Core Criteria	Sub Criteria	IO1	Rock revetments (A2, B, C2), Concrete floodwall (A2), Rock revetments (C1, D) and concrete floodwall (A1, A3, B, C3).	IO2	Rock revetments (A2, B, C2), Concrete floodwall (A2), Rock revetments (C1, D) and concrete floodwall (A1, A3, B, C3). Add rock to rock berm (B) and concrete floodwall (C2) deferred until 2075.	IO3	Rock revetments (A2, B, C2), Concrete floodwall (A2). Rock revetments (C1, D) and concrete floodwall (A1, A3, B, C3) deferred until 2050-2075. Add rock to rock berm (B) and concrete floodwall (C2) deferred until 2075.	IO4	Rock revetments (A2, B, C2). Concrete floodwall (A2) deferred until 2050. Rock revetments (C1, D) and concrete floodwall (A1, A3, B, C3) deferred until 2050-2075. Add rock to rock berm (B) and concrete floodwall (C2) deferred until 2075.	Do Minimum	Reactive Maintenance
Economy	Land Use & Third Party Assets		Impacts on 3rd party land-owners with potential Compulsory Purchase Order required.		Impacts on 3rd party land-owners with potential Compulsory Purchase Order required.		Impacts on 3rd party land-owners with potential Compulsory Purchase Order required.		Impacts on 3rd party land-owners with potential Compulsory Purchase Order required.		No land-take required as no works would occur.
	Capital expenditure		This is the most expensive Implementation Option with costs required to provide all proposed measures required		This option is similar to Implementation Option 1 with a similar volume of rock and construction required.		This Implementation Option would result in comparatively low costs in the short term, further investment is likely required by 2075 giving this option advantages.		This Implementation Option would result in comparatively low costs in the short term, but further investment required by 2050 increasing cost while reducing economies of scale.		This Implementation Option would include minimal capital costs
	Maintenance expenditure		Operational maintenance costs for this Implementation Option should be relatively low. Some maintenance in the form of repositioning rocks may be required within the design life but this should be infrequent.		This Implementation Option has significant advantages as it would only require a routine and post storm monitoring plan and should require minimal maintenance during the design life. This Implementation Option has potential for monitoring and maintenance where works are deferred.		This Implementation Option scores slightly lower than Implementation Option 2 due to potential monitoring and maintenance where works are deferred.		This Implementation Option would require the most monitoring and potential maintenance in areas where works are deferred.		This Implementation Option would rely on reactive repairs and maintenance. Maintenance would be ad hoc and emergency repairs.
Safety	Health & Safety (Construction)		The revetments will be constructed by land based equipment although some marine works will be required to transport the rock to the workface. However, this Implementation Option requires significant construction works and therefore has an increased Health and Safety risk.		The revetments will be constructed by land based equipment although some marine works will be required to transport the rock to the workface. However, this Implementation Option requires significant construction works and therefore has an increased Health and Safety risk.		This Implementation Option requires less construction works with some works deferred. There will still be large volumes of rock armour required and working in a coastal setting which can be hazardous.		This Implementation Option requires less works than Implementation Option 1 and Implementation Option 2 . There will still be large volumes of rock armour required and working in a coastal setting which can be hazardous. The extent of this works required is lowest for this option, however potential need for emergency repair work is higher.		This Implementation Option would result in localised remedial works being required. Minor works of this nature would be risk assessed by the contractor. However, these works may be undertaken under poor working conditions due to immediate risk to the railway.
	Health & Safety (Design Life)		This option could pose some Health and Safety risks of people climbing on the rock revetments and becoming trapped. Warning signs should be installed to mitigate this. The revetments will significantly reduce the useable area of the beach which could lead to people becoming trapped by the tides. This can be mitigated through increased access points through the revetments.		This option could pose some Health and Safety risks of people climbing on the rock revetments and becoming trapped. Warning signs should be installed to mitigate this. The revetments will significantly reduce the useable area of the beach in which could lead to people becoming trapped by the tides. This can be mitigated through increased access points through the revetments. This Implementation Option is very similar to Implementation Option 1 but with some works deferred which would have minimal change on the Health and Safety risk.		This option could pose some Health and Safety risks of people climbing on the rock revetments and becoming trapped. Warning signs should be installed to mitigate this. The revetments will reduce the useable area of the beach in which could lead to people becoming trapped by the tides. This can be mitigated through increased access points through the revetments. This option includes less revetments and therefore the risk of people becoming trapped in the revetment is reduced		This option could pose some Health and Safety risks of people climbing on the rock revetments and becoming trapped. Warning signs should be installed to mitigate this. This option would leave more areas of the coast unprotected resulting in higher erosion and changing conditions on the foreshore which could present some Health and Safety risk to the public		This option will involve maintaining the defences through reactive repairs. Therefore as there will be no proactive monitoring or maintenance, deterioration of the defences will occur and there are likely to be periods where there are Health and Safety risks in the defence prior to repair works being undertaken. The frequency and scale of the damage and repair works will increase over time. This option does not include any improvement or upgrades to the defences to account for climate change therefore increased overtopping and flooding of the railway line will occur over time which poses Health and Safety Risks
Accessibility & Social Inclusion	Community		This Implementation Option would place a rock revetment along the entire coastline, which would likely have a detrimental effect on the local community. This is because the rock revetment would be placed along the length and breadth of the existing beach area, restricting its use and general amenity value for the local community.		This Implementation Option would place a rock revetment along the entire coastline, which would likely have a detrimental effect on the local community. This is because the rock revetment would be placed along the length and breadth of the existing beach area, restricting its use and general amenity value for the local community.		This Implementation Option would place a rock revetment along large amounts of the coastline, which would likely have a detrimental effect on the local community. This is because the rock revetment would be placed along the length and breadth of the existing beach area, restricting its use and general amenity value for the local community. Implementation of rock revetments at some sub areas will be deferred until 2050-2075. However the lower level of protection has potential to impact the local community in the event of extreme storm events.		This Implementation Option would only place rock revetments in three locations with the implementation of rock revetments at other areas being deferred. This reduces the area impacted by revetments but does result in more areas being at risk of erosion which has the potential to impact the local community in the event of extreme storm events, for example if footpaths are lost		While any maintenance programmes currently taking place will continue under this scenario, occurrences of coastal erosion and breach / collapse of existing erosion measures will continue and potentially get worse in line with climate change predictions. Furthermore, the continuation of such coastal erosion has the potential to impact operational train services using the rail line in future years.
