

**Risk Matrixes (APPENDIX B)**

**Climate Change Adaptation  
Second Round**

**Second Round**

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Risk management mechanism	Business function	First Round			Second Round Amendment			Risk description	Action	Validation	Round 2 Amendment
		Risk score (near term)	Risk score (medium term)	Risk score (long term)	Risk score (near term)	Risk score (medium term)	Risk score (long term)				
WRMP	Water resources	5	20	25	3	6	9	Increased demand for water at peak from permanent population, driven by reduced rainfall and higher temperatures	Research risk through Water UK, UKWIR, Company population data, links with university projects. Incorporate risk in to future water resources management planning cycles as per regulatory guidelines and implement demand management and/or supply schemes as required.	Outturn data of distribution input, weather impacts, consumption monitors, etc. (June Return)	Likelihood score reduced due to high degree of uncertainty. Consequence score reduced as increased demand has a slow onset and so can be monitored, managed through water efficiencies and investment insigated if required as risk increases
WRMP	Water resources	5	20	25	3	6	9	Increased demand from seasonal (tourist) population at peak	Contined engagement with regional planners. Review third party data. Incorporate risk in to future water resources management planning cycles as per regulatory guidelines and implement demand management and/or supply schemes as required.	Outturn data of distribution input, weather impacts, consumption monitors, etc. (June Return)	Likelihood score reduced due to high degree of uncertainty. Consequence score reduced as increased demand has a slow onset and so can be monitored, managed through water efficiencies and investment insigated if required as risk increases
WRMP and DP	Water resources	5	15	20	3	6	9	Increased occurrence of drought	Review Level of Service in next water resources management planning cycle. Assess impacts of climate change on Drought Plan.	None.	The frequence and severity of droughts is due to increase over time but managable by restricting demand, water efficiencies, increased raw water storage and water therefore consequence score reduced. The likelihood of increased occurance has also been reduced due to high degree of uncertainty in the medium to long term
WRMP	Water resources	3	9	15	2	6	9	Increased demand from net inward migration of retirement population	Contined engagement with regional planners. Review third party data. Incorporate risk in to future water resources management planning cycles as per regulatory guidelines and implement demand management and/or supply schemes as required	Outturn data of distribution input, weather impacts, consumption monitors, etc. (June Return)	High degree of uncertainty, likelihood score reduced
WRMP	Water resources	9	9	12	2	6	9	Increased risk of breach of environmental flow requirements in water courses, reducing reliability of sources for public water supply	Undertake AMP 5 investigations, continued engagement with Environment Agency.	Continued river flow gauging (Portsmouth Water and Environment Agency)	High degree of uncertainty, likelihood score reduced
WRMP	Water resources	3	9	12	2	6	9	Increased summer abstraction by other (existing) catchment users due to reduced rainfall	Continued engagement with Environment Agency and regional planners. Make use of third party data. Share knowledge through WRSE and Water UK.	None.	High degree of uncertainty, likelihood score reduced
WRMP	Water resources	3	9	12	2	6	9	Increase in agriculture leads to increase in abstraction by other catchment users	Continued engagement with Environment Agency and regional planners. Make use of third party data. Share knowledge through WRSE and Water UK.	None.	High degree of uncertainty, likelihood score reduced
WRMP	Water resources	4	4	8	2	4	4	Saline intrusion of borehole sources	No action required at this stage. Review next round of sea level rise projections and aquifer modelling as they become available.	Continued conductivity monitoring will identify salinity.	Few of the borehole sources are located in areas vulnerable to saline intusion, the one borehole source sits on lower ground has a normal daily output of <20 MI/d therefore consequence score reduced
WRMP	Water resources	5	5	5	-	-	-	Rising salinity at River Itchen intake	No action required. Review next round of sea level rise projections and shoreline management policies as they become available.	Continued conductivity monitoring will identify salinity.	
WRMP	Water resources	5	5	5	-	-	-	Reduced aquifer recharge during summer months causes reduced summer source yield	Continue to work with the Environment Agency and other stakeholders on aquifer modelling.	Continued groundwater level and source yield monitoring.	
WRMP	Water resources	2	2	4	-	-	-	Population migration away from flood risk impacts regional supply-demand balance	Continued engagement with regional planners. Ongoing monitoring.	Outturn data of distribution input.	
WRMP	Water resources	2	4	4	-	-	-	Increased evapotranspiration reducing aquifer recharge	Continue to work with the Environment Agency and other stakeholders on aquifer modelling.	Continued groundwater level and source yield monitoring.	
WRMP	Water resources	2	2	4	-	-	-	Water resources asset loss from coastal change	Continued engagement with regional planners. Ongoing monitoring.	Existing conductivity monitoring will identify salinity.	
WRMP	Water resources	4	4	4	-	-	-	Saline intrusion from lower groundwater / increased abstraction	No action required.	Review next round of sea level rise projections and shoreline management policies as they become available. Existing conductivity monitoring will identify salinity.	
WRMP	Water resources	3	3	3	-	-	-	Reduced aquifer recharge during summer months leads to reduced source yield in October	Continue to work with the Environment Agency and other stakeholders on aquifer modelling.	Existing conductivity monitoring will identify salinity.	
WRMP	Water resources	2	2	2	-	-	-	Saline intrusion of Havant and Bedhampton Springs source	Ongoing monitoring.	Existing conductivity monitoring will identify salinity.	
WRMP	Water resources	2	2	2	-	-	-	Population migration away from coastal change impacting regional supply-demand balance	Continued engagement with regional planners. Ongoing monitoring.	Outturn data of distribution input.	
WRMP	Water resources	1	1	1	-	-	-	Increased soil compaction reduces aquifer recharge	Continue to work with the Environment Agency and other stakeholders on aquifer modelling.	Continued groundwater level and source yield monitoring.	

