



NOS.CE.01
First Edition

**NATIONAL OCCUPATIONAL STANDARD FOR CIVIL
ENGINEER**

APPROVING AUTHORITY

This National Occupational Standard has been prepared and published under the authority of the Zambia Qualifications Authority Board 20th December, 2023.

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 for the registration and accreditation of qualifications; 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) 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. Copperbelt University
2. Engineering Institution of Zambia
3. Ministry of Local Government and Rural Development
4. Road Development Agency
5. Surveyors Institute of Zambia
6. University of Zambia
7. Zambia Institute of Architects
8. Association of Building and Civil Engineering Contractors
9. Water Resources Management Authority
10. Bari Zambia Limited
11. Zulu Barrow Construction
12. Ng'andu Consulting
13. Zambia Qualifications Authority – Secretariat

ACKNOWLEDGEMENT

The Zambia Qualifications Authority would like to acknowledge the invaluable support of the following stakeholders that participated in the development of this National Occupational Standard:

1. Arch. Mofya Kumisuku (Zambia Institute of Architects)
2. Arch. Peter Simphila Chiuto (Zambia Institute of Architects)
3. Dr. Erastus Mishengú Mwanaumo (University of Zambia)
4. Dr. Ephraim Zulu (Copperbelt University)
5. Mr. Abraham Zulu (Association of Building and Civil Engineering Contractors)
6. Mr. Felisian Ngosa (Ministry of Local Government and Rural Development)
7. Eng. Christopher Ngwira (Road Development Agency)
8. Dr. Chabota Kaliba (Engineering Institution of Zambia)
9. Mr. Michael Chileshe (Surveyors Institute of Zambia)
10. Mr. Stubbs Bernadine Mofya (Surveyors Institute of Zambia)
11. Mr. Douglas Lubaba (Water Resources Management Authority)
12. Eng. Dr. Kasongo Mwale (Ng'andu Consulting)
13. Mr. Elliot B. Phiri (Bari Zambia Limited)
14. Mr. Joseph Nyirenda (Zulu Barrow Construction)
15. Mr. Fidelis Cheelo (Zambia Qualifications Authority)
16. Mr. Jericho Kashiya (Zambia Qualifications Authority)
17. Ms. Womba Soneka (Zambia Qualifications Authority)

TABLE OF CONTENTS

FOREWORD	v
JUSTIFICATION	v
ACRONYMS AND ABBREVIATIONS	vi
GLOSSARY OF TERMS	vii
1. OVERVIEW	1
2. SCOPE	3
3. PERSONAL ATTRIBUTES (VALUES, ETHICS AND ATTITUDES)	3
4. UNITS AND ELEMENTS	3
5. EQUIPMENT, TOOLS AND CONSUMABLE MATERIALS	23
6. DILEMMAS/CHALLENGES AND COMPLEXITIES FOR A JOB HOLDER	23
6.1 Alternative Choices (Solutions) to Dilemmas and Complexities	23
7. WORKING CONDITIONS/ENVIRONMENT	24
8. PARTIES INVOLVED/INTERACTING WITH THE JOB HOLDER OR TRAINEE 24	
9. PHYSICAL DEMANDS ON THE BODY	24
ANNEX A	25
ANNEX B	26

FOREWORD

The Zambia Qualifications Authority (ZAQA) is a statutory body under the Ministry of Education established by ZAQA Act No. 13 of 2011 to ***develop and implement a national qualifications framework; register and accredit qualifications; and ensure that standards and registered qualifications are internationally comparable.***

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 Manufacturing sector, demonstration of competence against this NOS may be required in order to run a business or practice a craft or profession.

JUSTIFICATION

A Civil Engineer plays a critical role as he harnesses natural resource for the benefit of mankind; in both the public and commercial sectors, as he/she conceptualizes, designs, develops, oversees, runs, and maintains infrastructure projects and systems, such as highways, buildings, airports, tunnels, dams, bridges, and water supply and sewage treatment systems.

This National Occupational Standard highlights core knowledge, skills, competences and personal attributes that Civil Engineers must possess to be successful in their jobs.

