Summer 2023

Regional Water Resources Plan

North West

Natura Impact Statement

Appendix D

Tionscadal Éireann
Project Ireland
2040

6 CLEAN WATER AND SANITATION

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-NW 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-NW. 2019 was selected as the base year to align with the planning period (2019-2025) of the NWRP.

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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

Table D1.01: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAA-111a 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		
Cloghernagore Bog and Glenveagh National Park SAC (002047)	0m	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Northern Atlantic wet heaths with *Erica tetralix* [4010] European dry heaths [4030] Alpine and Boreal heaths [4060] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Blanket bogs (* if active bog) [7130] Depressions on peat substrates of the *Rhynchosporion* [7150] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] **Annex II species:** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Trichomanes speciosum* (Killarney Fern) [1421]	New surface water (SW) abstraction from Lough Altan, new water treatment plant (WTP), pump station, and storage. Option study area is within this European site. **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to supporting habitats of QI species during construction works given that the works are in close proximity to the SAC. **Mortality-** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact fish and restrict access to spawning habitat effecting 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 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	New surface water (SW) abstraction from Lough Altan, new water treatment plant (WTP), pump station, and storage. Option study area is within this European site. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats. **Water table/availability** There is potential for impacts on otter and other QI species 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** With the implementation of mitigation as noted above there is no potential for AESI	**N**
Ballyness Bay SAC (Donegal) (001090)	7.2km	**Annex I habitat:** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Humid dune slacks [2190] **Annex II species:** *Vertigo geyeri* (Geyer's Whorl Snail) [1013]	New surface water (SW) abstraction from Lough Altan, new water treatment plant (WTP), pump station, storage and associated watermains. Option study area is hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution event during construction could affect hydrologically connected habitats.	New surface water (SW) abstraction from Lough Altan, new water treatment plant (WTP), pump station, storage and associated watermains. Option study area is hydrologically linked to this European site. No operational impacts predicted.	• 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**

Table D1.02: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAA-111a 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		
Derryveagh and Glendowan Mountains SPA (004039)	0m	Red-throated Diver (*Gavia stellata)* [A001] Merlin (*Falco columbarius*) [A098] Peregrine (*Falco peregrinus*) [A103] Golden Plover (*Pluvialis apricaria*) [A140] Dunlin (*Calidris alpina schinzii)* [A466]	breed breed breed breed breed	New SW abstraction from Lough Altan and new WTP. Option study area is within/ adjacent to this European site (new SW abstraction and WTP). **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/adjacent to SPA boundary impacting QI birds. **Mortality-** pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI birds or prey species relied on by QI. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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 birds given the study area is within/adjacent to the SPA.	New SW abstraction from Lough Altan and new WTP. Option study area is within/ adjacent to this European site (new SW abstraction and WTP). **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact QI species and/or associated supporting habitats. **Water table/availability** There is potential for impacts on QI birds or prey species 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** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.03: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAA-118a 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		
Gweedore Bay and Islands SAC (Donegal) (001141)	1.2km	**Annex I habitats:** Coastal lagoons [1150] Reefs [1170] Perennial vegetation of stony banks [1220]	New SW abstraction from Loch an Luir, new WTP, pump station, storage and associated new watermains. Upgrade WTP. Option study area is hydrologically linked to this European site.	New SW abstraction from Loch an Luir, new WTP, pump station, storage and associated new watermains. Upgrade WTP. Option study area is	• 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] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Decalcified fixed dunes with *Empetrum nigrum* [2140] Atlantic decalcified fixed dunes (*Calluno-Ulicetea*) [2150] Dunes with Salix repens ssp. argentea (*Salicion arenariae*) [2170] Humid dune slacks [2190] Machairs (* in Ireland) [21A0] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] European dry heaths [4030] Alpine and Boreal heaths [4060] Juniperus communis formations on heaths or calcareous grasslands [5130] **<u>Annex II species:</u>** *Euphydryas aurinia* (Marsh Fritillary) [1065] *Lutra lutra* (Otter) [1355] *Petalophyllum ralfsii* (Petalwort) [1395] *Najas flexilis* (Slender Naiad) [1833]	**Habitat degradation – changes in water quality (pollution) -** potential pollution event during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter from construction works.	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 (SPAs) with option TG1-SAA-118a 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		
Derryveagh and Glendowan Mountains SPA (004039)	0m	Red-throated Diver (*Gavia stellata*) [A001] Merlin (*Falco columbarius*) [A098] Peregrine (*Falco peregrinus*) [A103] Golden Plover (*Pluvialis apricaria*) [A140] Dunlin (*Calidris alpina schinzii*) [A466]	breed breed breed breed breed	New SW abstraction from Loch an Luir, new WTP, pump station, and storage. Upgrade WTP. Option study area is 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	New SW abstraction from Loch an Luir, new WTP, pump station, and storage. Upgrade WTP. Option study area is hydrologically linked to this European site. **No operational impacts are predicted**	• 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	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
				within/adjacent to SPA boundary impacting QI birds. **Mortality-** pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact on QI birds. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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 birds given the study area is within/adjacent to the SPA.			

Table D1.05: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAA-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		
Aran Island (Donegal) Cliffs SAC (000111)	900m	**Annex I habitats:** Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] European dry heaths [4030] Alpine and Boreal heaths [4060] Calcareous rocky slopes with *chasmophytic* vegetation [8210] Siliceous rocky slopes with *chasmophytic* vegetation [8220] Submerged or partially submerged sea caves [8330]	Increase existing SW abstraction from Lough Shore by raising impoundment. Option study area 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 habitats.	Increase existing SW abstraction from Lough Shore by raising impoundment. Option study area is hydrologically linked to this European site. **Habitat degradation – hydrological/ hydrogeological changes** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact QI habitats. **Water table/availability** There is potential for impacts on QI habitats relying on 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** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D1.06: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAA-141 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		
West Donegal Coast SPA (004150)	600m	Fulmar (*Fulmarus glacialis*) [A009] Cormorant (*Phalacrocorax carbo*) [A017] Shag (*Phalacrocorax aristotelis*) [A018] Peregrine (*Falco peregrinus*) [A103] Herring Gull (*Larus argentatus*) [A184] Kittiwake (*Rissa tridactyla*) [A188] Razorbill (*Alca torda*) [A200] Chough (*Pyrrhocorax pyrrhocorax*) [A346]	breed breed breed breed breed breed breed breed	Increase existing SW abstraction from Lough Shore by raising impoundment. Upgrade WTP and new watermains. Option study area is adjacent to this European site. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species, in particular Chough, given the study area is adjacent to the SPA and potentially within supporting habitat for the QI species.	Increase existing SW abstraction from Lough Shore by raising impoundment. Upgrade WTP and new watermains. Option study area is adjacent to this European site. **No operational impacts are predicted.**	• 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**

Table D1.07: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAA-217 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 Finn SAC (002301)	5km	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Northern Atlantic wet heaths with *Erica tetralix* [4010] Blanket bogs (* if active bog) [7130] Transition mires and quaking bogs [7140] **Annex II species:** *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Rationalise Alt Raws to Lough Mourne WRZ. New pump station and associated new watermains. Option study area 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 habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species such as otter from construction works.	Rationalise Alt Raws to Lough Mourne WRZ. New pump station and associated new watermains. Option study area 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**
River Foyle and Tributaries SAC (UK0030320)	5km	**Annex I habitats:** Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] **Annex II species:** *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Rationalise Alt Raws to Lough Mourne WRZ. New pump station and associated new watermains. Option study area is hydrologically linked to this site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species such as otter from construction works.	Rationalise Alt Raws to Lough Mourne WRZ. New pump station and associated new watermains. Option study area is hydrologically linked 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**

Table D1.08: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAA-218 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 Finn SAC (002301)	3km	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Northern Atlantic wet heaths with *Erica tetralix* [4010] Blanket bogs (* if active bog) [7130] Transition mires and quaking bogs [7140] **Annex II species:** *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Rationalise Meeneragh to Lough Mourne WRZ. New pump station and associated new watermains. Option study area 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 habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species such as otter from construction works.	Rationalise Meeneragh to Lough Mourne WRZ. New pump station and associated new watermains. Option study area 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**
River Foyle and Tributaries SAC (UK0030320)	3km	**Annex I habitats:** Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] **Annex II species:** *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Rationalise Meeneragh to Lough Mourne WRZ. New pump station and associated new watermains. Option study area is hydrologically linked to this site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species such as otter from construction works.	Rationalise Meeneragh to Lough Mourne WRZ. New pump station and associated new watermains. Option study area 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**

Table D1.09: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAA-542 (TG1-SAA-026a, TG1-SAA-191, TG1-SAA-192, TG1-SAA-193) 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 Finn SAC (002301)	0m	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110] Northern Atlantic wet heaths with *Erica tetralix* [4010] Blanket bogs (* if active bog) [7130] Transition mires and quaking bogs [7140] **Annex II species:** *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Upgrade Lough Mourne WTP and new watermain to interconnect Lough Mourne with new WTP at Knaddar. Option study area is within this European site as the new watermain crosses the SAC. The WTP upgrade is hydrologically linked to this site. **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to supporting habitats of QI species during construction works given that the works within the SAC.	Upgrade Lough Mourne WTP and new watermain to interconnect Lough Mourne with new WTP at Knaddar. Option study area is within this European site as the new watermain crosses the SAC. The WTP upgrade is hydrologically linked 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**

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		
			Mortality- habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact fish and restrict access to spawning habitat effecting 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 habitats **Disturbance (including biological disturbance) -** there is potential for disturbance to otter from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.			
Lough Eske and Ardnamona Wood SAC (000163)	0m	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] **Annex II species:** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Salmo salar* (Salmon) [1106] *Trichomanes speciosum* (Killarney Fern) [1421]	New pump stations, and new watermains to interconnect Lough Mourne with new WTP at Knaddar. Upgrate WTPs. Option study area is within/adjacent to this European site as the new watermains crosses the site and the new pump stations are adjacent to the site. **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to supporting habitats of QI species during construction works given that the works are in close proximity to the SAC. **Mortality-** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact fish, restrict access to spawning habitat and smother FWPM. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to FWPM 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.	New pump stations, and new watermains to interconnect Lough Mourne with new WTP at Knaddar. Upgrate WTPs. Option study area is within/adjacent to this European site as the new watermains crosses the site and the new pump stations are adjacent to the site. **No operational impacts predicted.**	• General Mitigation Measures are outlined in **Section 6.3.3** In addition to general mitigation measures outlined above, options specific measures have been identified for **SAA-542** (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**

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		
Donegal Bay (Murvagh) SAC (000133)	0m	**Annex I habitats:** Mudflats and sandflats not covered by seawater at low tide [1140] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Dunes with Salix repens ssp. argentea (*Salicion arenariae*) [2170] Humid dune slacks [2190] **Annex II species:** *Phoca vitulina* (Harbour Seal) [1365]	Upgrade Frosses-Inver WTP and pump station, new watermains and pump stations. Option study area is adjacent to and hydrologically linked to this European site. **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to QI habitats during construction works given that the works are adjacent to theSAC. **Habitat degradation – changes in water quality (pollution) -** potential pollution event during construction could affect hydrologically connected habitats. **Disturbance (including biological disturbance) -** There is also potential for the spread of invasive species given that the works are adjacent to the SAC boundary.	Upgrade Frosses-Inver WTP and pump station, new watermains and pump stations. Option study area is adjacent to and hydrologically linked to this European site. **No operational impacts predicted.**	• 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**
Croaghonagh Bog SAC (000129)	0m	**Annex I habitats:** Blanket bogs (* if active bog) [7130]	New watermains. Option study area is adjacent to this European site. **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to QI habitats during construction works given that the works are adjacent the SAC. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect hydrologically connected QI habitats **Disturbance (including biological disturbance) -** There is potential for the spread of invasive species given that the works are adjacent to the SAC boundary.	New watermains. Option study area is adjacent 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**
Ballintra SAC (000115)	0m	**Annex I habitats:** European dry heaths [4030] Limestone pavements [8240]	New watermains. Option study area is adjacent to this European site. **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to QI habitats during construction works given that the works are adjacent the SAC. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect hydrologically connected QI habitats **Disturbance (including biological disturbance) -** There is potential for the spread of invasive species given that the	New watermains. Option study area is adjacent 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		
			works are adjacent to the SAC boundary.			
River Foyle and Tributaries SAC (UK0030320)	4km	**Annex I habitats:** Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] **Annex II species:** *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	New watermains. Option study area is hydrologically linked to this site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species such as otter from construction works.	New watermains. Option study area is hydrologically linked 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**

Table D1.10: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAA-542 (TG1-SAA-026a, TG1-SAA-191, TG1-SAA-192, TG1-SAA-193) 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		
Donegal Bay SPA (004151)	0m	Great Northern Diver (*Gavia immer*) [A003] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Common Scoter (*Melanitta nigra*) [A065] Sanderling (*Calidris alba*) [A144] Wetland and Waterbirds [A999]	non-b non-b non-b non-b	New SW abstraction from Lough Assaroe, new storage, watermains, WTP and pump station. Upgrade WTP. Option study area is adjacent to and 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/adjacent to SPA boundary impacting QI birds. **Mortality-** pollution events during construction (associated with sediment runoff, or accidental spillage) could impact QI birds or prey species relied on by QI. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat used by QI bird species.	New SW abstraction from Lough Assaroe, new storage, watermains, WTP and pump station. Upgrade WTP. Option study area is adjacent to and hydrologically linked to this European site. **No operational impacts are predicted.**	• 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	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
				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 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), as well as within the SPA given the study area is within the SPA.			
Durnesh Lough SPA (004145)	3.8km	Whooper Swan (*Cygnus cygnus*) [A038] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	Non-B Non-B	New watermains and a WTP upgrade are in the vicinity of the European site. Option study area is in the 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 ecologically connected to it (e.g. grassland, arable farmland), as well as within the SPA given the study area is within the SPA.	New watermains and a WTP upgrade are in the vicinity of the European site. Option study area is in the vicinity of 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 C1.11: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAA-566 (TG1-SAA-261, TG1-SAA-262, TG1-SAA-263, TG1-SAA-264, TG1-SAA-265, TG1-SAA-266, TG1-SAA-267, TG1-SAA-268, TG1-SAA-269, TG1-SAA-270) leading to potential LSEs.

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		
North Inishowen Coast SAC (002012)	0m	**<u>Annex I habitats:</u>** Mudflats and sandflats not covered by seawater at low tide [1140] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Machairs (* in Ireland) [21A0] European dry heaths [4030]	New storage and pump stations hydrologically linked to the European site. New watermains adjacent to the Suropean site. Upgrade of Inishowen West WTP and Tiernaleague WTP hydrologically linked to the European site.Option study area is adjacent to and hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution event during construction could	New storage and pump stations hydrologically linked to the European site. New watermains adjacent to the Suropean site. Upgrade of Inishowen West WTP and Tiernaleague WTP hydrologically linked to the European site.Option study area is adjacent to	• 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: *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014] *Lutra lutra* (Otter) [1355]	affect QI species using watercourses within the hinterland of the SAC or watercouses outside the SAC but ecologically connected to it. Pollution events may affect QI coastal habitats that are hydrologically connected. **Mortality-** pollution impacts during construction (associated with sediment runoff, or accidental spillage) could impact on QI species utilising watercourses or habitats ecologically connected to the SAC and the works, as well as coastal QI habitats adjacent to the works or hydrologically connected to them. **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.	and hydrologically linked to this European site. **No operational impacts predicted.**		
Cloghernagore Bog and Glenveagh National Park SAC (002047)	0m	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Northern Atlantic wet heaths with *Erica tetralix* [4010] European dry heaths [4030] Alpine and Boreal heaths [4060] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Blanket bogs (* if active bog) [7130] Depressions on peat substrates of the *Rhynchosporion* [7150] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] **Annex II species:** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Trichomanes speciosum* (Killarney Fern) [1421]	New SW abstractions, watermains, storage and pump stations within the European site. Option study area is within this European site. **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to QI habitats as well as supporting habitats of QI species during construction works. **Mortality-** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could have a direct impact on aquatic QI species. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter, FWPM 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.	New SW abstractions, watermains, storage and pump stations within the European site. Option study area is within this European site. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats. **Water table/availability** There is potential for impacts on QI habitats or aquatic QI species utilising 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, options specific measures have been identified for **SAA-566** (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	
Leannan River SAC (002176)	0m	**<u>Annex I habitats:</u>** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] **<u>Annex II species:</u>** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Najas flexilis* (Slender Naiad) [1833]	New SW abstraction and watermains within and crossing the European site. Option study area is within this European site. **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to 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 have a direct impact on aquatic QI species. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter, FWPM 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.	New SW abstraction and watermains within and crossing the European site. Option study area is within this European site. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats. **Water table/availability** There is potential for impacts on otter, FWPM and other QI species 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, options specific measures have been identified for **SAA-566** (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**
Horn Head and Rinclevan SAC (000147)	0m	**<u>Annex I habitats:</u>** Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Dunes with *Salix repens* ssp. argentea (*Salicion arenariae*) [2170] Humid dune slacks [2190] Machairs (* in Ireland) [21A0] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] **<u>Annex II species:</u>** *Vertigo geyeri* (Geyer's Whorl Snail) [1013]	New watermains runs adjacent to the European site and is hydrologically linked to it. Option study area is adjacent to and 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 habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species from construction works. There is also potential for the spread of invasive	New watermains runs adjacent to the European site and is hydrologically linked to it. Option study area is adjacent to and 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		
		Halichoerus grypus (Grey Seal) [1364] *Petalophyllum ralfsii* (Petalwort) [1395] *Najas flexilis* (Slender Naiad) [1833]	species given that the works are adjacent to the SAC boundary.			
Mulroy Bay SAC (002159)	0m	**Annex I habitats:** Mudflats and sandflats not covered by seawater at low tide [1140] Large shallow inlets and bays [1160] Reefs [1170] **Annex II species:** *Lutra lutra* (Otter) [1355]	New watermains, pump stations and storage are adjacent to the European site. The new watermains crosses the SAC. Option study area crosses the European site, is adjacent to and hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution event during construction could affect QI species and hydrologically connected habitats. **Mortality-** pollution impacts during construction (associated with sediment runoff, or accidental spillage) could impact on QI species or habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter from construction works.	New watermains, pump stations and storage are adjacent to the European site. The new watermains crosses the SAC. Option study area corsses the European site, is adjacent to and 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**
Kindrum Lough SAC (001151)	0m	**Annex I habitats:** Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] **Annex II species:** *Najas flexilis* (Slender Naiad) [1833]	A new watermains runs adjacent to the European site. Option study area is adjacent to and hydrologically linked to this European site **Habitat degradation – changes in water quality (pollution) -** potential pollution during construction could impact this QI habitat and associated QI species.	A new watermains runs adjacent to the European site. Option study area is adjacent to and 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**
Magheradrumman Bog SAC (000168)	30m	**Annex I habitats:** Northern Atlantic wet heaths with *Erica tetralix* [4010] Blanket bogs (* if active bog) [7130]	Upgrade Inishowen East WTP. Option study area is adjacnet to this European site. **Disturbance (including biological disturbance) -** there is potential for the spread of invasive species given that the works are adjacent to the SAC boundary.	Upgrade Inishowen East WTP. Option study area is adjacent 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**
Sheephaven SAC (001190)	100m	**Annex I habitats:** Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310]	New watermains runs adjacent to the European site. New SW abstraction from Glen lough, new storage and pump station are hydrologically linked to this European site. Option study area is adjacent to and hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution event during construction could	New watermains runs adjacent to the European site. New SW abstraction from Glen lough, new storage and pump station are hydrologically linked to this European site. Option study area is adjacent to and hydrologically linked to this European site.	• 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		
		Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Humid dune slacks [2190] Machairs (* in Ireland) [21A0] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] **Annex II species:** *Euphydryas aurinia* (Marsh Fritillary) [1065] *Petalophyllum ralfsii* (Petalwort) [1395]	affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -**There is also potential for the spread of invasive species given that the works are adjacent to the SAC boundary	**No operational impacts predicted.**		
Lough Swilly SAC (002287)	1.7km	**Annex I habitats:** Estuaries [1130] Coastal lagoons [1150] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] **Annes II species:** *Lutra lutra* (Otter) [1355]	Upgrading WTPs, new storage, pump station and water mains hydrologically linked to this European site. New SW abstraction and increased SW abstraction distantly hydrologically linked to this European site. Option study area 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 habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter from construction works.	Upgrading WTPs, new storage, pump station and water mains hydrologically linked to this European site. New SW abstraction and increased SW abstraction distantly hydrologically linked to this European site. Option study area is hydrologically linked to this European site. **No operational impacts predicted.**	• 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**

