GEOSPATIAL ENGINEERING COMPETENCIES

Specialist Engineering Surveying

The measurement, definition and portrayal, either digitally or graphically in the form of maps or plans, of the physical features of, and the structures on the earth's surface. The ability to understand engineering design information and from this, provide dimensional control for all stages of construction work.

GEES01		**Competency**	**Undertake engineering surveying/setting out and provide reports to clients and third parties**				
				Date of assessment			
	Optimum Standard		**Activity Details**	A	K	E	B
ITEM	**TECHNICAL MEMBER**	**MEMBER**					
A	K	B	Site reconnaissance, survey methodology and risk assessment				
B	E	B	Understanding requirements, accuracies, theory of error				
C	E	B	Retrieving existing survey information and linking this to design drawings.				
D	E	B	Use of appropriate survey control stations and measurements e.g. closed, well-conditioned traverse				
E	E	B	Use and understanding of GNSS surveying techniques: - Modes of GNSS positioning (static, post-processed kinematic, local base station RTK, Network RTK, Precise Point Positioning) and their application e.g. survey control, detailing, setting out - Role of base stations, baseline lengths, session durations - Error sources and mitigation: orbits and clocks, ionosphere, troposphere, multipath, antenna phase centres, geometry effects, interference - Post-processing and analysis of GNSS data - Quality control of GNSS-based positions - Multi-GNSS: benefits and limitations				

GEES01 continued		**Competency**	**Undertake engineering surveying/setting out and provide reports to clients and third parties**				
				Date of assessment			
	Optimum Standard		**Activity Details**	A	K	E	B
ITEM	**TECHNICAL MEMBER**	**MEMBER**					
F	E	B	Height control – use of different methods of establishing heights e.g. levelling, GNSS				
G	E	B	Methods of marking and maintaining dimensional control information on site				
H	E	B	Data capture and feature coding. Recording of survey information				
I	E	B	Communication of dimensional information to others. Using verbal, digital and written presentation of information				

GEES01: Undertake engineering surveying/setting out and provide reports to clients and third parties	
Name of Supervisor	Name of Applicant
Supervisor’s signature	Date

GEES02		**Competency**	**Use and understanding of surveying instruments**				
				Date of assessment			
	Optimum Standard		**Activity Details**	A	K	E	B
ITEM	**TECHNICAL MEMBER**	**MEMBER**					
A	E	B	Total Stations				
B	E	B	GNSS - Static – Kinematic				
C	A	K	Theodolites				
D	E	B	**Levels** 1. Optical 2. Electronic 3. Digital				
E	E	B	Construction Laser Devices				
F	K	K	Use of three dimensional machine control				
G	E	B	Instrument checking				

GEES02 continued		**Competency**	**Ability to use and understanding of surveying instruments**				
				Date of assessment			
	Optimum Standard		**Activity Details**	A	K	E	B
ITEM	**TECHNICAL MEMBER**	**MEMBER**					
H	E	B	Instrument adjustment within the boundaries and limitations of the equipment in use along with associated checking and procedures				
I	E	B	Accessories; checking and adjustment				
J	E	B	Other methods of measuring distance				

GEES02: Use and understanding of surveying instruments	
Name of Supervisor	Name of Applicant
Supervisor’s signature	Date

GEES03		**Competency**	**Application of geometric principles**				
				Date of assessment			
	Optimum Standard		**Activity Details**	A	K	E	B
ITEM	**TECHNICAL MEMBER**	**MEMBER**					
A	E	B	Calculating 3 dimensional coordinate geometry using manual or computerised methods				
B	E	B	2D and 3D Survey control. Intersections, resections, free station, traverse, network and geometric configurations				
C	E	B	Adjustment of survey measurements. Redundant observations. Principles of least squares, residuals, standard errors, error ellipses				
D	E	B	Measurement of heights, use of height datum, datum transformations, geoid/spheroid separations				
E	E	B	Error propagation				

GEES03: Application of geometric principles	GELS03: Application of geometric principles
Name of Supervisor	Name of Applicant
Supervisor’s signature	Date

GEES04		**Competency**	**Ability to use ICT in surveying**				
				Date of assessment			
	Optimum Standard		**Activity Details**	A	K	E	B
ITEM	**TECHNICAL MEMBER**	**MEMBER**					
A	E	B	Transfer of survey data between instrument and computer				
B	E	B	Electronic processing of coordinate geometry data including geometric networks				
C	E	B	Use and manipulation of digital ground models				
D	E	B	Use of design data for dimensional control				
E	E	B	CAD - general principles, structure, layering, UCS				

GEES04: Ability to use ICT in surveying	
Name of Supervisor	Name of Applicant
Supervisor’s signature	Date