



# **Guide to Professional Development and Professional Qualification for Hydrologists**

**Draft 1.1**

**September 2008**

**Prepared by the BHS Professional Development and Training Working Group**

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### **1. Objectives of this Guide**

The objectives of this guide are to provide BHS members with information on the current opportunities and procedures for hydrologists aiming to attain a recognised professional qualification, referred to here as Chartered Status. Chartered status can currently be achieved through your own efforts with the support of a colleague who is already professionally qualified. In some cases it can also be achieved through a Professional Development training scheme operated by your employer and recommended by the Society (although just some of the larger consultants have such schemes at present). The aim of this guideline is to resolve confusion and misunderstanding over issues of professional affiliations and qualifications, and to help hydrologists to make informed decisions about the best route to Chartered Status for their individual circumstances.

BHS would welcome any comments or corrections which would lead to improvements to this document however, it is unfortunately unable to offer advice on any individual member's application for Chartered status (unfortunately we do not have the staff resources). Any comments about this guide should be sent to the BHS Honorary Secretary at [honsec@hydrology.org.uk](mailto:honsec@hydrology.org.uk) (Please use President's email: [frank.farquharson@btinternet.com](mailto:frank.farquharson@btinternet.com)).

A glossary of terms used in this guide is included as Appendix D.

### **2. Why would a hydrologist want to achieve Chartered status ?**

Although Chartered status may not be relevant to your current employer, it may be a very important factor should you move to a new job with another employer. Chartered status is becoming more important for career progression showing employers, clients and work colleagues that you are as well qualified and competent as other professionals.

Achieving Chartered status provides many benefits for the individual, employers and society as a whole. It is a universally accepted qualification benchmark for all professionals of similar standing in technical disciplines such as engineering, science, architecture, surveying and the natural or built environment. The more BHS members that achieve Chartered status, the more BHS will be able to raise the status and value of the professional hydrologist. The demand for hydrologists is growing and Chartered status helps demonstrate to employers, that as dedicated employees you will:

- Maintain high professional and ethical standards of service to clients and the public
- Have the requisite skills, knowledge and experience to become a valued member of staff
- Be capable of independent judgement and of innovation
- Demonstrate your potential for leadership



- Have access through BHS and a professional membership, to the latest information on innovation and sustainability
- Be committed to your own continued professional development.

### **3. Chartered status routes**

#### **3.1 Membership of a Professional Institution**

They are several different routes by which a hydrologist practicing in the UK can acquire Chartered status. Gaining this level of professional qualification is a considerable achievement and it must of course be earned through commitment, hard work and no little financial cost. For most of routes described below, there are three steps to Chartered status:

- a) Educational background
- b) Professional experience after graduation
- c) A professional interview, and in some cases an examination.

The educational background is perhaps the easiest to achieve, as we believe that more than three quarters of BHS members have a postgraduate qualification in addition to a first degree. Professional experience is acquired through your job, and we will show later what types of hydrological experience can be used to demonstrate achievement of the various competencies required by the various awarding bodies. The level of professional interview and/or examination is discussed in Appendix A.

It is important for each individual to carefully choose the best qualification and route, depending on their academic background, work experience and current role, career ambition, and what the individual wants from Chartered status.

In order to achieve Chartered status, BHS members must be members of one of the following Professional Institutions :-

- ICE, Institution of Civil Engineers
- CIWEM, Chartered Institution of Water and Environmental Management
- IES, Institution of Environmental Sciences
- IWO, Institution of Water Officers
- RMetS, Royal Meteorological Society
- RGS, Royal Geographical Society

Appendix A lists these Institutions and the basic qualifications needed to apply for membership.

#### **a) Main recommended routes to Chartered Status**

There are currently four main Chartered status designations a hydrologist may aspire to: CEng, CEnv, CSci and MCIWEM (where it is hoped the post nominal CWem may soon be used). The following section aims to provide guidance on potential routes to Chartered status for

hydrologist. The following table shows the available professional qualifications together with the associated Institutions able to award the qualification. The final column in the table suggests the type of hydrological experience that might be considered most relevant to each type of Chartered status, however, many hydrologists may feel that they cover more than one area of expertise. The choice of professional designation is a matter of personal choice, although you should be guided by your educational background, your postgraduate experience and your longer-term career aspirations as will be shown below.

<b>Professional Qualification</b>	<b>Designation</b>	<b>Awarding Institutions</b>	<b>Suggested Type of hydrologist</b>
Chartered Engineer	CEng	ICE, CIWEM, IWO	Engineering hydrologist
Chartered Environmentalist	CEnv	ICE, CIWEM, IES, IWO, RMetS	Environmental hydrologist
Chartered Scientist	CSci	CIWEM	Scientific hydrologist
MCIWEM	CWem*	CIWEM	Hydrologist

\* *The post nominal CWem is not currently available, and chartered members of CIWEM must call them selves “Chartered Water and Environmental Manager” in full. It is hoped that CWem will become legal during the final quarter of 2008.*

Unfortunately the Privy Council have indicated there can be no professional qualification allowing BHS members to use the title ‘Chartered Hydrologist’, so the above designations have been selected as those which most closely describes the career titles for BHS members who have achieved Chartered status with these designations.

#### **b) Other routes to Chartered status**

There are two other routes to Chartered status which a small number of BHS members have also followed. These are :-

<b>Professional Qualification</b>	<b>Designation</b>	<b>Awarding Institution</b>
Chartered Meteorologist	CMet	RMetS
Chartered Geographer	CGeog	RGS

The BHS Main Committee would not wish to denigrate these two qualifications in any way, which may well fully meet some members aspirations, However, we believe that they may not carry quite as much weight with some employers (such as firms of consultants) as CEng and CEnv, being awarded primarily on the basis of years of experience without reference to the same types of examination of individual applicant’s achievement of designated competencies..

#### 4. How to choose the best route for your career

The problem for the young hydrologist in choosing the best professional development route is the very breadth of the activities within the field of hydrology. It is not easy to navigate through all the detail within the four recommended Chartered Status routes, none of which are ideally suited to all aspects of hydrology.

There are two important elements that will help determine both the most appropriate Chartered route and the Professional Institution to apply for membership and through which Chartered status can be achieved.

- 1) Educational Background
- 2) Employment and working experience

As explained previously, determining which chartered qualification you might best attempt and deciding which institution to become a member of is a difficult choice, and one which must be determined by your educational background, postgraduate experience and by career aspirations. The first decision you should make is which Chartered route you wish to follow, and this will be determined partly by your educational background, partly by your current work experience and partly by your future career aspirations.

The second choice you need to make is one of which awarding Institution you might wish to, or be able to, become a member of. This will generally be determined by your educational background, as unless you have an MEng qualification, or possibly a BEng plus an appropriate MSc, attaining CEng is not possible. In this case, it might be more appropriate to consider going for CEnv, which may be achieved through CIWEM, ICE, IES, IWO or RMetS.