ACRONYMS AND ABBREVIATIONS

CS	Core Skill
EIZ	Engineering Institution of Zambia
CE	Civil Engineer
NOS	National Occupational Standard
NOSDT	National Occupational Standards Development Team
OK	Organisational Knowledge
OSHE	Occupational Safety Health and Environment
PC	Performance Criteria
PPE	Personal Protective Equipment
PPP	Public Private Partnership
PS	Professional Skill
RK	Regulatory Knowledge
RPL	Recognition of Prior Learning
TK	Technical Knowledge
ZAQA	Zambia Qualifications Authority
ZPPA	Zambia Public Procurement 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 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 Title: 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.CE.01
Occupation	Civil Engineering
Job Title	Civil Engineer
Job Description	A Civil Engineer plans, designs and oversees construction and maintenance of building structures and infrastructure, such as roads, railways, airports, bridges, harbours, dams, irrigation projects, power plants, and water and sewerage systems, etc.
Job Purpose	Civil Engineers work in a variety of industries. Civil Engineers play a fundamental role in making the world more livable by building bridges, road, airports, homes, hospitals, parks, tunnels, stadiums, water and wastewater treatment plant, power generation station, flood control system, irrigation schemes etc. This is achieved by harnessing nature to the benefit of mankind.
ZQF Level	Level 7
Sector	Construction
Sub sectors	Building Works, Roads and Highways, Bridges, Railways, Airports, Ports, Renewable Energy, Infrastructure, Water and Sanitation, Dams ,Power Stations, Tunnels, Irrigation, etc.
Other Economic Sector(s) in which the Occupation is Practiced	Education, Mining, Transport, Telecommunication, Health, water and Energy Sector. Etc.
Other Similar Jobs that can be performed by the Civil Engineer	Project Engineer, Research Engineer, Maintenance Engineer/Manager, Tutor/Lecturer/Trainer or Training Manager, Sales Engineer/Manager, Consultant, Construction Dispute Resolution Board, Quantity Surveying, Town and Country Planning, Environmentalist, Archaeologists, Mining Sector, etc.
Minimum Educational Job Entry Qualification(s)	Bachelor's degree in Civil Engineering, or equivalent
Practicing License Requirements (if any)	Membership with the Engineering Institution of Zambia (EIZ) and Practicing License from the Engineering Registration Board (EngRB).
Training/RPL	<ol style="list-style-type: none"> 1. Previous Diploma in Civil Engineering with a minimum work experience of 10 years 2. Awareness of the Industry Standards and Rules and Regulations and their application

	3. Use of ICTs (Internet, Computer packages, email, Computer Software and Hardware necessary for the job, etc.). 4. Quality Enhancement Methods. 5. General industry practice (site and office work)
Minimum Job Entry Age	21 years
Prior Experience (Suggested)	Minimum of 6 months internship in construction, consultancy, or relevant government agencies
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 Civil Engineers must possess to be successful in their jobs.

3. PERSONAL ATTRIBUTES (VALUES, ETHICS AND ATTITUDES)

This job requires an individual to possess the following attributes:

- Creativity
- Critical Thinking
- Technical Competence
- Problem solving skills
- Project Management skills
- Effective leadership
- Communication skills
- Interpersonal Skills
- Integrity
- Project Investment and Finance Awareness
- Economic Awareness
- Green Industrial Revolution Awareness
- Entrepreneurship
- Occupational Safety and Environmental awareness, etc.

4. UNITS AND ELEMENTS

This National Occupational Standard is divided into 5 units representing the tasks that a jobholder should undertake in his/her day-to-day work. The unit is further broken down into elements depicting the number of activities to be carried out for the successful execution of a particular task.

UNIT 1 [This Unit covers the skills and knowledge required by a Civil Engineer to undertake conceptualise/planning and design of works].

Unit No.	01
Unit Title	Conceptualise/Plan and Design
Description	This Unit describes the skills and knowledge required to conceptualise/plan and design civil engineering works.
Scope	This Unit covers the following: <ul style="list-style-type: none"> • Conceptualising the design as given by Client/Owner's Technical Brief/Terms of Reference • Assessing Site Conditions • Key Stakeholder Management • Planning and Design
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Conceptualising the design as given by Client/Owner's Technical Brief/Terms of Reference	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC1. Understand the Client/Owner's project requirements and conceptualise as required PC2. Perform preliminary analysis of the project requirements PC3. Conduct document review
Assessing Site Conditions	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC4. Perform a site reconnaissance Survey PC5. Undertake Topographical/Geotechnical, Materials investigations, PC6. Conduct laboratory material testing PC7. Carry out Hydrological studies
Key Stakeholder Management	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC8. Engage key stakeholders of the project (government officials, local leaders and other interest groups)
Planning And Design	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC9. Undertake Pre-Feasibility/Feasibility Study PC10. Conduct document review of similar aspects PC11. Generate designs (structural, highways, water and sanitation, etc.) PC12. Generate technical drawings, details and associated schedules PC13. Take off quantities and generate the Bill Of Quantities PC14. Formulate Cost Estimates PC15. Demonstrate appreciation of basic economics with respect to construction and other associated sectors PC16. Demonstrate comprehension of Project Investment and Finance PC17. Prepare Technical Specifications PC18. Compile Tender Documentation

Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/organisation and its processes)	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none"> OK1. Relevant Standards, Procedures and Policies of the organisation OK2. Context of the organisation as determined by external factors, such as legal, financial, social, regulatory and cultural OK3. Internal factors, organisation structure, governance, resource capabilities OK4. Roles and Responsibilities OK5. Risk Management OK6. Occupational Health and Safety, Quality And Environmental Management OK7. Performance Evaluation OK8. Change Order Management
B. Technical Knowledge	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none"> TK1. Local construction codes and mandatory standards TK2. Engineering design principles TK3. Relevant Design Codes and Standards TK4. Draughting and detailing of technical drawings TK5. Computer literate in Computer Aided Design software TK6. Civil Engineering Standard Form Contract Types TK7. Perform and/or supervise materials testing both in-situ and laboratory TK8. Relevant Technical Specifications for materials, performance, conformity TK9. Off take of quantities from drawings TK10. Basic Risk Management TK11. Usage of Drones for engineering applications TK12. Technical Knowledge of various construction materials TK13. Green Industrial Revolution TK14. Basic Negotiations Strategies TK15. Human Resource Management TK16. Collaboration with other disciplines such as mechanical, electrical/electronics, geomatic engineering, quantity surveyor, architects, environmentalist, archaeologists, etc.
C. Regulatory Context (Knowledge of Rules and Regulations)	<p>The individual on the job must demonstrate knowledge and understanding of regulatory compliance aspects of the industry pertaining to latest laws, regulations, guidelines and specifications but not limited to those listed below:</p> <ul style="list-style-type: none"> RK1. Engineering Institution of Zambia Act ,2010 RK2. Mines and Minerals Development Act, 2015 RK3. Environmental Management Act,2011 RK4. Occupational Health and Safety Act,2010 RK5. Factories Act Cap 441 RK6. Workers Compensation Act No. 10 of 1999 RK7. Employment Act Chapter 268 and associated labour legislature RK8. Public Roads Acts, No12 of 2012

	RK9. Tolls Act 2011 RK10. Public Procurement Act 2020, etc.
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	The individual on the job must be able to: CS1. Produce Technical Reports CS2. Prepare and provide clear and simple instructions, details and sketches to co-workers/others CS3. Develop/Review Standard Particular Specifications CS4. Develop/Review Particular Contract Conditions CS5. Communicate effectively through writing as appropriate for the needs of the audience CS6. Use conversational communication methods such as E-mail, WhatsApp, etc. CS7. Demonstrate good command of the English language
	Reading Skills
	The individual on the job must be able to: CS8. Read English and be able to or have the means to give simple instructions in the local language used at the office/site CS9. Read and interpret sketches, drawings, schedules, technical instructions provided for the required work CS10. Research, read and interprets technical data from manuals, books and any other relevant literature CS11. Read and comprehend written information or communication
	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS12. Demonstrate active listening and interpret communication/instructions from the supervisor and other co-workers CS13. Convey information clearly and concisely to co-workers and others CS14. Illustrate ideas using presentation skills and applications such as PowerPoint, etc. CS15. Manage technical meetings and discussions CS16. Provide feedback on technical works and reports
B. Professional Skills	Decision Making
	The individual on the job must be able to: PS1. Adhere to the organisation decision making policies PS2. Make independent and sound decisions based on engineering judgement and considering public safety and interest of other stakeholders PS3. Make prompt decisions on designs, plans etc. when required
	Plan and Organise
	The individual on the job should be able to: PS4. Plan, Organise, Lead and Control organisation activities in line with the applicable deadlines

	PS5. Schedule tasks and complete them within time and budget
	PS6. Work to achieve set goals
	PS7. Evaluate the Strengths, Weaknesses, Opportunities and Threats (SWOT) of the task, assignment, and/or organisation
	Customer Centricity
	The individual on the job should be able to:
	PS8. Manage relationships with customers with intent to satisfying their project requirements
	Problem Solving
	This process involves gathering, analysing and communicating information to identify and troubleshoot solutions. The individual on the job should be able to:
	PS9. Demonstrate ability to identify problems, brainstorm and analyse possible answers with the view of implementing the optimal solution
	PS10. Consult widely and identify possible remedies
PS11. Escalate when required in line with the organisation procedures and protocols	
Analytical Thinking	
The individual on the job should be able to:	
PS12. Apply domain knowledge, observations and data to perform tasks related to the assignment	
PS13. Apply a methodical step-by-step approach to thinking and break down complex problems into smaller and manageable components	
PS14. Demonstrate creativity, interpersonal skills and organisational skills	
PS15. Employ data analysis, logical thinking, and research and communication skills	
Judgement And Critical Thinking	
The individual on the job should be able to:	
PS16. Demonstrate ability to observe and predict opportunities, threats and solutions	
PS17. Collect, understand and interpret data and other information	
PS18. Demonstrate ability to draw inferences based on relevant data and personal knowledge and experience	
PS19. Communicate resulting information with others verbally, nonverbally and in writing	

UNIT 2 [This Unit covers the skills and knowledge required by a Civil Engineer to undertake procurement of engineering services, goods and works].

