



# **TRAINING & CAREER DEVELOPMENT HANDBOOK**



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## **TRAINING & CAREER DEVELOPMENT**

The CSA has developed a fully structured Path of Development and Career Progression to encourage field commissioning engineers (and any other staff involved in the commissioning process) to follow a definitive course of study which will develop their theoretical knowledge and practical skills and ensure that they are able to fully realise their potential in the commissioning world.

The aim of this handbook is to show how this system works and how each applicant may achieve the best results. The objective is to ensure that all commissioning staff have the necessary knowledge to be able to carry out their work to the best of their ability. This has two main benefits. Firstly it ensures that staff provide a consistently good standard of work. Secondly it ensures that commissioning companies provide their clients with a consistently good standard of commissioning service. Both of these combine to ensure that CSA Members, both company and individual, are assured of a reputation for good work. This can benefit them over the long term in repeat business from satisfied clients.

The following pages comprise an outline of the career path, the various job descriptions for the different grades of commissioning personnel and the qualifications available:

- The Path of Development identifies the six stages of CSA study & qualification. It shows also how people can enter the system at various points and which external qualifications may be useful.
- The Job Descriptions identify the scope of the duties for each of the six grades and allows each person to carry out an appraisal of their own capabilities and potential against the requirements.
- The page on Distance Learning Courses describes what the distance learning courses are, and what the pupils have to do.
- The Distance Learning Course outline chart provides an easy reference "flow chart" of how the system operates.
- An index is provided of all three parts of the Distance Learning Courses, identifying the module headings and thus providing an outline syllabus.
- The three pages following the DLC index provide information on how a commissioning engineer can attain the three senior grades - Grade 4, (Commissioning Engineer); Grade 5 (Senior Commissioning Engineer) & Grade 6 (Commissioning Manager) - and detail the requirements for each grade and the criteria against which each candidate is assessed.



## JOB DESCRIPTIONS

JOB TITLE:                   **TRAINEE**

JOB GRADE:                 TRAINEE

Experience:                 N/A

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### Duties & Responsibilities.

- a) To become familiar with site safety and current Health & Safety at Work Regulations.
- b) To learn site discipline and procedures.
- c) To assist senior personnel in carrying out commissioning activities on site and generally to observe instructions given by an authorised person.
- d) To learn about instruments used on site, how to handle and look after them.
- e) To report to site control when arriving and leaving site.
- f) Undertake and comply with company's training policy.

### Development Aim:

To participate fully in the company and CSA Training Schemes with a view to completing Part A of the Distance Learning Courses of the Commissioning Specialists Association.



**JOB TITLE: COMMISSIONING TRAINEE/ ASSISTANT**

**JOB GRADE: GRADE ONE**

**Academic standard: As Path of Development**

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### Duties & Responsibilities:

- a) To be familiar with your companies Health & Safety policy and be aware of the requirements of safety for yourself and others.
- b) To assist senior personnel in carrying out commissioning activities on site and generally to observe instructions given by an authorised person.
- c) To take part in the pre-commissioning activities and to become familiar with working drawings and job technical specifications.
- d) To learn about instruments used on site, how to look after them, which instruments are appropriate to various tasks and how to use and read them.
- e) To learn how to balance water and air flows whilst assisting more senior staff.

### Development Aim:

To participate fully in the Company and CSA training schemes with a view to completing Parts A and B of the Distance Learning Course of the Commissioning Specialists Association.



JOB TITLE: **INTERMEDIATE COMMISSIONING/BALANCING  
TECHNICIAN**

JOB GRADE: GRADE TWO

Academic standard: As Path of Development

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## Duties & Responsibilities

- a) To be familiar with company Health & Safety policy and be aware of the requirements of safety for yourself and others.
- b) To be familiar with the scope of works, installed equipment and Client's technical schedules.
- c) To understand and comply with your employer's Method Statements and any other specific instructions given by your employer.
- d) To obtain design information, tolerances and agreed methods of working.
- e) To be aware of the programme of work you are required to achieve.
- f) To carry out balancing of air and water systems under supervision.
- g) To liaise on any problems with your immediate senior or supervisor and to record and convey them using approved reporting procedures.
- h) To complete air and water balance test sheets legibly and presentable for checking by the lead engineer or supervisor.