	Access		There will be the imposition of rock revetments along significant lengths of this CCA, access steps will be incorporated into the revetment to ensure any formal / informal access points to the beach amenity that currently exist and used by members of the public are maintained but access along the beach will be restricted		There will be the imposition of rock revetments along the majority of this CCA, access steps will be incorporated into the revetment to ensure any formal / informal access points to the beach amenity that currently exist and used by members of the public are maintained but access along the beach will be restricted		There will be the imposition of rock revetments along sections of this CCA, access steps will be incorporated into the revetment to ensure any formal / informal access points to the beach amenity that currently exist and used by members of the public are maintained but access along the beach will be restricted. Implementation of rock revetments at some sub areas will be deferred until 2050-2075. Advantageous due to increased deferral of revetment works which will result in less impacts.		There will be the imposition of rock revetments along sections of this CCA, access steps will be incorporated into the revetment to ensure any formal / informal access points to the beach amenity that currently exist and used by members of the public are maintained but access along the beach will be restricted. Implementation of rock revetments at some sub areas will be deferred until 2050 Advantageous over Implementation Option 1 and Implementation Option 2 due to increased deferral of revetment works.		Continuous erosion of the beach will result in the eventual loss of walking paths behind the beach which currently provide access.
	Social & Recreation Facilities		Rock revetments will be placed along the majority of the coastline within this CCA, which will likely limit or remove the use of the beach amenity area for recreational purposes.		Rock revetments will be placed along the majority of the coastline within this CCA, which will likely limit or remove the use of the beach amenity area for recreational purposes.		Rock revetments will be placed along the majority of the coastline within this CCA, which will likely limit or remove the use of the beach amenity area for recreational purposes. Implementation of rock revetments at some sub areas will be deferred until 2050-2075.		Rock revetments will be placed along the majority of the coastline within this CCA, which will likely limit or remove the use of the beach amenity area for recreational purposes. Implementation of rock revetments at some sub areas will be deferred until 2050		This Implementation Option will not protect the existing social & recreational facilities (i.e. beach amenity areas) in this CCA from the effects of climate change.
Integration	Compatibility with Development Plans		This Implementation Option aligns with high level coastal protection and coastal area management objectives within the development plan. However, there is no enhancement of the areas, it does not utilise naturally occurring green infrastructure, is likely to impact upon natural habitats, involves large amount of hard standing and does not provide coastal recreation amenities or incorporate pedestrian/cycling infrastructure. The Wicklow County Council Dev Plan Cell 6 (Kilcoole - Wicklow Town) is dominated by The Murrough cSAC, which occupies 25% of the area. The Murrough is a coastal wetland complex, which stretches for 15km from Ballygannon to north of Wicklow town, and in parts, extends inland for up to 1km (The Murrough is also a pNHA). A shingle ridge stretches the length of the site. The site supports a number of habitats listed on Annex I of the EU Habitats Directive and a number of bird species listed on Annex I of the EU Birds Directive, as well as a wide range of important migratory birds. There are also many rare plants in the site. Has specific objectives including ' No development will be permitted that has an adverse impact on the environmental and ecological quality of The Murrough cSAC. The Planning Authority will have particular regard to the impact that all developments have on the integrity of the cSAC, including development that is within the cSAC and development that is not within a designated area, but which is likely to have an effect thereon.' and 'To facilitate the development of a coastal walk (having due regard to environmental designations and compliance with the EU Habitats Directive) and to restrict development that interferes with the achievement of this objective.' and 'To protect all listed views and prospects along the R761 and coast in this cell.' and 'To facilitate coastal protection works (natural, soft and hard engineered), to protect both the amenity and ecological value of the coastline and the significant economic and social value of the railway line.' The southern-most section of the study area also appears to be within Cell 7: Wicklow Town which seeks "To support the coastal protection and development objectives of the relevant Local (Area) Plan for Wicklow Town - Rathnew." It also states " No development will be permitted that has the potential to adversely affect the conservation objectives of the Murrough Wetlands SAC, The Murrough SPA, Wicklow Head SAC, or Wicklow Reef SPA either directly, indirectly or cumulatively. " It further states "To facilitate the development and enhancement of visitor and recreational facilities along the coastal area, particularly walking routes, car parking areas, signage, changing/toilet facilities and water based clubs." It also states "To facilitate coastal protection works (natural, soft and hard engineered), to protect both the amenity and ecological value of the coastline and the significant economic and social value of the railway line." Within zonings, Conservation Zone, cSPA, pNHA, SAC, public right of way and listed views. Note Wicklow Town LAP 2019 Conservation Area which appears to cover the southern tip of the study area.		This Implementation Option aligns with high level coastal protection and coastal area management objectives within the development plan. However, there is no enhancement of the areas, it does not utilise naturally occurring green infrastructure, is likely to impact upon natural habitats, involves large amount of hard standing and does not provide coastal recreation amenities or incorporate pedestrian/cycling infrastructure. The Wicklow County Council Dev Plan Cell 6 (Kilcoole - Wicklow Town) is dominated by The Murrough cSAC, which occupies 25% of the area. The Murrough is a coastal wetland complex, which stretches for 15km from Ballygannon to north of Wicklow town, and in parts, extends inland for up to 1km (The Murrough is also a pNHA). A shingle ridge stretches the length of the site. 