Table D1.12: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAA-566 (TG1-SAA-261, TG1-SAA-262, TG1-SAA-263, TG1-SAA-264, TG1-SAA-265, TG1-SAA-266, TG1-SAA-267, TG1-SAA-268, TG1-SAA-269, TG1-SAA-270) leading to potential LSEs. 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		
Trawbreaga Bay SPA (004034)	0m	Barnacle Goose (*Branta leucopsis*) [A045] Light-bellied Brent Goose (*Branta bernicla hrota)* [A046] Chough (*Pyrrhocorax pyrrhocorax*) [A346] Wetland and Waterbirds [A999]	non-b non-b non-b	New watermains is hydrologically linked to this European site. At one point the new watermains runs adjacent to the European site. Upgrade WTP and new storage is	New watermains is hydrologically linked to this European site. At one point the new watermains runs adjacent to the European site. Upgrade WTP and	• 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		
				hydrologically linked to the European site. Option study area is adjacent to and hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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 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), as well as within the SPA given the study area is within the SPA.	new storage is hydrologically linked to the European site. Option study area is adjacent to and hydrologically linked to this European site. **No operational impacts predicted.**		
Derryveagh and Glendowan Mountains SPA (004039)	0m	Red-throated Diver (*Gavia stellata*) [A001] Merlin (*Falco columbarius*) [A098] Peregrine (*Falco peregrinus*) [A103] Golden Plover (*Pluvialis apricaria*) [A140] Dunlin (*Calidris alpina schinzii*) [A466]	breed breed breed breed breed	Two new SW abstraction points, new storage and pump station within the European site. New watermains adjacent to the Eruopean site. Option study area is within and adjacent to this European site. **Physical loss of habitats/supporting habitat –** There is potential for some loss of supporting habitats (e.g., foraging habitats) during construction works given that the works are within and adjacent to the SPA potentially impacting on QI birds. **Mortality-** pollution of lakes during construction (associated with sediment runoff, or accidental spillage) could impact QI birds, in particular the Redd-throated Diver, or prey species relied on by QI.	Two new SW abstraction points, new storage and pump station within the European site. New watermains adjacent to the Eruopean site. Option study area is within and adjacent to this European site. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact QI species. **Water table/availability** There is potential for impacts on QI species 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** 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		
				Habitat degradation – changes in water quality (pollution) - there is potential for pollution of waterbodies during construction that could impact on the wetland habitat used by QI bird species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds during construction works.			
Horn Head to Fanad Head SPA (004194)	500m	Fulmar (*Fulmarus glacialis*) [A009] Cormorant (*Phalacrocorax carbo*) [A017] Shag (*Phalacrocorax aristotelis*) [A018] Barnacle Goose (*Branta leucopsis*) [A045] Peregrine (*Falco peregrinus*) [A103] Kittiwake (*Rissa tridactyla*) [A188] Guillemot (*Uria aalge*) [A199] Razorbill (*Alca torda*) [A200] Chough (*Pyrrhocorax pyrrhocorax*) [A346] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	breed breed breed non-b non-b breed breed breed breed breed	New watermains is hyrdologically linked to this European site via a number of watercourses. Option study area is hydrologically linked 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 ecologically connected to it (e.g. grassland, arable farmland).	New watermains is hyrdologically linked to this European site via a number of watercourses. Option study area 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**
Lough Swilly SPA (004075)	1.7km	Great Crested Grebe (*Podiceps cristatus*) [A005] Grey Heron (*Ardea cinerea*) [A028] Whooper Swan (*Cygnus cygnus*) [A038] Greylag Goose (*Anser anser*) [A043] Shelduck (*Tadorna tadorna*) [A048] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Mallard (*Anas platyrhynchos*) [A053] Shoveler (*Anas clypeata*) [A056] Scaup (*Aythya marila*) [A062] Goldeneye (*Bucephala clangula*) [A067] Red-breasted Merganser (*Mergus serrator*) [A069] Coot (*Fulica atra*) [A125] Oystercatcher (*Haematopus ostralegus*) [A130] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Greenshank (*Tringa nebularia*) [A164] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Sandwich Tern (*Sterna sandvicensis*) [A191]	non-b breed	Upgrading WTPs, new storage, pump station and water mains hydrologically linked to this European site. New SW abstraction and increased SW abstraction distantly hydrologically linked to this European site. Option study area is hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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	Upgrading WTPs, new storage, pump station and water mains hydrologically linked to this European site. New SW abstraction and increased SW abstraction distantly hydrologically linked to this European site. Option study area 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	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Common Tern (*Sterna hirundo*) [A193] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	non-b breed breed	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).			
Lough Fern SPA (004060)	3km	Pochard (*Aythya ferina*) [A059] Wetland and Waterbirds [A999]	non-b	New watermains, storage and pump stations and upgrade WTPs hydrologically linked to the European site. New SW abstraction distantly hydrologically linked to the Wuropean site. Option study area is hydrologically connected to this European site. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat used by QI bird species. Potential pollution of watercourses during construction could have indirect effects on QI bird species through impacts upon prey species.	New watermains, storage and pump stations and upgrade WTPs hydrologically linked to the European site. New SW abstraction distantly hydrologically linked to the Wuropean site. Option study area is hydrologically connected to this European site. **No operational impacts predicted**.	• 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**

Table D1.13: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAA-567 (TG1-SAA-271, TG1-SAA-272, TG1-SAA-273, TG1-SAA-274) 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		
West of Ardara/Maas Road SAC (000197)	0m	**<u>Annex I habitats:</u>** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Large shallow inlets and bays [1160] Annual vegetation of drift lines [1210] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]	New watermains crosses the European site. Increase SW abstraction from Derkmore Lough, upgrade WTP, new pump station and pressure tank are adjacent to and hydrologically linked to the European site. Option study area crosses and is hydrologically linked to this European site. **Physical loss of habitats/supporting habitat–** There is potential for the loss of/damage to QI/Annex I habitats and supporting habitats of QI species during construction works given that the works	New watermains crosses the European site. Increase SW abstraction from Derkmore Lough, upgrade WTP, new pump station and pressure tank are adjacent to and hydrologically linked to the European site. Option study area crosses and is hydrologically linked to this European site. **Habitat degradation – hydrological/**	• 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, options specific measures have been identified for **SAA-567** (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	**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		
		Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Decalcified fixed dunes with *Empetrum nigrum* [2140] Atlantic decalcified fixed dunes (*Calluno-Ulicetea*) [2150] Dunes with Salix repens ssp. argentea (*Salicion arenariae*) [2170] Humid dune slacks [2190] Machairs (* in Ireland) [21A0] Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/*or Isoeto-Nanojuncetea* [3130] Northern Atlantic wet heaths with *Erica tetralix* [4010] European dry heaths [4030] Alpine and Boreal heaths [4060] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510] Blanket bogs (* if active bog) [7130] Depressions on peat substrates of the *Rhynchosporion* [7150] Alkaline fens [7230] **Annex II species:** *Vertigo geyeri* (Geyer's Whorl Snail) [1013] *Margaritifera margaritifera (*Freshwater Pearl Mussel) [1029] *Euphydryas aurinia* (Marsh Fritillary) [1065] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365] *Petalophyllum ralfsii* (Petalwort) [1395] *Najas flexilis* (Slender Naiad) [1833]	are crossing and are in close proximity to the SAC. **Mortality-** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact aquatic QI speciesrestrict access to spawning habitat and smother FWPM **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species from construction works. **T**here is also potential for the spread of invasive species given that the works are adjacent to the SAC boundary.	**hydrogeological changes-** An increase in abstraction could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats. **Water table/availability-** There is potential for impacts on FWPM, otter and other species utilising watercourses hydrologically linked to this European site through a reduction in flows/water levels due to surface water abstraction.	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	
Lough Nillan Bog (Carrickatlieve) SAC (000165)	25m	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Blanket bogs (* if active bog) [7130]	New watermains and decomissioning of WTP adjacent to the European site. Option study area is adjacent to this European site. **Disturbance (including biological disturbance) -** There is potential for the spread of invasive species given that the works are adjacent to the SAC boundary.	New watermains and decomissioning of WTP adjacent to the European site. Option study area is adjacent 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		
River Finn SAC (002301)	30m	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Northern Atlantic wet heaths with *Erica tetralix* [4010] Blanket bogs (* if active bog) [7130] Transition mires and quaking bogs [7140] **Annes II species:** *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	New watermains crosses the European site. Increase SW abstraction from Derkmore Lough, upgrade WTP, new pump station and pressure tank are adjacent to and hydrologically linked to the European site. Option study area crosses and is hydrologically linked to this European site. **Disturbance (including biological disturbance) -** There is potential for the spread of invasive species given that the works are adjacent to the SAC boundary.	New watermains crosses the European site. Increase SW abstraction from Derkmore Lough, upgrade WTP, new pump station and pressure tank are adjacent to and hydrologically linked to the European site. Option study area crosses and 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**
Slieve Tooey/ Tormore Island/ Loughros Beg Bay SAC (000190)	100m	**Annex I habitats:** Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Decalcified fixed dunes with *Empetrum nigrum* [2140] Atlantic decalcified fixed dunes (*Calluno-Ulicetea*) [2150] Alpine and Boreal heaths [4060] Blanket bogs (* if active bog) [7130] **Annex II species:** *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014] *Lutra lutra* (Otter) [1355] *Halichoerus grypus* (Grey Seal) [1364]	New watermains is hydrologically linked to the European site. Upgrade of WTP is adjacent to the European site. Option study area is adjacent to and hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution event during construction could affect QI species, such as otter (through reduced prey availability), and hydrologically connected QI habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter from construction works.	New watermains is hydrologically linked to the European site. Upgrade of WTP is adjacent to the European site. Option study area is adjacent to and 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 D1.14: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAA-567 (TG1-SAA-271, TG1-SAA-272, TG1-SAA-273, TG1-SAA-274) 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		
Lough Nillan Bog SPA (00410)	0m	Merlin (*Falco columbarius*) [A098] Golden Plover (*Pluvialis apricaria*) [A140] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Dunlin (Calidris *alpina schinzii*) [A466]	non-b breed breed breed	New watermains and decomissioning of WTP adjacent to the European site. Option study area is adjacent to this European site. **Disturbance (including biological disturbance) -** There is potential for disturbance to QI birds using habitats situated within	New watermains and decomissioning of WTP adjacent to the European site. Option study area is adjacent 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 immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland), as well as within the SPA given the study area is within the SPA.			
Derryveagh and Glendowan Mountains SPA (004039)	500m	Red-throated Diver (*Gavia stellata*) [A001] Merlin (*Falco columbarius*) [A098] Peregrine (*Falco peregrinus*) [A103] Golden Plover (*Pluvialis apricaria*) [A140] Dunlin (*Calidris alpina schinzii*) [A466]	breed breed breed breed breed	Decomissioning of WTP in close proximity to the European site. Option study area is in close proximity 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 ecologically connected to it (e.g. grassland, arable farmland).	Decomissioning of WTP in close proximity to the European site. Option study area is in close proximity 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**
Sheskinmore Lough SPA (004090)	6.5km	Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	non-b	New watermains, pump stations, storage and brake pressure tanks are in the vicinity of the European site and distantly hydrologically connected to it. Option study area is in close proximity to this European site. **Disturbance (including biological disturbance)** - There is potential for disturbance to QI birds using habitats situated in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).	New watermains, pump stations, storage and brake pressure tanks are in the vicinity of the European site and distantly hydrologically connected to it. Option study area is in close proximity 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**

Preferred Approach options TG1-SAB-549, TG1-SAB-067, TG1-SAB-072, TG1-SAB-077 & TG1-SAB-078 combined, TG1-SAB-084, TG1-SAB-104, TG1-SAB-115, TG1-SAB-123, TG1-SAB-127, TG1-SAB-173, TG1-SAB-189 and TG1-SAB-190 are not listed below as no LSEs were identified for these options.

Table D2.01: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAB-060 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		
Lough Oughter and Associated Loughs SAC (000007)	15km	**Annex I habitats:** Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150] Bog woodland [91D0] **Annex II species:** *Lutra lutra* (Otter) [1355]	New SW abstraction from River Drumore to supply deficit and new pump hydrologically linked to the European site. Option study area 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 habitats.	New SW abstraction from River Drumore to supply deficit and new pump hydrologically linked to the European site. Option study area is 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 D2.02: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAB-060 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		
Lough Oughter Complex SPA (004049)	20km	Great Crested Grebe (*Podiceps cristatus*) [A005] Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Wetland and Waterbirds [A999]	Non-b Non-b Non-b	New SW abstraction and pump hydrologically linked to the European site. New watermains and upgrade WTP in the vicinity of the European site. Option study area is in the 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 ecologically connected to it (e.g. grassland, arable farmland).	New SW abstraction and pump hydrologically linked to the European site. New watermains and upgrade WTP in the vicinity of the European site. Option study area is in the vicinity of this European site. **No operational impacts are predicted.**	• 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**

Table D2.03: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAB-086 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		
Lough Oughter and Associated Loughs SAC (000007)	5.3km	**Annex I habitats:** Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150] Bog woodland [91D0] **Annex II species:** *Lutra lutra* (Otter) [1355]	Increase GW abstraction (productive fissured bedrock) from existing boreholes to supply deficit at Clones WRZ. Option study area 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 their prey) and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter from construction works.	Increase GW abstraction (productive fissured bedrock) from existing boreholes to supply deficit at Clones WRZ. Option study area 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**
Upper Lough Erne SAC (UK0016614)	5.9km	**Annex I habitats:** Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150] 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:** *Lutra lutra* (Otter) [1355]	Increase GW abstraction from existing boreholes to supply deficit at Clones WRZ. Option study area is hydrologically linked to this site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species (and their prey) and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter from construction works.	Increase GW abstraction from existing boreholes to supply deficit at Clones WRZ. Option study area is hydrologically linked 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**

Table D2.04: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAB-086 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		
Upper Lough Erne SPA (UK9020071)	1.2km	Whooper Swan (*Cygnus cygnus*) [A038]	Non-B	Increase GW abstraction from existing boreholes to supply deficit at Clones WRZ. Option study area is hydrologically linked to this site. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat used by QI bird species.	Increase GW abstraction from existing boreholes to supply deficit at Clones WRZ. Option study area is hydrologically linked 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**

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		
				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 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).			

Table D2.05: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAB-202 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		
Glenade Lough SAC (001919)	0m	**Annex I habitats:** Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150] **Annex II species:** *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Najas flexilis* (Slender Naiad) [1833]	New SW abstraction from Glenade Lough and upgrade of existing Glenade WTP. New pump and watermains. Option study area is within this European site. **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to QI habitats and supporting habitats of QI species during construction works given that the works are within the SAC. **Mortality-** habitat loss and pollution of waterbodies during construction (associated with sediment runoff, or accidental spillage) could impact QI species. **Habitat degradation – changes in water quality (pollution) -** potential pollution of waterbodies during construction could impact on aquatic QI species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species from construction works. There is also potential for the spread of invasive species given that the works are within this European site.	New SW abstraction from Glenade Lough and upgrade of existing Glenade WTP. New pump and watermains. Option study area is within this European site. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact QI species or habitats. **Water table/availability** There is potential for impacts on QI species 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** 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		
Lough Gill SAC (001976)	1.4km	**Annex I habitats:** Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] 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:** *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	New SW abstraction and watermains hydrologically connected to the European site. Option study area is hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of waterbodies during construction could impact aquatic QI species. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other aquatic QI species from construction works.	New SW abstraction and watermains hydrologically connected to the European site. Option study area is hydrologically linked to this European site. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact downstream aquatic QI species. **Water table/availability** There is potential for impacts on otter and other QI species utilising watercourses within 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** 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 (SPAs) with option TG1-SAB-202 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		
Sligo/Leitrim Uplands SPA (004187)	1km	Peregrine (*Falco peregrinus*) [A103] Chough (*Pyrrhocorax pyrrhocorax*) [A346]	Breed Breed	New SW abstraction from Glenade Lough and upgrade of existing Glenade WTP. New pump and watermains. Option study area is in close proximity to this EU site **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds given the study area is close to the SPA which is a breeding site for QI bird species	New SW abstraction from Glenade Lough and upgrade of existing Glenade WTP. New pump and watermains. Option study area is in close proximity to this EU 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 D2.07: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAB-133 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		
Lough Oughter Complex SPA (004049)	13.6km	Great Crested Grebe (*Podiceps cristatus*) [A005] Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Wetland and Waterbirds [A999]	Non-B Non-B Non-B	Replace rising main connecting raw water pump station and WTP at Lough Gowna (Cornadrung Pump Station), namely flooding of pump station, lack of control (raw water pumps control flow through plant) and increase SW abstraction to supply deficit. Increase SW abstraction, upgrade Smear WTP, and new watermains. Option study area is hydrologically linked 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 ecologically connected to it (e.g., grassland, arable farmland).	Replace rising main connecting raw water pump station and WTP at Lough Gowna (Cornadrung Pump Station), namely flooding of pump station, lack of control (raw water pumps control flow through plant) and increase SW abstraction to supply deficit. Increase SW abstraction, upgrade Smear WTP, and new watermains. Option study area 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**

Table D2.08: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with grouped option TG1-SAB-535 (TG1-SAB-157, TG1-SAB-185) 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		
Pettigoe Plateau SPA (UK9020051)	900m	Golden plover (*Pluvialis apricaria*)	Breed	New SW abstraction from Assaroe Lake, new WTP and new watermains in close proximity to the site. Option study area is in close proximity to this 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).	New SW abstraction from Assaroe Lake, new WTP and new watermains in close proximity to the site. Option study area is in close proximity 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**
Donegal Bay SPA (004151)	2.3km	Great Northern Diver (*Gavia immer*) [A003] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Common Scoter (*Melanitta nigra*) [A065] Sanderling (*Calidris alba*) [A144]	Non-b Non-b Non-b Non-b	New SW abstraction from Assaroe Lake, new WTP and new watermains hydrologically linked to the European site. Option study area is	New SW abstraction from Assaroe Lake, new WTP and new watermains hydrologically linked to the European site. Option	• 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		
		Wetland and Waterbirds [A999]		hydrologically linked to this European site **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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 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).	study area is 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 D2.09: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with grouped option TG1-SAB-538 (TG1-SAB-024, TG1-SAB-029, TG1-SAB-041, TG1-SAB-048) 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		
Lough Oughter and Associated Loughs SAC (000007)	0m	**Annex I habitats:** Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150] Bog woodland [91D0] **Annex II species:** *Lutra lutra* (Otter) [1355]	Increase GW abstraction from existing boreholes, upgrade Ballyconnell WTP, and new pump, watermains and storage within the European site. Option study area is within this SAC. The GW ZOC overlaps this site. **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to supporting habitats of QI species during construction works given that the works are in the SAC. **Mortality-** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact on QI species or fish and restrict access to habitats effecting QI species and their prey.	Increase GW abstraction from existing boreholes, upgrade Ballyconnell WTP, and new pump, watermains and storage within the European site. Option study area is within this SAC. The GW ZOC overlaps this site. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact QI species or habitats. **Water table/availability** There is potential for impacts on otter and other QI species utilising watercourses hydrologically linked to this European site	• 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		
			Habitat degradation – changes in water quality (pollution) - potential pollution of watercourses during construction could affect QI species and hydrologically connected 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.	through a reduction in flows/water levels.		
Cladagh (Swanlinbar) River SAC (UK0030116)	1.1km	**Annex I habitats:** Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] **Annex II species:** *Margaritifera margaritifera* (Freshwater pearl mussel) [1029]	Option study area is in close proximity to this site. New mains, decommission WTP. Option is hydrologically linked to this site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats.	Option study area is in close proximity to this site. New mains, decommission WTP. Option is hydrologically linked 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**
Upper Lough Erne SAC (UK0016614)	1.1km	**Annex I habitats:** Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150] 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:** *Lutra lutra* (Otter) [1355]	Increase GW abstraction from existing boreholes, upgrade Ballyconnell WTP, and new pump, watermains and storage in close proximity to this site. Option is hydrologically linked to this site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works.	Increase GW abstraction from existing boreholes, upgrade Ballyconnell WTP, and new pump, watermains and storage in close proximity to this site. Option is hydrologically linked 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**