### Grade 2 Job Description (continued)

- i) To be able to input test information onto prepared test sheets via a computer using your employer's software.
- j) To become competent to demonstrate completed and balanced work to relevant authorities
- k) To learn to identify additional work that is requested, implied or expected over and above your employer's agreed contractual commitment.
- l) To follow your employer's procedures for carrying out additional work.
- m) To ensure that all instruments used for definitive readings are covered by a current calibration certificate and instruments used in proportional balancing have a current record of checks made against a 'master' instrument.
- n) To be responsible for the safety and careful handling of, and account for all instruments issued to you by your employer.

Development Aim: To participate fully in your Company and CSA training schemes with a view to completing Parts C of the Distance Learning Course of the Commissioning Specialists Association.



JOB TITLE: **COMMISSIONING TECHNICIAN**

JOB GRADE: GRADE THREE

Academic standard: As Path of Development

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### Duties & Responsibilities:

- a) To be familiar with the your company Health & Safety policy and be aware of the requirements of safety for yourself and others, and carry out and understand risk assessment.
- b) To assist senior personnel in commissioning activities.
- c) To liaise with the Client's representative if so directed.
- d) To obtain design information, tolerances and agreed methods of working.
- e) To ensure all relevant instruments, documentation and information are available prior to going on site.
- f) To make contact with your office daily if you are the senior representative of your company on site.
- g) To establish the commissionability of each system. To be competent in all air and water balancing activities, site testing of installed equipment and fault diagnosis and to develop management skills.
- h) To be competent to work on site without supervision and to take charge of others on appropriate contracts.
- i) To be cognisant of current electrical regulations.
- j) To assist in starting up major plant
- k) To carry out environmental checks



### Grade 3 Job Description (continued)

- l) To keep a daily diary of events and activities under your control, including a list of specialist contractors on site, trainees working under your direction and any decisions made by authorities on site which may affect progress. Any delays must be recorded, giving the reasons for the delays..
- m) To assist in the training and motivation of trainees under your supervision on site.
- n) To be conversant with your employee's computer software packages to enable you to produce test data and commissioning reports in line with your employer's standard procedures and submit them fully collated to your supervisor or, if directed, the Client's representative.

Development aim: To participate in Company Training Schemes and undertake sufficient personal development so as to be capable of obtaining a pass at the Commissioning Specialists Association Grade 4 examination.



JOB TITLE: **COMMISSIONING ENGINEER**

JOB GRADE: GRADE FOUR

Academic standard: As Path of Development

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### Duties & Responsibilities:

- a) To be responsible for all aspects of site safety for yourself and others including risk assessment, method statements and toolbox talks.
- b) To assist your company's manager to achieve successful completion of the project.
- c) To carry out any tasks for Grade 1 to 3 as may be necessary or mandatory.
- d) To be fully conversant with the structure of the project management.
- e) To liaise with the Client's representative and accept his instructions in accordance with your company's procedures when acting as senior representative on site.
- e) To delegate to technicians such sections of work as they should be able to undertake in accordance with their job descriptions.
- f) To carry out commissionability review of all systems under your control.
- g) To ensure that you have adequate resources to meet the programme for commissioning.
- h) To ensure that your manager or supervisor is aware of any changes in programme in sufficient time for adequate resources to be supplied to site or surplus technicians to be relocated.



### Grade 4 Job Description (continued)

- j) To carry out witness testing of systems and operate your employer's company policy for completion certification.
- k) To be conversant with electrical diagrams and become proficient at inspecting controls.
- l) To liaise with other trades on site to ensure access is available as required for your works and for any specialist under your control.
- m) To write concise reports to accompany test documentation for record purposes.
- n) To actively encourage, motivate and assist the development and training of Grade 1, Grade 2 and Grade 3 personnel under your supervision.

Development aim: To be aware of and research changes within the industry.

