

# **N4 Collooney to Castlebaldwin, *Proposed Road Development***

## **APPENDIX NO. 14.2**

### **Hydrological & Hydrogeological Impact Summary**

**PREPARED BY: Minerex Environmental Limited**



## Document Control

Status	Issued For	Signed	Approved
<i>FINAL</i>	<i>Publication</i>	<i>CQ</i>	<i>CQ</i>

No.	Environmental aspect	Phase	Potential impact	Attribute	Feature	Quality/ value	Attribute importance	Impact consequence	Impact magnitude	Impact significance	Mitigation	Impact duration	Residual impact magnitude	Residual impact significance
1	Hydrology	Construction	Reduction in stream water quality	Drainage	Surface water quality in streams	High/ local	High	Minor loss of fishery	Small adverse	Moderate/ slight	Provision of controls within Erosion and Sediment Control Plan and suitably sized crossings & culverts	Temporary	Negligible	Imperceptible
				Conservation areas	Unshin River cSAC pNHA	High/ international	Extremely high	Insufficient magnitude to affect use or integrity of receiving watercourses	Negligible	Imperceptible				
					Lough Arrow cSAC, SPA, pNHA			Moderate sensitivity to changes in water quality	Moderate adverse	Significant				
				Wetland habitats	Toberscanavan Lough	High/ regional	Very high	Insufficient magnitude to affect use or integrity of receiving watercourses	Negligible	Imperceptible				
					Lackagh Fen	High/ regional	Very high							
					Boathole & Lough Corran	High/ regional	Very high							
					Carrowkeel wet woodland	High/ regional	Very high							
					Cuilencroobagh Lough	High/ local	High							
					Aghalenane & Ardloy Lough Fen	High/ international	Extremely high							
					Tawnagh Lake Swallow hole complex	High/ regional	Very high							
Fisheries value	Surface water quality	Medium	Medium	Minor loss of fishery	Small adverse	Slight								
2	Hydrology	Construction	Re-sectioning or re-aligning of stream channels	Drainage	Surface water quality in streams	High/ local	High	Minor loss of fishery	Small adverse	Moderate/ slight	Provision of controls within Erosion and Sediment Control Plan and suitably sized crossings & culverts	Permanent	Small adverse	slight
				Fisheries value	Surface water quality	Medium	Medium	Minor loss of fishery		Slight				slight

No.	Environmental aspect	Phase	Potential impact	Attribute	Feature	Quality/ value	Attribute importance	Impact consequence	Impact magnitude	Impact significance	Mitigation	Impact duration	Residual impact magnitude	Residual impact significance		
3	Hydrology	Construction	Disturbance of existing field drainage systems	Drainage	Field drainage systems	Low	Low	Minor impact on integrity	Small adverse	Imperceptible	Provision of controls within Erosion and Sediment Control Plan and suitably sized crossings & culverts	Permanent	Small adverse	Imperceptible		
				Conservation areas	Unshin River cSAC pNHA	High/ international	Extremely high	Insufficient magnitude to affect use or integrity of receiving watercourses	Negligible	Imperceptible			Negligible	Imperceptible	Negligible	Imperceptible
					Lough Arrow cSAC, SPA, pNHA											
				Wetland habitats	Toberscanavan Lough	High/ regional	Very high									
					Lackagh Fen	High/ regional	Very high									
					Boathole & Lough Corran	High/ regional	Very high									
					Carrowkeel wet woodland	High/ regional	Very high									
					Cuilencroobagh Lough	High/ local	High									
					Aghalenane & Ardloy Lough Fen	High/ international	Extremely high									
				Tawnagh Lake Swallow hole complex	High/ regional	Very high										
Flooding	Outfall 5	Low	Low	Increase in predicted flood level by >50mm	Moderate adverse	Slight	Moderate adverse				Slight	Moderate adverse	Slight			
	Outfall 9							Large adverse	Slight/ moderate	Large adverse				Slight/ moderate		
4	Hydrology	Operational	Increased attenuation and containment		Drainage	Surface water quality in streams	High/ local	High	Reduction in pollution risk of 50% or more where existing risk is <1% annually	Minor beneficial	Minor beneficial	None	Permanent	Minor beneficial		
					Conservation areas	Unshin River cSAC pNHA	High/ international	Extremely high								
						Lough Arrow cSAC, SPA, pNHA										
					Wetland habitats	Lackagh Fen	High/ regional	Very high								
						Boathole & Lough Corran	High/ regional	Very high								

