Frazer-Nash Consultancy is pleased to provide this proposal for Lot 4 of the Hydrogen Skills and Standards for Heat Programme. We are working at the forefront of the energy transition and are engaged by BEIS' vision for clear objective evidence to support the emerging hydrogen economy. We recognise that the development of technical standards is a key part of the evidence base for hydrogen for heat and is essential for the delivery of hydrogen heating trials.

1 Skills and Experience

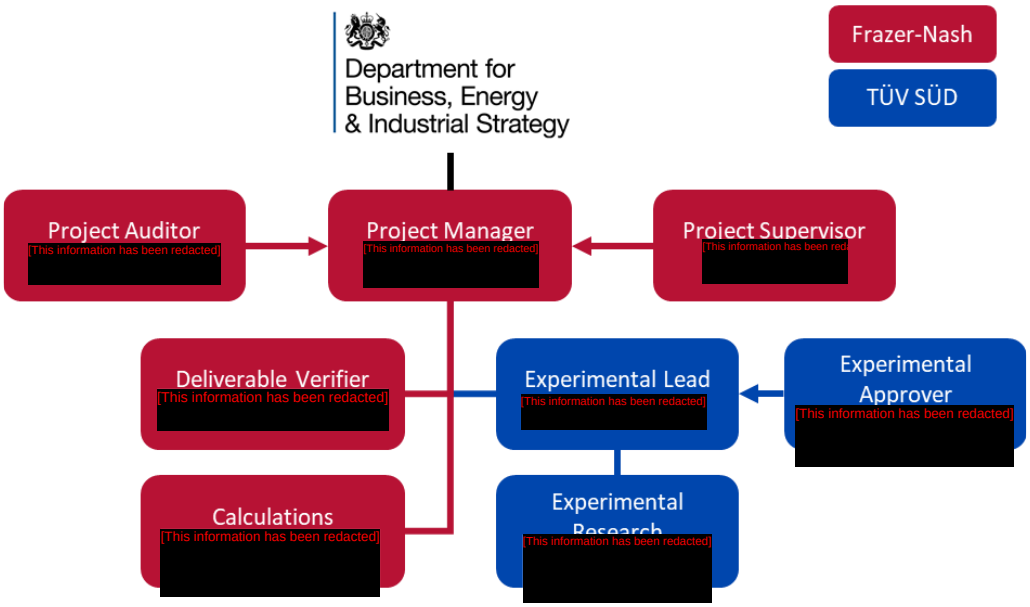
BEIS is undertaking a demonstration-led approach to the Hydrogen for Heat programme, and rigorous experimentation backed up by detailed gas flow analysis and industrial research is at the heart of our method. Frazer-Nash Consultancy is a leading, independent engineering and technology consultancy. We undertake gas and fluids modelling for a range of safety critical industries including in nuclear, O&G and process industries often for the purposes of developing standards and industry best practice. To deliver this work we have partnered with TÜV SÜD National Engineering Laboratory who will undertake the gas flow experiments. TÜV SÜD is the holder of the UK's National Standards for flow and density measurement. Frazer-Nash will provide the project leadership, research and gas flow modelling and will work closely with TÜV SÜD to plan, deliver and verify the supporting experiments. Our roles in the delivery of this work are summarised as follows.

Project Role \ Project Partner	Frazer-Nash Consultancy	TUV SUD National Engineering Laboratory
Project Management and interface with BEIS	✓	
Literature Review	✓	
Gas Flow Calculations	✓	
Hydrogen Flow and Pressure Experiments		✓
Verification of Experiments	✓	✓
Reporting	✓	

1.1 Delivery Team

We have formed a specialist team to deliver the desk based and experimental activities. This comprises a range of senior staff to lead and oversee the work and junior staff for value. The project governance roles are in accordance with Frazer-Nash ISO9001 approved project controls.

