ENGINEERING COUNCIL OF SOUTH AFRICA *Standards and Procedures System*			
Discipline-specific Training Guideline for Candidate Engineers in Agricultural Engineering			
Status: Approved by Registration Committee for Professional Engineers			
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Contents

1. Purpose

All persons applying for registration as Professional Engineers are expected to demonstrate the competencies specified in document R-02-PE and to demonstrate these competencies at the prescribed level, irrespective of the trainee's discipline, through work performed by the applicant at the prescribed level.

This document supplements the generic Training and Mentoring Guide R-04-P and the guide to the competency standards for professional engineers, document R-08-PE. This document is subordinate to the documents referred to above and the Policy on Registration, document R-01-P.

Attention is drawn to the following sections of the Training and Mentoring Guide R-04-P:

7.3.2 Duration of training and period working at level required for registration
7.3.3 Principles of planning training and experience
7.3.4 Progression of Training programme
7.3.5 Documenting Training and Experience
7.4 Demonstrating responsibility

The Guide to the Competency Standards, document R-08-P provides both a high-level and outcome-by-outcome understanding of the competency standards as an essential basis for this discipline specific guide.

2. Audience

This Guide is directed to candidates and their supervisors and mentors in the discipline of Agricultural Engineering.

This guide applies to persons who have:

- Completed the education requirements by obtaining an accredited BScEng/BEng-type qualification, or a Washington-Accord Recognised qualification or through evaluation/assessment;
- Registered as Candidate Engineers;
- Embarked on a Process of Acceptable Training, preferably under a registered Commitment And Undertaking (CU), with a Mentor guiding the professional development process at each stage;
- Follow a program of training and experience incorporating the good practice elements described in this guide.

The guide may be applied in the case of a person moving into a candidacy programme at a later stage that is at a level below that required for registration (see Section 6.3).

3. Persons not Registered as a Candidate or not Training under a C&U

All applicants for registration must present the same evidence of competence and be assessed against the same standards, irrespective of the development path followed. Application for registration as a Professional Engineer is permitted without being registered as a Candidate Engineer or without training under a C&U. Mentorship and adequate supervision are however key factors in effective

development to the level required for registration. A C&U indicates that the company is committed to mentorship and supervision.

If the trainee's employer has no C&U, the trainee should establish the level of mentorship and supervision the employer is able to provide. In the absence of an internal mentor, the services of an external mentor should be secured. The Voluntary Association for the discipline should be consulted for assistance in locating an external mentor. A mentor should be in place at all stages of the development process.

This guide is written for the recent graduate who is training and gaining experience toward registration. Mature applicants for registration may apply the guide retrospectively to identify possible gaps in their development.

Any applicants who have not enjoyed mentorship are advised to request an experienced mentor (internal or external) to act as an application adviser while they prepare their application for registration.

The guide may be applied in the case of a person moving into a candidacy programme at a later stage that is at a level below that required for registration (see section 7.3).

4. Agricultural Engineering

Agricultural Engineers (OFO 214905)

The expertise of Agricultural Engineers, who have unique skills to connect the living world of plants, soil, water and animals with the technology of engineering (i.e. systems, structures and machines), are required to ensure sustainable environments with adequate water supplies, energy and food production and processing systems. Agricultural engineers thus operate at the interfaces between engineering science and practice, agricultural production and processing and rural environmental management. The implication is that agricultural engineers must be aware of the factors that are important in agricultural production and processing and environmental sustainability. This is promoted by including introductory agricultural courses in the tertiary education of the agricultural engineer. In the case of candidates who have degrees in engineering specialities other than agricultural they will have to show that they have attained this knowledge through practical experience in at least one of the many diverse areas of sustainable agricultural production and processing if they are to be registered as agricultural engineers.

An Agricultural Engineer plans, performs and supervises engineering work related to the development and/or improvement of infrastructure, machinery and processes for agricultural production, the post-harvest handling and processing of agricultural produce, and similar engineering processes in associated environmental and biological contexts. This may include the use and development of agricultural land, environment, infrastructure (buildings, roads, river crossings, dams, irrigations systems, electrification etc.), machines, equipment and processes.