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The Planning Authority will have particular regard to the impact that all developments have on the integrity of the cSAC, including development that is within the cSAC and development that is not within a designated area, but which is likely to have an effect thereon.' and 'To facilitate the development of a coastal walk (having due regard to environmental designations and compliance with the EU Habitats Directive) and to restrict development that interferes with the achievement of this objective.' and 'To protect all listed views and prospects along the R761 and coast in this cell.' and 'To facilitate coastal protection works (natural, soft and hard engineered), to protect both the amenity and ecological value of the coastline and the significant economic and social value of the railway line.' 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Within zonings, Conservation Zone, cSPA, pNHA, SAC, public right of way and listed views. Note Wicklow Town LAP 2019 Conservation Area which appears to cover the southern tip of the study area.		Do Minimum realises on the minimum amount of works will rely on repairs and do not actively tackle the issue. 'Patching up' existing infrastructure and not addressing long term climate issues does not satisfy development plans.
	Compatibility with Climate Adaptation Plans		This Implementation Option would align with the Transport Climate Change Sectoral Adaptation Plan (TCCSAP) by protecting the existing rail infrastructure through a complete upgrade of existing defences. However, it would also involve a significant volume of materials for the rock revetments to be brought to site and transport of same. No concrete will be required however. This Implementation Option provides the maximum level of coastal protection.		This Implementation Option would align with the Transport Climate Change Sectoral Adaptation Plan (TCCSAP) by protecting the existing rail infrastructure through a complete upgrade of existing defences. However, it would also involve a significant volume of materials for the rock revetments to be brought to site and transport of same. No concrete will be required however. This Implementation Option provides a high level of coastal protection.		This Implementation Option would align with the Transport Climate Change Sectoral Adaptation Plan (TCCSAP) by protecting the existing rail infrastructure through a complete upgrade of existing defences. However, this Implementation Option would avoid the significant volume of materials and transport of same until 2050 due to deferral of rock revetments in some sub areas. This Implementation Option provides a high level of coastal protection.		This Implementation Option would align with the Transport Climate Change Sectoral Adaptation Plan (TCCSAP) by protecting the existing rail infrastructure through a complete upgrade of existing defences. This Implementation Option would avoid the significant volume of materials and transport of same until after 2050 but does not provide coastal protection as robust as other options.		The Do Minimum Implementation Option works rely on repairs, not a full upgrade and so would not fully achieve the objectives of the plans which include the need for climate adaptation. The Climate Action Plan 2023 sets out under 15.3.6 (Adaptation) the challenges related to the operation and resilience of the inter alia the rail network. There is a need to go beyond 'patching up' and to prepare for current and future change.
	Compatibility with Transport Plans		This Implementation Option will improve the protection of the rail line against climate change impacts, in line with the Transport Strategy's aim to "provide a sustainable, accessible and effective transport system for the Greater Dublin Area which meets the region's climate change requirements, serves the needs of urban and rural communities, and supports economic growth". The Greater Dublin Area Cycle Network Plan proposes a National Cycle Route, the East Coast Trail, with an indicative route along part of the coastline between Greystones and Wicklow Town. Providing the intervention works can accommodate the East Coast Trail, this Implementation Option will support the Transport Strategy.		This Implementation Option will improve the protection of the rail line against climate change impacts, in line with the Transport Strategy's aim to "provide a sustainable, accessible and effective transport system for the Greater Dublin Area which meets the region's climate change requirements, serves the needs of urban and rural communities, and supports economic growth". The Greater Dublin Area Cycle Network Plan proposes a National Cycle Route, the East Coast Trail, with an indicative route along part of the coastline between Greystones and Wicklow Town. Providing the intervention works can accommodate the East Coast Trail, this Implementation Option will support the Transport Strategy.		This Implementation Option will improve the protection of the rail line against climate change impacts, in line with the Transport Strategy's aim to "provide a sustainable, accessible and effective transport system for the Greater Dublin Area which meets the region's climate change requirements, serves the needs of urban and rural communities, and supports economic growth". The Greater Dublin Area Cycle Network Plan proposes a National Cycle Route, the East Coast Trail, with an indicative route along part of the coastline between Greystones and Wicklow Town. Providing the intervention works can accommodate the East Coast Trail, this Implementation Option will support the Transport Strategy. However, this option would provide less protection than some of the other Implementation Options.		This Implementation Option will improve the protection of the rail line against climate change impacts, in line with the Transport Strategy's aim to "provide a sustainable, accessible and effective transport system for the Greater Dublin Area which meets the region's climate change requirements, serves the needs of urban and rural communities, and supports economic growth". The Greater Dublin Area Cycle Network Plan proposes a National Cycle Route, the East Coast Trail, with an indicative route along part of the coastline between Greystones and Wicklow Town. Providing the intervention works can accommodate the East Coast Trail, this Implementation Option will support the Transport Strategy. However, this option would provide less protection than some of the other Implementation Options.		Do Minimum is expected to involve disruptions to public transport in the short to medium term to conduct repairs as the need arises. The ad hoc repairs will address damage that may occur, but won't build longer-term resilience against potential impacts of flooding or erosion. This is likely to put increasing pressure on the public transport system and challenge its reliability, going against the Transport Strategy's focus on facilitating increased use of sustainable modes.