No.	Environmental aspect	Phase	Potential impact	Attribute	Feature	Quality/ value	Attribute importance	Impact consequence	Impact magnitude	Impact significance	Mitigation	Impact duration	Residual impact magnitude	Residual impact significance
					Carrowkeel wet woodland	High/ regional	Very high							
					Cuilencroobagh Lough	High/ local	High							
					Aghalenane & Ardloy Lough Fen	High/ international	Extremely high							
					Tawnagh Lake Swallow hole complex	High/ regional	Very high							
				Fisheries value	Surface water quality	Medium	Medium	Reduction in pollution risk of 50% or more where existing risk is <1% annually	Minor beneficial	Minor beneficial			Minor beneficial	
5	Hydrology	Operational	Increased risk of a serious accidental spillage	Drainage	Surface water quality in streams	High/ local	High	Calculated risk of a serious pollution incident is <0.5% annually	Negligible	Imperceptible	None	Permanent	Negligible	Imperceptible
				Conservation areas	Unshin River cSAC pNHA	High/ international	Extremely high							
					Lough Arrow cSAC, SPA, pNHA									
				Wetland habitats	Lackagh Fen	High/ regional	Very high							
					Boathole & Lough Corran	High/ regional	Very high							
					Carrowkeel wet woodland	High/ regional	Very high							
					Cuilencroobagh Lough	High/ local	High							
					Aghalenane & Ardloy Lough Fen	High/ international	Extremely high							
					Tawnagh Lake Swallow hole complex	High/ regional	Very high							
				Fisheries value	Surface water quality	Medium	Medium							

No.	Environmental aspect	Phase	Potential impact	Attribute	Feature	Quality/ value	Attribute importance	Impact consequence	Impact magnitude	Impact significance	Mitigation	Impact duration	Residual impact magnitude	Residual impact significance
6	Hydrology	Operational	Increased volume & rate of runoff	Drainage	Surface water quality streams	High/ local	High	Negligible change in predicted peak flood level	Negligible	Imperceptible	Provision of attenuating systems, such as grassed surface water channels, wetland-attenuating ponds and suitably sized crossings & culverts	Permanent	Negligible	Imperceptible
				Conservation areas	Unshin River cSAC pNHA	High/ international	Extremely high	No impact potential as increase <2% of average recharge						
					Lough Arrow cSAC, SPA, pNHA									
				Wetland habitats	Lackagh Fen	High/ regional	Very high	low potential as increase <5% of average recharge	Small/moderate adverse	Moderate/ slight				
					Boathole & Lough Corran	High/ regional	Very high							
					Carrowkeel wet woodland	High/ regional	Very high							
					Cuilencroobagh Lough	High/ local	High							
					Aghalenane & Ardloy Lough Fen	High/ international	Extremely high							
					Tawnagh Lake Swallow hole complex	High/ regional	Very high							
				Flooding	Recorded areas of recurrent flooding	High/ local	High	Negligible change in predicted peak flood level	Negligible	Imperceptible				
Fisheries value	Surface water quality	High/ international	Extremely high	Negligible change in predicted peak flood level										
7	Hydrology	Operational	Reduction in surface water catchment area	Conservation areas	Unshin River cSAC pNHA	High/ international	Extremely high	No impact potential as abstraction <2% of average recharge	Negligible	Imperceptible		Permanent	Negligible	Imperceptible
					Lough Arrow cSAC, SPA, pNHA									
				Wetland habitats	Lackagh Fen	High/ regional	Very high	low impact potential as abstraction <5% of average recharge for high dependency habitat	Small/moderate adverse	Slight				

