Winter 2023

Regional Water Resources Plan South East

Natura Impact Statement

Appendix D

Tionscadal Éireann Project Ireland 2040

Data disclaimer: This document uses best available data at time of writing. As data relating to population forecasts and trends are based on information gathered before the Covid-19 Pandemic, monitoring and feedback will be used to capture any updates. The National Water Resources Plan will also align to relevant updates in applicable policy. In December 2022, the Water Services (Amendment) (No. 2) Act, 2022 was signed into law. This act provides that, from the 31 December 2022, Irish Water will only be known as Uisce Éireann. It also provides that, from that date, all references in any enactment, legal proceedings or other document to Irish Water shall be construed as references to Uisce Éireann only. The NIS reflects this transition from Irish Water to Uisce Éireann.

Baseline data included in the RWRP-SE has been incorporated from numerous sources including but not limited to; National Planning Framework, Central Statistics Office, Regional Spatial and Economic Strategies, Local Authority data sets, Regional Assembly data sets and Uisce Éireann data sets. Data sources will be detailed in the relevant sections of the RWRP-SE. 2019 was selected as the base year to align with the planning period (2019-2025) of the NWRP.

Limitation: This report has been prepared on behalf of, and for the exclusive use of Jacobs' Client (Uisce Éireann), and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party.

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Appendix D

Adverse Effects on Site Integrity Tables

Note: TG3-SAK-476 is part of the Preferred Approach for SAK, but is assessed in the SAJ Preferred Approach (within grouped option TG2-SAJ-614) in the RWRP South West NIS.

Table D1.01: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-073 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Lower River Suir SAC (002137)	900m	**Annex I habitats** Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Taxus baccata* woods of the British Isles [91J0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	New GW and upgrade Jamestown WTP to supply deficit (progressing as project to address RAL). New GW abstraction, new storage, new watermains and WTP upgrade in the vicinity of this European site. Works are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works.	New GW and upgrade Jamestown WTP to supply deficit (progressing as project to address RAL). New GW abstraction, new storage, new watermains and WTP upgrade in the vicinity of this European site. Works are hydrologically linked to this European site. This GW abstraction overlies productive fissured bedrock which this European site also overlies. However, no operational impacts are predicted due to the abstraction being 6km from where the European site overlies the bedrock.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.02: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-077 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
River Barrow And River Nore SAC (002162)	0m	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170]	Increase GW abstraction from existing spring and BH and upgrade Callan WTP to supply deficit. Increase one GW abstraction, replace pumping station and upgrade Callan WTP within this European site. Increase one GW abstraction and new reservoir adjacent to this European site. Works are	Increase GW abstraction from existing spring and BH and upgrade Callan WTP to supply deficit. Increase one GW abstraction, replace pumping station and upgrade Callan WTP within this European site. Increase one GW abstraction and new reservoir	• General Mitigation Measures are outlined in **Section 6.3.3** • Hydrogeological modelling as in **Section 6.3.5** • Hydrological modelling as in **Section 6.3.5**	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Vertigo moulinsiana* (Desmoulin's Whorl Snail) [1016] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Trichomanes speciosum* (Killarney Fern) [1421] *Margaritifera durrovensis* (Nore Pearl Mussel) [1990]	hydrologically linked to this European site. European site within Zone of Contribution (ZOC) of abstraction. **Physical loss of habitat –** there is potential for some loss of/damage to QI habitats or the supporting habitats of QI species during construction works given that the works are within the SAC. **Mortality -** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species, their prey, and restrict access to spawning habitat further affecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.	adjacent to this European site. Works are hydrologically linked to this European site. European site within Zone of Contribution (ZOC) of abstraction. **Habitat degradation – hydrological/ hydrogeological changes -** abstraction could lead to hydrological changes (reduced flows – impacting on water quality) that could impact groundwater dependent (GWD) QI species or habitats such as Desmoulin's whorl snail, hydrophilous tall herb fringe communities, water courses of plain to montane levels, petrifying springs with tufa formation and alluvial forests. **Water table/availability - t**here is potential for impacts on GWD QI species and habitats through a reduction in flows/water levels.	With the implementation of mitigation as noted above there is no potential for AESI	

Table D1.03: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAK-077 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
River Nore SPA (004233)	1.7km	Kingfisher (*Alcedo atthis*) [A229]	Breed	Increase GW abstraction from existing spring and BH and upgrade Callan WTP to supply deficit. Increase two GW abstractions, replace pumping station, new	Increase GW abstraction from existing spring and BH and upgrade Callan WTP to supply deficit. Increase two GW abstractions, replace pumping station, new reservoir and	• General Mitigation Measures are outlined in **Section 6.3.3**	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
				reservoir and upgrade Callan WTP in the vicinity of this European site. Works are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses from run-off or soakage during construction that could impact the habitats used by kingfisher. Potential pollution of watercourses during construction could have indirect effects on kingfisher through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to kingfisher, given the works are in the vicinity of the SPA.	upgrade Callan WTP in the vicinity of this European site. Works are hydrologically linked to this European site. No operational impacts predicted.	With the implementation of mitigation as noted above there is no potential for AESI	

Table D1.04: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-106 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Lower River Suir SAC (002137)	9.7km	**Annex I habitats** Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Taxus baccata* woods of the British Isles [91J0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095]	Rationalise Templetuohy to Templemore [rationalise to College Hill WTP]. Rationalisation within WRZ. Increase GW abstraction, new pump, upgrade Templemore College Hill WTP, upgrade Whitefield WTP, and abandon Templetuohy WTP in the vicinity of hydrological links to this European site. Some works hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats downstream.	Rationalise Templetuohy to Templemore [rationalise to College Hill WTP]. Rationalisation within WRZ. Increase GW abstraction, new pump, upgrade Templemore College Hill WTP, upgrade Whitefield WTP, and abandon Templetuohy WTP in the vicinity of hydrological links to this European site. Some works hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Lampetra planeri (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]				

Table D1.05: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-120 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Lower River Suir SAC (002137)	0m	**Annex I habitats** Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Taxus baccata* woods of the British Isles [91J0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	New SW abstraction from Aherlow River and upgrade Rossadrehid WTP, Thomastown Augmentation WTP, Springmount Source WTP and Farranamnagh WTP for WQ. New SW abstraction, new mains and WTP upgrade within this European site. New pumping station, new reservoir, three WTP upgrades and new mains in the vicinity of this European site. Some works are hydrologically linked to this European site. **Physical loss of habitat –** there is potential for some loss of/damage to QI habitats or the supporting habitats of QI species during construction works given that the works are within the SAC. **Mortality -** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species, their prey, and restrict access to spawning habitat further affecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.	New SW abstraction from Aherlow River and upgrade Rossadrehid WTP, Thomastown Augmentation WTP, Springmount Source WTP and Farranamnagh WTP for WQ. New SW abstraction, new mains and WTP upgrade within this European site. New pumping station, new reservoir, three WTP upgrades and new mains in the vicinity of this European site. Some works are hydrologically linked to this European site. **Habitat degradation – hydrological/ hydrogeological changes -** abstraction could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats including freshwater pearl mussel (FWPM), white-clawed crayfish, lamprey species, shad, salmon, otter, and water courses of plain to montane levels. **Water table/availability -** there is potential for impacts on otter and other QI species and habitats utilising watercourses hydrologically linked to this European site through a reduction in flows/water levels.	• General Mitigation Measures are outlined in **Section 6.3.3** • Hydrological modelling as in **Section 6.3.5** In addition to general mitigation measures outlined above, option specific measures have been identified for **SAK-120** (see **Section 6.3.4**) as follows: Construction works (pipeline crossing of SAC) will avoid the main migration and spawning periods for salmon (this period is also critical to the lifecycle of the freshwater pearl mussel) to minimise the risk of displacement or barrier effects due to noise, vibration or site-derived pollutants, unless project-specific environmental assessments identify that any effects associated with construction works will be 'not significant' or will have no adverse effect on the integrity of the SAC. To note there are significant variations in the timing and duration of salmonid spawning activity throughout the Republic of Ireland (IFI, 2016). Instream works should be carried out during the period July-September (except in exceptional circumstances and with agreement with IFI). *Note it is not anticipated that there would be any direct impacts on FWPM, as such impacts could be designed out through, for example, strategic positioning of crossing points. Only indirect effects are anticipated for FWPM through potential impacts on their host species. The potential for direct impacts can only be determined at the project stage which will influence the location for any crossing points.*	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
					With the implementation of mitigation as noted above there is no potential for AESI	

Table D1.06: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-180 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Lower River Suir SAC (002137)	2.2km	**Annex I habitats** Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Taxus baccata* woods of the British Isles [91J0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	New GW abstraction, new WTP to supply deficit and upgrade of Fawnagown WTP for WQ purposes. New GW abstraction, new pumps, new balancing tank, new storage, new WTP, WTP upgrade, and new mains in the vicinity of this European site. New mains adjacent to hydrological link to this European site. GW abstraction from karstic region European site overlies. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works.	New GW abstraction, new WTP to supply deficit and upgrade of Fawnagown WTP for WQ purposes. New GW abstraction, new pumps, new balancing tank, new storage, new WTP, WTP upgrade, and new mains in the vicinity of this European site. New mains adjacent to hydrological link to this European site. GW abstraction from karstic region European site overlies. However, no operational impacts predicted due to the GW abstraction site being over 10km from area of European site that overlies the same karstic region.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.07: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-211 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Lower River Suir SAC (002137)	0m	**<u>Annex I habitats</u>** Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Taxus baccata* woods of the British Isles [91J0] **<u>Annex II species</u>** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Increase GW abstraction from 2 BHs and upgrade Ballylooby Springs WTP to supply deficit. Increase GW abstraction, upgrade pumping station, upgrade WTP, and new mains within this European site. 2 WTP upgrades and new mains in the vicinity of this European site. Some of the works are hydrologically linked to this European site. European site within ZOC of abstraction. **Physical loss of habitat –** there is potential for some loss of/damage to QI habitats or the supporting habitats of QI species during construction works given that the works are within the SAC. **Mortality -** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species, their prey, and restrict access to spawning habitat further affecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.	Increase GW abstraction from 2 BHs and upgrade Ballylooby Springs WTP to supply deficit. Increase GW abstraction, upgrade pumping station, upgrade WTP, and new mains within this European site. 2 WTP upgrades and new mains in the vicinity of this European site. Some of the works are hydrologically linked to this European site. European site within ZOC of abstraction. **Habitat degradation – hydrological/ hydrogeological changes -** abstraction could lead to hydrological changes (reduced flows – impacting on water quality) that could impact GWD QI habitats such as hydrophilous tall herb fringe communities, water courses of plain to montane levels, and alluvial forests. **Water table/availability - t**here is potential for impacts on GWD habitats through a reduction in flows/water levels.	• General Mitigation Measures are outlined in **Section 6.3.3** • Hydrogeological modelling as in **Section 6.3.5** • Hydrological modelling as in **Section 6.3.5** In addition to general mitigation measures outlined above, option specific measures have been identified for **SAK-211** (see **Section 6.3.4**) as follows: Construction works (pipeline crossing of SAC) will avoid the main migration and spawning periods for salmon (this period is also critical to the lifecycle of the freshwater pearl mussel) to minimise the risk of displacement or barrier effects due to noise, vibration or site-derived pollutants, unless project-specific environmental assessments identify that any effects associated with construction works will be 'not significant' or will have no adverse effect on the integrity of the SAC. To note there are significant variations in the timing and duration of salmonid spawning activity throughout the Republic of Ireland (IFI, 2016). Instream works should be carried out during the period July-September (except in exceptional circumstances and with agreement with IFI). *Note it is not anticipated that there would be any direct impacts on FWPM, as such impacts could be designed out through, for example, strategic positioning of crossing points. Only indirect effects are anticipated for FWPM through potential impacts on their host species. The potential for direct impacts can only be determined at the project stage which will influence the location for any crossing points.* With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.08: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAK-211 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Blackwater Callows SPA (004094)	16.6km	Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Black-tailed Godwit (*Limosa limosa*) [A156] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b	Increase GW abstraction from 2 BHs and upgrade Ballylooby Springs WTP to supply deficit. Works in the Zone of Influence (ZoI) of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g. grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Increase GW abstraction from 2 BHs and upgrade Ballylooby Springs WTP to supply deficit. Works in the Zone of Influence (ZoI) of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.09: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-386 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Blackwater River (Cork/Waterford) SAC (002170)	2.5km	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Perennial vegetation of stony banks [1220] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Taxus baccata* woods of the British Isles [91J0] **Annex II species**	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. WTP upgrade is in the vicinity of and adjacent to a hydrological link to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats.	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. WTP upgrade is in the vicinity of and adjacent to a hydrological link to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Margaritifera margaritifera (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Trichomanes speciosum* (Killarney Fern) [1421]				

Table D1.10: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAK-387 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Dungarvan Harbour SPA (004032)	1.8km	Great Crested Grebe (*Podiceps cristatus*) [A005] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Red-breasted Merganser (*Mergus serrator*) [A069] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Turnstone (*Arenaria interpres*) [A169] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. All three WTP upgrades in the vicinity of this European site. Two of the WTPs are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g. grassland, arable farmland), given the works are in the vicinity of the SPA and potentially within supporting habitat for the QI species.	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. All three WTP upgrades in the vicinity of this European site. Two of the WTPs are hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.11: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-441 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Lower River Suir SAC (002137)	870m	**Annex I habitats** Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Taxus baccata* woods of the British Isles [91J0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	New GW abstraction (karstic) and new WTP to supply deficit. New GW abstraction, new WTP, new pump, new reservoir, new mains and upgrade WTP in the vicinity of this European site. GW abstraction site overlies same karstic region as this European site. WTP upgrade hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works.	New GW abstraction (karstic) and new WTP to supply deficit. New GW abstraction, new WTP, new pump, new reservoir, new mains and upgrade WTP in the vicinity of this European site. GW abstraction site overlies same karstic region as this European site. WTP upgrade hydrologically linked to this European site. **Habitat degradation – hydrological/ hydrogeological changes -** abstraction could lead to hydrological changes (reduced flows – impacting on water quality) that could impact GWD QI habitats such as hydrophilous tall herb fringe communities, water courses of plain to montane levels, and alluvial forests. **Water table/availability - t**here is potential for impacts on GWD habitats through a reduction in flows/water levels.	• General Mitigation Measures are outlined in **Section 6.3.3** • Hydrogeological modelling as in **Section 6.3.5** • Hydrological modelling as in **Section 6.3.5** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.12: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAK-441 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Dungarvan Harbour SPA (004032)	16.7km	Great Crested Grebe (*Podiceps cristatus*) [A005] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Red-breasted Merganser (*Mergus serrator*) [A069] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b	New GW abstraction (karstic) and new WTP to supply deficit. Works in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland), given	New GW abstraction (karstic) and new WTP to supply deficit. Works in the ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Turnstone (*Arenaria interpres*) [A169] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b	the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.			
Blackwater Callows SPA (004094)	19km	Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Black-tailed Godwit (*Limosa limosa*) [A156] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b	New GW abstraction (karstic) and new WTP to supply deficit. Works in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	New GW abstraction (karstic) and new WTP to supply deficit. Works in the ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.13: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-444 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Blackwater River (Cork/Waterford) SAC (002170)	480m	**<u>Annex I habitats</u>** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Perennial vegetation of stony banks [1220] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]	Increase GW abstraction from Tooraneena BH and upgrade Touraneena WTP to supply deficit. Increase GW abstraction and WTP upgrade in the vicinity of, and in close proximity to a hydrological link to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works.	Increase GW abstraction from Tooraneena BH and upgrade Touraneena WTP to supply deficit. Increase GW abstraction and WTP upgrade in the vicinity of, and in close proximity to a hydrological link to this European site. No operational impacts predicted due to there being no overlap between the ZOC of abstraction and this European site.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Taxus baccata* woods of the British Isles [91J0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Trichomanes speciosum* (Killarney Fern) [1421]				

Table D1.14: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAK-450 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Dungarvan Harbour SPA (004032)	6.2km	Great Crested Grebe (*Podiceps cristatus*) [A005] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Red-breasted Merganser (*Mergus serrator*) [A069] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Turnstone (*Arenaria interpres*) [A169] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b	Increase GW abstraction from Kilrossanty BH and upgrade Kilrossanty WTP to supply deficit. Increase GW abstraction, upgrade WTP and replace pumping station in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g. grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Increase GW abstraction from Kilrossanty BH and upgrade Kilrossanty WTP to supply deficit. Increase GW abstraction, upgrade WTP and replace pumping station in the ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Mid-Waterford Coast SPA (004193)	6.8km	Cormorant (*Phalacrocorax carbo*) [A017] Peregrine (*Falco peregrinus*) [A103] Herring Gull (*Larus argentatus*) [A184] Chough (*Pyrrhocorax pyrrhocorax*) [A346]	Breed Breed Breed Breed	Increase GW abstraction from Kilrossanty BH and upgrade Kilrossanty WTP to supply deficit. Increase GW abstraction, upgrade WTP and replace pumping station in the ZoI of this European site. Works near a hydrological link to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species.	Increase GW abstraction from Kilrossanty BH and upgrade Kilrossanty WTP to supply deficit. Increase GW abstraction, upgrade WTP and replace pumping station in the ZoI of this European site. Works near a hydrological link to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.15: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAK-472 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Dungarvan Harbour SPA (004032)	2.1km	Great Crested Grebe (*Podiceps cristatus*) [A005] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Red-breasted Merganser (*Mergus serrator*) [A069] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Turnstone (*Arenaria interpres*) [A169] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b	Increase GW abstraction from Ballyguiry BH and upgrade Ballyguiry WTP to supply deficit. Increase GW abstraction, upgrade WTP and new mains in the vicinity of this European site. New mains hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g. grassland, arable farmland), given	Increase GW abstraction from Ballyguiry BH and upgrade Ballyguiry WTP to supply deficit. Increase GW abstraction, upgrade WTP and new mains in the vicinity of this European site. New mains hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
				the works are in the vicinity of the SPA and potentially within supporting habitat for the QI species.			
Blackwater Callows SPA (004094)	17.7km	Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Black-tailed Godwit (*Limosa limosa*) [A156] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b	Increase GW abstraction from Ballyguiry BH and upgrade Ballyguiry WTP to supply deficit. Increase GW abstraction, upgrade WTP and new mains in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g. grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Increase GW abstraction from Ballyguiry BH and upgrade Ballyguiry WTP to supply deficit. Increase GW abstraction, upgrade WTP and new mains in the ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.16: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-477 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Blackwater River (Cork/Waterford) SAC (002170)	2.2km	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Perennial vegetation of stony banks [1220] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0]	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. WTP upgrade in the vicinity of this European site and of hydrological links to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats.	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. WTP upgrade in the vicinity of this European site and of hydrological links to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Taxus baccata woods of the British Isles [91J0] **<u>Annex II species</u>** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Trichomanes speciosum* (Killarney Fern) [1421]				