Unit No.	02
Unit Title	Procurement Of Engineering Services, Goods And Works
Description	This Unit describes the skills and knowledge required for procurement of engineering services, goods and works in civil engineering.
Scope	This Unit covers the following: <ul style="list-style-type: none"> • Need(s) for Engineering Services, Goods and Works • Tender Process • Contract Award
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Need(s) for Engineering Services, Goods and Works	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC1. Identify the need(s) for Engineering Services (Consultancy), Goods and Works PC2. Identify the most appropriate method to employ for procurement of Services (consultancy), Works or Goods PC3. Engage the key stakeholders for input in the need(s) PC4. Formulate the appropriate procurement plans PC5. Identify the most appropriate Methods of Procurement
Tender Process	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC6. Design Solicitation Documents (Contract, Bills of Quantities, Specifications, Drawings, Other Schedules, Technical Reports etc.) that respond to the identified need(s) PC7. Ensure that the procurement is done in line with ZPPA Guidelines PC8. Establish Confidential Cost Estimates for budgetary purposes PC9. Promulgate the Tender Process PC10. Adjudicate Tender PC11. Produce Tender Evaluation Report PC12. Participate in Tender Negotiations PC13. Prepare Tender Negotiations Minutes and Addenda PC14. Compile and file Contract Documents.
Contract Award	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC15. Generate Letter of Award to the successful Bidder PC16. Facilitate receipt of Acceptance Letter from Bidder to Client/Owner PC17. Assist in the Award of Contract(s)
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. Relevant Standards, Procedures and Policies of the organisation relating to procurement OK2. Context of the organisation as determined by whether it is Client/Owners Body, Consultancy or Construction as well as legal, financial, social, regulatory and cultural

	<p>OK3. Internal factors, organisation structure, governance, resource capabilities</p> <p>OK4. Roles and Responsibilities</p> <p>OK5. Risk Management</p> <p>OK6. Occupational Health and Safety, Quality and Environmental Management</p> <p>OK7. Performance Evaluation</p> <p>OK8. Change Order Management</p>
<p>B. Technical Knowledge</p>	<p>The individual on the job must demonstrate knowledge and understanding of but not limited to the following:</p> <p>TK1. Technical knowledge regarding the identified need (s)</p> <p>TK2. Relevant Design Codes and Standards</p> <p>TK3. Ability to read technical drawings</p> <p>TK4. Computer literacy</p> <p>TK5. Comprehension of Civil Engineering Standard Form Contract Types</p> <p>TK6. Knowledge of procurement methods such as Design-Bid-Build, Design and Build, PPP, etc.</p> <p>TK7. Knowledge of drafting contract documents and associated addenda</p> <p>TK8. Comprehension of relevant Technical Specifications for materials, performance, conformity</p> <p>TK9. Understand the Technical Knowledge of various construction materials</p> <p>TK10. Apply basic Risk Management</p> <p>TK11. Apply basic Green Design Principles</p> <p>TK12. Employ basic Negotiations Strategies</p> <p>TK13. Knowledge of required staffing levels</p> <p>TK14. Collaborate with other specialisations such as mechanical, electrical/electronics, geomatic engineers, quantity surveyors, Town and Country Planners, architects, archaeologist, etc.</p> <p>TK15. Demonstrate knowledge and ability to respond to queries requiring clarifications of the Tender Documentation</p>
<p>C. Regulatory Context (Knowledge of Rules and Regulations)</p>	<p>The individual on the job must demonstrate knowledge and understanding of regulatory compliance aspects of the industry pertaining to latest laws, regulations, guidelines and specifications but not limited to those listed below:</p> <p>RK1. Engineering Institution Of Zambia Act ,2010</p> <p>RK2. Mines and Minerals Development Act, 2015</p> <p>RK3. Environmental Management Act,2011</p> <p>RK4. Occupational Health and Safety Act,2010</p> <p>RK5. Factories Act Cap 441</p> <p>RK6. Workers Compensation Act No. 10 of 1999</p> <p>RK7. Employment Act Chapter 268 and associated labour legislature</p> <p>RK8. Public Roads Acts, No12 of 2012</p> <p>RK9. Tolls Act 2011</p> <p>RK10. Public Finance Management Act</p>
<p>Skills (S)</p>	