The project manager [This information has been redacted] will be the primary contact for BEIS during this project. [This information has] has a background in industrial R&D and has managed research projects varying in value from £5k to £500k. [This information has] will be supported by a team of engineers proficient in gas flow modelling, standards development and hydrogen experimentation. Our project delivery team is as follows:



Pen-portraits for the key members of the delivery team are as follows:

[This information has been redacted] – Project Manager

[This information has been redacted]

[This information has been redacted] – Project Auditor

[This information has been redacted]

[This information has been redacted] – Experimental Approver

[This information has been redacted]

[This information has been redacted] – Project Supervisor

[This information has been redacted]

[This information has been redacted] – Deliverable Verifier

[This information has been redacted]

[This information has been redacted] – Experimental Lead

[This information has been redacted]

[This information has been redacted] – Experimental Research

[This information has been redacted]

1.2 Case Studies

Recent projects undertaken by our delivery team are summarised as follows:

Case Study 1: Appraisal of Domestic Hydrogen Appliances

[This information has been redacted]

Frazer-Nash explored the engineering challenges of developing domestic gas appliances (boilers, cookers and fires) that can operate on 100% hydrogen. We looked at how domestic natural gas appliances operate and considered the key components that would need to be re-designed for hydrogen. This study involved a detailed literature review and extensive industry engagement with appliance and component manufacturers, test centres, academics and consultancies.

We also investigated the logistical challenges of transitioning UK domestic properties from natural gas to 100% hydrogen. We investigated the gas pipework systems that

are currently used in UK homes – how these are installed, the required safety tests and the typical timescale and costs of installation and maintenance. We considered the regulations governing domestic gas work and the training required by skilled Gas-Safe engineers. This work was led by [This information has been redacted]

Case Study 2: Domestic Hydrogen Gas Metering Testing

[This information has been redacted]

TÜV SÜD designed and built a hydrogen flow calibration facility for domestic gas flow meters. They have been using this to provide new traceable, independent and accurate testing of hydrogen gas meters for homes.

Domestic gas meters are subject to type approval under the EU Measuring Instruments Directive and must demonstrate maximum permissible errors as low as 1%. Facilities used to calibrate flow meters must be several times more accurate than the device under test, so a major challenge was to provide the hydrogen reference flow rate measurements with suitably low measurement uncertainty. The calibration facility can operate with hydrogen or mixtures containing hydrogen at flow rates of up to 50 Sm^3/hr. Measurement uncertainty in the reference hydrogen flow rates is estimated at ±0.3% at 95% confidence.

The calibration facility is currently being used in a test programme to support the UK HyDeploy project. This work was carried out by [This information has been redacted]

Case Study 3: [This information has been redacted]

[This information has been redacted]

[This information has been redacted]

Case Study 4: [This information has been redacted]

[This information has been redacted]

[This information has been redacted]

Case Study 5: [This information has been redacted]

[This information has been redacted]

[This information has been redacted]

2 Methodology

Our method follows the proposed approach in the ITT and will develop a rigorous evidence base on pipe pressure losses with 100% hydrogen compared with natural gas. This is highlighted as follows:

2.1 Literature Review

The calculation of pressure drops in pipes follows a well known methodology that relies on both knowledge of the physical dimensions of the pipe, the gas velocity, density and a friction factor. The friction factor is calculated from a combination of the physical roughness of the pipe but also the Reynolds Number which is a function of the flow and the physical properties of the gas. The approach taken in BS 6891 covers two gases (natural gas and LPG) the physical properties of the gas have been simplified into relationships for ease of use within this standard.

In the literature review, we will gather evidence on methods and data for pipe pressure losses involving 100% hydrogen in the pipe size and velocity range required. We will investigate existing hydrogen programmes Hy4Heat, H21, HyDeploy and H100 as well as the wider academic and grey literature [This information has been redacted]

2.2 Hydrogen Flow Calculations

2.2.1 Existing Natural Gas Pressure Drop Calculation

BS 6891:2015+A1:2019 (BS 6891) covers the design of gas pipe work up to 35 mm in diameter between the meter and the appliance isolation valve. The maximum pressure drop allowed between these two points is 1 mbar. Annex A of the standard gives guidance on how to calculate the pressure drop for natural gas and LPG. Included in this guidance are a set of tables (scope shown in table) with calculated pressure drop for a range of heat input cases for both Natural Gas and LPG.

Variable	Scope covered in Tables in Annex A of BS 6891
[This information has been redacted]	

2.2.2 Application to Hydrogen

[This information has been redacted]

We will collate and compare the range of experimental data published and also the calculation methods found in the literature search.

