

# **IHE Professional Certificate in Traffic Signal Control**

Endorsed by ADEPT TS Group  
and Transport for London

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# This document explains

- How you benefit from an IHE Professional Certificate
- How to apply
- The purpose of the certificate interview
- The method of assessment
- The three levels of competence
- The Statements of Competence and Knowledge

## How you benefit

### The IHE Professional Certificate in Traffic Signal Control provides

- Tangible evidence to your employer and future employers of your proven competence in signals
- Independent assessment of your knowledge and performance
- Access to EngTech registration at Foundation level marking you out as a professional

### For authorities and consultants the benefits include

- Tested competence against DfT- endorsed standards
- Competitive advantages as an employer of proven competent staff

The certificate is open to all. You do not need to be, or to become, a member of IHE nor do you have to complete a training course or have particular academic qualifications. You *are* required to prove that you meet the standards of competence.

The certificate is available at three levels. **Foundation level** is for signals staff with one to two years' experience and it's a basic broad testament of your knowledge and attributes. **Practitioner** is for the signals specialist and **Expert** denotes a senior practitioner with policy responsibilities.

You apply by submitting an Experience Report and compiling a portfolio of your work matched to the Traffic Signal Control Standards of Competence and presenting your work at an interview with two assessors. You will need to reach the required standard in the Core competences plus a number of optional competences of your choice, again at your chosen level.

With the IHE Professional Certificate you will be offered membership of IHE if you have either a NC or higher academic qualification or sufficient years of experience.

You may also be able to register as an Engineering Technician. Ask IHE to advise you.

For IEng and CEng you will need to take a separate Professional Review.

## Need Help?

If you are unsure, please contact our Membership Manager on 020 7436 7487 or email [membership@theihe.org](mailto:membership@theihe.org).



## How to apply

### Step One

- Read the signal competence standards below.  
You are seeking to show the assessors that you know and apply the principles listed.
- Make some notes about relevant recent jobs.
- Find reports, designs, correspondence etc. associated with these schemes.

### Step Two

Open a folder and put into it:

- A completed IHE Application form(TSC 10)
- Copies of your academic certificates (post-school)
- Your CV (making sure it explains your various jobs)
- Your job description and organisation chart with your post highlighted

### Step Three

First decide whether you want to describe your experience under each competence heading or if you would prefer to write a chronological description of recent work which shows you cover the competence statements.

It is not enough to show you know what to do (Knowledge), the assessors want to see that you have applied your knowledge, for example, do not explain how an inter green works, show that you have applied this knowledge at a real junction.

Aim for 1000-2000 words. Describe clearly the schemes and your personal input and responsibilities. We want to know what you did and why – use “I” not “we”. Mention the size and the complexity of policy aspects of the schemes. For the higher levels, say more about the recent schemes where you have exercised greater responsibility. At Practitioner and Expert level, you will be expected to have taken the lead and exercised independent technical and professional judgment. Explain what options you considered, what you did and why by reference to relevant regulations, standards, policy and good practice guidance. Include photos and layouts to assist your explanation. Mention budgets.

Be succinct, if the assessors want more information we will ask you for this before your interview.

### Step Four

Cross reference the Step 3 Experience Report, if it is in chronological order, to the Core and selected Optional Statements and Knowledge areas using the right hand margin.

### Step Five

Choose sufficient documents produced by you to cover each of the Statements.

List the documents in a matrix against the Statements list.

Competence	Statements						
	1	2	3	4	5	6	
Document							
1. Risk Assessment for High Street junction with River Street.	√	√		√			
2. ....		√	√				

Include only documents which are your own work or, if not, explain what you contributed. Do not include any extracts from manuals etc.

You do not need to produce a separate piece of evidence for each Competence. Communication skills, for example, will be covered by any correspondence or reports you have written and used for another Competence.

## Step Six

Put all the papers from Step Two with your Experience Report, Documents and Matrix into a folder with a Contents List.

Ask your line Manager to review and sign off your folder.

Make 3 copies. Keep the originals and send one copy to IHE by the closing date.

## Style Guide for Written Work

In preparing your assignments, portfolio or any report, it is good practice to:

- word process the text using one and a half line spacing on one side of A4
- leave a line between paragraphs
- use headings and subheadings
- number the sections, paragraphs and pages
- number any photos, tables in the text
- number any attachments and prepare a list of the attachments
- get the assignments bound or use a ring binder
- reduce plans if possible or fold them into a plastic wallet
- include photos, sketches or plans to help to explain the site
- justify your reasoning, comments and recommendations by reference to national and local standards
- make clear the extent of your responsibilities

Make sure your submission is easy to handle and to find your way around.

