

**ESSENTIAL
STANDARD
no.40**

A contractor's guide to Confined Space Entry in Thames Water



KEY MESSAGES

- Thames Water operates a Zero-Compromise culture approach to working in Confined Spaces.
- All persons entering a confined space when working for or on our behalf must ensure that they do so in compliance with the Confined Space Regulations and in line with our standards.
- Any persons carrying out a confined space entry or associated task must hold a current qualification for the relevant type of entry being undertaken – certification must be readily available on request.
- All personnel must be clean shaven and able to demonstrate a face fit test. If an alternative type of equipment is used this Must have a Risk Assessment concurrent with the task in hand demonstrating compliance with all confined space related legislation including the working from heights and PPE regulations.

1. Introduction

The term Confined Space is used widely throughout the water industry. In general terms, a confined space will be identified by its enclosed nature together with a reasonably foreseeable specified risk.

The Confined Space Regulations make it clear that entry into confined spaces, where possible, must be avoided and all reasonable steps taken to carry out work without the need for entry. We know that in Thames Water this is not always achievable given the nature of our operations.

The risks involved in working in confined spaces are significantly more hazardous than normal workplaces. The hazards may not be unique to confined spaces but are worsened due to the enclosed nature of the working area.

Effectively managed, planned and controlled, no confined space entry should expose individuals to foreseeable risk and everyone who enters should go home safe and well at the end of every day.

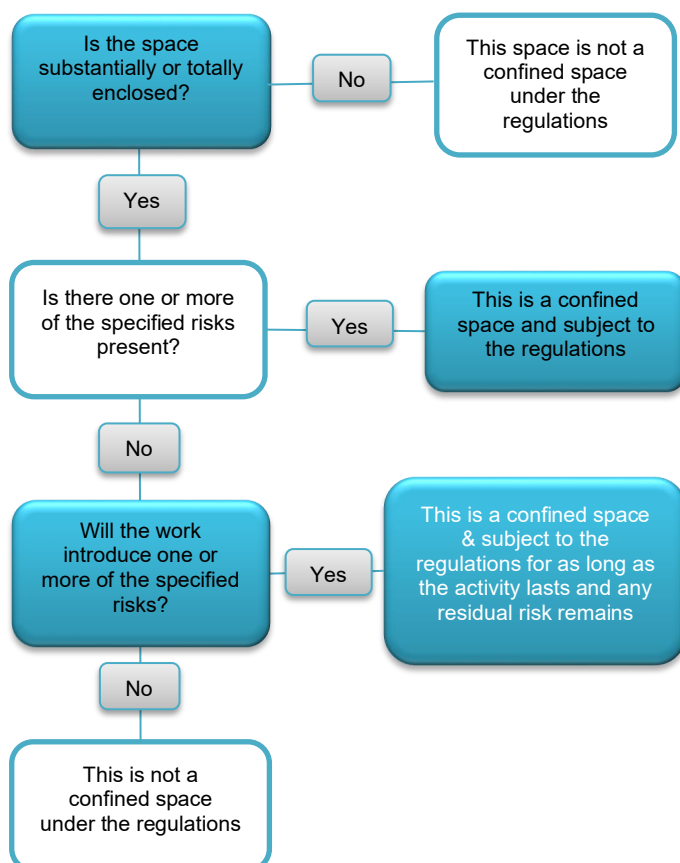
This guidance is designed to help managers to make the right decisions when committing people to work in confined spaces or managing contractors working on our behalf. It must not be read in isolation, further information covering all aspects of confined space work can be found in the document referenced below.

2. Confined Space

What is a Confined Space?

Confined Space	The term 'Confined Space' is used widely throughout our industry. According to the dictionary definition: a Confined Space can be identified by its enclosed nature together with a reasonably foreseeable specified risk being either inherent (due to the working area i.e; natural build-up of Hydrogen Sulphide, Methane or the presence of chemicals or free flowing solids) or an introduced risk (i.e solvents, hot works, airborne flammable contaminants such as dust). The Health & Safety Executive (HSE) define the 5 specified risks as: • Loss of consciousness caused by gases, vapours, fumes, or lack of oxygen • Loss of consciousness caused by an increase in body temperature • Serious injury resulting from fire or explosion • Drowning from an increase in the level of liquid • Asphyxiation caused by a free flowing solid or inability to reach a respirable environment due to entrapment by a free flowing solid.
Restricted / Enclosed Space	A restricted or enclosed space can be best described as an area with no inherent or introduced reasonably foreseeable specified risk. However, the space may make movement and access / egress more difficult, therefore may require additional controls to be put into place before the entry. An Enclosed Space is an area which is fully or substantially covered BUT no specified risk exists. They would have limited openings for entry and exit, good ventilation but are not designed to be occupied on a continual basis. Dry wells are not normally confined spaces but may become one if intrusive work or additional hazards are introduced. -For additional support see HSI38– Restricted, Enclosed and Dry Well entry procedure

The following flowchart can help managers with the decision-making process. For a work area to be deemed a Confined Space, there must be at least one specified risk present or reasonably foreseeable to make an enclosed or restricted space a Confined Space.