2.3 Identification of potential vibration issues

The gas velocity of hydrogen within existing pipe installations will be higher than the current natural gas velocity and we will carry out a desktop assessment of potential vibrations this may cause. The natural frequency of a section of pipe work is based on its cross section and the length between pipe supports. The frequency of a standing wave length within a section of pipe is based on the length of the pipe and the speed

of the gas within it. When these two frequencies are the same then the pipe can enter resonance and have vibration issues.

Initially, we will examine the potential vibration cases in [This information has been redacted] [redacted]. This will highlight whether the resonant pipe lengths calculated are likely lengths to be seen within a domestic or non-domestic setting. The model developed for this will be made in the BEIS QA modelling Excel template.

For each case we also propose conducting a vibration risk screening calculation for Flow Induced Turbulence Excitation based on the Energy Institute's 2008 standard "Guidelines for the avoidance of vibration induced fatigue failure in process pipework, 2008". In contrast to the separate calculations we propose for length based resonance, this calculation appraises the risk of flow excitation caused by a representative but bounding run of bends that could occur between 2 pipework supports. Frazer-Nash were part of the Steering Group that updated this standard in circa 2016 for subsea pipework applications.

2.4 Physical Testing

Experiments will be conducted in TUV SUD National Engineering Laboratory's Hydrogen Domestic Gas Metering Test Facility.

[This information has been redacted] [redacted]

[This information has been redacted] [redacted]

Based on TUV SUD's experience with ensuring accurate pressure measurement the following steps will be taken:

- Copper and steel pipes will be ultrasonically scanned to ensure uniform wall thickness and inner diameter at the pressure tapping location.

- Practical care and precision will be taken when tapping the pipe as distortions, burrs or other anomalies with the tapping hole itself can cause unreliable measurement.

The test matrix has been developed to cover a range of pipe sizes, materials, gas flowrates and velocities. We will run this matrix using [This information has been redacted]

[redacted]

1: Baseline Nitrogen Test

[This information has been redacted]

2. [redacted] Data Analysis

Full data analysis of the [This information has been redacted] comparing with the expected pressure drop values obtain through theoretical calculations. There may be a need to repeat certain conditions or review the test set up if there is large variations from the theoretical values. All data analysis conducted under will be included in the final test

3: Hydrogen Test

Tests 1.1 to 1.5 repeated with hydrogen

4. Hydrogen Data Analysis

Full data analysis of the hydrogen test data, comparing with the expected pressure drop values obtain through theoretical calculations. Any and all issues with the test set up should be picked up between Tasks 1 and 2, so the expectation is that any anomalies or deviations from expected data are due to the change in fluid and not the test set up or facility. All data analysis conducted under Task 4 will be included in the final test report.

The test matrix currently consists of a number flowrates which will need to be confirmed before testing. Two repeats will be taken for each test condition (three measurements in total).

2.4.1 Vibrational Analysis

[This information has been redacted]

2.4.2 Full Test Report Covering Baseline Tests

We will develop a comprehensive test report outlining the background, experimental test set ups and methodologies, along with the full data analysis including raw data sets. It will include photographs of each test set up and a full calibration summary of all instruments used in the test and uncertainty analysis for pressure drop measurements, demonstrating confidence in the measured results.

2.5 Ready Reckoner Tables

We will implement the standardised methodology that has been developed from the literature review and validated experimentally, in the BEIS Quality Assurance Modelling Excel Template to produce a series of ready reckoner tables mirroring those published in Annex A of BS6891. By using the BEIS template the implementation of the standardised methodology will be clear to future users and ease further use of the methodology.

Section A.3 of BS6891 is an example natural gas pipework installation design. This is described as a typical natural gas copper tube installation; it has various pipe sizes and four appliances. [This information has been redacted]

3 Management of Delivery

3.1 Project Management

Frazer-Nash is a Corporate Partner of the Association of Project Management (APM). We employ experienced project and programme professionals that utilise best practice from across industry to deliver projects to time and cost.

3.2 Project Kick Off

Both Frazer-Nash and TÜV SÜD will attend the project inception meeting where we will present and agree the methodology with BEIS project team and the standards bodies. We will confirm this in a final project plan delivered to BEIS.