No.	Environmental aspect	Phase	Potential impact	Attribute	Feature	Quality/ value	Attribute importance	Impact consequence	Impact magnitude	Impact significance	Mitigation	Impact duration	Residual impact magnitude	Residual impact significance
					Boathole & Lough Corran	High/ regional	Very high							
					Carrowkeel wet woodland	High/ regional	Very high							
					Cuilencroobagh Lough	High/ local	High							
					Aghalenane & Ardloy Lough Fen	High/ international	Extremely high							
					Tawnagh Lake Swallow hole complex	High/ regional	Very high							
8	Hydrology	Operational	Reduction in water quality in streams receiving routine runoff	Drainage	Surface water quality in streams receiving runoff	High/ local	High	Insufficient magnitude to affect use or integrity of receiving watercourses	Negligible	Imperceptible	Provision of water treatment systems, such as grassed surface water channels, wetland-attenuating ponds, spill containment & interceptors	Permanent	Negligible	Imperceptible
				Conservation areas	Unshin River cSAC pNHA Lough Arrow cSAC, SPA, pNHA	High/ international	Extremely high							
				Fisheries value	Surface water quality streams receiving runoff	High/ local	High							
1	Hydrogeology	Construction	Reduction in groundwater quality	Groundwater body status	Ballymote Lavagh-Ballintougher Ballygawley	High/ local	High	Resulting in impact on integrity or moderate changes to unsaturated zone	Moderate adverse	Significant/ moderate	Provision of controls within Erosion and Sediment Control Plan and suitably sized crossings & culverts	Temporary	Negligible	Imperceptible

No.	Environmental aspect	Phase	Potential impact	Attribute	Feature	Quality/ value	Attribute importance	Impact consequence	Impact magnitude	Impact significance	Mitigation	Impact duration	Residual impact magnitude	Residual impact significance
2	Hydrogeology	Construction	Reduction in level of protection	Aquifer vulnerability	Road cuts 1 to 10	High/ local	High	Reduction in thickness of overburden providing protection to the bedrock aquifer	Small adverse	Moderate	Provision of controls within Erosion and Sediment Control Plan and suitably sized crossings & culverts	Temporary	Small adverse	Moderate/ slight
					Areas of soft ground for removal			Insufficient magnitude to affect use or integrity of attribute	Negligible	Imperceptible	None			
					Borrow Pits			Temporary localised impact	Negligible	Imperceptible	None			
3	Hydrogeology	Construction	Interception of shallow groundwater	Groundwater flow	Road cuts 3, 5, 7, and 12	High/ local	High	Low impact potential as abstraction <5% of average recharge	Small adverse	Moderate	Collection of groundwater in narrow filter drain, separate from road runoff and diversion to existing open drain	Temporary	Small adverse	Moderate/ slight
					Areas of soft ground for removal			Insufficient magnitude to affect use or integrity of attribute	Negligible	Imperceptible	None			
					Borrow Pits			Temporary localised impact	Negligible	Imperceptible	None			
4	Hydrogeology	Construction	Localised lowering of water table	Groundwater levels	Road cuts 3, 5, 7 and 12	High/ local	High	Removal of small proportion of aquifer	Small adverse	Slight	Collection of groundwater in narrow filter drain, separate from road runoff and diversion to existing open drain	Temporary	Negligible	Imperceptible



No.	Environmental aspect	Phase	Potential impact	Attribute	Feature	Quality/ value	Attribute importance	Impact consequence	Impact magnitude	Impact significance	Mitigation	Impact duration	Residual impact magnitude	Residual impact significance
					Areas of soft ground for removal			Insufficient magnitude to affect use or integrity of attribute	Negligible	Imperceptible	None			
					Borrow Pits			Temporary localised impact	Negligible	Imperceptible	None			
5	Hydrogeology	Construction	Localised flooding	Karst features	Possible dolines & swallow holes	High/ local	High	Minor impact on integrity	Small adverse	Moderate/ slight	Provision of controls within Erosion and Sediment Control Plan and suitably sized crossings & culverts	Temporary	Small adverse	Moderate/ slight
6	Hydrogeology	Construction	Entry & rapid transfer of contamination in subsurface	Karst features	Possible dolines & swallow holes	High/ local	High	Resulting in impact on integrity or loss of part of attribute	Moderate adverse	Significant/ moderate	Provision of controls within Erosion and Sediment Control Plan and suitably sized crossings & culverts	Temporary	Moderate adverse	Significant/ moderate
7	Hydrogeology	Construction	Potential collapse of identified & unidentified karst features	Karst features	Possible dolines & swallow holes	High/ local	High	Resulting in minor impact on integrity or loss of small part of attribute	Small adverse	Moderate/ slight	Provision of drainage control including ban on soakaway drains or French drains and use of sealed drainage	Temporary	Small adverse	Moderate/ slight