Environment	Biodiversity		This Implementation Option would result in loss of QI species and habitats under the footprint of the revetment. It also has the potential for change to hydrology causing erosion from hard infrastructure on seaward side. Changes to land-ward side wetland habitats unknown and Priority habitat of Calcareous fens present in this area. A significant amount of rock armour would be needed which would need to be transported by barge. Night time works could be needed causing disturbance. There are no Ramsar sites, there is one SAC (The Murrough SAC), one SPA (The Murrough SPA) and one HNA (The Murrough HNA) within CCA6.2. On the seaward side of the shingle bank which runs along The Murrough Wetlands SAC site drift line vegetation and previously rare and legally protected Oyster plant (Mertensia maritima) (Flora (Protection) Order, 1999) has been recorded on the gravelly shore (now considered extinct). Drift lines along entire length and perennial vegetation in south and covering a notable area. Salt meadows (Glauco-Puccinelli Talia maritime) to west of rail in line in and around Broadlough Estuary. Areas of 80-100 cover in proximity to west of rail line. Mediterranean salt meadows (Juncetalia maritime) with similar distribution to (Glauco-Puccinelli Talia maritime) to west of rail in line in and around Broadlough Estuary. Priority habitat at south of CCA. At the southern end of the site, Broad Lough, a brackish, partly tidal lake, has a well-developed saltmarsh community. Light-bellied Brent Goose occurs here in internationally important numbers. Nationally important for Red-throated Diver, Greylag Goose, Wigeon, Teal, Black-headed Gull and Herring Gull. It is probably the most important site in the country for nesting Little Tern and nesting area runs along the entire stretch of the shore line. Seal (QI of Lambay Island SAC) haul out here. Construction effects include disturbance to QI species and habitat degradation.		The Murrough SAC, SPA and HNA run along the entirety of this CCA so deferring portions of the works will reduce the impact caused by ECRIPP on protected areas. Some works in the southern end of the CCA (C2) which is home to sensitive environments such as salt meadows and salt marsh communities will be deferred until 2075.		The Murrough SAC, SPA and HNA run along the entirety of this CCA so deferring portions of the works will not stop the works from immediately having an impact on protected areas. However, deferring portions of the works will lessen the magnitude of the impact at any one time and allow biodiversity time to adapt. Changes to land-ward side wetland habitats unknown and Priority habitat of Calcareous fens present in this area. Impacts similar to CCA6.1 due to revetments and wall and loss of habitat, disturbance, mortality and fragmentation. Some works in the southern end of the CCA (C2, C3 and D) which is home to sensitive environments such as salt meadows and salt marsh communities will be deferred until 2050.		The Murrough SAC, SPA and HNA run along the entirety of this CCA so deferring portions of the works will not stop the works from immediately having an impact on protected areas. However, deferring portions of the works will lessen the magnitude of the impact at any one time and allow biodiversity time to adapt. Some works in the southern end of the CCA (C2, C3 and D) which is home to sensitive environments such as salt meadows and salt marsh communities will be deferred until 2050.		Do Minimum requires little/limited/targeted construction work and therefore minimal impact on biodiversity/ protected areas in the short to medium term. There are no Ramsar sites, there is one SAC (The Murrough SAC), one SPA (The Murrough SPA) and one HNA (The Murrough HNA) within CCA6.1 and repair works could cause disturbance to QI bird species and habitats for example. If unhindered, the natural process of habitat expansion will provide supporting habitat for SPA bird species of The Murrough SPA and foraging for breeding little tern. Limited impacts to QI species from construction are through impacts to habitats from habitat degradation and disturbance to birds and seals (QI of Lambay Island SAC) from noise.