Due to the multi-disciplinary nature of Agricultural Engineering, practising Agricultural Engineers generally concentrate in one or more of the following areas:

- Agricultural Energy Engineering

- Agricultural Renewable Energy Engineering
- Agricultural Product Processing Engineering
- Agricultural Structures and Facilities Engineering
- Agricultural Waste Handling and Management
- Aquaculture Engineering
- Mechanisation Engineering
- Irrigation Engineering
- Hydrology and Agricultural Water Use Management
- Natural Resources Engineering
- Food Engineering
- Environmental Engineering
- Rural Infrastructure Engineering

Potential fields of work for Agricultural Engineers include the following:

- Advising on and/or conducting research and development of new or improved theories and methods related to Agricultural Engineering (i.e. soil and water, power and machinery, processing and handling of agricultural /biological products, structures and environment, energy – particularly renewable energy, and biological systems).

- The design, management and/or advising on technology for food, fibre and energy production systems including the design, sizing, selection and management of agricultural machinery, implements and equipment for field operations (e.g. for soil preparation, planting, harvesting, storage and transport of produce), testing and evaluation of new agricultural machinery and equipment, the use of precision agriculture technologies (e.g. GIS, GPS) to ensure optimal and sustainable agricultural production systems which takes due consideration of the environment, and the design and operation of transportation systems to move produce from fields to storage facilities, factories and consumers.

- The design and management of irrigation systems to irrigate plants efficiently in order to obtain optimal yield per unit of water applied and the design and installation of drainage systems for land conservation and optimal crop production.

- The design and management of agricultural and rural water resource systems by the design of dams, canals, boreholes, extraction works and pipe networks for water supply to agriculture and humans, the assessment of the availability of water resources in order to meet demands for water in a highly variable climate in South Africa, the management of water resources by reconciling demands for water with the available supplies, the design of soil and water conservation systems to control runoff and thus minimise erosion and maximise agricultural production, and by sustaining the environment by minimising any negative impacts of agricultural practices.

- The design and operation of agricultural structures and infrastructure (e.g. farm buildings, farm roads, minor river crossings and bridges, animal handling facilities, agricultural waste handling and management facilities, spray races and dips).

- The design and management of food processing and storage systems in order to add value to raw products by the use of technology to preserve and process food and animal feed, and

ensuring products are safe for human consumption (e.g. structures, cold stores, pack houses, factories and plants for agricultural produce value addition, cooling, heating, dehydration and pasteurisation facilities, grain handling-, storage- and silo facilities, fish processing plants, abattoirs, marketing structures).

- The design and management of intensive animal and plant production structures and control systems which may have controlled environments for optimal plant (e.g. greenhouses) and animal (e.g. housing structures, broiler units, dairy plants, milking parlours) production.

- The use of renewable sources of energy by the design and development of technology to grow and utilise sustainable sources of energy (e.g. hydro, bio-fuels, solar, wind) and the processing of agricultural products and biomass into bio-energy (e.g. anaerobic digesters).

- Design, management and advising on power and energy systems for agricultural production, including design, sizing, selection and management of agricultural machinery and equipment (e.g. engines, motors, pumps, fans, pipes), testing and evaluation of new agricultural machinery and equipment.

- Determining and specifying construction methods, materials and quality standards and directing construction work.

- Establishing control systems to ensure efficient functioning of infrastructure as well as safety and environmental protection.

- Organising and directing operation, maintenance and repair of agricultural production structures and facilities.

- Analysing the stability of structures, machinery and implements and testing the behaviour and durability of materials used in their construction.

5. Training Implications of the Nature and Organisation of the Industry

5.1 Diverse Fields of Specialisation

Agricultural Engineering encompasses a diverse range of fields, and it would be unrealistic to expect a Candidate Engineer (CE) to achieve exposure to the full range of fields during the training period, or even throughout his career. However, it is important that the CE:

- is exposed to and demonstrates a good understanding of the context within which he is applying his knowledge, skills and engineering judgement;
- gains experience across the full spectrum of tasks in the typical lifecycle of engineering projects; and
- is familiar with the statutory requirements related to his field of operation.

5.2 The Need for Strong Contextual Knowledge

By nature, work in the Agricultural Engineering sector is very closely integrated with biological systems and the natural environment. Furthermore, it requires of the engineer a thorough understanding of the range of people and circumstances that an agricultural engineering solution

would need to be suited to, which may vary from ultramodern agro-industrial factories and complex multi-faceted commercial farming enterprises, through to robust pro-poor rural food security systems within complex multi-user social structures.