No.	Environmental aspect	Phase	Potential impact	Attribute	Feature	Quality/ value	Attribute importance	Impact consequence	Impact magnitude	Impact significance	Mitigation	Impact duration	Residual impact magnitude	Residual impact significance
8	Hydrogeology	Construction	Reduction in groundwater quality	Groundwater quality	Regionally important aquifer	High/ local	High	Resulting in impact on integrity or loss of part of attribute	Moderate adverse	Significant/ moderate	Provision of controls within Erosion and Sediment Control Plan and suitably sized crossings & culverts	Temporary	Negligible	Imperceptible
9	Hydrogeology	Construction	Reduction in groundwater quality	GWDTE's	Lackagh Fen	High/ regional	Very high	Resulting in impact on integrity or loss of part of attribute	Moderate adverse	Significant/ moderate	Provision of controls within Erosion and Sediment Control Plan and suitably sized crossings & culverts	Temporary	Negligible	Imperceptible
			Boathole & Lough Corran		High/ regional	Very high								
			Carrowkeel wet woodland		High/ regional	Very high								
			Cuilencroobagh Lough		High/ local	High								
			Aghalenane & Ardloy Lough Fen		High/ international	Extremely high								
			Tawnagh Lake Swallow hole complex		High/ regional	Very high								
10	Hydrogeology	Construction	Interception of shallow groundwater	GWDTE's	Lackagh Fen	High/ regional	Very high	Low impact potential as abstraction <5% of average recharge	Negligible	Imperceptible	None	Temporary	Negligible	Imperceptible
			Boathole & Lough Corran		High/ regional	Very high								
			Carrowkeel wet woodland		High/ regional	Very high								
			Cuilencroobagh Lough		High/ local	High								
			Aghalenane & Ardloy Lough Fen		High/ international	Extremely high								
			Tawnagh Lake Swallow hole complex		High/ regional	Very high								

No.	Environmental aspect	Phase	Potential impact	Attribute	Feature	Quality/ value	Attribute importance	Impact consequence	Impact magnitude	Impact significance	Mitigation	Impact duration	Residual impact magnitude	Residual impact significance
11	Hydrogeology	Operational	Reduction in groundwater quality	GWDTE's	Lackagh Fen	High/ regional	Very high	Medium risk of pollution to groundwater from routine runoff	Moderate adverse	Significant/moderate	Provision of water treatment systems, such as grassed surface water channels, wetland-attenuating ponds, spill containment & interceptors	Permanent	Negligible	Imperceptible
					Boathole & Lough Corran	High/ regional	Very high							
					Carrowkeel wet woodland	High/ regional	Very high							
					Cuilencroobagh Lough	High/ local	High							
					Aghalenane & Ardloy Lough Fen	High/ international	Extremely high							
					Tawnagh Lake Swallow hole complex	High/ regional	Very high							
13	Hydrogeology	Operational	Increased risk of a serious accidental spillage	Groundwater body status	Ballymote	High/ local	High	Calculated risk of a serious pollution incident is <0.5% annually	Negligible	Imperceptible	None	Permanent	Negligible	Imperceptible
					Lavagh-Ballintougher									
					Ballygawley									
14	Hydrogeology	Operational	Reduction in groundwater contributions	Groundwater body status	Ballymote	High/ local	High	No impact potential as abstraction <2% of average recharge	Negligible	Imperceptible	None	Permanent	Negligible	Imperceptible
					Lavagh-Ballintougher									
					Ballygawley									
15	Hydrogeology	Operational	Increase in level of protection	Aquifer vulnerability	Proposed road realignment	High/ local	High	Minor improvement in attribute quality	Minor beneficial	Minor beneficial	None	Permanent	Minor beneficial	Minor beneficial
16	Hydrogeology	Operational	Localised backing-up of water table	Groundwater levels	All road cuts, borrow pits & areas of soft ground for removal	High/ local	High	Insufficient magnitude to affect use or integrity of receiving watercourses	Negligible	Imperceptible	None	Permanent	Negligible	Imperceptible

