water and Sediment Quality	None	N/A
Marine Ecology	None	N/A
Commercial Fisheries and Shellfisheries	None	N/A
Marine Archaeology	None	N/A
Heritage	None	N/A
Transport	None	N/A
Noise and Vibration	None	N/A

Table 21.1: Summary of Proposed Additional Mitigation		
Air Quality	None	N/A
Climate	None	N/A
Material Resource and Waste	None	N/A
Landscape, Seascape and Visual	None available	N/A
Socio-economics	None	N/A

21.3 Enhancement

- 21.3.1 In addition to the mitigation outlined in Table 21.1, enhancement measures have been identified in respect of transport, climate, material resource and waste and landscape. The enhancements outlined will be secured via appropriately worded planning and marine license conditions.
- 21.3.2 Transport enhancement measures have been identified to further reduce private car travel and enable and encourage access to the site by sustainable modes in both the demolition and construction and operational stages. During the demolition and construction stage, enhancement measures would be implemented and monitored through the Construction Traffic Management Plan. Examples of measures include:
- Scheduling and management of construction HGV arrivals/departures to minimise trips made in peak hours, and to avoid multiple HGV arrivals/departures at one time.
 - Monitoring of construction HGV arrivals/departures to enforce requirements around vehicle routing, arrival/departure time, appropriate driver/vehicle accreditations (e.g. Direct Vision Standard, HGV Safety Permit), and restrictions on waiting, loading/unloading or parking on the public highway.
 - To promote the use of public transportation and minimise the reliance on private vehicles, construction workers, where practical, should be encouraged to utilise local bus services or the Falmouth Docks train station, conveniently located nearby, as an alternative mode of travel to and from the site.
 - Recording any complaints by members of the public in relation to construction traffic and taking further measures to respond to issues identified.
- 21.3.3 The following enhancement measures will be considered to reduce carbon (greenhouse gas emissions) during the demolition and construction:
- A GI would be undertaken to inform detailed design, and this may result in pile size reducing;
 - The design should use Ground Granulated Blast Slag (GGBS) lean concrete for in-situ concrete and should consider using eco-crete (Cornish concrete product), which has been used on-site on other projects i.e. structural beams;
 - Sourcing of Environmental Product Declarations (EPDs) should be considered as the design develops;
 - The design should utilise high recycled content steel;
 - Opportunity to use local suppliers should be considered. Several local quarries within a two-three mile radius would supply Cornwall granite, riprap stone for rock armour and fine sand material;
 - Biofuels for machinery should be used during construction where possible; and
 - Specialist works such as dredging may require a more national/international workforce. A local workforce should be sourced where possible during construction.
- 21.3.4 The proposed development will undergo an upgrade to the high voltage network at the docks which is due to be completed by March 2025. This will enable the provision of ship to shore power which will reduce vessel emissions at the docks.

- 21.3.5 In regard to material resource and waste, the client will explore non-landfill options for waste disposal to minimise impacts.
- 21.3.6 In regard to landscape, visual and seascape, vessels docking at the site shall be encouraged to extinguish unnecessary external lighting to reduce impacts on nighttime landscape and dark sky at the Cornwall National Landscape.

21.4 Significant Residual Effects

- 21.4.1 This section summarises the identified significant residual environmental effects of the proposed development following the adoption and inclusion of the additional mitigation measures that are set out in Table 21.1.
- 21.4.2 Reference should be made to ES Chapters 6-19 in ES Volume 1 for a detailed description of likely residual environmental effects.
- Construction and Demolition Significant Residual Effects**
- 21.4.3 Table 21.2 summarises the significant residual effects which have been identified by the individual technical assessments as likely to arise from the construction and demolition stage of the proposed development.
- 21.4.4 No significant residual beneficial environmental effects have been identified during the construction and demolition stage.
- 21.4.5 The following temporary and permanent significant residual adverse environmental effects have been identified during the construction stage, and are highlighted in **bold** text in Table 21.2:
- Potential significant effect relating to evening and night-time demolition and construction noise, which is temporary and reversible;
 - Potential significant effect relating to demolition and construction road traffic noise, which is temporary and reversible; and
 - Significant effects relating to regional landfill void capacity from hazardous waste.