Table D2.10: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with grouped option TG1-SAB-538 (TG1-SAB-024, TG1-SAB-029, TG1-SAB-041, TG1-SAB-048) 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		
Upper Lough Erne SPA (UK9020071)	1.1km	Whooper Swan (*Cygnus cygnus*) [A038]	Non-B	Increase GW abstraction from existing boreholes, upgrade Ballyconnell WTP, and new pump, watermains and storage in close proximity to this site. Option is hydrologically linked to this site.	Increase GW abstraction from existing boreholes, upgrade Ballyconnell WTP, and new pump, watermains and storage in close proximity to this site. Option	• 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		
				Habitat degradation – changes in water quality (pollution) - there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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 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).	is hydrologically linked to this site. **No operational impacts predicted**		
Lough Oughter Complex SPA (004049)	3.3km	Great Crested Grebe (*Podiceps cristatus*) [A005] Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Wetland and Waterbirds [A999]	Non-b Non-b Non-b	Increase GW abstraction from existing boreholes. Upgrade Ballyconnell WTP. New pump, watermains and storage in the vicinity of the European site. Option study area is close 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 ecologically connected to it (e.g. grassland, arable farmland).	Increase GW abstraction from existing boreholes. Upgrade Ballyconnell WTP. New pump, watermains and storage in the vicinity of the European site. Option study area is close 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 D2.11: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with grouped option TG1-SAB-501 (TG1-SAB-011, TG1-SAB-053) 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		
Lough Oughter and Associated Loughs SAC (000007)	5.3km	**Annex I habitats:** Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150] Bog woodland [91D0]	Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. Upgrade Lismean WTP for water quality improvements. Ballyjamesduff RWSS is	Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. Upgrade Lismean WTP	• 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		
		Annex II species: *Lutra lutra* (Otter) [1355]	not in deficit and supply spare capacity to Cavan RWSS. Upgrade WTP, and new storage and watermains 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 habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter during construction.	for water quality improvements. Ballyjamesduff RWSS is not in deficit and supply spare capacity to Cavan RWSS. Upgrade WTP, and new storage and watermains 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 D2.12: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with grouped option TG1-SAB-501 (TG1-SAB-011, TG1-SAB-053) 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		
Lough Oughter Complex SPA (004049)	5.4km	Great Crested Grebe (*Podiceps cristatus*) [A005] Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Wetland and Waterbirds [A999]	Non-b Non-b Non-b	Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. Upgrade Lismean WTP for water quality improvements. Ballyjamesduff RWSS is not in deficit and supply spare capacity to Cavan RWSS. Upgrade WTP, and new storage and watermains hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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 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).	Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. Upgrade Lismean WTP for water quality improvements. Ballyjamesduff RWSS is not in deficit and supply spare capacity to Cavan RWSS. Upgrade WTP, and new storage and watermains 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		
Lough Sheelin SPA (004065)	8.7km	Great Crested Grebe (*Podiceps cristatus*) [A005] Pochard (*Aythya ferina*) [A059] Tufted Duck (*Aythya fuligula*) [A061] Goldeneye (*Bucephala clangula*) [A067] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b	Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. Upgrade Lismean WTP for water quality improvements. Ballyjamesduff RWSS is not in deficit and supply spare capacity to Cavan RWSS. Upgrade WTP hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat used by QI bird species. Potential pollution of watercourses during construction could have indirect effects on QI bird species through impacts upon prey species.	Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. Upgrade Lismean WTP for water quality improvements. Ballyjamesduff RWSS is not in deficit and supply spare capacity to Cavan RWSS. Upgrade WTP 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**
Upper Lough Erne SPA (UK9020071)	17.3km	Whooper Swan (*Cygnus cygnus*) [A038]	Non-B	Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. Upgrade Lismean WTP for water quality improvements. Ballyjamesduff RWSS is not in deficit and supply spare capacity to Cavan RWSS. Upgrade WTP, and new storage and watermains hydrologically linked 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 ecologically connected to it (e.g. grassland, arable farmland).	Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. Upgrade Lismean WTP for water quality improvements. Ballyjamesduff RWSS is not in deficit and supply spare capacity to Cavan RWSS. Upgrade WTP, and new storage and watermains 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 D3.01: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SA-C-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		
Glenamoy Bog Complex SAC (000500)	0m	**Annex I habitats:** Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Machairs (* in Ireland) [21A0] Natural dystrophic lakes and ponds [3160] Northern Atlantic wet heaths with *Erica tetralix* [4010] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Blanket bogs (* if active bog) [7130] Transition mires and quaking bogs [7140] Depressions on peat substrates of the Rhynchosporion [7150] **Annex II species:** *Salmo salar* (Salmon) [1106] *Petalophyllum ralfsii* (Petalwort) [1395] *Saxifraga hirculus* (Marsh Saxifrage) [1528] *Hamatocaulis vernicosus* (Slender Green Feather-moss) [6216]	Increase ground water (GW) abstraction (Belmullet GWB (poorly productive bedrock) to supply deficit at Ceide Fields WRZ, upgrade Ceide Fields water treatment plant (WTP). Option study area is within this European site. **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to QI habitats and supporting habitats of QI species during construction works given that the works are within the SAC. **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 the spread of invasive species given that the works are within the SAC boundary	Increase GW abstraction (Belmullet GWB (poorly productive bedrock) to supply deficit at Ceide Fields WRZ, upgrade Ceide Fields WTP. Option study area is within this European site. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact on aquatic QI species or habitats (GWDTHs in particular). **Water table/availability** There is potential for impacts on QI species and GWDTHs 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 D3.02: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SA-C-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		
Streedagh Point Dunes SAC (001680)	2.6km	**Annex I habitats:** Mudflats and sandflats not covered by seawater at low tide [1140] Perennial vegetation of stony banks [1220] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	New GW abstraction overlying the same karstic aquifier as the European site. New watermains hydrologically linked to the European site. Option study area is hydrologically linked to the European site. **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 overlying the same karstic aquifier as the European site. New watermains hydrologically linked to the European site. Option study area is hydrologically linked to the European site. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact on	• 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		
		Annex II species: *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014]		aquatic QI species or habitats (GWDTHs in particular). **Water table/availability** There is potential for impacts on QI species and GWDTHs habitats through a reduction in flows/water levels.		
Bunduff Lough And Machair/ Trawalua/ Mullaghmore SAC (000625)	3.7km	**Annex I habitats:** Mudflats and sandflats not covered by seawater at low tide [1140] Large shallow inlets and bays [1160] Reefs [1170] Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Humid dune slacks [2190] Machairs (* in Ireland) [21A0] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Alkaline fens [7230] **Annex II species:** *Euphydryas aurinia* (Marsh Fritillary) [1065] *Petalophyllum ralfsii* (Petalwort) [1395]	New GW abstraction overlying the same karstic aquifier as the European site. Option study area is hydrologically linked to the European site. **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 overlying the same karstic aquifier as the European site. Option study area is hydrologically linked to the European site. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact on aquatic QI species or habitats (GWDTHs in particular). **Water table/availability** There is potential for impacts on QI species and GWDTHs 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 (SACs) with option TG1-SA-C-067 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 Moy SAC (002298)	1km	**Annex I habitats:** Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) [6510] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150] Alkaline fens [7230] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]	New GW abstraction to supply deficit at Foxford, upgrade WTP, new pump station, wellfield and storage in the vicinity of the European site. New watermains crosses a hydrological link to the European site. **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 to supply deficit at Foxford, upgrade WTP, new pump station, wellfield and storage in the vicinity of the European site. New watermains crosses a hydrological link to the European site. **No operational impacts are predicted as the GW abstraction is outside the ZOC.**	• 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		
		Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0] **Annex II species:** *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]				

Table D3.04: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SA-C-067 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		
Lough Conn and Lough Cullin SPA (004228)	3.4km	Tufted Duck (*Aythya fuligula*) [A061] Common Scoter (*Melanitta nigra*) [A065] Common Gull (*Larus canus*) [A182] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-B Breed Breed Non-B	New GW abstraction to supply deficit at Foxford, upgrade WTP, new pump station, wellfield, storage and watermains in the vicinity of the 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).	New GW abstraction to supply deficit at Foxford, upgrade WTP, new pump station, wellfield, storage and watermains in the vicinity of the 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 D3.05: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SA-C-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 Moy SAC (002298)	0m	**Annex I habitats:** Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) [6510] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150] Alkaline fens [7230] 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:** *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Interconnect Kilaturley GWS with Charlestown and supply deficit from GWS. Option study area is within this European site (watermains crosses SAC). GW abstraction ZOC overlaps SAC **Mortality-** pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species or fish and restrict access to spawning habitat effecting 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 QI species from construction works. **T**here is also potential for the spread of invasive species given that the works within the SAC.	Interconnect Kilaturley GWS with Charlestown and supply deficit from GWS. Option study area is within this European site (watermains crosses SAC). GW abstraction ZOC overlaps SAC **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact on aquatic QI species or habitats (GWDTHs in particular). **Water table/availability** There is potential for impacts on QI species and GWDTHs 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 D3.06: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SA-C-101 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		
Lough Gill SAC (001976)	0m	**Annex I habitats:** Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* – type vegetation [3150] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] 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:** *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Salmo salar* (Salmon) [1106]	Upgrade and increase the existing SW abstraction from Lough Gill, decommission Kilsellagh WTP, upgrade Foxes Den WTP and new water mains crossing the European site. Option study area is within this European site. **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to QI habitats and supporting habitats of QI species during construction works. **Mortality-** habitat loss and pollution of waterbodies during construction (associated with sediment runoff, or accidental spillage) could impact QI species or fish and restrict access to spawning habitat effecting QI species and their prey.	Upgrade and increase the existing SW abstraction from Lough Gill, decommission Kilsellagh WTP, upgrade Foxes Den WTP and new water mains crossing the European site. Option study area is within this European site. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats. **Water table/availability** There is potential for impacts on otter and other QI species 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** • Hydrogeological 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		
		Lutra lutra (Otter) [1355]	**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 QI species from construction works. **T**here is also potential for the spread of invasive species given that the works are within the SAC.			
Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (000627)	30m	**Annex I habitats:** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Petrifying springs with tufa formation (*Cratoneurion*) [7220] **Annex II species:** *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra fluviatilis* (River Lamprey) [1099] *Phoca vitulina* (Harbour Seal) [1365]	New watermains 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	New watermains 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**

Table D3.07: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SA-C-101 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		
Cummeen Strand SPA (004035)	300m	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Oystercatcher (*Haematopus ostralegus*) [A130] Redshank (*Tringa totanus*) [A162] Wetland and Waterbirds [A999]	Non-B Non-B Non-B	New watermains is hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) –** there is potential for pollution of waterbodies during construction	New watermains 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	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
				that could impact on the wetland habitat 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 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).			

Table D3.08: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SA-C-108 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		
Lough Gill SAC (001976)	0m	**Annex I habitats:** Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* – type vegetation [3150] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] 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:** *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Increase abstraction at Lough Gill and upgrade pump station within the European site. Upgrade of watermains is crossing the European site. Upgrade Moneyduff WTP. Option study area is within this European site. **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to QI habitats and supporting habitats of QI species during construction works. **Mortality-** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species or fish and restrict access to spawning habitat effecting 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 QI species from construction works. **T**here is also potential for the spread	Increase abstraction at Lough Gill and upgrade pump station within the European site. Upgrade of watermains is crossing the European site. Upgrade Moneyduff WTP. Option study area is within this European site. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats. **Water table/availability** There is potential for impacts on otter and other QI species 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** • Hydrogeological 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		
			of invasive species given that the works are within the SAC.			

Table D3.09: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SA-C-131 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		
Boleybrack Mountain SAC (002032)	0m	**Annex I habitats:** Natural dystrophic lakes and ponds [3160] Northern Atlantic wet heaths with *Erica tetralix* [4010] European dry heaths [4030] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Blanket bogs (* if active bog) [7130]	Keep supplying Dowra WRZ from Doobally GWS, involves SW abstraction from Lough Naweelion. Option study area is hydrologically linked to this European site and abstraction site is within this European site. **Habitat degradation – changes in water quality (pollution) –** potential pollution of watercourses during construction could affect hydrologically connected QI habitats.	Keep supplying Dowra WRZ from Doobally GWS, involves SW abstraction from Lough Naweelion. Option study area is hydrologically linked to this European site and abstraction site is within this European site. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI habitats, particularly natural dystrophic lakes. **Water table/availability -** There is potential for impacts on QI habitats through a reduction in flows/water levels, particularly natural dystrophic lakes.	• 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 D3.10: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SA-C-137 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 Moy SAC (002298)	1.2km	**Annex I habitats:** Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) [6510] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150] Alkaline fens [7230] 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:** *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Rationalise Swinford to Kilaturley GWS. Option study area is hydrologically linked to this European site (including increase GW abstraction). **Mortality-** pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species or fish and restrict access to spawning habitat effecting 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 Swinford to Kilaturley GWS. Option study area is hydrologically linked to this European site (including increase GW abstraction). **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 D3.11: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SA-C-138 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		
Lough Arrow SAC (001673)	50m	**Annex I habitats:** Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. [3140]	Upgrade current GW abstraction at Heapstown Spring. GW abstraction ZOC overlaps this European site. **Habitat degradation – changes in water quality (pollution) –** potential pollution of waterbody during construction could affect QI habitat. **Disturbance (including biological disturbance) – T**here is potential for the spread of invasive species given that the works are adjacent to the SAC boundary.	Upgrade current GW abstraction at Heapstown Spring. GW abstraction ZOC overlaps 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**
Unshin River SAC (001898)	500m	**Annex I habitats:** Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]	Option study area is hydrologically linked to this European site. GW abstraction ZOC overlaps this European site. **Habitat degradation – changes in water quality (pollution) –** potential pollution of	Option study area is hydrologically linked to this European site. GW abstraction ZOC overlaps this European site.	• 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		
		Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] 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:** *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	watercourses during construction could affect QI species and hydrologically connected QI habitats. **Disturbance (including biological disturbance) –** there is potential for disturbance to QI species from construction works.	**Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact on aquatic QI species or habitats (GWDTHs in particular). **Water table/availability** There is potential for impacts on QI species and GWDTHs habitats through a reduction in flows/water levels.	With the implementation of mitigation as noted above there is no potential for AESI	

Table D3.12: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SA-C-138 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		
Lough Arrow SPA (004050)	50m	Little Grebe (*Tachybaptus ruficollis*) [A004] Tufted Duck (*Aythya fuligula*) [A061] Wetland and Waterbirds [A999]	Non-B Non-B	Upgrade current GW abstraction at Heapstown Spring, Upgrade Riverstown WTP. Option study area is adjacent to this European site **Habitat degradation – changes in water quality (pollution) –** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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 birds given the study area is adjacent to the SPA.	Upgrade current GW abstraction at Heapstown Spring, Upgrade Riverstown WTP. Option study area is adjacent 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**
Ballysadare Bay SPA (004129)	17.7km	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Grey Plover (*Pluvialis squatarola*) [A141] Dunlin (*Calidris alpina*) [A149] Bar-tailed Godwit (*Limosa lapponica*) [A157] Redshank (*Tringa totanus*) [A162] Wetland and Waterbirds [A999]	Non-B Non-B Non-B Non-B Non-B	Upgrade current GW abstraction at Heapstown Spring, Upgrade Riverstown WTP. Option study area is close to a hydrological link to this European site. **Disturbance (including biological disturbance) –** There is potential for disturbance to QI birds using habitats situated within	Upgrade current GW abstraction at Heapstown Spring, Upgrade Riverstown WTP. Option study area is close 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		
				the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g., grassland, arable farmland).			

Table D3.13: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SA-C-142 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		
Keel Machair/Menaun Cliffs SAC (001513)	0m	**Annex I habitats:** Perennial vegetation of stony banks [1220] Machairs (* in Ireland) [21A0] Alpine and Boreal heaths [4060] **Annex II species:** *Petalophyllum ralfsii* (Petalwort) [1395]	New SW abstraction from Keel Lough, new pump and watermains within the European site. Option study area is within 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 **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to QI habitats and supporting habitats of QI habitats during construction works given that the works are within the SAC. **Disturbance (including biological disturbance) – T**here is potential for the spread of invasive species given that the works are within the SAC.	New SW abstraction from Keel Lough, new pump and watermains within the European site. Option study area is within 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**
Croaghaun/ Slievemore SAC (001955)	0m	**Annex I habitats:** Northern Atlantic wet heaths with *Erica tetralix* [4010] European dry heaths [4030] Alpine and Boreal heaths [4060] Blanket bogs (* if active bog) [7130] Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) [8110] Siliceous rocky slopes with chasmophytic vegetation [8220]	Upgrade WTP and new watermains are adjacent to the European site. Option study area is adjacent to this European site. **Disturbance (including biological disturbance) – T**here is potential for the spread of invasive species given that the works are adjacent to the SAC boundary	Upgrade WTP and new watermains are adjacent to the European site. Option study area is adjacent 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 D3.14: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with grouped option TG1-SA-C-515 (TG1-SA-C-035, TG1-SA-C-035a) 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 Moy SAC (002298)	320m	**Annex I habitats:** Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) [6510] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150] Alkaline fens [7230] 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:** *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Rationalise Knock Airport to Kilkelly WRZ. Increase GW abstraction at Kilkelly WRZ and upgrade Kilkelly WTP adjacent to the European site. New watermains and pump station hydrologically linked to the European site. Option study area is adjacent to and 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 and species.	Rationalise Knock Airport to Kilkelly WRZ. Increase GW abstraction at Kilkelly WRZ and upgrade Kilkelly WTP adjacent to the European site. New watermains and pump station hydrologically linked to the European site. Option study area is adjacent to and hydrologically linked to this European site. **No operational impacts are predicted as the GW ZOC does not overlap the SAC.**	• 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 (SACs) with grouped option TG1-SA-C-542 (TG1-SA-C-139, TG1-SA-C-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		
River Moy SAC (002298)	0m	**Annex I habitats:** Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150] Alkaline fens [7230] 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:** *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Rationalise Kiltimagh to Lough Mask WRZ. Decomission Kiltimagh WTP and new watermains within and crossing the European site. New storage and pump station close to a hydrological link to the European site. Option study area is within this European site. **Mortality-** pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species or fish and restrict access to spawning habitat effecting 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 QI species from construction works. **T**here is also potential for the spread of invasive species given that the works are within the SAC.	Rationalise Kiltimagh to Lough Mask WRZ. Decomission Kiltimagh WTP and new watermains within and crossing the European site. New storage and pump station close to a hydrological link to the European site. Option study area is within 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**
Balla Turlough SAC (000463)	0m	**Annex I habitats:** Turloughs [3180]	New watermains and pump station are adjacent to the European site. Option study area is adjacent to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of turlough during construction given works adjacent SAC. **Disturbance (including biological disturbance) -** There is potential for the spread of invasive species given that the works are adjacent to the SAC boundary	New watermains and pump station are adjacent to the European site. Option study area is adjacent 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**
Lough Carra/Mask Complex SAC (001774)	0m	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140] European dry heaths [4030]	Increase SW abstraction from Lough Mask. Option study area is within this European site. **No construction required, therefore no impacts predicted.**	Option study area is within this European site (increase SW abstraction) **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats. **Water table/availability** There is potential for impacts on otter and other QI species utilising watercourses	• 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		
		Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] Alkaline fens [7230] Limestone pavements [8240] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0] **Annex II species:** *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] *Lutra lutra* (Otter) [1355] *Hamatocaulis vernicosus* (Slender Green Feather-moss) [6216]		hydrologically linked to this European site through a reduction in flows/water levels.		