“Specified Risk” means a risk of-

Flammable Substances and Oxygen Enrichment <i>(Serious injury to any person at work arising from a fire or explosion)</i>
Excessive Heat <i>(the loss of consciousness of any person at work arising from an increase in body temperature)</i>
Ingress or the presence of liquid <i>(The drowning of any person at work arising from an increase in the level of liquid)</i>
Toxic Gas, Fumes, Vapours or Oxygen Deficiency <i>(The loss of consciousness or asphyxiation of any person at work arising from gas, fume, vapour or the lack of oxygen)</i>
Free Flowing Solid Materials <i>(The asphyxiation of any person at work arising from a free flowing solid or the inability to reach a respirable environment due to entrapment by a free flowing solid)</i>
Note: Additional Hazards arising from outside influences Work activities outside a confined space can introduce hazards inside it, such as ignition sources from welding or hot works, chemicals, gases or vapours, and contamination from adjacent plant, processes or surrounding ground. Examples include the release of carbon dioxide from acidic groundwater, methane and hydrogen sulphide from decaying organic matter.

3. Competence and Classifications

National Occupational Standards (NOS)

The National Occupational Standards (NOS) are statements of the standards, of the performance that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding.” In relation to Confined Spaces these are listed as EUSC codes in the table below.

The Energy & Utility Skills Register (EUSR) is the online register of training and skills for the energy and utilities industries. Thames Water does not specify which awarding body must be used, only that it meets the agreed standards set out by the [Confined Spaces – EUSR](#)

Thames Water’s preferred and primary requirement for all confined-space operations is the use of tight-fitting Respiratory Protective Equipment (RPE). This equipment must fully comply with all relevant PPE Regulations and Working at Height Regulations. All personnel undertaking confined-space activities are required to be clean shaven and must hold valid face-fit certification for the specific tight-fitting RPE in use.

Where the use of non-tight-fitting RPE is proposed, it must be supported by a comprehensive risk assessment demonstrating full compliance with applicable PPE requirements and Working at Height regulations.

Non-compliance with any statutory or Thames Water–specific requirements relating to confined-space work will result in the rejection of associated method statements and risk assessments.

Water UK’s Occasional Guidance Note

Water UK’s Occasional Guidance Note for Confined Space Entries (NC 1 to NC 3) are intended as generic standards for grouping vertical entries into Confined Spaces. These may be used to establish safe working methods for access and egress. They should be considered alongside the risk assessment for the characteristics of the specific workplace.

Some NC3 and all NC4/NCX classified entries are complex and necessitate the development of a detailed task specific Safe System of Work (SSoW/SHE4), risk assessment and emergency arrangements.

Classification	Definition
NC1	Low risk, shallow entry with adequate natural or mechanical ventilation, where access is simple and unobstructed and there is no likely risk of flooding, e.g. meter pits, valve chambers, booster-pumping stations, PRV chambers etc.
NC2	Vertical, direct, unobstructed access with continuous attachment to a man riding hoist or similar mechanical rescue device.
NC3	When it is not possible to have persons permanently attached to a safety line. Usually, it will be a team entry which moves away from the entry point e.g. man entry sewers, utility service subway tunnels, aqueducts and complex wet wells. Working without an attached rescue line includes working away from the point of entry but on an unobstructed horizontal plan.
NC4	Complex access and egress that do not meet any of the classifications above or involving complex operations which introduce additional risks and require specific controls and rescue arrangements e.g. mechanical hazards, physical complexity of system introduced hazards, enhanced specific intrinsic hazards. Circumstances, which might lead to NC4 classification include where: - • fluid, mechanical or electrical isolation arrangements are complex • structural conditions are in doubt • underground systems are particularly deep or complex • record drawings are in doubt; • there is a history of serious atmosphere hazard; • industrial waste discharges are insufficiently diluted to control harm from chemical, biological or radioactive agents • the risk of drowning is only controlled by pumping or by tide • the job involves hot work or a fume producing process • the job requires electrical apparatus operating above Safety Extra Low Voltage • (SELV) 25 volts or which is not explosion protected • the work in hand is unfamiliar, complex or inherently hazardous This list is not intended to be exhaustive
NCX	It should be remembered that not all confined spaces are vertical entry spaces. Some are horizontal entry (e.g. rooms or spaces with gas storage or combustion plant), others have vertical upward entry (e.g. roof spaces where methane or hydrogen could accumulate). Specific atmospheric analysis, access arrangements and rescue plans must be devised for each such space encountered.

