



**NATIONAL OCCUPATIONAL
STANDARD FOR GEOMATICS
ENGINEER**

APPROVING AUTHORITY

This National Occupational Standard has been prepared and published under the authority of the Zambia Qualifications Authority Board on 25th February 2021.

ZAMBIA QUALIFICATIONS AUTHORITY

The Zambia Qualifications Authority Act No. 13 of 2011 was enacted by the Government of the Republic of Zambia to ***“provide for the development and implementation of a national qualifications framework; establish the Zambia Qualifications Authority; provide measures to ensure that standards and registered qualifications are internationally comparable; and provide for matters connected with, or incidental to the foregoing”***. Among other functions, ZAQA is responsible for *determining national standards for any occupation*, through various sector specific National Occupational Standards Development Teams (NOSDTs).

REVISION OF NATIONAL OCCUPATIONAL STANDARDS

National Occupational Standards shall be revised every after **5 years**, or whenever necessary, by the issue of either amendments or of revised editions. It is important that users of National Occupational Standards (NOS) should ascertain that they are in possession of the latest amendments or editions.

NOS DEVELOPMENT TEAM RESPONSIBLE

This National Occupational Standard was prepared by the Construction National Occupational Standards Development Team, upon which the following organisations were represented:

1. Association of Building and Civil Engineering Contractors
2. Association of Consulting Engineers of Zambia
3. Copperbelt University
4. Department of Public Infrastructure/ Ministry of Housing and Infrastructure Development
5. Engineering Institution of Zambia
6. Ministry of Housing and Infrastructure Development
7. National Council for Construction
8. Road Development Agency
9. Surveyors Institute of Zambia
10. Technical Education, Vocational and Entrepreneurship Training Authority
11. Thorn Park Construction Training Centre
12. University of Zambia
13. Zambia Institute of Architects
14. Zambia Qualifications Authority – Secretariat
15. ZESCO Limited

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FOREWORD

The Zambia Qualifications Authority (ZAQA) is a statutory body under the Ministry of Higher Education established by ZAQA Act No. 13 of 2011 to “**provide for the development and implementation of a national qualifications framework; provide measures to ensure that standards and registered qualifications are internationally comparable; and provide for matters connected with, or incidental to the foregoing**”.

Among other functions, ZAQA is responsible for “*determining national standards for any occupation*”, through various sector specific National Occupational Standards Development Teams (NOSDTs) of experts composed of representation from appropriate authorities, government departments, industry, academia, regulators, consumer associations and non-governmental organisations, etc.

This National Occupational Standard (NOS) has been developed by the Construction National Occupational Standards Development Team in accordance with the procedures and guidelines of ZAQA. All users should ensure that they have the latest edition of this publication as National Occupational Standards are revised from time to time.

This NOS shall be used by, among others, industry, employers, quality assurance bodies, awarding and professional bodies and education and training institutions, as a benchmark to identify training needs, develop job profiles/descriptions, develop curricula and learning programmes, in various sectors where the occupation exists. In the Construction sector, demonstration of competence against this NOS may be required in order to run a business or practice a craft or profession.

JUSTIFICATION

The Construction sector is one of the growing sectors in Zambia. Among the occupations that have played a key role in this are Geomatics Engineers. The Geomatics Engineers play an integral role in land development, from the planning and design through to the final construction of roads, buildings and landscaping. Geomatics Engineers are the first people on any construction site, measuring and mapping the land. These primary measurements are then used by Architects and Engineers to plan structures accurately and safely, ensuring buildings not only fit with the landscape but are able to be constructed.

It is therefore imperative for Geomatics Engineers to be equipped with knowledge and skills necessary for them to be able to use the latest technology such as high order GPS, Robotic Total Stations (Theodolites), aerial vehicles (manned and unmanned) and terrestrial scanners to map an area, making computations and taking photos as evidence. Geomatics Engineers should also be able to use surveying software to draft plans and map the onsite measurements.

These National Occupational Standard highlights core knowledge, skills, competences and values that Geomatics Engineers must possess to be successful in their places of work.