Table D3.16: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with grouped option TG1-SA-C-542 (TG1-SA-C-139, TG1-SA-C-140) 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		
Lough Mask SPA (004062)	0m	Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Tufted Duck (*Aythya fuligula*) [A061] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Lesser Black-backed Gull (*Larus fuscus*) [A183] Common Tern (*Sterna hirundo*) [A193] Wetland and Waterbirds [A999]	Non-B Non-B Breed Breed Breed Breed	Rationalise Kiltimagh to Lough Mask WRZ. Increase SW abstraction at Lough Mask and upgrade Tourmakeady WTP. Option study area is within this European site (increase SW abstraction) **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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 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).	Rationalise Kiltimagh to Lough Mask WRZ. Increase SW abstraction at Lough Mask and upgrade Tourmakeady WTP. Option study area is within this European site (increase SW abstraction) **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact QI species. **Water table/availability** There is potential for impacts on QI birds or prey species 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** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D3.17: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with grouped option TG1-SA-C-543 (TG1-SA-C-143, TG1-SA-C-144, TG1-SA-C-145) 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 Moy SAC (002298)	0m	**Annex I habitats:** Lowland hay meadows (*Alopecurus pratensis*, Sanguisorba officinalis) [6510] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150] Alkaline fens [7230] 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:** *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Increase abstraction from Lough Conn. Upgrade Lisglennon WTP and maintain Wherrew WTP. Rationalise Lough Talt and Lough Easkey to Lisglennon WTP. Option study area is adjacent to this European site (increase SW abstraction, upgrade WTP, new watermains). **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to QI habitats and supporting habitats of QI species during construction works. **Mortality-** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact QI species or fish and restrict access to spawning habitat effecting 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 QI species from construction works. **T**here is also potential for the spread of invasive species given that the works are adjacent to the SAC boundary	Increase abstraction from Lough Conn. Upgrade Lisglennon WTP and maintain Wherrew WTP. Rationalise Lough Talt and Lough Easkey to Lisglennon WTP. Option study area is adjacent to this European site (increase SW abstraction, upgrade WTP, new watermains). **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**
Killala Bay/Moy Estuary SAC (000458)	0m	**Annex I habitats:** Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] 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] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Humid dune slacks [2190] **Annex II species:** *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014]	Option study area is adjacent to this European site (new watermains). **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI habitats **Disturbance (including biological disturbance) - T**here is potential for the spread of invasive species given that the works are adjacent to the SAC boundary	Option study area is adjacent to this European site (new watermains). **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		
		Petromyzon marinus (Sea Lamprey) [1095] *Phoca vitulina* (Harbour Seal) [1365]				
Lough Hoe Bog SAC (000633)	0m	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Blanket bogs (* if active bog) [7130] **Annex II species:** *Vertigo geyeri* (Geyer's Whorl Snail) [1013] *Austropotamobius pallipes* (White-clawed Crayfish) [1092]	New watermains runs alongside the European site. Option study area is adjacent 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 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	New watermains runs alongside the European site. Option study area is adjacent 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 D3.18: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with grouped option TG1-SA-C-543 (TG1-SA-C-143, TG1-SA-C-144, TG1-SA-C-145) 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		
Lough Conn and Lough Cullin SPA (004228)	0m	Tufted Duck (*Aythya fuligula*) [A061] Common Scoter (*Melanitta nigra*) [A065] Common Gull (*Larus canus*) [A182] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-B Breed Breed Non-B	Increase abstraction from Lough Conn. Upgrade Lisglennon WTP and maintain Wherrew WTP. Rationalise Lough Talt and Lough Easkey to Lisglennon WTP. Option study area is adjacent to this European site (increase SW abstraction, upgrade WTP, new watermains). **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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	Increase abstraction from Lough Conn. Upgrade Lisglennon WTP and maintain Wherrew WTP. Rationalise Lough Talt and Lough Easkey to Lisglennon WTP. Option study area is adjacent to this European site (increase SW abstraction, upgrade WTP, new watermains). **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		
				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).			
Killala Bay/Moy Estuary SPA (004036)	1.7km	Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Sanderling (*Calidris alba*) [A144] Dunlin (*Calidris alpina*) [A149] 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	Option study area is hydrologically linked to this European site (new watermains). **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat used by QI bird species. Potential pollution of watercourses during construction could have indirect effects on QI bird species through impacts upon prey species.	Option study area is hydrologically linked to this European site (new watermains). **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 D4.01: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAD-014 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		
West Connacht Coast SAC (002998)	120m	**Annex II species:** *Tursiops truncatus* (Common Bottlenose Dolphin) [1349]	New GW abstraction (poorly productive bedrock - Clare Island groundwater body). Option study area is close to this European site (new GW abstraction, new WTP, new reservoir, new pump station and new mains close to SAC). Within ZOC. **Disturbance (including biological disturbance) -** there is potential for visual disturbance to QI species from construction works.	New GW abstraction (poorly productive bedrock - Clare Island groundwater body). Option study area is close to this European site (new GW abstraction, new WTP, new reservoir, new pump station and new mains close to SAC). Within ZOC. No operational impacts are predicted given the QI present.	• 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 D4.02: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAD-014 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		
Clare Island SPA (004136)	650m	Fulmar (*Fulmarus glacialis*) [A009] Shag (*Phalacrocorax aristotelis*) [A018] Common Gull (*Larus canus*) [A182] Kittiwake (*Rissa tridactyla*) [A188] Guillemot (*Uria aalge*) [A199] Razorbill (*Alca torda*) [A200] Chough (*Pyrrhocorax pyrrhocorax*) [A346]	Breed Breed Breed Breed Breed Breed Breed	New GW abstraction (poorly productive bedrock - Clare Island groundwater body). Option study area is close to this European site (abandon old SW abstraction and WTP, new GW abstraction, new WTP, new reservoir, new pump station and new mains close to SPA). **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 close to SPA boundary impacting QI birds. **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).	New GW abstraction (poorly productive bedrock - Clare Island groundwater body). Option study area is close to this European site (abandon old SW abstraction and WTP, new GW abstraction, new WTP, new reservoir, new pump station and new mains close to SPA). 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 D4.03: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAD-027 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		
The Twelve Bens/Garraun Complex SAC (002031)	100m	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Alpine and Boreal heaths [4060] Blanket bogs (* if active bog) [7130] Depressions on peat substrates of the *Rhynchosporion* [7150] Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) [8110] Calcareous rocky slopes with chasmophytic vegetation [8210] Siliceous rocky slopes with chasmophytic vegetation [8220] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] **Annex II species:** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Najas flexilis* (Slender Naiad) [1833]	New SW abstraction from Lough Auna and upgrade existing Clifden WTP. Option study area is adjacent to/ hydrologically linked to this European site (new WTP, WTP upgrade, new mains, new break pressure tank (BPT) adjacent to SAC, new SW abstraction downstream from SAC). **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Mortality-** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact fish and restrict access to spawning habitat effecting QI species and their prey. **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.	New SW abstraction from Lough Auna and upgrade existing Clifden WTP. Option study area is adjacent to/ hydrologically linked to this European site (new WTP, WTP upgrade, new mains, new break pressure tank (BPT) adjacent to SAC, new SW abstraction downstream from SAC). No operational impacts are predicted given the SW abstraction is downstream from the 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**
Kingstown Bay SAC (002265)	7.3km	**Annex I habitats:** Large shallow inlets and bays [1160]	Option study area is hydrologically linked to this European site (New SW abstraction, new mains and new BPT hydrologically linked to SAC). **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect hydrologically connected habitats.	Option study area is hydrologically linked to this European site (New SW abstraction, new mains and new BPT hydrologically linked to SAC). 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 D4.04: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAD-027 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		
Slyne Head to Ardmore Point Islands	9.5km	Barnacle Goose (*Branta leucopsis*) [A045] Sandwich Tern (*Sterna sandvicensis*) [A191] Arctic Tern (*Sterna paradisaea*) [A194] Little Tern (*Sterna albifrons*) [A195]	Non-B Breed Breed Breed	New SW abstraction from Lough Auna and upgrade existing Clifden WTP. European site is within Zone of Influence of the study area.	New SW abstraction from Lough Auna and upgrade existing Clifden WTP. European site is within Zone of Influence of the study area.	• 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		
SPA (004159)				**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).	No operational impacts are predicted.	With the implementation of mitigation as noted above there is no potential for AESI	
Cruagh Island SPA (004170)	14.1km	Manx Shearwater (*Puffinus puffinus*) [A013] Barnacle Goose (*Branta leucopsis*) [A045]	Breed Non-B	European site is within Zone of Influence of the study area. **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).	European site is within Zone of Influence of the study area. 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**
High Island, Inishshark and Davillaun SPA (004144)	17.5km	Fulmar (*Fulmarus glacialis*) [A009] Barnacle Goose (*Branta leucopsis*) [A045] Arctic Tern (*Sterna paradisaea*) [A194]	Breed Non-B Breed	European site is within Zone of Influence of the study area. **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).	European site is within Zone of Influence of the study area. 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 D4.05: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAD-033 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		
Lough Corrib SAC (000297)	0m	**<u>Annex I habitats:</u>** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210]	New SW abstraction from Lough Corrib and new WTP. Option study area is within this European site (new SW abstraction from SAC, new mains, new WTP, new BTP, new pumping station and WTP upgrade adjacent to SAC). FWPM catchment is south of works and works are in close proximity to lesser horseshoe (LHS) bat foraging range, and within the LHS 2.5km buffer. **Physical loss of habitats/supporting habitat –** There	New SW abstraction from Lough Corrib and new WTP. Option study area is within this European site (new SW abstraction from SAC, new mains, new WTP, new BTP, new pumping station and WTP upgrade adjacent to SAC). FWPM catchment is south of works and works are in close proximity to lesser horseshoe (LHS) bat foraging range, and within the LHS 2.5km buffer. **Habitat degradation – hydrological/ hydrogeological changes-**	• 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		
		Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Alkaline fens [7230] Limestone pavements [8240] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Bog woodland [91D0] **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] *Salmo salar* (Salmon) [1106] *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] *Lutra lutra* (Otter) [1355] *Najas flexilis* (Slender Naiad) [1833] *Hamatocaulis vernicosus* (Slender Green Feather-moss) [6216]	is potential for some loss of/damage to QI/Annex 1 habitats during construction works given that the works are within the SAC boundary and within lesser horseshoe (LHS) 2.5km core foraging range. Vegetation, hedgerow or tree clearance associated with the works could sever important commuting routes for LHS bats commuting between their roost site in the SAC and foraging areas outside the confines of the SAC. This would require further assessment to ensure impacts are avoided. **Mortality -** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact fish, restrict access to spawning habitat and smother freshwater pearl mussel. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to bats, 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.	Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats. **Water table/availability** - There is potential for impacts on FWPM and QI species utilising watercourses hydrologically linked to this European site through a reduction in flows/water levels.		
Lough Carra/Mask Complex SAC (001774)	400m	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. [3140] European dry heaths [4030] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] Alkaline fens [7230] Limestone pavements [8240] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0] **Annex II species:**	Option study area is close to/ hydrologically connected to this European site (new SW abstraction, new mains, new WTP, new BTP, new pumping station and WTP upgrade close to SAC). Works within LHS roost and foraging grounds. **Physical loss of habitats/supporting habitat –** There is potential for some loss of/damage to QI/Annex 1 habitats during construction works given that the works are close to the SAC boundary and within lesser horseshoe (LHS) 2.5km core foraging range. Vegetation, hedgerow or tree clearance associated with the works could sever important commuting routes for LHS bats commuting	Option study area is close to/ hydrologically connected to this European site (new SW abstraction, new mains, new WTP, new BTP, new pumping station and WTP upgrade close to SAC). Works within LHS roost and foraging grounds. 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		
		Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303] *Lutra lutra* (Otter) [1355] *Hamatocaulis vernicosus* (Slender Green Feather-moss) [6216]	between their roost site in the SAC and foraging areas outside the confines of the SAC. This would require further assessment to ensure impacts are avoided. **Mortality-** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact fish and restrict access to spawning habitat effecting 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 habitats **Disturbance (including biological disturbance) -** there is potential for disturbance to bats, otter and other QI species from construction works. There is also potential for the spread of invasive species given that the works are in close proximity to the SAC boundary.			
Ballymaglancy Cave, Cong SAC (000474)	1.4km	**Annex I habitats:** Caves not open to the public [8310] **Annex II species:** *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]	Option study area is in close proximity to this European site (new mains) and is within LHS bat foraging range. **Physical loss of habitats/supporting habitat –** There is potential for some loss of/damage to QI/Annex 1 habitats during construction works given that the works are within lesser horseshoe (LHS) 2.5km core foraging range. Vegetation, hedgerow or tree clearance associated with the works could sever important commuting routes for LHS bats commuting between their roost site in the SAC and foraging areas outside the confines of the SAC. This would require further assessment to ensure impacts are avoided. **Disturbance (including biological disturbance) -** there is potential for disturbance to bats from construction works.	Option study area is in close proximity to this European site (new mains) and is within LHS bat foraging range. 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 D4.06: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAD-033 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		
Lough Corrib SPA (004042)	0m	Gadwall (*Anas strepera*) [A051] Shoveler (*Anas clypeata*) [A056] Pochard (*Aythya ferina*) [A059] Tufted Duck (*Aythya fuligula*) [A061] Common Scoter (*Melanitta nigra*) [A065] Hen Harrier (*Circus cyaneus*) [A082] Coot (*Fulica atra*) [A125] Golden Plover (*Pluvialis apricaria*) [A140] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Common Tern (*Sterna hirundo*) [A193] Arctic Tern (*Sterna paradisaea*) [A194] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Breed Non-b Non-b Non-b Breed Breed Breed Breed	New SW abstraction from Lough Corrib and new WTP. Option study area is within this European site (new SW abstraction from SPA, new mains, new WTP, new BTP, new pumping station and WTP upgrade adjacent to SPA). **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 SPA boundary impacting QI birds. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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 birds given the study area is within the SPA, and 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).	New SW abstraction from Lough Corrib and new WTP. Option study area is within this European site (new SW abstraction from SPA, new mains, new WTP, new BTP, new pumping station and WTP upgrade adjacent to SPA). **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact QI species and/or associated supporting habitats. **Water table/availability** There is potential for impacts on QI birds or prey species 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** With the implementation of mitigation as noted above there is no potential for AESI	**N**
Lough Mask SPA (004062)	450m	Tufted Duck (*Aythya fuligula*) [A061] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Lesser Black-backed Gull (*Larus fuscus*) [A183] Common Tern (*Sterna hirundo*) [A193] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-B Non-B Breed Breed Breed Breed	Option study area is close to/ hydrologically connected to this European site (new SW abstraction, new mains, new WTP, new BTP, new pumping station and WTP upgrade close to SPA). **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	Option study area is close to/ hydrologically connected to this European site (new SW abstraction, new mains, new WTP, new BTP, new pumping station and WTP upgrade close to SPA). 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		
				close to SPA boundary impacting QI birds. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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 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)..			

Table D4.07: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAD-040 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		
Lough Corrib SAC (000297)	380m	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. [3140] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Active raised bogs [7110]	New GW abstraction from Gortgarogh GWB (Sean, Robbie spring) spring. Option study area is close to/ hydrologically connected to this European site (new GW abstraction, WTP upgrades), within the same karstic region. **Mortality-** pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact fish and restrict access to spawning habitat effecting 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 habitats. **Disturbance (including biological disturbance) -** there is potential for	New GW abstraction from Gortgarogh GWB (Sean, Robbie spring) spring. Option study area is close to/ hydrologically connected to this European site (new GW abstraction, WTP upgrades), within the same karstic region. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats such as active and degraded raised bogs, depressions on peat substrates of the *Rhynchosporion,* petrifying springs, alkaline and calcareous fens and bog woodland. **Water table/availability** - There is potential for impacts on otter and other	• 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		
		Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Alkaline fens [7230] Limestone pavements [8240] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Bog woodland [91D0] **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] *Salmo salar* (Salmon) [1106] *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] *Lutra lutra* (Otter) [1355] *Najas flexilis* (Slender Naiad) [1833] *Hamatocaulis vernicosus* (Slender Green Feather-moss) [6216]	disturbance to otter from construction works. There is also potential for the spread of invasive species given that the works are close to the SAC boundary.	QI species utilising watercourses hydrologically linked to this European site through a reduction in flows/water levels.		
Lough Lurgeen Bog/Glenamaddy Turlough SAC	3km	**Annex I habitats:** Turloughs [3180] Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation [3270] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150]	Option study area is in close proximity to this European site (new GW abstraction, WTP upgrade), within ZOC. No impacts are predicted given distance from site, a lack of hydrological link, and the QI present.	Option study area is in close proximity to this European site (new GW abstraction, WTP upgrade), within ZOC. **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact QI habitats such as turloughs, active and degraded raised bogs, and depressions on peat substrates of the *Rhynchosporion*. **Water table/availability -** There is potential for impacts on QI 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** • 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 D4.08: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAD-046a 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		
Lough Corrib SAC (000297)	0m	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. [3140] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Alkaline fens [7230] Limestone pavements [8240] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Bog woodland [91D0] **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] *Salmo salar* (Salmon) [1106] *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] *Lutra lutra* (Otter) [1355] *Najas flexilis* (Slender Naiad) [1833] *Hamatocaulis vernicosus* (Slender Green Feather-moss) [6216]	Increase existing SW abstraction at Terryland from River Corrib. Option study area is within/adjacent to this European site (increased SW abstraction, WTP upgrade, new mains, pump station upgrades, new storage within/adjacent to SAC). **Mortality-** pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact fish and restrict access to spawning habitat effecting 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 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/adjacent to the SAC boundary.	Increase existing SW abstraction at Terryland from River Corrib. Option study area is within/adjacent to this European site (increased SW abstraction, WTP upgrade, new mains, pump station upgrades, new storage within/adjacent to SAC). **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats. **Water table/availability -** There is potential for impacts on otter and other QI species 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** With the implementation of mitigation as noted above there is no potential for AESI	**N**
Galway Bay Complex SAC (000268)	1.5km	**Annex I habitats:** Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160]	Increase existing SW abstraction at Terryland from River Corrib. Option study area is hydrologically connected to this European site (increased SW abstraction, WTP	Increase existing SW abstraction at Terryland from River Corrib. Option study area is hydrologically connected to this European site (increased SW abstraction, WTP upgrade, new watermains, new pumps).	• 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		
		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] Turloughs [3180] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] Alkaline fens [7230] Limestone pavements [8240] **Annex II species:** *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365]	upgrade, new watermains, new pumps). **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works.	No operational impacts predicted		