Any person undertaking confined space entry activity on Thames Water assets must conform to either the Thames Water categorisations, or the EUSR NC1-NC4 or equivalent.

Thames Water does not specify which awarding body must be used, only that it meets the agreed standards set out by the [Confined Spaces – EUSR](#)

The cards issued by the awarding body come in various styles, of which some examples are detailed in the following table.

All should be enrolled within the [Energy & Utility Skills Register](#), which can be checked by using the QR Codes alongside each example.

EUSR	Energy & Utility Skills Register		
NOCN	National Open College Network		
C&G	City & Guilds		
CABWI	Certification and Assessment Board for the Water Industry		

Note: The full list of acceptable qualifications can be found on the EUSR webpage

4. Hazard Identification and Risk Assessment

Before undertaking any work in a confined space, a risk assessment is necessary to determine the measures that must be taken to ensure the safety, health and wellbeing of those entering and working in the confined space.

The risk assessment should identify the relevant hazards / risks and will help to formulate a safe system of work. It must also determine the manning levels, competency requirements and emergency arrangements that must be in place prior to any entry. The risk assessment must evaluate the risks to those entering or working in the confined space including any third parties within the vicinity.

Other hazards must be considered e.g. Up and downstream influences, working from height, possible contact with moving machinery, live electrical equipment etc.

5. Permits (PTW)

Controlling some hazards may require additional permits to work. A permit is a documented procedure that authorises a person or persons to carry out specific tasks within a specified time frame. The permit will detail the precautions required to complete the task safely, based on a risk assessment. It will describe what work will be done and where, which will be detailed in a method statement. The use of the Permit does not, by itself, make the task safe.

6. Role of the CSA

The Role of the Confined Spaces Authority (CSA) (formerly the Independent Authorising Body, IAB)

All Wastewater Confined Space entry activities, (regardless of complexity levels), must be reviewed, authorised, coordinated and checked for conflicts by the CSA prior to validation by the Wastewater Operational Control Centre (WOCC).

For the Water side of the business Low complexity confined space entries can be approved locally by suitably assessed and Appointed Persons.

Medium and high complexity water activities should be discussed with the CSA. Dependent on the hazards/risks and consequences a route of approval must be agreed before works proceed.

Any changes that impact the way the wastewater network operates must be authorised by the CSA. Thames Water responsible person will issue a diversion request to the CSA who will raise and issue a diversion notice communicating the changes to all relevant parties.

Note: Confined spaces are further broken down for clarity within Thames into complexity levels. Thames Water's Complexity table can be found in appendix 1 below.

For further advice speak to your Health Safety & Wellbeing Business Partner

7. Declassification

In some circumstances it may be necessary to apply a temporary declassification. (i.e. cleaned/purged digesters, service tunnels and holding tanks).

This will only be appropriate if:

- No actual or potential atmospheric hazards exist
- All other hazards associated with the work area can be eliminated for the duration of the entry

If these conditions are not met before entry, the entry must be treated as a confined space and relevant working procedures must be followed.

Only those specifically trained and appointed to Senior Atmospheric Tester (SAT) standard, to de-classify confined spaces and authorised to issue the atmospheric test safety clearance certificate.

Where no appointed SAT is in place speak to your Health Safety & Wellbeing Business Partner.

8. Planning, Preparation and Equipment

Methods of communication must be determined at the planning stage of any confined space entry

- Clearly defined roles and responsibilities (who's in charge)
- Clearly defined rescue plans.
- Any additional Permits and authorisations
- Additional Influences (Tidal, emergencies etc)

Medicals

All those required to work in confined spaces must be fit to carry out their duties and hold an in date medical and within their company prescribed policy weight limit.

All confined space personnel are responsible for ensuring that this weight limit is not exceeded.

Face Fit Testing

For any employees required to wear respiratory protective equipment, you must comply with the Respiratory Protective equipment (RPE) Regulations (breathing apparatus or escape sets) and hold a current Face fit test.