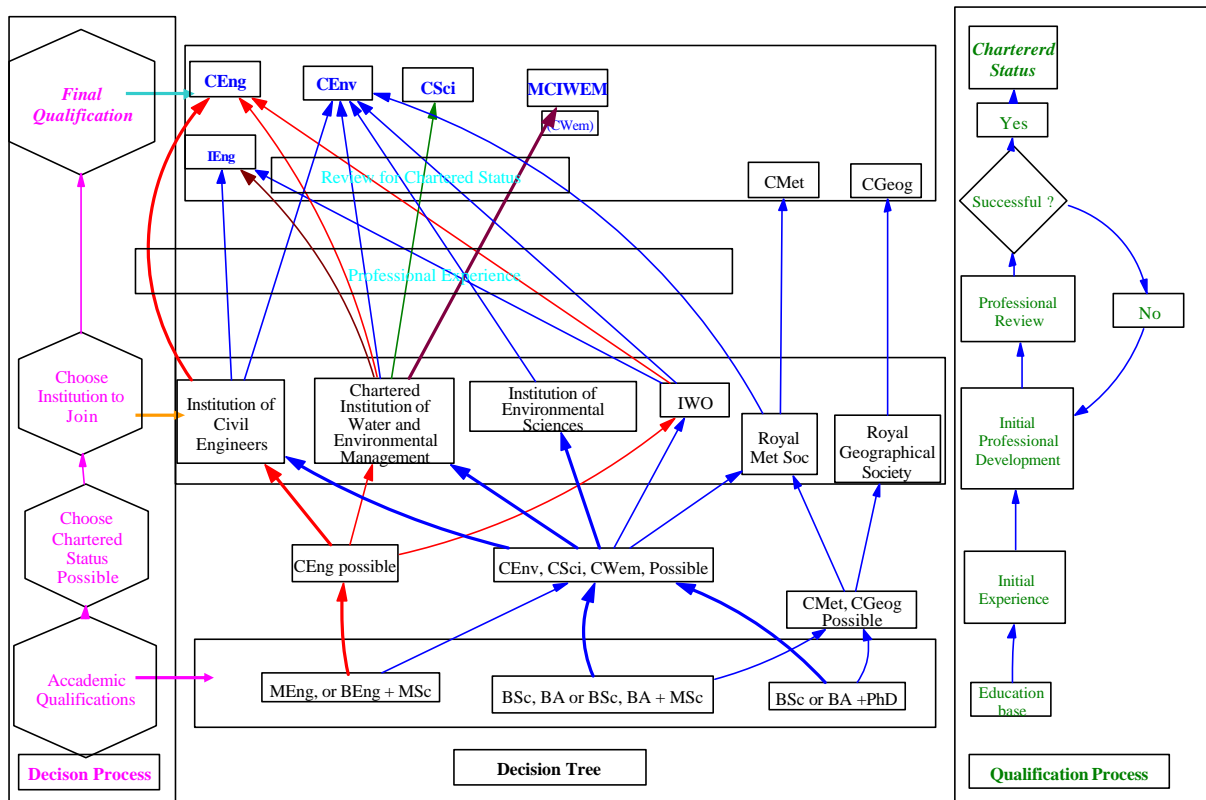
Fig. 1 shows a decision tree incorporating these elements to help you decide which of the four recommended Chartered status routes are most appropriate for your own personal circumstances. The light pink shaded column on the left hand edge of this figure shows the decision process, which may be summarised as:

- Decide which Chartered status your qualifications and experience fit you for (pink shaded row on Fig 1)
- Choose the most appropriate awarding Institution for the chosen Chartered grade (yellow shaded row on Fig 1)

The green shaded column on the right hand edge shows the qualification process;

- Your education base and experience to date should guide you towards the most appropriate Chartered qualification.
- You will then need to become a member of the most appropriate awarding Institution.
- You may then need to gain additional experience to fulfil the entry requirements for your chosen qualification, and having a mentor, or senior colleague to assist you through this phase can be very helpful.
- You must then fill in the appropriate application forms demonstrating that you have satisfied the necessary competencies.

- You will then have to pass the Professional Review of the awarding Institution, and in some cases (CEng), sit an examination to demonstrate your understanding of engineering practices and management (blue shaded row on Fig 1).



**Figure 1** Decision tree to guide you through the processes

Section 4.3 and Appendix B offer guidelines to help you match the competencies required for each professional qualification against your employment background and working experiences, and the following sections expand upon these issues

#### 4.1 Educational Background

Applicants for each of the six Chartered status routes must meet defined requirements for qualifications, experience and competence levels and be able to demonstrate commitment to maintaining that competence (Continuing Professional Development or CPD).

The educational qualifications are broadly similar to the requirements for membership of the appropriate recognised body, but there are some differences – for example Chartered Scientist requires an MSc. In some cases, a PhD can count as work experience and as an academic



qualification (e.g. a relevant PhD counts as 2 years' experience for the RMetS). Student vacation work can also count towards meeting objectives if it is relevant, documented and signed off.

## **4.2 Matching employment background and experience with competencies**

In order to understand the issues and procedures behind getting Chartered, it is helpful to first distinguish between the professional institution to which a hydrologist may apply for Membership (e.g. ICE, CIWEM, IES, IWO, RMetS or RGS), and the Council or Society who can register applicants as 'Chartered', hence dictating the basic requirements for award of that title (e.g. the Engineering Council, the Society for the Environment, the Science Council). For simplicity the first group are referred to in this report as 'Institutions' and the second group as 'Councils', although they do not all have those titles.

The Councils and most of the Institutions have a 'Royal Charter' granted by the Privy Council (a government office) which gives them authority to grant the title Chartered. The Institutions, among many other things, assess candidates, both for Membership of themselves and for registration with the Council as Chartered. This includes setting a specific list of professional development requirements called 'Mandatory Competences', which include the Council's basic criteria for attaining Chartered status, and may include more specific Institution requirements.

ICE, CIWEM, RMetS and the RGS have Royal Charters, and applicants may become Chartered directly via any of these without reference to an external Council, although registrations with one or more external Councils may also be applied for. Neither IES or IWO have a Royal Charter but are nevertheless able to award Chartered status, CEng by IWO on behalf of the Engineering Council, and CEnv by both on behalf of the Society for the Environment (SocEnv).

There are also various options for achieving membership (or grade of membership) of the various Institutions without necessarily becoming Chartered. To get Chartered status normally involves submitting written reports documenting experience to demonstrate the required competences, and attending a face-to-face interview (often called a professional review interview). The specific requirements vary for each Institution and Council.

See Appendices A and C for further details of the various Councils and Institutions.

## **4.3 Mapping of competencies for various Chartered routes**

At first glance the required competencies, or evidence of experience, for each of the Chartered qualifications, CEng, CEnv, CSci and CMIWEM look rather daunting, and it is easy for an individual to think "I cannot achieve these standards". However, in reality, with sufficient experience we believe that most hydrologists can in fact meet the competencies of at least one of these chartering bodies without too much difficulty. Many hydrologists have chosen their career after a bachelors degree followed by an MSc or PhD, as there is no first degree in

hydrology. Consequently, most hydrologists can meet the minimum educational requirements for CEnv, CMIWEM and CSci (plus CMet and CGeog) without too much difficulty. Attaining CEng has become more difficult in recent years, and only hydrologists with an appropriate educational background can expect to achieve these unless they have many years of relevant experience.

In Appendix B we attempt to provide examples of the types of hydrological work that can be used to ‘map onto’ the required competencies for CEng, CEnv or CSci. These examples are in no way comprehensive, and it would be quite possible for a hydrologist to use other types of experience to demonstrate achievement of a particular competency. The examples in Appendix B are intended to encourage applicants to recognise the types of hydrological experience that can be used to meet the requirements, and the list is not intended to be comprehensive.