A. Core Skills/ Generic Skills	Writing Skills
	The individual on the job must be able to: CS1. Produce Evaluation Report(s) CS2. Prepare and provide clear and simple instructions, details and sketches to co-workers/others CS3. Develop/Review Standard Particular Specifications CS4. Develop/Review Particular Contract Conditions CS5. Communicate effectively through writing as appropriate for the needs of the audience CS6. Use conversational communication methods such as E-mail, WhatsApp, etc CS7. Demonstrate good command of the English language
	Reading Skills
	The individual on the job must be able to: CS8. Read English and be able to or have the means to give simple instructions CS9. Read and cross check that Tender Documentation is responsive to the requirements. CS10. Research, read and interpret technical data from manuals, books and any other relevant literature CS11. Read and comprehend written information or communication.
B. Professional Skills	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS12. Demonstrate active listening and interpret communication/instructions from the supervisor, co-workers and Tenderers CS13. Convey information clearly and concisely to co-workers and others CS14. Illustrate ideas using presentation skills and applications such as PowerPoint, etc. CS15. Manage Pre-Tender meetings and discussions CS16. Manage Tender Evaluation and Negotiations Meetings CS17. Provide feedback on technical works and reports
	Decision Making
	The individual on the job must be able to: PS1. Adhere to the organisation decision making policies PS2. Make independent and sound decisions based on engineering judgement and considering public safety and interest of other stakeholders PS3. Make prompt decisions on feedback on Tender Documentation evaluations PS4. Demonstrate impartiality in deciding the responsive Tenderer. PS5. Demonstrate high ethical standards
B. Professional Skills	Plan and Organise
	The individual on the job should be able to:

	PS6.	Plan, Organise, Lead and Control organisation activities in line with the applicable deadlines
	PS7.	Schedule tasks and complete them within time and budget.
	PS8.	Work to achieve set goals
	PS9.	Evaluate the Tender Documentation in line with the Tender Procurement Plan
	Customer Centricity	
	The individual on the job should be able to:	
	PS10.	Manage relationships with customer with intent to satisfying their project requirements
	Problem Solving	
	The individual on the job should be able to:	
	PS11.	Demonstrate ability to identify problem, brainstorm and analyse possible answers with the view of implementing the optimal solution
PS12.	Consult widely and identify possible remedies	
PS13.	Escalate when required in line with the organisation procedures and protocols	
Analytical Thinking		
The individual on the job should be able to:		
PS14.	Apply domain knowledge, observations and data to perform tasks related to the assignment	
PS15.	Apply a methodical step-by-step approach to thinking and break down complex problems into smaller and manageable components	
PS16.	Demonstrate creativity, interpersonal skills and organisational skills	
PS17.	Employ data analysis, logical thinking, and research and communication skills	
Critical Thinking		
The individual on the job should be able to:		
PS18.	To observe and predict opportunities, threats and solutions	
PS19.	Collect, understand and interpret data and other information	
PS20.	Demonstrate ability to draw inferences based on relevant data and personal knowledge and experience	
PS21.	Communicate resulting information with others verbally, nonverbally and in writing	

UNIT 3 [This Unit covers the skills and knowledge required by a Civil Engineer to undertake execution of engineering works].

Unit No.	03
Unit Title	Execution Of Civil Engineering Works Stage
Description	This Unit describes the skills and knowledge required for execution of civil engineering works.
Scope	This Unit covers the following: <ul style="list-style-type: none"> • Project Implementation • Project Management • Construction Management • Contract Management • Testing and Commissioning • Occupational Safety Health And Environment Management
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Project Implementation	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC1. Identify the need(s) for Engineering Services (Consultancy), Goods and Works PC2. Comprehend and identify the most appropriate method to employ for procurement of Services (consultancy), Works or Goods PC3. Engage the key stakeholders for input in the need(s) PC4. Formulate the appropriate procurement plans PC5. Identify the most appropriate Methods of Procurement
Project Management	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC6. Demonstrate knowledge of the Project Cycle PC7. Appreciate the Work Breakdown Structure PC8. Employ Cost Estimation and Budget tracking PC9. Apply Vendor Management PC10. Perform Project Scheduling (Programme) PC11. Carry out Quality Control PC12. Employ Project Controls for Time, Cost, Scope and Risk PC13. Undertake Human resources management PC14. Perform Project Communication Management PC15. Execute Project Records Management PC16. Oversee project design and construction
Construction Management	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC17. Demonstrate knowledge of overall planning, coordination and control of the construction process from start to finish PC18. Organise and manage project budget PC19. Set and track the schedules and ensure that all tasks are completed on time PC20. Oversee site safety and security PC21. Ensure that the project is completed on time, on budget and to client specifications PC22. Conduct Change Order Management PC23. Manage construction resource (human capital, plant and equipment, tools, materials etc.)