The strong contextual nature of Agricultural Engineering solutions holds specific implications for the training of the CE. It is strongly recommended that the CE also acquires first-hand exposure to and experience of the non-engineering context (farms, rural communities, agri-businesses) within which Agricultural Engineering solutions need to be relevant. Adequate first-hand exposure will enable the CE to:

- Understand that he is working with the uncertainties of economy, climate, different social contexts and farming environments;
- Understand, respect and be able to collaborate with related disciplines in a complex environment, including specialists in crops, soils, food science, health, chemical suppliers, environmental aspects; and
- Appreciate the economic realities in agriculture, including low margins in agriculture; resource-poor communities; and socio-economic impacts of, and on, engineering interventions.

5.3 Tasks/Functions in the Engineering Project Lifecycle

The Candidate Engineer should ensure that the work he/she engages in during the training period is relevant to his/her progression towards registration, and gradually increases his/her degree of responsibility. He/she should further ensure that he/she gains experience in all the typical tasks in the lifecycle of agricultural engineering projects, specifically including practical site work and engineering design. The tasks in the engineering project lifecycle are further elaborated in "Appendix A: Training Elements (QCTO Curriculum)", namely:

i. Solving complex engineering problems, using engineering & contextual knowledge;
ii. Planning/implementing/operating engineering projects/systems/products/processes;
iii. Mitigating risk & impact; and
iv. Managing engineering activities.

The Candidate Engineer can develop further insight into the typical stages in the implementation of engineering projects by studying the Guideline Scope of Services and Tariff of Fees for Persons Registered in terms of the Engineering Profession Act, 2000 (Act No.46 of 2000) (see Engineering Council of South Africa Board Notice No 208 of 2011 in the Government Gazette No.34875 of 20 December 2011).

The six stages for implementation of normal services in an engineering project are:

- **Stage 1** - Inception (including assessment of needs and resources)
- **Stage 2** - Concept and Viability (often called Preliminary Design)
- **Stage 3** - Design Development (also termed Detail Design)
- **Stage 4** - Documentation and Procurement (developing of tender documentation including drawings, specifications, quantities and tenders/contracts, and procurement, including tendering process)

- **Stage 5** - Contract Administration and Inspection (requiring adequate first-hand practical experience of the CE in site work, such as fabrication, construction, manufacturing, installation; construction administration and inspection)
- **Stage 6** - Close-Out (project close-out and handover, including commissioning, operating documentation and as-built plans)

For continuing projects in an operational environment, the Agricultural Engineer may be responsible for project management such as ongoing operation and maintenance, asset management and renewal, and optimisation, including:

- post-implementation/ operation/ management;
- shut-down, preventative maintenance;
- ongoing optimisation;
- repair, refurbishment, upgrading; and
- decommissioning, safe disposal/ re-use/ recycling.

Both practical experience in site work (Stage 5) and engineering design (Stages 2 and 3) are essential in the training of an Agricultural Engineer. It should be noted that design is not restricted to physical infrastructure and artifacts, but may also produce new processes or operating systems.

5.4 Industry-related statutory requirements, risk and impact mitigation

The close association of Agricultural Engineering with biological and environmental systems requires specific attention to risk and impact mitigation, and requires the CE to develop a good working knowledge of specific laws and regulations, including but not limited to the following:

i. Atmospheric Pollution Prevention Act, No. 45 of 1965
ii. Conservation of Agricultural Resources Act. No. 43 of 1983 (CARA)
iii. Land Reform legislature
iv. Land Use Planning Ordinance, No. 15 of 1985 (LUPO)
v. National Environmental Management Act, 1998 (Act no. 107 of 1998)
vi. National Environmental Management Biodiversity Act, No. 10 of 2004
vii. National Environmental Management Waste Act, No. 59 of 2008
viii. National Water Act, No. 36 of 1998
ix. Occupational Health and Safety Act, No. 85 of 1993

6. Developing competency: Elaborating on sections in the Guide to the Competency Standards, document R-08-PE

The Candidate Engineer can demonstrate competency in his or her field by compiling a portfolio of evidence, structured according to the eleven outcomes mentioned in R-02-PE and further described in R-08-PE. The eleven outcomes are organised in five groups (Groups A-E), and nested as shown below:

Group A: Knowledge-based Engineering Problem Solving (Outcomes 1, 2, 3)
Group B: Managing Engineering Activities (Outcomes 4, 5)
Group C: Risk and Impact Mitigation (Outcomes 6,7)
Group D: Exercising Judgement and Taking Responsibility (Outcomes 8, 9, 10)
Group E: Developing Own Competency (Outcomes 11)