No.	Environmental aspect	Phase	Potential impact	Attribute	Feature	Quality/ value	Attribute importance	Impact consequence	Impact magnitude	Impact significance	Mitigation	Impact duration	Residual impact magnitude	Residual impact significance
17	Hydrogeology	Operational	Reduction in groundwater quality receiving routine runoff	Groundwater quality	Regionally important aquifer	High/ local	High	Medium risk of pollution to groundwater from routine runoff	Moderate adverse	Significant/moderate	Provision of water treatment systems, such as grassed surface water channels, wetland-attenuating ponds, spill containment & interceptors	Permanent	Negligible	Imperceptible
18	Hydrogeology	Operational	Increased risk of a serious accidental spillage	Groundwater quality	Regionally important aquifer	High/ local	High	Calculated risk of a serious pollution incident is <0.5% annually	Negligible	Imperceptible	None	Permanent	Negligible	Imperceptible
19	Hydrogeology	Operational	Increased risk of a serious accidental spillage	GWDTE's	Lackagh Fen	High/ regional	Very high	Calculated risk of a serious pollution incident is <0.5% annually	Negligible	Imperceptible	None	Permanent	Negligible	Imperceptible
					Boathole & Lough Corran	High/ regional	Very high							
					Carrowkeel wet woodland	High/ regional	Very high							
					Cuilencroobagh Lough	High/ local	High							
					Aghalenane & Ardloy Lough Fen	High/ international	Extremely high							
					Tawnagh Lake Swallow hole complex	High/ regional	Very high							
20	Hydrogeology	Operational	Increased volume & rate of runoff	GWDTE's	Lackagh Fen	High/ regional	Very high	Low impact potential as total <5% of average recharge	Negligible	Imperceptible	None	Permanent	Negligible	Imperceptible
					Boathole & Lough Corran	High/ regional	Very high							
					Carrowkeel wet woodland	High/ regional	Very high							
					Cuilencroobagh Lough	High/ local	High							

No.	Environmental aspect	Phase	Potential impact	Attribute	Feature	Quality/ value	Attribute importance	Impact consequence	Impact magnitude	Impact significance	Mitigation	Impact duration	Residual impact magnitude	Residual impact significance
					Aghalenane & Ardloy Lough Fen	High/ international	Extremely high							
					Tawnagh Lake Swallow hole complex	High/ regional	Very high							
21	Hydrogeology	Operational	Reduction in groundwater contributions	GWDT's	Lackagh Fen	High/ regional	Very high	Low impact potential as abstraction <5% of average recharge	Negligible	Imperceptible	None	Permanent	Negligible	Imperceptible
					Boathole & Lough Corran	High/ regional	Very high							
					Carrowkeel wet woodland	High/ regional	Very high							
					Cuilencroobagh Lough	High/ local	High							
					Aghalenane & Ardloy Lough Fen	High/ international	Extremely high							
					Tawnagh Lake Swallow hole complex	High/ regional	Very high							
22	Hydrogeology	Operational	Reduction available water yield volume	wells	Carrownagark	High	high	Slight decrease in yield	Negligible	Imperceptible	None	Permanent	Imperceptible	Imperceptible
					Tobercanavan	High	medium	Loss of well	Large	significant			significant	significant
					Doorly (west)	High	high	Slight decrease in yield	Negligible	Imperceptible			Imperceptible	Imperceptible
					Doorly (east)	High	high	Slight decrease in yield	Negligible	Imperceptible			Imperceptible	Imperceptible
					Ardloy	High	high	Slight decrease in yield	Negligible	Imperceptible			Imperceptible	Imperceptible