Table D1.17: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAK-478 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Helvick Head to Ballyquin SPA (004192)	1.9km	Cormorant (*Phalacrocorax carbo*) [A017] Peregrine (*Falco peregrinus*) [A103] Herring Gull (*Larus argentatus*) [A184] Kittiwake (*Rissa tridactyla*) [A188] Chough (*Pyrrhocorax pyrrhocorax*) [A346]	Breed Breed Breed Breed Breed	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. WTP upgrade in the vicinity of this European site and of a hydrological link to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g. grassland, arable farmland), given the works are in the vicinity of the SPA and potentially within supporting habitat for the QI species.	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. WTP upgrade in the vicinity of this European site and of a hydrological link to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.18: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAK-525 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Mid-Waterford Coast SPA (004193)	6.5km	Cormorant (*Phalacrocorax carbo*) [A017] Peregrine (*Falco peregrinus*) [A103] Herring Gull (*Larus argentatus*) [A184] Chough (*Pyrrhocorax pyrrhocorax*) [A346]	Breed Breed Breed Breed	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. WTP upgrade in the ZoI of this European site and adjacent to a hydrological link to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species.	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. WTP upgrade in the ZoI of this European site and adjacent to a hydrological link to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.19: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with options TG3-SAK-560 and TG3-SAK-618 combined and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Lower River Suir SAC (002137)	0m	**Annex I habitats** Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Taxus baccata* woods of the British Isles [91J0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095]	New GW abstraction and new WTP to partly supply deficit. Increase GW abstraction from Portlaw BH and Portlaw spring and upgrade Portlaw WTP to partly supply deficit. New mains cross this European site. New GW abstraction, two increased GW abstractions, new pump, new balancing tank, new WTP, new mains, and upgrade WTP adjacent to or in the vicinity of this European site. Some of the works are hydrologically linked to this European site. New GW abstraction and this European site within same karstic region. **Physical loss of habitat –** there is potential for some loss of/damage to QI habitats or the supporting habitats of QI species during construction works given that the works are within the SAC. **Mortality -** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species, their prey, and restrict access to	New GW abstraction and new WTP to partly supply deficit. Increase GW abstraction from Portlaw BH and Portlaw spring and upgrade Portlaw WTP to partly supply deficit. New mains cross this European site. New GW abstraction, two increased GW abstractions, new pump, new balancing tank, new WTP, new mains, and upgrade WTP adjacent to or in the vicinity of this European site. Some of the works are hydrologically linked to this European site. New GW abstraction and this European site within same karstic region. **Habitat degradation – hydrological/ hydrogeological changes -** abstraction could lead to hydrological changes (reduced flows – impacting on water quality) that could impact GWD QI habitats such as hydrophilous tall herb fringe communities, water courses of plain	• General Mitigation Measures are outlined in **Section 6.3.3** • Hydrogeological modelling as in **Section 6.3.5** • Hydrological modelling as in **Section 6.3.5** In addition to general mitigation measures outlined above, option specific measures have been identified for **SAK-560** and **SAK-618** combined (see **Section 6.3.4**) as follows: Construction works (pipeline crossing of SAC) will avoid the main migration and spawning periods for salmon (this period is also critical to the lifecycle of the freshwater pearl mussel) to minimise the risk of displacement or barrier effects due to noise, vibration or site-derived pollutants, unless project-specific environmental assessments identify that any effects associated with construction works will be 'not significant' or will have no adverse effect on the integrity of the SAC. To note there are significant variations in the timing and duration of salmonid spawning activity	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Lampetra planeri (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	spawning habitat further affecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.	to montane levels, and alluvial forests. **Water table/availability - t**here is potential for impacts on GWD habitats through a reduction in flows/water levels.	throughout the Republic of Ireland (IFI, 2016). Instream works should be carried out during the period July-September (except in exceptional circumstances and with agreement with IFI). *Note it is not anticipated that there would be any direct impacts on FWPM, as such impacts could be designed out through, for example, strategic positioning of crossing points. Only indirect effects are anticipated for FWPM through potential impacts on their host species. The potential for direct impacts can only be determined at the project stage which will influence the location for any crossing points.* With the implementation of mitigation as noted above there is no potential for AESI	

Table D1.20: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with options TG3-SAK-560 and TG3-SAK-618 combined and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Tramore Back Strand SPA (004027)	16.2km	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b	New GW abstraction and new WTP to partly supply deficit. Increase GW abstraction from Portlaw BH and Portlaw spring and upgrade Portlaw WTP to partly supply deficit. Works in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland), given the works are in the vicinity of the SPA and potentially within supporting habitat for the QI species.	New GW abstraction and new WTP to partly supply deficit. Increase GW abstraction from Portlaw BH and Portlaw spring and upgrade Portlaw WTP to partly supply deficit. Works in the ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.21: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-569 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Lower River Suir SAC (002137)	230m	**Annex I habitats** Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Taxus baccata* woods of the British Isles [91J0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. WTP upgrade in close proximity to this European site and to hydrological link to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works.	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. WTP upgrade in close proximity to this European site and to hydrological link to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.22: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-648 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Lower River Suir SAC (002137)	1.6km	**Annex I habitats** Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]	Bring back Silverspring WTP to production and supply deficit. Increase GW abstraction and three WTP upgrades in the vicinity of this European site. Works adjacent to hydrological links to this European site. GW abstraction and this European site within same karstic region. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during	Bring back Silverspring WTP to production and supply deficit. Increase GW abstraction and three WTP upgrades in the vicinity of this European site. Works adjacent to hydrological links to this European site. GW abstraction and this European site within same karstic region. **Habitat degradation – hydrological/ hydrogeological**	• General Mitigation Measures are outlined in **Section 6.3.3** • Hydrogeological modelling as in **Section 6.3.5** • Hydrological modelling as in **Section 6.3.5** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Taxus baccata* woods of the British Isles [91J0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works.	**changes -** abstraction could lead to hydrological changes (reduced flows – impacting on water quality) that could impact GWD QI habitats such as hydrophilous tall herb fringe communities, water courses of plain to montane levels, and alluvial forests. **Water table/availability - t**here is potential for impacts on GWD habitats through a reduction in flows/water levels.		
River Barrow And River Nore SAC (002162)	7.2km	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Vertigo moulinsiana* (Desmoulin's Whorl Snail) [1016] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092]	Bring back Silverspring WTP to production and supply deficit. Increase GW abstraction and three WTP upgrades in the vicinity of this European site. Works hydrologically linked to this European site via hydrological links to the River Suir. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats.	Bring back Silverspring WTP to production and supply deficit. Increase GW abstraction and three WTP upgrades in the vicinity of this European site. Works hydrologically linked to this European site via hydrological links to the River Suir. No operational impacts predicted due to distance from site and the abstraction and European site overlying different aquifers.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Petromyzon marinus (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Trichomanes speciosum* (Killarney Fern) [1421] *Margaritifera durrovensis* (Nore Pearl Mussel) [1990]				

Table D1.23: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-837 (TG3-SAK-265, TG3-SAK-269, TG3-SAK-271, TG3-SAK-273, TG3-SAK-289) and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Lower River Suir SAC (002137)	35m	**Annex I habitats** Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Taxus baccata* woods of the British Isles [91J0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	New GW abstraction and new Linguan WTP to supply deficit. Rationalise Rathgormack, Ballyknock, Crehanagh and Garravoone WRZs. New GW abstraction, WTP, storage, mains and pump, upgrade Linguan WTP, and decommission Coolnamuck WTP adjacent to this European site. New pumps, storage, mains, upgrade Crotty's Lake WTP, and decommission Rathgormack WTP, Crehanagh WTP, Garravoone WTP, and Ballyknock WTP in vicinity of this European site. Some of the works hydrologically linked to this European site. New GW abstraction overlies same karst aquifer as this European site. **Mortality -** pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species, their prey, and restrict access to spawning habitat further affecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for	New GW abstraction and new Linguan WTP to supply deficit. Rationalise Rathgormack, Ballyknock, Crehanagh and Garravoone WRZs. New GW abstraction, WTP, storage, mains and pump, upgrade Linguan WTP, and decommission Coolnamuck WTP adjacent to this European site. New pumps, storage, mains, upgrade Crotty's Lake WTP, and decommission Rathgormack WTP, Crehanagh WTP, Garravoone WTP, and Ballyknock WTP in vicinity of this European site. Some of the works hydrologically linked to this European site. New GW abstraction overlies same karst aquifer as this European site. However, previous trial well tests indicate no interaction between the aquifer and the river waterbody, therefore no operational impacts are predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
			disturbance to otter and other QI species from construction works. There is also potential for the spread of invasive species given that the works are adjacent to the SAC boundary.			

Table D1.24: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-853 (TG3-SAK-222, TG3-SAK-239) and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Lower River Suir SAC (002137)	0m	**Annex I habitats** Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Taxus baccata* woods of the British Isles [91J0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Increase abstraction at Mullinbawn spring and upgrade Mullinbawn WTP to supply deficit to neighboring WRZ in deficit. Interconnect Coalbrook/Commons and Fethard & Mullenbawn and supply deficit from Fethard & Mullenbawn [Mullinbawn WTP]. Increase GW abstraction, and replace pump and Mullinbawn WTP within this European site. Upgrade Fethard WTP and Dualla WTP in close proximity to this European site. New pumps, storage and mains, and upgrade Coalbrook WTP, Commons WTP and Ballincurry WTP in the vicinity of this European site. Some works hydrologically linked to this European site. European site within ZOC of abstraction. **Physical loss of habitat –** there is potential for some loss of/damage to QI habitats or the supporting habitats of QI species during construction works given that the works are within the SAC. **Mortality -** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species, their prey, and restrict access to spawning habitat further affecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats.	Increase abstraction at Mullinbawn spring and upgrade Mullinbawn WTP to supply deficit to neighboring WRZ in deficit. Interconnect Coalbrook/Commons and Fethard & Mullenbawn and supply deficit from Fethard & Mullenbawn [Mullinbawn WTP]. Increase GW abstraction, and replace pump and Mullinbawn WTP within this European site. Upgrade Fethard WTP and Dualla WTP in close proximity to this European site. New pumps, storage and mains, and upgrade Coalbrook WTP, Commons WTP and Ballincurry WTP in the vicinity of this European site. Some works hydrologically linked to this European site. European site within ZOC of abstraction. **Habitat degradation – hydrological/ hydrogeological changes -** abstraction could lead to hydrological changes (reduced flows – impacting on water quality) that could impact GWD QI habitats such as hydrophilous tall herb fringe communities, water courses of plain to montane levels, and alluvial forests. **Water table/availability - t**here is potential for impacts on GWD habitats through a reduction in flows/water levels.	• General Mitigation Measures are outlined in **Section 6.3.3** • Hydrogeological modelling as in **Section 6.3.5** • Hydrological modelling as in **Section 6.3.5** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
			Disturbance (including biological disturbance) - there is potential for disturbance to otter and other QI species from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.			
River Barrow And River Nore SAC (002162)	2.9km	**<u>Annex I habitats</u>** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **<u>Annex II species</u>** *Vertigo moulinsiana* (Desmoulin's Whorl Snail) [1016] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Trichomanes speciosum* (Killarney Fern) [1421] *Margaritifera durrovensis* (Nore Pearl Mussel) [1990]	Increase abstraction at Mullinbawn spring and upgrade Mullinbawn WTP to supply deficit to neighboring WRZ in deficit. Interconnect Coalbrook/Commons and Fethard & Mullenbawn and supply deficit from Fethard & Mullenbawn [Mullinbawn WTP]. New pumps, storage and mains, and upgrade Coalbrook WTP, Commons WTP and Ballincurry WTP in the vicinity of this European site. Some works hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats.	Increase abstraction at Mullinbawn spring and upgrade Mullinbawn WTP to supply deficit to neighboring WRZ in deficit. Interconnect Coalbrook/Commons and Fethard & Mullenbawn and supply deficit from Fethard & Mullenbawn [Mullinbawn WTP]. New pumps, storage and mains, and upgrade Coalbrook WTP, Commons WTP and Ballincurry WTP in the vicinity of this European site. Some works hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.25: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-949 (TG3-SAK-356, TG3-SAK-399, TG3-SAK-438, TG3-SAK-495, TG3-SAK-501, TG3-SAK-530, TG3-SAK-538, TG3-SAK-555, TG3-SAK-604 and TG3-SAK-608) and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Lower River Suir SAC (002137)	0m	**Annex I habitats** Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Taxus baccata* woods of the British Isles [91J0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit. Rationalise Ballyogarty, Kilmacthomas, Faha, Smoore, Fews, Kill/Ballylaneen, Scrahan, Dunhill - Cois Coille and Dunhill Ballinageeragh to East Waterford WRZ. New SW abstraction and new mains within this European site. New pump, new reservoir, new storage, new mains and WTP upgrade adjacent to this European site. Other works including new pumps, new storage, new mains and decommission 10 WTPs in the vicinity of this European site. Some works hydrologically linked to this European site. **Physical loss of habitat –** there is potential for some loss of/damage to QI habitats or the supporting habitats of QI species during construction works given that the works are within the SAC. **Mortality -** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species, their prey, and restrict access to spawning habitat further affecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit. Rationalise Ballyogarty, Kilmacthomas, Faha, Smoore, Fews, Kill/Ballylaneen, Scrahan, Dunhill - Cois Coille and Dunhill Ballinageeragh to East Waterford WRZ. New SW abstraction and new mains within this European site. New pump, new reservoir, new storage, new mains and WTP upgrade adjacent to this European site. Other works including new pumps, new storage, new mains and decommission 10 WTPs in the vicinity of this European site. Some works hydrologically linked to this European site. **Habitat degradation – hydrological/ hydrogeological changes -** abstraction could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats including FWPM, white-clawed crayfish, lamprey species, shad, salmon, otter, and water courses of plain to montane levels. **Water table/availability -** there is potential for impacts on otter and other QI species and habitats utilising watercourses hydrologically linked to this European site through a reduction in flows/water levels.	• General Mitigation Measures are outlined in **Section 6.3.3** • Hydrological modelling as in **Section 6.3.5** In addition to general mitigation measures outlined above, option specific measures have been identified for **SAK-949** (see **Section 6.3.4**) as follows: Construction works (pipeline crossing of SAC) will avoid the main migration and spawning periods for salmon (this period is also critical to the lifecycle of the freshwater pearl mussel) to minimise the risk of displacement or barrier effects due to noise, vibration or site-derived pollutants, unless project-specific environmental assessments identify that any effects associated with construction works will be 'not significant' or will have no adverse effect on the integrity of the SAC. To note there are significant variations in the timing and duration of salmonid spawning activity throughout the Republic of Ireland (IFI, 2016). Instream works should be carried out during the period July-September (except in exceptional circumstances and with agreement with IFI). *Note it is not anticipated that there would be any direct impacts on FWPM, as such impacts could be designed out through, for example, strategic positioning of crossing points. Only indirect effects are anticipated for FWPM through potential impacts on their host species. The potential for direct impacts can only be determined at the project stage which will influence the location for any crossing points.* With the implementation of mitigation as noted above there is no potential for AESI	**N**
River Barrow And River Nore SAC (002162)	14.4km	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170]	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit. Rationalise Ballyogarty, Kilmacthomas, Faha, Smoore, Fews, Kill/Ballylaneen, Scrahan, Dunhill - Cois Coille and Dunhill Ballinageeragh to East Waterford WRZ. New pumps, new storage, new	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit. Rationalise Ballyogarty, Kilmacthomas, Faha, Smoore, Fews, Kill/Ballylaneen, Scrahan, Dunhill - Cois Coille and Dunhill Ballinageeragh to East Waterford	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Vertigo moulinsiana* (Desmoulin's Whorl Snail) [1016] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Trichomanes speciosum* (Killarney Fern) [1421] *Margaritifera durrovensis* (Nore Pearl Mussel) [1990]	mains, WTP upgrade, and decommission three WTPs in the vicinity of this European site. Some works hydrologically linked to this European site via hydrological links to the River Suir. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats.	WRZ. New pumps, new storage, new mains, WTP upgrade, and decommission three WTPs in the vicinity of this European site. Some works hydrologically linked to this European site via hydrological links to the River Suir. No operational impacts predicted.		