Essential Activities of Professional Engineers	Using Enabling Knowledge	Taking Account of Consequences	Exercising Personal Attributes	Maintaining and Extending Competence
1:Define, investigate and analyse *complex* engineering problems. **2**: Design or develop solutions to *complex* engineering problems	**3**: Comprehend and apply advanced knowledge of the widely-applied principles underpinning good engineering practice, specialist knowledge and knowledge specific to the jurisdiction and local conditions.	**6**: Recognise and address the reasonably foreseeable social, cultural and environmental effects of *complex* engineering activities.	**8**: Conduct engineering activities ethically. **9**: Exercise sound judgement in the course of *complex* engineering activities.	**11**: Undertake professional development activities sufficient to maintain and extend his or her competence
4: Manage part or all of one or more *complex* engineering activities **5**: Communicate clearly with others in the course of his or her engineering activities		**7**: Meet all legal and regulatory requirements and protect the health and safety of persons in the course of his or her *complex* engineering activities.	**10**: Be responsible for making decisions on part or all of *complex* engineering activities.	

A Knowledge based problem solving (this should be a strong focus)
The CE may develop and demonstrate competency in Outcomes 1, 2 and 3 by providing evidence of problem identification and analysis which successfully interpreted a diversity of factors in farming, rural development or agro-industrial contexts affecting possible engineering solutions; examples of identification, evaluation, selection, design and implementation of suitable engineering solutions (which may include infrastructure and/or processes); and application of engineering and non-engineering knowledge and insight to achieve workable solutions.

B Management and Communication
Evidence for the CE's competency in Outcomes 4 and 5, management and communication in Agricultural Engineering, can include examples of planning, organising and human resource management, funds, machinery, methods and materials in site work and agricultural engineering office contexts. This may also include professional and effective communication with farmers, rural communities, contractors, persons engaged in agro-industry, relevant government departments, clients and peers.

C Identifying and mitigating the impacts of engineering activity
Examples demonstrating competency in Outcome 6, identifying and mitigating the impacts of agricultural engineering activity may include the responsible development, utilisation and protection of natural resources related to agriculture, including water, soil, biodiversity and air quality. It may further include mitigation of non-regulated impacts, such as disturbances to social and economic stability through ill-considered engineering developments, particularly in remote rural areas.

Evidence of competency in Outcome 7 may include examples of protection of human, animal and plant health, in farming and agro-industrial contexts, in addition to compliance with relevant regulatory requirements in the design of engineering solutions.

D Judgement and responsibility

For Outcomes 8, 9 and 10, the CE should demonstrate that he or she is willing and able to take responsibility for decisions, and is competent in judgement and responsible conduct in accordance with the ECSA Code of Conduct.

E Independent learning

Towards achievement of Outcome 11, the CE should develop the ability and habit for independent and lifelong learning, and can provide evidence of relevant Continuous Professional Development (CPD) activities completed during the training period, using the CPD guidance documentation available on the ECSA website.

6.1 Recommended Practical and Formal Learning Activities

The following practical and formal learning activities/objectives are recommended for inclusion in the training period for a CE in Agricultural Engineering:

- Practical exposure to non-engineering skills, and underlying background experience in farming, rural development and/or agro-industry contexts. If possible, it is strongly advised that candidate agricultural engineers work in a farming or agro-industrial environment for at least three months to a year upon graduation;
- Getting into the habit of CPD in functions related to the discipline;
- Networking and getting to know peers and related disciplines;
- Developing targeted soft skills, to act effectively with respect for social realities and management contexts;
- Attendance of industry-related conferences/ presentations / seminars / workshops;
- IT/software applications relevant to the discipline;
- Project planning and management;
- Engineering management; and
- Entrepreneurship and business management.

7. Programme Structure and Sequencing

The Candidate Engineer, with his supervisor and mentor, should ensure that his work is structured and sequenced to enable systematic progression towards registration. Progress can be planned and measured using the scales for degree of responsibility, engineering activity and engineering problem solving as described in R-04-P: Training and Mentoring Guide and R-08-PE: Guide to the Competency Standard.