Develop and promote good working practices, and man management skills.

To undertake continual professional development and be capable of developing and presenting a thesis to meet the requirements for progression to Commissioning Specialists Association Grade 5.



**JOB TITLE: SENIOR COMMISSIONING ENGINEER**

**JOB GRADE: GRADE FIVE**

**Academic standard: As Path of Development**

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### Duties & Responsibilities:

- a) To be responsible for all aspects of site safety for yourself and others; including risk assessment, method statements and toolbox talks.
- b) To be skilled in communication and man management.
- c) To fully understand drawings, specifications and contractual commitments for the project.
- d) To produce method statements for work which you control directly and to obtain, co-ordinate and submit, as necessary, method statements from specialists.
- e) To obtain approval for method statements submitted.
- f) To be fully aware of your company's policies in respect of their contractual commitments.
- g) To liaise with the Client's representative on all matters concerning the project.
- h) To set up site accommodation for technicians, be responsible for arranging facilities, security, general tidiness and preparation of all site reports.
- i) To co-ordinate all tasks and site activities under your control.
- j) To produce programmes, using proprietary software, co-ordinated with the main construction programme, to aid timely completion of the contract.
- k) To ensure the correct procedures are followed and recorded for pre-commissioning and any necessary actions are taken.



### Grade 5 Job Description (continued)

- l) To monitor and record progress of commissioning and all other trades which directly or indirectly affect commissioning.
- m) To be skilled in detailed report writing, planning and site meetings.
- n) To have a working knowledge of all specialised activities associated with your discipline.
- o) To have a knowledge of IEE regulations (BS7671) and electrical installations.
- p) To have a knowledge of all piped services used in buildings.
- q) To undertake reviews of building services designs with respect to commissionability, and obtain approval of the same.
- r) To produce technical reports and hold discussions with designs to improve commissionability.
- s) To evaluate the technical aspects of method statements for specialists under your control.
- t) To understand and apply the requirements for correct instrumentation in checking and witnessing specialists work.
- u) To be familiar with refrigeration, electrical and control disciplines in order to discuss, control, inspect, witness and accept the works of these specialists on behalf of your employer when required.
- v) To actively encourage, motivate and assist with the development and training of personnel under your supervision, and where felt required to mentor particular personnel.

Development Aim: To be aware of and research changes within the industry.

To undertake continual professional development and be capable of satisfying the Committee of the CSA as to your suitability for progression to CSA Grade 6.



JOB TITLE: **COMMISSIONING MANAGER**

JOB GRADE: GRADE SIX

Academic standard: As Path of Development

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### Duties & Responsibilities:

- a) To be responsible for all aspects of site safety for yourself and others including risk assessment, method statements toolbox talks.
- b) To take full control of one or more projects and be responsible to your employer.
- c) To be responsible, on behalf of your employer, to his Client for all site events within the scope of the contract.
- d) To agree documentation requirements and standards.
- e) To evaluate labour requirements against the programme and tender submissions.
- f) To be skilled in communication and man-management.
- g) To recognise strengths and weaknesses in those to whom you delegate and work to form an effective team.
- h) To respond to changes in requirements objectively.
- i) To identify all design data and ensure adherence to specific standards.
- j) To recognise your own abilities and know when to call for assistance in dealing with matters which fall beyond your experience.



### Grade 6 Job Description (continued)

- k) To produce commissioning reports to the satisfaction of your employers and their Clients.
- l) To review and evaluate commissionability of designs to minimise time taken on site, ensure Client satisfaction with the end product and maximise your employer's company efficiency.
- m) To actively encourage, motivate and assist with the development and training of all personnel under your supervision, and where felt required to mentor particular personnel.
- n) To report regularly and as required to your employer on all aspects of the work for which you are employed.

Development Aims: To undertake continued professional development and be aware of and research changes within the industry.

It is appreciated that that the Job Descriptions for the Grade 5 and Grade 6 will not cover all personal situations. In these and all cases, the Committee retains the right to allocate a Grade on information submitted.