Table D4.09: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAD-046a 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		
Lough Corrib SPA (004042)	0m	Gadwall (*Anas strepera*) [A051] Shoveler (*Anas clypeata*) [A056] Pochard (*Aythya ferina*) [A059] Tufted Duck (*Aythya fuligula*) [A061] Common Scoter (*Melanitta nigra*) [A065] Hen Harrier (*Circus cyaneus*) [A082] Coot (*Fulica atra*) [A125] Golden Plover (*Pluvialis apricaria*) [A140] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Common Tern (*Sterna hirundo*) [A193] Arctic Tern (*Sterna paradisaea*) [A194] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-B Non-B Non-B Non-B Non-B Breed Non-B Non-B Non-B Breed Breed Breed Breed	Increase existing SW abstraction at Terryland from River Corrib. Option study area is within/adjacent to this European site (upgrade WTP within SPA, increased SW abstraction, WTP upgrade, new mains, pump station upgrades, new storage adjacent to SPA). **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat used by QI bird species. Potential pollution of watercourses during construction could have indirect effects on QI bird species	Increase existing SW abstraction at Terryland from River Corrib. Option study area is within/adjacent to this European site (upgrade WTP within SPA, increased SW abstraction, WTP upgrade, new mains, pump station upgrades, new storage adjacent to SPA). **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact QI species and/or associated supporting habitats. **Water table/availability** - There is potential for impacts on QI birds or prey species utilising watercourses	• 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	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
				through impacts upon prey species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds given the study area is within the SPA, and 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).	hydrologically linked to this European site through a reduction in flows/water levels.		
Inner Galway Bay SPA (004031)	1.5km	Black-throated Diver (*Gavia arctica*) [A002] Great Northern Diver (*Gavia immer*) [A003] Cormorant (*Phalacrocorax carbo*) [A017] Grey Heron (*Ardea cinerea*) [A028] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Red-breasted Merganser (*Mergus serrator*) [A069] Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140] Lapwing (*Vanellus vanellus*) [A142] Dunlin (*Calidris alpina*) [A149] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Turnstone (*Arenaria interpres*) [A169] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Sandwich Tern (*Sterna sandvicensis*) [A191] Common Tern (*Sterna hirundo*) [A193] Wetland and Waterbirds [A999]	N/A Non-B Breed 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 Breed Breed	Increase existing SW abstraction at Terryland from River Corrib. Option study area is hydrologically connected to this European site (increased SW abstraction, WTP upgrade, new watermains, new pumps). **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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 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).	Increase existing SW abstraction at Terryland from River Corrib. Option study area is hydrologically connected to this European site (increased SW abstraction, WTP upgrade, new watermains, new pumps). 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**
Cregganna Marsh SPA (004142)	9km	Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	Non-B	Option study area in Zone of Influence of study area. **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).	Option study area in Zone of Influence of study area. 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**
Rahasane Turlough	12.6km	Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050]	Non-B Non-B	Option study area is hydrologically linked to this European site (abandon WTPs) and in Zone of	Option study area is hydrologically linked to this European site (abandon WTPs) and in Zone of	• 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		
SPA (004089)		Golden Plover (*Pluvialis apricaria*) [A140] Black-tailed Godwit (*Limosa limosa*) [A156] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-B Non-B Non-B	Influence of study area (new storage). **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).	Influence of study area (new storage). No operational impacts are predicted.	With the implementation of mitigation as noted above there is no potential for AESI	

Table D4.10: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAD-055 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		
Inishbofin and Inishshark SAC (000278)	0m	**Annex I habitats:** Coastal lagoons [1150] Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Northern Atlantic wet heaths with *Erica tetralix* [4010] European dry heaths [4030] **Annex II species:** *Halichoerus grypus* (Grey Seal) [1364]	Desalination plant to supply full deficit. No blending, chemical remineralization only. Option study area is within this European site (new SW abstraction, new mains, new desalination plant, new storage, new pump, WTP upgrade). **Physical loss of habitats/supporting habitat –** There is potential for some loss of/damage to supporting habitats of QI species during construction works given that the works are within the SAC. **Mortality -** habitat loss and pollution of watercourses during construction (associated with sediment runoff, or accidental spillage) could impact fish and restrict access to spawning habitat effecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) -** potential pollution of waterbodies during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species from construction works.	Desalination plant to supply full deficit. No blending, chemical remineralization only. Option study area is within this European site (new SW abstraction, new mains, new desalination plant, new storage, new pump, WTP upgrade). **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction and brine discharge which could lead to hydrological changes (increased salinity and thermal changes – impacting on water quality) that could impact aquatic QI species. Brine discharge has the potential to alter the activity, diversity and abundance of species within and surrounding the habitat it disperses into. This may impact the foraging ground of protected species for which it has been designated (grey seal).	• 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**
West Connacht Coast SAC (002998)	580m	**Annex II species:** *Tursiops truncatus* (Common Bottlenose Dolphin) [1349]	Option study area is hydrologically linked to this European site. Desalination plant is within potential supporting habitats for the designated QI species. **Mortality -** habitat loss and pollution of water during construction (associated with	Option study area is hydrologically linked to this European site. Desalination plant is within potential supporting habitats for the designated QI species.	• General Mitigation Measures are outlined in **Section 6.3.3** • 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		
			sediment runoff, or accidental spillage) could impact fish and restrict access to spawning habitat effecting QI species and their prey. **Habitat degradation – changes in water quality (pollution) -** potential pollution of waterbodies during construction could affect QI species. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species from construction works.	**Habitat degradation – hydrological/ hydrogeological changes -** Abstraction and brine discharge which could lead to hydrological changes (increased salinity and thermal changes – impacting on water quality) that could impact aquatic QI species. Brine discharge has the potential to alter the activity, diversity and abundance of species within and surrounding the habitat it disperses into. This may impact the foraging ground of protected species for which it has been designated (common bottlenose dolphin).	With the implementation of mitigation as noted above there is no potential for AESI	
Slyne Head Islands SAC (000328)	19km	**Annex I habitats:** Reefs [1170] **Annex II species:** *Tursiops truncatus* (Common Bottlenose Dolphin) [1349] *Halichoerus grypus* (Grey Seal) [1364]	Desalination plant is within potential supporting habitats for the designated QI species. **Habitat degradation – changes in water quality (pollution) -** potential pollution of waterbodies during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species from construction works.	Desalination plant is within potential supporting habitats for the designated QI species. **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction and brine discharge which could lead to hydrological changes (increased salinity and thermal changes – impacting on water quality) that could impact aquatic QI species. Brine discharge has the potential to alter the activity, diversity and abundance of species within and surrounding the habitat it disperses into. This may impact the foraging ground of protected species for which it has been designated (common bottlenose dolphin and grey seal).	• 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**
Kilkieran Bay and Islands SAC (002111)	39km	**Annex I habitats:** Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Machairs (* in Ireland) [21A0] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510]	Desalination plant is within potential supporting habitats for the designated QI species. No impacts predicted given the works required and distance from site.	Desalination plant is within potential supporting habitats for the designated QI species. **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction and brine discharge which could lead to hydrological changes (increased salinity and thermal changes – impacting on water quality) that could impact aquatic QI species. Brine discharge has the potential to alter the activity, diversity and abundance of species within and surrounding the habitat it disperses into. This may impact the foraging ground of protected species for	• 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		
		Annex II species: *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365] *Najas flexilis* (Slender Naiad) [1833]		which it has been designated (harbour seal).		
Clew Bay Complex SAC (001482)	40km	**Annex I habitats:** Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Machairs (* in Ireland) [21A0] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] **Annex II species:** *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365]	Desalination plant is within potential supporting habitats for the designated QI species. No impacts predicted given the works required and distance from site.	Desalination plant is within potential supporting habitats for the designated QI species. **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction and brine discharge which could lead to hydrological changes (increased salinity and thermal changes – impacting on water quality) that could impact aquatic QI species. Brine discharge has the potential to alter the activity, diversity and abundance of species within and surrounding the habitat it disperses into. This may impact the foraging ground of protected species for which it has been designated (harbour seal).	• 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**
Duvillaun Islands SAC (000495)	49km	**Annex II species:** *Tursiops truncatus* (Common Bottlenose Dolphin) [1349] *Halichoerus grypus* (Grey Seal) [1364]	Desalination plant is within potential supporting habitats for the designated QI species. No impacts predicted given the works required and distance from site.	Desalination plant is within potential supporting habitats for the designated QI species. **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction and brine discharge which could lead to hydrological changes (increased salinity and thermal changes – impacting on water quality) that could impact aquatic QI species. Brine discharge has the potential to alter the activity, diversity and abundance of species within and surrounding the habitat it disperses into. This may impact the foraging ground of protected species for which it has been designated (common bottlenose dolphin and grey seal).	• 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**
Inishkea Islands SAC (000507)	52km	**Annex I habitats:** Machairs (* in Ireland) [21A0] **Annex II species:** *Halichoerus grypus* (Grey Seal) [1364] *Petalophyllum ralfsii* (Petalwort) [1395]	Desalination plant is within potential supporting habitats for the designated QI species. No impacts predicted given the works required and distance from site.	Desalination plant is within potential supporting habitats for the designated QI species. **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction and brine discharge which could lead to	• General Mitigation Measures are outlined in **Section 6.3.3** • 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		
				hydrological changes (increased salinity and thermal changes – impacting on water quality) that could impact aquatic QI species. Brine discharge has the potential to alter the activity, diversity and abundance of species within and surrounding the habitat it disperses into. This may impact the foraging ground of protected species for which it has been designated (grey seal).	With the implementation of mitigation as noted above there is no potential for AESI	

Table D4.11: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAD-055 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		
Inishbofin, Omey Island and Turbot Island SPA (004231)	90m	Corncrake (*Crex crex*) [A122]	Breed	Desalination plant to supply full deficit. No blending, chemical remineralization only. Option study area is in close proximity to this European site (new SW abstraction, new mains, new desalination plant, new storage, new pump, WTP upgrade). **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds given the study area is in close proximity to the SPA.	Desalination plant to supply full deficit. No blending, chemical remineralization only. Option study area is in close proximity to this European site (new SW abstraction, new mains, new desalination plant, new storage, new pump, WTP upgrade). 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**
High Island, Inishshark and Davillaun SPA (004144)	1.1km	Fulmar (*Fulmarus glacialis*) [A009] Barnacle Goose (*Branta leucopsis*) [A045] Arctic Tern (*Sterna paradisaea*) [A194]	Breed Non-B Breed	Option study area is hydrologically linked and in close proximity to this European site (new SW abstraction, new mains, new desalination plant, new storage, new pump, WTP upgrade). **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).	Option study area is hydrologically linked and in close proximity to this European site (new SW abstraction, new mains, new desalination plant, new storage, new pump, WTP upgrade). **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction and brine discharge which could lead to hydrological changes (increased salinity and thermal changes – impacting on water quality) that could impact QI species. Brine discharge has the potential to alter the activity, diversity and abundance of species within and	• 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	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
					surrounding the habitat it disperses into. This may impact the foraging ground of protected bird species for which it has been designated through impacts on prey species.		
Cruagh Island SPA (004170)	9.1km	Manx Shearwater (*Puffinus puffinus*) [A013] Barnacle Goose (*Branta leucopsis*) [A045]	Breed Non-B	European site is within Zone of Influence of the study area. **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).	European site is within Zone of Influence of the study area. 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 D4.12: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAD-058 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		
Inisheer Island SAC (001275)	90m	**Annex I habitats:** Coastal lagoons [1150] Reefs [1170] European dry heaths [4030] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) [6510] Limestone pavements [8240]	Optimise GW abstraction from current springs (includes GW harvesting/raw water storage). Option study area is adjacent to this European site (increase GW abstraction, WTP upgrade, new mains, new storage). European site overlies same karst region as abstraction and ZOC adjacent to SAC. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect hydrologically connected QI habitats.	Optimise GW abstraction from current springs (includes GW harvesting/raw water storage). Option study area is adjacent to this European site (increase GW abstraction, WTP upgrade, new mains, new storage). European site overlies same karst region as abstraction and ZOC adjacent to SAC. **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact QI habitats such as coastal lagoons. **Water table/availability** - There is potential for impacts on QI 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** • 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 D4.13: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAD-069 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		
Inishmaan Island SAC (000212)	3m	**Annex I habitats:** Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Machairs (* in Ireland) [21A0] European dry heaths [4030] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) [6510] Limestone pavements [8240]	Optimise GW abstraction from current springs (includes GW harvesting/raw water storage). Option study area is adjacent to this European site (increase GW abstraction, WTP upgrade, new storage). European site within ZOC. **Physical loss of habitats/supporting habitat –** There is potential for some loss of/damage to QI habitats during construction works given that the works are in close proximity to the SAC. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect hydrologically connected QI habitats**.**	Optimise GW abstraction from current springs (includes GW harvesting/raw water storage). Option study area is adjacent to this European site (increase GW abstraction, WTP upgrade, new storage). European site within ZOC. **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact QI habitats such as machairs. **Water table/availability** - There is potential for impacts on QI 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** • 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 D4.14: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAD-074 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		
Inishmore Island SAC (000213)	0m	**Annex I habitats:** Coastal lagoons [1150] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Dunes with Salix repens ssp. argentea (*Salicion arenariae*) [2170] Humid dune slacks [2190] Machairs (* in Ireland) [21A0] European dry heaths [4030] Alpine and Boreal heaths [4060] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210]	Increase GW abstraction from existing boreholes and new raw water storage to maximise GW availability in winter months. Option study area is within/adjacent to this European site (WTP upgrades, increase GW abstractions, new pump, new mains). European site within ZOC. **Physical loss of habitats/supporting habitat –** There is potential for some loss of/damage to supporting habitats of QI species during construction works given that the works are within the SAC. **Mortality -** habitat loss during construction could impact narrow-mouthed whorl snail. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats.	Increase GW abstraction from existing boreholes and new raw water storage to maximise GW availability in winter months. Option study area is within/adjacent to this European site (WTP upgrades, increase GW abstractions, new pump, new mains). European site within ZOC. **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact QI species or habitats such as coastal lagoons and machairs. **Water table/availability** - There is potential for impacts on QI species utilising watercourses and habitats hydrologically 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		
		Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) [6510] Limestone pavements [8240] Submerged or partially submerged sea caves [8330] **Annex II species:** *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014]				