## Use good English

- Be precise
- Check your grammar and spelling: ask colleagues to look over the text
- Write short sentences
- Use plain English words

Ask a colleague to proof read the report for technical accuracy.

## What happens at IHE

**IHE will** acknowledge receipt of your application, and give you contact details for your assessors.

**Send** your submission to the two assessors by the Post Office.

**IHE will** tell everyone the time and date of the interview and give you details of the venue.

**Afterwards**, the assessors make a recommendation to the IHE Traffic Signal Control Steering Group and IHE's Membership & Qualifications Committee.

## The purpose of the interview

The assessors want to reassure themselves that your knowledge covers that listed in the Competence Standards. They will ask you to present your work and will ask questions about your experience and documents to satisfy themselves that you meet requirements.

The assessors will set you at your ease. The interview is not an examination: it is a discussion with senior colleagues. No one interview is the same as another. The assessors have their own styles but their conduct must be fair and proper. Their assessment will be based entirely on the work submitted and your performance on the day.

### Beforehand,

- Identify significant or interesting aspects of your work to talk about
- Practice talking about your work
- Think about questions you could be asked and your answers
- Refresh your K knowledge (see page 18)

### On the day,

Your submission will have been read by the assessors who will ask you to talk them through your report: expand and explain, don't repeat the report.

They will ask you questions to test your knowledge and competence to satisfy themselves that you meet the Statements of Competence.

Be prepared to explain what you did and why. A good approach is to practice talking through a few key schemes from your submission to bring out the extent of your experience.

### Remember to

- listen to the questions
- say what you mean, logically and clearly
- take comments objectively, not as a personal slight
- stop digging if you get into a hole: don't waffle.

### Afterwards

The assessors' recommendation is considered by the IHE Traffic Signals Steering Group.

IHE will write to you after the next Membership Committee with your results and offering you membership of the Institute normally within 4 to 6 weeks.. Your certificate will list the subjects and level you passed in.

## Method of Assessment: Demonstration of Competence

To gain a Professional Certificate in Traffic Signal Control you must meet the Knowledge requirements, and pass nine Core competences at your chosen level, plus sufficient Optional Competences to meet the pass mark.

### Core Competences

These are **1, 2, 4, 7, 11, 12, 15, 20 and 22** and you must pass all at the level for which you have applied.



## Optional Competences

Each of the 40 competences carries four marks to reflect levels of competences

Level 0 = Not achieved

Level 1 = Foundation level

Level 2 = Practitioner level

Level 3 = Expert Practitioner level

To gain a Professional Certificate at Foundation level you must pass 9 Core competences plus another 6 chosen from the remaining 31 (ie 15 in all) at level1. To give you some leeway, you can submit up to 20 Competences

At Practitioner level you need to choose and pass in 20 competences at level 2, nine of which are mandatory. To give you some leeway, you can submit up to 27.

The minimum and maximum number you can choose depends on the Pass Mark for the level you are applying for. You cannot mix the competence levels submitted or awarded.

## In Summary

Level	Pass Mark	Number of Competences to be submitted	
		Minimum	Maximum
Foundation	15 (15 @ level 1)	15	20
Practitioner	40 (20 @ level 2)	20	27
Expert Practitioner	75 (25 @ level 3)	25	34

## Levels of Certification

The IHE Professional Certificate in Traffic Signal Control is awarded at three levels. Certificates record the Competences passed.

### Foundation

You should be able to apply proven techniques and procedures and know where to access relevant legislation and best practice. You may have detailed knowledge of specific areas and/or you may exercise supervisory responsibilities. Your submission should demonstrate your experience of applying knowledge gained.

### Practitioner

You should be managing the application of current technologies, be able to solve complex problems and lead the specification, design or implementation of schemes ensuring effective delivery and quality

### Expert

You should be exercising significant leadership and management and have policy responsibilities. You will be responsible for developing in depth and original responses to complicated and unpredictable problems or applications and may be a recognised industry expert.



## What Next?

To become a rounded professional engineer, you need to take the IHE Professional Review for CEng or IEng.

With the Practitioner Certificate and engineering qualifications approved by the Engineering Council, you can apply for the Review at IEng or CEng level. There is an obvious overlap between the TSC Competence Statements and the standards set by the Engineering Council for its registers. EC Statements C.3 (Managing teams and staff), D.3 (Interpersonal skills) E.1 (Professional commitment), E.4 (Continuing professional commitment) however, are not covered by the TSC Statements and you will need to find additional evidence but otherwise you can easily re-cast your descriptions and documentary evidence from the Certificate to complete the 16 Professional Development Forms. These Forms, coupled with your CPD records and Plans, a summary of the one or two projects you want to present at your Review interview completes your Professional Review submission with little extra work.