### **DISTANCE LEARNING COURSES**

The COMMISSIONING SPECIALISTS ASSOCIATION is committed to the concept of training of commissioning technicians and engineers and to overseeing and arranging learning courses uniquely designed to meet their needs.

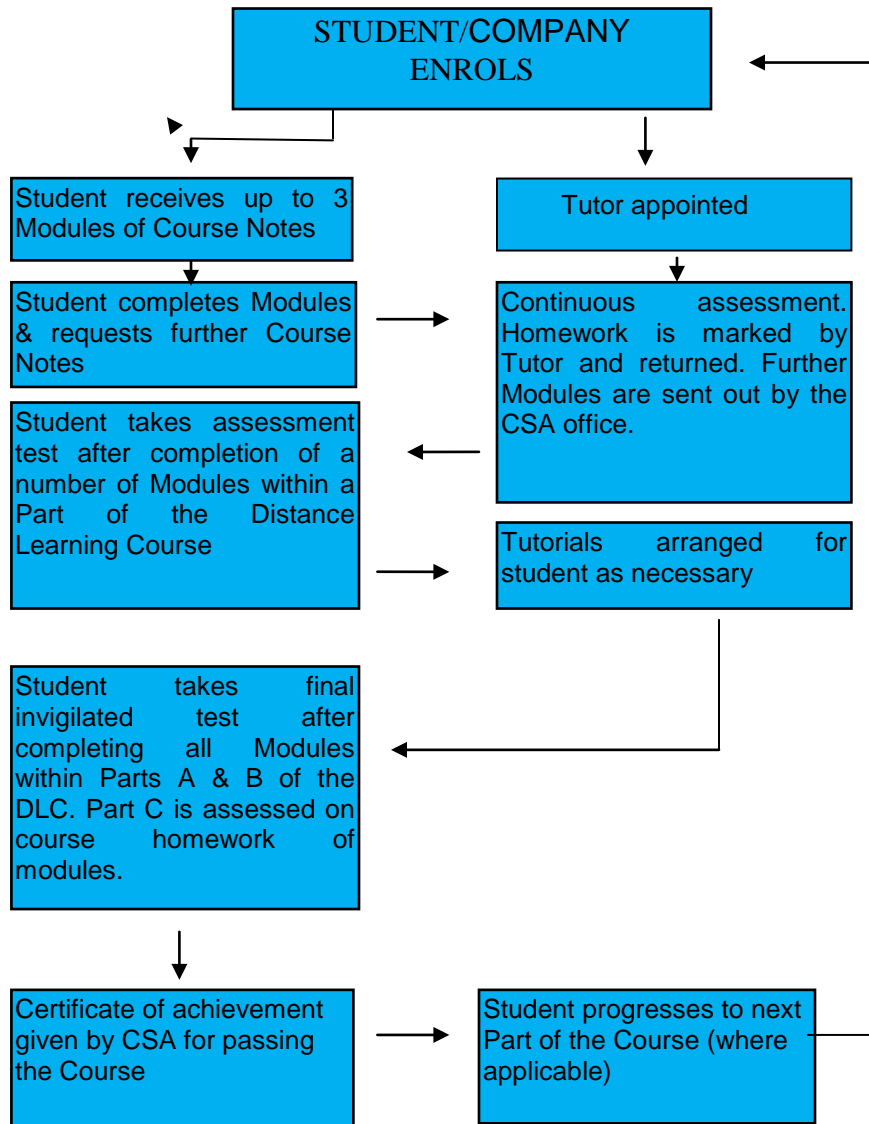
Within the overall framework of Grades 1 to 6, training courses covering the technical theory and knowledge required for Grades 1 to 3 have been developed during the past twenty years. They are available to students as a DISTANCE LEARNING COURSE. There are three self-contained Parts, each incorporating a number of Modules.