Table D4.15: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAD-074 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		
Inishmore SPA (004152)	1.3km	Kittiwake (*Rissa tridactyla*) [A188] Arctic Tern (*Sterna paradisaea*) [A194] Little Tern (*Sterna albifrons*) [A195] Guillemot (*Uria aalge*) [A199]	Breed Breed Breed Breed	Increase GW abstraction from existing boreholes and new raw water storage to maximise GW availability in winter months. Option study area is near this European site (WTP upgrades, increase GW abstractions, new pump, new mains). **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).	Increase GW abstraction from existing boreholes and new raw water storage to maximise GW availability in winter months. Option study area is near this European site (WTP upgrades, increase GW abstractions, new pump, new mains). 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**
Slyne Head to Ardmore Point Islands SPA (004159)	13.7km	Barnacle Goose (*Branta leucopsis*) [A045] Sandwich Tern (*Sterna sandvicensis*) [A191] Arctic Tern (*Sterna paradisaea*) [A194] Little Tern (*Sterna albifrons*) [A195]	Non-B Breed Breed Breed	European site is within Zone of Influence of the study area. **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).	European site is within Zone of Influence of the study area. 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 D4.16: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAD-101 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		
Lough Corrib SAC (000297)	1.1km	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. [3140] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Alkaline fens [7230] Limestone pavements [8240] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Bog woodland [91D0] **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] *Salmo salar* (Salmon) [1106] *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] *Lutra lutra* (Otter) [1355] *Najas flexilis* (Slender Naiad) [1833] *Hamatocaulis vernicosus* (Slender Green Feather-moss) [6216]	Increase existing GW abstraction from existing spring (karstic bedrock - Clare-Corrib groundwater body). Option study area is hydrologically linked and in close proximity to this site to this European site (increased GW abstraction, WTP upgrade, upgrade pumping station, new balancing tank). European site overlies same karst region as abstraction and ZOC adjacent to SAC. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter from construction works.	Increase existing GW abstraction from existing spring (karstic bedrock - Clare-Corrib groundwater body). Option study area is hydrologically linked and in close proximity to this site to this European site (increased GW abstraction, WTP upgrade, upgrade pumping station, new balancing tank). European site overlies same karst region as abstraction and ZOC adjacent to SAC. **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats such as active and degraded raised bogs, depressions on peat substrates of the *Rhynchosporion,* calcareous and alkaline fens, petrifying springs and bog woodland. **Water table/availability** - There is potential for impacts on QI species 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** • 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 D4.17: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAD-111 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		
Owenduff/Nephin Complex SAC (000534)	190m	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Natural dystrophic lakes and ponds [3160] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Northern Atlantic wet heaths with *Erica tetralix* [4010] Alpine and Boreal heaths [4060] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Blanket bogs (* if active bog) [7130] Transition mires and quaking bogs [7140] **Annex II species:** *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Saxifraga hirculus* (Marsh Saxifrage) [1528] *Hamatocaulis vernicosus* (Slender Green Feather-moss) [6216]	New GW abstraction (karstic bedrock - Newport groundwater body). Option study area is close to this European site (WTP upgrade). **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter from construction works. There is also potential for the spread of invasive species given that the works are in close proximity to the SAC boundary.	New GW abstraction (karstic bedrock - Newport groundwater body). Option study area is close to this European site (WTP upgrade). **No operational impacts predicted due to size and scale of abstraction, and due to 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**
Clew Bay Complex SAC (001482)	770m	**Annex I habitats:** Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae)* [1330] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Machairs (* in Ireland) [21A0] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] **Annex II species:** *Vertigo geyeri* (Geyer's Whorl Snail) [1013] *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365]	New GW abstraction (karstic bedrock - Newport groundwater body). Option study area is near hydrological link to this European site and in close proximity to the European site (WTP upgrade, new GW abstraction, new pumps, new mains, new WTP) and overlying the same karstic aquifer as abstraction. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter from construction works. There is also potential for the spread of invasive species given that the works are in close proximity to the SAC boundary.	New GW abstraction (karstic bedrock - Newport groundwater body). Option study area is near hydrological link to this European site and in close proximity to the European site (WTP upgrade, new GW abstraction, new pumps, new mains, new WTP) and overlying the same karstic aquifer as abstraction. **No operational impacts predicted due to size and scale of abstraction, and due to the GWD habitat being over 7km from the 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 D4.18: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAD-111 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		
Owenduff/Nephin Complex SPA (004098)	100m	Merlin (*Falco columbarius*) [A098] Golden Plover (*Pluvialis apricaria*) [A140]	Breed breed	New GW abstraction (karstic bedrock - Newport groundwater body). Option study area is adjacent to this European site (WTP upgrade). **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds given the study area is adjacent to the SPA and 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).	New GW abstraction (karstic bedrock - Newport groundwater body). Option study area is adjacent to this European site (WTP upgrade). 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**
Blacksod Bay/Broad Haven SPA (004037)	16.8km	Red-throated Diver (*Gavia stellata*) [A001] Great Northern Diver (*Gavia immer*) [A003] Slavonian Grebe (*Podiceps auritus*) [A007] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Common Scoter (*Melanitta nigra*) [A065] Red-breasted Merganser (*Mergus serrator*) [A069] Ringed Plover (*Charadrius hiaticula*) [A137] Sanderling (*Calidris alba*) [A144] Dunlin (*Calidris alpina*) [A149] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Sandwich Tern (*Sterna sandvicensis*) [A191] Dunlin (*Calidris alpina schinzii*) [A466] 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 Breed Breed	European site is within Zone of Influence of the study area. **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).	European site is within Zone of Influence of the study area. 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 D4.19: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAD-117a 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		
Newport River SAC (002144)	0m	**Annex II species:** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Salmo salar* (Salmon) [1106]	Increase SW abstraction from existing River Newport and upgrade existing Newport WTP. Option study area is within this European site (increase SW abstraction and WTP upgrade). Within FWPM catchment but infrastructure already in place.	Increase SW abstraction from existing River Newport and upgrade existing Newport WTP. Option study area is within this European site (increase SW abstraction and WTP upgrade). Within FWPM catchment but infrastructure already in place.	• General Mitigation Measures are outlined in **Section 6.3.3** • 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		
			Mortality - pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact fish, restrict access to spawning habitat and smother freshwater pearl mussel. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to FWPM 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.	**Habitat degradation – hydrological/ hydrogeological changes -** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species. **Water table/availability** - There is potential for impacts on FWPM and other QI species utilising watercourses hydrologically linked to this European site through a reduction in flows/water levels.	With the implementation of mitigation as noted above there is no potential for AESI	
Clew Bay Complex SAC (001482)	1.5km	**Annex I habitats:** Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Machairs (* in Ireland) [21A0] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] **Annex II species:** *Vertigo geyeri* (Geyer's Whorl Snail) [1013] *Lutra lutra (*Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365]	Option study area is hydrologically linked to this European site (increase SW abstraction and WTP upgrade). **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter from construction works.	Option study area is hydrologically linked to this European site (increase SW abstraction and WTP upgrade). 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 D4.20: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAD-122 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		
Lough Corrib SAC (000297)	650m	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. [3140] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Alkaline fens [7230] Limestone pavements [8240] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Bog woodland [91D0] **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] *Salmo salar* (Salmon) [1106] *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] *Lutra lutra* (Otter) [1355] *Najas flexilis* (Slender Naiad) [1833] *Hamatocaulis vernicosus* (Slender Green Feather-moss) [6216]	Increase SW abstraction from existing Lough Buffy. Option study area is hydrologically linked to this European site (increase SW abstraction, upgrade WTP, upgrade pump). Adjacent to FWPM catchment. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats.	Increase SW abstraction from existing Lough Buffy. Option study area is hydrologically linked to this European site (increase SW abstraction, upgrade WTP, upgrade pump). Adjacent to FWPM catchment. **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats. **Water table/availability** - There is potential for impacts on 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** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D4.21: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAD-122 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		
Lough Corrib SPA (004042)	3.7km	Gadwall (*Anas strepera*) [A051] Shoveler (*Anas clypeata*) [A056] Pochard (*Aythya ferina*) [A059] Tufted Duck (*Aythya fuligula*) [A061] Common Scoter (*Melanitta nigra*) [A065] Hen Harrier (*Circus cyaneus*) [A082] Coot (*Fulica atra*) [A125] Golden Plover (*Pluvialis apricaria*) [A140] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Common Tern (*Sterna hirundo*) [A193] Arctic Tern (*Sterna paradisaea*) [A194] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-B Non-B Non-B Non-B Non-B Breed Non-B Non-B Non-B Breed Breed Breed Breed	Increase SW abstraction from existing Lough Buffy. Option study area is hydrologically linked to this European site (increase SW abstraction, upgrade WTP, upgrade pump). **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).	Increase SW abstraction from existing Lough Buffy. Option study area is hydrologically linked to this European site (increase SW abstraction, upgrade WTP, upgrade pump). 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**
Inner Galway Bay SPA (004031)	18.3km	Black-throated Diver (*Gavia arctica*) [A002] Great Northern Diver (*Gavia immer*) [A003] Cormorant (*Phalacrocorax carbo*) [A017] Grey Heron (*Ardea cinerea*) [A028] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Red-breasted Merganser (*Mergus serrator*) [A069] Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140] Lapwing (*Vanellus vanellus*) [A142] Dunlin (*Calidris alpina*) [A149] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Turnstone (*Arenaria interpres*) [A169] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Sandwich Tern (*Sterna sandvicensis*) [A191] Common Tern (*Sterna hirundo*) [A193] Wetland and Waterbirds [A999]	N/A Non-B Breed 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 Breed Breed	European site is hydrologically linked to the study area via Lough Corrib. **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).	European site is hydrologically linked to the study area via Lough Corrib. 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 D4.22: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAD-158 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		
High Island, Inishshark and Davillaun SPA (004144)	8.2km	Fulmar (*Fulmarus glacialis*) [A009] Barnacle Goose (*Branta leucopsis*) [A045] Arctic Tern (*Sterna paradisaea*) [A194]	Breed Non-B Breed	Raise existing dam height and new impoundment on the other side of the lake. Increase SW abstraction from existing Lake Coolacknick impoundment and WTP upgrade. European site is within Zone of Influence of the study area. **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).	Raise existing dam height and new impoundment on the other side of the lake. Increase SW abstraction from existing Lake Coolacknick impoundment and WTP upgrade. European site is within Zone of Influence of the study area. 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 D4.23: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with grouped option TG1-SAD-541 (TG1-SAD-195, TG1-SAD-196) 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		
Cregduff Lough SAC (001251)	0m	**Annex I habitats:** Transition mires and quaking bogs [7140] **Annex II species:** *Najas flexilis* (Slender Naiad) [1833]	New SW abstraction from Lough Skannive, upgrade existing WTP and upgrade existing Carna Kilkieran WTP. Rationalise to Carna Kilkieran. Option study area is within and hydrologically linked to this European site (new pump and mains adjacent to SAC). **Physical loss of habitats/supporting habitat –** There is potential for some loss of/damage to supporting habitats of QI species during construction works given that the works are within the SAC. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect slender naiad and hydrologically connected habitats.	New SW abstraction from Lough Skannive, upgrade existing WTP and upgrade existing Carna Kilkieran WTP. Rationalise to Carna Kilkieran. Option study area is within and hydrologically linked to this European site (new pump and mains adjacent to SAC). 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**
Slyne Head Peninsula SAC (002074)	0m	**Annex I habitats:** Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220]	Option study area is within and hydrologically linked to this European site (decommission WTP, new mains). **Physical loss of habitats/supporting habitat –** There is potential for some loss of/damage to supporting habitats of QI	Option study area is within and hydrologically linked to this European site (decommission WTP, new mains). 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		
		Atlantic salt meadows (*Glauco-Puccinellietalia maritimae)* [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Machairs (* in Ireland) [21A0] Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. [3140] European dry heaths [4030] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) [6510] Alkaline fens [7230] **Annex II species:** *Tursiops truncatus* (Common Bottlenose Dolphin) [1349] *Petalophyllum ralfsii* (Petalwort) [1395] *Najas flexilis* (Slender Naiad) [1833]	species during construction works given that the works are within the SAC. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species, such as slender naiad, and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species from construction works.			
Connemara Bog Complex SAC (002034)	0m	**Annex I habitats:** Coastal lagoons [1150] Reefs [1170] Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Natural dystrophic lakes and ponds [3160] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Northern Atlantic wet heaths with *Erica tetralix* [4010] European dry heaths [4030] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410]	Option study area is within/adjacent and hydrologically linked to this European site (new mains, new pump). **Physical loss of habitats/supporting habitat –** There is potential for some loss of/damage to supporting habitats of QI species during construction works given that the works are within the SAC. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Mortality -** habitat loss and pollution of watercourses during construction (associated with sediment runoff, or accidental spillage) could impact fish and	Option study area is within/adjacent and hydrologically linked to this European site (new mains, new pump). 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		
		Blanket bogs (* if active bog) [7130] Transition mires and quaking bogs [7140] Depressions on peat substrates of the *Rhynchosporion* [7150] Alkaline fens [7230] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] **Annex II species:** *Euphydryas aurinia* (Marsh Fritillary) [1065] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Najas flexilis* (Slender Naiad) [1833]	restrict access to spawning habitat effecting QI species and their prey. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and other QI species from construction works.			
Kilkieran Bay and Islands SAC (002111)	670m	**Annex I habitats:** Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Machairs (* in Ireland) [21A0] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) [6510] **Annex II species:** *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365] *Najas flexilis* (Slender Naiad) [1833]	Option study area is hydrologically linked and close to this European site (new mains, new SW abstraction, WTP upgrade). **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected 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 in close proximity to the SAC boundary.	Option study area is hydrologically linked and close to this European site (new mains, new SW abstraction, WTP upgrade). **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats. **Water table/availability** - There is potential for impacts on QI species 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** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D4.24: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with grouped option TG1-SAD-541 (TG1-SAD-195, TG1-SAD-196) 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		
Connemara Bog Complex SPA (004181)	0m	Cormorant (*Phalacrocorax carbo*) [A017] Merlin (*Falco columbarius*) [A098] Golden Plover (*Pluvialis apricaria*) [A140] Common Gull (*Larus canus*) [A182]	Breed Breed Breed Breed	New SW abstraction from Lough Skannive, upgrade existing WTP and upgrade existing Carna Kilkieran WTP. Rationalise to Carna Kilkieran. Option study area is	New SW abstraction from Lough Skannive, upgrade existing WTP and upgrade existing Carna Kilkieran WTP. Rationalise to Carna Kilkieran. Option study area is within/adjacent 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		
				within/adjacent and hydrologically linked to this European site (new mains, new pump). **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 QI birds. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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 birds given the study area is adjacent to the SPA and 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).	hydrologically linked to this European site (new mains, new pump). No operational impacts are predicted.	With the implementation of mitigation as noted above there is no potential for AESI	
Slyne Head to Ardmore Point Islands SPA (004159)	670m	Barnacle Goose (*Branta leucopsis*) [A045] Sandwich Tern (*Sterna sandvicensis*) [A191] Arctic Tern (*Sterna paradisaea*) [A194] Little Tern (*Sterna albifrons*) [A195]	Non-B Breed Breed Breed	Option study area is close to this European site (decommission WTP, new mains). **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).	Option study area is close to this European site (decommission WTP, new mains). 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**
Cruagh Island SPA (004170)	12.5km	Manx Shearwater (*Puffinus puffinus*) [A013] Barnacle Goose (*Branta leucopsis*) [A045]	Breed Non-B	European site is within Zone of Influence of the study area. **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).	European site is within Zone of Influence of the study area. 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**
High Island, Inishshark and Davillaun SPA (004144)	16.7km	Fulmar (*Fulmarus glacialis*) [A009] Barnacle Goose (*Branta leucopsis*) [A045] Arctic Tern (*Sterna paradisaea*) [A194]	Breed Non-B Breed	European site is within Zone of Influence of the study area. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of	European site is within Zone of Influence of the study area. 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	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
				the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).			

Table D4.25: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with grouped option TG1-SAD-543 (TG1-SAD-199, TG1-SAD-200, TG1-SAD-201, TG1-SAD-202) 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		
Connemara Bog Complex SAC (002034)	0m	**Annex I habitats:** Coastal lagoons [1150] Reefs [1170] Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Natural dystrophic lakes and ponds [3160] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Northern Atlantic wet heaths with *Erica tetralix* [4010] European dry heaths [4030] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Blanket bogs (* if active bog) [7130] Transition mires and quaking bogs [7140] Depressions on peat substrates of the *Rhynchosporion* [7150] Alkaline fens [7230] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] **Annex II species:** *Euphydryas aurinia* (Marsh Fritillary) [1065] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Najas flexilis* (Slender Naiad) [1833]	Increase existing SW abstraction from Lough Bouliska and connect with neighbouring WRZs. Rationalise Carraroe to Spiddal (Lough Bouliska). Rationalise Rosmuc to Spiddal (Lough Bouliska). Rationalise to Spiddal (Lough Bouliska). Option study area is within/adjacent to and hydrologically linked to this European site (increase SW abstraction, new mains, upgrade WTP, new pumps, new storage, decommission WTP). **Physical loss of habitats/supporting habitat –** There is potential for some loss of/damage to 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 fish and restrict access to spawning habitat effecting 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 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 existing SW abstraction from Lough Bouliska and connect with neighbouring WRZs. Rationalise Carraroe to Spiddal (Lough Bouliska). Rationalise Rosmuc to Spiddal (Lough Bouliska). Rationalise to Spiddal (Lough Bouliska). Option study area is within/adjacent to and hydrologically linked to this European site (increase SW abstraction, new mains, upgrade WTP, new pumps, new storage, decommission WTP). **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats. **Water table/availability** - There is potential for impacts on QI species 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** 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		
Kilkieran Bay and Islands SAC (002111)	0m	**Annex I habitats:** Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Machairs (* in Ireland) [21A0] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) [6510] **Annex II species:** *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365] *Najas flexilis* (Slender Naiad) [1833]	Option study area is within/adjacent to and hydrologically linked to this European site (new mains, new storage, decommission WTP). New watermains run along seafloor in this European site. **Physical loss of habitats/supporting habitat –** There is potential for some loss of/damage to 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 fish and restrict access to spawning habitat effecting 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 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.	Option study area is within/adjacent to and hydrologically linked to this European site (new mains, new storage, decommission WTP). New watermains run along seafloor in 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 D4.26: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with grouped option TG1-SAD-543 (TG1-SAD-199, TG1-SAD-200, TG1-SAD-201, TG1-SAD-202) 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		
Connemara Bog Complex SPA (004181)	0m	Cormorant (*Phalacrocorax carbo*) [A017] Merlin (*Falco columbarius*) [A098] Golden Plover (*Pluvialis apricaria*) [A140] Common Gull (*Larus canus*) [A182]	Breed Breed Breed Breed	Increase existing SW abstraction from Lough Bouliska and connect with neighbouring WRZs. Rationalise Carraroe to Spiddal (Lough Bouliska). Rationalise Rosmuc to Spiddal (Lough Bouliska). Rationalise to Spiddal (Lough Bouliska). Option study area is within/adjacent to this European site (new mains in SPA, increase SW abstraction, WTP upgrade near SPA). **Physical loss of habitats/supporting habitat –** There is potential for some loss of/damage to protected sites and	Increase existing SW abstraction from Lough Bouliska and connect with neighbouring WRZs. Rationalise Carraroe to Spiddal (Lough Bouliska). Rationalise Rosmuc to Spiddal (Lough Bouliska). Rationalise to Spiddal (Lough Bouliska). Option study area is within/adjacent to this European site (new mains in SPA, increase SW abstraction, WTP upgrade near SPA). 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	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
				supporting habitats (e.g. foraging habitats) during construction works given that the works are within and adjacent to SPA boundary impacting QI birds. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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 birds given the study area is adjacent to the SPA and 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).			
Slyne Head to Ardmore Point Islands SPA (004159)	7km	Barnacle Goose (*Branta leucopsis*) [A045] Sandwich Tern (*Sterna sandvicensis*) [A191] Arctic Tern (*Sterna paradisaea*) [A194] Little Tern (*Sterna albifrons*) [A195]	Non-B Breed Breed Breed	European site is within Zone of Influence of the study area. **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).	European site is within Zone of Influence of the study area. 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**
Inner Galway Bay SPA (004031)	11.7km	Black-throated Diver (*Gavia arctica*) [A002] Great Northern Diver (*Gavia immer*) [A003] Cormorant (*Phalacrocorax carbo*) [A017] Grey Heron (*Ardea cinerea*) [A028] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Red-breasted Merganser (*Mergus serrator*) [A069] Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140] Lapwing (*Vanellus vanellus*) [A142] Dunlin (*Calidris alpina*) [A149] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162]	N/A Non-B Breed 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	European site is within Zone of Influence of the study area. **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).	European site is within Zone of Influence of the study area. 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	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
		Turnstone (*Arenaria interpres*) [A169] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Sandwich Tern (*Sterna sandvicensis*) [A191] Common Tern (*Sterna hirundo*) [A193] Wetland and Waterbirds [A999]	Non-B Non-B Non-B Breed Breed				
Lough Corrib SPA (004042)	13km	Gadwall (*Anas strepera*) [A051] Shoveler (*Anas clypeata*) [A056] Pochard (*Aythya ferina*) [A059] Tufted Duck (*Aythya fuligula*) [A061] Common Scoter (*Melanitta nigra*) [A065] Hen Harrier (*Circus cyaneus*) [A082] Coot (*Fulica atra*) [A125] Golden Plover (*Pluvialis apricaria*) [A140] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Common Tern (*Sterna hirundo*) [A193] Arctic Tern (*Sterna paradisaea*) [A194] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-B Non-B Non-B Non-B Non-B Breed Non-B Non-B Non-B Breed Breed Breed Breed	European site is within Zone of Influence of the study area. **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).	European site is within Zone of Influence of the study area. 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 D4.27: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with grouped option TG1-SAD-545 (TG1-SAD-209, TG1-SAD-210, TG1-SAD-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		
Maumturk Mountains SAC (002008)	0m	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Northern Atlantic wet heaths with *Erica tetralix* [4010] Alpine and Boreal heaths [4060] Blanket bogs (* if active bog) [7130] Depressions on peat substrates of the *Rhynchosporion* [7150] Siliceous rocky slopes with chasmophytic vegetation [8220] **Annex II species:** *Salmo salar* (Salmon) [1106] *Najas flexilis* (Slender Naiad) [1833]	New Connemara Regional Water Supply Scheme (RWSS) (Kylemore Lough). Option study area is within/adjacent to this European site (new mains, new storage, decommission WTP). **Physical loss of habitats/supporting habitat –** There is potential for some loss of/damage to 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	New Connemara Regional Water Supply Scheme (RWSS) (Kylemore Lough). Option study area is within/adjacent to this European site (new mains, new storage, decommission WTP). 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		
			sediment runoff, or accidental spillage) could impact fish and restrict access to spawning habitat effecting QI species. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.			
The Twelve Bens/Garraun Complex SAC (002031)	0m	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Alpine and Boreal heaths [4060] Blanket bogs (* if active bog) [7130] Depressions on peat substrates of the *Rhynchosporion* [7150] Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) [8110] Calcareous rocky slopes with chasmophytic vegetation [8210] Siliceous rocky slopes with chasmophytic vegetation [8220] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] **Annex II species:** *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Najas flexilis* (Slender Naiad) [1833]	Option study area is within this European site (new SW abstraction, new pumps, new storage, new WTP, new mains, decommission WTP). Within the FWPM catchment. **Physical loss of habitats/supporting habitat –** There is potential for some loss of/damage to supporting habitats of QI species during construction works given that the works are within the SAC and within the FWPM catchment. **Mortality -** habitat loss and pollution of water courses during construction (associated with sediment runoff, or accidental spillage) could impact fish, restrict access to spawning habitat and smother freshwater pearl mussel. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats (linked to FWPM catchment). **Disturbance (including biological disturbance) -** there is potential for disturbance to otter, FWPM 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.	Option study area is within this European site (new SW abstraction, new pumps, new storage, new WTP, new mains, decommission WTP). Within the FWPM catchment. **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats. **Water table/availability** - There is potential for impacts on otter, FWPM and other QI species 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** • Option Specific Measures as in **Section 6.3.4** • Hydrological modelling as in **Section 6.3.5** The pipelines associated with this option will cross this European site. For SAC river crossings it is assumed that the least impactful solution will always be employed, for example, directional drilling beneath the river rather than open cut. *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.* 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	**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		
					should be carried out during the period July-September (except in exceptional circumstances and with agreement with IFI). With the implementation of mitigation as noted above there is no potential for AESI	
West Connacht Coast SAC (002998)	45m	**Annex II species:** *Tursiops truncatus* (Common Bottlenose Dolphin) [1349]	Option study area is adjacent to this European site (new mains, decommission WTP). **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species from construction works.	Option study area is adjacent to this European site (new mains, decommission WTP). 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 D4.28: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with grouped option TG1-SAD-545 (TG1-SAD-209, TG1-SAD-210, TG1-SAD-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		
Illaunnanoon SPA (004221)	770m	Sandwich Tern (*Sterna sandvicensis*) [A191]	Breed	New Connemara Regional Water Supply Scheme (RWSS) (Kylemore Lough). Option study area is in close proximity to this European site (new mains, new pump, decommission WTP). **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds given the study area is in close proximity to the SPA.	New Connemara Regional Water Supply Scheme (RWSS) (Kylemore Lough). Option study area is in close proximity to this European site (new mains, new pump, decommission WTP). 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**
Cruagh Island SPA (004170)	5.9km	Manx Shearwater (*Puffinus puffinus*) [A013] Barnacle Goose (*Branta leucopsis*) [A045]	Breed Non-B	European site is within Zone of Influence of the study area. **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).	European site is within Zone of Influence of the study area. 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**
High Island, Inishshark and Davillaun SPA (004144)	8.5km	Fulmar (*Fulmarus glacialis*) [A009] Barnacle Goose (*Branta leucopsis*) [A045] Arctic Tern (*Sterna paradisaea*) [A194]	Breed Non-B Breed	European site is within Zone of Influence of the study area. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI birds using habitats situated within the immediate	European site is within Zone of Influence of the study area. 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	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
				hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).			
Lough Mask SPA (004062)	12.1km	Tufted Duck (*Aythya fuligula*) [A061] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Lesser Black-backed Gull (*Larus fuscus*) [A183] Common Tern (*Sterna hirundo*) [A193] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-B Non-B Breed Breed Breed Breed	European site is within Zone of Influence of the study area. **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).	European site is within Zone of Influence of the study area. 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**
Slyne Head to Ardmore Point Islands SPA (004159)	13km	Barnacle Goose (*Branta leucopsis*) [A045] Sandwich Tern (*Sterna sandvicensis*) [A191] Arctic Tern (*Sterna paradisaea*) [A194] Little Tern (*Sterna albifrons*) [A195]	Non-B Breed Breed Breed	European site is within Zone of Influence of the study area. **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).	European site is within Zone of Influence of the study area. 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**
Lough Corrib SPA (004042)	13.5km	Gadwall (*Anas strepera*) [A051] Shoveler (*Anas clypeata*) [A056] Pochard (*Aythya ferina*) [A059] Tufted Duck (*Aythya fuligula*) [A061] Common Scoter (*Melanitta nigra*) [A065] Hen Harrier (*Circus cyaneus*) [A082] Coot (*Fulica atra*) [A125] Golden Plover (*Pluvialis apricaria*) [A140] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Common Tern (*Sterna hirundo*) [A193] Arctic Tern (*Sterna paradisaea*) [A194] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-B Non-B Non-B Non-B Non-B Breed Non-B Non-B Non-B Breed Breed Breed Breed	European site is within Zone of Influence of the study area. **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).	European site is within Zone of Influence of the study area. 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 D4.29: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with grouped option TG1-SAD-548 (TG1-SAD-217, TG1-SAD-218) 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		
Lough Carra/Mask Complex SAC (001774)	0m	**Annex I habitats:** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140] European dry heaths [4030] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] Alkaline fens [7230] Limestone pavements [8240] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0] **Annex II species:** *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] *Lutra lutra* (Otter) [1355] *Hamatocaulis vernicosus* (Slender Green Feather-moss) [6216]	Rationalise Louisburgh via new Community/GWS being developed to take water from Westport to Murrisk. Increase SW abstraction from existing Lough Mask and upgrade Tourmakeady WTP. Option study area is within and hydrologically linked this European site (increase SW abstraction, upgrade WTP). **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.	Rationalise Louisburgh via new Community/GWS being developed to take water from Westport to Murrisk. Increase SW abstraction from existing Lough Mask and upgrade Tourmakeady WTP. Option study area is within and hydrologically linked this European site (increase SW abstraction, upgrade WTP). **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic QI species or habitats. **Water table/availability** - There is potential for impacts on QI species 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** With the implementation of mitigation as noted above there is no potential for AESI	**N**
Clew Bay Complex SAC (001482)	45m	**Annex I habitats:** Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Machairs (* in Ireland) [21A0] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] **Annex II species:** *Vertigo geyeri* (Geyer's Whorl Snail) [1013] *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365]	Option study area is adjacent and hydrologically linked to this European site (new mains). **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect QI species and hydrologically connected habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to otter from construction works. There is also potential for the spread of invasive species given that the works are adjacent to the SAC boundary.	Option study area is adjacent and hydrologically linked to this European site (new mains). 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 D4.30: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with grouped option TG1-SAD-548 (TG1-SAD-217, TG1-SAD-218) 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		
Lough Mask SPA (004062)	0m	Tufted Duck (*Aythya fuligula*) [A061] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Lesser Black-backed Gull (*Larus fuscus*) [A183] Common Tern (*Sterna hirundo*) [A193] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-b Non-b Breed Breed Breed Breed	Rationalise Louisburgh via new Community/GWS being developed to take water from Westport to Murrisk. Increase SW abstraction from existing Lough Mask and upgrade Tourmakeady WTP. Option study area is within and hydrologically linked this European site (increase SW abstraction, upgrade WTP). **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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 birds given the study area is within the SPA and 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).	Rationalise Louisburgh via new Community/GWS being developed to take water from Westport to Murrisk. Increase SW abstraction from existing Lough Mask and upgrade Tourmakeady WTP. Option study area is within and hydrologically linked this European site (increase SW abstraction, upgrade WTP). **Habitat degradation – hydrological/ hydrogeological changes -** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact QI species. **Water table/availability -** There is potential for impacts on QI birds or prey species 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** With the implementation of mitigation as noted above there is no potential for AESI	**N**
Lough Corrib SPA (004042)	16.3km	Gadwall (*Anas strepera*) [A051] Shoveler (*Anas clypeata*) [A056] Pochard (*Aythya ferina*) [A059] Tufted Duck (*Aythya fuligula*) [A061] Common Scoter (*Melanitta nigra*) [A065] Hen Harrier (*Circus cyaneus*) [A082] Coot (*Fulica atra*) [A125] Golden Plover (*Pluvialis apricaria*) [A140] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Common Tern (*Sterna hirundo*) [A193] Arctic Tern (*Sterna paradisaea*) [A194] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-B Non-B Non-B Non-B Non-B Breed Non-B Non-B Non-B Breed Breed Breed Breed	European site is within Zone of Influence of the study area. **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).	European site is within Zone of Influence of the study area. 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**