Table D1.26: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAK-949 (TG3-SAK-356, TG3-SAK-399, TG3-SAK-438, TG3-SAK-495, TG3-SAK-501, TG3-SAK-530, TG3-SAK-538, TG3-SAK-555, TG3-SAK-604 and TG3-SAK-608) and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Mid-Waterford Coast SPA (004193)	3.2km	Cormorant (*Phalacrocorax carbo*) [A017] Peregrine (*Falco peregrinus*) [A103] Herring Gull (*Larus argentatus*) [A184]	Breed Breed Breed	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply	• General Mitigation Measures are outlined in **Section 6.3.3**	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Chough (*Pyrrhocorax pyrrhocorax*) [A346]	Breed	to supply deficit. Rationalise Ballyogarty, Kilmacthomas, Faha, Smoore, Fews, Kill/Ballylaneen, Scrahan, Dunhill - Cois Coille and Dunhill Ballinageeragh to East Waterford WRZ. Works in the ZoI of this European site, with some works, mainly new watermains, hydrologically linked to the site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species, given the works are in the vicinity of the SPA and potentially within supporting habitat for the QI species.	deficit. Rationalise Ballyogarty, Kilmacthomas, Faha, Smoore, Fews, Kill/Ballylaneen, Scrahan, Dunhill - Cois Coille and Dunhill Ballinageeragh to East Waterford WRZ. Works in the ZoI of this European site, with some works, mainly new watermains, hydrologically linked to the site. No operational impacts predicted.	With the implementation of mitigation as noted above there is no potential for AESI	
Tramore Back Strand SPA (004027)	4.5km	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit. Rationalise Ballyogarty, Kilmacthomas, Faha, Smoore, Fews, Kill/Ballylaneen, Scrahan, Dunhill - Cois Coille and Dunhill Ballinageeragh to East Waterford WRZ. Works, mainly new watermains, in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species, given the works are in the vicinity of the SPA and potentially within supporting habitat for the QI species.	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit. Rationalise Ballyogarty, Kilmacthomas, Faha, Smoore, Fews, Kill/Ballylaneen, Scrahan, Dunhill - Cois Coille and Dunhill Ballinageeragh to East Waterford WRZ. Works, mainly new watermains, in the ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
Dungarvan Harbour SPA (004032)	10.5km	Great Crested Grebe (*Podiceps cristatus*) [A005] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Red-breasted Merganser (*Mergus serrator*) [A069] Oystercatcher (*Haematopus ostralegus*) [A130]	Non-b Non-b Non-b Non-b Non-b	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit. Rationalise Ballyogarty, Kilmacthomas, Faha, Smoore, Fews, Kill/Ballylaneen, Scrahan, Dunhill - Cois Coille and	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit. Rationalise Ballyogarty, Kilmacthomas, Faha, Smoore, Fews, Kill/Ballylaneen, Scrahan, Dunhill - Cois Coille and Dunhill	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Turnstone (*Arenaria interpres*) [A169] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b	Dunhill Ballinageeragh to East Waterford WRZ. Works, mainly new watermains, new pumps, new storage and decommissioned WTPs, in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species, given the works are in the vicinity of the SPA and potentially within supporting habitat for the QI species.	Ballinageeragh to East Waterford WRZ. Works, mainly new watermains, new pumps, new storage and decommissioned WTPs, in the ZoI of this European site. No operational impacts predicted.		

Table D1.27: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-973 (TG3-SAK-672, TG3-SAK-673, TG3-SAK-674, TG3-SAK-675, TG3-SAK-676, TG3-SAK-677, TG3-SAK-756) and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Blackwater River (Cork/Waterford) SAC (002170)	0m	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Perennial vegetation of stony banks [1220] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Taxus baccata* woods of the British Isles [91J0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029]	Increase GW (to include commissioning new TW) abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to supply deficit. New GW abstraction and upgrade WTP LCB Cappoquin WTP to partly supply deficit. Rationalise Lacken, Kereen and Moores Well, Monatarriff, Carrignagower and Ballysaggart to Lismore/Cappoquin/Ballyduff (LCB) WRZ. New mains within this European site. New GW abstraction, mains, pumps, and storage, increased GW abstraction, upgrade pump and three WTPs (LCB Cappoquin WTP, LCB Lismore Deerpark WTP and LCB Ballyduff WTP), and decommission five WTPs (Ballysaggart WTP, Monatarrif WTP, Carrignagower WTP, Moore's Well WTP and Lacken WTP) adjacent or in close proximity to this European site. Some of the works are hydrologically linked to this European site. Both new and increased GW abstractions overlie same karst aquifer as this European site. **Physical loss of habitat –** there is potential for some loss of/damage to QI	Increase GW (to include commissioning new TW) abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to supply deficit. New GW abstraction and upgrade WTP LCB Cappoquin WTP to partly supply deficit. Rationalise Lacken, Kereen and Moores Well, Monatarriff, Carrignagower and Ballysaggart to Lismore/Cappoquin/Ballyduff (LCB) WRZ. New mains within this European site. New GW abstraction, mains, pumps, and storage, increased GW abstraction, upgrade pump and three WTPs (LCB Cappoquin WTP, LCB Lismore Deerpark WTP and LCB Ballyduff WTP), and decommission five WTPs (Ballysaggart WTP, Monatarrif WTP, Carrignagower WTP, Moore's Well WTP and Lacken WTP) adjacent or in close proximity to this European site. Some of the works are hydrologically linked to this European site. Both new and increased GW abstractions overlie	• General Mitigation Measures are outlined in **Section 6.3.3** • Hydrogeological modelling as in **Section 6.3.5** • Hydrological modelling as in **Section 6.3.5** In addition to general mitigation measures outlined above, option specific measures have been identified for **SAK-973** (see **Section 6.3.4**) as follows: Construction works (pipeline crossing of SAC) will avoid the main migration and spawning periods for salmon (this period is also critical to the lifecycle of the freshwater pearl mussel) to minimise the risk of displacement or barrier effects due to noise, vibration or site-derived pollutants, unless project-specific environmental assessments identify that any effects associated with construction works will be 'not significant' or will have no adverse effect on the integrity of the SAC. To note there are significant variations in the timing and duration of salmonid spawning activity throughout the Republic of Ireland (IFI, 2016). Instream works should be carried out during the period	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Austropotamobius pallipes (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Trichomanes speciosum* (Killarney Fern) [1421]	habitats or the supporting habitats of QI species during construction works given that the works are within the SAC. **Mortality -** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species, their prey, and restrict access to spawning habitat further affecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.	same karst aquifer as this European site. **Habitat degradation – hydrological/ hydrogeological changes -** abstraction could lead to hydrological changes (reduced flows – impacting on water quality) that could impact GWD QI habitats such as water courses of plain to montane levels and alluvial forests. **Water table/availability - t**here is potential for impacts on GWD habitats through a reduction in flows/water levels.	July-September (except in exceptional circumstances and with agreement with IFI). *Note it is not anticipated that there would be any direct impacts on FWPM, as such impacts could be designed out through, for example, strategic positioning of crossing points. Only indirect effects are anticipated for FWPM through potential impacts on their host species. The potential for direct impacts can only be determined at the project stage which will influence the location for any crossing points.* With the implementation of mitigation as noted above there is no potential for AESI	

Table D1.28: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAK-973 (TG3-SAK-672, TG3-SAK-673, TG3-SAK-674, TG3-SAK-675, TG3-SAK-676, TG3-SAK-677, TG3-SAK-756) and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Blackwater Callows SPA (004094)	500m	Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Black-tailed Godwit (*Limosa limosa*) [A156] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b	Increase GW (to include commissioning new TW) abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to supply deficit. New GW abstraction and upgrade WTP LCB Cappoquin WTP to partly supply deficit. Rationalise Lacken, Kereen and Moores Well, Monatarriff, Carrignagower and Ballysaggart to Lismore/Cappoquin/ Ballyduff (LCB) WRZ. New GW abstraction, mains, pumps, and storage, increased GW abstraction, upgrade pump and three WTPs (LCB Cappoquin WTP, LCB Lismore Deerpark WTP and LCB Ballyduff WTP), and decommission five WTPs (Ballysaggart WTP, Monatarrif WTP, Carrignagower	Increase GW (to include commissioning new TW) abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to supply deficit. New GW abstraction and upgrade WTP LCB Cappoquin WTP to partly supply deficit. Rationalise Lacken, Kereen and Moores Well, Monatarriff, Carrignagower and Ballysaggart to Lismore/Cappoquin/ Ballyduff (LCB) WRZ. New GW abstraction, mains, pumps, and storage, increased GW abstraction, upgrade pump and three WTPs (LCB Cappoquin WTP, LCB Lismore Deerpark WTP and LCB Ballyduff WTP), and decommission five WTPs (Ballysaggart WTP, Monatarrif WTP, Carrignagower WTP, Moore's Well WTP and Lacken WTP) in the vicinity	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
				WTP, Moore's Well WTP and Lacken WTP) in the vicinity or ZoI of this European site. Some of the new mains are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	or ZoI of this European site. Some of the new mains are hydrologically linked to this European site. No operational impacts predicted.		
Dungarvan Harbour SPA (004032)	8.8km	Great Crested Grebe (*Podiceps cristatus*) [A005] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Red-breasted Merganser (*Mergus serrator*) [A069] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Turnstone (*Arenaria interpres*) [A169] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b	Increase GW (to include commissioning new TW) abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to supply deficit. New GW abstraction and upgrade WTP LCB Cappoquin WTP to partly supply deficit. Rationalise Lacken, Kereen and Moores Well, Monatarriff, Carrignagower and Ballysaggart to Lismore/Cappoquin/ Ballyduff (LCB) WRZ. New GW abstraction, mains, pumps, and storage, increased GW abstraction, upgrade pump and three WTPs (LCB Cappoquin WTP, LCB Lismore Deerpark WTP and LCB Ballyduff WTP), and decommission five WTPs (Ballysaggart WTP, Monatarrif WTP, Carrignagower WTP, Moore's Well WTP and Lacken WTP) in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or	Increase GW (to include commissioning new TW) abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to supply deficit. New GW abstraction and upgrade WTP LCB Cappoquin WTP to partly supply deficit. Rationalise Lacken, Kereen and Moores Well, Monatarriff, Carrignagower and Ballysaggart to Lismore/Cappoquin/ Ballyduff (LCB) WRZ. New GW abstraction, mains, pumps, and storage, increased GW abstraction, upgrade pump and three WTPs (LCB Cappoquin WTP, LCB Lismore Deerpark WTP and LCB Ballyduff WTP), and decommission five WTPs (Ballysaggart WTP, Monatarrif WTP, Carrignagower WTP, Moore's Well WTP and Lacken WTP) in the ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
				in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.			
Blackwater Estuary SPA (004028)	9.9km	Wigeon *(Anas penelope)* [A050] Golden Plover *(Pluvialis apricaria)* [A140] Lapwing *(Vanellus vanellus)* [A142] Dunlin *(Calidris alpina*) [A149] Black-tailed Godwit *(Limosa limosa)* [A156] Bar-tailed Godwit *(Limosa lapponica)* [A157] Curlew *(Numenius arquata)* [A160] Redshank *(Tringa totanus)* [A162] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b	Increase GW (to include commissioning new TW) abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to supply deficit. New GW abstraction and upgrade WTP LCB Cappoquin WTP to partly supply deficit. Rationalise Lacken, Kereen and Moores Well, Monatarriff, Carrignagower and Ballysaggart to Lismore/Cappoquin/ Ballyduff (LCB) WRZ. New GW abstraction, mains, pumps, and storage, increased GW abstraction, upgrade pump and three WTPs (LCB Cappoquin WTP, LCB Lismore Deerpark WTP and LCB Ballyduff WTP), and decommission five WTPs (Ballysaggart WTP, Monatarrif WTP, Carrignagower WTP, Moore's Well WTP and Lacken WTP) in the ZoI of this European site. Some of works are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species.	Increase GW (to include commissioning new TW) abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to supply deficit. New GW abstraction and upgrade WTP LCB Cappoquin WTP to partly supply deficit. Rationalise Lacken, Kereen and Moores Well, Monatarriff, Carrignagower and Ballysaggart to Lismore/Cappoquin/ Ballyduff (LCB) WRZ. New GW abstraction, mains, pumps, and storage, increased GW abstraction, upgrade pump and three WTPs (LCB Cappoquin WTP, LCB Lismore Deerpark WTP and LCB Ballyduff WTP), and decommission five WTPs (Ballysaggart WTP, Monatarrif WTP, Carrignagower WTP, Moore's Well WTP and Lacken WTP) in the ZoI of this European site. Some of works are hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.29: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-975 (TG3-SAK-684, TG3-SAK-685, TG3-SAK-686, TG3-SAK-687, TG3-SAK-688, TG3-SAK-689) and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Lower River Suir SAC (002137)	0m	**Annex I habitats** Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Taxus baccata* woods of the British Isles [91J0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Supply spare capacity from Thurles to neighbouring WRZs in deficit. Rationalise Horse and Jockey, Littleton, and Two Mile Borris to Thurles WRZ. Interconnect Dundrum Regional and Thurles and supply deficit from Thurles. Rationalise Glengar to Dundrum regional WRZ. New mains within this European site. New pumps, mains and storage, and upgrade Ironsmill WTP, Stooke WTP and Thurles WTP adjacent to or in close proximity to this European site. New pumps, storage and mains, upgrade Hollyford WTP, and decommission Littleton WTP, Two Mile Borris WTP, Glengar WTP, and Curragheen WTP in ZoI of this European site. Some of the works are hydrologically linked to this European site. **Physical loss of habitat –** there is potential for some loss of/damage to QI habitats or the supporting habitats of QI species during construction works given that the works are within the SAC. **Mortality -** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species, their prey, and restrict access to spawning habitat further affecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.	Supply spare capacity from Thurles to neighbouring WRZs in deficit. Rationalise Horse and Jockey, Littleton, and Two Mile Borris to Thurles WRZ. Interconnect Dundrum Regional and Thurles and supply deficit from Thurles. Rationalise Glengar to Dundrum regional WRZ. New mains within this European site. New pumps, mains and storage, and upgrade Ironsmill WTP, Stooke WTP and Thurles WTP adjacent to or in close proximity to this European site. New pumps, storage and mains, upgrade Hollyford WTP, and decommission Littleton WTP, Two Mile Borris WTP, Glengar WTP, and Curragheen WTP in ZoI of this European site. Some of the works are hydrologically linked to this European site. No operational impacts predicted as there are no new or increased abstractions associated with this option, only maintained abstractions.	• General Mitigation Measures are outlined in **Section 6.3.3** In addition to general mitigation measures outlined above, option specific measures have been identified for **SAK-975** (see **Section 6.3.4**) as follows: Construction works (pipeline crossing of SAC) will avoid the main migration and spawning periods for salmon (this period is also critical to the lifecycle of the freshwater pearl mussel) to minimise the risk of displacement or barrier effects due to noise, vibration or site-derived pollutants, unless project-specific environmental assessments identify that any effects associated with construction works will be 'not significant' or will have no adverse effect on the integrity of the SAC. To note there are significant variations in the timing and duration of salmonid spawning activity throughout the Republic of Ireland (IFI, 2016). Instream works should be carried out during the period July-September (except in exceptional circumstances and with agreement with IFI). *Note it is not anticipated that there would be any direct impacts on FWPM, as such impacts could be designed out through, for example, strategic positioning of crossing points. Only indirect effects are anticipated for FWPM through potential impacts on their host species. The potential for direct impacts can only be determined at the project stage which will influence the location for any crossing points.* With the implementation of mitigation as noted above there is no potential for AESI	**N**
Lower River Shannon SAC (002165)	140m	**Annex I habitats:** Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140]	Supply spare capacity from Thurles to neighbouring WRZs in deficit. Rationalise Horse and Jockey, Littleton, and Two Mile Borris to Thurles WRZ. Interconnect Dundrum Regional and Thurles and supply deficit from Thurles. Rationalise Glengar to Dundrum regional	Supply spare capacity from Thurles to neighbouring WRZs in deficit. Rationalise Horse and Jockey, Littleton, and Two Mile Borris to Thurles WRZ. Interconnect Dundrum Regional and Thurles and supply deficit from Thurles. Rationalise	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (Juncetalia maritimi) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species:** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Salmo salar* (Salmon) [1106] *Tursiops truncatus* (Common Bottlenose Dolphin) [1349] *Lutra lutra* (Otter) [1355]	WRZ. New mains, upgrade Ironsmill WTP and decommission Glengar WTP adjacent to or in close proximity to this European site. Some of the works are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works. There is also potential for the spread of invasive species given that the works are adjacent to the SAC boundary.	Glengar to Dundrum regional WRZ. New mains, upgrade Ironsmill WTP and decommission Glengar WTP adjacent to or in close proximity to this European site. Some of the works are hydrologically linked to this European site. No operational impacts predicted as there are no new or increased abstractions associated with this option, only maintained abstractions.		
Philipston Marsh SAC (001847)	1.6km	**Annex I habitats:** Transition mires and quaking bogs [7140]	Supply spare capacity from Thurles to neighbouring WRZs in deficit. Rationalise Horse and Jockey, Littleton, and Two Mile Borris to Thurles WRZ. Interconnect Dundrum Regional and Thurles and supply deficit from Thurles. Rationalise Glengar to Dundrum regional WRZ. New mains, upgrade Ironsmill WTP and decommission Glengar WTP adjacent to or in close proximity to this European site. Some of the works are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect hydrologically connected QI habitats.	Supply spare capacity from Thurles to neighbouring WRZs in deficit. Rationalise Horse and Jockey, Littleton, and Two Mile Borris to Thurles WRZ. Interconnect Dundrum Regional and Thurles and supply deficit from Thurles. Rationalise Glengar to Dundrum regional WRZ. New mains, upgrade Ironsmill WTP and decommission Glengar WTP adjacent to or in close proximity to this European site. Some of the works are hydrologically linked to this European site. No operational impacts predicted as there are no new or increased abstractions associated with this option, only maintained abstractions.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.30: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAK-975 (TG3-SAK-684, TG3-SAK-685, TG3-SAK-686, TG3-SAK-687, TG3-SAK-688, TG3-SAK-689) and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Slievefelim to Silvermines Mountains SPA (004165)	2.9km	Hen Harrier (*Circus cyaneus*) [A082]	Breed	Supply spare capacity from Thurles to neighbouring WRZs in deficit. Rationalise Horse and Jockey, Littleton, and Two Mile Borris to Thurles WRZ. Interconnect Dundrum Regional and Thurles and supply deficit from Thurles. Rationalise Glengar to Dundrum regional WRZ. New mains, upgrade Ironsmill WTP and decommission Glengar WTP in ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to hen harrier using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Supply spare capacity from Thurles to neighbouring WRZs in deficit. Rationalise Horse and Jockey, Littleton, and Two Mile Borris to Thurles WRZ. Interconnect Dundrum Regional and Thurles and supply deficit from Thurles. Rationalise Glengar to Dundrum regional WRZ. New mains, upgrade Ironsmill WTP and decommission Glengar WTP in ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.31: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-983 (TG3-SAK-733, TG3-SAK-734, TG3-SAK-735, TG3-SAK-736, TG3-SAK-737, TG3-SAK-738, TG3-SAK-739, TG3-SAK-740, TG3-SAK-741, TG3-SAK-742, TG3-SAK-743) and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Lower River Suir SAC (002137)	0m	**Annex I habitats** Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0]	New abstraction from the River Suir and new WTP at Barne site to supply deficit. Interconnect Templetney/Brackford Bridge and Ardfinnan Regional with Clonmel WRZ. Rationalise Russelstown, Kilmanahan, Tullohea, Kilcash, Ahenny and Ballinvir, Glenagad and Poulavanogue. New SW abstraction and mains within this European site. New pumps, mains and storage, upgrade Goatenbridge WTP and Templetney WTP, and decommission Glenary WTP, Ballinvir WTP, Ahenny WTP, Russelstown WTP, Kilmanahan WTP, Clonmel- Poulavanogue WTP, Poulavanogue WTP and Glennagad WTP adjacent to or in close proximity to	New abstraction from the River Suir and new WTP at Barne site to supply deficit. Interconnect Templetney/Brackford Bridge and Ardfinnan Regional with Clonmel WRZ. Rationalise Russelstown, Kilmanahan, Tullohea, Kilcash, Ahenny and Ballinvir, Glenagad and Poulavanogue. New SW abstraction and mains within this European site. New pumps, mains and storage, upgrade Goatenbridge WTP and Templetney WTP, and decommission Glenary WTP, Ballinvir WTP, Ahenny WTP, Russelstown WTP, Kilmanahan WTP, Clonmel- Poulavanogue WTP,	• General Mitigation Measures are outlined in **Section 6.3.3** • Hydrological modelling as in **Section 6.3.5** In addition to general mitigation measures outlined above, option specific measures have been identified for **SAK-983** (see **Section 6.3.4**) as follows: Construction works (pipeline crossing of SAC) will avoid the main migration and spawning periods for salmon (this period is also critical to the lifecycle of the freshwater pearl mussel) to minimise the risk of displacement or barrier effects due to noise, vibration or site-derived pollutants, unless project-specific environmental assessments identify that any effects associated with	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Taxus baccata woods of the British Isles [91J0] **<u>Annex II species</u>** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	this European site. New WTP, pumps, storage and mains, upgrade Monroe WTP, and decommission Kilcash WTP and Tullohea WTP in ZoI of this European site. Some of the works are hydrologically linked to this European site. **Physical loss of habitat –** there is potential for some loss of/damage to QI habitats or the supporting habitats of QI species during construction works given that the works are within the SAC. **Mortality -** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species, their prey, and restrict access to spawning habitat further affecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.	Poulavanogue WTP and Glennagad WTP adjacent to or in close proximity to this European site. New WTP, pumps, storage and mains, upgrade Monroe WTP, and decommission Kilcash WTP and Tullohea WTP in ZoI of this European site. Some of the works are hydrologically linked to this European site. **Habitat degradation – hydrological/ hydrogeological changes -** abstraction could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats including FWPM, white-clawed crayfish, lamprey species, shad, salmon, otter, and water courses of plain to montane levels. **Water table/availability -** there is potential for impacts on otter and other QI species and habitats utilising watercourses hydrologically linked to this European site through a reduction in flows/water levels.	construction works will be 'not significant' or will have no adverse effect on the integrity of the SAC. To note there are significant variations in the timing and duration of salmonid spawning activity throughout the Republic of Ireland (IFI, 2016). Instream works should be carried out during the period July-September (except in exceptional circumstances and with agreement with IFI). *Note it is not anticipated that there would be any direct impacts on FWPM, as such impacts could be designed out through, for example, strategic positioning of crossing points. Only indirect effects are anticipated for FWPM through potential impacts on their host species. The potential for direct impacts can only be determined at the project stage which will influence the location for any crossing points.* With the implementation of mitigation as noted above there is no potential for AESI	