The following format has been developed for the DLC's

- The student, or the company employing that student, enrolls with the CSA and pays a fee to the CSA for the relevant part of the course to be taken.
- Once the student has enrolled, they will be supplied with a Starter Pack. This consists of a binder containing the first three modules of the relevant course, together with a number of pre-printed cards. Upon completing the work on the first modules, the student will send in one of the cards to the CSA, requesting further modules. Each module will give much of the information needed for the work, but the student will need to refer to standard reference books (e.g. CIBSE Guides and Codes) during the course.
- Each student is assigned a tutor, who will monitor their progress and be available to give assistance and guidance where needed. A tutor will be appointed from the CSA Training sub-committee or other suitable person.
- Each module contains "homework" and tests to be assessed, marked and commented on by the tutor. Communication between student and tutor may be direct or may be via the CSA office.
- When the student has completed a course of modules, i.e. one Part, they will be expected to take a completion test in a controlled environment, i.e. in an office with an invigilator appointed by the CSA or at a college in controlled academic conditions. A certificate is then issued for the Part of the course completed.
- Progression is intended to be from Part A upwards. Each Part must be completed successfully before a student starts the next stage.
- Completion of the Parts of the Distance Learning Course will, providing other criteria are met (see the Path of Development), enable students to gain promotion to higher Grades.

The CSA also runs a NVQ level 3 course, Installation and Commissioning.

## OUTLINE PROCEDURE FOR DISTANCE LEARNING COURSES





## INDEX TO CSA DISTANCE LEARNING COURSE MODULES

PART A:	A/1	Health & Safety
	A/2	S.I. Units
	A/3	Drawing & Notation
	A/4	Basic Water Systems
	A/5	Basic Air Systems
	A/6	Types of Pumps & Fans
	A/7	Basic Flow Measurements & Types of Instruments
	A/8	Codes of Practice
	A/9	Basic Flow Regulation
	A/10	Documentation & Reports
	A/11	Quality Assurance Outlines
PART B:	B/1	Reporting & Contractual Awareness
	B/2	Heat
	B/3	Heat Transmission
	B/4	Flowrate & Circulation
	B/5	Air & Water Design Concepts
	B/6	Electrical Theory
	B/7	Airflow Regulation
	B/8	Water Flow Regulation
	B/9	Advanced Air Systems
	B/10	Advanced Water Systems
	B/11	Filtration
PART C:	C/1	Instrument Calibration
	C/2	Duct Sizing
	C/3	Pipe Sizing
	C/4	Heat Exchangers
	C/5	Fans & Pumps
	C/6	Duty Calculations
	C/7	Water Treatment, Flushing & Venting
	C/8	Advanced Water Flow Regulation
	C/9	Advanced Air Commissioning



## **GRADE 4 Examination.**

The Grade 4 Examination consists of two elements:

### **Element 1. Technical Examination.**

The technical paper is designed to test the candidates knowledge of commissioning activities and covers the following areas:

- Duct sizing - calculating areas, resistances
- Locating water flow metering stations
- Fan/Pump laws, static pressure relationships
- Coil duties
- Mixing airflows, temperature relationships
- Psychrometrics - interpretation of charts, derivation of variables from given data
- Electric motors, overloads, full load currents
- VAV systems - commissioning methods
- Refrigeration - basic system arrangements
- S.I. units & derivations
- Problem solving - over volume systems, branch/main valve discrepancies, motorised control valves

The paper contains 20-25 questions, which are answered on the paper itself. It is important to show all calculations and workings –out as marks may be awarded for method even in the final answer is wrong.

This is a “closed book” examination of approximately 2 hours duration, and must be undertaken under suitable independent invigilation.

### **Element 2. Theory Examination**

Normally framed around a hypothetical site situation containing several scenarios that are often found in the commissioning environment. The question paper may examine the candidate’s understanding of either or both technical and contractual procedures and his/her ability to communicate this to various levels of personnel within the industry.

The question paper is a “closed book” examination of approximately 1 hour duration, and must be undertaken under suitable independent invigilation.



### **GRADE 5 THESIS**

The basis of the upgrade from Grade 4 (Commissioning Engineer) to Grade 5 (Senior Commissioning Engineer) is a 2500 - 3000 word (approx.) thesis on a subject allied to commissioning. The choice of subject is left open to the candidate and can be directly or indirectly connected to commissioning.