3.3 Project Progress

We will schedule monthly virtual meetings via Teams (or similar) with the BEIS project manager and [This information has been redacted] to update on progress, project risks and any inputs from other parts of the programme. We will report quarterly evaluation KPIs.

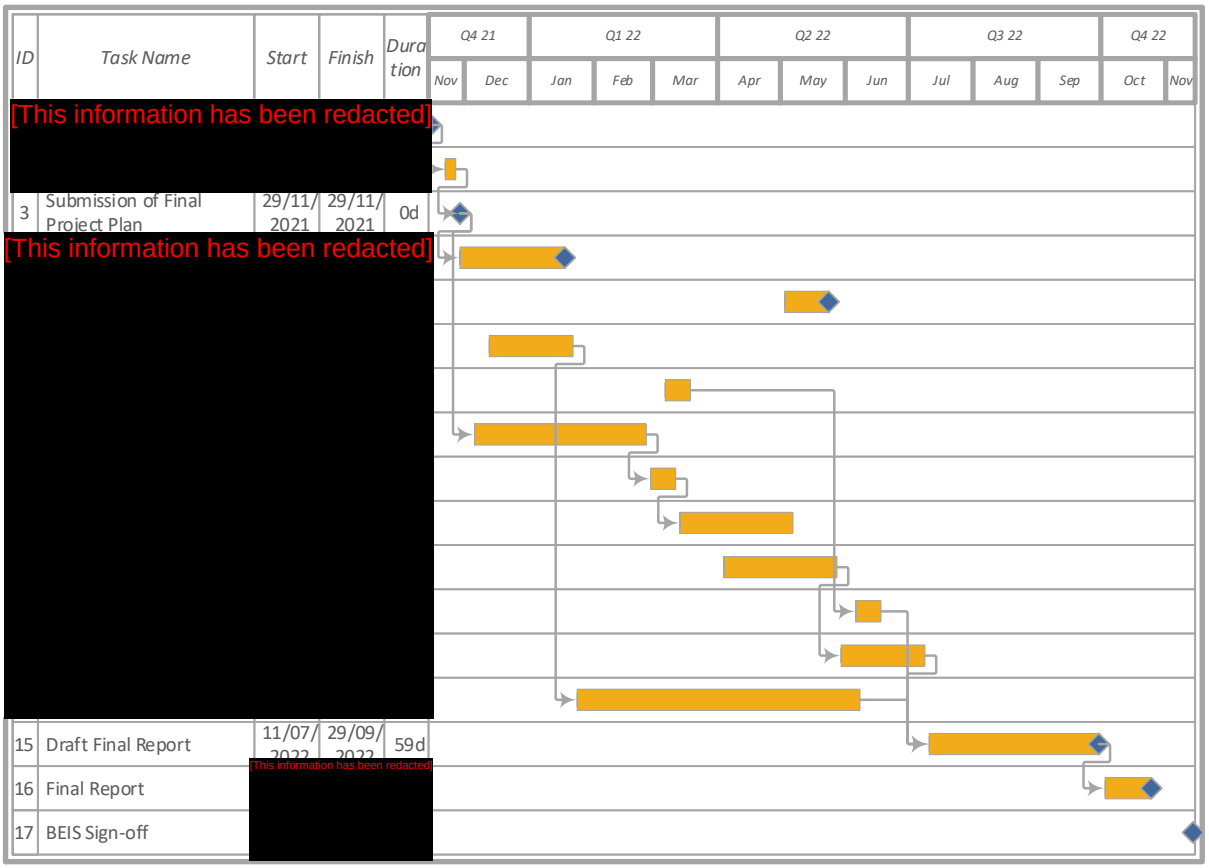
An interim project meeting will be held in the week commencing 16th May 2022, where we expect to present the results of both the literature review and assessment of existing evidence and the results from [This information has been redacted] experiments and initial results from the hydrogen testing. We will then deliver this as an interim report.

3.4 Final Reporting

Our final report will provide a thorough account of our activities including literature review, gas flow calculations and experiments. For the experiments we will explain the methodology used, assumptions made with justification, experimental setup, full experimental results, ready reckoner tables, conclusions and recommendations. We will issue a draft report to BEIS for comment before submitting the final report. We request that consolidated comments are provided within 2-3 weeks of submission.