Any person(s) working on behalf of Thames Water or on a Thames Water asset must be clean shaven in line with TWUL Policy.

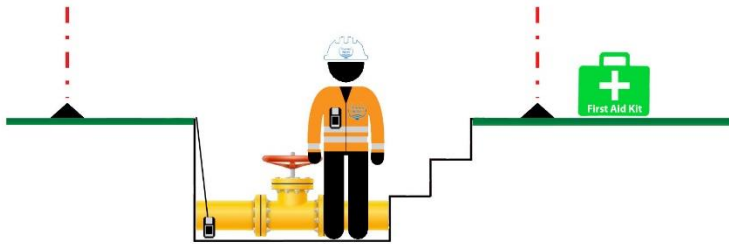
- Identify those employees required to wear tight fitting RPE
- Ensure a face fit test is completed at regular intervals and monitored for dramatic physical changes (weight loss, dental work etc), additional face fit test is carried out where necessary thereafter.
- Ensure that the results of the face fit tests are recorded
- Ensure they are clean shaven for both practical training and work activities.

9. Minimum staffing levels

The Safe System of Work (SSOW) must set out the correct personnel and equipment levels required for the specific entry.

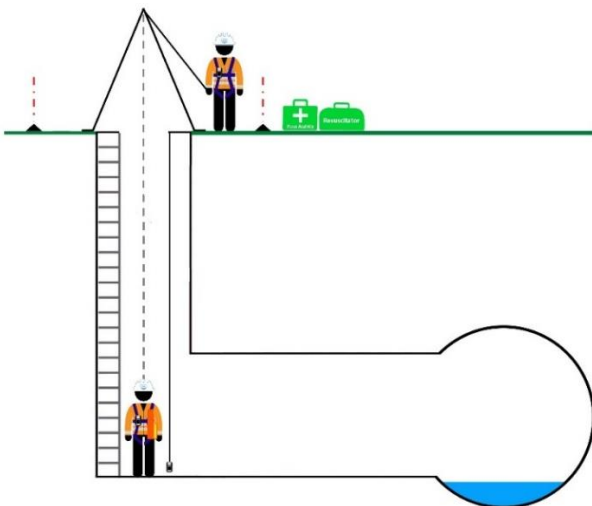
NC1

Gas check required prior to entry.



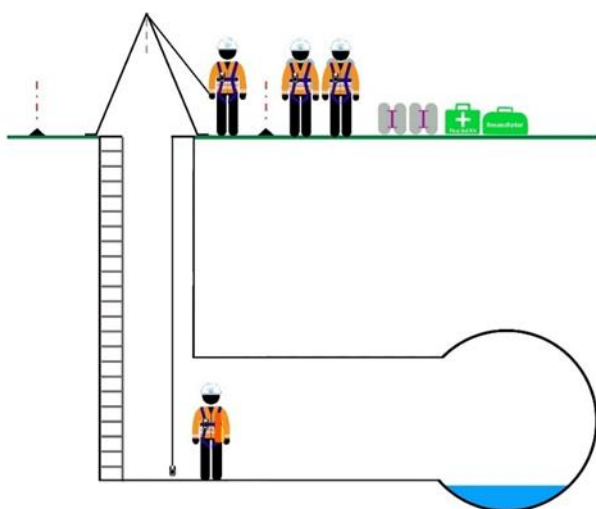
People	
Minimum Team Size 1	1x Entrant to be Confined Space Awareness Trained (<i>as a minimum</i>)

NC2



People	
Minimum Team Size 2	1 x Entrant to be Medium Risk Trained (<i>as a minimum</i>) 1 x Entry Controller Trained and appointed by Line Manager