Full details are on <http://www.theihe.org/membership/>

The IHE Professional Certificate accredits your competence, marks you out as a qualified professional and is backed by top Traffic Signal Control professionals on the ADEPT Traffic Signal Group and by Transport for London – your employers.

ADVANCE YOUR CAREER



## TRAFFIC SIGNAL CONTROL COMPETENCES

Knowledge	Range of Knowledge/ Competence	FOUNDATION	PRACTITIONER	EXPERT
<b>1. Undertake a Risk Assessment (CORE)</b>				
<p>Understand and manage risk and potential hazards.</p> <p>Know the risks and hazards associated with works during the whole life cycle of a scheme.</p>	<p>Risk Assessments, traffic/pedestrian flow, width of carriageway/footway, speed surveys, classified vehicle counts,</p> <p>night time working, lone working.</p> <p>Able to demonstrate how to minimise and manage the effect of risks and hazards during the whole life cycle of the scheme.</p>	<p>Identify hazards, and complete a risk assessment.</p>	<p>As Foundation - together with risk management and reduction of the likelihood of incidents occurring.</p>	<p>As Practitioner – plus formulate and review: policy, procedures, method of working and changes in legislations.</p>
<b>2. Manage health and safety requirements (CORE)</b>				
<p>Understand and manage Health and Safety requirements in accordance with statutory regulations and good practice.</p>	<p>Sector 8 Scheme and CSCS cards, PPE, type of traffic management, position of controller, vehicle hard standing, voltage types, G39 training.</p> <p>Able to implement relevant health and safety at work regulations.</p>	<p>Implement relevant Health and Safety at work regulations.</p>	<p>As Foundation - together with the management of the application of Health and Safety at work regulations.</p>	<p>As Practitioner - with in-depth knowledge of relevant Health and Safety at work regulations.</p> <p>Able to review policy and procedures.</p>

Knowledge	Range of Knowledge/ Competence	FOUNDATION	PRACTITIONER	EXPERT
<b>3. Determine the need for Traffic Regulation Orders and action their implementation</b>				
Understand the need for and requirements of Traffic Regulation Orders.	<p>Prepare Traffic Regulation Orders, reports, consultation documentation, and notices.</p> <p>Able to prepare statement of reasons, process for implementation, and schedule of restriction.</p> <p>Conforms with Statutory requirements.</p>	Know the information required to implement a TRO eg a parking restriction such as 'no waiting at any time'.	<p>As Foundation – plus experience of carrying out a statutory consultation on a Traffic Regulation Order and be able to assist others.</p> <p>Know the information required to implement an Experimental TRO.</p>	As Practitioner – plus explain the procedures in accordance with other types of Traffic Regulations Orders e.g. no loading at any time.
<b>4. Apply DfT and other technical advice and guidance (CORE)</b>				
Know the relevant technical advice and guidance on good practice.	<p>Reports, design documentation, audits.</p> <p>Demonstrate an understanding of how to apply technical advice and interpret guidance on best practice. Make reference to DMRB, Technical Directive, Traffic Advisory Leaflet, and Statutory Requirements.</p>	Apply existing technical advice together with detailed knowledge of relevant areas.	<p>As Foundation - together with the ability to analyse more complex designs ensuring effective delivery and quality. Advise others on these issues.</p> <p>Know implications of departures from Codes of Practice. Know how to seek site approval for departures from standards.</p>	As Practitioner - together with management and policy responsibilities.

Knowledge	Range of Knowledge/ Competence	FOUNDATION	PRACTITIONER	EXPERT
<b>5. Identify factors affecting delivery of traffic signals schemes</b>				
Know the factors likely to affect the design, implementation or operation of a traffic signal scheme.	<p>Reports, design documentation, audits, consultation, utility survey, traffic impact assessment reports make reference to TIA, consultation, conservation area, source of funding (LTP/Section 106/Section 278), statutory requirements, Traffic Management Act.</p> <p>Demonstrate an understanding of the effect of various factors on a scheme.</p>	Identify factors which would affect a scheme and demonstrate how to overcome any issues.	<p>As Foundation - together with the ability to analyse more complex designs ensuring effective delivery and quality.</p> <p>Advise others on these issues.</p> <p>Good understanding of Highway Law.</p>	<p>As Practitioner - together with management and policy responsibilities.</p> <p>Full understanding of highway law, Traffic Management Act and relevant regulations. Able to interpret legal rulings as applied to highways.</p>
<b>6. Commission and Interpret traffic flow survey</b>				
Know relevant technical advice and guidance on good practice for conducting surveys.	<p>Identification of the need for traffic flows, conversion to pcu's, swept paths, number of pedestrians/cyclists, pedestrian desire lines, determine the peak hours periods, the need for O&amp;D flows, speed of traffic.</p> <p>Demonstrate an</p>	Be able to interpret results of a link based traffic survey or a simple junction survey.	<p>As Foundation - together with the ability to analyse more complex networks.</p> <p>Advise others on these issues.</p>	As Practitioner - together with management and policy responsibilities.