ACRONYMS AND ABBREVIATIONS

CAD	Computer Aided Design
CS	Core Skill
ES	Engineering Surveyor
EIZ	Engineering Institute of Zambia
GE	Geomatics Engineer
GIS	Geographical and Information System
NOS	National Occupational Standard
NOSDT	National Occupational Standards Development Team
OK	Organisational Knowledge
PC	Performance Criteria
PS	Professional Skill
RPL	Recognition of Prior Learning
SIZ	Surveyors Institute of Zambia
TK	Technical Knowledge
ZAQA	Zambia Qualifications Authority
ZQF	Zambia Qualifications Framework

GLOSSARY OF TERMS

For the purposes of this NOS, the following terms and definitions shall apply:

Core Skills/Generic Skills: are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the NOS, these include technical, interpersonal communication related skills that are applicable to most job roles.

Function: is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of NOS.

Job Role: defines a unique set of functions that together form a unique employment opportunity in an organisation.

Knowledge and Understanding: are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.

National Occupational Standards (NOS): are statements of the standards of performance individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding. They are precise descriptions of what an individual is expected to be able to do in his/her work role.

National Occupational Standards (NOS) Code: is a unique reference code that identifies a NOS.

National Occupational Standards Development Team (NOSDT): means an established group of national stakeholders/experts responsible for the development of National Occupational Standards within a specific economic sector or occupation.

Occupation: is a set of job roles, which perform similar/related set of functions in an industry.

Organisational Context: includes the way the organisation is structured and how it operates, including the extent of operative knowledge that managers have in their relevant areas of responsibility.

Performance Criteria: are statements that together specify the standard of performance required when carrying out a task.

Scope: is the set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on the quality of performance required.

Sector: is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.

Sub-Sector: is derived from a further breakdown based on the characteristics and interests of its components.

Technical Knowledge: is the specific knowledge needed to accomplish specific designated responsibilities.

Unit Title: gives a clear overall statement about what the incumbent should be able to do.

1. OVERVIEW

This is an introductory section providing a brief summary and specific information or commentary about the content of the NOS and the targeted sector and occupation to help the user judge whether it is relevant to them.

NOS Code	NOS.GE.01
Occupation	Geomatics Engineering
Job Title	Geomatics Engineer
Job Description	Make exact measurements and determine property boundaries. Provide data relevant to the shape, contour, gravitation, location, elevation, or dimension of land or land features on or near the earth's surface for engineering, mapmaking, mining, land evaluation, construction, and other purposes
Job Purpose	The job holder carries out land surveying using modern and conventional systems and instruments
ZQF Level	7
Sector	Construction
Sub sector	Real Estate and Infrastructure Construction
Other Economic Sector(s) in which the Occupation is Practiced	Mining, Transportation, Energy, Agriculture, Financial, Education, Cadastral (Land Titling), Urban and Regional Planning, Geo-information Management, etc.
Other Similar Jobs Performed in the Occupation	Building Surveyor, Party Wall Surveyor, Photogrammetry, Remote Sensing, Cartography, Geographic Information Systems (GIS), Hydrographic Surveys, Urban and Regional Planning, etc.
Minimum Educational Job Entry Qualification(s)	Bachelor's Degree
Practicing License Requirements (if any)	1. Membership with the Surveyors Institute of Zambia, Engineering Institution of Zambia (EIZ) and Practicing Licence from the Engineering Registration Board 2. For Cadastral; Registered Geomatics Engineer under the Survey Control Board
Training/RPL	1. Engineering Surveying and GIS 2. Geodesy and Geoinformatics 3. Quality Enhancement Methods
Minimum Job Entry Age	21 years
Prior Experience (Recommended)	Two (2) years
Performance Criteria	As described in the Units under Section 4

2. SCOPE

This National Occupational Standard specifies the fundamental knowledge and understanding, skills and competences that a Geomatics Engineer must possess to be successful in his/her job role. It is applicable to Geomatics Engineers working in public or private organisations or self-employed within or outside the construction sector.

3. PERSONAL ATTRIBUTES (VALUES, ETHICS AND ATTITUDES)

The job requires the individual to have:

Communication skills: Geomatics Engineer Geomatics Engineer must provide clear instructions to team members, clients, and government officials. They also must be able to interpret Architectural, Planning and Engineering drawings as well as set out the design elements on the ground. They should also be able to explain the project's progress to developers, lawyers, financiers, and government authorities, and other stakeholders.

Detail oriented: Geomatics Engineer must work with precision and accuracy because they produce legally binding documents.

Physical stamina: Geomatics Engineer traditionally work outdoors, often in rugged terrain. They must be able to cover long distances and for long periods.