For many of the development objectives, applicants must for example demonstrate ability, that is they must be able to demonstrate that they have performed the task without supervision, and hence the choice of verb can be very important. For some competencies it is possible to use words such as ‘participated in’ or ‘assisted with’ a task, but where ability is required, applicants should use terms such as ‘undertook a flood risk assessment’ or ‘led preparation of a drought assessment’ etc.

It is hoped that by referring to the examples in Appendix B that applicants can more readily translate their hydrological experience to the required competencies or attribute groups required to meet the requirements for CEng, CEnv or CSci.

In time, we hope that this document should also serve as guidance for employers who want to encourage Professional Development for Hydrologists through the adoption of structured training schemes linked to the recommended routes, to be known as the *PD4H* Routes. However, this PD4H option is not yet available for most hydrologists, although members considering Chartered Status are encouraged to approach their employers and enquire about professional development options within their organisation, and discuss the most appropriate route and training scheme to suit both the employer and the trainee hydrologist.

## 5 Conclusions

1. Chartership has obvious benefits – it is an internationally recognised statement of professional competence and reputation, it stands out on a CV and improves promotion prospects. Many advertised jobs are restricted to candidates who are Chartered;
2. There are currently six Chartered status options relevant to hydrologists practising in the UK: CEng, CEnv, CSci, MCIWEM, CMet and CGeog;
3. CEng is generally not an option for hydrologists without a MEng or BEng/MSc degree, unless they can demonstrate that their educational background is broadly comparable to an MEng (requires consideration by an ICE Accreditation Panel or the CIWEM Qualifications Panel), or have many years relevant experience (more than perhaps 8-10 years);

4. The ICE is encouraging hydrologists to join as Associate Members (AMICE), but this will not lead to CEng or IEng status but can lead to CEnv status;
5. To apply for chartership the applicant needs to document training and work experience, ideally signed by a supervisor (this can be anyone who knows what the applicant has done). Ultimately it will be up to the Professional Review panel to decide if achievement of the relevant competences required for Chartered status has been demonstrated, but it helps the members of the panel to make a judgement if the record has been signed for and can be verified;
6. It is the responsibility of applicants to ensure that they have sufficient experience to demonstrate achievement of the required competencies but it is useful to have a mentor to assist with review and suggest opportunities for fulfilling the requirements. It is often fruitful to have a mentor who is influential, but not an immediate line manager, so conflicting interests in work programmes are avoided;
7. Sitting the Professional Review without having the required experience and knowledge is not recommended, as the assessors are efficient at identifying weak candidates. It is recommended that candidates are honest about their experience and competences and know their own limitations.

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## **Appendix A Institutions and Chartered Routes**

### **A1- Bodies responsible for registration of Chartered status qualifications**

The UK national bodies approved by the Privy Council as the awarding authority for professional qualifications are:

- Engineering Council registers Chartered Engineers, CEng
- Society for the Environment (SocEnv) registers Chartered Environmentalists, CEnv
- Science Council registers Chartered Scientists, CSci

Applicants to the Councils must be a member of a professional body recognised by the Council or Society – for example CIWEM is affiliated to all three, whilst ICE is affiliated to the Engineering Council and SocEnv. Procedures for award of Chartered status vary slightly, but essentially are dealt with by the professional membership Institutions in accordance with the requirements of the Council or Society.

### **A2 – Professional Membership Institutions**

#### **A.2.1 Institution of Civil Engineers**

The Institution of Civil Engineers (ICE) offers a range of grades of Membership and paths for getting there, depending on qualifications and experience. There are three fundamental stages towards becoming a professionally qualified Member: The Educational Base (i.e. a recognised degree), Initial Professional Development (a set of Development Objectives must be achieved and formally recorded), and the Professional Review (submission of various documents including an Experience Report and a Project Report, followed by an interview and written exam). CEng, IEng and CEnv may be applied for along with the Professional Review application, and are assessed concurrently. The most relevant points for hydrologists may be summarised as:

1. To become a Chartered Engineer via the ICE, candidates must (with exceptions) first have a Masters level degree accredited by the ICE. This would typically be an MEng in Civil Engineering, but may differ, for example an accredited BEng or BSc followed by an accredited MSc. The ICE holds a list of accredited degrees, and is willing to consider degrees not on its list. They may request 'top up' courses and require candidates to undergo an Academic Assessment;
2. Engineering experience can count in lieu of academic qualifications – in an extreme case candidates may not need a degree at all, but can expect to spend a number of years achieving equivalent experience,
3. To become a Chartered Engineer the Development Objectives will include 'engineering principles' (technical and professional). Training and experience which is hydrological science, but not engineering, will not be sufficient. Some experience of construction sites will be



required for anyone who has a position which might involve responsibility for designing civil works;

4. Candidates can become a Member of the ICE (MICE), but not a Chartered Engineer, with any Bachelors level degree – this still requires experience of engineering principles. If the Bachelors degree is accredited then there is an option of becoming an Incorporated Engineer (IEng);

5. Associate Member of ICE (AMICE) is a new membership category which was introduced in 2006. This is designed to encourage professionals who are closely involved with civil engineers, such as hydrologists, to become affiliated. It requires a Professional Review based on technical or scientific principles;

6. MICE and AMICE candidates can also apply to become a Chartered Environmentalist (CEnv) via the ICE, subject to the requirements of the Society for the Environment;

7. Members of professional institutions in EU countries can short-cut the procedure towards membership of the ICE (and other UK professional institutions);

8. There is no explicit 'research route' to MICE, but researchers may be able to meet the requirements.

Many employers run Approved Training Schemes, and will assign a Supervising Civil Engineer (i.e. a mentor) who is responsible for appraising whether an applicant is ready to sit the Professional Review, and for arranging opportunities to get the required Initial Professional Development (IPD).

For applicants who are not on an approved scheme, professional development is approached by Self Managed Training and Experience – and the ICE will do a Career Appraisal to assess whether or not the applicant is ready for the Professional Review. If this appraisal is positive the applicant can apply immediately to take the Professional Review, which involves submission of training reports, an interview and writing two essays under exam conditions. If not, the feedback will provide recommendations for additional experience and training.

### **A.2.2 Chartered Institution of Water and Environmental Management**

The Chartered Institution of Water and Environmental Management (CIWEM) was formed in 1987 from several predecessor institutions dating back to 1895 and was granted a Royal Charter in 1995. This means that it can directly grant the status of Chartered Water and Environmental Manager which allows the use of the letters MCIWEM.

There are seven classes of CIWEM membership: Environmental Partner, Student, Affiliate, Associate, Graduate, Member and Fellow. To become a full member and get Chartered status of MCIWEM, candidates must be at least 25 years of age, have an accredited honours degree plus 4 years' relevant experience, and pass a Professional Review which assesses whether they have



achieved CIWEM's 10 Mandatory Competences through the submission of written reports and a face-to-face interview.

There are 3 stages to becoming MCIWEM:

1. Submit completed application form and Mandatory Competence form showing how experience meets CIWEM's requirements. Details of academic course modules together with a list of training courses and professional meetings (especially CIWEM meetings) attended also need to be submitted;
2. Submit a Career Report (1500-2000 words) and a Project Report (2500-4000 words based on 2 or 3 projects). Examples of "projects" could be the installation of a gauging station, development of a rainfall-runoff model, the development of a new technique/method. A good "project" would display all stages from identification of a need, through testing and option appraisal to implementation of the preferred solution – this should ensure that a wide range of the Mandatory Competences are picked up. In the reports it is important to illustrate professional competency as well as technical competency, and cross-reference to the Mandatory Competences. Appendices can be used to include supporting information such as photos, diagrams and tables of data;
3. A Professional Review Interview (typically 40-60 minutes and held in London) including a short (<7mins) technical presentation, together with questions based on the Project(s) Report, Career Report and the achievement of the Mandatory Competences. There will be either two or three interviewers and at least one will share the applicant's discipline and area of expertise. An awareness of current topical environmental issues is essential.