Knowledge	Range of Knowledge/ Competence	FOUNDATION	PRACTITIONER	EXPERT
	understanding of what surveys are appropriate and how to interpret standard surveys.			
<b>7. Carry out site and traffic movement inspections (CORE)</b>				
Know relevant technical advice and guidance on good practice for carrying out inspections.	<p>Visibility, gradient, street furniture, utility services, parking issues, saturation flow, private vehicle accesses identified.</p> <p>Able to apply technical advice and interpret guidance on best practice and apply.</p>	Able to carry out an inspection in a safe manner	<p>As Foundation - together with the ability to analyse more complex networks.</p> <p>Advise others on these issues.</p>	As Practitioner - together with management and policy responsibilities.
<b>8. Commission and conduct consultations internally and externally with stakeholders</b>				
Know internal and statutory processes for conducting consultations.	Purpose of consultation, process to follow, timescale, choice of consultation method, meetings, questionnaires, letters, public notice, web-based information.	Knowledge of appropriate processes and methods for carrying out consultations.	<p>As Foundation - together with the ability to analyse more complex consultations.</p> <p>Advise others on these issues.</p>	As Practitioner - together with strategy development and policy responsibilities.

Knowledge	Range of Knowledge/ Competence	FOUNDATION	PRACTITIONER	EXPERT
	Demonstrate how to capture and interpret feedback from stakeholders to add value to schemes.			
<b>9. Write a design brief</b>				
Know information required to prepare a design brief to ensure effective delivery and quality	Objective of the scheme, the benefits, timescale, cost, statutory procedures.  Demonstrate an understanding of how to prepare a brief reviewing the options available and making recommendations.	Know the information to be incorporated into the brief summarising the options and making recommendations.	As Foundation - together with the preparation of a more complex brief.  Advise others on these issues.	As Practitioner - together with the presentation of a brief to clients, stakeholders or management team.
<b>10. Prepare tender documents</b>				
Know tender and procurement processes and assessment techniques.	Financial requirements, type of tender, timescale, selective list, tender assessment.  Demonstrate an understanding of	Know the information required in a tender document and letting of the contract in accordance with financial controls and assessment	As Foundation - with tenders to a higher value (over £100,000)	As Practitioner – plus experience of OJEU tender requirements.

<b>Knowledge</b>	<b>Range of Knowledge/ Competence</b>	<b>FOUNDATION</b>	<b>PRACTITIONER</b>	<b>EXPERT</b>
	how to prepare and to let a tender (including terms and conditions); able to carry out tender assessments.	procedures.		

### **11. Conduct or respond to a Stage 2 safety audit and/or safety review (CORE)**

Know the relevant technical advice and guidance on audits.	Know the objective of Safety Audit and Safety Review; able to explain the procedures to follow for various stages within the Safety Audit, departure from standards and exception report or can explain the procedures to follow for Safety Review.  Demonstrate an understanding of how to conduct or respond to Audits/Safety Review	Applies existing technical advice and has detailed knowledge of relevant areas.	As Foundation - together with the ability to analyse more complex designs.  Advise others on these issues.	As Practitioner - together with management and policy responsibilities.
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### **12. Establish and maintain effective communication with various stakeholders (e.g. elected members) (CORE)**

Know the methods for effective communication with stakeholders.	Purpose of consultation, process to follow, timescale, type of	Understand processes and methods for communicating	As Foundation - together with the ability to facilitate more diverse	As Practitioner - together with high-level communication
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Knowledge	Range of Knowledge/ Competence	FOUNDATION	PRACTITIONER	EXPERT
	<p>questionnaires, Objective of communication, methods of communication, evidence of feedback.</p> <p>Demonstrate how to communicate effectively with stakeholders and how feedback is used.</p>	with stakeholders	methods of communication with senior management and elected members.	with the media.