Problem-solving skills: Geomatics Engineer must correct discrepancies between documents showing property lines and current conditions on the land. If there were changes in previous years, they must discover the reason behind them and re-establish property lines. They must also assist in land boundary dispute resolution. Geomatics Engineers must endeavour to solve all technical problems spanning from data acquisition to data analysis and reporting through maps, plans, imagery and chats etc. They should also be able to apply critical decisions through GIS and Geodetic principles.

Time-and Cost management skills: Geomatics Engineers must be able to effectively plan their time and their team members' time on the job. This is critical when pressing deadlines exist and meeting budgets.

Visualisation skills: Geomatics Engineers

Geomatics Engineers must have the ability to present survey data in a variety of graphic standards easily understood by end users

4. UNITS AND ELEMENTS

This National Occupational Standard is divided into 5 Units representing the tasks that a job-holder should undertake in his/her day-to-day work. Each Unit is further broken down into elements depicting the number of activities to be carried out for the successful execution of a particular task. Considering the broad coverage of a Geomatics Engineer's tasks, units are designed to be as generic as possible. This is also for the fact that the field of Geomatics Engineering is a constantly evolving field with the new emerging technology in terms of equipment and software.

UNIT 1 [This Unit covers the skills and knowledge required by a Geomatics Engineer to be proficient in carrying out instrument setup and configuration for data collection].

Unit No.	01
Unit Title	Instrument Setup and Configuration for data collection
Description	This Unit describes the skills and knowledge required to carry out Instrument setup and configuration for data collection
Scope	This Unit covers the following: <ul style="list-style-type: none"> Carry out setting up of Levelling instruments, Total Stations, GPS, Drones, etc. Execution of various Geomatics Engineering tasks with specific instruments and tools
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Carry out instrument setup and configuration.	To be competent, the individual must be able to: PC1. Set up the instruments (levels, total stations, drones, GPS, etc.) PC2. Configure the instrument into working systems (setting up flight plans, working plan, etc)
Carry out data collection	To be compete in carrying out data collection using different fit-for-purpose methods; PC3. Collect coordinate information using various instruments e.g., levels, total stations, GPS, Drones etc. PC4. Collect data through Drones PC5. Carry out scanning, digitization, data transformations
Carry out data processing and analysis	To be competent, the individual must be able to: PC6. Process coordinate information into maps, charts, graphs, etc. PC7. Process Drone imagery and generate maps, DTMs, etc.
Carry out data presentation	PC8. Present survey data in textual narrative, TIN format, DTMs, as client may require for end user purposes.
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: <ul style="list-style-type: none"> OK1. standard practices for surveying works OK2. safety rules and regulations for handling and storing required tools, equipment and materials OK3. personal protection including the use of related safety gear and equipment OK4. service request procedures for tools, materials and equipment OK5. statutory compliance requirement related to working at height OK6. statutory compliance requirement related to workmen engagement
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: <ul style="list-style-type: none"> TK1. types of errors in surveying instruments

	TK2. setup, configure and use instruments correctly TK3. uphold the principle of working from the whole to part and from the known to the unknown
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	The individual on the job must be able to: CS1. Write in English and be able to or have the means to give simple instructions in the local language used at the site CS2. provide clear and simple instructions, details and sketches to subordinates CS3. record and document daily productivity report, daily labour attendance and details regarding work done CS4. prepare status updates or reports for the superiors in the prescribed format
	Reading Skills
	The individual on the job must be able to: CS5. read and understand the English language CS6. read drawings, specifications and standards related to work CS7. read key documents including quality standards and standards working methods CS8. read various sign boards, safety rules and safety tags, as well as instructions related to exit routes during emergencies at the workplace CS9. be able to read manuals and Instructions for the Surveying Equipment
	Oral Communication (Listening and Speaking skills)
The individual on the job must be able to: CS10. speak in English and be able to or have the means to give simple instructions in the local language used at the site CS11. listen attentively and clearly follow instructions given by the superior CS12. provide clear instructions to subordinates for completion of tasks as per work plan, time schedule and quality	
B. Professional Skills	Decision Making
	The individual on the job must be able to: PS1. determine the most suitable equipment/instrument for the task at hand
	Plan and Organise
	The individual on the job must be able to: PS2. confirm the availability of instruments, tools and manpower before scheduling the work PS3. confirm configuration of instruments before use
	Customer Centricity
	The individual on the job must be able to: PS4. ensure completion of work as per agreed time schedule and quality
Problem Solving	
The individual on the job must be able to: PS5. Identify whether the equipment requires permanent adjustments	

	Analytical Thinking
	The individual on the job must be able to: PS6. Ability to understand and interpret survey data (e.g. Engineering drawings)
	Critical Thinking
	The individual on the job must be able to: PS7. Ensure alignment and compliance with governing rules and regulations

UNIT 2 [This Unit covers the skills and knowledge required by a Geomatics Engineer to be proficient in planning, arranging and managing resources for successful execution of work].