	<p>PC24. Perform Quality Control Management</p> <p>PC25. Draw up and Operation and Maintenance Plan</p> <p>PC26. Manage key stakeholders</p> <p>PC27. Coordinate the multidiscipline team on the project</p> <p>PC28. Facilitate the Safety Health and Environmental Management</p> <p>PC29. Conduct and manage Site Progress and Technical Meetings</p> <p>PC30. Oversee communication management</p> <p>PC31. Implement Project Records Management</p> <p>PC32. Undertake project Close Out</p>
<p>Contract Management</p>	<p>To be competent, the individual must be able to:</p> <p>PC33. Comprehend of Contract Law</p> <p>PC34. Demonstrate basic comprehension of a construction contract</p> <p>PC35. Formulate a construction contract document</p> <p>PC36. Demonstrate understanding of various standards and model forms of contracts</p> <p>PC37. Manage contract execution</p> <p>PC38. Carryout Risk identification, allocation and management</p> <p>PC39. Manage contract claims</p> <p>PC40. Undertake Change Order management</p> <p>PC41. Comprehend the Roles, Relationships and Responsibilities of the parties to the contract</p> <p>PC42. Implement Project Records Management</p> <p>PC43. Demonstrate understanding of remedies of breach of contract</p> <p>PC44. Appreciate various types of contract securities (Bonds, Guarantees and Insurances)</p> <p>PC45. Facilitate Dispute and Conflict Management</p>
<p>Testing And Commissioning</p>	<p>To be competent, the individual must be able to:</p> <p>PC46. Plan the Testing and Commission procedure</p> <p>PC47. Conduct all requisite testing on the completed construction as specified to verify conformance to design and specifications</p> <p>PC48. Perform the on-site Commission</p> <p>PC49. Prepare the Testing and Commissioning Report</p>
<p>Occupational Safety Health And Environment Management</p>	<p>To be competent, the individual must be able to:</p> <p>PC50. Demonstrate understanding of occupational safety, health and environmental aspects</p> <p>PC51. Appreciate the company safety, health and environment policies and procedures</p> <p>PC52. Conduct the Job Hazard Safety Analysis</p> <p>PC53. Comprehend Fire Hazards</p> <p>PC54. Facilitate on site Environmental management</p> <p>PC55. Compile a Safety Management Plan</p> <p>PC56. Guide the installation of appropriate safety signage on site</p> <p>PC57. Appreciate the importance of Toolbox Talk and other safety training.</p> <p>PC58. Enforce usage of PPE</p>

Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/organisation and its processes)	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none"> OK1. Project, Construction, Contract Management OK2. Relevant Standards, Procedures and Policies of the organisation relating to OSHE OK3. Consultancy or Construction as well as legal, financial, social, regulatory and cultural context of the organisation OK4. Internal factors, organisation structure, governance, resource capabilities OK5. Roles and Responsibilities OK6. Risk Management OK7. Occupational Health, Safety and Environmental Management OK8. Performance Evaluation OK9. Change Order Management
B. Technical Knowledge	<p>The individual on the job must demonstrate knowledge and understanding with ability to:</p> <ul style="list-style-type: none"> TK1. Comprehend Project, Construction and Contract Management TK2. Demonstrate knowledge regarding the OSHE aspects Relevant Codes and Standards TK3. Demonstrate computer literacy skills TK4. Formulate contract documentation and associated OSHE components TK5. Compile relevant Technical Specifications for materials, performance, conformity and impact on OSHE TK6. Interpret Technical Knowledge of various construction materials TK7. Employ Basic Risk Management TK8. Basic Green Design Principles TK9. Assemble the required staffing levels for a particular task TK10. Collaborate with other specialisations such as mechanical, electrical/electronics, surveyor, architects, etc. TK11. Demonstrate ability to facilitate drafting of the OSHE Management Plan. TK12. Conduct Quality Control and Testing
C. Regulatory Context (Knowledge of Rules and Regulations)	<p>The individual on the job must demonstrate knowledge and understanding of regulatory compliance aspects of the industry pertaining to latest laws, regulations, guidelines and specifications but not limited to those listed below:</p> <ul style="list-style-type: none"> RK1. Engineering Institution Of Zambia Act ,2010 RK2. Mines and Minerals Development Act, 2015 RK3. Environmental Management Act,2011 RK4. Occupational Health and Safety Act,2010 RK5. Factories Act Cap 441 RK6. Workers Compensation Act No. 10 of 1999 RK7. Employment Code Act RK8. Public Roads Acts, No12 of 2012 RK9. Tolls Act 2011 RK10. Public Procurement Act 2020, etc.

Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	The individual on the job must be able to: CS1. Produce Progress, Technical, Claims, Safety. Environment, Final Completion, Maintenance and Operations Reports etc CS2. Prepare and provide clear and simple instructions, details and sketches to co-workers/others CS3. Review Standard Particular Specifications relating to OSHE CS4. Review Particular Contract Conditions relating to OSHE CS5. Communicate effectively through writing as appropriate for the needs of the audience CS6. Use conversational communication methods such as E-mail, WhatsApp, etc CS7. Demonstrate good command of the English language CS8. Facilitate Toolbox Talk write-up and other safety, environment training materials
	Reading Skills
	The individual on the job must be able to: CS9. Read English and be able to or have the means to give simple instructions CS10. Research, read and interprets technical data from manuals, books and any other relevant literature CS11. Read and comprehend written information or communication
B. Professional Skills	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS12. Demonstrate active listening and interpret communication/instructions from the supervisor, co-workers and Tenderers CS13. Convey information clearly and concisely to co-workers and others CS14. Illustrate ideas using presentation skills and applications such as PowerPoint, etc CS15. Manage Pre-Tender meetings and discussions CS16. Manage Tender Evaluation and Negotiations Meetings CS17. Provide feedback on technical works and reports
	Decision Making
	The individual on the job must be able to: PS1. Adhere to the organisation decision making policies PS2. Make independent and sound decisions based on engineering judgement and considering public safety and interest of other stakeholders PS3. Make prompt decision on feedback on Tender Documentation evaluations PS4. Demonstrate impartiality in deciding the responsive Tenderer. PS5. Demonstrate high ethical standards

	Plan and Organise
	The individual on the job should be able to: PS6. Plan, Organise, Lead and Control organisation activities in line with the applicable deadlines PS7. Schedule tasks and complete them within time and budget PS8. Work to achieve set goals
	Customer Centricity
	The individual on the job should be able to: PS9. Manage relationships with customer with intent to satisfying their project requirements
	Problem Solving
	The individual on the job should be able to: PS10. Demonstrate ability to identify problems, brainstorm and analyse possible answers with the view of implementing the optimal solution PS11. Consult widely and identify possible remedies PS12. Escalate when required in line with the organisation procedures and protocols
	Analytical Thinking
The individual on the job should be able to: PS13. Apply domain knowledge, observations and data to perform tasks related to the assignment PS14. Apply a methodical step-by-step approach to thinking and break down complex problems into smaller and manageable components PS15. Demonstrate creativity, interpersonal skills and organisational skills PS16. Employ data analysis, logical thinking, and research and communication skills	
Critical Thinking	
The individual on the job should be able to: PS17. Observe and predict opportunities, threats and solutions PS18. Collect, understand and interpret data and other information PS19. Demonstrate ability to draw inferences based on relevant data and personal knowledge and experience PS20. Communicate resulting information with others verbally, nonverbally and in writing	

UNIT 4 [This Unit covers the skills and knowledge required by a Civil Engineer to undertake operations and maintenance of engineering works].

Unit No.	04
Unit Title	Operation And Maintenance
Description	This Unit describes the skills and knowledge required for execution of operation and maintenance of civil engineering works.
Scope	This Unit covers the following: <ul style="list-style-type: none"> • Operations • Maintenance
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Operations	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC1. Formulate As-Built drawings/Information and Operations/User Manuals for the facility, infrastructure etc PC2. Conduct training for staff responsible for operations PC3. Operate the facility, infrastructure etc
Maintenance	<ul style="list-style-type: none"> PC4. Generate Maintenance Manuals PC5. Carryout repairs and maintenance on the facility or infrastructure etc
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. Relevant Standards, Procedures and Policies of the organisation relating to operations and maintenance OK2. Consultancy or Construction as well as legal, financial, social, regulatory and cultural context of the organisation OK3. Internal factors, organisation structure, governance, resource capabilities OK4. Roles and Responsibilities OK5. Occupational Health and Safety, Quality And Environmental Management
B. Technical Knowledge	The individual on the job must be able to: <ul style="list-style-type: none"> TK1. Demonstrate technical knowledge regarding the operations and maintenance TK2. Apply the relevant Design Codes and Standard TK3. Read technical drawings TK4. Demonstrate computer literacy TK5. Demonstrate understanding relevant Technical Specifications for materials, performance, conformity TK6. Comprehend technical knowledge of various construction materials TK7. Apply basic Risk Management TK8. Apply basic Green Design Principles TK9. Undertake Human Resource Management
C. Regulatory Context (Knowledge of Rules and Regulations)	The individual on the job must demonstrate knowledge and understanding of regulatory compliance aspects of the industry pertaining to latest laws, regulations, guidelines and specifications but not limited to those listed below: <ul style="list-style-type: none"> RK1. Engineering Institution Of Zambia Act ,2010 RK2. Mines and Minerals Development Act, 2015