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		Risk score (near term)	Risk score (medium term)	Risk score (long term)		Risk score (near term)	Risk score (medium term)	Risk score (long term)				
Resilience, Emergency Planning	Abstraction, treatment, raw and potable transport	3	9	12		-	-	-	Increased flooding to source and treatment works from rivers and groundwater	Review new flood maps as they become available. Risk already incorporated in to Emergency Plan. Consider future risk when procuring new or replacement assets.	Continued monitoring of asset performance and failure data.	
Resilience, Emergency Planning	Raw tranport, potable transport	3	6	9		-	-	-	Increased flooding to pumping stations (raw and potable) and valves from rivers and groundwater	Review new flood maps as they become available. Risk already incorporated in to Emergency Plan. Consider future risk when procuring new or replacement assets.	Continued monitoring of asset performance and failure data.	
Resilience, Emergency Planning	Potable transport	3	6	9		-	-	-	Increased regional flooding from rivers and groundwater impedes routine mains repair	Review new flood maps as they become available. Risk already incorporated in to Emergency Plan.	Continued monitoring of asset performance and failure data.	
Resilience, Emergency Planning	Treatment	2	4	6		-	-	-	Road melt events impede treatment works access	Incorporate in to Emergency Plan.	None.	
Resilience, Emergency Planning	Abstraction, raw transport, treatment, potable storage, potable transport	3	3	6		-	-	-	Increased interruptions to telecommunications and telemetry	Ongoing monitoring.	Continued monitoring of asset performance and failure data.	
Resilience, Emergency Planning	Abstraction, treatment, raw and potable transport	2	2	4		-	-	-	Increased pluvial flooding to works and pumping stations	Review new flood maps as they become available. Risk already incorporated in to Emergency Plan. Consider future risk when procuring new or replacement assets.	Continued monitoring of asset performance and failure data.	
Resilience, Emergency Planning	Abstraction, raw transport, treatment, potable storage, potable transport	2	2	4		-	-	-	Storm damage to above ground assets (buildings and overhead cables)	Risk already incorporated in to Emergency Plan. Consider future risk when procuring new or replacement assets.	Continued monitoring of asset performance and failure data.	
Resilience, Emergency Planning	Potable transport	2	2	4		-	-	-	Road melt events impede routine mains repair	Incorporate in to Emergency Plan.	None.	
Resilience, Emergency Planning	Potable transport	2	2	4		-	-	-	Increased regional pluvial flooding inpedes routine mains repair	Review new flood maps as they become available. Risk already incorporated in to Emergency Plan. Consider future risk when procuring new or replacement assets.	Continued monitoring of asset performance and failure data.	
Resilience, Emergency Planning	Potable storage	3	3	3		-	-	-	Service reservoir monitoring equipment failure due to flooding	Review new flood maps as they become available. Risk already incorporated in to Emergency Plan. Consider future risk when procuring new or replacement assets.	Continued monitoring of asset performance and failure data.	
Resilience, Emergency Planning	Abstraction	1	1	2		-	-	-	Road melt events impede abstraction works access	Incorporate in to Emergency Plan.	None.	
Resilience, Emergency Planning	Abstraction, raw transport, treatment, potable storage, potable transport	1	1	2		-	-	-	Increased interruptions to electricity supply	Risk already incorporated in to Emergency Plan. Consider future risk when procuring new or replacement assets.	Continued monitoring of asset performance and failure data.	
Resilience, Emergency Planning	Raw tranport	1	1	2		-	-	-	Road melt events impede raw water boosters access	Incorporate in to Emergency Plan.	None.	
Resilience, Emergency Planning	Abstraction, raw transport, treatment, potable storage, potable transport	1	1	2		-	-	-	Increased interruptions to electricity supply	Risk already incorporated in to Emergency Plan. Consider future risk when procuring new or replacement assets.	Continued monitoring of asset performance and failure data.	