Unit No.	02
Unit Title	Plan, arrange and manage resources for successful execution of work
Description	This Unit describes the skills and knowledge required to plan, arrange and manage resources for successful execution of work
Scope	This Unit covers the following: <ul style="list-style-type: none"> • Arrange for and manage manpower • Arrange for, allocate and manage tools, materials and equipment
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria (PC)
Arrange for and manage manpower	To be competent, the individual must be able to: PC1. determine quantum and nature of work under assigned activity PC2. calculate requirement of manpower for assigned activities PC3. submit manpower requirement to superiors PC4. allocate and extract work as per plan PC5. provide clear instructions to workmen for execution of work PC6. ensure optimum utilisation of manpower resources PC7. record the daily workforce attendance PC8. prepare the daily productivity report
Arrange for, allocate and manage tools, materials and equipment	To be competent, the individual must be able to: PC9. estimate quantity of assigned work PC10. estimate requirement for material, components and fixtures PC11. estimate equipment, tools and accessories required PC12. submit material, equipment and tool requirements to superiors PC13. allocate materials, equipment and tools to workmen and assign the work as per daily work plan PC14. provide clear instructions for optimised use of resources
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. standard practices for execution of a specific works OK2. safety rules and regulations for handling and storing required tools, equipment and materials OK3. personal protection including the use of related safety gear and equipment OK4. service request procedures for tools, materials and equipment OK5. statutory compliance requirement related to workmen engagement
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: TK1. construction drawing of specific works to be carried out TK2. manpower requirement on the basis of quantum of work and

	<p>productivity TK3. sequence and priority of activities TK4. how to identify priority and critical activities of a particular task TK5. method and technique on briefing team members about specific works to be carried out TK6. different checks to evaluate progress and quality of work TK7. importance of daily productivity report TK8. importance of daily attendance register TK9. standard working practices for specific works TK10. principles of measurements TK11. conversion of units TK12. arithmetic and geometric calculation TK13. how to calculate quantum of relevant work TK14. calculation of tools and material requirement TK15. optimise use of available resources TK16. computer basics and CAD software application for 2D drawing</p>
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	<p>The individual on the job must be able to: CS1. write in English and be able to or have the means to give simple instructions in the local language used at the site CS2. provide clear and simple instructions, details and sketches to subordinates CS3. record and document daily productivity report, daily labour attendance and details regarding work done CS4. prepare status updates or reports for the superiors in the prescribed format</p>
	Reading Skills
	<p>The individual on the job must be able to: CS5. read and understand the English language CS6. read drawings, specifications and standards related to work CS7. read key documents including quality standards and standards working methods CS8. read manufacturer's instructions and specifications for using materials, equipment and tools CS9. read various sign boards, safety rules and safety tags, as well as instructions related to exit routes during emergencies at the workplace</p>
B. Professional Skills	Oral Communication (Listening and Speaking skills)
	<p>The individual on the job must be able to: CS10. speak in English and be able to or have the means to give simple instructions in the local language used at the site CS11. listen attentively and clearly follow instructions given by the superior CS12. provide clear instructions to subordinates for completion of tasks as per work plan, time schedule and quality</p>
B. Professional Skills	Decision Making
	<p>The individual on the job must be able to: PS1. decide if the workplace is safe for working and also ensure that workers are not creating hazardous conditions for others</p>

	<p>PS2. decide on manpower, tools, materials and equipment for specific work</p> <p>PS3. decide on an alternative course of action in case of hindrance to work</p>
	<p>Plan and Organise</p>
	<p>The individual on the job must be able to:</p> <p>PS4. plan work and organise required resources in coordination with team members and superior</p> <p>PS5. plan work targets, work schedules for subordinates, time schedule and quality</p>
	<p>Customer Centricity</p>
	<p>The individual on the job must be able to:</p> <p>PS6. ensure completion of work as per agreed time schedule and quality</p>
	<p>Problem Solving</p>
	<p>The individual on the job must be able to:</p> <p>PS7. suggest to workers remedial actions for making corrections</p> <p>PS8. resolve any conflicts within the team</p>
	<p>Analytical Thinking</p>
	<p>The individual on the job must be able to:</p> <p>PS9. reconcile material consumption</p> <p>PS10. assess quantity of resources required for daily work</p> <p>PS11. optimise the use of resources</p> <p>PS12. minimise wastages</p>
	<p>Critical Thinking</p>
<p>The individual on the job must be able to:</p> <p>PS13. assess complexity of the tasks and provide guidance for carrying out corrective action as per requirement</p> <p>PS14. identify and assess how violation of any safety norms may lead to accidents</p>	

UNIT 3 [This Unit covers the skills and knowledge required by a Geomatics Engineer to be proficient in maintaining a healthy and safe working environment].