### 13. Conduct post-project appraisal

Know how to evaluate project delivery and operational effectiveness.	<p>Review Safety Audits Stage 3 and 4, project management, financial information, feedback.</p> <p>Demonstrate an understanding of how to carry out a post-project appraisal including any necessary data collection.</p> <p>Able to interpret the results of the appraisal and formulate an action plan if required.</p>	Apply proven techniques to carry out post project appraisal. Maintain records in order that PPAs can be conducted.	As Foundation - and able to review more complex post-project appraisal and advise others on these issues.	As Practitioner - together with management and policy responsibilities. Establish PPA procedures and implement lessons learnt.
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Knowledge	Range of Knowledge/ Competence	FOUNDATION	PRACTITIONER	EXPERT
<b>14. Prepare technical reports associated with traffic signal control</b>				
Know the development and evaluation of options for traffic signal control.	<p>Evaluation of preliminary designs, signal calculations.</p> <p>Demonstrate how to evaluate the most appropriate layout for traffic signal control to achieve the aims of the scheme.</p>	Able to use proven techniques to produce layouts for control by traffic signals together with evaluation of operation.	As Foundation - for more complex junctions and able to advise others on these issues.	As Practitioner - together with management and policy responsibilities.
<b>15. Present and discuss traffic signal control proposals (CORE)</b>				
Know the factors likely to affect the design, implementation and operation of a traffic signal scheme.	<p>List the beneficiaries and the impacts of the schemes, audits, consultation, traffic impact assessment report. Make reference to policies and objectives, statutory requirements, TMA.</p> <p>Demonstrate can present proposals so that decisions can be reached.</p>	Able to prepare reports on proposals for a simple traffic signal controlled crossing or junction.	<p>As Foundation – for a complex traffic signal controlled junction.</p> <p>Advise others on these issues.</p>	As Practitioner - with strategy development and policy responsibilities.
<b>16. Contribute to establishing relevant local authority policies or apply local authority policies</b>				
Know existing policies.	Local policies for the introduction or design of traffic	Know local policies for implementing	As Foundation – plus responsible for implementing	As Practitioner - together with strategy

<b>Knowledge</b>	<b>Range of Knowledge/ Competence</b>	<b>FOUNDATION</b>	<b>PRACTITIONER</b>	<b>EXPERT</b>
	<p>signal schemes.</p> <p>Demonstrate an understanding of local policies and objectives.</p>	<p>traffic signal schemes.</p>	<p>policies.</p> <p>Advise others on these issues.</p>	<p>development and policy responsibilities.</p>

### **17. Use of Linsig or equivalent software for analysing single junctions**

<p>Know the application and use of junction analysis software.</p>	<p>Data used to produce the model and interpretation of the results obtained.</p> <p>Demonstrate an understanding of how to evaluate different layouts for signal control junctions.</p>	<p>Evaluate the output, understand the numerical results, and make recommendations as to whether the model performs as expected and identify any areas in the output which might give cause for concern.</p>	<p>As Foundation - plus able to prepare a junction model. Should also be able to carry out complete checks on models prepared by others.</p>	<p>As Practitioner - plus be able to model unusual junctions and give advice where required.</p> <p>Should have the technical confidence to challenge work carried out by others.</p>
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### **18. Use of Transyt or equivalent software for analysing a network**

<p>Know the application and use of network analysis software.</p>	<p>Data used to produce the model and interpretation of the results obtained.</p> <p>Demonstrate an understanding of how to evaluate the layout for the network.</p>	<p>Evaluate the output, understand the numerical results, and make recommendations on any areas in the output which might give cause for concern.</p>	<p>As Foundation - plus able to prepare a network model.</p> <p>Able to examine the integrity of coordinated signal timings with particular regard to safety issues at closely spaced successive stop lines within a network.</p>	<p>As Practitioner - should have the technical confidence to challenge work carried out by others.</p> <p>Able to assess scheme results against policy objectives.</p>
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Knowledge	Range of Knowledge/ Competence	FOUNDATION	PRACTITIONER	EXPERT
<b>19. Plan and manage the implementation of traffic signals schemes</b>				
Able to prepare a plan for implementation of schemes and to track progress of the scheme.	<p>Project management, critical path analysis, design, tenders, delivery of equipment, booking the road space and power supply / BT line.</p> <p>Demonstrate an understanding of the issues associated with planning, associated timescales and implementation of a scheme. Knows how to resolve and mitigate any problems encountered.</p>	Prepare a basic project plan and track progress of the scheme.	<p>As Foundation – plus able to implement more complex scheme ensuring effective delivery and quality.</p> <p>Advise others on these issues.</p>	As Practitioner - together with management and policy responsibilities.
<b>20. Apply quality control and maintain the design file (CORE)</b>				
Know the processes for applying quality control and know where the information is stored.	<p>The reasons for having a design file method of tracking documents, type of filing system, recording information.</p> <p>Demonstrate an understanding of the issues associated with quality control and maintaining the design file.</p>	Able to apply proven techniques for quality control and maintaining the Design file.	<p>As Foundation - and able to review existing systems.</p> <p>Providing assistance to others.</p>	As Practitioner - together with management and policy responsibilities.