Table D1.32: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAK-983 (TG3-SAK-733, TG3-SAK-734, TG3-SAK-735, TG3-SAK-736, TG3-SAK-737, TG3-SAK-738, TG3-SAK-739, TG3-SAK-740, TG3-SAK-741, TG3-SAK-742, TG3-SAK-743) and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Blackwater Callows SPA (004094)	13km	Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Black-tailed Godwit (*Limosa limosa*) [A156] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b	New abstraction from the River Suir and new WTP at Barne site to supply deficit. Interconnect Templetney/Brackford Bridge and Ardfinnan Regional with Clonmel WRZ. Rationalise Russelstown, Kilmanahan, Tullohea, Kilcash, Ahenny and Ballinvir, Glenagad and Poulavanogue. Some of the	New abstraction from the River Suir and new WTP at Barne site to supply deficit. Interconnect Templetney/Brackford Bridge and Ardfinnan Regional with Clonmel WRZ. Rationalise Russelstown, Kilmanahan, Tullohea, Kilcash, Ahenny and Ballinvir, Glenagad and Poulavanogue. Some of the works are in the ZoI of this European site.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
				works are in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g. grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	No operational impacts predicted.		

Table D1.33: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAK-985c (TG3-SAK-748, TG3-SAK-749, TG3-SAK-750, TG3-SAK-751, TG3-SAK-752, TG3-SAK-753) and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Lower River Shannon SAC (002165)	0m	**Annex I habitats:** Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species:**	Rationalise Carrigmore, Kilteely, Herbertstown, Knocklong/Hospital, Ballylanders and Galbally to Clareville WTP (Limerick City). This option involves the increased SW abstraction at Clareville (SA8). Increased SW abstraction within this European site. Carrigmore WTP adjacent to this European site. New pumps, storage and mains, upgrade pumps, and decommission Herbertstown WTP and Kilteely WTP in vicinity of this European site. Some of the works are hydrologically linked to this European site. **Mortality -** pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species, their prey, and restrict access to spawning habitat further affecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats.	Rationalise Carrigmore, Kilteely, Herbertstown, Knocklong/Hospital, Ballylanders and Galbally to Clareville WTP (Limerick City). This option involves the increased SW abstraction at Clareville (SA8). Increased SW abstraction within this European site. Carrigmore WTP adjacent to this European site. New pumps, storage and mains, upgrade pumps, and decommission Herbertstown WTP and Kilteely WTP in vicinity of this European site. Some of the works are hydrologically linked to this European site. **Habitat degradation – hydrological/ hydrogeological changes -** abstraction could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats including FWPM, lamprey species, salmon, otter, and water courses of plain to montane levels. **Water table/availability -** there is potential for impacts on otter and other QI species and habitats utilising watercourses hydrologically	• General Mitigation Measures are outlined in **Section 6.3.3** • Hydrological modelling as in **Section 6.3.5** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Margaritifera margaritifera (Freshwater Pearl Mussel) [1029] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Salmo salar* (Salmon) [1106] *Tursiops truncatus* (Common Bottlenose Dolphin) [1349] *Lutra lutra* (Otter) [1355]	**Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works. There is also potential for the spread of invasive species given that the works are within and adjacent to the SAC boundary.	linked to this European site through a reduction in flows/water levels.		
Lower River Suir SAC (002137)	6.5km	**Annex I habitats** Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Taxus baccata* woods of the British Isles [91J0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Rationalise Carrigmore, Kilteely, Herbertstown, Knocklong/Hospital, Ballylanders and Galbally to Clareville WTP (Limerick City). This option involves the increased SW abstraction at Clareville (SA8). New pumps, storage and mains, upgrade pumps, and decommission Knocklong WTP, Hospital WTP 1, Hospital WTP 2, Knocklong Church Road WTP, Kilteely WTP, Galbally WTP, Ballylanders WTP and Carrigmore WTP in the vicinity of this European site. Some of the works are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works.	Rationalise Carrigmore, Kilteely, Herbertstown, Knocklong/Hospital, Ballylanders and Galbally to Clareville WTP (Limerick City). This option involves the increased SW abstraction at Clareville (SA8). New pumps, storage and mains, upgrade pumps, and decommission Knocklong WTP, Hospital WTP 1, Hospital WTP 2, Knocklong Church Road WTP, Kilteely WTP, Galbally WTP, Ballylanders WTP and Carrigmore WTP in the vicinity of this European site. Some of the works are hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.34: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAK-985c (TG3-SAK-748, TG3-SAK-749, TG3-SAK-750, TG3-SAK-751, TG3-SAK-752, TG3-SAK-753) and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
River Shannon and River Fergus Estuaries SPA (004077)	6.2km	Cormorant (*Phalacrocorax carbo*) [A017] Whooper Swan (*Cygnus cygnus*) [A038] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Pintail (*Anas acuta*) [A054] Shoveler (*Anas clypeata*) [A056] Scaup (*Aythya marila*) [A062] Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Greenshank (*Tringa nebularia*) [A164] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Wetland and Waterbirds [A999]	Breed Non-b	Rationalise Carrigmore, Kilteely, Herbertstown, Knocklong/Hospital, Ballylanders and Galbally to Clareville WTP (Limerick City). This option involves the increased SW abstraction at Clareville (SA8). Some of the works including increased SW abstraction and upgrade pumps are in the ZoI of this European site. Some of the works are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g. grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Rationalise Carrigmore, Kilteely, Herbertstown, Knocklong/Hospital, Ballylanders and Galbally to Clareville WTP (Limerick City). This option involves the increased SW abstraction at Clareville (SA8). Some of the works including increased SW abstraction and upgrade pumps are in the ZoI of this European site. Some of the works are hydrologically linked to this European site. No operational impacts are predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.35: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAK-995 (TG3-SAK-783, TG3-SAK-784, TG3-SAK-785) and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Dungarvan Harbour SPA (004032)	0m	Great Crested Grebe (*Podiceps cristatus*) [A005] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048]	Non-b Non-b Non-b	Increase GW abstraction and upgrade Ballinamuck WTP to supply deficit. Rationalise Graiguenageeha and Stradbally to Dungarvan WRZ. New mains within	Increase GW abstraction and upgrade Ballinamuck WTP to supply deficit. Rationalise Graiguenageeha and Stradbally to Dungarvan WRZ. New mains within this European site. New	• General Mitigation Measures are outlined in **Section 6.3.3**	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Red-breasted Merganser (*Mergus serrator*) [A069] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Turnstone (*Arenaria interpres*) [A169] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b	this European site. New pumps, mains and storage, increased GW abstraction and WTP upgrade adjacent to this European site. Other new mains and decommission WTPs in ZoI of this European site. Some of the works are hydrologically linked to this European site. **Physical loss of habitats/supporting habitat -** there is potential for some loss of/damage to protected sites and supporting habitats (e.g., foraging habitats) during construction works given that the works are within the SPA boundary. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g. grassland, arable farmland), given the works are both within the SPA and in the ZoI of the SPA and potentially within supporting habitat for the QI species.	pumps, mains and storage, increased GW abstraction and WTP upgrade adjacent to this European site. Other new mains and decommission WTPs in ZoI of this European site. Some of the works are hydrologically linked to this European site. No operational impacts predicted.	With the implementation of mitigation as noted above there is no potential for AESI	
Mid-Waterford Coast SPA (004193)	25m	Cormorant (*Phalacrocorax carbo*) [A017] Peregrine (*Falco peregrinus*) [A103] Herring Gull (*Larus argentatus*) [A184] Chough (*Pyrrhocorax pyrrhocorax*) [A346]	Breed Breed Breed Breed	Increase GW abstraction and upgrade Ballinamuck WTP to supply deficit. Rationalise Graiguenageeha and Stradbally to Dungarvan WRZ. New mains adjacent to this European site. New pumps, mains and storage, increased GW abstraction, WTP upgrade and decommission WTPs in ZoI of this European site. Some of the works are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during	Increase GW abstraction and upgrade Ballinamuck WTP to supply deficit. Rationalise Graiguenageeha and Stradbally to Dungarvan WRZ. New mains adjacent to this European site. New pumps, mains and storage, increased GW abstraction, WTP upgrade and decommission WTPs in ZoI of this European site. Some of the works are hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
				construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland), given the works are adjacent to the SPA and in the ZoI of the SPA and potentially within supporting habitat for the QI species.			
Blackwater Callows SPA (004094)	19.8km	Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Black-tailed Godwit (*Limosa limosa*) [A156] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b	Increase GW abstraction and upgrade Ballinamuck WTP to supply deficit. Rationalise Graiguenageeha and Stradbally to Dungarvan WRZ. New pumps, mains and storage, increased GW abstraction, WTP upgrade and decommission WTPs in ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g. grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Increase GW abstraction and upgrade Ballinamuck WTP to supply deficit. Rationalise Graiguenageeha and Stradbally to Dungarvan WRZ. New pumps, mains and storage, increased GW abstraction, WTP upgrade and decommission WTPs in ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D2.01: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAL-015 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
River Barrow And River Nore SAC (002162)	670m	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Vertigo moulinsiana* (Desmoulin's Whorl Snail) [1016] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Trichomanes speciosum* (Killarney Fern) [1421] *Margaritifera durrovensis* (Nore Pearl Mussel) [1990]	Increase GW abstraction from Busherstown Springs and upgrade Glenmore WTP to supply deficit. Works are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats downstream. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species utilising supporting habitats upstream from the SAC from the construction works.	Increase GW abstraction from Busherstown Springs and upgrade Glenmore WTP to supply deficit. Works are hydrologically linked to this European site. The GW abstraction overlies the same bedrock aquifer as the European site. **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction could lead to hydrological changes (reduced flows – impacting on water quality) that could impact groundwater dependent (GWD) QI species or habitats such as Desmoulin's whorl snail, Mediterranean salt meadows, water courses of plain to montane levels, petrifying springs with tufa formation and alluvial forests. **Water table/availability -** There is potential for impacts on the GWD QI species and habitats utilising the bedrock aquifer linked to this European site through a reduction in flows/water levels.	• General Mitigation Measures are outlined in **Section 6.3.3** • Hydrogeological modelling as in **Section 6.3.5** • Hydrological modelling as in **Section 6.3.5** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D2.02: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAL-073 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
River Barrow And River Nore SAC (002162)	230m	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Vertigo moulinsiana* (Desmoulin's Whorl Snail) [1016] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Trichomanes speciosum* (Killarney Fern) [1421] *Margaritifera durrovensis* (Nore Pearl Mussel) [1990]	New GW abstraction, new WTP and new wellfield located south of New Ross WRZ. Upgrade Castlemoyle WTP to supply deficit. New PS, three new reservoirs and new watermains between New Ross and Adamstown. The new watermains crosses a hydrological link to this site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats downstream. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species utilising supporting habitats upstream from the SAC from the construction works.	New GW abstraction, new WTP and new wellfield located south of New Ross WRZ. Upgrade Castlemoyle WTP to supply deficit. The new PS, three new reservoirs and new watermains between New Ross and Adamstown. The new watermains crosses a hydrological link to this site. No operational impacts predicted given the new GW abstraction takes place 13km from the European site and the works overlie a different aquifer to the European site.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
Bannow Bay SAC (000697)	9km	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210]	New GW abstraction, new WTP and new wellfield located south of New Ross WRZ. Upgrade Castlemoyle WTP to supply deficit. New PS, three new reservoirs and new watermains between New Ross and Adamstown. The new	New GW abstraction, new WTP and new wellfield located south of New Ross WRZ. Upgrade Castlemoyle WTP to supply deficit. The new PS, three new reservoirs and new watermains between New Ross and Adamstown. The new watermains	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Perennial vegetation of stony banks [1220] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) [1420] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	watermains crosses hydrological links to this site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect hydrologically connected QI habitats downstream.	crosses a hydrological link to this site. No operational impacts predicted given the distance and the GW abstraction overlies a different aquifer to this European site.		

Table D2.03: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAL-073 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Wexford Harbour and Slobs SPA (004076)	9.8km	Little Grebe (*Tachybaptus ruficollis*) [A004] Great Crested Grebe (*Podiceps cristatus*) [A005] Cormorant (*Phalacrocorax carbo*) [A017] Grey Heron (*Ardea cinerea*) [A028] Bewick's Swan (*Cygnus columbianus bewickii*) [A037] Whooper Swan (*Cygnus cygnus*) [A038] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Mallard (*Anas platyrhynchos*) [A053] Pintail (*Anas acuta*) [A054] Scaup (*Aythya marila*) [A062] Goldeneye (*Bucephala clangula*) [A067] Red-breasted Merganser (*Mergus serrator*) [A069] Hen Harrier (*Circus cyaneus*) [A082] Coot (*Fulica atra*) [A125] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140]	non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b	New GW abstraction, new WTP and new wellfield located south of New Ross WRZ. Upgrade Castlemoyle WTP to supply deficit. New PS, three new reservoirs and new watermains between New Ross and Adamstown. All the new infrastructure is in the vicinity of the European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species, given the works are in the vicinity of the SPA and potentially within supporting habitat for the QI species.	New GW abstraction, new WTP and new wellfield located south of New Ross WRZ. Upgrade Castlemoyle WTP to supply deficit. New PS, three new reservoirs and new watermains between New Ross and Adamstown. All the new infrastructure is in the vicinity of the European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Lesser Black-backed Gull (*Larus fuscus*) [A183] Little Tern (*Sterna albifrons*) [A195] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b				
Bannow Bay SPA (004033)	12.9km	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Pintail (*Anas acuta*) [A054] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b	New GW abstraction, new WTP and new wellfield located south of New Ross WRZ. Upgrade Castlemoyle WTP to supply deficit. New PS, three new reservoirs and new watermains between New Ross and Adamstown. The new watermains crosses a hydrological link to this site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact the downstream habitats used by QI bird species. Potential pollution of watercourses during construction could have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species, given the works are in the vicinity of the SPA and potentially within supporting habitat for the QI species.	New GW abstraction, new WTP and new wellfield located south of New Ross WRZ. Upgrade Castlemoyle WTP to supply deficit. New PS, three new reservoirs and new watermains between New Ross and Adamstown. The new watermains crosses a hydrological link to this site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
Ballyteige Burrow SPA (004020)	18.8km	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Black-tailed Godwit (*Limosa limosa*) [A156]	non-b non-b non-b non-b non-b non-b	New GW abstraction, new WTP and new wellfield located south of New Ross WRZ. Upgrade Castlemoyle WTP to supply deficit. New PS, three new reservoirs and new watermains between New Ross and Adamstown. All the new infrastructure is in the vicinity of the European site.	New GW abstraction, new WTP and new wellfield located south of New Ross WRZ. Upgrade Castlemoyle WTP to supply deficit. New PS, three new reservoirs and new watermains between New Ross and Adamstown. All the new	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Bar-tailed Godwit (*Limosa lapponica*) [A157] Wetland and Waterbirds [A999]	non-b	**Disturbance (including biological disturbance) -** there is potential for disturbance to QI species, given the works are in the vicinity of the SPA and potentially within supporting habitat for the QI species.	infrastructure is in the vicinity of the European site. No operational impacts predicted.		