3.5 Project Milestones, Deliverables and Gantt Chart

The project milestones and deliverables are listed below along with a project Gantt Chart. Note these dates assume that the contract award date and availability of BEIS stakeholders to attend meetings and review deliverables.



Milestone / Deliverable	Date Due
Contract Commences	[This information has been redacted]
Project Inception Meeting	
Final Project Plan	
Submission of Literature Review	
Interim Project Meeting/Presentation	
Interim Report	
Ready Reckoner Tables	
Draft Report	
Final Report	
BEIS Sign-off	14/11/2022

3.6 How We Will Deliver Success

- **We have the right people to manage the project.** Our Project Manager, [This information has] has experience of managing research and development projects. [This information has b] experience includes both managing small (~£5k) and large (~£500k) projects including working collaboratively with other organisations to deliver to the customer.
- **We have the right people to analyse and gather information, develop the model and write up the findings.** Our delivery team has significant expertise in industrial research and gas flow modelling, including hydrogen. Our team has delivered similar projects and has a track record of undertaking clear and rigorous industrial research, including for BEIS.
- **We have the right people and facilities to undertake the experiments**. TÜV SÜD has the existing hydrogen test facility for gas meters and the engineers experienced in undertaking gas flow tests to very low uncertainty.
- **We have rigorous procedures for verification of the findings.** Our team includes additional highly qualified engineers to verify the findings. [This information has been redacted] will verify the literature review, standardised methodology creation and other calculations carried out by Frazer-Nash. He has a track record in delivery of projects of this type and is comfortable with applying Frazer-Nash's rigorous verification procedures.

  The structure of the practical work to be carried out by TÜV SÜD has verification of the results built into the test programme. By carrying out [This information has been redacted] followed by a secondary review of the results against the calculations by Frazer-Nash the test setup will be checked for errors before moving on to the new measurements with hydrogen.
- **We have Senior Independent review**. [This information has been redacted] will provide high-level oversight to the project. He will be removed from day-to-day activities so that he can

provide independent assessment of the deliverables (essentially putting himself in BEIS' position).

- **We have a robust plan to manage the risks and ensure our Quality Assurance is maintained throughout the project.** Frazer-Nash has a designated Quality Manager and all our staff are trained in our Quality Management procedures.

3.7 Quality Management System

Our Quality Management System (QMS) ensures that the products and services we provide to our clients fulfil their expectations and business objectives. As a consultancy we are adept at tailoring our approach to comply with the requirements of our clients' own specific quality standards and other sector schemes, as required by the markets in which we operate. Our system is designed to be effective and economical, and to provide objective evidence that our delivery is fit for purpose. The QMS is an essential part of our ability to work in industries where the consequences of errors or non-conformances are serious.

We have developed a tailored Quality Assurance plan for this project from our ISO9001 certified Quality Management System (QMS) and this is summarised as follows:

[This information has been redacted]

3.8 Project Controls

Our QMS requires an individual quality plan to be completed for each project under contract. This plan is a single reference source for: the people, processes and tools which will be used in executing the work; the quality procedures to be followed; the project controls used and the deliverables that will be produced. To ensure that quality procedures are correctly adhered to, a trained Frazer-Nash quality representative will oversee and sign off the process on completion.

Our quality system also requires that each project has a nominated project auditor; providing an independent reviewer to deliver a balanced assessment of the project objectives, including satisfying the client's requirements, combined with a review of the technical and commercial risks across the complete project. [This information has been redacted] will act as auditor and he has significant experience in research and fluid flow modelling. The project will receive formal project audits, with the project manager and auditor meeting to discuss the project and agree that the project risks are controlled.

3.9 Quality in Undertaking Literature Reviews

In our Literature Review, we will undertake a Quality Assessment (QA) on the long-list of information sources, before we down-select to a short-list for detailed consideration:

Our QA will consider if the:

- Research is clear and justified
- Document is appropriately referenced
- Methods employed by the research are appropriate
- Document has been peer reviewed or independently verified
- Conclusions are consistent with the results
- Author and publishing organisation have a track record in the area of fluid mechanics.