	Landscape, visual & Seascape		As a natural material, rock revetements would tie in comparatively successfully with the natural qualities of this long stretch of coastline that is already influenced by existing rock revetements and the shingle beach material. The placement of material would be more robust and considered than reactionary measures, and as such would complement and enhance those rock revetements already present. When used consistently, the continuous feature will have a scale and uniformity that will complement its large sweeping nature, moderating landscape and visual effects. However, the significant modification of the landscape amenity and the large land take, which will result in the loss of a large areas of beach which is considered adverse.		As a natural material, rock revetements would tie in comparatively successfully with the natural qualities of this long stretch of coastline that is already influenced by existing rock revetements and the shingle beach material. The placement of material would be more robust and considered than reactionary measures, and as such would complement and enhance those rock revetements already present. When used consistently, the continuous feature will have a scale and uniformity that will complement its large sweeping nature, moderating landscape and visual effects. However, the significant modification of the landscape amenity and the large land take, which will result in the loss of a large areas of beach which is considered adverse.		As a natural material, rock revetements would tie in comparatively successfully with the natural qualities of this long stretch of coastline that is already influenced by existing rock revetements and the shingle beach material. The placement of material would be more robust and considered than reactionary measures, and as such would complement and enhance those rock revetements already present. When used consistently, the continuous feature will have a scale and uniformity that will complement its large sweeping nature, moderating landscape and visual effects. However, the significant modification of the landscape amenity and more moderate land take will result in the loss of a large areas of beach which is considered adverse.		As a natural material, rock revetements would tie in comparatively successfully with the natural qualities of this long stretch of coastline that is already influenced by existing rock revetements and the shingle beach material. The placement of material would be more robust and considered than reactionary measures, and as such would complement and enhance those rock revetements already present. When used consistently, the continuous feature will have a scale and uniformity that will complement its large sweeping nature, moderating landscape and visual effects. However, the significant modification of the landscape amenity and more moderate land take will result in the loss of a large areas of beach which is considered adverse.		Continued reactive interventions would compromise the character and quality of this stretch of coastline, with ongoing works generating adverse landscape/seascape and visual effects. Given the scale of this section of coastline, this ongoing state of repair and disruption is comparatively less impactful than in other parts of the coastline.
	Archaeology, Architectural & Cultural Heritage		A potential direct impact on one SMR Zone of Notification associated with WI019-038; Prehistoric site - lithic scatter has been identified, there is also the potential for direct impacts to occur on previously unrecorded archaeological heritage. There is the potential for significant indirect setting and visual impacts to occur on one SMR site WI019-038; Prehistoric site - lithic scatter and the associated Zone of Notification. There is also the potential for indirect setting and visual impacts to occur on two further SMR sites (WI25-013; Castle - Anglo-Norman masonry castle and WI025-012012; Promontory fort - coastal). There is the potential for indirect setting and visual impacts to occur on 3 NIAH Sites one of which is also an RPS site (16401912; Station master's house (RPS ref 13-38), 16005001; lighthouse, 16004154; pier/jetty). There is the potential for indirect setting and visual impacts to occur on one further RPS site (RPS ref 19-12; coastguard cottages). There is also the potential for significant direct impacts to occur on previously unrecorded material culture.		A potential direct impact on one SMR Zone of Notification associated with WI019-038; Prehistoric site - lithic scatter has been identified, there is also the potential for direct impacts to occur on previously unrecorded archaeological heritage. There is the potential for significant indirect setting and visual impacts to occur on one SMR site WI019-038; Prehistoric site - lithic scatter and the associated Zone of Notification. There is also the potential for indirect setting and visual impacts to occur on two further SMR sites (WI25-013; Castle - Anglo-Norman masonry castle and WI025-012012; Promontory fort - coastal). There is the potential for indirect setting and visual impacts to occur on 3 NIAH Sites one of which is also an RPS site (16401912; Station master's house (RPS ref 13-38), 16005001; lighthouse, 16004154; pier/jetty). There is the potential for indirect setting and visual impacts to occur on one further RPS site (RPS ref 19-12; coastguard cottages). There is also the potential for significant direct impacts to occur on previously unrecorded material culture. The site with potential for direct impact is prehistoric site W1010-038 is within sub cell area B. Works within this sub cell are not being deferred with this option.		The site with potential for direct impact is prehistoric site W1010-038 is within sub cell area B. Works within this sub cell are not being deferred with this option. However, some works within sub cell area D and A1 are being deferred and these have the potential to indirectly impact the lighthouse, pier/jetty and railway station.		The site with potential for direct impact is prehistoric site W1010-038 is within sub cell area B. Works within this sub cell are not being deferred with this option. However, some works within sub cell area D and A1 are being deferred and these have the potential to indirectly impact the lighthouse, pier/jetty and railway station.		Continued degradation, and piecemeal, reactive interventions, would generate a coastline that is in a constant state of repair and disruption, with constant adverse Archaeology, Architectural and Cultural Heritage effects.
	Marine Archaeology		There are 2 known wrecks; WO2313, W18550 and 1 recorded loss W10651 located in this section. This Implementation Option does not involve any works offshore and therefore there are no direct impacts on previously unrecorded wrecks, paleoenvironmental landscapes and material culture, and therefore no potential impact on archaeological features in the intertidal and marine elements. However, there will be a need for significant trans-shipment and marine delivery of the rock to the nearshore and there is a low risk of potential impact on archaeological features in the intertidal and marine elements.		There are 2 known wrecks; WO2313, W18550 and 1 recorded loss W10651 located in this section. This Implementation Option does not involve any works offshore and therefore there are no direct impacts on previously unrecorded wrecks, paleoenvironmental landscapes and material culture, and therefore no potential impact on archaeological features in the intertidal and marine elements. However, there will be a need for significant trans-shipment and marine delivery of the rock to the nearshore and there is a low risk of potential impact on archaeological features in the intertidal and marine elements.		There are 2 known wrecks; WO2313, W18550 and 1 recorded loss W10651 located in this section. This Implementation Option does not involve any works offshore and therefore there are no direct impacts on previously unrecorded wrecks, paleoenvironmental landscapes and material culture, and therefore no potential impact on archaeological features in the intertidal and marine elements. However, there will be a need for some trans-shipment and marine delivery of the rock to the nearshore and there is a low risk of potential impact on archaeological features in the intertidal and marine elements. Due to lower quantities of rock required this Implementation Option scores higher than Implementation Option 1 and Implementation Option 2 .		There are 2 known wrecks; WO2313, W18550 and 1 recorded loss W10651 located in this section. This Implementation Option does not involve any works offshore and therefore there are no direct impacts on previously unrecorded wrecks, paleoenvironmental landscapes and material culture, and therefore no potential impact on archaeological features in the intertidal and marine elements. However, there will be a need for some trans-shipment and marine delivery of the rock to the nearshore and there is a low risk of potential impact on archaeological features in the intertidal and marine elements.		Do Minimum would provide some advantage as there would be limited/targeted construction and therefore no potential impact on archaeological features in the intertidal and marine elements.