Table 21.2: Construction and Demolition Significant Residual Effects									
Topic	Receptor	Description of Residual Effects	Additional Mitigation	Scale and Significance of Residual Effect*	Nature Residual Effect**				
					+ -	D I	P T	R IR	St Mt Lt
Marine Water and Sediment Quality	No Significant Residual Effects								
Marine Ecology	No Significant Residual Effects								
Commercial Fisheries and Shellfisheries	No Significant Residual Effects								
Marine Archaeology	No Significant Residual Effects								
Heritage	No Significant Residual Effects								
Transport	No Significant Residual Effects								

Table 21.2: Construction and Demolition Significant Residual Effects										
Noise and Vibration	Residential apartments Challenger Quay	Evening and night-time demolition and construction noise	None	Minor to Moderate / Not significant to Potentially Significant	-	D	T	R	St	
	Residential Receptors along Tinnars Walk, Bar Road (East of Tinnars Walk)	Demolition and Construction Road traffic noise	None	Moderate / Potentially Significant	-	D	T	R	St	
Air Quality	No Significant Residual Effects									
Climate	No Significant Residual Effects									
Material Resource and Waste	Landfill void – hazardous waste	Reduced regional landfill void capacity for hazardous waste	None	Very large/ Significant	-	D	P	IR	Lt	
Landscape, Seascape and Visual	No Significant Residual Effects									
Socio-economics	No Significant Residual Effects									
* Moderate/Major Significant residual adverse effects			** - = Adverse; + = Beneficial +/- = Neutral D = Direct I = Indirect P = Permanent; T = Temporary R = Reversible; IR= Irreversible St = Short-term; Mt = Medium-term; Lt = Long-term							

21.5 Operational Development Significant Residual Effects

- 21.5.1 Table 21.3 summarises the significant residual effects which have been identified by the individual technical assessments as likely to arise upon operation of the proposed development.
- 21.5.2 The following significant residual beneficial effects for the operational development have been identified and are highlighted in underlined text in Table 21.3:
- Employment creation and expansion of port activities; and
 - Increased volume of cruise ship passengers and crew disembarking benefiting local economy.
- 21.5.3 The following significant residual adverse environmental effects for the operational development have been identified with respect to seascape, landscape and visual amenity and are highlighted in **bold** text in Table 21.3. These only relate to the maximum worst-case scenario of a fully assembled FLOW device and two Excellence Class cruise vessels docked alongside the wharfs. These effects would be temporary and reversible:
- Change to the intensity and scale of operations at existing landscape features with effects on some parts of the seascape and landscape character;

- Damage to the perceived rural character and tranquillity of some areas of the seascape and landscape;
- Changes to the setting and visual amenity of the coastline for some receptors; and
- Changes to skyline for some receptors.

Table 21.3: Operational Development Significant Residual Effects									
Topic	Receptor	Description of Residual Effects	Additional Mitigation	Scale and Significance of Residual Effect*	Nature Residual Effect**				
					+ -	D I	P T	R IR	St Mt Lt
Marine Water and Sediment Quality	No Significant Residual Effects								
Marine Ecology	No Significant Residual Effects								
Commercial Fisheries and Shellfisheries	No Significant Residual Effects								
Marine Archaeology	No Significant Residual Effects								
Heritage	No Significant Residual Effects								
Transport	No Significant Residual Effects								
Noise and Vibration	No Significant Residual Effects								
Air Quality	No Significant Residual Effects								
Climate	No Significant Residual Effects								
Material Resource and Waste	No Significant Residual Effects								
Landscape, Seascape and Visual	Seascape and Landscape Character Note – all significant residual effects relate to Daytime Scenario Two only – maximum worst-case scenario of a fully assembled FLOW device and two Excellence Class cruise vessels docked alongside the wharfs. These effects would be temporary and reversible.								
	CCA 16 Falmouth to St Mawes	Notable change to the intensity and scale of operations at an existing landscape feature with perceptual effects on landscape character in proximity to the site. Effects would	None	Major/Moderate/ Significant	-	D/I	T	R	Lt
	MCA 49 South Cornwall Coastal Waters and Estuaries.		None	Major/Moderate/ Significant	-	D/I	T	R	Lt
	Falmouth TCA 3 Waterfront		None	Major/Moderate (major effect within 1 km of	-	I	T	R	Lt

Table 21.3: Operational Development Significant Residual Effects									
		dissipate with distance from the proposed development.		the Site) / Significant					
	Mylor LLCT Steep-sided river valley – arable and pasture	Notable change to the intensity and scale of operations at an existing landscape feature with perceptual effects on landscape character	None	Major/Moderate/ Significant	-	I	T	R	Lt
Landscape Designations Note – all significant residual effects relate to Daytime Scenario Two only – maximum worst-case scenario of a fully assembled FLOW device and two Excellence Class cruise vessels docked alongside the wharfs. These effects would be temporary and reversible.									
	Cornwall National Landscape Section 9: South Coast Central - The Fal Ria	Damage to the perceived rural character and tranquillity which is part of the CNL Special Quality	None	Major/Moderate/ Significant	-	I	T	R	Lt
	Cornwall National Landscape Section 9: South Coast Central – The Roseland		None	Major/Moderate/ Significant	-	I	T	R	Lt
	Heritage Coast: The Roseland	Increase in FLOW assembly and commercial activities would result in changes to the setting and visual amenity of the coastline	None	Major/Moderate/ Significant	-	I	T	R	Lt
	Mylor AHLV 4	Notable change to the intensity	None	Major/Moderate/ Significant	-	I	T	R	Lt