<b>Knowledge</b>	<b>Range of Knowledge/ Competence</b>	<b>FOUNDATION</b>	<b>PRACTITIONER</b>	<b>EXPERT</b>

**21. Maintain financial control**

Know the financial control system of the organisation and good practice guidance.	Existing standards, methods of recording income and expenditure, reviewing costs, forecasting, time management.  Demonstrate an understanding of the financial control system.	Know the information required for the financial control system and how to monitor costs on an individual scheme.	As Foundation – plus able to review costs and forecasting. Providing assistance to others.	As Practitioner – plus applies cost control over a number of budgets. Wider understanding of capital and revenue streams. Able to forecast budget requirements to meet capital programmes and evaluate revenue implications.
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**22. Calculate intergreens and explain different types of phases (CORE)**

Know relevant technical advice and good practice guidance.	Stage diagrams with the appropriate phases, calculation all intergreens including pedestrian phases.  Demonstrate an understanding of technical advice and guidance and how to apply technical	Understand the concept of Phases, Stages, Intergreens and Interstages and able to explain what is meant by these terms.  Able to calculate intergreen values and to check these	As Foundation – plus able to carry out junction design using the full range of phase types available.  Knows the application of phase delays and when they might be used.  Providing	As Practitioner –but involving more complex junctions.
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Knowledge	Range of Knowledge/ Competence	FOUNDATION	PRACTITIONER	EXPERT
	advice and interpret guidance on best practice and apply.	items within a project proposal for a traffic signal controlled crossing.	assistance to others	
<b>23. Design a traffic signal scheme (including facilities for pedestrians or cyclists) to operate in VA and FT and one other mode e.g. UTC</b>				
Able to design a traffic signal scheme.	<p>Produce a detailed design of a junction showing all traffic signal equipment, tactile paving, chambers and ducting reports, design documentation, audits.</p> <p>Demonstrate an understanding of how to apply technical advice, interpret guidance on best practice and apply. Make reference to DMRB, Technical Directives, Traffic Advisory Leaflets, Statutory requirements</p>	<p>Apply existing technical advice together with detailed knowledge of relevant areas to the design of a simple junction.</p> <p>Able to implement different modes and describe their differences and operation.</p>	As Foundation – plus able to design more complex junctions, ensuring effective delivery and quality. Advise others on these issues.	As Practitioner - together with management and policy responsibilities.
<b>24. Manual calculation of practical reserve capacity</b>				
Know relevant theory and technical advice on how to calculate these figures.	Stage diagrams with the appropriate phases including pedestrian phases. Manual calculation showing saturation flows, lost time and Practical Reserve Capacity	Understand the terms Saturation Flow, Lost time and Practical Reserve Capacity.	<p>Able to calculate Saturation flows using calculator or spread sheet and enter appropriate parameters into appropriate software packages.</p> <p>Able to perform signal calculations for a simple signal</p>	As Practitioner – should be able to train others in these techniques.

Knowledge	Range of Knowledge/ Competence	FOUNDATION	PRACTITIONER	EXPERT
	Demonstrate an understanding of these figures and their importance.		junction using calculator or spreadsheet to determine degrees of saturation, Practical Reserve Capacity and signal timings.	
<b>25. Interpret, evaluate and apply microsimulation software e.g. Paramics</b>				
Know how to use the output of microsimulation models.	Set up small network and/or explain data required for the model. Able to explain the results.  Demonstrate an understanding of how to apply the results of microsimulation models in traffic signal schemes.	Evaluate the output, understand the numerical results, and make recommendations on any areas in the output which might give cause for concern.	As Foundation - plus able to prepare a small network model.	As Practitioner - should have the technical confidence to challenge work carried out by others. Able to demonstrate results to more senior managers. stakeholders etc.
<b>26. Evaluate a traffic impact assessment report</b>				
Know the expected content of a TIA.	Explain the purpose of the TIA, what information is required within the report and what needs to be checked.	Evaluate a simple TIA and make comments on it.	As Foundation – plus able to analyses more complex TIAs and make comments.  Advise others on	As Practitioner - together with management and policy responsibilities. Has the confidence to challenge work

<b>Knowledge</b>	<b>Range of Knowledge/ Competence</b>	<b>FOUNDATION</b>	<b>PRACTITIONER</b>	<b>EXPERT</b>
	Demonstrate an understanding of how to evaluate a TIA and make comments.		these issues.	carried out by others. Able to work with Development Management colleagues and developers on issues of policy, law, design and standards

### **27. Prepare controller specification forms**

Know relevant technical advice and guidance on good practice for the preparation of controller specifications.	Complete the forms and explain the various data sheets.  Demonstrate an understanding of how to complete controller specification forms.	Knowledge of information required for a simple junction.	As Foundation – plus be able to complete the forms for a more complex junction. Able to assist others.	As Practitioner – plus be able to complete the forms for a highly complex multi-stream junction or Traffic control scheme involving more than one junction.
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### **28. Conduct factory acceptance tests for traffic signal schemes**