Unit No.	03
Unit Title	Manage the workplace for a safe and healthy working environment
Description	This Unit describes the skills and knowledge required to maintain a healthy and safe working environment
Scope	This Unit covers the following: <ul style="list-style-type: none"> • Ensure healthy and safe working environment for subordinates • Identify and respond to risks and emergencies associated with work practices and the workplace and ensure that related organisational and statutory requirements are followed
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria (PC)
Ensure a healthy and safe working environment for subordinates	To be competent, the individual must be able to: PC1. ensure proper housekeeping at workplace PC2. implement safe handling and stacking methods at workplace and storage area/facility PC3. ensure that the health and safety plan is followed by all subordinates PC4. identify any hazards in the workplace and report them to the appropriate authority PC5. ensure that all safety and protection installation are correctly placed and adequate PC6. ensure safe access to and within the work place for movement of workers as well as equipment, tools and materials PC7. ensure safe use of tools and tackles by the workers as per applicability PC8. ensure appropriate use of the following Personal Protective Equipment (PPE) as per applicability: <ul style="list-style-type: none"> • head protection • ear protection • fall protection • foot protection • face and eye protection • hand and body protection • respiratory protection PC9. maintain access routes to and from confined spaces, excavated pits and other locations in accordance with safety parameters or as per instructions from safety personnel
Identify and respond to risks and emergencies associated with work practices and the workplace and ensure that	To be competent, the individual must be able to: PC10. ensure that organisational policies and procedures are followed for health, safety and welfare of workers, in relation to: <ul style="list-style-type: none"> • methods of receiving or sourcing information • dealing with accidents and emergencies associated with work practices and the working environment • reporting • stooping work • evacuation

<p>related organisational and statutory requirements are followed</p>	<ul style="list-style-type: none"> • fire risks and safe exit procedures <p>PC11. follow procedures for accident recording and reporting as per organisational and statutory requirements PC12. ensure effective adherence to response procedures or protocols for emergencies PC13. report any cases of emergencies/risks to relevant authorities at the site PC14. report any perceived risks or hazards to superiors or the concerned environmental, health and safety team/personnel PC15. demonstrate the use of fire prevention and firefighting equipment for different types of fire hazards and accidents PC16. implement control measures to reduce risks and meet all legal requirements applicable to the organisation or occupation</p>
<p>Knowledge and Understanding (K)</p>	
<p>A. Organisational Context (Knowledge of the company/ organisation and its processes)</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>OK1. the policies, procedures and protocols set up by the environmental, health and safety department/team with respect to health, safety and environment at the site OK2. reporting procedures in cases of breaches or hazards in site safety, accidents or emergency situations OK3. safe working practices for materials, tools, tackles and equipment OK4. workplace policies, health and safety requirements for dealing with potential risks as defined by the environmental, health and safety department/team</p>
<p>B. Technical Knowledge</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>TK1. how to respond to accidents and emergencies TK2. the appropriate personal protective equipment to be used based on various working conditions TK3. how to use necessary materials, tools, tackles and equipment in a safe and appropriate manner TK4. how to monitor work progress in the workplace while keeping safety and health in mind</p>
<p>Skills (S)</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Writing Skills</p>
	<p>The individual on the job must be able to:</p> <p>CS1. write in English and be able to or have the means to give simple instructions in the local language used at the site CS2. fill in safety related forms for near misses, unsafe conditions and safety enhancement suggestions</p>
	<p>Reading Skills</p>
	<p>The individual on the job must be able to:</p> <p>CS3. read and understand the English language CS4. read instructions, rules, guidelines and sign boards related to safety</p>
<p>Oral Communication (Listening and Speaking skills)</p>	
<p>The individual on the job must be able to:</p> <p>CS5. speak in English and be able to or have the means to give simple instructions in the local language used at the site CS6. listen attentively to instructions/communications shared by</p>	