Note: Anywhere the Carlingford Lough SPA based in Northern Ireland is mentioned, both the Carlingford Lough SPA and the Carlingford Marine SPA are implied.
Preferred Approach options TG1-SAE-021, TG1-SAE-024, TG1-SAE-033, TG1-SAE-050b, TG1-SAE-052, TG1-SAE-061, TG1-SAE-513 are not listed below as no LSEs were identified for these options.

Table D5.01: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAE-001 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		
Dundalk Bay SAC (000455)	200m	**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]	Increase abstraction from the river Fane and upgrade WTPs, and new watermains hydrologically linked to the European site. New storage is in close proximity to the European site, however there is no hydrological link. Option study area is 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, such as estuaries and mudflats and sandflats not coveed by seawater at low tide.	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 D5.02: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAE-001 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		
Dundalk Bay SPA (000455)	200m	Great Crested Grebe (*Podiceps cristatus*) [A005] Greylag Goose (*Anser anser*) [A043] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Teal (*Anas crecca*) [A052] Mallard (*Anas platyrhynchos*) [A053] Pintail (*Anas acuta*) [A054] Common Scoter (*Melanitta nigra*) [A065] Red-breasted Merganser (*Mergus serrator*) [A069] Oystercatcher (*Haematopus ostralegus*) [A130] 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]	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	Increase abstraction from the river Fane and upgrade WTPs, and new watermains hydrologically linked to the European site. New storage is in close proximity to the European site, however there is no hydrological link. Option study area is hydrologically linked 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 ecologically connected to it (e.g. grassland, arable farmland).	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	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] Common Gull (*Larus canus*) [A182] Herring Gull (*Larus argentatus*) [A184] Wetland and Waterbirds [A999]	Non-B Non-B Non-B Non-B Non-B				
Carlingford Lough SPA (004078)	700m	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Wetland and Waterbirds [A999]	Non-B	Upgrade WTPs and new storage in close proximity to the European site. Option study area is in close proximity to the 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).	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**
Carlingford Lough SPA (NI) (UK9020160)	3.5km	Sandwich Tern (*Sterna sandvicensis*) [A91] Common Tern (*Sterna hirundo*) [A193] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]	Breed Non-B	Upgrade WTPs and new storage in close proximity to the European site. Option study area is in close proximity to the 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).	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**
Stabannan-Braganstown SPA (004091)	6km	Greylag Goose (*Anser anser*) [A043]	Non-B	Abandon WTP hydrologically linked to the European site, new pump, storage and watermains in close proximity to the European site. Option study area is in close proximity 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 ecologically connected to it (e.g. grassland, arable farmland).	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 D5.03: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAE-508 (TG1-SAE-049, TG1-SAE-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		
River Boyne and River Blackwater SAC (002299)	100m	**Annex I habitats:** Alkaline fens [7230] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0] **Annex II species:** *Lampetra fluviatilis* (River Lamprey) [1099] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	Decommission WTP and new watermains crossing a hydrological link to the European site. Option study area 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 supporting habitats. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species such as otter from construction works. There is also potential for the spread of invasive species given that the works are close to the SAC boundary.	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 D5.04: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAE-508 (TG1-SAE-049, TG1-SAE-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		
River Boyne and River Blackwater SPA (004232)	100m	Kingfisher (*Alcedo atthis*) [A229]	Breed	Decommission WTP and new watermains crossing a hydrological link to the European site. Option study area is hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of watercourses during construction that could impact on the habitat 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 birds using habitats situated within the immediate hinterland of	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 SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).			
Dundalk Bay SPA (000455)	14km	Great Crested Grebe (*Podiceps cristatus*) [A005] Greylag Goose (*Anser anser*) [A043] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Teal (*Anas crecca*) [A052] Mallard (*Anas platyrhynchos*) [A053] Pintail (*Anas acuta*) [A054] Common Scoter (*Melanitta nigra*) [A065] Red-breasted Merganser (*Mergus serrator*) [A069] Oystercatcher (*Haematopus ostralegus*) [A130] 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] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Herring Gull (*Larus argentatus*) [A184] Wetland and Waterbirds [A999]	Non-B Non-B	Decommission WTP in close proximity to the European site. New GW abstraction, new storage and upgrade WTP hydrologically linked to the European site. Option study area is hydrologically linked 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 ecologically connected to it (e.g. grassland, arable farmland).	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**

Preferred Approach options TG1-SAF-068, TG1-SAF-072, TG1-SAF-147, TG1-SAF-150, TG1-SAF-161 and TG1-SAF-529 (TG1-SAF-066, TG1-SAF-128) are not listed below as no LSEs were identified for these options.

Table D6.01: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAF-009 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		
Lough Forbes Complex SAC (001818)	0m	**Annex I habitats:** Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0]	No impacts predicted given the construction works are outside the European site and there are no hydrological links. SW abstraction is pre-existing, so no construction required.	Increase SW abstraction from Lough Forbes, upgrade WTP and pumps within the European site. New storage in close proximity to the European site Option study area is within this European site. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact aquatic habitats. **Water table/availability** There is potential for impacts to QI habitats 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** With the implementation of mitigation as noted above there is no potential for AESI	**N**

Table D6.02: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAF-009 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		
Ballykenny-Fisherstown Bog SPA (004101)	0m	Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	N/A	Increase SW abstraction from Lough Forbes and upgrade WTP. Option study area is within this European site. **Disturbance (including biological disturbance) -** There is potential for disturbance to QI birds using the SPA, 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).	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**
Lough Ree SPA (004064)	15.1km	Little Grebe (*Tachybaptus ruficollis*) [A004] Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Mallard (*Anas platyrhynchos*) [A053] Shoveler (*Anas clypeata*) [A056] Tufted Duck (*Aythya fuligula*) [A061]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b	New storage in the Zone of Influence of the 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	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	

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		
		Common Scoter (*Melanitta nigra*) [A065] Goldeneye (*Bucephala clangula*) [A067] Coot (*Fulica atra*) [A125] Golden Plover (*Pluvialis apricaria*) [A140] Lapwing (*Vanellus vanellus*) [A142] Common Tern (*Sterna hirundo*) [A193] Wetland and Waterbirds [A999]	Breed Non-b Non-b Non-b Non-b Breed	ecologically connected to it (e.g., grassland, arable farmland).			

Table D6.03: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAF-021 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		
Lough Ree SAC (000440)	700m	**Annex I habitats:** Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Alkaline fens [7230] Limestone pavements [8240] Bog woodland [91D0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0] **Annex II species:** *Lutra lutra* (Otter) [1355]	No impacts predicted given the construction works are outside the European site and there are no hydrological links between construction works and the European site.	New GW abstraction, upgrade Lisreevagh WTP and Newtowncashel WTP, upgrade pumps and upgrade WTP at ESB site. Option study area is in close proximity to this European site. Within ZOC. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact ground water dependent QI habitats such as Active raised bogs, Degraded raised bogs still capable of natural regeneration and Alkaline fens. **Water table/availability** There is potential for impacts on ground water dependent QI habitats utilising groundwater hydrologically linked to this European site through a reduction in 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**
Fortwilliam Turlough SAC (000448)	1.8km	**Annex I habitats:** Turloughs [3180]	No impacts predicted given the construction works are outside the European site and there are no hydrological links between construction works and the European site.	New GW abstraction, upgrade Lisreevagh WTP and Newtowncashel WTP, upgrade pumps and upgrade WTP at ESB site. Option study area is in close proximity to this European site. Within ZOC. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact ground	• 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		
				water dependent QI habitats such as Turloughs. **Water table/availability** There is potential for impacts on ground water dependent QI habitats utilising groundwater hydrologically linked to this European site through a reduction in water levels.		

Table D6.04: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAF-021 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		
Lough Ree SPA (004064)	700m	Little Grebe (*Tachybaptus ruficollis*) [A004] Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Mallard (*Anas platyrhynchos*) [A053] Shoveler (*Anas clypeata*) [A056] Tufted Duck (*Aythya fuligula*) [A061] Common Scoter (*Melanitta nigra*) [A065] Goldeneye (*Bucephala clangula*) [A067] Coot (*Fulica atra*) [A125] Golden Plover (*Pluvialis apricaria*) [A140] Lapwing (*Vanellus vanellus*) [A142] Common Tern (*Sterna hirundo*) [A193] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Breed Non-b Non-b Non-b Non-b Breed	New GW abstraction, upgrade Lisreevagh WTP and Newtowncashel WTP, upgrade pumps and upgrade WTP at ESB site. Option study area is in close proximity to this European site. Within ZOC. **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).	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 D6.05: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAF-030 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		
Lough Kinale and Derragh Lough SPA (004061)	0m	Pochard (*Aythya ferina*) [A059] Tufted Duck (*Aythya fuligula*) [A061] Wetland and Waterbirds [A999]	Non-b Non-b	Increase SW abstraction from Lough Kinale, re-locate existing intake and upgrade WTP. Option study area is within this European site (upgrades and new storage).	Increase SW abstraction from Lough Kinale, re-locate existing intake and upgrade WTP. Option study area is within this European site. **Habitat degradation – hydrological/ hydrogeological**	• General Mitigation Measures are outlined in **Section 6.3.3** • Hydrological modelling as in **Section 6.3.5**	**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		
				Physical loss of habitats/supporting habitat– There is potential for some loss of/damage to supporting habitats of QI birds during construction works given that the works are in close proximity to the SPA. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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 birds using the SPA, 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).	**changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact QI species. **Water table/availability** There is potential for impacts on QI birds or prey species utilising watercourses hydrologically linked to this European site through a reduction in flows/water levels.	With the implementation of mitigation as noted above there is no potential for AESI	
Lough Sheelin SPA (004065)	2.9km	Great Crested Grebe (*Podiceps cristatus*) [A005] Pochard (*Aythya ferina*) [A059] Tufted Duck (*Aythya fuligula*) [A061] Goldeneye (*Bucephala clangula*) [A067] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b	Increase SW abstraction from Lough Kinale, re-locate existing intake, upgrade WTP and pumps and new storage. Option study area is in close proximity 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 ecologically connected to it (e.g., grassland, arable farmland).	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**
Lough Derravarragh SPA (004043)	11.2km	Whooper Swan (*Cygnus cygnus*) [A038] Pochard (*Aythya ferina*) [A059] Tufted Duck (*Aythya fuligula*) [A061] Coot (*Fulica atra*) [A125] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b	Increase SW abstraction from Lough Kinale, re-locate existing intake, upgrade WTP and pumps and new storage. Option study area is in close proximity to this European site. **Disturbance (including biological disturbance) -** There is potential for disturbance to QI birds using habitats situated	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		
				within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g., grassland, arable farmland).			
Garriskil Bog SPA (004102)	13.2km	Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	N/A	Increase SW abstraction from Lough Kinale, re-locate existing intake, upgrade WTP and pumps and new storage. Option study area is in close proximity 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 ecologically connected to it (e.g., grassland, arable farmland).	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 D6.06: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAF-038 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		
Lough Ree SAC (000440)	1.5km	**Annex I habitats:** Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Alkaline fens [7230] Limestone pavements [8240] Bog woodland [91D0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0] **Annex II species:** *Lutra lutra* (Otter) [1355]	Upgrade Ballinagard Springs and Toberdan WTP. Option study area 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 **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species using areas outside the SAC but ecologically connected to it from construction works.	Upgrade Ballinagard Springs and Toberdan WTP. Option study area 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**

Table D6.07: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAF-038 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		
Lough Ree SPA (004064)	2km	Little Grebe (*Tachybaptus ruficollis*) [A004] Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Mallard (*Anas platyrhynchos*) [A053] Shoveler (*Anas clypeata*) [A056] Tufted Duck (*Aythya fuligula*) [A061] Common Scoter (*Melanitta nigra*) [A065] Goldeneye (*Bucephala clangula*) [A067] Coot (*Fulica atra*) [A125] Golden Plover (*Pluvialis apricaria*) [A140] Lapwing (*Vanellus vanellus*) [A142] Common Tern (*Sterna hirundo*) [A193] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Non-b Breed Non-b Non-b Non-b Non-b Breed	Upgrade Ballinagard Springs and Toberdan WTP. Option study area is hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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 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).	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**
River Suck Callows SPA (004097)	5.2km	Whooper Swan (*Cygnus cygnus*) [A038] 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 Non-b	Upgrade Ballinagard Springs, Toberdan and Toberreoge WTP. New storage. Option study area is in close proximity 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 ecologically connected to it (e.g., grassland, arable farmland).	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 D6.08: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAF-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		
Corliskea/ Trien/ Cloonfelliv Bog SAC (002110)	3.8km	**Annex I habitats:** Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150] Bog woodland [91D0]	Increase GW abstraction at Longford Springs to supply deficit and upgrade WTP. Option study area is in close proximity to this European site. Hydrologically linked: overlying the same karstic aquifer. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect hydrologically connected QI habitats	Increase GW abstraction at Longford Springs to supply deficit and upgrade WTP. Option study area is in close proximity to this European site. Hydrologically linked: overlying the same karstic aquifer. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact ground water dependent QI habitats such as Active raised bogs, Degraded raised bogs still capable of natural regeneration and Bog woodland. **Water table/availability** - There is potential for impacts on ground water dependent QI habitats utilising groundwater hydrologically linked to this European site through a reduction in 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 D6.09: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAF-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		
Callow Bog SAC (000595)	0m	**Annex I habitats:** Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150]	New watermains within the European site, Decommission the existing abstraction, new SW abstraction, upgrade Lough Gara WTP, upgrade storage and upgrade pumps adjacent to the European site. Option study area is within and adjacent to this European site. **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to QI habitats during construction works given that the works are in close proximity to the SAC. **Disturbance (including biological disturbance) -** There is also potential for the spread of invasive species given	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		
			that the works are adjacent to the SAC boundary			