3.10 Control and Storage of Information

As a company we routinely receive, store and handle sensitive information from clients, individuals and governments. We recognise the importance of robust control and storage of this information and have an active Information Assurance Policy to ensure that appropriate methods are employed to achieve this. Our Information Security Management System is accredited to ISO 9001:2015.

3.11 [This information has been redacted] Development and Use

Development of the [This information has been redacted] requires application of quality assurance processes above and beyond those already mentioned. The outputs produced will be subject to our quality processes and will be produced in-line with BEIS Quality Assurance guidance for models. In particular:

[This information has been redacted]

3.12 Reporting and Deliverable Quality

The deliverables will be recorded in the project's Quality Plan, which will also appoint a suitably qualified and experienced independent verifier and an independent approver for both the model and report. Each deliverable will be also be subject to a "Deliverable Verification and Approval Record" (DVAR), which will record the agreement between author, verifier and approver that the deliverable is fit for purpose. These measures, in addition to a formal project audit will ensure that an objective record of project quality is maintained throughout delivery.

3.13 Management of Subcontractors

TÜV SÜD will be subcontractors to Frazer-Nash. Frazer-Nash has a structured process for managing subcontractors and BEIS can have confidence that we will manage this in a professional and transparent manner. We have a designated subcontractor manager who oversees our 3rd party service procurement and to date we have a 100% success rate of working with our sub-contractors and have never entered into a dispute. The key features of our subcontracting are as follows:

- We undertake a due-diligence process to approve the sub-contractors we work with at the start of our procurement process. We have confirmed that TÜV SÜD hold ISO 9001:2015.

- We flow down our client's contracting terms to subcontractors where appropriate and ensure our sub-contractors are aware of our client's priorities for successful project delivery. Our contracting templates are drafted in such a way to promote clear, unambiguous specifications of work.
- All outputs received from sub-contractors will be subject to approval by the Technical Lead before delivery to BEIS.
- Our approach is tried and tested – [This information has been redacted]

3.14 Risk Management

Our approach to risk management ensures that risks are identified early, effective mitigations are put in place and where appropriate, issues are escalated and resolved as quickly and effectively as possible.

Our risk management process has been refined and developed from our experiences of managing similar industrial research projects across a wide range of industry sectors. It benefits from the application of best practice, tools and techniques. The key activities of our risk management process are outlined below:

[This information has been redacted]

Our Project Manager, [This information has been redacted] will be the single point of contact with BEIS to ensure clear communication and involvement in the risk management process. We will set up a live risk register at the start of the project and review and update this throughout its duration. We will review risks at the Kick-Off meeting and will provide updates during each meeting with BEIS. We will escalate any issues or high risks pro-actively to ensure their early review and collaboration in the development of solutions. The overall aim is to ensure risks are identified and managed early, to minimise issues. Where issues do arise, these will be addressed and managed to the satisfaction of the stakeholders.

During the development of our tender, we have identified a number of specific risks to the delivery of this project and these are summarised in the following table. The table also includes controls and mitigations that we propose to use to minimise the probability/severity of the issues that may impact the project. Risks are characterised in terms of Severity (1-5) and Likelihood (1-5) with the Overall Risk Score the product of these two (1-25).

ID	Risk	Mitigation(s)	Severity (1-5)	Likelihood (1-5)	Score (1-25)
1	Poor or incorrect evidence is found during the literature review. When incorporated into the model, this provides wrong results.	We will undertake Quality Assurance on the evidence used (that conforms to BEIS processes). This will highlight poor information. The results of the calculations are being compared to experimental data.	[This information has been redacted]		
2	The experimental results do not align with the theoretical calculations. Resulting in inconclusive outcomes to the project.	Both TÜV SÜD and Frazer-Nash's quality processes are ISO 9001 certified. This will significantly reduce the possibility of erroneous results. Any inconsistencies will be identified at an early stage and rectified through Frazer-Nash and TÜV SÜD working together.			
3	The outcome of the project does not fulfil the requirements to provide the evidence required for the future work in developing the hydrogen economy	The project will have a kick off meeting involving the project stakeholders to confirm the project plan meets the requirements of the stakeholders.			
4	[This information has been redacted]				
5a	Loss of Frazer-Nash personnel in project. Project requires expertise in gas flow calculations. If key staff are lost, this could impact project quality and delivery timescales.	Frazer-Nash has considerable strength in-depth in our in fluids analysis. We have over 40 qualified fluids engineers and modellers who could meet any personnel gaps. The technical oversight provided by our Senior Approver allows project knowledge to be passed without delays to project.			
5b	Loss of TÜV SÜD personnel in project. Project requires expertise in operation of the hydrogen experiments.	There are multiple people trained and competent in running the hydrogen facility.			