Table D2.04: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAL-078 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
River Barrow And River Nore SAC (002162)	0m	**<u>Annex I habitats</u>** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **<u>Annex II species</u>** *Vertigo moulinsiana* (Desmoulin's Whorl Snail) [1016] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096]	New GW abstraction, new WTP, new PS, new watermains and new reservoir at existing Bennetsbridge WTP site. Decommission Kilmaganny WTP. All new infrastructure is within this European site. **Physical loss of habitat –** There is potential for some loss of/damage to QI habitats or the supporting habitats of QI species during construction works given that the works are within the SAC. **Mortality -** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species, their prey, and restrict access to spawning habitat further effecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses from direct inputs, run-off or soakage during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.	New GW abstraction, new WTP, new PS, new watermains and new reservoir at existing Bennetsbridge WTP site. Decommission Kilmaganny WTP. All new infrastructure is within this European site. The GW abstraction overlies the same gravel aquifer and bedrock aquifer as the European site. **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction could lead to hydrological changes (reduced flows – impacting on water quality) that could impact GWD QI species or habitats such as Desmoulin's whorl snail, Mediterranean salt meadows, water courses of plain to montane levels, petrifying springs with tufa formation and alluvial forests. The abstraction is 40m away from the river and therefore is not predicted to impact the aquatic QI within the river. **Water table/availability -** There is potential for impacts on the GWD QI species and habitats utilising the gravel and bedrock aquifer linked to this European site through a reduction in flows/water levels.	• General Mitigation Measures are outlined in **Section 6.3.3** • Hydrogeological modelling as in **Section 6.3.5** • Hydrological modelling as in **Section 6.3.5** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Lampetra fluviatilis (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Trichomanes speciosum* (Killarney Fern) [1421] *Margaritifera durrovensis* (Nore Pearl Mussel) [1990]				

Table D2.05: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAL-078 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
River Nore SPA (004233)	30m	Kingfisher (*Alcedo atthis*) [A229]	breed	New GW abstraction, new WTP, new PS, new watermains and new reservoir at existing Bennetsbridge WTP site. Decommission Kilmaganny WTP. All new infrastructure is 30m from this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses from run-off or soakage during construction that could impact the habitats used by QI bird species. Potential pollution of watercourses during construction could have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species, given the works are adjacent to the SPA.	New GW abstraction, new WTP, new PS, new watermains and new reservoir at existing Bennetsbridge WTP site. Decommission Kilmaganny WTP. All new infrastructure is 30m from this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D2.06: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAL-511 (TG3-SAL-007, TG3-SAL-052) and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
River Barrow And River Nore SAC (002162)	0m	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Vertigo moulinsiana* (Desmoulin's Whorl Snail) [1016] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Trichomanes speciosum* (Killarney Fern) [1421] *Margaritifera durrovensis* (Nore Pearl Mussel) [1990]	Upgrade Troyswood WTP and abandon Radestown WTP. Rationalise Ballyragget to Kilkenny City WRZ for increased resilience and long term OPEX savings. New watermains within European site. Upgrade Troyswood WTP and decommission Ballyragget WTP adjacent to European site. Decommission Radestown WTP in vicinity of this European site. Works hydrologically linked to this European site. **Physical loss of habitat –** There is potential for some loss of/damage to QI habitats or the supporting habitats of QI species during construction works given that the works are within the SAC. **Mortality –** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species, their prey, and restrict access to spawning habitat further effecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) –** potential pollution of watercourses from direct inputs, run-off or soakage during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) –** there is potential for disturbance to otter and other QI species from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.	Upgrade Troyswood WTP and abandon Radestown WTP. Rationalise Ballyragget to Kilkenny City WRZ for increased resilience and long term OPEX savings. New watermains within European site. Upgrade Troyswood WTP and decommission Ballyragget WTP adjacent to European site. Decommission Radestown WTP in vicinity of this European site. Works hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** In addition to general mitigation measures outlined above, option specific measures have been identified for **SAL-511** (see **Section 6.3.4**) as follows: Construction works (pipeline crossing of SAC) will avoid the main migration and spawning periods for salmon (this period is also critical to the lifecycles of the freshwater pearl mussel (FWPM) and Nore pearl mussel) to minimise the risk of displacement or barrier effects due to noise, vibration or site-derived pollutants, unless project-specific environmental assessments identify that any effects associated with construction works will be 'not significant' or will have no adverse effect on the integrity of the SAC. To note there are significant variations in the timing and duration of salmonid spawning activity throughout the Republic of Ireland (IFI, 2016). Instream works should be carried out during the period July-September (except in exceptional circumstances and with agreement with IFI). *Note it is not anticipated that there would be any direct impacts on FWPM or Nore pearl mussel, as such impacts could be designed out through, for example, strategic positioning of crossing points. Only indirect effects are anticipated for FWPM and/or Nore pearl mussel through potential impacts on their host species. The potential for direct impacts can only be determined at the project stage which will influence the location for any crossing points.* With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D2.07: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAL-511 (TG3-SAL-007, TG3-SAL-052) and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
River Nore SPA (004233)	0m	Kingfisher (*Alcedo atthis*) [A229]	breed	Upgrade Troyswood WTP and abandon Radestown WTP. Rationalise Ballyragget to Kilkenny City WRZ for increased resilience and long term OPEX savings. New watermains within European site. Upgrade Troyswood WTP and decommission Ballyragget WTP adjacent to European site. Decommission Radestown WTP in vicinity of this European site. Works hydrologically linked to this European site. **Physical loss of habitats/supporting habitat -** There is potential for some loss of/damage to protected sites and supporting habitats (e.g., foraging habitats) during construction works given that the works are within the SPA boundary impacting kingfisher. **Mortality-** pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact kingfisher or prey species relied on by QI. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses from direct inputs, run-off or soakage during construction could impact the habitats used by kingfisher. Potential pollution of watercourses during construction could have indirect effects on kingfisher through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to kingfisher, given the works are within the SPA.	Upgrade Troyswood WTP and abandon Radestown WTP. Rationalise Ballyragget to Kilkenny City WRZ for increased resilience and long term OPEX savings. New watermains within European site. Upgrade Troyswood WTP and decommission Ballyragget WTP adjacent to European site. Decommission Radestown WTP in vicinity of this European site. Works hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D2.08: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAL-521 (TG3-SAL-036, TG3-SAL-039) and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
River Barrow And River Nore SAC (002162)	0m	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Vertigo moulinsiana* (Desmoulin's Whorl Snail) [1016] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Trichomanes speciosum* (Killarney Fern) [1421] *Margaritifera durrovensis* (Nore Pearl Mussel) [1990]	New GW abstraction and upgrade Thomastown PS and WTP. Decommission existing Graiguenamanagh WTP. New watermains between Graiguenamanagh and Thomastown. New infrastructure at Thomastown including GW abstraction is within or adjacent to the European site. New watermains at Graiguenamanagh runs adjacent to the European site. Works hydrologically linked to this European site. Abstraction and European site within same ZOC. **Physical loss of habitat –** There is potential for some loss of/damage to QI habitats or the supporting habitats of QI species during construction works given that the works are within the SAC. **Mortality -** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species, their prey, and restrict access to spawning habitat further effecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses from direct inputs, run-off or soakage during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.	New GW abstraction and upgrade Thomastown PS and WTP. Decommission existing Graiguenamanagh WTP. New watermains between Graiguenamanagh and Thomastown. New infrastructure at Thomastown including GW abstraction is within or adjacent to the European site. New watermains at Graiguenamanagh runs adjacent to the European site. Works hydrologically linked to this European site. Abstraction and European site within same ZOC. **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction could lead to hydrological changes (reduced flows – impacting on water quality) that could impact GWD QI species or habitats such as Desmoulin's whorl snail, Mediterranean salt meadows, water courses of plain to montane levels, petrifying springs with tufa formation and alluvial forests. The abstraction is 130m away from the river and therefore is not predicted to impact the aquatic QI within the river. **Water table/availability -** There is potential for impacts on the GWD QI species and habitats utilising the gravel and bedrock aquifer linked to this European site through a reduction in flows/water levels.	• General Mitigation Measures are outlined in **Section 6.3.3** • Hydrogeological modelling as in **Section 6.3.5** • Hydrological modelling as in **Section 6.3.5** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D2.09: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAL-521 (TG3-SAL-036, TG3-SAL-039) and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
River Nore SPA (004233)	30m	Kingfisher (*Alcedo atthis*) [A229]	breed	New GW abstraction and upgrade Thomastown PS and WTP. Decommission existing Graiguenamanagh WTP. New watermains between Graiguenamanagh and Thomastown. New infrastructure at Thomastown 50m from the European site. New watermains at Graiguenamanagh runs adjacent to the European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses from run-off or soakage during construction could impact the habitats used by kingfisher. Potential pollution of watercourses during construction could have indirect effects on kingfisher through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to kingfisher, given the works are adjacent to the SPA.	New GW abstraction and upgrade Thomastown PS and WTP. Decommission existing Graiguenamanagh WTP. New watermains between Graiguenamanagh and Thomastown. New infrastructure at Thomastown 50m from the European site. New watermains at Graiguenamanagh runs adjacent to the European site. No operational impacts predicted	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D2.10: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAL-526 (TG3-SAL-083, TG3-SAL-084, TG3-SAL-085) and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
River Barrow And River Nore SAC (002162)	0m	**<u>Annex I habitats</u>** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] European dry heaths [4030]	New GW abstraction and new WTP located at Woodquater to supply full demand and maintain existing abstraction. Rationalise Ballinkillen and Borris WRZs to Gowran-Goresbridge-Paulstown WRZ. Works are within, adjacent to or in the vicinity of this European site. Two new watermains cross this European site at different points. New pumps within this European site, and Borris WTP to be abandoned adjacent to European site. New GW abstraction, new WTP, two new pumps, new balancing tank, new pipeline, upgrade Gowran Goresbridge Paulstown WTP, and abandon two WTPs (Choill Rua WTP and Ballinkillin WTP) all in the vicinity of this European site. Works are	New GW abstraction and new WTP located at Woodquater to supply full demand and maintain existing abstraction. Rationalise Ballinkillen and Borris WRZs to Gowran-Goresbridge-Paulstown WRZ. Works are within, adjacent to or in the vicinity of this European site. Two new watermains cross this European site at different points. New pumps within this European site, and Borris WTP to be abandoned adjacent to European site. New GW abstraction, new WTP, two new pumps, new balancing tank, new pipeline, upgrade Gowran Goresbridge Paulstown WTP and abandon two WTPs (Choill Rua WTP and	• General Mitigation Measures are outlined in **Section 6.3.3** In addition to general mitigation measures outlined above, option specific measures have been identified for **SAL-526** (see **Section 6.3.4**) as follows: Construction works (pipeline crossing of SAC) will avoid the main migration and spawning periods for salmon (this period is also critical to the lifecycles of the freshwater pearl mussel (FWPM) and Nore pearl mussel) to minimise the risk of displacement or barrier effects due to noise, vibration or site-derived pollutants, unless project-specific environmental assessments identify that any effects associated with construction works will be 'not significant' or will have no adverse effect on the integrity of	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Vertigo moulinsiana* (Desmoulin's Whorl Snail) [1016] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Trichomanes speciosum* (Killarney Fern) [1421] *Margaritifera durrovensis* (Nore Pearl Mussel) [1990]	hydrologically linked to this European site. **Physical loss of habitat –** There is potential for some loss of/damage to QI habitats or the supporting habitats of QI species during construction works given that the works are within the SAC. **Mortality -** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species, their prey, and restrict access to spawning habitat further effecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses from direct inputs, run-off or soakage during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.	Ballinkillin WTP) all in the vicinity of this European site. Works are hydrologically linked to this European site. However, no operational impacts are predicted given that the new GW abstraction is 3.5km away from the European site, and the abstraction overlies a different bedrock aquifer to the European site and does not share a Zone of Contribution (ZOC) with the European site.	the SAC. To note there are significant variations in the timing and duration of salmonid spawning activity throughout the Republic of Ireland (IFI, 2016). Instream works should be carried out during the period July-September (except in exceptional circumstances and with agreement with IFI). *Note it is not anticipated that there would be any direct impacts on FWPM or Nore pearl mussel, as such impacts could be designed out through, for example, strategic positioning of crossing points. Only indirect effects are anticipated for FWPM and/or Nore pearl mussel through potential impacts on their host species. The potential for direct impacts can only be determined at the project stage which will influence the location for any crossing points.* With the implementation of mitigation as noted above there is no potential for AESI	

Table D3.01: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAM-017 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Cahore Marshes SPA (004143)	15.6km	Wigeon (*Anas penelope*) [A050] Golden Plover (*Pluvialis apricaria*) [A140] Lapwing (*Vanellus vanellus*) [A142] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. Upgrade WTP and new storage in the Zone of Influence (ZoI) of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. Upgrade WTP and new storage in the Zone of Influence (ZoI) of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
Wexford Harbour and Slobs SPA (004076)	17.6km	Little Grebe (*Tachybaptus ruficollis*) [A004] Great Crested Grebe (*Podiceps cristatus*) [A005] Cormorant (*Phalacrocorax carbo*) [A017] Grey Heron (*Ardea cinerea*) [A028] Bewick's Swan (*Cygnus columbianus bewickii*) [A037] Whooper Swan (*Cygnus cygnus*) [A038] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Mallard (*Anas platyrhynchos*) [A053] Pintail (*Anas acuta*) [A054] Scaup (*Aythya marila*) [A062] Goldeneye (*Bucephala clangula*) [A067] Red-breasted Merganser (*Mergus serrator*) [A069] Hen Harrier (*Circus cyaneus*) [A082] Coot (*Fulica atra*) [A125] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Dunlin (*Calidris alpina)* [A149] Black-tailed Godwit (*Limosa limosa*) [A156]	Non-b Non-b	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. Upgrade WTP and new storage in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. Upgrade WTP and new storage in the ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Bar-tailed Godwit (*Limosa lapponica*) [A157]	Non-b				
		Curlew (*Numenius arquata*) [A160]	Non-b				
		Redshank (*Tringa totanus*) [A162]	Non-b				
		Black-headed Gull (*Chroicocephalus ridibundus*) [A179]	Non-b				
		Lesser Black-backed Gull (*Larus fuscus*) [A183]	Non-b				
		Little Tern (*Sterna albifrons*) [A195]	Non-b				
		Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	Non-b				
		Wetland and Waterbirds [A999]					

Table D3.02: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAM-029 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Slaney River Valley SAC (000781)	1.1km	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365]	New GW abstraction and new WTP to partly supply full demand (abandon existing SW source). New GW abstraction, pumps, storage, WTP and mains in vicinity of this European site. Decommission WTP further from European site but in ZoI. Some of the works are hydrologically linked to this European site and GW abstraction overlies the same bedrock aquifer as this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works.	New GW abstraction and new WTP to partly supply full demand (abandon existing SW source). New GW abstraction, pumps, storage, WTP and mains in vicinity of this European site. Decommission WTP further from European site but in ZoI. Some of the works are hydrologically linked to this European site and GW abstraction overlies the same bedrock aquifer as this European site. **Habitat degradation – hydrological/ hydrogeological changes -** abstraction could lead to hydrological changes (reduced flows – impacting on water quality) that could impact groundwater dependent (GWD) QI habitats such as water courses of plain to montane levels and alluvial forests. **Water table/availability -** there is potential for impacts on GWD QI habitats through a reduction in flows/water levels.	• General Mitigation Measures are outlined in **Section 6.3.3** • Hydrogeological modelling as in **Section 6.3.5** • Hydrological modelling as in **Section 6.3.5** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D3.03: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAM-029 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Wexford Harbour and Slobs SPA (004076)	11.8km	Little Grebe (*Tachybaptus ruficollis*) [A004] Great Crested Grebe (*Podiceps cristatus*) [A005] Cormorant (*Phalacrocorax carbo*) [A017] Grey Heron (*Ardea cinerea*) [A028] Bewick's Swan (*Cygnus columbianus bewickii*) [A037] Whooper Swan (*Cygnus cygnus*) [A038] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Mallard (*Anas platyrhynchos*) [A053] Pintail (*Anas acuta*) [A054] Scaup (*Aythya marila*) [A062] Goldeneye (*Bucephala clangula*) [A067] Red-breasted Merganser (*Mergus serrator*) [A069] Hen Harrier (*Circus cyaneus*) [A082] Coot (*Fulica atra*) [A125] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Dunlin (*Calidris alpina)* [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Lesser Black-backed Gull (*Larus fuscus*) [A183] Little Tern (*Sterna albifrons*) [A195] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-b Non-b	New GW abstraction and new WTP to partly supply full demand (abandon existing SW source). New GW abstraction, pumps, storage, WTP and mains, and decommission WTP in ZoI of this European site. Some of the works are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	New GW abstraction and new WTP to partly supply full demand (abandon existing SW source). New GW abstraction, pumps, storage, WTP and mains, and decommission WTP in ZoI of this European site. Some of the works are hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
Cahore Marshes SPA (004143)	18.8km	Wigeon (*Anas penelope*) [A050] Golden Plover (*Pluvialis apricaria*) [A140] Lapwing (*Vanellus vanellus*) [A142]	Non-b Non-b Non-b Non-b	New GW abstraction and new WTP to partly supply full demand (abandon existing SW source). New GW abstraction, pumps, storage,	New GW abstraction and new WTP to partly supply full demand (abandon existing SW source). New GW abstraction, pumps, storage,	• General Mitigation Measures are outlined in **Section 6.3.3**	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]		WTP and mains in ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	WTP and mains in ZoI of this European site. No operational impacts predicted.	With the implementation of mitigation as noted above there is no potential for AESI	