	<p>site's environmental, health and safety department/team and superiors regarding site safety CS7. communicate site conditions, hazards, accidents, etc.</p>
<p>B. Professional Skills</p>	<p>Decision Making</p>
	<p>The individual on the job must be able to: PS1. decide on the appropriate application and installation of safety equipment like barricades and nets PS2. decide on contents for tool box talks</p>
	<p>Plan and Organise</p>
	<p>The individual on the job must be able to: PS3. identify any hazards in the workplace and organise safety equipments prior to commencing work</p>
	<p>Customer Centricity</p>
	<p>The individual on the job must be able to: PS4. ensure safe and healthy environmental conditions at the workplace</p>
	<p>Problem Solving</p>
	<p>The individual on the job must be able to: PS5. identify, analyse and report hazards, accidents, health and safety risks, etc., or seek help from the appropriate authorities to address the same, as per the guidelines laid down by site's environmental, health and safety department/team</p>
	<p>Analytical Thinking</p>
<p>The individual on the job must be able to: PS6. analyse areas of work at the site with potential to cause safety hazards and result in injury, loss of life or damage to property</p>	
<p>Critical Thinking</p>	
<p>The individual on the job must be able to: PS7. respond to critical health risks or accidents on an urgent basis through appropriate actions</p>	

UNIT 4 [This Unit covers the skills and knowledge required by a Geomatics Engineer to be proficient in applying land related Laws].

Unit No.	04
Unit Title	Apply Land Legislation
Description	This Unit describes the skills and knowledge required to have an understanding of and applying Land related Laws.
Scope	This Unit covers the following: <ul style="list-style-type: none"> Understanding applicable laws within the territory relating to Land and Engineering Surveying.
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria (PC)
Demonstrate the understanding of applicable land laws	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC1. Identify applicable laws PC2. Understand and Apply the Land Survey Act PC3. Understand and Apply the Land and Deeds Registry Act PC4. Understand and Apply the Lands Act PC6. Understand and Apply the Urban and Regional Planning Act Understanding Common Leasehold Schemes Act PC7. Understanding Common Leasehold Schemes Act PC8. Understanding Environmental Management Act PC9. Understanding Roads and Road Traffic Act PC10. Understanding the Zambia Wildlife Act PC11. Engineering Institution of Zambia Act
Ensure adherence to applicable land laws	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC7. Ensure that copies of applicable land laws are available for reference PC8. Ensure organisational policies and procedures are consistent with the applicable laws PC9. Follow procedures for carrying out the surveys as stipulated in the applicable laws PC10. Adhere to standards and procedures set in the applicable laws PC11. Report any cases of discrepancies and help to resolve them PC12. Report any perceived deviations from Survey Plans and ensure updated plans are lodged with Government Survey Department. PC13. Ensure personnel act with integrity and adhere to applicable laws
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: <ul style="list-style-type: none"> OK1. Applicable land laws OK2. Reporting procedures in cases of breaches of the applicable land laws OK3. Adequate record keeping and management

B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: TK1. How to follow survey standard and regulations in accordance with the applicable Acts
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	The individual on the job must be able to: CS1. write in English and be able to or have the means to give simple instructions in the local language used at the site CS2. fill in related forms for submission of various documents to effect surveys carried out
	Reading Skills
	The individual on the job must be able to: CS3. read and understand the English language CS4. read instructions, rules, guidelines and applicable laws
	Oral Communication (Listening and Speaking skills)
B. Professional Skills	Decision Making
	The individual on the job must be able to: PS1. Decide on the appropriate application and use of relevant laws
	Plan and Organise
	The individual on the job must be able to: PS3. identify any impediments to applicable laws and how to resolve them
	Customer Centricity
	The individual on the job must be able to: PS4. Ensure that no applicable laws are flouted which can lead to disputes
	Problem Solving
	The individual on the job must be able to: PS5. identify, analyse and report and likely disputes which may arise from Survey work
	Analytical Thinking
	The individual on the job must be able to: PS6. Analyse and ensure adherence to applicable laws
Critical Thinking	
The individual on the job must be able to: PS7. Respond to needs of applicable law	

UNIT 5 [This Unit covers the skills and knowledge required by a Geomatics Engineer to be proficient in managing the workplace for ethical behaviour and professional conduct].