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DWSP	Raw water quality	3	6	12	-	-	-	Lower river flows cause higher contaminant concentrations	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	
DWSP	Raw water quality	4	8	10	-	-	-	Reduced cloud cover leads to increased biological growth in river	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	
DWSP	Raw water quality	4	6	8	-	-	-	Higher temperatures cause increased biological and bacterial growth in river	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	
DWSP	Raw water quality	4	6	6	-	-	-	Lower river flows cause warmer water and increased biological and bacterial growth in river	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	
DWSP	Treatment	2	4	6	-	-	-	Chemical supply chain disruption from regional heatwaves and floods	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	
DWSP	Potable transport	3	3	6	2	2	4	Saline intrusion of potable water mains (metallic mains)	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	Saline water is unable to move through water mains unless a burst has taken place. Operational procedures such as flushing post and repair of main would remove any saline water therefore the consequence score has been reduced
DWSP	Raw transport (water quality)	4	4	4	-	-	-	Saline intrusion of raw water mains (water quality risk)	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	
DWSP	Raw water quality	2	4	4	4	8	8	Increased turbidity events from runoff (river and springs sources)	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	The nature of the chalk aquifer in the region means the company is vulnerable to turbidity events, such as increasing levels of crypto-sporidom therefore likelihood score increased
DWSP	Potable transport and storage (water quality)	2	2	4	-	-	-	Accelerated chlorine depletion in treated water (potable storage and transpotation)	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	
DWSP	Potable transport (water quality)	2	2	4	-	-	-	Regional flooding from groundwater and rivers causes infiltration of water mains; bacterial contamination risk	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	
DWSP	Treatment	3	3	3	-	-	-	Increased bacterial growth in rapid gravity filters	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	RGFs are now covered, likelihood remains low
DWSP	Potable storage (water quality)	3	3	3	1	1	1	Saline intrusion of service reservoirs	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	AMP 5 flood survey and review by Water Quality team has shown that due to the positioning of the service reservoirs on high ground (average 82 AOD) , this risk should be reduced
DWSP	Potable storage (water quality)	3	3	3	-	-	-	Infiltration of service reservoirs from flooding	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	
DWSP	Raw storage (water quality)	3	3	3	-	-	-	Increased flooding to raw water storage assets from rivers and groundwater; bacterial contamination, asset damage	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	
DWSP	Treatment	1	1	2	-	-	-	Disturbance of flocculant blanket in treatment	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	
DWSP	Treatment	2	2	2	-	-	-	Bacterial growth in rapid gravity filters	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	
DWSP	Treatment	1	1	1	-	-	-	Algal growth in rapid gravity filters and clarifiers	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	RGFs are now covered, likelihood remains low
DWSP	Potable transport (water quality)	1	1	1	-	-	-	Increased pluvial flooding leads to infiltration of potable water mains; bacterial contamination risk	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	
DWSP	Potable transport (water quality)	3	3	3	-	-	-	Saline intrusion of potable water mains (non-metallic mains)	Incorporate risk into DWSP; operationally managed risk. Communicate climate and hydrology data.	Continued source-to-tap water quality monitoring.	