Table D3.04: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAM-036 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Slaney River Valley SAC (000781)	0m	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	New GW abstraction and upgrade Carrickduff WTP to supply deficit. New mains, increase GW abstraction and upgrade pumps within this European site. New GW abstraction and pumps adjacent to this European site. New storage, WTP upgrade, and new mains in vicinity of this European site. Some of the works are hydrologically linked to this European site. This European site overlies the Zone of Contribution (ZOC) of the GW abstraction to be increased, and also overlies the same bedrock aquifer as the new GW abstraction. **Physical loss of habitat –** there is potential for some loss of/damage to QI habitats or the supporting habitats of QI species during construction works given that the works are within the SAC. **Mortality -** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species, their prey, and restrict access to spawning habitat further affecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during	New GW abstraction and upgrade Carrickduff WTP to supply deficit. New mains, increase GW abstraction and upgrade pumps within this European site. New GW abstraction and pumps adjacent to this European site. New storage, WTP upgrade, and new mains in vicinity of this European site. Some of the works are hydrologically linked to this European site. This European site overlies the Zone of Contribution (ZOC) of the GW abstraction to be increased, and also overlies the same bedrock aquifer as the new GW abstraction. **Habitat degradation – hydrological/ hydrogeological changes -** abstraction could lead to hydrological changes (reduced flows – impacting on water quality) that could impact groundwater dependent (GWD) QI habitats such as water courses of plain to montane levels and alluvial forests. The abstractions are both over 40m away from the river and therefore are not predicted to impact the aquatic QI within the river.	• General Mitigation Measures are outlined in **Section 6.3.3** • Hydrogeological modelling as in **Section 6.3.5** • Hydrological modelling as in **Section 6.3.5** In addition to general mitigation measures outlined above, option specific measures have been identified for **SAM-036** (see **Section 6.3.4**) as follows: Construction works (pipeline crossing of SAC) will avoid the main migration and spawning periods for salmon (this period is also critical to the lifecycle of the freshwater pearl mussel) to minimise the risk of displacement or barrier effects due to noise, vibration or site-derived pollutants, unless project-specific environmental assessments identify that any effects associated with construction works will be 'not significant' or will have no adverse effect on the integrity of the SAC. To note there are significant variations in the timing and duration of salmonid spawning activity throughout the Republic of Ireland (IFI, 2016). Instream works should be carried out during the period July-September (except in exceptional circumstances and with agreement with IFI). *Note it is not anticipated that there would be any direct impacts on FWPM, as such impacts*	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Phoca vitulina (Harbour Seal) [1365]	construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.	**Water table/availability -** there is potential for impacts on GWD QI habitats through a reduction in flows/water levels.	*could be designed out through, for example, strategic positioning of crossing points. Only indirect effects are anticipated for FWPM through potential impacts on their host species. The potential for direct impacts can only be determined at the project stage which will influence the location for any crossing points.* With the implementation of mitigation as noted above there is no potential for AESI	

Table D3.05: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAM-036 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Wexford Harbour and Slobs SPA (004076)	19km	Little Grebe (*Tachybaptus ruficollis*) [A004]	Non-b	New GW abstraction and upgrade Carrickduff WTP to supply deficit. Works are in the ZoI of this European site. New watermains cross a hydrological link to this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	New GW abstraction and upgrade Carrickduff WTP to supply deficit. Works are in the ZoI of this European site. New watermains cross a hydrological link to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
		Great Crested Grebe (*Podiceps cristatus*) [A005]	Non-b				
		Cormorant (*Phalacrocorax carbo*) [A017]	Non-b				
		Grey Heron (*Ardea cinerea*) [A028]	Non-b				
		Bewick's Swan (*Cygnus columbianus bewickii*) [A037]	Non-b				
		Whooper Swan (*Cygnus cygnus*) [A038]	Non-b				
		Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]	Non-b				
		Shelduck (*Tadorna tadorna*) [A048]	Non-b				
		Wigeon (*Anas penelope*) [A050]	Non-b				
		Teal (*Anas crecca*) [A052]	Non-b				
		Mallard (*Anas platyrhynchos*) [A053]	Non-b				
		Pintail (*Anas acuta*) [A054]	Non-b				
		Scaup (*Aythya marila*) [A062]	Non-b				
		Goldeneye (*Bucephala clangula*) [A067]	Non-b				
		Red-breasted Merganser (*Mergus serrator*) [A069]	Non-b				
		Hen Harrier (*Circus cyaneus*) [A082]	Non-b				
		Coot (*Fulica atra*) [A125]	Non-b				
		Oystercatcher (*Haematopus ostralegus*) [A130]	Non-b				
		Golden Plover (*Pluvialis apricaria*) [A140]	Non-b				
		Grey Plover (*Pluvialis squatarola*) [A141]	Non-b				
		Lapwing (*Vanellus vanellus*) [A142]	Non-b				
		Knot (*Calidris canutus*) [A143]	Non-b				

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Sanderling (*Calidris alba*) [A144]	Non-b				
		Dunlin (*Calidris alpina)* [A149]	Non-b				
		Black-tailed Godwit (*Limosa limosa*) [A156]	Non-b				
		Bar-tailed Godwit (*Limosa lapponica*) [A157]	Non-b				
		Curlew (*Numenius arquata*) [A160]	Non-b				
		Redshank (*Tringa totanus*) [A162]	Non-b				
		Black-headed Gull (*Chroicocephalus ridibundus*) [A179]	Non-b				
		Lesser Black-backed Gull (*Larus fuscus*) [A183]	Non-b				
		Little Tern (*Sterna albifrons*) [A195]	Non-b				
		Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	Non-b				
		Wetland and Waterbirds [A999]					

Table D3.06: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAM-044 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Slaney River Valley SAC (000781)	7.7km	**<u>Annex I habitats</u>** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **<u>Annex II species</u>** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103]	Increase GW abstraction and upgrade Ballycrystal WTP to supply deficit. New mains, increase GW abstraction, and upgrade pumps and WTP in the ZoI of this European site. The works are adjacent to a hydrological link to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats.	Increase GW abstraction and upgrade Ballycrystal WTP to supply deficit. New mains, increase GW abstraction, and upgrade pumps and WTP in the ZoI of this European site. The works are adjacent to a hydrological link to this European site. No operational impacts predicted due to this European site being outside of the ZOC of the GW abstraction.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Salmo salar (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365]				

Table D3.07: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAM-044 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Wexford Harbour and Slobs SPA (004076)	14.3km	Little Grebe (*Tachybaptus ruficollis*) [A004] Great Crested Grebe (*Podiceps cristatus*) [A005] Cormorant (*Phalacrocorax carbo*) [A017] Grey Heron (*Ardea cinerea*) [A028] Bewick's Swan (*Cygnus columbianus bewickii*) [A037] Whooper Swan (*Cygnus cygnus*) [A038] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Mallard (*Anas platyrhynchos*) [A053] Pintail (*Anas acuta*) [A054] Scaup (*Aythya marila*) [A062] Goldeneye (*Bucephala clangula*) [A067] Red-breasted Merganser (*Mergus serrator*) [A069] Hen Harrier (*Circus cyaneus*) [A082] Coot (*Fulica atra*) [A125] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Dunlin (*Calidris alpina)* [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162]	Non-b Non-b	Increase GW abstraction and upgrade Ballycrystal WTP to supply deficit. New mains, increase GW abstraction, and upgrade pumps and WTP in the ZoI of this European site. The works are adjacent to a hydrological link to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Increase GW abstraction and upgrade Ballycrystal WTP to supply deficit. New mains, increase GW abstraction, and upgrade pumps and WTP in the ZoI of this European site. The works are adjacent to a hydrological link to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Black-headed Gull (*Chroicocephalus ridibundus*) [A179]	Non-b				
		Lesser Black-backed Gull (*Larus fuscus*) [A183]	Non-b				
		Little Tern (*Sterna albifrons*) [A195]	Non-b				
		Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	Non-b				
		Wetland and Waterbirds [A999]					

Table D3.08: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAM-050 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Slaney River Valley SAC (000781)	7.1km	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365]	Increase GW abstraction and upgrade Ballindaggin WTP to supply deficit. New storage, increase GW abstraction, and upgrade WTP in the ZoI of this European site. The works are adjacent to a hydrological link to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats.	Increase GW abstraction and upgrade Ballindaggin WTP to supply deficit. New storage, increase GW abstraction, and upgrade WTP in the ZoI of this European site. The works are adjacent to a hydrological link to this European site. No operational impacts predicted due to this European site being outside of the ZOC of the GW abstraction.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D3.09: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAM-050 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Wexford Harbour and Slobs SPA (004076)	11.9km	Little Grebe (*Tachybaptus ruficollis*) [A004]	Non-b	Increase GW abstraction and upgrade Ballindaggin WTP to supply deficit. New storage, increase GW abstraction, and upgrade WTP in the ZoI of this European site. The works are adjacent to a hydrological link to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Increase GW abstraction and upgrade Ballindaggin WTP to supply deficit. New storage, increase GW abstraction, and upgrade WTP in the ZoI of this European site. The works are adjacent to a hydrological link to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
		Great Crested Grebe (*Podiceps cristatus*) [A005]	Non-b				
		Cormorant (*Phalacrocorax carbo*) [A017]	Non-b				
		Grey Heron (*Ardea cinerea*) [A028]	Non-b				
		Bewick's Swan (*Cygnus columbianus bewickii*) [A037]	Non-b				
		Whooper Swan (*Cygnus cygnus*) [A038]	Non-b				
		Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]	Non-b				
		Shelduck (*Tadorna tadorna*) [A048]	Non-b				
		Wigeon (*Anas penelope*) [A050]	Non-b				
		Teal (*Anas crecca*) [A052]	Non-b				
		Mallard (*Anas platyrhynchos*) [A053]	Non-b				
		Pintail (*Anas acuta*) [A054]	Non-b				
		Scaup (*Aythya marila*) [A062]	Non-b				
		Goldeneye (*Bucephala clangula*) [A067]	Non-b				
		Red-breasted Merganser (*Mergus serrator*) [A069]	Non-b				
		Hen Harrier (*Circus cyaneus*) [A082]	Non-b				
		Coot (*Fulica atra*) [A125]	Non-b				
		Oystercatcher (*Haematopus ostralegus*) [A130]	Non-b				
		Golden Plover (*Pluvialis apricaria*) [A140]	Non-b				
		Grey Plover (*Pluvialis squatarola*) [A141]	Non-b				
		Lapwing (*Vanellus vanellus*) [A142]	Non-b				
		Knot (*Calidris canutus*) [A143]	Non-b				
		Sanderling (*Calidris alba*) [A144]	Non-b				
		Dunlin (*Calidris alpina)* [A149]	Non-b				
		Black-tailed Godwit (*Limosa limosa*) [A156]	Non-b				
		Bar-tailed Godwit (*Limosa lapponica*) [A157]	Non-b				
		Curlew (*Numenius arquata*) [A160]	Non-b				
		Redshank (*Tringa totanus*) [A162]	Non-b				
		Black-headed Gull (*Chroicocephalus ridibundus*) [A179]	Non-b				
		Lesser Black-backed Gull (*Larus fuscus*) [A183]	Non-b				
		Little Tern (*Sterna albifrons*) [A195]	Non-b				
		Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	Non-b				
		Wetland and Waterbirds [A999]					

Table D3.10: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAM-061 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Slaney River Valley SAC (000781)	2.3km	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365]	Increase GW abstraction and upgrade Monageer WTP to supply deficit. Increase GW abstraction, and upgrade WTP and pumps in the vicinity of this European site. The works are adjacent to a hydrological link to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works.	Increase GW abstraction and upgrade Monageer WTP to supply deficit. Increase GW abstraction, and upgrade WTP and pumps in the vicinity of this European site. The works are adjacent to a hydrological link to this European site. No operational impacts predicted due to this European site being outside of the ZOC of the GW abstraction.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D3.11: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAM-061 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Wexford Harbour and Slobs SPA (004076)	7.1km	Little Grebe (*Tachybaptus ruficollis*) [A004] Great Crested Grebe (*Podiceps cristatus*) [A005] Cormorant (*Phalacrocorax carbo*) [A017] Grey Heron (*Ardea cinerea*) [A028] Bewick's Swan (*Cygnus columbianus bewickii*) [A037] Whooper Swan (*Cygnus cygnus*) [A038] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b	Increase GW abstraction and upgrade Monageer WTP to supply deficit. Increase GW abstraction, and upgrade WTP and pumps in the ZoI of this European site. The works are adjacent to a hydrological link to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses	Increase GW abstraction and upgrade Monageer WTP to supply deficit. Increase GW abstraction, and upgrade WTP and pumps in the ZoI of this European site. The works are adjacent to a hydrological link to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Wigeon (*Anas penelope*) [A050]	Non-b	during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.			
		Teal (*Anas crecca*) [A052]	Non-b				
		Mallard (*Anas platyrhynchos*) [A053]	Non-b				
		Pintail (*Anas acuta*) [A054]	Non-b				
		Scaup (*Aythya marila*) [A062]	Non-b				
		Goldeneye (*Bucephala clangula*) [A067]	Non-b				
		Red-breasted Merganser (*Mergus serrator*) [A069]	Non-b				
		Hen Harrier (*Circus cyaneus*) [A082]	Non-b				
		Coot (*Fulica atra*) [A125]	Non-b				
		Oystercatcher (*Haematopus ostralegus*) [A130]	Non-b				
		Golden Plover (*Pluvialis apricaria*) [A140]	Non-b				
		Grey Plover (*Pluvialis squatarola*) [A141]	Non-b				
		Lapwing (*Vanellus vanellus*) [A142]	Non-b				
		Knot (*Calidris canutus*) [A143]	Non-b				
		Sanderling (*Calidris alba*) [A144]	Non-b				
		Dunlin (*Calidris alpina)* [A149]	Non-b				
		Black-tailed Godwit (*Limosa limosa*) [A156]	Non-b				
		Bar-tailed Godwit (*Limosa lapponica*) [A157]	Non-b				
		Curlew (*Numenius arquata*) [A160]	Non-b				
		Redshank (*Tringa totanus*) [A162]	Non-b				
		Black-headed Gull (*Chroicocephalus ridibundus*) [A179]	Non-b				
		Lesser Black-backed Gull (*Larus fuscus*) [A183]	Non-b				
		Little Tern (*Sterna albifrons*) [A195]	Non-b				
		Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	Non-b				
		Wetland and Waterbirds [A999]					
The Raven SPA (004019)	15.1km	Red-throated Diver (*Gavia stellata*) [A001]	Non-b	Increase GW abstraction and upgrade Monageer WTP to supply deficit. Increase GW abstraction, and upgrade WTP and pumps in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Increase GW abstraction and upgrade Monageer WTP to supply deficit. Increase GW abstraction, and upgrade WTP and pumps in the ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
		Cormorant (*Phalacrocorax carbo*) [A017]	Non-b				
		Common Scoter (*Melanitta nigra*) [A065]	Non-b				
		Grey Plover (*Pluvialis squatarola*) [A141]	Non-b				
		Sanderling (*Calidris alba*) [A144]	Non-b				
		Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	Non-b				
		Wetland and Waterbirds [A999]					

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Cahore Marshes SPA (004143)	16.9km	Wigeon (*Anas penelope*) [A050] Golden Plover (*Pluvialis apricaria*) [A140] Lapwing (*Vanellus vanellus*) [A142] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b	Increase GW abstraction and upgrade Monageer WTP to supply deficit. Increase GW abstraction, and upgrade WTP and pumps in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Increase GW abstraction and upgrade Monageer WTP to supply deficit. Increase GW abstraction, and upgrade WTP and pumps in the ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D3.12: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAM-100 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Slaney River Valley SAC (000781)	4.3km	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103]	New GW abstraction and upgrade Clonroche WTP to supply full demand. New GW abstraction and mains, and upgrade WTP and pumps in ZoI of this European site. Some of the works are hydrologically linked to this European site. New GW abstraction from productive fissured bedrock that this European site overlies. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats.	New GW abstraction and upgrade Clonroche WTP to supply full demand. New GW abstraction and mains, and upgrade WTP and pumps in ZoI of this European site. Some of the works are hydrologically linked to this European site. New GW abstraction from productive fissured bedrock that this European site overlies. However, no operational impacts predicted due to the GW abstraction location being 4.3km from this European site, which is outside of the 3km buffer for productive fissured bedrock.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Salmo salar (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365]				