This open choice is deliberate in that the CSA wishes to give candidates as much scope as possible to pick a subject with which they are both comfortable and have the opportunity to carry out research. The subjects can thus be chosen from areas as diverse as the personal development of staff (one early submission examined the transition from "hands on" commissioning to commissioning management) or a detailed technical treatise (the most recent example being the comparison of ice storage and conventional chilled water systems).

The criteria that are used to judge the standard of the thesis are as follows:

- Does the candidate exhibit a detailed knowledge of the chosen subject?
- Does the thesis show clear evidence of personal research?
- Are the arguments clearly presented in a logical manner? Are both pros and cons considered (i.e. does it have rigour)?
- Is there a definitive conclusion? Is this fully supported by the arguments?
- Is the thesis well written and presented?

The thesis must therefore show personal development/ technical knowledge and the ability to examine a subject objectively and to seek out and present arguments for and against a case. The thesis must also show that a candidate has the necessary report writing skills.

Any thesis submitted is initially examined by the CSA Training Sub-Committee. It is then usual for the candidate to be invited to give a short presentation to two or three members of this sub-committee. This is to ensure that candidates have in fact considered all aspects of the chosen subject and have not, for instance, merely picked a conclusion which mirrors their own belief and selected the evidence to suit.

Once the Training Sub-Committee are agreed that the candidate and thesis satisfy the criteria, a recommendation is made to the CSA Main Committee that an upgrade be awarded.



### **GRADE 5 THESIS con't**

Candidates wishing to submit a thesis are encouraged to contact the Secretary in the first instance, who will discuss their proposed subject with them and give any necessary guidance on the degree of research required and the focus that the thesis might be given. This is to ensure that candidates prepare their work to the required standard and also to ensure that they select their subject so as not to cover too wide an area - a common fault is to define a subject area which leads to so many side issues that the primary thrust of the work is lost. To aid with this initial examination a one page synopsis of the proposed thesis is helpful.

From initial request to upgrade to a Grade 5, to the completion and acceptance of the thesis there is a time limit of one year.

To see some previous successful Grade 5 thesis go to the CSA web site [www.csa.org.uk](http://www.csa.org.uk)



### **PROCEDURE FOR UPGRADE TO GRADE 6.**

A detailed C.V. will be submitted to the Secretary by the applicant at least one month prior to the Main Committee meeting. This document will need to include two reference letters from senior staff with one of the following:

- 1/ An End User Client
- 2/ A Management Contractor
- 3/ A Consultant Engineer
- 3/ A Building Services Company
- 4/ A Corporate Member of the CSA (but not his/her employer)

The letter must support the applicant's case and clearly demonstrate Commissioning Management expertise on at least one project. Given that the applicant is a Grade 5 and thus may not have taken full responsibility for a major project, works undertaken as an assistant to a Commissioning Manager on a major project may be accepted.

The C.V. will be immediately circulated to the Committee Members.

Committee Members will examine the C.V. and pose any questions raised by the C.V. to the Secretary within two weeks. Committee Members are especially asked to examine the projects indicated that the applicant had a senior involvement showing Grade 6 potential or expertise, and to make any necessary enquiries..

The Secretary will carry out any necessary research within one week and communicate the results of the research to all Committee Members such that they have all available information approximately one week prior to the Committee Meeting.

The interview itself will take place at some point during the Main Committee meeting. The exact time will be arranged to suit both the committee and the applicant.