In particular, "Table 4: Progression throughout the candidacy period" in R-04-P refers to the gradual increase in the degree of responsibility that a CE is expected to acquire and exhibit during his/her engineering training. Specific examples and outcomes appropriate to training in Agricultural Engineering are given below:

Degree of	Nature of work	Activities/duties to be undertaken during training

Responsibility	The candidate …	(Agricultural Engineering)
A: Being Exposed	… undergoes induction, observes processes and work of competent practitioners	While working under close supervision of a competent/professional engineer and senior colleagues in the firm/organization, the trainee should: • Be directed to read the various Acts and regulations that affect the work of a professional engineer; • Be exposed to the firm or organization's work environment, including the organizational structure; • Read materials about the firm/organization; • Be exposed to field work and engineering office work environment and culture; • Attend and participate in meetings, including office, field/site meetings, seminars, workshops, etc.; • Be sensitized about the importance of CPD and relevant vocational society meetings; • Be exposed and/or trained in the use of both the general and specialized computer software packages used by the firm/organization in its delivery of day-to-day work; • Be part of a team comprising competent engineers(s) and CEs working on engineering projects in a sub-discipline of agricultural engineering; • If possible, the trainee should be attached/exposed to different projects in the known sub-disciplines of agricultural engineering; and • Be personally committed to his/her development and training by gaining experience in the full range of engineering activities available in the firm/organization.
B: Assisting	… performs specific processes under close supervision	While working under close supervision of a professional engineer, the trainee should: • Be engaged in engineering tasks under close supervision of a competent engineer; • Develop and display an appreciation of the numerous resources at the disposal of an agricultural engineer; • Be engaged in conducting special studies or research to solve customer service problems; • Assist in the selection of outside consultants and contractors; • Assist in the preparation of and issuance of proposals to consultants and contractors; • Be assigned the responsibilities of assisting/ supervising new staff at the ' A – Being Exposed' level and other lower level technical staff; • Assist in the review of bid proposals and make recommendations and forward his/her report to the supervising professional engineer; and • Be personally committed to his/her development and training by gaining experience of the whole range of engineering activities available in the firm/organization.
C: Participating	… performs specific processes as directed	While working under reduced supervision compared to the Degree of Responsibility at levels A and B, the trainee

	with limited supervision	should: • Administer assigned contracts and provide administrative support in the preparation of construction and maintenance contracts; • Participate in the preparation of budgets for assigned projects, submit budget recommendation and monitor expenditure; • Assist in monitoring outside consultants' work and progress of projects and disbursement of payments; • Compile engineering and other relevant data for use by other engineering project team members for assigned projects; • Participate in minor engineering work design work as directed by a competent engineer; • Be personally committed to his/her development and training by gaining experience of the whole range of engineering activities available in the firm/organization; and • Remain committed to CPD.
D: Contributing	… performs specific work with detailed approval of work outputs	While working under minimum supervision, the trainee applies engineering technology and knowledge of biological sciences to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products, in order to: • Develop criteria for design, manufacture, or construction of equipment, structures, and facilities; • Design and use sensing, measuring, and recording devices and instrumentation to study such problems as effects of temperature, humidity, and light, on plants or animals, or relative effectiveness of different methods of applying insecticides; • Design and direct manufacture of equipment for land tillage and fertilization, plant and animal disease and insect control, and for harvesting or transport of commodities; • Design and supervise erection of structures for crop storage, animal shelter, and human dwelling, including light, heat, air-conditioning, water supply, and waste disposal; • Plan and direct construction of irrigation, drainage, and flood-control systems for soil and water conservation; • Design and supervise installation of equipment and instruments used to evaluate and process farm products, and to automate agricultural operations groups, and related farm cooperatives; and • Remain committed to CPD. It should be noted that the trainee need not contribute/work in all the said areas because the firm/organization may not be involved in engineering work covering all the agricultural engineering sub-disciplines.

E: Performing	… works in team without supervision, recommends work outputs, responsible but not accountable	While working under no supervision, the trainee applies engineering technology and knowledge of biological sciences to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products, in order to: • Develop criteria for design, manufacture, or construction of equipment, structures, and facilities; • Develop and implement production, processing and management systems; • Design and use sensing, measuring, and recording devices and instrumentation to study such problems as effects of temperature, humidity and light on plants or animals, or relative effectiveness of different methods of applying insecticides; • Design and direct manufacture of equipment for land tillage and fertilization, plant and animal disease and insect control, and for harvesting or transport of commodities; • Design and supervise erection of structures for crop storage, animal shelter, and human dwelling, including light, heat, air-conditioning, water supply, and waste disposal; • Plan and direct construction of irrigation, drainage, and flood-control systems for soil and water conservation; • Design and supervise installation of equipment and instruments used to evaluate and process farm products, and to automate agricultural operations groups, and related farm cooperatives; • Assume technical responsibility and coordinate the work of his/her juniors; • Manage multi-disciplinary engineering projects; • Be required to exercise engineering judgment and take responsibility, the output of which must be confirmed by a professional engineer; and • Remain committed to CPD. It should be noted that the trainee need not contribute/work in all the said areas because the firm/organization may not be involved in engineering work covering all the agricultural engineering sub-disciplines.