Table D3.13: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAM-100 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Wexford Harbour and Slobs SPA (004076)	11.7km	Little Grebe (*Tachybaptus ruficollis*) [A004] Great Crested Grebe (*Podiceps cristatus*) [A005] Cormorant (*Phalacrocorax carbo*) [A017] Grey Heron (*Ardea cinerea*) [A028] Bewick's Swan (*Cygnus columbianus bewickii*) [A037] Whooper Swan (*Cygnus cygnus*) [A038] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Mallard (*Anas platyrhynchos*) [A053] Pintail (*Anas acuta*) [A054] Scaup (*Aythya marila*) [A062] Goldeneye (*Bucephala clangula*) [A067] Red-breasted Merganser (*Mergus serrator*) [A069] Hen Harrier (*Circus cyaneus*) [A082] Coot (*Fulica atra*) [A125] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Dunlin (*Calidris alpina)* [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162]	Non-b Non-b	New GW abstraction and upgrade Clonroche WTP to supply full demand. New GW abstraction and mains, and upgrade WTP and pumps in ZoI of this European site. Some of the works are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	New GW abstraction and upgrade Clonroche WTP to supply full demand. New GW abstraction and mains, and upgrade WTP and pumps in ZoI of this European site. Some of the works are hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Black-headed Gull (*Chroicocephalus ridibundus*) [A179]	Non-b				
		Lesser Black-backed Gull (*Larus fuscus*) [A183]	Non-b				
		Little Tern (*Sterna albifrons*) [A195]	Non-b				
		Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	Non-b				
		Wetland and Waterbirds [A999]					
Bannow Bay SPA (004033)	18.6km	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]	Non-b	New GW abstraction and upgrade Clonroche WTP to supply full demand. New GW abstraction and mains, and upgrade WTP and pumps in ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	New GW abstraction and upgrade Clonroche WTP to supply full demand. New GW abstraction and mains, and upgrade WTP and pumps in ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
		Shelduck (*Tadorna tadorna*) [A048]	Non-b				
		Pintail (*Anas acuta*) [A054]	Non-b				
		Oystercatcher (*Haematopus ostralegus*) [A130]	Non-b				
		Golden Plover (*Pluvialis apricaria*) [A140]	Non-b				
		Grey Plover (*Pluvialis squatarola*) [A141]	Non-b				
		Lapwing (*Vanellus vanellus*) [A142]	Non-b				
		Knot (*Calidris canutus*) [A143]	Non-b				
		Dunlin (*Calidris alpina*) [A149]	Non-b				
		Black-tailed Godwit (*Limosa limosa*) [A156]	Non-b				
		Bar-tailed Godwit (*Limosa lapponica*) [A157]	Non-b				
		Curlew (*Numenius arquata*) [A160]	Non-b				
		Redshank (*Tringa totanus*) [A162]	Non-b				
		Wetland and Waterbirds [A999]					

Table D3.14: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAM-127 & TG3-SAM-207 combined and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Screen Hills SAC (000708)	430m	**Annex I habitats** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] European dry heaths [4030]	Increase GW abstraction and upgrade WTP to partly supply deficit. New GW and new WTP to partly supply deficit. New GW abstraction, pumps, storage, WTP and mains in vicinity of this European site. Increase GW abstraction, upgrade two WTPs and pumps, and new mains in ZoI of this European site. Some of the new watermains are hydrologically linked to this European site. New GW abstraction from gravel aquifer that this European site overlies. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during	Increase GW abstraction and upgrade WTP to partly supply deficit. New GW and new WTP to partly supply deficit. New GW abstraction, pumps, storage, WTP and mains in vicinity of this European site. Increase GW abstraction, upgrade two WTPs, and pumps, and new mains in ZoI of this European site. Some of the new watermains are hydrologically linked to this European site. New GW abstraction from gravel aquifer that this European site overlies. However, no operational impacts predicted due to the GW abstraction	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
			construction could affect hydrologically connected QI habitats.	location being 3.7km from this European site, which is outside of the 1km buffer for gravel aquifers.		
Slaney River Valley SAC (000781)	1.3km	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365]	Increase GW abstraction and upgrade WTP to partly supply deficit. New GW and new WTP to partly supply deficit. New GW abstraction, pumps, storage, WTP and mains in vicinity of this European site. Increase GW abstraction, upgrade two WTPs and pumps, and new mains in ZoI of this European site. Some of the works are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works.	Increase GW abstraction and upgrade WTP to partly supply deficit. New GW and new WTP to partly supply deficit. New GW abstraction, pumps, storage, WTP and mains in vicinity of this European site. Increase GW abstraction, upgrade two WTPs and pumps, and new mains in ZoI of this European site. Some of the works are hydrologically linked to this European site. No operational impacts predicted due to this European site overlying a different aquifer than the abstractions.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D3.15: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAM-127 & TG3-SAM-207 combined and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Wexford Harbour and Slobs SPA (004076)	1.3km	Little Grebe (*Tachybaptus ruficollis*) [A004] Great Crested Grebe (*Podiceps cristatus*) [A005] Cormorant (*Phalacrocorax carbo*) [A017] Grey Heron (*Ardea cinerea*) [A028] Bewick's Swan (*Cygnus columbianus bewickii*) [A037] Whooper Swan (*Cygnus cygnus*) [A038]	Non-b Non-b Non-b Non-b Non-b Non-b	Increase GW abstraction and upgrade WTP to partly supply deficit. New GW and new WTP to partly supply deficit. New GW abstraction, pumps, storage, WTP and mains in vicinity of this European site. Increase GW abstraction, upgrade two WTPs and pumps, and new mains in ZoI	Increase GW abstraction and upgrade WTP to partly supply deficit. New GW and new WTP to partly supply deficit. New GW abstraction, pumps, storage, WTP and mains in vicinity of this European site. Increase GW abstraction, upgrade two WTPs and pumps, and new mains in ZoI of this European site. Some of the	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]	Non-b	of this European site. Some of the works are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	works are hydrologically linked to this European site. No operational impacts predicted.		
		Shelduck (*Tadorna tadorna*) [A048]	Non-b				
		Wigeon (*Anas penelope*) [A050]	Non-b				
		Teal (*Anas crecca*) [A052]	Non-b				
		Mallard (*Anas platyrhynchos*) [A053]	Non-b				
		Pintail (*Anas acuta*) [A054]	Non-b				
		Scaup (*Aythya marila*) [A062]	Non-b				
		Goldeneye (*Bucephala clangula*) [A067]	Non-b				
		Red-breasted Merganser (*Mergus serrator*) [A069]	Non-b				
		Hen Harrier (*Circus cyaneus*) [A082]	Non-b				
		Coot (*Fulica atra*) [A125]	Non-b				
		Oystercatcher (*Haematopus ostralegus*) [A130]	Non-b				
		Golden Plover (*Pluvialis apricaria*) [A140]	Non-b				
		Grey Plover (*Pluvialis squatarola*) [A141]	Non-b				
		Lapwing (*Vanellus vanellus*) [A142]	Non-b				
		Knot (*Calidris canutus*) [A143]	Non-b				
		Sanderling (*Calidris alba*) [A144]	Non-b				
		Dunlin (*Calidris alpina)* [A149]	Non-b				
		Black-tailed Godwit (*Limosa limosa*) [A156]	Non-b				
		Bar-tailed Godwit (*Limosa lapponica*) [A157]	Non-b				
		Curlew (*Numenius arquata*) [A160]	Non-b				
		Redshank (*Tringa totanus*) [A162]	Non-b				
		Black-headed Gull (*Chroicocephalus ridibundus*) [A179]	Non-b				
		Lesser Black-backed Gull (*Larus fuscus*) [A183]	Non-b				
		Little Tern (*Sterna albifrons*) [A195]	Non-b				
		Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	Non-b				
		Wetland and Waterbirds [A999]					
The Raven SPA (004019)	2km	Red-throated Diver (*Gavia stellata*) [A001]	Non-b	Increase GW abstraction and upgrade WTP to partly supply deficit. New GW and new WTP to partly supply deficit. New GW abstraction, pumps, storage, WTP and mains, increase GW abstraction, and upgrade two WTPs and pumps in ZoI of this European site. Some of the works are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could	Increase GW abstraction and upgrade WTP to partly supply deficit. New GW and new WTP to partly supply deficit. New GW abstraction, pumps, storage, WTP and mains, increase GW abstraction, and upgrade two WTPs and pumps in ZoI of this European site. Some of the works are hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
		Cormorant (*Phalacrocorax carbo*) [A017]	Non-b				
		Common Scoter (*Melanitta nigra*) [A065]	Non-b				
		Grey Plover (*Pluvialis squatarola*) [A141]	Non-b				
		Sanderling (*Calidris alba*) [A144]	Non-b				
		Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	Non-b				
		Wetland and Waterbirds [A999]					

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
				impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.			
Cahore Marshes SPA (004143)	11.4km	Wigeon (*Anas penelope*) [A050] Golden Plover (*Pluvialis apricaria*) [A140] Lapwing (*Vanellus vanellus*) [A142] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b	Increase GW abstraction and upgrade WTP to partly supply deficit. New GW and new WTP to partly supply deficit. New GW abstraction, pumps, storage, WTP and mains, increase GW abstraction, and upgrade two WTPs and pumps in ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Increase GW abstraction and upgrade WTP to partly supply deficit. New GW and new WTP to partly supply deficit. New GW abstraction, pumps, storage, WTP and mains, increase GW abstraction, and upgrade two WTPs and pumps in ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D3.16: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAM-141 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Slaney River Valley SAC (000781)	3.9km	**<u>Annex I habitats</u>** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140]	Increase GW abstraction and upgrade Ballinavortha WTP to supply deficit. Increase GW abstraction and upgrade WTP in ZoI of this European site. The	Increase GW abstraction and upgrade Ballinavortha WTP to supply deficit. Increase GW abstraction and upgrade WTP in ZoI of this European site. The works are	• General Mitigation Measures are outlined in **Section 6.3.3**	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365]	works are near a hydrological link to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats.	near a hydrological link to this European site. No operational impacts predicted due to this European site being outside of the ZOC of the GW abstraction.	With the implementation of mitigation as noted above there is no potential for AESI	

Table D3.17: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAM-144 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Slaney River Valley SAC (000781)	4.7km	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0]	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. Upgrade WTP in ZoI of this European site. The WTP upgrade is hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats.	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. Upgrade WTP in ZoI of this European site. The WTP upgrade is hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Annex II species *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365]				

Table D3.18: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAM-146 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Slaney River Valley SAC (000781)	870m	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. Upgrade WTP in vicinity of this European site. The WTP upgrade is near a hydrological link to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works.	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. Upgrade WTP in vicinity of this European site. The WTP upgrade is near a hydrological link to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Phoca vitulina (Harbour Seal) [1365]				

Table D3.19: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAM-148 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Ballyteige Burrow SAC (00696)	7.9km	**<u>Annex I habitats</u>** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) [1420] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Atlantic decalcified fixed dunes (*Calluno-Ulicetea*) [2150] Humid dune slacks [2190]	New GW abstraction and upgrade Mayglass WTP to supply deficit. Bring unused BHs back to production (GW abstraction from existing BHs currently not in supply). New GW abstraction and mains and upgrade pumps and WTP in the ZoI of this European site. Works are near a hydrological link to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect hydrologically connected QI habitats.	New GW abstraction and upgrade Mayglass WTP to supply deficit. Bring unused BHs back to production (GW abstraction from existing BHs currently not in supply). New GW abstraction and mains and upgrade pumps and WTP in the ZoI of this European site. Works are near a hydrological link to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D3.20: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAM-148 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Tacumshin Lake SPA (004092)	4.3km	Little Grebe (*Tachybaptus ruficollis*) [A004] Bewick's Swan (*Cygnus columbianus bewickii*) [A037] Whooper Swan (*Cygnus cygnus*) [A038]	Non-b Non-b Non-b	New GW abstraction and upgrade Mayglass WTP to supply deficit. Bring unused BHs back to production (GW abstraction from	New GW abstraction and upgrade Mayglass WTP to supply deficit. Bring unused BHs back to production (GW abstraction from existing BHs	• General Mitigation Measures are outlined in **Section 6.3.3**	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Wigeon (*Anas penelope*) [A050] Gadwall (*Anas strepera*) [A051] Teal (*Anas crecca*) [A052] Pintail (*Anas acuta*) [A054] Shoveler (*Anas clypeata*) [A056] Tufted Duck (*Aythya fuligula*) [A061] Coot (*Fulica atra*) [A125] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Black-tailed Godwit (*Limosa limosa*) [A156] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b	existing BHs currently not in supply). New GW abstraction and mains and upgrade pumps and WTP in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	currently not in supply). New GW abstraction and mains and upgrade pumps and WTP in the ZoI of this European site. No operational impacts predicted.	With the implementation of mitigation as noted above there is no potential for AESI	
Wexford Harbour and Slobs SPA (004076)	5.1km	Little Grebe (*Tachybaptus ruficollis*) [A004] Great Crested Grebe (*Podiceps cristatus*) [A005] Cormorant (*Phalacrocorax carbo*) [A017] Grey Heron (*Ardea cinerea*) [A028] Bewick's Swan (*Cygnus columbianus bewickii*) [A037] Whooper Swan (*Cygnus cygnus*) [A038] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Mallard (*Anas platyrhynchos*) [A053] Pintail (*Anas acuta*) [A054] Scaup (*Aythya marila*) [A062] Goldeneye (*Bucephala clangula*) [A067] Red-breasted Merganser (*Mergus serrator*) [A069] Hen Harrier (*Circus cyaneus*) [A082] Coot (*Fulica atra*) [A125] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Dunlin (*Calidris alpina)* [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157]	Non-b Non-b	New GW abstraction and upgrade Mayglass WTP to supply deficit. Bring unused BHs back to production (GW abstraction from existing BHs currently not in supply). New GW abstraction and mains and upgrade pumps and WTP in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	New GW abstraction and upgrade Mayglass WTP to supply deficit. Bring unused BHs back to production (GW abstraction from existing BHs currently not in supply). New GW abstraction and mains and upgrade pumps and WTP in the ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Lesser Black-backed Gull (*Larus fuscus*) [A183] Little Tern (*Sterna albifrons*) [A195] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b				
Ballyteige Burrow SPA (004020)	8.5km	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b	New GW abstraction and upgrade Mayglass WTP to supply deficit. Bring unused BHs back to production (GW abstraction from existing BHs currently not in supply). New GW abstraction and mains and upgrade pumps and WTP in the ZoI of this European site. Works are near a hydrological link to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	New GW abstraction and upgrade Mayglass WTP to supply deficit. Bring unused BHs back to production (GW abstraction from existing BHs currently not in supply). New GW abstraction and mains and upgrade pumps and WTP in the ZoI of this European site. Works are near a hydrological link to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
The Raven SPA (004019)	10.7km	Red-throated Diver (*Gavia stellata*) [A001] Cormorant (*Phalacrocorax carbo*) [A017] Common Scoter (*Melanitta nigra*) [A065] Grey Plover (*Pluvialis squatarola*) [A141] Sanderling (*Calidris alba*) [A144] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b	New GW abstraction and upgrade Mayglass WTP to supply deficit. Bring unused BHs back to production (GW abstraction from existing BHs currently not in supply). New GW abstraction and mains and upgrade pumps and WTP in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for	New GW abstraction and upgrade Mayglass WTP to supply deficit. Bring unused BHs back to production (GW abstraction from existing BHs currently not in supply). New GW abstraction and mains and upgrade pumps and WTP in the ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
				disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.			
Bannow Bay SPA (004033)	16.8km	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Pintail (*Anas acuta*) [A054] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b	New GW abstraction and upgrade Mayglass WTP to supply deficit. Bring unused BHs back to production (GW abstraction from existing BHs currently not in supply). New GW abstraction and mains and upgrade pumps and WTP in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	New GW abstraction and upgrade Mayglass WTP to supply deficit. Bring unused BHs back to production (GW abstraction from existing BHs currently not in supply). New GW abstraction and mains and upgrade pumps and WTP in the ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D3.21: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAM-149 and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Slaney River Valley SAC (000781)	330m	**<u>Annex I habitats</u>** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]	New GW wellfield at Adamstown and new WTP to supply deficit. Upgrade WTP in vicinity of this European site. New GW abstraction, pumps, WTP and mains in ZoI of this European site. New GW abstraction from productive fissured bedrock that this European site overlies. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works.	New GW wellfield at Adamstown and new WTP to supply deficit. Upgrade WTP in vicinity of this European site. New GW abstraction, pumps, WTP and mains in ZoI of this European site. New GW abstraction from productive fissured bedrock that this European site overlies. However, no operational impacts predicted due to the abstraction location being 5.7km from this European site, which is outside of	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365]		the 3km buffer for productive fissured bedrock.		
Bannow Bay SAC (000697)	5.5km	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) [1420] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	New GW wellfield at Adamstown and new WTP to supply deficit. New GW abstraction, pumps, WTP and mains in ZoI of this European site. New mains are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect hydrologically connected QI habitats.	New GW wellfield at Adamstown and new WTP to supply deficit. New GW abstraction, pumps, WTP and mains in ZoI of this European site. New mains are hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
Ballyteige Burrow SAC (00696)	10.6km	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] *Salicornia* and other annuals colonising mud and sand [1310]	New GW wellfield at Adamstown and new WTP to supply deficit. New GW abstraction, pumps, WTP and mains in ZoI of this European site. New mains are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect hydrologically connected QI habitats.	New GW wellfield at Adamstown and new WTP to supply deficit. New GW abstraction, pumps, WTP and mains in ZoI of this European site. New mains are hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
		Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) [1420] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Atlantic decalcified fixed dunes (*Calluno-Ulicetea*) [2150] Humid dune slacks [2190]				