	Noise and Vibration		Noise impact will be from mobile plant when working in proximity to population Noise Sensitive Locations . Very low density of population Noise Sensitive Locations along full length. Specific instances of elevated noise will be localised and temporary when working close to Noise Sensitive Locations . There will be periods of night-time works required to work around tides. No significant vibration impacts from this proposal. All impacts are temporary to short-term. No long term operational noise or vibration impacts.		Noise impact will be from mobile plant when working in proximity to population Noise Sensitive Locations . Very low density of population Noise Sensitive Locations along full length. Specific instances of elevated noise will be localised and temporary when working close to Noise Sensitive Locations . There will be periods of night-time works required to work around tides. No significant vibration impacts from this proposal. All impacts are temporary to short-term. No long term operational noise or vibration impacts.		Noise impact will be from mobile plant when working in proximity to population Noise Sensitive Locations . Very low density of population Noise Sensitive Locations along full length. Specific instances of elevated noise will be localised and temporary when working close to Noise Sensitive Locations . There will be periods of night-time works required to work around tides. No significant vibration impacts from this proposal. All impacts are temporary to short-term. No long term operational noise or vibration impacts. Slightly advantage due to construction works being staggered, therefore, noise and vibration construction impacts at each sub area will not be occurring concurrently.		Noise impact will be from mobile plant when working in proximity to population Noise Sensitive Locations . Very low density of population Noise Sensitive Locations along full length. Specific instances of elevated noise will be localised and temporary when working close to Noise Sensitive Locations . There will be periods of night-time works required to work around tides. No significant vibration impacts from this proposal. All impacts are temporary to short-term. No long term operational noise or vibration impacts. Slightly advantage over Implementation Option 1 due to construction works being staggered, therefore, noise and vibration construction impacts at each sub area will not be occurring concurrently.		Do-Minimum would provide some advantages due to absence of temporary - short term noise and vibration impacts from any construction works. The existing maintenance works will continue as necessary which will be of neutral impact, albeit these will likely intensify in frequency. The long term operational scenario is neutral compared to other options, although the rail service will likely be less reliable and has potential for increased traffic on surrounding road network. Due to the longer term duration of potential impacts, this is weighted as less advantageous over other options.
	Air Quality		Minimal operational phase impacts, with the assumption that maintenance requirement is very low. This Implementation Option would facilitate operational phase reliance on public transport and reduce reliance on private vehicles for the long term. Potential for construction phase impacts associated with potentially dusty activities and construction vehicle emissions. Construction phase impacts would be likely considered short term and dust mitigation can be put in place.		Minimal operational phase impacts, with the assumption that maintenance requirement is very low hence some advantages. This Implementation Option would facilitate operational phase reliance on public transport and reduce reliance on private vehicles for the long term. Potential for construction phase impacts associated with potentially dusty activities and construction vehicle emissions. Construction phase impacts would be likely considered short term and dust mitigation can be put in place. These impacts will be less impactful due to deferral of some construction works.		Minimal operational phase impacts, with the assumption that maintenance requirement is very low hence some advantages. This Implementation Option would facilitate operational phase reliance on public transport and reduce reliance on private vehicles for the long term. Potential for construction phase impacts associated with potentially dusty activities and construction vehicle emissions. Construction phase impacts would be likely considered short term and dust mitigation can be put in place. There is potential for some construction phase impacts associated with potentially dusty activities but less compared to more significant interventions.		Minimal operational phase impacts, with the assumption that maintenance requirement is very low hence some advantages. This Implementation Option would facilitate operational phase reliance on public transport and reduce reliance on private vehicles for the long term. Potential for construction phase impacts associated with potentially dusty activities and construction vehicle emissions. Construction phase impacts would be likely considered short term and dust mitigation can be put in place. There is potential for some construction phase impacts associated with potentially dusty activities but less compared to more significant interventions.		Lower or not significant construction phase impacts. General construction dust emissions and heavy machinery have the potential to be used for reactive do-minimum construction works, resulting sources of dust and air pollution. Potential for long term local operational phase impacts should the rail line be suspended in future. If rail services are suspended this has the potential to increase local road traffic.