The whole process typically takes around 9 - 12 months to complete.

Applicants can achieve the Mandatory Competences either through a formal training scheme with a mentor (who does not need to be a CIWEM member), or by individual achievement of competences and recording of experience.

Candidates need two sponsors who should be CIWEM members (or, exceptionally, a Chartered member of an equivalent body). Local Branches and the CIWEM Executive will help find a CIWEM member if this is a problem. Either the sponsor/supervisor/mentor has to sign the Mandatory Competence forms and validate the Project Report to confirm that it represents the candidate's own work. A supervisor needs to be familiar with the candidate's work e.g. a line manager or project manager. A mentor is someone who helps the applicant with guidance through the Chartership process and ensures that the required skills and attributes are developed. It is often fruitful to have a mentor who is influential, but not a line manager, so that conflicting interests in work programmes are avoided.

When applying for full membership (MCIWEM), applicants are invited to apply for registration as a Chartered Engineer (CEng), Chartered Environmentalist (CEnv) or Chartered Scientist (CSci). If approved by a Professional Board which reviews the application, the candidate's eligibility will be assessed during the Professional Review Interview, based on the requirements



of the appropriate Society/Council as well as those of CIWEM. If an applicant asks to be considered for Chartership through one or more of the Councils at the same time this will be considered concurrently. This is because the CIWEM Competences have been carefully mapped against the requirements of the external bodies.

An ongoing requirement of being MCIWEM is to maintain Continuing Professional Development (CPD) and to keep a record of this. CPD records can be called upon at any time. CIWEM requires 5 days (6 hours/day) of CPD per year over a three year rolling programme.

### **A.2.3 Royal Meteorological Society**

To become a Chartered Meteorologist (CMet), candidates need to be Fellows of the RMetS (FRMetS). To achieve this, they need to have an honours degree in science or engineering, and 5 years' relevant experience (e.g. as a hydrologist with meteorological interest). Sometimes long experience can replace the academic qualification requirement. The review for becoming CMet includes assessment of examples of written work and experience, recommendations from 3 referees (one of whom if possible should be CMet) and then an interview. The Accreditation Board then makes a recommendation to Council.

As with the other institutions, communication and professional skills are important requirements. Formal written reports, as required by ICE and CIWEM, are not required by RMetS. Extensive knowledge of meteorology is not necessary but it is necessary to have a good knowledge of basic meteorology and the meteorological aspects of hydrology (e.g. precipitation types and processes), and therefore a drainage or dam engineer might need additional training in these aspects. The failure rate for first-time applicants is about 30%.

A particular feature of the CMet qualification is that it is reviewed annually, and Continuing Professional Development (CPD) has to be reported every two years for scrutiny by the Accreditation Board. If the CPD is deemed not to have been acceptable then the candidate will be asked to improve it, or risk being struck off.

CEnv status can also be achieved via RMetS – exactly the same procedure is followed, except that the Accreditation Board makes its recommendation based on the Society for the Environment's criteria. There are presently about 5 hydrologists who hold the qualification which is recognised formally in the EU and also accepted in Asia, USA and Australasia.

### **A.2.4 Institution of Water Officers**

The Institution of Water Officers (IWO) is of a similar size and nature to BHS. IWO's members are mainly water industry employees, including water utility companies, suppliers, consultants and regulators. IWO does not have a Royal Charter and therefore cannot directly grant Chartered status, however candidates can apply to be a Corporate Member of IWO which allows the use of the designatory letters MIWO. When applying for MIWO, candidates can also apply for registration as a Chartered Engineer (CEng), Incorporated Engineer (IEng),



Engineering Technician (EngTech) and Chartered Environmentalist (CEnv). IWO's key strength is the networking opportunities it offers its members. It also has a quarterly magazine and is organised into regional branches.

There are 2 classes of IWO membership: Corporate and Associate. Anyone in the water or associated industries can be an Associate member – it just requires the completion of a simple application form (available on IWO's website). To become a Corporate Member (MIWO) applicants must be at least 21 years of age, have a satisfactory education base (BTEC minimum or equivalent) plus 3 years relevant experience. There is also a mature candidate route for those without formal qualifications. Applicants have to prove their attainment of IWO's key competence through a Professional Review (written report and interview).

The IWO competences are grouped into 4 areas:

- (a) Knowledge & understanding to apply technology
- (b) Application to practice
- (c) Leadership & supervision
- (d) Interpersonal skills

There are 3 stages to getting MIWO:

1. Submit completed application form to IWO (available on IWO's website);
2. Submit a Career Report illustrating professional and technical competency, and cross referencing to the IWO competences. The report should include a personal development action plan;
3. A professional interview (typically 30 minutes and held locally).

The whole process typically takes around 6 months to complete.

To become Chartered via IWO, the additional criteria of the Engineering Council (for CEng) or the Society for the Environment (for CEnv) must be demonstrated at the Professional Review.

### **A.2.5 Institution of Environmental Sciences**

The Institution of Environmental Sciences (IES) is a charitable organisation which promotes and raises public awareness of environmental science by supporting professional scientists and academics working in this crucial arena. As a seminal environmental sciences organisation, founded in 1971, the Institution is consulted by the Government and other interested parties on environmental issues. The Institution has strong ties with Higher Education and promotes and supports environmental science and sustainable development in universities and colleges both nationally and internationally.

Membership of the Institution offers stepping stones on a career path - from student to Chartered status, attracting professionals of high standing with significant specialist and interdisciplinary experience.



The Institution of Environmental Sciences is a Licensed Constituent Body of the Society for the Environment (SocEnv). This enables the IES to award the Chartered Environmentalist qualification to those members who meet the criteria laid down by SocEnv, which include Key Competences in relation to work and academic experience as well as knowledge of sustainable practice.

Chartered Environmentalist embraces a wide range of disciplines and is an excellent way of recognising virtuosity in environmental management and sustainability. The designation benefits all concerned with the environment:

- The Public, who can be confident in the knowledge and competence of an environmental practitioner;
- Practitioners by identification as a professionally qualified environmentalist that puts them at the forefront of their profession;
- Employers, with confirmation of the professional ability and competence of employees and candidates;
- Governments and governmental bodies seeking to appoint advisers or consultants will be assured about an individual competence;
- Professional Bodies, who will be able to benchmark the qualification for membership purposes;
- Higher Education, in setting and monitoring benchmarks for environmental courses, and promoting study programmes;
- Regulatory Bodies, who could be confident in specifying the CEnv designation in Acts of Parliament and regulations;
- Legal credibility, enabling expert witness participation at a defined standard;
- Professional standing, recognising equality of excellence across a wide range of environment disciplines

### **A.2.6 Royal Geographical Society**

Anyone can be a Member of the Royal Geographical Society (RGS), and anyone working in the field of geography can be a Fellow. The professional qualification of Chartered Geographer (CGeog) can be applied for along with a Fellowship application. The requirements are a recognised geographical orientated degree, plus 6-8 years' working experience, or 15 years of practical experience for those without a degree, and continued involvement in CPD activities. There is, at present, no interview – the review is based on a written application including a 1000-word professional self-evaluation.