Knowledge of how FATs should be carried out.	Explain the purpose of FAT, what tests need to be carried out and how the check list is used.  Demonstrate an understanding of how to carry out and document FATs.	Apply proven test techniques when conducting a FAT for a simple junction and document results.	As Foundation – plus able to test more complex junctions, analyse the results and recommend any necessary changes.	As Practitioner - together with the ability to test a highly complex junction with facilities such as LRT, UTC, or MOVA modes.  Able to establish procedures for FATs.
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### **29. Conduct site acceptance tests for pedestrian crossings or traffic signal**

Knowledge	Range of Knowledge/ Competence	FOUNDATION	PRACTITIONER	EXPERT
<b>schemes, including timing adjustments</b>				
Know the purpose of SATs.	<p>Explain the purpose of SAT, what tests need to be carried out including electrical testing and how the check list is used.</p> <p>Demonstrate an understanding of how to carry out a SAT and make adjustments.</p>	Apply proven test techniques when conducting a SAT for a pedestrian crossing or a simple traffic signal junction, make adjustments and document results.	As Foundation – plus able to test more complex junctions and analyse any problems and make any necessary changes.	As Practitioner - together with the testing a highly complex junction with facilities such as LRT, UTC, or MOVA modes. Establish procedures for SATs.
<b>30. Explain the system specification for the supply and installation of traffic signal equipment</b>				
Know the contents of a system specification.	<p>Explain the purpose of the system specification and what information is provided within this document.</p> <p>Demonstrate an understanding of how to apply technical advice and interpret guidance on best practice and apply. Make reference to DMRB, Technical Directive, Traffic Advisory Leaflets, Statutory Requirements.</p>	Be able to prepare a system specification for a simple crossing or junction.	As Foundation – for a more complex designs. Advise others on these issues.	As Practitioner - together ability to check the work of others.

Knowledge	Range of Knowledge/ Competence	FOUNDATION	PRACTITIONER	EXPERT
<b>31. Develop or implement traffic signal strategies</b>				
Work relating to a scheme with strategies such as emergency hurry call or developing/customising existing strategies to meet specific client requirements.	Understand control strategies and how to implement them appropriately.  Demonstrate an understanding of how to implement traffic signal strategies.	Know the different types of traffic control signal strategies.	Able to interpret customer requirements and implement the required strategies.	As Practitioner - together with management and policy responsibilities for the development of traffic signal control strategies. Wider understanding of traffic signal strategies as they relate to overall policy, the legal position and the TMA.
<b>32. Prepare the principal terms and conditions within a maintenance contract</b>				
Know the principal Terms and Conditions Work relating to a maintenance contract	Prepare the principal Terms and Conditions within a maintenance contract.  Demonstrate an understanding of contract preparation, how to apply technical advice and interpret guidance on best practice and apply. Make reference to DMRB or	Contribute to the preparation of the term and conditions.	As Foundation – responsibility for preparing the term and conditions.	As Practitioner - together with management and policy responsibilities. Understands the full range of requirements including budget implications of any terms and conditions

Knowledge	Range of Knowledge/ Competence	FOUNDATION	PRACTITIONER	EXPERT
	Manual for Streets, Technical Directives and Statutory Requirements.			
<b>33. Monitor maintenance contracts and list key performance indicators</b>				
Know the service level agreements, the purpose of KPIs.	Regular meetings with the maintenance contractors to discuss KPIs.  Demonstrate understanding of KPIs and the effect of these on the Contract performance.	Able to review the existing Contract using established methods.  Know of relevant KPIs.	As Foundation – Specify KPIs and monitor progress.	As Practitioner – ensure contractors are performing and address areas of concern. Devise contract monitoring procedures over and above the statutory requirements eg BV1165.
<b>34. Determine priorities for the planned maintenance, updating and replacement of equipment</b>				
Know relevant technical advice and guidance on good practice for determining priorities.	Plan for the maintenance, update and replacement of equipment. Make reference to annual inspections.  Demonstrate understanding of Asset Management, equipment life cycle, the need for planned maintenance, modernisation and replacement of damaged equipment.	Able to monitor progress on the plan in accordance with the priorities which have been set.	As Foundation – prepare priorities for the maintenance, update and replacement of equipment.  Advise others on these issues.	As Practitioner - together with management and policy responsibilities.  Understands the issues surrounding the Asset Management Process (TAMP) and funding.