	Carbon Management		Of the Implementation Options, the Whole Life Carbon (tonnes CO2e) of this Implementation Option would be highest as it would require the full intervention of all measures now. This Implementation Option would facilitate operational phase reliance on public transport and reduce reliance on private vehicles for the long term.		Of the Implementation Options, the Whole Life Carbon (tonnes CO2e) of this Implementation Option would be high as it would require the implementation of the majority of the measures now. This Implementation Option would facilitate operational phase reliance on public transport and reduce reliance on private vehicles for the long term.		Of the Implementation Options, the Whole Life Carbon (tonnes CO2e) of this Implementation Option would be low as it would require the only partial intervention of all measures now. This option would facilitate operational phase reliance on public transport and reduce reliance on private vehicles for the long term. This option keeps the volume of materials to a minimum whilst affording protection to the railway infrastructure.		Of the Implementation Options, the Whole Life Carbon (tonnes CO2e) of this Implementation Option would be low as it would require the only partial intervention of all measures now. This option would facilitate operational phase reliance on public transport and reduce reliance on private vehicles for the long term. This option keeps the volume of materials to an absolute minimum whilst affording protection to the railway infrastructure. However, further works with further CO2e may be needed relatively quickly to maintain this level of protection.		GHG emissions from embodied carbon is minimised due to no construction. General construction works and heavy machinery used to implement beach nourishment and dune regeneration are sources of dust and air pollution. However, the potential for long term local operational phase impacts should the rail line be suspended in future. If rail services are suspended this has the potential to increase local road traffic.
	Water Resources		Minimal impacts to groundwater as minimal below ground construction required.		Minimal impacts to groundwater as minimal below ground construction required.		Minimal impacts to groundwater as minimal below ground construction required.		Minimal impacts to groundwater as minimal below ground construction required.		Do Minimum would provide a significant advantage as there would be minimal construction work and therefore negligible impact on groundwater.

Core Criteria	Sub Criteria	IO1	Rock revetments (A2, B, C2), Concrete floodwall (A2), Rock revetments (C1, D) and concrete floodwall (A1, A3, B, C3).	IO2	Rock revetments (A2, B, C2), Concrete floodwall (A2), Rock revetments (C1, D) and concrete floodwall (A1, A3, B, C3). Add rock to rock berm (B) and concrete floodwall (C2) deferred until 2075.	IO3	Rock revetments (A2, B, C2), Concrete floodwall (A2), Rock revetments (C1, D) and concrete floodwall (A1, A3, B, C3) deferred until 2050-2075. Add rock to rock berm (B) and concrete floodwall (C2) deferred until 2075.	IO4	Rock revetments (A2, B, C2), Concrete floodwall (A2) deferred until 2050. Rock revetments (C1, D) and concrete floodwall (A1, A3, B, C3) deferred until 2050-2075. Add rock to rock berm (B) and concrete floodwall (C2) deferred until 2075.	Do Minimum	Reactive Maintenance
	Geology and Soils		Rock revetment and wave walls are anticipated to cause minimal disturbance to geological resources throughout CCA6.2. There is also potential that excavations in the vicinity of historic and current contaminative land features (e.g., former gas works, infilled pits, military facilities, industrial land uses, etc.) could result in the remobilisation of associated contamination. Furthermore the quantity of rock required is very significant.		Rock revetment and wave walls are anticipated to cause minimal disturbance to geological resources throughout CCA6.2. There is also potential that excavations in the vicinity of historic and current contaminative land features (e.g., former gas works, infilled pits, military facilities, industrial land uses, etc.) could result in the remobilisation of associated contamination. Furthermore the quantity of rock required is very significant.		Rock revetment and wave walls are anticipated to cause minimal disturbance to geological resources throughout CCA6.2. There is also potential that excavations in the vicinity of historic and current contaminative land features (e.g., former gas works, infilled pits, military facilities, industrial land uses, etc.) could result in the remobilisation of associated contamination. Reduced quantities of rock required for this option.		Rock revetment and wave walls are anticipated to cause minimal disturbance to geological resources throughout CCA6.2. There is also potential that excavations in the vicinity of historic and current contaminative land features (e.g., former gas works, infilled pits, military facilities, industrial land uses, etc.) could result in the remobilisation of associated contamination. Furthermore the quantity of rock required is significant, although less than Implementation Option 1 , Implementation Option 2 and Implementation Option 3 .		There will be some advantages in the short term as a result of the minimal disturbance during the construction phase of the scheme. However, the mitigation installed may not be sufficient to address erosion of geological resources caused by climate change.
	Material & Circular Economy		This Implementation Option has a materials consumption score of 1,070,563t, the highest of all implementation options.		This Implementation Option would require significant material quantities.		This Implementation Option would require lower material quantities .		This Implementation Option would require lower material quantities in the initial scheme than Implementation Option 1 , Implementation Option 2 and Implementation Option 3 . However, it could require more materials to maintain the level of protection.		Do Minimum would provide significant advantages over other Implementation Options as it minimises the consumption and use of material resources through maximising the use of existing assets to reduce the extent of any new construction required (i.e. during the current maintenance regime of ongoing monitoring and reactive repairs).
	Waste		This Implementation Option would generate the highest waste quantities.		There will be a slightly lower level of waste generated compared to the full implementation of all measures.		There will be a significant lower level of waste generated compared to the full implementation of all measures.		There will be a significant lower level of waste generated compared to the full implementation of all measures.		Do Minimum would provide significant advantages over other Implementation Options as it minimises the generation and disposal of waste through maximising the use of existing assets to reduce the extent of any new construction required (i.e. during the current maintenance regime of ongoing monitoring and reactive repairs).