BHS has some Chartered Geographers. 60% of Chartered Geographers are academics – it has never previously been pushed to non-academics.

## Appendix B: Examples of how to map hydrological experience to the required competencies of CEng, CEnv, CSci & CIWEM

### 1. CEng - Mapping Hydrological Expertise to Development Objectives for CEng

	<b>CEng - Development Objective / Core competence</b>	<b>Examples of hydrological expertise to demonstrate attainment of competence</b>
<b>A</b>	<b>Develop your engineering knowledge and understanding to make the most of existing and emerging technology</b>	
A1	Broaden and deepen your hydrological knowledge	Identify limits of your own personal knowledge of hydrology and seek to fill gaps in knowledge through further training. Keep up to date with current research by attending appropriate BHS, ICE, CIWEM etc meetings. Read scientific journals to be aware of current trends in technology. Be knowledgeable about the role of hydrology within civil engineering, for example by reading NCE.
<b>B</b>	<b>Apply appropriate theoretical and practical methods to the analysis and solution of engineering problems</b>	
B1	Identify engineering problems and define possible solutions	Work with colleagues within your organisation to identify emerging engineering problems, for example the adequacy of flood embankments or reservoir storage. Identify the appropriate hydrological techniques and procedures to help address these problems, e.g. flood and drought frequency analysis. Contribute to specifying the engineering solution, rather than only specifying the problem.  Present papers at appropriate BHS, ICE, CIWEM etc meetings to disseminate results of projects you have undertaken.
B2	Conduct appropriate research, and analysis relating to engineering problems	Identify, evaluate and apply appropriate hydrological tools, models and analytical techniques for solution of a range of engineering focused problems. Examples could be undertaking a flood risk assessment, determining reservoir storage required for a particular need, or how to establish environmental flow requirements. Hydrological research (e.g. within an MSc or PhD), which aims to help solve engineering problems.

B3	Implement solutions to problems and evaluate their effectiveness	Become actively involved in the implementation of an engineering project. Traditionally, this is achieved by directly supervising construction, for example surveying, monitoring health and safety, quality control, and solving on-site problems. While construction site experience is a good way of achieving this competence, these types of examples do not necessarily mean presence on a construction site. They can be achieved from an office environment, and can be applied to projects other than construction, such as implementing monitoring networks, inspections of sewerage systems, channel dredging.
<b>C</b>	<b>Provide technical and commercial management</b>	
C1	Plan for effective project implementation	Have the ability to plan for effective project management. Understand contractual process and be able to deliver effective hydrological solutions.
C2	Control budgets, tasks, people and resources	Be able to deliver results on time and within budget. Be able to work effectively within a project team. Ensure that outputs of your work meet the requirements of others reliant upon your activities.
C3	Develop people to meet challenging technical and managerial needs	Be able to develop a logical and deliverable work plan. Be able to instruct other staff working on the project on their responsibilities and to monitor their delivery of outputs to other team members. Support colleagues' individual training and development.
C4	Bring about continuous improvement through quality management	Apply the appropriate equality assurance procedures of your organisation. Understand and apply the principles of quality systems.
C5	Manage contractual issues	Be aware of contractual process and of bidding and tendering process within own area of responsibility. Be able to prepare small project bids, and to contribute to larger project plans and development of workplans. Be able to deliver expected outputs on time and within budget.
<b>D</b>	<b>Demonstrate effective interpersonal skills</b>	
D1	Communicate with others at all levels	Be able to write clear technical reports and letters. Be able to communicate effectively in meetings. Present verbal papers at BHS, ICE, CIWEM etc meetings.
D2	Demonstrate personal and social skills	Be aware of the needs and concerns of colleagues. Develop a good working relationship with colleagues, clients and the public as appropriate. Set an example to junior colleagues and act as a mentor to assist their personal development and

		training.
<b>E</b>	<b>Demonstrate a personal commitment to professional standards, recognising obligations to society, the profession and the environment</b>	
E1	Comply with relevant codes of conduct	Comply with professional codes of conduct of ICE, BHS and other professional bodies. Aim to promote engineering hydrology in public.
E2	Manage and apply safe systems of work	Identify and take responsibility for own responsibility for Health, safety and Welfare (HS&W). Me able to prepare a risk assessment and safe system of work for activities to be undertaken.
E3	Contribute to sustainable development through engineering activities	Have a sound knowledge of sustainable development best practice. Be able to contribute to sustainable development through application of hydrology.
E4	Manage your own continuing professional development, and assist others	Review your own development needs and submit suggested training plans to supervisor/line manager. Maintain a record of CPD. Apply company appraisal procedures.

## 2. MCIWEM - Mapping Hydrological Expertise to MCIWEM (No designatory letters available for this yet) Required Competences

	<b>MCIWEM –Competences</b>	<b>Examples of activities aimed at attaining competence</b>
<b>A</b>	<b>Existing and Emerging Factors Influencing Environmental and Water Issues</b>	
A1	Your personal knowledge of environmental and water issues (knowledge)	<ol style="list-style-type: none"> <li>1. Build up knowledge of current and historic developments in hydro(geo)logical theories through review of technical or local journals or formal study</li> <li>2. Demonstrate how you have acquired knowledge by working on a project or attending a public meeting or both</li> <li>3. Demonstrate understanding through documented training received during previous study or by preparation of a report</li> </ol> <p>For example, identify limits of your own personal knowledge of hydrology, the hydrological cycle, and its application in water and environmental affairs. Show evidence of filling gaps in knowledge through further training, including keeping a CPD record (also see competence E1 below), keep up to date with current research by attending appropriate BHS, ICE and CIWEM meetings. Read scientific journals to be aware of current trends in technology and be knowledgeable about the role of hydrology within environmental affairs, for example by reading the WEM magazine.</p>
A2	Your ability to develop corporate or personal strategy to address legislative, economic or technological changes affecting the sector in which you work (strategy)	<ol style="list-style-type: none"> <li>1. Demonstrate ability to interpret hydro(geo)logical information and application of such interpretations in the development of water and environmental related strategies or policies</li> <li>2. Demonstrate awareness of emerging initiatives e.g. flood warning systems, catchment abstraction management strategies, catchment flood management plans, integrated river basin management plans and assess relevance to your work</li> <li>3. Participate in the development of a River Basin Plan under the Water Framework Directive or related activities</li> </ol> <p>For example, identify, monitor and review changes and developments in the water and environmental sectors. Prepare and agree a policy framework for dealing with changes or developments. Develop, modify and agree detailed policies or proposals for a programme of research or investigation.</p>
<b>B</b>	<b>Project Planning and Implementation</b>	