NC3

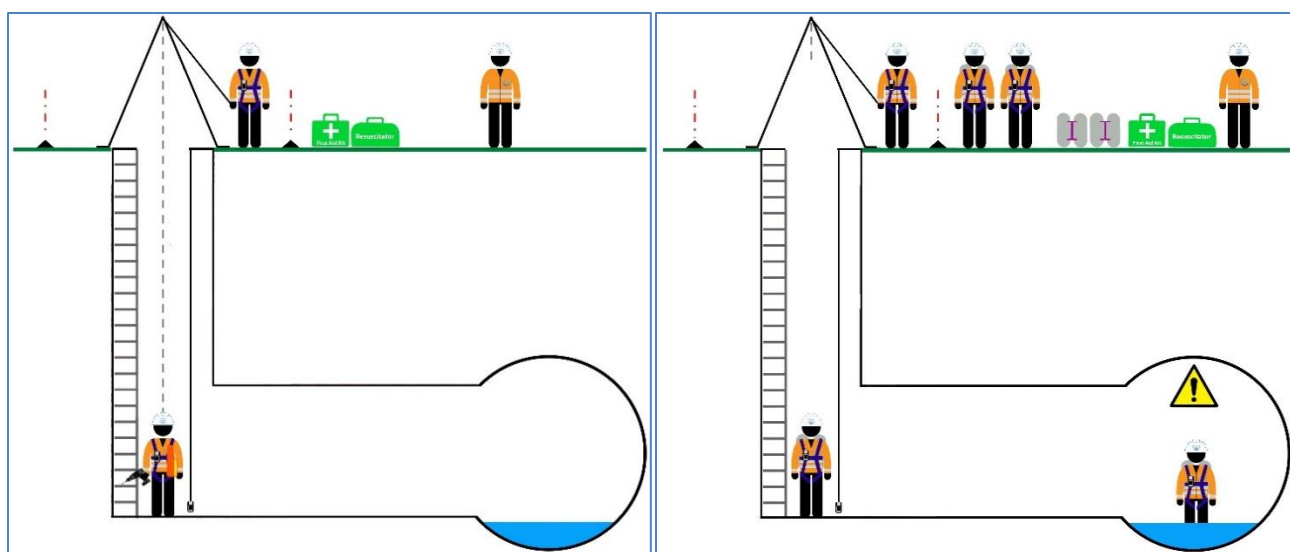


People	
Minimum Team Size 4	1 x Entrants to be Medium Risk Trained (<i>as a minimum</i>). 1 x Entry Controller Trained and appointed by Line Manager. 2 x Rescue Team Operative to be High Risk & Rescue and Recovery Trained.

NC4/NCX (not including CTBA activities)

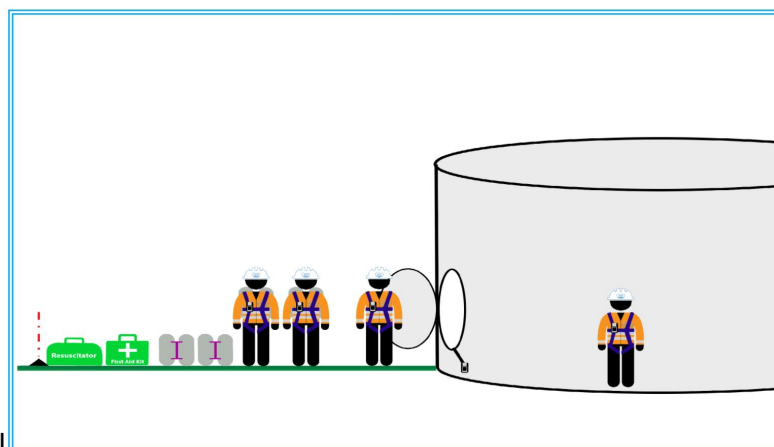
Works under a C Permit - entries may require additional staff over and above the minimum requirements dependent on guidance given by the AP(C) issuing the C permit.

Note: AP(C) does not need to remain on site throughout the duration of the activity but must be on site for the issuing of the C Permit.



*Entry involving 110V electrical tools

* Entries using Breathing apparatus.



NCX entry non vertical

Note: NC4/NCX High risk entries may require additional staff dependent on the specific activity.

People	
Minimum Team Size 2 or 4 +	1+ x Entrants to be High Risk Trained. 1 x High risk Entry Controller, Trained and appointed 2 x /High Risk Rescue Team Operative to be Rescue and Recovery Trained. Authorised Person C (Confined spaces) <i>where required</i>.

10. Emergency Rescue

Possible emergencies must be anticipated, and appropriate rescue arrangements clearly defined. Consideration of the likely risks, with instructions identifying communication source, the equipment, and measures to be taken to enable a successful rescue by fully trained and appointed.

Reliance on the emergency services alone will not be enough and should not be a major part of any emergency procedure.

Note: Where emergency services are required to enter a confined space a specific request must be made for the NHS Paramedic, Hazardous Area Response Team (HART), to be in attendance.

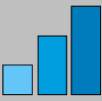
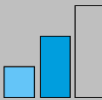
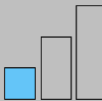
11. Visitors in Sewers

Thames Water recognises that on occasion for business-critical reasons that it is not practical to follow the above process. Where this is the case, you must make contact with Thames Water's Senior Health Safety and Wellbeing team or the CSA.