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Capital Planning	Potable transport	4	12	16		3	6	9	Accelerated asset deterioration of cast iron water mains from more extreme wetting and drying cycles and earth movement	Consider future climates when procuring replacement assets.	Continue to monitor asset performance data for capital maintenance planning.	Likelihood score reduced as cast iron main bursts are easier to locate compared to other materials, assuming an increased burst rate, cast iron mains would be targeted as a part of the Company's ongoing mains renewal activity
Capital Planning	Potable transport	4	8	12		-	-	-	Accelerated asset deterioration of ductile iron, fibre reinforced concrete, PVC and steel water mains from more extreme wetting and drying cycles and earth movement	Near term risk is low. Review case in AMP 6 for incorporating climate change impacts in to asset deterioration modelling, and consider future climates when procuring replacement assets.	Continue to monitor asset performance data for capital maintenance planning.	
Capital Planning	Abstraction	2	2	4		-	-	-	Accelerated abstraction asset deterioration (from wetting and drying cycles)	Consider future climates when procuring new or replacement long term assets.	Continue to monitor asset performance data for capital maintenance planning.	
Capital Planning	Abstraction	2	2	4		-	-	-	Abstraction asset loss or outage from coastal change	No action required on existing assets. Consider risk when developing new assets. Review next round of coastal change projections and management policies. Continued engagement with regional planners.	Existing raw water quality monitoring will identify any salinity events.	
Capital Planning	Raw transport	2	2	4		-	-	-	Reduced raw water transportation pump (M&E) efficiency	No action required on existing assets. Consider future temperature exposure when procuring replacement assets.	Continue to monitor asset performance and energy data.	
Capital Planning	Potable transport	4	4	4		-	-	-	Accelerated asset deterioration of MDPPE and HPPE water mains (wetting and drying cycles; earth movement)	Consider future climates when developing new or replacement long term assets.	Continue to monitor asset performance data for capital maintenance planning.	
Capital Planning	Raw transport	4	4	4		-	-	-	Raw water boosters asset loss from coastal change	Consider future climates when developing new or replacement long term assets. Review next round of coastal change projections and management policies. Continued engagement with regional planners.	Continue to monitor asset performance data.	
Capital Planning	Treatment	1	2	3		-	-	-	Reduced treatment pump (M&E) efficiency	No action required on existing assets. Consider future temperature exposure when procuring replacement assets.	Continue to monitor asset performance and energy data.	
Capital Planning	Potable storage	3	3	3		-	-	-	Asset loss or outage of service reservoirs from coastal change	Consider future climates when developing new or replacement long term assets.	Review next round of coastal change projections and management policies. Continued engagement with regional planners.	
Capital Planning	Potable transport	2	2	2		-	-	-	Population migration away from coastal change (network sizing)	Consider future climates when developing new or replacement long term assets.	Review next round of coastal change projections and management policies. Continued engagement with regional planners.	
Capital Planning	Abstraction	2	2	2		-	-	-	Reduced abstraction pump (M&E) efficiency	No action required on existing assets. Consider future temperature exposure when procuring replacement assets.	Continue to monitor asset performance and energy data.	
Capital Planning	Abstraction	2	2	2		-	-	-	River Itchen intake too high due to low flows	No action required.	Continue to monitor intake yields.	
Capital Planning	Raw transport	2	2	2		-	-	-	Accelerated asset deterioration of raw water booster assets (wetting and drying cycles)	Consider future climates when developing new or replacement long term assets.	Continue to monitor asset performance data for capital maintenance planning.	
Capital Planning	Treatment	2	2	2		-	-	-	Accelerated deterioration of treatment assets (wetting and drying cycles)	Consider future climates when developing new or replacement long term assets.	Continue to monitor asset performance data for capital maintenance planning.	
Capital Planning	Potable transport	2	2	2		-	-	-	Potable water mains asset loss due to coastal change	Consider future climates when developing new or replacement long term assets.	Review next round of coastal change projections and management policies. Continued engagement with regional planners.	
Capital Planning	Potable transport	2	2	2		-	-	-	Increased seasonal (tourist) population (network sizing)	No action required.	Undertake network reinforcement as required.	
Capital Planning	Raw transport	1	1	1		-	-	-	Accelerated deterioration of raw water and potable storage assets (wetting and drying cycles)	Consider future climates when developing new or replacement long term assets.	Continue to monitor asset performance data for capital maintenance planning.	
Capital Planning	Treatment	1	1	1		-	-	-	Treatment asset loss or outage from coastal change	Consider future climates when developing new or replacement long term assets.	Review next round of coastal change projections and management policies. Continued engagement with regional planners.	
Capital Planning	Potable storage, potable transport	1	1	1		-	-	-	Reduced potable storage and potable transport pump (M&E) efficiency	No action required on existing assets. Consider future temperature exposure when procuring replacement assets.	Continue to monitor asset performance and energy data.	
Capital Planning	Potable transport	1	1	1		-	-	-	Accelerated deterioration of potable transport assets (wetting and drying cycles)	Consider future climates when developing new or replacement long term assets.	Continue to monitor asset performance data for capital maintenance planning.	
Capital Planning	Potable transport	1	1	1		-	-	-	Population migration away from flood risk (network sizing)	No action required.	Undertake network reinforcement as required.	