B1	Your understanding of the constraints and success factors affecting environmental and water issues whilst supporting sustainable development and resource use. (survey problems)	<p><b><i>A “project” can be whatever work events you are responsible for – e.g. a design, some research work, feasibility study, a site-based project or a catchment-based project</i></b></p> <ol style="list-style-type: none"> <li>1. Formulate and agree a brief that meets Client, user and community requirements, ensuring recognition of the complexities involved</li> <li>2. Determine baseline data for analysis of sewerage systems, river flooding, coastal flooding, flood-warning action plans, future developments, water demand, sewage flows and loads, infiltration and industrial discharges</li> <li>3. Prepare reports, which includes liaison with regulatory authorities and planning departments. Apply planning policy guidance (e.g. PPS25) for development in flood-prone areas</li> </ol> <p>For example, work with colleagues within your organisation to identify emerging water and environment problems, e.g. the adequacy of flood estimates in permeable catchments and highly urbanised catchments. Identify the appropriate hydrological techniques and procedures to help address problem of inadequate flood estimates. Contribute to identifying a solution to flood and drought management problems, rather than only specifying the problem. Design a spillway or storm sewer with a consideration of hydrological risk. Develop a water resource or flood risk management plan or design a hydrometric monitoring network.</p>
B2	Your ability to develop potential solutions using creative and original thought where appropriate; to evaluate their merit; and to prepare recommendations. (feasibility of options)	<ol style="list-style-type: none"> <li>1. Review hydrological impacts of a proposed development. Arrange EIA, liaise with English Heritage, Natural England, RSPB and other statutory and non-statutory bodies to assess feasibility of options</li> <li>2. Determine energy requirements of a project and identify measures to minimise use of non-renewables</li> <li>3. Undertake a feasibility study of strategic options e.g. flood warning/proofing vs. hard defences</li> </ol> <p>For example, identify, evaluate and apply appropriate hydrological tools, models and analytical techniques for solution of water and environment problems. Examples could involve a flood risk assessment, determining reservoir storage required for a particular need, or the determination of environmental flow requirements. Evaluate and report the limitations of available methods and solution options. Undertake hydrological research (e.g. within an MSc or PhD), which involves looking at a range of options and the applicability of different analytical approaches.</p>
B3	Your ability to initiate, implement and control change, including the impact on associated liabilities. (make changes)	<ol style="list-style-type: none"> <li>1. Plan or participate in a public consultation exercise, including reporting of findings. Identify discharge consent requirements from a combined sewer overflow/outfall and identify consequences</li> <li>2. Prepare or participate in the development of a method statement for an offer submission/design statement for a project and participate in meetings to finalise approach</li> <li>3. Assess how things could be done more efficiently, more enjoyably and lead to career progress</li> </ol>

		For example, specify and supervise the implementation procedure from a strategy or plan – e.g. the installation of boreholes, installation of a monitoring network, or construction of a storm sewer, channel maintenance, or development of new modelling software or methods of flood estimation in highly urbanised/permeable catchments. Identify areas of weakness and plan improvements
B4	Your ability to plan and control current and future operations and to maintain systems or advisory services, including monitoring and assessment of their performance. (operate and maintain)	<ol style="list-style-type: none"> <li>1. Investigate historical development of coastlines in relation to flood defence structures and processes</li> <li>2. Plan the operation of hydro(geo)logical/environmental management systems and services to meet performance objectives</li> <li>3. Develop a high or low flow hydrological data collection programme with the objective of reducing uncertainty in key data sets used</li> </ol> <p>For example, monitor and report on the performance of a hydro(geo)logical project by analysing data on costs, benefits, and quality of the project. Monitor and evaluate the performance of systems and services against pre-determined standards. Identify and diagnose the causes of unacceptable variations in performance. Identify any risks which may compromise the expected project outcome.</p>
<b>C</b>	<b>Safe and Effective Working Practices</b>	
C1	Your contribution to the effectiveness and competitiveness of your organisation through effective and efficient management of financial and staff resources. (resources, money and people)	<ol style="list-style-type: none"> <li>1. Deploy, monitor, control, organise, direct and prioritise the use of people and financial resources to ensure activities are performed as planned (within budgetary and time constraints), and that corrective action is taken as required</li> <li>2. Develop, monitor, maintain and improve a resources strategy</li> <li>3. Deliver or organise lunchtime workshop/meetings on developing technical issues or recommendations made in reports to Clients. Establish and implement best practice.</li> </ol> <p>For example, plan a project in terms of the programme of work, resourcing, training, method statements and risk assessments. Understand contractual obligations and communicate these to project staff and contractors. Take responsibility for a project budget. Demonstrate that you know how to deliver results on time and within budget e.g. via effective programming of work, and management of resources. Manage junior staff e.g. via delegation of work, supervision of the work quality, mentoring and training.</p>
C2	Your understanding and promotion of health and safety and your commitment to the health and safety requirements relevant to your work (health and	<ol style="list-style-type: none"> <li>1. Contribute to risk register for project construction, or operation or decommissioning</li> <li>2. Demonstrate awareness of employer's health and safety policy and procedures and of health and safety practices appropriate to all aspects of your professional activity</li> <li>3. Contribute to the development of safety guidelines, taking account of risk assessment, safe systems of work, control procedures and recovery methods</li> </ol>

	safety)	For example, specify and supervise health and safety requirements. Assess and create safe systems and conditions, putting community safety at the forefront of consideration. Promote adherence to safety requirements. Co-ordinate and control environmental safety and impact with respect to pollution control and biodiversity protection
C3	Your promotion and understanding of sustainable environmental management and your contribution to its implementation (sustainable environmental management)	<ol style="list-style-type: none"> <li>1. Prepare contract tender documents for a Client. Assess environmental aspects of an investment and assess funding constraints and sustainability issues</li> <li>2. Strive to achieve the beneficial objectives of your work with the lowest possible consumption of raw materials and energy, and by adopting sustainable management practices</li> <li>3. Promote the wise use of non-renewable resources through waste minimisation, recycling and the development of alternatives wherever possible</li> </ol> <p>For example, develop familiarity with the concepts of environmental and economic sustainability, and the major sustainability issues related to hydrology in practice. Demonstrate awareness that sustainability concepts are being applied in your projects. Manage environmental performance through audit, reporting, evaluation, planning and monitoring</p>
C4	Your ability to understand and promote relevant quality assurance requirements (quality management)	<ol style="list-style-type: none"> <li>1. Contribute to the continuous improvement of quality management systems</li> <li>2. Apply the appropriate quality control and assurance techniques</li> <li>3. Foster the acceptance of quality management principles in colleagues to ensure that work is performed to the established standards</li> </ol> <p>For example, apply the appropriate quality assurance procedures of your organisation in your work. Understand and apply the principles of quality systems. Make recommendations about improving quality systems. Specify and supervise the use of appropriate codes of practice. Manage information systems and databases. Keep records.</p>
<b>D</b>	<b>Professional ethics</b>	
D1	Your ability to apply professional ethics in your work; your ability to communicate effectively; your objectivity and integrity (communication and integrity)	<ol style="list-style-type: none"> <li>1. Communicate with others, at all levels, both in hydrology and in other relevant sectors. Share experiences, ideas and plans via presentation and discussion in order to achieve and implement a solution to a technical challenge</li> <li>2. Set out problems factually, providing objective evidence, opinion and statement, so that they may be solved</li> <li>3. Prepare baseline descriptions for a hydrological scoping study as part of an SEA, EIA or a major development project in permeable, urban and/or rural environments</li> </ol> <p>For example, write clear technical reports and letters. Communicate effectively in meetings, with both junior and senior staff. Present oral papers at BHS, ICE, CIWEM meetings. Publish in scientific or professional journals such as the ICE Proceedings Be familiar with the CIWEM's professional code of</p>