7.1 Best-practice programmes

Recognition of prior engineering training outside the realm of ECSA training requirements guide should be used to determine at what level of responsibility a late entrant or one who has changed employment should join the candidacy programme. The onus is placed on the trainee applicant to

provide verifiable evidence that the engineering work they were involved in, in the past indeed meets the requirements of the degree of responsibilities contained in this DSTG.

7.2 Considerations for generalists, specialists, researchers and academics

Persons whose formative development has not followed a conventional path, for example academics, researchers, and specialists, are enabled to register. The overriding consideration is that to be registered, a person, irrespective of the route followed, must provide evidence of competence against the standard. The onus is on such applicants to provide verifiable evidence that the degree of responsibility and competence required in this DSTG have been met.

7.3 Moving into or between Candidacy Programmes

This Guide assumes that the candidate enters a programme after graduation and continues with the programme until ready to submit an application for registration. It also assumes that the candidate is supervised and mentored by persons who meet the requirements in document R-04-P section 7.2. In the case of a person changing from one candidacy programme to another or moving into a candidacy programme from a less structure environment, it is essential that the following steps be completed:

- The candidate must complete the Training and Experience Summary (TES) and Training and Experience Reports (TER) for the previous programme or unstructured experience. In the latter case it is important to reconstruct the experience as accurately as possible. The TERs must be signed off.
- On entering the new programme, the Mentor and Supervisor should review the candidate's development in the light of the past experience and opportunities and requirements of the new programme and plan at least the next phase of the candidate's programme.

Appendix: Training Elements

	Occupational		Work experience	Scope of Work Experience
	tasks	contexts		
1	Solving problems based on engineering and contextual knowledge			
1.1		Conceptualisation of complex engineering problems		
1.1.1			Receive brief	
1.1.2			Investigate/evaluate requirements	
1.1.3			Develop preliminary solutions	
1.1.4			Justify the preliminary design	
1.2		Design or development processes for complex engineering problems		
1.2.1			Detailed design or development processes	
1.2.2			Documentation development for Implementing Complex Engineering Solutions	
2	Implementing or operating engineering projects, systems, products or processes			
2.1		Planning processes for Implementation or Operations		
2.1.1			Develop business and stakeholder relationships	
2.1.2			Scope and plan	
2.2		Organising processes for Implementation or Operations		
2.2.1			Manage resources	
2.2.2			Optimisation of resources and processes	
2.3		Controlling processes for Implementation or Operations		
2.3.1			Site work: Monitor progress and delivery	
2.3.2			Monitor quality	
2.4		Close out Processes for Implementation or Operations		
2.4.1			Commissioning processes	
2.4.2			Development of operational documentation	
2.4.3			Handover processes	
2.5		Maintenance and repair processes		
2.5.1			Maintenance planning and scheduling	
2.5.2			Monitor quality	
2.5.3			Oversee repairs and/or implement remedial processes	
3	Risk and Impact Mitigation			
3.1		Impact and risk assessments		
3.1.1			Impact assessments	
3.1.2			Risk assessments	
3.2		Regulatory compliance processes		
3.2.1			Health and Safety	
3.2.2			Legal and regulatory	
4	Managing Engineering Activities			
4.1		Self Management Processes		
4.1.1			Manage own activities	
4.1.2			Communicates effectively	
4.2		Team environment		
4.2.1			Participate in and contribute to team planning activities	
4.2.2			Manage people	
4.3		Professional communication and relationships		
4.3.1			Establish and maintain professional and business relationships	
4.3.2			Communicates effectively	
4.4		Exercising Judgement and Taking Responsibility		
4.4.1			Ethical practices	
4.4.2			Exercise sound judgement in the course of complex engineering activities	
4.4.3			Be responsible for decision making on part or all of complex engineering activities	
4.5		Competency development		
4.5.1			Plan own development strategy	
4.5.2			Construct initial professional development record	

Revision History

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Rev 0: Concept A	15 Sep 2012		Initial attempt by task Ag Eng PAC team
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