Unit No.	05
Unit Title	Manage the workplace for ethical behaviour and professional conduct
Description	This Unit describes the skills and knowledge required to maintain ethical behaviour and professional conduct
Scope	This Unit covers the following: <ul style="list-style-type: none"> • Ensure ethical behaviour and professional conduct • Identify and respond to breaches of ethical behaviour and professional conduct
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria (PC)
Ensure ethical behaviour and professional conduct	To be competent, the individual must be able to: PC1. demonstrate knowledge and understanding of ethical behaviour and professional conduct PC2. adhere to ethical behaviour and professional conduct in carrying out duties in the work place PC3. ensure that the survey conforms with ethical standards PC4. identify any deviation from the ethical code of conduct and how to rectify this PC5. ensure that all ethical standards are presented and shared with all subordinates
Identify and respond to breaches of ethical behaviour and professional conduct	To be competent, the individual must be able to: PC6. ensure that organisational policies and procedures on ethical behaviour and professional conduct are followed with regards to: <ul style="list-style-type: none"> • methods of receiving or sourcing information • dealing with information and ensuring confidentiality • accurate and concise reporting • adhering to prescribed ethical and professional conduct • preparation of an appropriate grievance code for ethical behaviour and professional conduct PC7. follow procedures for recording and reporting breaches of ethical behaviour and professional conduct as per organisational and statutory requirements PC8. demonstrate effective record keeping for any disciplinary procedures and actions PC9. report any cases requiring disciplinary action to appropriate authorities
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. the policies, procedures and protocols set up by the organisation OK2. reporting procedures in cases of breaches of ethical behaviour and professional conduct OK3. code of practice for ethical behaviour and professional conduct

B. Technical Knowledge	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none"> TK1. how to respond to ethical and professional misconduct TK2. how to develop ethical behaviour and professional conduct guidelines TK3. how to conduct a disciplinary and grievance hearing TK4. how to prepare a report on disciplinary and grievance hearing
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS1. write in English and be able to or have the means to give simple instructions in the local language used at the site CS2. Fill in related forms for breaches of ethical behaviour and professional conduct
	Reading Skills
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS3. read and understand the English language CS4. read instructions, rules, guidelines and documents relating to ethical behaviour and professional conduct
B. Professional Skills	Oral Communication (Listening and Speaking skills)
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> CS5. Speak in English and be able to or have the means to give simple instructions in the local language used at the site CS6. listen attentively to instructions/communications shared by ethical behaviour and professional conduct champions and/ or superiors
	Decision Making
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> PS1. follow on the appropriate ethical behaviour and professional conduct PS2. decide on content for the ethical behaviour and professional code of conduct
	Plan and Organise
	<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> PS3. identify potential breaches of ethical behaviour and professional conduct PS4 identify appropriate training for ethical behaviour and professional conduct
Customer Centricity	
<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> PS4. ensure adherence to ethical behaviour and professional conduct in dealing with external stakeholders 	
Problem Solving	
<p>The individual on the job must be able to:</p> <ul style="list-style-type: none"> PS5. identify, analyse and report breaches of ethical behaviour and professional conduct PS6. seek help from the appropriate authorities to address breaches of ethical behaviour and professional conduct as per the organisational guidelines 	
Analytical Thinking	

	The individual on the job must be able to: PS7. analyse areas of work at the site with potential to cause breaches of ethical behaviour and professional conduct
	Critical Thinking
	The individual on the job must be able to: PS8. respond to critical questions on ethical behaviour and professional conduct

5. EQUIPMENT, TOOLS AND CONSUMABLE MATERIALS

These include, but not limited to the following:

- Personal Protective Equipment (such as Surveyor's Safety Vest, Boots, Work Suit and Hardhat),
- Surveying Magnetic Locators,
- Field Books and Pens,
- Flagging and Survey Markers,
- Gammon, Climbing Ladders,
- Reels,
- Marking Paint,
- Hubs and Nails,
- Surveying Tripods,
- Surveying Bipods,
- Prism Poles,
- Prisms,
- Range Poles,
- GPS Equipment,
- Surveying Equipment,
- Unmanned aerial Vehicles
- Adapters, Clamps and Cradles,
- Robotics Poles,
- Robotics Accessories,
- Grade Rods,
- Cut and Fill Grade Rods,
- Direct Reading Optical Rods
- Direct Reading Laser Rods,
- Invar Grade Rods,
- Tribrachs,
- Automatic Levels,
- Levels and Transit-Levels,
- Electronic Levels,
- Total Stations,
- Theodolites,
- Elevating Tripods,
- Abney Levels,
- Hand Levels,
- Distance Measuring Wheels,
- Measuring Tapes,
- Surveyors Measuring Rope,
- Brush Axes,
- Plumb Bobs,
- Surveyors Hand Tools,
- Scanner Targets,
- Laser Scanner Accessories,
- Bags and Cases,
- Compasses and Clinometers,
- Area Planimeters,
- Surveyors Umbrellas,