		conduct, and be able to demonstrate that you comply with it using examples. Be aware of ethical issues relevant to your work, and current developments.
D2	Your understanding of and compliance with relevant Codes of Conduct (codes of conduct)	<ol style="list-style-type: none"> <li>1. Demonstrate application of, promote and comply with professional ethics and codes of conducts relevant to your work</li> <li>2. Ensure that those for whom we have responsibility comply with the required standards</li> <li>3. Demonstrate understanding of how conflict between your professional ethics and commercial challenges might play out through your professional commitments</li> </ol> <p>For example, be aware of the needs and concerns of colleagues. Develop a good working relationship with colleagues, Clients and the public as appropriate. Set an example to junior colleagues and act as a Mentor to assist with their personal development and training.</p>
<b>E</b>	<b>Professional development</b>	
E1	Your commitment to continued learning and professional development in both personal skills and professional knowledge. (continued learning)	<ol style="list-style-type: none"> <li>1. Raise technical issues with a senior technical manager for resolution or wider debate through technical networks. Raise working practice issues with your team leader for initial debate with others</li> <li>2. Present a paper on your project to BHS or colleagues. Organise lunch time seminar. Become familiar with, and follow established codes of conduct. Attend BHS events.</li> <li>3. Provide evidence of attendance at typically 5 days per year of training courses, seminars or conferences</li> </ol> <p>For example, present papers at appropriate BHS, ICE, CIWEM meetings to disseminate results of projects you have undertaken. Demonstrate experience of instructing other staff on their responsibilities and to monitor their delivery of outputs to other team members. Identify training requirements for yourself and other staff in response to changing roles, and new methods and technology. Support colleagues' individual training and development, for example as acting as a Mentor.</p>
E2	Demonstrate your commitment to CIWEM	NEED TO FILET OUT SOME OF THE ABOVE TO GO IN HERE

#### 4. CEnv - Mapping Hydrological Expertise to CEnv Required Competences

	<b>Society for the Environment Competences</b>	<b>Examples of Activities Aimed at Attaining Competence</b>
<b>A</b>	<b>Use knowledge and understanding of the environment to further the aims of sustainable development</b>	<ol style="list-style-type: none"> <li>4. Demonstrate understanding through documented training received during previous study or by preparation of a short report.</li> <li>5. Build up knowledge of current and historic developments through review of technical or local journals or formal study</li> <li>6. Demonstrate how you have acquired knowledge by working on a project, attending a public meeting</li> <li>7. Demonstrate research undertaken into historical development of UK water industry, keeping a list of books, papers read, and presentation given to other graduates in final year of training.</li> <li>8. Demonstrate awareness of emerging initiatives e.g. flood warning systems, catchment abstraction management strategies, catchment flood management plans, integrated river basin management plans and assess relevance to your work.</li> </ol>
A1	Understand fundamental sustainable development principles, in particular the environmental management component	
A2	Demonstrate an ability to contribute to sustainable development through the application of knowledge and understanding	
A3	Explain the critical importance of maintaining and enhancing natural cycles and biodiversity in achieving sustainability	
<b>B</b>	<b>Analyse and evaluate problems from an environmental perspective and develop practical sustainable solutions</b>	<ol style="list-style-type: none"> <li>4. Investigate historical development of coastlines in relation to coastal defence structures and processes. Contribute to risk register for project construction, or operation or decommissioning.</li> <li>5. Review archaeology, landscape and townscape impacts of a proposed development. Arrange EIA, liaise with English Heritage, Natural England, RSPB and other statutory bodies.</li> <li>6. Determine baseline data for analysis of sewerage systems, river flooding, coastal flooding, future developments, water demand, sewage flows, infiltration and industrial discharges.</li> <li>7. Determine energy requirements of a project and identify measures to minimise use of non-renewables.</li> <li>8. Prepare reports, which includes liaison with regulatory authorities and planning departments. Apply planning policy guidance (e.g. PPS25) for development in flood-prone areas</li> </ol>
B1	Clearly analyse and evaluate environmental problems	
B2	See beyond strict legislative compliance and anticipate environmental trends	

	<b>Society for the Environment Competences</b>	<b>Examples of Activities Aimed at Attaining Competence</b>
		Also see A above
<b>C</b>	<b>Demonstrate leadership in sustainable management of the environment</b>	4. Deliver or organise lunchtime workshop/meetings on developing technical issues or recommendations made in reports to clients. Establish and implement best practice. 5. Participate in multi-disciplinary project meetings and record what you learned. Review professional society literature and attend appropriate workshops. Contribute to the work of BHS. 6. Present a paper on your project to BHS or colleagues. Organise lunch time seminar. Become familiar with, and follow established codes of conduct. Attend BHS events. 7. Demonstrate attendance at least two BHS events each year, attending at least one with a mentor. Assess liability in a particular case. Assess the risks in a contract. 8. Raise technical issues with a senior technical manager for resolution or wider debate through technical networks. Raise working practice issues with team leader for initial debate with others
C1	Seek to positively influence others in respect of environmental issues, effects and sustainable development	
C2	Promote a positive sustainable environmental culture and move towards sustainability	
C3	Demonstrate leadership and management skills	
<b>D</b>	<b>Demonstrate effective interpersonal skills</b>	4. Prepare a project brief. Produce contract tender documents for a client. Assess environmental aspects of an investment and assess funding constraints and sustainability issues. 5. Prepare or participate in the development of a method statement for an offer submission/design statement for a project and participate in meetings to finalise approach. 6. Plan or participate in a public consultation exercise, including reporting of findings. Identify discharge consent requirements from a combined sewer overflow/outfall and identify consequences. 7. Prepare baseline descriptions for scoping study for SEA, EIA or a major development project in urban and/or rural environments. Undertake a feasibility study of strategic options. 8. Investigate historical development of coastlines in relation to coastal defence structures and processes. Contribute to risk register for project construction, or operation or decommissioning.
D1	Develop and communicate the environmental case	
D2	Identify, engage with and respond to an appropriate range of stakeholders	
D3	Develop effective means with which to liaise with and advise others	

	<b>Society for the Environment Competences</b>	<b>Examples of Activities Aimed at Attaining Competence</b>
<b>E</b>	<b>Demonstrate a personal commitment to professional standards, recognising obligations to society, the profession and the environment.</b>	5. Assess how things could be done more efficiently, more enjoyably and lead to career progress. 6. Identify areas of weakness and plan improvements. 7. Ask for assistance where no alternatives are clear and follow through the implications where these should lead to further training. 8. Prepare and agree programmes for additional training with line management. 9. Keep up-to-date with professional development reports and actions therefrom.
E1	Ensure individuals and organisations are accountable and understand their responsibility for environmental damage and improvement	
E2	Take responsibility for your own personal development and work towards and secure change and improvements for a sustainable future	

#### 4. CSci - Mapping Hydrological Expertise to CSci Required Competences

*Chartered Scientists must be competent throughout their professional life using a combination of their knowledge, training and experience to:*