Table 21.3: Operational Development Significant Residual Effects									
	Riverside fields and woodland	and scale of operations at an existing landscape feature with perceptual effects on landscape character							
Visual Amenity Note – all significant residual effects relate to Daytime Scenario Two only – maximum worst-case scenario of a fully assembled FLOW device and two Excellence Class cruise vessels docked alongside the wharfs. These effects would be temporary and reversible.									
	Residential Settlement: Falmouth	Impact on visual permeability across Carrick Road with a notable change to the skyline	None	Major/Moderate/ Significant	-	I	T	R	Lt
	Residential Settlement: Flushing	Notable change to the skyline	None	Major/Moderate/ Significant	-	I	T	R	Lt
	Residential Settlement: St Mawes		None	Major/Moderate/ Significant	-	I	T	R	Lt
	Transport Routes: Marine transport and Ferry Routes	Up-close change to scale of maritime and industrial elements visible on the site, dominating views of vessels and FLOW Device construction activities. The effect reduces when the visual receptor travels northward of Carrick Roads	None	Major/Moderate (effect reduces when over 1 km away from the Site)/ Significant	-	I	T	R	Lt

Table 21.3: Operational Development Significant Residual Effects									
	Recreational Routes: South West Coast Path	Impact on visual permeability across Carrick Roads with a notable change to the skyline	None	Major/Moderate (effect reduces when over 1 km away from the Site)/ Significant	-	I	T	R	Lt
	Tourist Attraction: Flushing Beach	Notable change to skyline	None	Major/Moderate/ Significant	-	I	T	R	Lt
	Tourist Attraction: St Mawes Castle		None	Major/Moderate/ Significant	-	I	T	R	Lt
	Tourist Attraction: Marina/ Waterfront	Up-close change to scale of maritime and industrial elements visible on site, dominating views of vessels and FLOW Device construction activities. The effect reduces further west of the coastline	None	Major/Moderate (effect reduces when over 1 km away from the Site)/ Significant	-	I	T	R	Lt
Socio-economics	Economy in respect of employment and economic output (GVA)	Employment creation through expansion of port and port-related business activities	Not required	Moderate <u>Significant</u> (at local level) Minor Not significant at regional level	+	D	P	I	Lt
	Economy in respect of employment and economic output	Expansion of port and port-related business activities	Not required	Moderate <u>Significant</u> (at local level) Minor Not significant at regional level	+	D	P	I	Lt

Table 21.3: Operational Development Significant Residual Effects										
	Visitor and tourist economy	Increased volume of cruise ship passengers and crew disembarking benefiting local economy	Not required	Moderate <u>Significant</u> (at local level) Negligible to Minor (at district and regional levels)	+	D	P	I	Lt	
* Moderate/Major <u>Significant residual beneficial effects</u> Significant residual adverse effects			** - = Adverse; + = Beneficial +/- = Neutral D = Direct I = Indirect P = Permanent T = Temporary R = Reversible IR= Irreversible St = Short-term Mt = Medium-term Lt = Long-term							

21.6 Implementation of Mitigation Measures

- 21.6.1 It is important that measures set out in the ES to reduce adverse effects are implemented. These are likely to be secured via appropriately worded planning or marine license conditions.
- 21.6.2 During the demolition and construction stage, effects would be managed by implementation of a CEMP which would be the responsibility of the contractor. As set out in Technical Appendix 5.1, the CEMP would include measures such as:
- A Construction Traffic Management Plan;
 - A Site Waste Management Plan;
 - Proposed site management controls, roles and responsibilities, and a review and monitoring regime;
 - Details of construction working hours;
 - Contractor responsibilities such as adherence to the Considerate Constructors Scheme;
 - An environmental and communication/ liaison strategy;
 - Emergency procedures;
 - Visual, noise, vibration, traffic and dust controls;
 - Measures for contamination prevention and protection of water resources; and
 - Waste and materials management measures
- 21.6.3 During operation, mitigation measures will include the implementation of measures such as:
- Port Marine Safety Plan; and
 - Marine Safety Management Plan.