- Sextants
- Surveying Equipment Batteries and Chargers,
- 3D Scanners, Drawing Instrument Box with Accessories,
- Bond/Manila Paper,
- Computer with an Internet Supply,
- UPS,
- MS-Office XP or Latest Version of Operating Software,
- CAD with Power Pack or Latest Version,
- Laser Jet Printer,
- Chest of Drawers,
- Locker,
- Bookshelf,
- Drawing Table,
- Chairs,
- Computer/Printer Table,
- First Aid Box,
- Firefighting Equipment, etc.

6. DILEMMAS/CHALLENGES AND COMPLEXITIES FOR A JOB HOLDER

Dilemmas associated with the job of Geomatics Engineer include: long working hours, standing for long hours, lifting relatively heavy materials/equipment, pressure (from customers/clients and superiors), handling high volumes of work, dealing with unruly customers/clients. As Geomatics Engineers also spend time in front of computers doing detailed technical work, they may be susceptible to eyestrain, back discomfort, and hand and wrist problems, etc.

6.1 Alternative Choices (Solutions) to Dilemmas and Complexities

Solutions to dilemmas include exercising regularly to maintain physical fitness, planning and prioritising projects, delegating work where necessary, undertaking training in customer service and anger management, ensuring constant supply of materials, tools and consumables, using a computer screen filter, practicing proper work/computer ergonomics, etc.

7. WORKING CONDITIONS/ENVIRONMENT

Depending on the specific job duties, land surveying involves both fieldwork and office work. Fieldwork involves working outdoors in all types of weather, walking long distances, and standing for extended periods while taking measurements. Geomatics Engineers sometimes climb hills with heavy packs of surveying instruments. When working near hazards such as traffic, Geomatics Engineers generally wear brightly coloured or reflective vests so they may be seen more easily. When working in underground mines, Geomatics Engineers work in enclosed spaces. Traveling is often part of the job, and Geomatics Engineers may commute long distances or stay at a project location for an extended period of time. Those who work on resource extraction projects may work in remote areas and spend long periods away from home.

8. PARTIES INVOLVED/INTERACTING WITH THE JOB HOLDER OR TRAINEE

8.1 Internal/Within the Organisation

Parties involved/interacting with the job holder who are internal to the organization include superiors, subordinates, other employees (e.g. architects, surveyors, engineers: civil, building, electrical and mechanical), trainers, safety team, etc.

8.2 External/Outside the Organisation

Parties involved/interacting with the job holder who are external to the organization include customers/clients, trainers, government regulators, suppliers of equipment/tools/consumables, Surveyors from other organisations, etc.

9. PHYSICAL DEMANDS ON THE BODY

- Stand or walk for long periods of time;
- Lift and move relatively heavy materials;
- Repetitive motion of hands/fingers;
- Bend or twist the for long periods of time;
- Seeing clearly up close, especially using a computer, etc.

ANNEX A

Criteria for Assessments based on this NOS

A.1 Guidelines for Assessment

A.1.1 Criteria for assessment for curricula and learning programmes based on this NOS will be created by curricula and programmes developers. Each Performance Criteria (PC) will be assigned marks proportional to its importance in the NOS. Curricula and programmes developers will also lay down proportion of marks for theory and practical skills for each performance criteria, giving more weight to practical skills.

There shall be allocated the 'Total Mark', which will be the sum of all marks in each Unit, distributed across the number of PCs in that particular Unit. The 'Out Of' mark will be the mark allocated to each PC, which will be shared between theory and practical skills assessments.

A.1.2 Awarding/assessment bodies or institutions and other users of the NOS will create unique question papers for the theory part and evaluations for skill practical part for their respective candidates.

ANNEX B NOS Version Control

This Annex gives details necessary for the tracking of the NOS versions based on the number of revisions.

NOS Code	NOS.GE.01		
ZQF Level	7	Version Number	01
Sector	Construction	Date of Approval	February 2021
Sub-sector	Real Estate and Infrastructure Construction	Date of Last Review	N/A
Occupation	Geomatics Engineering	Date of Next Review	March 2026

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