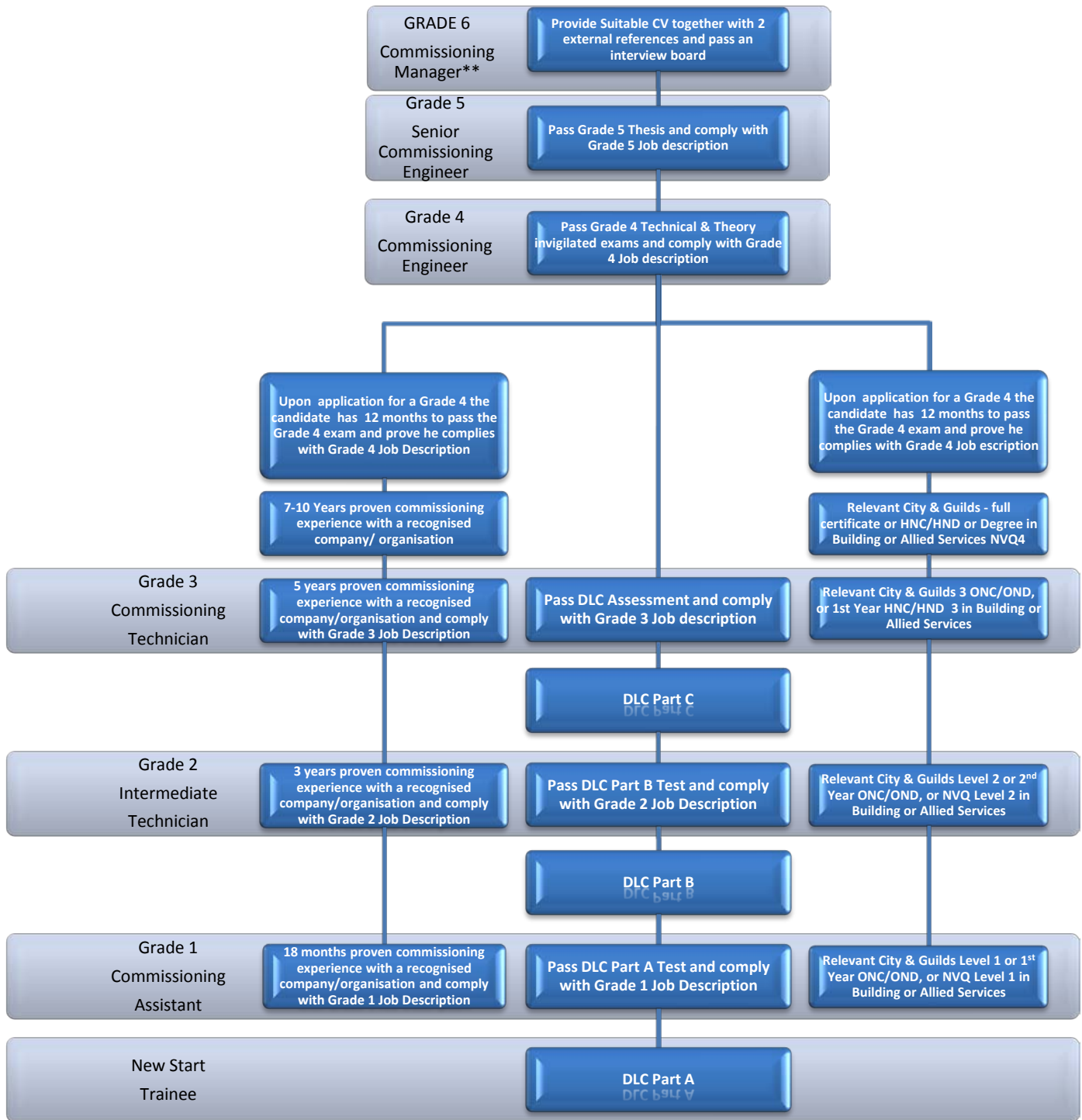
It is anticipated that the result of the upgrade request will be made known to the applicant immediately following the interview, unless special circumstances dictate otherwise. The Secretary will then confirm this in writing to the applicant and enclose the appropriately amended CSA membership card.

#### **Note:**

*The information gathered for this exercise will of course be confidential and limited to the Secretary and Committee Members.*



PATH OF DEVELOPMENT



**Notes** The above are guideline requirements and do not cover every personal situation and therefore the Committee retains the right to allocate a grade based on the information submitted or obtained.

\* Although the Committee accept external qualifications/allied experience, candidates are still encouraged to complete the comprehensive Distance Learning Courses and examinations to assist their own personal development.

\*\* At the Committee's discretion



Commissioning Specialists Association

The HVAC and Building Services Commissioning Engineers Association