	Traffic and Transport		Minimal operational impact expected to traffic & transport; the intervention works will be localised to the coast and are not anticipated to affect transport systems or travel demand.		Minimal operational impact expected to traffic & transport; the intervention works will be localised to the coast and are not anticipated to affect transport systems or travel demand.		Minimal operational impact expected to traffic & transport; the intervention works will be localised to the coast and are not anticipated to affect transport systems or travel demand. However the protection measures are not as significant as Implementation Option 1 and Implementation Option 2 and so higher potential for unexpected disruptions due to ad hoc repairs.		Minimal operational impact expected to traffic & transport; the intervention works will be localised to the coast and are not anticipated to affect transport systems or travel demand. However the protection measures are not as robust for this Implementation Option and so higher potential for unexpected disruptions due to ad hoc repairs.		Potential unexpected disruptions to transport to make ad hoc repairs. As the road network is further inland than the rail line in this CCA, rail service impacts would leave passengers with limited alternative travel options, leading to increased congestion on the wider road network and possible overcrowding on buses.
Engineering / Technical	Constructability		This Implementation Option requires significant volumes of rock armour and the construction is relatively simple but would be slow due to the scale of the works. Several work fronts could be opened up to improve construction duration. It is assumed that rock armour will be delivered by marine plant.		This Implementation Option requires significant volumes of rock armour and the construction is relatively simple but would be slow due to the scale of the works. Several work fronts could be opened up to improve construction duration. It is assumed that rock armour will be delivered by marine plant.		This Implementation Option requires less rock armour and therefore construction will be simplified and less rock armour will be required.		This Implementation Option requires a low quantity of materials overall and therefore construction will be simplified and less rock armour will be required.		This Implementation Option is likely to require ad hoc emergency repairs to the wall alongside the railway. Localised emergency works may also be required after significant weather events.
	Rail service impact		Minimal impact on operation of railway line. Irish Rail will require to be notified of works as adjacent to the railway line but this is expected to be low risk. The operational phase of the rail service will be enhanced by this coastal protection intervention.		Minimal impact on operation of railway line. Irish Rail will require to be notified of works as adjacent to the railway line but this is expected to be low risk. The operational phase of the rail service will be enhanced by this coastal protection intervention.		Minimal impact on operation of railway line. Irish Rail will require to be notified of works as adjacent to the railway line but this is expected to be low risk. The operational phase of the rail service will be enhanced by this coastal protection intervention. Lower standard of protection may result in railway operational impact due to wave overtopping. Likely future interventions required by 2050-2075 increasing potential impacts on the railway.		Minimal impact on operation of railway line. Irish Rail will require to be notified of works as adjacent to the railway line but this is expected to be low risk. The operational phase of the rail service will be enhanced by this coastal protection intervention. Lower standard of protection may result in railway operational impact due to wave overtopping. Likely future interventions required by 2050 increasing potential impacts on the railway.		This Implementation Option is likely to require ad hoc and emergency works to the wall alongside the railway, which may impact rail operations. It will be difficult to plan ahead for these works as there will be no strategy in place for routine maintenance works.
	Reliance on maintenance Maintenance burden		The revetments only require routine and post storm monitoring but should require minimal maintenance during the design life.		The revetments only require routine and post storm monitoring but should require minimal maintenance during the design life. Where works are deferred, additional maintenance may be required to maintain the standard of protection.		The revetments only require routine and post storm monitoring but should require minimal maintenance during the design life. Where works are deferred, additional maintenance may be required to maintain the standard of protection.		The revetments only require routine and post storm monitoring but should require minimal maintenance during the design life. Where works are deferred, additional maintenance may be required to maintain the standard of protection.		This Implementation Option would rely heavily on monitoring and maintenance.
	Adaptation		This Implementation Option would be designed to account for predicted climate change. Future changes to the rock revetments would be possible but complex and somewhat limited.		This Implementation Option would be designed to account for predicted climate change. Future changes to the rock revetments would be possible but complex and somewhat limited.		Future adaptation accounted for in the design.		Future adaptation accounted for in the design.		Minimal opportunities for adaptation.
	Residual risk		This Implementation Option would use new hard engineering to manage risk which is very resilient with little residual risk.		This Implementation Option would use new hard engineering to manage risk which is very resilient with little residual risk.		Deferral of works could lead to weaknesses in the existing hard defences and unprotected areas.		Deferral of works could lead to weaknesses in the existing hard defences and unprotected areas.		This Implementation Option would not eliminate weaknesses in the existing hard defence, which could lead to rapid failure.
Planning Risk	Consenting risk		A full upgrade of existing defences would protect the area for a longer time in line with planning policy. Works are carried out in Natura 2000 site with potential for temporary and permanent impacts on qualifying interests which could invoke IROPI. Works will likely require a Maritime Area Consent.		An upgrade of existing defences would protect the area for a longer time in line with planning policy Works are carried out in Natura 2000 site with potential for temporary and permanent impacts on qualifying interests which could invoke IROPI. Works will likely require a Maritime Area Consent.		An upgrade of existing defences would protect the area for a longer time in line with planning policy Works are carried out in Natura 2000 site with potential for temporary and permanent impacts on qualifying interests which could invoke IROPI. Works will likely require a Maritime Area Consent.		An upgrade of existing defences would protect the area for a longer time in line with planning policy Works are carried out in Natura 2000 site with potential for temporary and permanent impacts on qualifying interests which could invoke IROPI. Works will likely require a Maritime Area Consent.		Do Minimum would provide a significant advantage as it would require no consents.