

# Exposure Matrix

#	Potential failure event	System elements										Demands		
		Water source/production			Water distribution network						Controls		Demands	Firefighting demands
		Springs	Groundwater wells	Water treatment plant	Pipes	Automated valves	Physical valves	Elevated tanks	Pumps	Hydrant	Sensors	Controls/IT	Demands	Firefighting demands
<b>Water infrastructure failures</b>														
1	i	Technical failures												
	ii	Mechanical failures												
<b>Natural hazards</b>														
2	i	Avalanches												
	ii	Earthquakes												
	iii	Storms												
	iv	Land slides/Rock slides												
	v	River floods												
	vi	Wild fires												
	vii	Climate change/extreme temperatures												
<b>Contamination</b>														
3	i	Protozoa, virus, bacteria												
	ii	Chemical contamination												
	iii	Waste water												
	iv	Oil and hazardous substances												
	v	Radioactive contamination												
	vi	Animal diseases												
<b>Failure due to other infrastructures, elements, factors</b>														
4	i	Blackouts												
	ii	Roads, tunnels, aviation, cable cars, railway accidents												
	iii	Population increase												
<b>Pandemic</b>														
5	i	Water-borne germs												
	ii	Disruption to the supply chain												
	iii	Loss of revenue												
	iv	Loss of personnel												
	v	Change in consumer behaviour												
<b>Digital disruptions</b>														
6	i	Communication failure												
	ii	Manipulation of sensors												
	iii	Manipulation of the numerical pipe network model												
	iv	Manipulation of IT components												
<b>Criminal (physical) attacks</b>														
7	i	Terrorist attacks/use of weapons												
	ii	Vandalism/sabotage												

**Physical element failure:** 

- Repercussions on key components (pumps, pipes, elevated tanks) in the water supply system.
- Affects both quality and quantity of the water supply

**Quality:** 

- Contamination with foreign substances

**Quantity:** 

- Reduction in overall water supply

**Contact:**

Unit of Environmental Engineering,  
University of Innsbruck,  
Technickerstrasse 13  
6020 Innsbruck, Austria  
Tel:+4351250762101  
Mail: umwelttechnik@uibk.ac.at

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