Knowledge	Range of Knowledge/ Competence	FOUNDATION	PRACTITIONER	EXPERT
<b>35. Calculate CLF, UTC and Scoot Plans</b>				
The preparation of CLF, UTC and SCOOT plans.	CLF, UTC and SCOOT plans.  Demonstrate how to construct and write plans from basic timings.	Understand and interpret either a CLF, UTC or SCOOT plan.	Able to compile a CLF, UTC and SCOOT plan for a set of junction timings which have been obtained from an output from a standard network modelling package.	As Practitioner - should also have an understanding of the relative operational benefits and impacts of the three modes of coordinating signals.
<b>36. Assist with operating UTC/Scoot systems including amending the database or validating a Scoot network</b>				
The operation of a UTC/SCOOT System	The day to day operation of a UTC/SCOOT System. Preparation of database forms. Carrying out validation work on site.  Demonstrate the preparation of UTC/SCOOT plans timing reviews contingency plans and timetables. An understanding of how a UTC system functions together with techniques to validate and assess performance. Make reference to measuring various parameters on site.	Able to carry out routine day to day operation.	As Foundation – plus able to validate networks. Advise others on these issues.	As Practitioner - together with management and policy responsibilities.
<b>37. Introduce Mova control, apply fine tuning and adjust</b>				
Know the principles of	MOVA data sheets,	Understand the	As Foundation - be	As Practitioner

<b>Knowledge</b>	<b>Range of Knowledge/ Competence</b>	<b>FOUNDATION</b>	<b>PRACTITIONER</b>	<b>EXPERT</b>
MOVA control and how to make adjustments to it's operation.	MOVA setup and on site validation.  Demonstrate an understanding of how MOVA works together with techniques to validate and assess performance. preparation of MOVA data set. Make reference to measuring various parameters on site.	MOVA method of control and the necessary data collection required for a dataset.	able to prepare a dataset and carry out site validation. Advise others on these issues.	– but for a more complex junctions and able to analyse on-site faults and problems.
<b>38. Link Signals on arterial routes</b>				
Know the relevant technical advice and guidance on good practice for linking signals. Have an understanding of how to measure the performance of a network.	Traffic signal plans.  Demonstrate documentation of timing review for a network and recommendation to improve or mitigate any issues arising.	Understanding the benefit of linking signals and how it can be achieved.	As Foundation – plus able to implement on an arterial route, ensuring effective delivery. Advise others on these issues.	As Practitioner - together with management and policy responsibilities.
<b>39. Operate a fault management system</b>				
Know how to operate a Fault Management System.	Set up of a site on the FMS, how the system works and obtaining fault history records.  Demonstrate an	Able to monitor the FMS and ensure the faults are passed to the contractor.	As Foundation – Maintains the database, together with the analysis of faults to ensure effective delivery and quality of	As Practitioner - together with management and policy responsibilities.

Knowledge	Range of Knowledge/ Competence	FOUNDATION	PRACTITIONER	EXPERT
	understanding of fault management systems and the documentation of fault analysis. Investigation other methods of monitoring and recording potential faults for signals.		service. Advise others on these issues.	
<b>40. Operate a remote monitoring system</b>				
Know how to operate a remote monitoring system.	Set up of a site on the RMS, how the system works, monitoring a site.  Demonstrate Knowledge of remote monitoring systems and how to implement and use to  Monitor and capture operational data.	Able to monitor the system and take action in response to faults/events.	As Foundation – Maintains the database, together with the analysis of data to ensure effective delivery and quality of service. Advise others on these issues.	As Practitioner together with management and policy responsibilities.

<b>AWARENESS OR KNOWLEDGE</b> <b>In order to demonstrate these competences, all Traffic Signal Engineers should be aware or know:</b>	<b>Client aspects</b>	<b>Design aspects</b>	<b>Operation &amp; Control aspects</b>
<b>A. Relevant legislation eg CDM, Highways Act, TSRGD</b>	X	X	X
<b>B. Contract law and similar legislation</b>	X	X	X
<b>C. DfT and other technical standards, advice and guidance</b>	X	X	X

D. Health and safety legislation and codes of practice	X	X	X
E. The standard modelling software and their outputs	X	X	
F. How to prepare controller specification forms	X	X	
G. Relevant local authority policies	X	X	
H. Own organisation's financial regulations, procedures and OJEC requirements	X		
I. Methods of control (VA, FT etc)		X	X
J. How detection systems operate		X	X
K. How FATs and SATs are conducted	X	X	X
L. Traffic management techniques	X	X	X
M. Traffic signal theory and junction design	X	X	X
N. Electrical safety	X	X	X

**NOTE:** If you have attended the JCT course 'Essentials of Traffic Signals' and passed the assessment post-May 2008, you will be deemed to have met the Knowledge Statements C,I,J and M and have the underpinning knowledge for Competences 15,22,23 and 24 but you still need to show you can perform in these areas.



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