Appendix 1

Thames Water Confined Space Complexity Table

The Table below shows the complexity control levels used when working within Thames Water. Every confined space entry is different, and complexity levels should be considered as part of any risk assessment and method statement to ensure confined space hazards are identified, understood, controlled or mitigated to provide safe and secure entries and isolations.

Complexity	Description Table
High 	Confined space Permit to work C (NC4/NCX) entries into a Chemical Environment (<i>Class C sewer/Chamber</i>) * Not including toxic gas room/CTBA activities
	Confined space Permit to work C (NC4) entries for the use of continuous Breathing Apparatus *
	Liquid Inundation any isolation or flow control device used for the protection of people with a high consequence in the event of failure **
	Works in a potentially explosive atmosphere with a high likelihood of gases being present
	Works involving excess heat hazards
Medium 	Confined space Permit to work C (NC4) entries for Hot Works, physically complex/non-standard entries & other introduced hazards *
	Entries significantly influenced by a pumping station/treatment works or process stream. **
	Entries involving diversions on major wastewater catchments where flow is altered from standard operation
	Liquid inundation, any isolation or flow control device used for the protection of people with a medium consequence in the event of failure **
	Inundation by a free flowing solid
	All NC2, NC3, NC4 & NCX (excluding toxic gas), entries that do not meet higher complexity criteria.
	Intrusive working in a dry Well, tank or chamber with a Med/High consequence of failure. **
Low 	All NC1, NC2, & NC3 entries that are or do not meet higher complexity criteria.
	Liquid Inundation, any isolation or flow control device used for the protection of people with a low consequence in the event of failure **
	Intrusive working in a dry Well, tank, or chamber with a low consequence of failure. **
SHE3 Risk Assessment	A Thames Water SHE3 Risk Assessment may be used to approve works which have been determined as low risk (for example NC2 entry on to small diameter pipes). This will involve a review of the planned work in conjunction with the local Health and Safety Advisor and the CSA. Note: These activities will not be coordinated or conflict checked by the CSA.
* Key	*Reference must be made to Thames Water HSI 41 for guidance on planning an entry that requires a C-Permit. (Contractors should seek guidance from Thames Water Approved Person (C) or the CSA). **Flow control device Risk Assessment, condition survey and temporary works assessment may be required. Flow Control device must be maintained and inspected prior to use. Hazard Rating tool below and the Fill Time Calculator in Thames Water HSP46C can be used to understand influence/consequence. Modelling may also be required to demonstrate consequence levels.

Hazard Rating Tool

Hazard Rating (m2/s)	Velocity (m/s)													
	0	0.25	0.5	0.75	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3	3.1
Flow Depth (m)	1.3	0	0.325	0.65	0.975	1.3	1.625	1.95	2.275	2.6	2.925	3.25	3.575	3.9
	1.2	0	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3	3.3	3.6
	1.1	0	0.275	0.55	0.825	1.1	1.375	1.65	1.925	2.2	2.475	2.75	3.025	3.3
	1	0	0.25	0.5	0.75	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3
	0.9	0	0.225	0.45	0.675	0.9	1.125	1.35	1.575	1.8	2.025	2.25	2.475	2.7
	0.8	0	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4
	0.7	0	0.175	0.35	0.525	0.7	0.875	1.05	1.225	1.4	1.575	1.75	1.925	2.1
	0.6	0	0.15	0.3	0.45	0.6	0.75	0.9	1.05	1.2	1.35	1.5	1.65	1.8
	0.5	0	0.125	0.25	0.375	0.5	0.625	0.75	0.875	1	1.125	1.25	1.375	1.5
	0.4	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	1.1	1.2
	0.3	0	0.075	0.15	0.225	0.3	0.375	0.45	0.525	0.6	0.675	0.75	0.825	0.9
	0.2	0	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6
	0.1	0	0.025	0.05	0.075	0.1	0.125	0.15	0.175	0.2	0.225	0.25	0.275	0.3
0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Low Hazard (Low Consequence)	Medium Hazard (Medium Consequence)	High Hazard (High Consequence)	Extreme Hazard
Flow consequence must be understood and agreed by TSR appointed persons or the CSA.	Flow consequence must be understood and agreed with by the CSA.	Flow consequence must be understood and agreed with by the CSA. Additional controls maybe required to reduce the hazard.	Do Not Proceed, additional controls required to reduce or mitigate the hazard to an acceptable level.