Table D3.22: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAM-149 and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Wexford Harbour and Slobs SPA (004076)	1km	Little Grebe (*Tachybaptus ruficollis*) [A004] Great Crested Grebe (*Podiceps cristatus*) [A005] Cormorant (*Phalacrocorax carbo*) [A017] Grey Heron (*Ardea cinerea*) [A028] Bewick's Swan (*Cygnus columbianus bewickii*) [A037] Whooper Swan (*Cygnus cygnus*) [A038] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Mallard (*Anas platyrhynchos*) [A053] Pintail (*Anas acuta*) [A054] Scaup (*Aythya marila*) [A062] Goldeneye (*Bucephala clangula*) [A067] Red-breasted Merganser (*Mergus serrator*) [A069] Hen Harrier (*Circus cyaneus*) [A082] Coot (*Fulica atra*) [A125] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141]	Non-b Non-b	New GW wellfield at Adamstown and new WTP to supply deficit. Upgrade WTP in vicinity of this European site. New GW abstraction, pumps, WTP and mains in ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	New GW wellfield at Adamstown and new WTP to supply deficit. Upgrade WTP in vicinity of this European site. New GW abstraction, pumps, WTP and mains in ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Dunlin (*Calidris alpina)* [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Lesser Black-backed Gull (*Larus fuscus*) [A183] Little Tern (*Sterna albifrons*) [A195] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b				
The Raven SPA (004019)	8km	Red-throated Diver (*Gavia stellata*) [A001] Cormorant (*Phalacrocorax carbo*) [A017] Common Scoter (*Melanitta nigra*) [A065] Grey Plover (*Pluvialis squatarola*) [A141] Sanderling (*Calidris alba*) [A144] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b	New GW wellfield at Adamstown and new WTP to supply deficit. Upgrade WTP and new GW abstraction, pumps, WTP and mains in ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	New GW wellfield at Adamstown and new WTP to supply deficit. Upgrade WTP and new GW abstraction, pumps, WTP and mains in ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
Bannow Bay SPA (004033)	9.5km	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Pintail (*Anas acuta*) [A054] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b	New GW wellfield at Adamstown and new WTP to supply deficit. Upgrade WTP and new GW abstraction, pumps, WTP and mains in ZoI of this European site. New mains are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for	New GW wellfield at Adamstown and new WTP to supply deficit. Upgrade WTP and new GW abstraction, pumps, WTP and mains in ZoI of this European site. New mains are hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Wetland and Waterbirds [A999]		disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.			
Ballyteige Burrow SPA (004020)	10.8km	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b	New GW wellfield at Adamstown and new WTP to supply deficit. Upgrade WTP and new GW abstraction, pumps, WTP and mains in ZoI of this European site. New mains are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	New GW wellfield at Adamstown and new WTP to supply deficit. Upgrade WTP and new GW abstraction, pumps, WTP and mains in ZoI of this European site. New mains are hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
Tacumshin Lake SPA (004092)	14.4km	Little Grebe (*Tachybaptus ruficollis*) [A004] Bewick's Swan (*Cygnus columbianus bewickii*) [A037] Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Gadwall (*Anas strepera*) [A051] Teal (*Anas crecca*) [A052] Pintail (*Anas acuta*) [A054] Shoveler (*Anas clypeata*) [A056] Tufted Duck (*Aythya fuligula*) [A061] Coot (*Fulica atra*) [A125] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b	New GW wellfield at Adamstown and new WTP to supply deficit. Upgrade WTP and new GW abstraction, pumps, WTP and mains in ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	New GW wellfield at Adamstown and new WTP to supply deficit. Upgrade WTP and new GW abstraction, pumps, WTP and mains in ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Lapwing (*Vanellus vanellus*) [A142] Black-tailed Godwit (*Limosa limosa*) [A156] Wetland and Waterbirds [A999]	Non-b Non-b				

Table D3.23: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAM-547 (TG3-SAM-140) and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Slaney River Valley SAC (000781)	940m	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365]	Rationalise Ballingate to Tinahely WRZ (not in deficit). New pump, storage and mains and decommission Ballingate WTP in vicinity of this European site. New mains are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works.	Rationalise Ballingate to Tinahely WRZ (not in deficit). New pump, storage and mains and decommission Ballingate WTP in vicinity of this European site. New mains are hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D3.24: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAM-575 (TG3-SAM-224, TG3-SAM-225) and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Bannow Bay SAC (000697)	990m	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) [1420] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	Rationalise Carrigbyrne to South Regional WRZ. New GW abstraction and new WTP to supply deficit. New mains and WTP upgrade in the vicinity of this European site. New GW abstraction, pumps, storage, WTP and mains, and decommission Carrickbyrne WTP in the ZoI of this European site. Some of the works are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect hydrologically connected QI habitats.	Rationalise Carrigbyrne to South Regional WRZ. New GW abstraction and new WTP to supply deficit. New mains and WTP upgrade in the vicinity of this European site. New GW abstraction, pumps, storage, WTP and mains, and decommission Carrickbyrne WTP in the ZoI of this European site. Some of the works are hydrologically linked to this European site. No operational impacts predicted due to this European site overlying a different aquifer to the GW abstraction location.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D3.25: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAM-575 (TG3-SAM-224, TG3-SAM-225) and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Bannow Bay SPA (004033)	2.8km	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]	Non-b	Rationalise Carrigbyrne to South Regional WRZ. New GW abstraction and new WTP to supply deficit. New mains and WTP upgrade in the vicinity of this European site. New GW abstraction, pumps, storage, WTP and mains, and decommission Carrickbyrne WTP in the ZoI of this European site. Some of the works are hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have	Rationalise Carrigbyrne to South Regional WRZ. New GW abstraction and new WTP to supply deficit. New mains and WTP upgrade in the vicinity of this European site. New GW abstraction, pumps, storage, WTP and mains, and decommission Carrickbyrne WTP in the ZoI of this European site. Some of the works are hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
		Shelduck (*Tadorna tadorna*) [A048]	Non-b				
		Pintail (*Anas acuta*) [A054]	Non-b				
		Oystercatcher (*Haematopus ostralegus*) [A130]	Non-b				
		Golden Plover (*Pluvialis apricaria*) [A140]	Non-b				
		Grey Plover (*Pluvialis squatarola*) [A141]	Non-b				
		Lapwing (*Vanellus vanellus*) [A142]	Non-b				
		Knot (*Calidris canutus*) [A143]	Non-b				
		Dunlin (*Calidris alpina*) [A149]	Non-b				
		Black-tailed Godwit (*Limosa limosa*) [A156]	Non-b				
		Bar-tailed Godwit (*Limosa lapponica*) [A157]	Non-b				
		Curlew (*Numenius arquata*) [A160]	Non-b				
		Redshank (*Tringa totanus*) [A162]	Non-b				

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Wetland and Waterbirds [A999]		indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.			
Ballyteige Burrow SPA (004020)	9.1km	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b	Rationalise Carrigbyrne to South Regional WRZ. New GW abstraction and new WTP to supply deficit. New GW abstraction, pumps, storage, WTP and mains, upgrade WTP, and decommission Carrickbyrne WTP in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Rationalise Carrigbyrne to South Regional WRZ. New GW abstraction and new WTP to supply deficit. New GW abstraction, pumps, storage, WTP and mains, upgrade WTP, and decommission Carrickbyrne WTP in the ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
Wexford Harbour and Slobs SPA (004076)	14.4km	Little Grebe (*Tachybaptus ruficollis*) [A004] Great Crested Grebe (*Podiceps cristatus*) [A005] Cormorant (*Phalacrocorax carbo*) [A017] Grey Heron (*Ardea cinerea*) [A028] Bewick's Swan (*Cygnus columbianus bewickii*) [A037] Whooper Swan (*Cygnus cygnus*) [A038] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Mallard (*Anas platyrhynchos*) [A053] Pintail (*Anas acuta*) [A054] Scaup (*Aythya marila*) [A062] Goldeneye (*Bucephala clangula*) [A067] Red-breasted Merganser (*Mergus serrator*) [A069] Hen Harrier (*Circus cyaneus*) [A082] Coot (*Fulica atra*) [A125]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b	Rationalise Carrigbyrne to South Regional WRZ. New GW abstraction and new WTP to supply deficit. New GW abstraction, pumps, storage, WTP and mains, upgrade WTP, and decommission Carrickbyrne WTP in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Rationalise Carrigbyrne to South Regional WRZ. New GW abstraction and new WTP to supply deficit. New GW abstraction, pumps, storage, WTP and mains, upgrade WTP, and decommission Carrickbyrne WTP in the ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Oystercatcher (*Haematopus ostralegus*) [A130]	Non-b				
		Golden Plover (*Pluvialis apricaria*) [A140]	Non-b				
		Grey Plover (*Pluvialis squatarola*) [A141]	Non-b				
		Lapwing (*Vanellus vanellus*) [A142]	Non-b				
		Knot (*Calidris canutus*) [A143]	Non-b				
		Sanderling (*Calidris alba*) [A144]	Non-b				
		Dunlin (*Calidris alpina)* [A149]	Non-b				
		Black-tailed Godwit (*Limosa limosa*) [A156]	Non-b				
		Bar-tailed Godwit (*Limosa lapponica*) [A157]	Non-b				
		Curlew (*Numenius arquata*) [A160]	Non-b				
		Redshank (*Tringa totanus*) [A162]	Non-b				
		Black-headed Gull (*Chroicocephalus ridibundus*) [A179]	Non-b				
		Lesser Black-backed Gull (*Larus fuscus*) [A183]	Non-b				
		Little Tern (*Sterna albifrons*) [A195]	Non-b				
		Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	Non-b				
		Wetland and Waterbirds [A999]					
Tramore Back Strand SPA (004027)	17.8km	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]	Non-b	Rationalise Carrigbyrne to South Regional WRZ. New GW abstraction and new WTP to supply deficit. New GW abstraction, pumps, storage, WTP and mains, upgrade WTP, and decommission Carrickbyrne WTP in the ZoI of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Rationalise Carrigbyrne to South Regional WRZ. New GW abstraction and new WTP to supply deficit. New GW abstraction, pumps, storage, WTP and mains, upgrade WTP, and decommission Carrickbyrne WTP in the ZoI of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
		Golden Plover (*Pluvialis apricaria*) [A140]	Non-b				
		Grey Plover (*Pluvialis squatarola*) [A141]	Non-b				
		Lapwing (*Vanellus vanellus*) [A142]	Non-b				
		Dunlin (*Calidris alpina*) [A149]	Non-b				
		Black-tailed Godwit (*Limosa limosa*) [A156]	Non-b				
		Bar-tailed Godwit (*Limosa lapponica*) [A157]	Non-b				
		Curlew (*Numenius arquata*) [A160]	Non-b				
		Wetland and Waterbirds [A999]					

Table D3.26: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG3-SAM-576 (TG3-SAM-226, TG3-SAM-227, TG3-SAM-228, TG3-SAM-229, TG3-SAM-230) and Mitigation Measures. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
			Construction	Operation		
Slaney River Valley SAC (000781)	0m	**Annex I habitats** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365]	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit. Rationalise Bree, Ballyhogue, Glynn and Marshalstown to Enniscorthy WRZ. Increase SW abstraction, new storage, and upgrade WTP within this European site. New pumps and mains adjacent to this European site. New pumps, storage and mains, upgrade two WTPs, and decommission four WTPs in vicinity of this European site. Some of the works are hydrologically linked to this European site. **Physical loss of habitat –** there is potential for some loss of/damage to QI habitats or the supporting habitats of QI species during construction works given that some of the works are within the SAC. **Mortality -** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species, their prey, and restrict access to spawning habitat further affecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works. There is also potential for the spread of invasive species given that some of the works are within the SAC boundary.	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit. Rationalise Bree, Ballyhogue, Glynn and Marshalstown to Enniscorthy WRZ. Increase SW abstraction, new storage, and upgrade WTP within this European site. New pumps and mains adjacent to this European site. New pumps, storage and mains, upgrade two WTPs, and decommission four WTPs in vicinity of this European site. Some of the works are hydrologically linked to this European site. However, no operational impacts are predicted from this increase in abstraction due to the small scale of the abstraction (approximately 2.3% of Q95 in total).	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D3.27: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG3-SAM-576 (TG3-SAM-226, TG3-SAM-227, TG3-SAM-228, TG3-SAM-229, TG3-SAM-230) and Mitigation. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
Wexford Harbour and Slobs SPA (004076)	45m	Little Grebe (*Tachybaptus ruficollis*) [A004]	Non-b	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit. Rationalise Bree, Ballyhogue, Glynn and Marshalstown to Enniscorthy WRZ. Increase SW abstraction, new storage, pumps and mains, and upgrade WTP adjacent to this European site. New pumps, storage and mains, upgrade two WTPs, and decommission four WTPs in vicinity of this European site. Some of the works are hydrologically linked to this European site. **Physical loss of habitats/supporting habitat -** there is potential for some loss of/damage to protected sites and supporting habitats (e.g., foraging habitats) during construction works given that some of the works are adjacent to the SPA boundary. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are both adjacent to and in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit. Rationalise Bree, Ballyhogue, Glynn and Marshalstown to Enniscorthy WRZ. Increase SW abstraction, new storage, pumps and mains, and upgrade WTP adjacent to this European site. New pumps, storage and mains, upgrade two WTPs, and decommission four WTPs in vicinity of this European site. Some of the works are hydrologically linked to this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
		Great Crested Grebe (*Podiceps cristatus*) [A005]	Non-b				
		Cormorant (*Phalacrocorax carbo*) [A017]	Non-b				
		Grey Heron (*Ardea cinerea*) [A028]	Non-b				
		Bewick's Swan (*Cygnus columbianus bewickii*) [A037]	Non-b				
		Whooper Swan (*Cygnus cygnus*) [A038]	Non-b				
		Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]	Non-b				
		Shelduck (*Tadorna tadorna*) [A048]	Non-b				
		Wigeon (*Anas penelope*) [A050]	Non-b				
		Teal (*Anas crecca*) [A052]	Non-b				
		Mallard (*Anas platyrhynchos*) [A053]	Non-b				
		Pintail (*Anas acuta*) [A054]	Non-b				
		Scaup (*Aythya marila*) [A062]	Non-b				
		Goldeneye (*Bucephala clangula*) [A067]	Non-b				
		Red-breasted Merganser (*Mergus serrator*) [A069]	Non-b				
		Hen Harrier (*Circus cyaneus*) [A082]	Non-b				
		Coot (*Fulica atra*) [A125]	Non-b				
		Oystercatcher (*Haematopus ostralegus*) [A130]	Non-b				
		Golden Plover (*Pluvialis apricaria*) [A140]	Non-b				
		Grey Plover (*Pluvialis squatarola*) [A141]	Non-b				
		Lapwing (*Vanellus vanellus*) [A142]	Non-b				
		Knot (*Calidris canutus*) [A143]	Non-b				
		Sanderling (*Calidris alba*) [A144]	Non-b				
		Dunlin (*Calidris alpina)* [A149]	Non-b				
		Black-tailed Godwit (*Limosa limosa*) [A156]	Non-b				
		Bar-tailed Godwit (*Limosa lapponica*) [A157]	Non-b				
		Curlew (*Numenius arquata*) [A160]	Non-b				
		Redshank (*Tringa totanus*) [A162]	Non-b				
		Black-headed Gull (*Chroicocephalus ridibundus*) [A179]	Non-b				
		Lesser Black-backed Gull (*Larus fuscus*) [A183]	Non-b				
		Little Tern (*Sterna albifrons*) [A195]	Non-b				
		Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	Non-b				
		Wetland and Waterbirds [A999]					

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
The Raven SPA (004019)	13.6km	Red-throated Diver (*Gavia stellata*) [A001] Cormorant (*Phalacrocorax carbo*) [A017] Common Scoter (*Melanitta nigra*) [A065] Grey Plover (*Pluvialis squatarola*) [A141] Sanderling (*Calidris alba*) [A144] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit. Rationalise Bree, Ballyhogue, Glynn and Marshalstown to Enniscorthy WRZ. Increase SW abstraction, new storage, pumps and mains, upgrade three WTPs, and decommission four WTPs in vicinity of this European site. Some of the works are hydrologically linked to this European site via the Slaney River and Wexford Harbour. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction that could impact habitats used by QI bird species. Potential pollution of watercourses during construction could also have indirect effects on QI bird species through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit. Rationalise Bree, Ballyhogue, Glynn and Marshalstown to Enniscorthy WRZ. Increase SW abstraction, new storage, pumps and mains, upgrade three WTPs, and decommission four WTPs in vicinity of this European site. Some of the works are hydrologically linked to this European site via the Slaney River and Wexford Harbour. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
Bannow Bay SPA (004033)	16.6km	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Pintail (*Anas acuta*) [A054] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit. Rationalise Bree, Ballyhogue, Glynn and Marshalstown to Enniscorthy WRZ. Increase SW abstraction, new storage, pumps and mains, upgrade three WTPs, and decommission four WTPs in vicinity of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit. Rationalise Bree, Ballyhogue, Glynn and Marshalstown to Enniscorthy WRZ. Increase SW abstraction, new storage, pumps and mains, upgrade three WTPs, and decommission four WTPs in vicinity of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Wetland and Waterbirds [A999]		and potentially within supporting habitat for the QI species.			
Ballyteige Burrow SPA (004020)	17.2km	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit. Rationalise Bree, Ballyhogue, Glynn and Marshalstown to Enniscorthy WRZ. Increase SW abstraction, new storage, pumps and mains, upgrade three WTPs, and decommission four WTPs in vicinity of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit. Rationalise Bree, Ballyhogue, Glynn and Marshalstown to Enniscorthy WRZ. Increase SW abstraction, new storage, pumps and mains, upgrade three WTPs, and decommission four WTPs in vicinity of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**
Tacumshin Lake SPA (004092)	19.1km	Little Grebe (*Tachybaptus ruficollis*) [A004] Bewick's Swan (*Cygnus columbianus bewickii*) [A037] Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Gadwall (*Anas strepera*) [A051] Teal (*Anas crecca*) [A052] Pintail (*Anas acuta*) [A054] Shoveler (*Anas clypeata*) [A056] Tufted Duck (*Aythya fuligula*) [A061] Coot (*Fulica atra*) [A125] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Black-tailed Godwit (*Limosa limosa*) [A156] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b Non-b	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit. Rationalise Bree, Ballyhogue, Glynn and Marshalstown to Enniscorthy WRZ. Increase SW abstraction, new storage, pumps and mains, upgrade three WTPs, and decommission four WTPs in vicinity of this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but are ecologically connected to it (e.g., grassland, arable farmland), given the works are in the ZoI of the SPA and potentially within supporting habitat for the QI species.	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit. Rationalise Bree, Ballyhogue, Glynn and Marshalstown to Enniscorthy WRZ. Increase SW abstraction, new storage, pumps and mains, upgrade three WTPs, and decommission four WTPs in vicinity of this European site. No operational impacts predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** With the implementation of mitigation as noted above there is no potential for AESI	**N**