	<b>CSci –Competences</b>	<i>Examples of activities aimed at attaining competence</i>
<b>A</b>	<b>Deal with complex scientific issues, both systematically and creatively, make sound judgements in the absence of complete data and communicate their conclusions clearly to specialist and non-specialist audiences.</b>	
A1	Use a combination of general and experiential knowledge, understanding and skills to be able to optimise and engage in the application of existing and emerging science and technology	<i>A hydrologist can develop a high or low flow hydrological data collection programme with the objective of reducing uncertainty in key data sets used. This can be a new approach in the locality e.g. by leading on the development/delivery of equipment focussed specifically on the needs of high or low flows.</i>
A2	Use theoretical and practical methods in the analysis and solution of problems	<i>Recognising that the standard analyses for extreme flood estimation do not perform well in all catchments particularly highly permeable catchments. As a response to this a Hydrologist might therefore developed a programme of modelling using the latest methods of continuous simulation modelling to review the existing flood estimates for these catchments. A hydrologist might locally interpret and adapt guidance, e.g. on the Habitats Regulations review of consents, so that it can be applied successfully to specific rivers. A hydrologist may have to develop solutions that are acceptable to the major stakeholders e.g. the Environment Agency and English Nature. This could include identifying the available data sets, trialling a range of analytical approaches, assessing the relative merits of each in the context of project deadline, the uncertainties associated with the results and the overarching legislative requirements. A hydrologist may supervise hydrological PhD studies or research done on e.g. on catchment runoff response to rainfall and the water quality impacts this had on a receiving river. The hydrologist can be involved in developing the research methodology, assessing</i>

		<i>the results, testing various hypotheses, drawing defensible conclusions and publishing. A Hydrologist may produce flood estimations e.g. for new bridge designs in zones of extreme rainfall. This can involve developing models from catchment characteristics, finding and assessing rainfall records, statistical assessment of extremes, and applying hydraulic methods to convert predicted flood flows into water levels at the bridge sites.</i>
A3	Communicate effectively	<i>A hydrologist, may represent their employer on a national basis e.g. representing the Environment Agency's interests nationally on a related DEFRA research project (e.g FD2106) and contribute to the dissemination of this new science. A hydrologist may present a paper at a BHS meeting, or have published a paper in a peer reviewed journal.</i>
<b>B</b>	<b>Exercise self-direction and originality in solving problems, and exercise substantial personal autonomy in planning and implementing tasks at a professional level</b>	<b><i>A "problem" or "task" can be whatever work events you are responsible for – e.g. a design, some research work, feasibility study, a site-based project or a catchment-based project</i></b>
B1	Plan and organise projects effectively	<i>A Hydrologist might be responsible for undertaking and managing low-flow studies with time and budget constraints. For low flow studies this can include planning and deploying a data collection programme, analysing the data to deliver a final report capable of supporting a submission to AMP. Limited staff resources to service the field equipment, competing priorities for their time and limited revenue budget can also be constraints. Public perceptions of the cause of the problem, and the views and needs of abstractors to maintain supplies can be influences while success needs to be measured e.g. by inclusion of the issue in the wider programmes e.g. AMP. To ensure innovative approaches and new data sets are secured, hydrologists may have to evaluate priorities and secure a budget write the work specification, manage a contract to deliver river flow gauges (with new design and technology) and level gauges. A hydrologist may manage research including securing and managing funding and managing the work of several researchers.</i>
B2	Work effectively in a team	<i>A hydrologist may head up a team, e.g. of engineers and scientists, doing a range of studies including hydrological assessments. In this role the hydrologist manages this resource to deliver the required hydrological assessments to a professional standard, to time and to budget. To do this professionally, the hydrologist brings sound knowledge of the required</i>

		<i>outcomes and likely processes to be used – purpose of the assessment, hydrological difficulties, sensitivity required, reliance that will be placed on the outcome, uses that will be made of the outcome etc.. A hydrologist’s role can extend into technical review, critical challenges of the work and the interpretation of results, whilst managing the overall process.</i>
B3	Use effective influencing and negotiating skills	<i>To secure funding for innovative modelling programmes a hydrologist could have to demonstrate the potential of the modelling approach, e.g. continuous simulation modelling, in a pilot project.</i>
<b>C</b>	<b>Continue to advance their knowledge, understanding and competence to a high level</b>	
C1	Demonstrate a commitment to continuing professional development	<p><i>A Hydrologist may be a representative on research projects that are relevant to their work e.g. NERC LOCAR project, DEFRA research programmes and national research/project groups.</i></p> <p><i>A Hydrologist needs to be able to/can go beyond their science, to interpret their work in the wider context of what their client and society requires, and being able to give guidance and sound advice in difficult or risky situations.</i></p> <p><i>Deliver or organise lunchtime workshop/meetings on developing technical issues or recommendations made in reports to Clients.</i></p>
C2	Demonstrate an understanding and commitment to Health and Safety and environmental issues related to employment	<p><i>Demonstrate awareness of employer’s health and safety policy and procedures and of health and safety practices appropriate to all aspects of your professional activity</i></p> <p><i>Contribute to the development of safety guidelines, taking account of risk assessment, safe systems of work, control procedures and recovery methods</i></p> <p><i>For example, specify and supervise health and safety requirements for experimental projects.. Assess and create safe systems and conditions, putting community safety at the forefront of consideration. Promote adherence to safety requirements.</i></p>
C3	Comply with relevant codes of conduct	??



## **Appendix C: Further Information Sources**

ICE	<a href="http://www.ice.org.uk">www.ice.org.uk</a>
CIWEM	<a href="http://www.ciwem.org">www.ciwem.org</a>
IES	<a href="http://www.ies-uk.org.uk/charter/charter.html">http://www.ies-uk.org.uk/charter/charter.html</a>
RMets	<a href="http://www.rmets.org">www.rmets.org</a>
IWO	<a href="http://www.iwo.org.uk">www.iwo.org.uk</a>
RGS	<a href="http://www.rgs.org">www.rgs.org</a>
The Engineering Council	<a href="http://www.engc.org.uk">www.engc.org.uk</a>
The Science Council	<a href="http://www.sciencecouncil.org">www.sciencecouncil.org</a>
The Society for the Environment	<a href="http://www.socenv.org.uk">www.socenv.org.uk</a>

## Appendix D: Glossary of Terms

AMICE	Associate Member of the Institution of Civil Engineers
CEng	Chartered Engineer
CEnv	Chartered Environmentalist
CGeog	Chartered Geographer
CIWEM	The Chartered Institution of Water and Environmental Managers (awards MCIWEM directly plus CSci, CEnv, CEng, IEng, TechEng)
CIWEM Mentor	A mentor is someone who assists with guidance through the chartership process and ensures the development of the required skills and attributes. It is often fruitful to have a mentor who is influential, but not an immediate line manager, so conflicting interests in work programmes can be avoided
CIWEM Sponsor	A CIWEM member, or exceptionally a Chartered member of an equivalent body, who countersigns the application form. If an applicant has a problem finding a CIWEM member then the local branch may be able to assist.
CIWEM Supervisor	A supervisor who needs to be familiar with the applicant's work e.g. a line manager or project manager
CMet	Chartered Meteorologist
CPD	Continuous Professional Development is the systematic maintenance, improvement and broadening of knowledge and skill, and the development of personal qualities necessary for the execution of professional and technical duties throughout working life
CSci	Chartered Scientist
EngTech	Engineering Technician
ICE	The Institution of Civil Engineers (awards MICE plus CEng, IEng, EngTech)
IEng	Incorporated Engineer
IES	Institution of Environmental Sciences
IPD	Initial Professional Development i.e. pre-chartership
IWO	The Institution of Water Officers (awards MIWO plus CEng, IEng, TechEng, CEnv)
MCIWEM	Chartered Institution of Water and Environmental Management
MICE	Member of the Institution of Civil Engineers
RGS	The Royal Geographical Society (awards CGeog)
PD4H	Professional Development for Hydrologists
RMetS	The Royal Meteorological Society (awards CMet)
SocEnv	The Society for the Environment (awards CEnv via constituent bodies)