ID	Risk	Mitigation(s)	Severity (1-5)	Likelihood (1-5)	Score (1-25)
6	Hydrogen test facility not fully available due to other projects, maintenance or purchasing delays on pressure instrument.	On contract award the work will be scheduled into the facility timetable. The facility has been operating for a year and so is new and tested. Purchase of pressure instrument will be as soon as project starts.	[This information has been redacted]		
7a	COVID 19 causes delays to the project.	Both Frazer-Nash and TÜV SÜD have set up effective home working during the pandemic. TÜV SÜD has also effective procedures to continue undertaking practical work.			
8	Break down in contractual relationship between Frazer-Nash and TÜV SÜD .	Our preparation for this bid has been thorough we have agreed both T&Cs with flow down from the BEIS T&Cs and a statement of work for the experimental part of the project			
9	Delay in project due to delay in contract acceptance or availability of BEIS staff to support meetings and project reviews	Project planned and meetings and reviews planned in programme align with requirements of ITT			

4 Social Value

Frazer-Nash has a rich history of creating UK jobs and supporting training in emerging sectors. Today our company employs over 850 staff, mainly from engineering and technology sectors which are recognised on the UK's Shortage Occupation List. With offices across England and Scotland, many in or near locations considered deprived, we are actively supporting local economies and providing much needed employment opportunities. We also invest heavily in our staff, supporting their personal and professional development, this is embodied in Frazer-Nash's company value, 'we care'.

4.1 Our Company Values

Frazer-Nash's purpose is to help organisations deliver innovative engineering and technology solutions to make lives safe, secure, sustainable and affordable. This purpose is underpinned by our company's values:

- We care
- We deliver success
- We are trusted
- We want to do things that matter

We are a people business, our people are at the very heart of what we do, they are the reason our clients work with us to solve some of their greatest challenges. So, 'we care' about our people and support them to develop professionally and personally.

4.2 Breaking Down Barriers

We recognise the value that differences bring to our company. Diversity and a culture of inclusion are vital for us if we are to build a strong sustainable business that harnesses innovation and creativity, two fundamental elements of what makes Frazer-Nash. To deliver our Diversity and Inclusion Ambitions we need to recruit and retain key talent in line with the Equality Act 2010 and the Fair Work Act 2009. We will always work to avoid bias and we will build a culture that values meritocracy, openness, fairness and transparency.

We will comply with the relevant legislation within the countries we operate and will integrate diversity management with our established and approved management systems covering Quality, Health & Safety, Environmental and Information Security management, in accordance with internationally-recognised standards, as applicable.

To deliver this contract we have selected a team based on relevant skills and experience to meet the requirements of this tender and provide a high quality of service to BEIS. The staff who will deliver this work are from our Middlesbrough and Glasgow City office locations, in the performance of this contract we will be supporting employment opportunities in these areas. TÜV SÜD is also based in Glasgow.

We are committed to fostering a working culture that brings out the very best in our people, regardless of their circumstances, identity or background. We want our people to be themselves, feel empowered to achieve their personal and professional goals, and know that we respect the unique value they bring to the company. In support of this, we encourage thoughtful behaviours and work to foster a collaborative working environment.

We are all working to promote and support the activities that will strengthen us as an inclusive employer. Not only are we fully committed to the elimination of unlawful and unfair discrimination, we value the differences that a diverse workforce brings to the organisation, and want an environment where everyone can be the best they can be and are fairly rewarded and recognised for the work they do. This is the approach that you can expect from our team inclusive throughout the delivery of this contract.