Table D6.10: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAF-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		
Lough Gara SPA (004048)	0m	Whooper Swan (*Cygnus cygnus*) [A038] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	Non-b Non-b	Decommission the existing abstraction, new SW abstraction, upgrade Lough Gara WTP, upgrade storage, upgrade pumps and new watermains within the European site. Option study area is within this European site. **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to supporting habitats of QI birds during construction works given that the works are in close proximity to the SPA. **Disturbance (including biological disturbance) -** There is potential for disturbance to QI birds using the SPA, 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).	No operational impacts are predicted.	• 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**
Bellanagare Bog SPA (004105)	4.4km	Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	N/A	New watermains in close proximity to the 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).	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 D6.11: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAF-084 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		
Carrownagappul Bog SAC (001242)	4.2km	**Annex I habitats:** Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150]	No construction impacts predicted given the works proposed.	Increase GW abstraction for Mountbellew WRZ to supply deficit, decommission Ballygar WTP. Option study area is in close proximity to this European site. Hydrologically linked: overlying the same karstic aquifer. **Habitat degradation – hydrological/ hydrogeological changes- -** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact ground water dependent QI habitats such as Active raised bogs and Degraded raised bogs still capable of natural regeneration. **Water table/availability** There is potential for impacts to QI habitats hydrologically 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 D6.12: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAF-084 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 Suck Callows SPA (004097)	1.8km	Whooper Swan (*Cygnus cygnus*) [A038] 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 Non-b	Increase GW abstraction for Mountbellew WRZ to supply deficit, decommission Ballygar WTP. Option study area is hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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	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		
				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).			
Four Roads Turlough SPA (004140)	5km	Golden Plover (*Pluvialis apricaria*) [A140] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	Non-b Non-b	New watermains and Ballygar WTP will be decommissioned. Option study area is in close proximity 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 ecologically connected to it (e.g., grassland, arable farmland).	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**
Lough Croan Turlough SPA (004139)	8.7km	Shoveler (*Anas clypeata*) [A056] Golden Plover (*Pluvialis apricaria*) [A140] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]	N/A	New watermains and Ballygar WTP will be decommissioned. Option study area is in close proximity 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 ecologically connected to it (e.g., grassland, arable farmland).	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 D6.13: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with grouped option TG1-SAF-534 (TG1-SAF-081, TG1-SAF-133) 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		
Lough Corrib SAC (000297)	300m	**<u>Annex I habitats:</u>** Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. [3140]	Increase GW abstraction at Gortgarrow Spring, upgrade WTP and upgrade pump. Option study area is hydrologically linked to this European site, within ZOC. **Habitat degradation – changes in water quality**	Increase GW abstraction at Gortgarrow Spring, upgrade WTP and upgrade pump. Option study area is hydrologically linked to this European site, within ZOC. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could	• 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		
		Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Alkaline fens [7230] Limestone pavements [8240] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Bog woodland [91D0] **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] *Salmo salar* (Salmon) [1106] *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] *Lutra lutra* (Otter) [1355] *Najas flexilis* (Slender Naiad) [1833] *Hamatocaulis vernicosus* (Slender Green Feather-moss) [6216]	**(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 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	lead to hydrological changes (reduced flows – impacting on water quality) that could impact ground water dependent QI habitats such as Active raised bogs, Degraded raised bogs still capable of natural regeneration, Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*, Petrifying springs with tufa formation, Alkaline fens and bog woodland. **Water table/availability** There is potential for impacts on ground water dependent QI habitats utilising groundwater hydrologically linked to this European site through a reduction in water levels.		
Shankill West Bog SAC (000326)	330m	**Annex I habitats:** Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150]	New watermains crosses a hydrological link to the European site. Option study area is 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	No operational impacts are predicted as the GW abstraction is outside the ZOC for 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**

Table D6.14: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with grouped option TG1-SAF-534 (TG1-SAF-081, TG1-SAF-133) 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 Suck Callows SPA (004097)	16.2km	Whooper Swan (*Cygnus cygnus*) [A038] 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 Non-b	Increase the existing SW abstraction, upgrade Smear WTP and Mountbellew WTP, new storage new pump, new watermains and replace an existing pump. **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).	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**

D7.01: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAG-001 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		
East Burren Complex SAC (001926)	0m	**Annex I habitats:** Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. [3140] Turloughs [3180] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Alpine and Boreal heaths [4060] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Calaminarian grasslands of the *Violetalia calaminariae* [6130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Alkaline fens [7230] Limestone pavements [8240] Caves not open to the public [8310] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species:** *Euphydryas aurinia* (Marsh Fritillary) [1065] *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] *Lutra lutra* (Otter) [1355]	Increase the existing GW abstraction at Kilkeedy BH, upgrade Kilkeedy WTP and new storage. Option study area is within this European site within ZOC. Within LHS foraging range. **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to QI habitats and supporting habitats of QI species during construction works given that the works are within the SAC. Within lesser horseshoe bat (LHS) 2.5km core foraging range. Vegetation, clearance associated with the works could sever important commuting routes for LHS bats commuting between their roost site in the SAC and foraging areas. This would require further assessment to ensure impacts are avoided. **Mortality-** habitat loss and construction work (associated with sediment runoff, or accidental spillage) could impact species and restrict access to breeding habitat effecting QI species, in particular Marsh Fritillary which is mapped in close proximity to the study area. **Disturbance (including biological disturbance) -** there is potential for disturbance to QI species such as bats from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.	Increase the existing GW abstraction at Kilkeedy BH, upgrade Kilkeedy WTP and new storage. Option study area is within this European site, within ZOC. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact ground water dependent QI habitats such as Turloughs, Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*, Petrifying springs with tufa formation and Alkaline fens. **Water table/availability** There is potential for impacts on ground water dependent QI habitats utilising groundwater hydrologically linked to this European site through a reduction in 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 D7.02: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAG-001 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		
Corofin Wetlands SPA (004220)	6km	Little Grebe (*Tachybaptus ruficollis*) [A004] 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 Non-B	Upgrade Kilkeedy WTP and new storage. Option study area is within the Zone of Influence of this Euopean 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	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	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
				SPA but ecologically connected to it (e.g., grassland, arable farmland).			
Coole-Garryland SPA (004107)	7.7km	Whooper Swan (*Cygnus cygnus*) [A038]	Non-B	Upgrade Kilkeedy WTP and new storage. Option study area is within the Zone of Influence of this Euopean 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).	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 D7.03: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAG-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		
Coole-Garryland Complex SAC (000252)	5km	**Annex I habitats:** Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150] Turloughs [3180] Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation [3270] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Limestone pavements [8240] *Taxus baccata* woods of the British Isles [91J0]	New watermains crosses hydrological link to this European site. Option study area is 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.	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 D7.04: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAG-046 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		
Galway Bay Complex SAC (000268)	300m	**Annex I habitats:** 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] Turloughs [3180] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] Alkaline fens [7230] Limestone pavements [8240] **Annex II species:** *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365]	New GW abstraction at existing site, upgrade Kinvara WTP and the decommission of existing GW abstraction are hydrologically linked to the European site. New storage adjacent to the European site. Option study area is hydrologically linked to this European site and within ZOC. **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 at existing site, upgrade Kinvara WTP and decommissioning of existing GW abstraction are hydrologically linked to the European site. New storage adjacent to the European site. Option study area is hydrologically linked to this European site and within ZOC. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact ground water dependent QI habitats such as Turloughs, Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* and Alkaline fens. **Water table/availability** There is potential for impacts on ground water dependent QI habitats utilising groundwater hydrologically linked to this European site through a reduction in 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**
Caherglassaun Turlough SAC (000238)	2.6km	**Annex I habitats:** Turloughs [3180] Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation [3270] **Annex II species:** *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]	No impacts predicted given works are downstream from the European site. The works lie outside the LHS bat foraging range so there is no potential for impacts to this QI species.	New GW abstraction at existing site, upgrade Kinvara WTP and add a new storage. Existing GW abstraction will be decommissioned. Option study area is within the Zone of Influence of this European site. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact ground water dependent QI habitats such as Turloughs. **Water table/availability** There is potential for impacts on ground water dependent QI habitats utilising groundwater hydrologically linked to this European site through a reduction in 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**
Cahermore Turlough SAC (002294)	2.6km	**Annex I habitats:** Turloughs [3180]	No impacts predicted given distance from site and a lack of any source-	New GW abstraction at existing site. Existing GW abstraction will be decommissioned. Option study area is	• 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		
			pathway-receptor between the construction works and European site.	within the Zone of Influence of this European site. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact ground water dependent QI habitats such as Turloughs. **Water table/availability** There is potential for impacts on ground water dependent QI habitats utilising groundwater hydrologically linked to this European site through a reduction in water levels.	• 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	
East Burren Complex SAC (001926)	3.7km	**Annex I habitats:** Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. [3140] Turloughs [3180] Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation [3260] Alpine and Boreal heaths [4060] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Calaminarian grasslands of the *Violetalia calaminariae* [6130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Alkaline fens [7230] Limestone pavements [8240] Caves not open to the public [8310] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species:** *Euphydryas aurinia* (Marsh Fritillary) [1065] *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] *Lutra lutra* (Otter) [1355]	No impacts predicted given distance from site and a lack of any source-pathway-receptor between the construction works and European site.	New GW abstraction at existing site. Existing GW abstraction will be decommissioned. Option study area is within the Zone of Influence of this European site. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact ground water dependent QI habitats such as Turloughs, Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*, Petrifying springs with tufa formation and Alkaline fens. **Water table/availability** There is potential for impacts on ground water dependent QI habitats utilising groundwater hydrologically linked to this European site through a reduction in 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**
Coole-Garryland Complex SAC (000252)	4.7km	**Annex I habitats:** Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150] Turloughs [3180]	No impacts predicted given a lack of any source-pathway-receptor between the construction works and European site.	New GW abstraction at existing site. Existing GW abstraction will be decommissioned. Option study area is within the Zone of Influence of this European site.	• 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		
		Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation [3270] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Limestone pavements [8240] *Taxus baccata* woods of the British Isles [91J0]		**Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact ground water dependent QI habitats such as Turloughs. **Water table/availability** There is potential for impacts on ground water dependent QI habitats utilising groundwater hydrologically linked to this European site through a reduction in water levels.	With the implementation of mitigation as noted above there is no potential for AESI	

Table D7.05: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAG-046 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		
Inner Galway Bay SPA (004031)	1.7km	Black-throated Diver (*Gavia arctica*) [A002] Great Northern Diver (*Gavia immer*) [A003] Cormorant (*Phalacrocorax carbo*) [A017] Grey Heron (*Ardea cinerea*) [A028] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Red-breasted Merganser (*Mergus serrator*) [A069] Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140] Lapwing (*Vanellus vanellus*) [A142] Dunlin (*Calidris alpina*) [A149] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Turnstone (*Arenaria interpres*) [A169] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Sandwich Tern (*Sterna sandvicensis*) [A191] Common Tern (*Sterna hirundo*) [A193] Wetland and Waterbirds [A999]	N/A Non-B Breed 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 Breed Breed	New GW abstraction at existing site, upgrade Kinvara WTP and add a new storage. Existing GW abstraction will be decommissioned. Option study area is hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of watercourse during construction that could impact on the hydrologically linked waterbodies and wetland 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 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).	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**
Coole-Garryland SPA (004107)	4.7km	Whooper Swan (*Cygnus cygnus*) [A038]	Non-B	New GW abstraction at existing site, upgrade Kinvara WTP and add a new storage. Existing GW abstraction will be decommissioned. Option study	No operational impacts are predicted.	• 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		
				area is within the Zone of Influence 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).		With the implementation of mitigation as noted above there is no potential for AESI	
Corofin Wetlands SPA (004220)	17.4km	Little Grebe (*Tachybaptus ruficollis*) [A004] 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 Non-B	New GW abstraction at existing site, upgrade Kinvara WTP and add a new storage. Existing GW abstraction will be decommissioned. Option study area is within the Zone of Influence 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,	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	

Table D7.06: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAG-079 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		
East Burren Complex SAC (001926)	0m	**Annex I habitats:** Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. [3140] Turloughs [3180] Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation [3260] Alpine and Boreal heaths [4060] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Calaminarian grasslands of the *Violetalia calaminariae* [6130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Alkaline fens [7230]	Upgrade Corofin WTP. Option study area is within this European site. Within LHS foraging range. **Habitat degradation – changes in water quality (pollution) -** potential pollution of waterbodies during construction could affect QI species and hydrologically connected QI habitats **Disturbance (including biological disturbance) -** there is potential for disturbance to otter and bats from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.	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		
		Limestone pavements [8240] Caves not open to the public [8310] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species:** *Euphydryas aurinia* (Marsh Fritillary) [1065] *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] *Lutra lutra* (Otter) [1355]				

Table D7.07: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAG-079 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		
Corofin Wetlands SPA (004220)	0m	Little Grebe (*Tachybaptus ruficollis*) [A004] 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 Non-B	Upgrade Corofin WTP. Option study area is adjacent to this European site. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat used by QI bird species. Potential pollution of waterbodies 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 birds using the SPA, 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).	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 D7.08: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAG-501 (TG1-SAG-016, TG1-SAG-057) 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		
Inagh River Estuary SAC (000036)	5m	**Annex I habitats:** *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	New watermain to interconnect Ennistymon and West Clare is adjacent to the European site and Ballymacraven WTP upgrade is hydrologically linked to the European site. Option study area is hydrologically linked and adjacent to this European site. **Habitat degradation – changes in water quality (pollution) -** potential pollution of watercourses during construction could affect hydrologically connected QI habitats **Disturbance (including biological disturbance) -** There is potential for the spread of invasive species given that the works are adjacent to the SAC boundary.	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**
Carrowmore Point to Spanish Point and Islands SAC (001021)	1.6km	**Annex I habitats:** Coastal lagoons [1150] Reefs [1170] Perennial vegetation of stony banks [1220] Petrifying springs with tufa formation (*Cratoneurion*) [7220]	A new pump and new watermain to interconnect Ennistymon and West Clare hydrologically linked to the European site. Option study area is 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**.**	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 D7.09: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAG-501 (TG1-SAG-016, TG1-SAG-057) 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-Clare Coast SPA (004182)	1.6km	Cormorant (*Phalacrocorax carbo*) [A017] Barnacle Goose (*Branta leucopsis*) [A045] Ringed Plover (*Charadrius hiaticula*) [A137] Sanderling (*Calidris alba*) [A144] Purple Sandpiper (*Calidris maritima*) [A148] Dunlin (*Calidris alpina*) [A149] Turnstone (*Arenaria interpres*) [A169] Wetland and Waterbirds [A999]	Breed Non-B Non-B Non-B Non-B Non-B Non-B	A new pump and new watermain to interconnect Ennistymon and West Clare hydrologically linked to the European site. Option study area is hydrologically linked to this European. **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	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	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Mitigation Measure Conclusion	Adverse Effects on Site Integrity (Y/N)
				Construction	Operation		
				outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).			
Coole-Garryland SPA (004107)	11.2km	Whooper Swan (*Cygnus cygnus*) [A038]	Non-B	A new pump is within the Zone of Influence 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).	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 D7.10: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAG-506 (TG1-SAG-36, TG1-SAG-62) 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		
East Burren Complex SAC (001926)	0m	**Annex I habitats:** Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. [3140] Turloughs [3180] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Alpine and Boreal heaths [4060] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Calaminarian grasslands of the *Violetalia calaminariae* [6130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Alkaline fens [7230] Limestone pavements [8240] Caves not open to the public [8310] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] **Annex II species:**	Increase GW abstraction from Turlough BH, upgrade Turlough WTP and decommission Carron WTP within the European site. A new pump is adjacent to the European site. A new watermain runs though and adjacent to the European site. Option study area is within and adjacent to this European site. Within ZOC. **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to supporting habitats of QI species during construction works given that the works are within the SAC. **Disturbance (including biological disturbance) -** There is potential for the spread of invasive species given that the works are within the SAC boundary.	Increase GW abstraction from Turlough BH, upgrade Turlough WTP and decommission Carron WTP within the European site. A new pump is adjacent to the European site. Anew watermain runs though and adjacent to the European site. Option study area is within and adjacent to this European site. Within ZOC. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact ground water dependent QI habitats such as Turloughs, Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*, Petrifying springs with tufa formation and Alkaline fens. **Water table/availability** There is potential for impacts on ground water dependent QI habitats utilising groundwater hydrologically linked to this European site through a reduction in 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		
		Euphydryas aurinia (Marsh Fritillary) [1065] *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] *Lutra lutra* (Otter) [1355]				
Moneen Mountain SAC (000054)	0m	**Annex I habitats:** Turloughs [3180] Alpine and Boreal heaths [4060] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Limestone pavements [8240] **Annex II species:** Euphydryas aurinia (Marsh Fritillary) [1065] *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]	Increase GW abstraction from Turlough BH within the ZOC for the European site. A new watermain runs adjacent to the European site. Option study area is adjacent to this European site. **Disturbance (including biological disturbance) -** There is potential for the spread of invasive species given that the works are adjacent to the SAC boundary.	Increase GW abstraction from Turlough BH within the ZOC for the European site. A new watermain runs adjacent to the European site. Option study area is adjacent to this European site. **Habitat degradation – hydrological/ hydrogeological changes-** Abstraction which could lead to hydrological changes (reduced flows – impacting on water quality) that could impact ground water dependent QI habitats such as Turloughs and Petrifying springs with tufa formation. **Water table/availability** There is potential for impacts on ground water dependent QI habitats utilising groundwater hydrologically linked to this European site through a reduction in 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 D7.11: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAG-506 (TG1-SAG-36, TG1-SAG-62) 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		
Inner Galway Bay SPA (004031)	2.4km	Black-throated Diver (*Gavia arctica*) [A002] Great Northern Diver (*Gavia immer*) [A003] Cormorant (*Phalacrocorax carbo*) [A017] Grey Heron (*Ardea cinerea*) [A028] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Red-breasted Merganser (*Mergus serrator*) [A069] Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140] Lapwing (*Vanellus vanellus*) [A142] Dunlin (*Calidris alpina*) [A149] Bar-tailed Godwit (*Limosa lapponica*) [A157]	N/A Non-B Breed 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 Turlough BH, upgrade Turlough WTP, decommission Carron WTP and new pump and new watermain. Option study area is within the Zone of Influence 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).	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	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] Turnstone (*Arenaria interpres*) [A169] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182] Sandwich Tern (*Sterna sandvicensis*) [A191] Common Tern (*Sterna hirundo*) [A193] Wetland and Waterbirds [A999]	Non-B Non-B Non-B Non-B Non-B Breed Breed				
Corofin Wetlands SPA (004220)	9km	Little Grebe (*Tachybaptus ruficollis*) [A004] 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 Non-B	New pump station. Option study area is within the Zone of Influence 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).	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**
Coole-Garryland SPA (004107)	12.4km	Whooper Swan (*Cygnus cygnus*) [A038]	Non-B	New pump station. Option study area is within the Zone of Influence 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).	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 D7.12: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option TG1-SAG-513 (TG1-SAG-23, TG1-SAG-70) 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]	New watermains crosses the European site and a new pump station is within the European site. Option Study area is within this European site. **Physical loss of habitats/supporting habitat–** There is potential for some loss of/damage to QI habitats and supporting habitats of QI species during construction	No operational impacts are predicted.	• General Mitigation Measures are outlined in **Section 6.3.3** • Option Specific Measures as in **Section 6.3.4** The pipelines associated with this option will cross this European site. For SAC river crossings it is assumed that the least impactful solution will always be employed, for example, directional drilling beneath the river rather than open cut.	**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		
		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]	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 species such as FWPM and restrict access to spawning habitat effecting 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 QI species such as otter from construction works. There is also potential for the spread of invasive species given that the works are within the SAC boundary.		*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.* 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). With the implementation of mitigation as noted above there is no potential for AESI	
Carrowmore Point to Spanish Point and Islands SAC (001021)	8.4km	**Annex I habitats:** Coastal lagoons [1150] Reefs [1170] Perennial vegetation of stony banks [1220] Petrifying springs with tufa formation (*Cratoneurion*) [7220]	Increase SW abstraction from Doo Lough and upgrade existing New Doolough WTP. Decommission Old Doolough WTP. Option Study area is 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 such as coastal lagoons.	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 D7.13: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option TG1-SAG-513 (TG1-SAG-23, TG1-SAG-70) 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)	200m	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	New watermains crosses a hydrological link to the European site and a new pump station is adjacent to the European site. Option Study area is adjacent to and hydrologically linked to this European site. **Habitat degradation – changes in water quality (pollution) -** there is potential for pollution of waterbodies during construction that could impact on the wetland habitat 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 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).	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**
Mid-Clare Coast SPA (004182)	8.4km	Cormorant (*Phalacrocorax carbo*) [A017] Barnacle Goose (*Branta leucopsis*) [A045] Ringed Plover (*Charadrius hiaticula*) [A137] Sanderling (*Calidris alba*) [A144] Purple Sandpiper (*Calidris maritima*) [A148] Dunlin (*Calidris alpina*) [A149] Turnstone (*Arenaria interpres*) [A169] Wetland and Waterbirds [A999]	Breed Non-B Non-B Non-B Non-B Non-B Non-B Non-B	Increase SW abstraction from Doo Lough and upgrade existing New Doolough WTP. Decommission Old Doolough WTP. Option Study area is hydrologically linked 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 ecologically connected to it (e.g., grassland, arable farmland).	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**