4.3 Overcoming Skills Shortages

The engineering and technology sectors are at the core of our business, without people with these critical skills we would have no business. Therefore, we are acutely aware of the engineering skills shortages recognised nationally in the UK Occupation Shortage list and the need to recruit, train, develop and retain people with these skills to meet demand in this high growth sector. Furthermore, securing this work will

continue to demonstrate to our business that hydrogen is an emerging industry where we should invest further by equipping our staff with specialist skills for this sector.

We support our people seeking Chartership, we establish training plans and a mentor is assigned to provide all the necessary guidance and support. We ensure that our people learn a new skill set, work within another Frazer-Nash business group, work in a different market sector, and broaden their technical experience. Through this we ensure that our people acquire all of the necessary competencies to successfully attain Chartership status.

Through delivery of this project we will be directly supporting [This information has been redacted] as they work towards Chartered status. Frazer-Nash is currently investing in both [This information has been redacted] through [This information has been redacted]. Our training doesn't stop once our staff achieve Chartership, our Learning and Development Team provide a range of bespoke and CIPD recognised courses for staff across the business.

We also seek to support those considering a career in engineering at an early stage. We currently sponsor 10 PhD and EngD students across the UK and work hard to ensure that their research activities are incorporated and absorbed into our corporate skill-set. We anticipate significant early careers requirements for next year, and expect to employ 70 graduates, 44 summer students and 20 Year in Industry students.

Our Engineering Managers are constantly reviewing the skills in their teams to ensure they have the critical skills resilience required to support our clients. Delivering this project further enhances our ability to create employment and training opportunities in engineering and technology disciplines.

4.4 Our Communities

Our contribution to society is measured by both what we do and how we do it. We work together with our clients and our delivery partners, acting as their colleagues, learning from one another and always working as a team to deliver the best results. We recognise our values are closely aligned with your social value objectives, and we want to use this project as a chance to create employment and training opportunities, and influence stakeholders.

Frazer-Nash people regularly contribute to debate across the engineering sector through our membership of the Institution of Engineering and Technology (IET). Our people regularly speak at their events, contributing thought leadership and shaping the future direction of the organisation as panel members. [This information has been redacted] is the [This information has been r]. Thorough their programme of events they educate the engineers and scientists and have been supporting the promotion of hydrogen within the Tees Valley, through this contract [This information has] will be able to have greater input into the promotion of hydrogen within this platform.

4.5 Working with subcontractors

Frazer-Nash has a dedicated Procurement & Supply Chain Function. We work with a broad range of subcontractors on a regular basis, allowing us to offer our clients a diverse range of experience across different sectors. Our supply chain tracking system includes a robust end to end procurement process. This starts with supplier due-diligence, to screen and approve the suppliers we work with. The approval process includes financial screening, anti-bribery screening, and a number of different quality checks. We assess our supplier's experience, accreditations, insurances and other qualification aspects which may be of interest to our clients. We also ask each supplier to review and confirm compliance with our supplier code of conduct, so that we can be sure that all of our suppliers conduct their business in an ethical and socially responsible manner: www.fnc.co.uk/suppliercode.

Frazer-Nash are subcontracting TÜV SÜD to carry out the experimental work after fulfilling our supplier due-diligence process. We have agreed with TÜV SÜD the terms and conditions, flowing down conditions from BEIS T&Cs where required, and scope of work for their supply to Frazer-Nash of the experimental work. We have worked collaboratively to produce this proposal.

We recognise the importance of paying our suppliers promptly and have signed up to the prompt payment code and will pay TÜV SÜD promptly. To complete our end to end process, our Suppliers are also scored at the end of each project help inform future buying decisions and drive process improvements.

5 Price

Detail of our pricing is provided separately, all travel and subsistence for delivery of the project has been included within the fixed price of £94,728 excluding VAT.

[This information has been redacted] of the project by value will be subcontracted by Frazer-Nash to TÜV SÜD for the delivering the experimental part of the project.

The table below shows the invoicing schedule for the work.

	Milestone	% Paid	Amount
1	BEIS acceptance of literature review	[This information has been redacted]	
2	Interim presentation and report of progress		
3	BEIS acceptance of the draft report		
4	Receipt of final report		
5	BEIS acceptance of the final report		
		Total	**£94,728**

We expect acceptance within 20 working days of receipt.