	<p>RK3. Environmental Management Act,2011 RK4. Occupational Health and Safety Act,2010 RK5. Factories Act Cap 441 RK6. Workers Compensation Act No. 10 of 1999 RK7. Add Employment Code Act RK8. Public Roads Acts, No12 of 2012 RK9. Tolls Act 2011 RK10. Public Procurement Act 2020, etc.</p>
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	<p>The individual on the job must be able to:</p> <p>CS1. Produce Operations and Maintenance Manuals, Technical, Reports etc</p> <p>CS2. Prepare and provide clear and simple instructions, details and sketches to co-workers/others</p> <p>CS3. Communicate effectively through writing as appropriate for the needs of the audience</p> <p>CS4. Use conversational communication methods such as E-mail, WhatsApp, etc</p> <p>CS5. Demonstrate good command of the English language</p>
	Reading Skills
	<p>The individual on the job must be able to:</p> <p>CS6. Read English and be able to or have the means to give simple instructions</p> <p>CS7. Research, read and interprets technical data from manuals, books and any other relevant literature</p> <p>CS8. Read and comprehend written information or communication</p>
	Oral Communication (Listening and Speaking skills)
	<p>The individual on the job must be able to:</p> <p>CS9. Demonstrate active listening and interpret communication/instructions from the supervisor, co-workers</p> <p>CS10. Convey information clearly and concisely to co-workers and others</p> <p>CS11. Illustrate ideas using presentation skills and applications such as PowerPoint, etc</p> <p>CS12. Provide feedback on technical works and reports</p>
B. Professional Skills	Decision Making
	<p>The individual on the job must be able to:</p> <p>PS1. Adhere to the organisation decision making policies</p> <p>PS2. Make independent and sound decisions based on engineering judgement and considering public safety and interest of other stakeholders</p> <p>PS3. Make prompt decision on feedback on operations and maintenance</p> <p>PS4. Demonstrate high ethical standards</p>

	Plan and Organise
	The individual on the job should be able to: PS5. Plan, Organise, Lead and Control organisation activities in line with the applicable deadlines PS6. Schedule tasks and complete them within time and budget PS7. Work to achieve set goals
	Customer Centricity
	The individual on the job should be able to: PS8. Manage relationships with customer with intent to satisfying their project requirements
	Problem Solving
	The individual on the job should be able to: PS9. Demonstrate ability to identify problems, brainstorm and analyse possible answers with the view of implementing the optimal solution PS10. Consult widely and identify possible remedies PS11. Escalate when required in line with the organisation procedures and protocols
	Analytical Thinking
	The individual on the job should be able to: PS12. Apply domain knowledge, observations and data to perform tasks related to the assignment PS13. Apply a methodical step-by-step approach to thinking and break down complex problems into smaller and manageable components PS14. Demonstrate creativity, interpersonal skills and organisational skill PS15. Employ data analysis, logical thinking, and research and communication skills
	Critical Thinking
The individual on the job should be able to: PS16. Demonstrate ability to observe and predict opportunities, threats and solutions PS17. Collect, understand and interpret data and other information PS18. Demonstrate ability to draw inferences based on relevant data and personal knowledge and experience PS19. Communicate resulting information with others verbally, nonverbally and in writing	

UNIT 5 [This Unit covers the skills and knowledge required by a Civil Engineer to perform leadership roles and supervisory skills].

Unit No.	05
Unit Title	Application Of Leadership And Skills Roles
Description	This Unit describes the skills and knowledge required for demonstrating leadership and supervisory roles of civil engineering works.
Scope	This Unit covers the following: <ul style="list-style-type: none"> • Delegation of duties and responsibilities, supervision, • Training, mentorship and team building
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Delegation of Duties and Responsibilities, Supervision	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC1. Demonstrate ability to explain clearly the tasks to be delegated to the subordinate PC2. Delegate duties and responsibility to the appropriate subordinates, at the right time with the necessary resource, skills and authority to complete supervision tasks effectively PC3. Collaborate in setting clear and achievable performance criteria, monitor progress and provide feedback
Training, Mentorship and Team Building	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC4. Identify the skills gap and provide the appropriate training and mentorship to the subordinates PC5. Conduct team building to promote team spirit
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. Relevant Standards, Procedures and Policies of the organisation OK2. Organisational Roles, Responsibilities, Accountabilities and Authorities OK3. Organisational Strategic Goals and Objectives
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of : <ul style="list-style-type: none"> TK1. Planning, Organising, Directing and Controlling TK2. Problem Solving and Decision Making TK3. Conflict Resolution Management TK3. Effective communication TK4. Knowledge of required staffing levels TK5. Performance Management
C. Regulatory Context (Knowledge of Rules and Regulations)	The individual on the job must demonstrate knowledge and understanding of regulatory compliance aspects of the industry pertaining to latest laws, regulations, guidelines and specifications but not limited to those listed below: <ul style="list-style-type: none"> RK1. Engineering Institution of Zambia Act ,2010 RK2. Mines and Minerals Development Act, 2015 RK3. Environmental Management Act,2011 RK4. Occupational Health and Safety Act,2010 RK5. Factories Act Cap 441

	<p>RK6. Workers Compensation Act No. 10 of 1999 RK7. Add Employment Code Act RK8. Public Roads Acts, No12 of 2012 RK9. Tolls Act 2011 RK10. Public Procurement Act 2020, etc.</p>
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	<p>The individual on the job must be able to:</p> <p>CS1. Produce Training and Mentorship Manuals, Performance Evaluation Reports etc</p> <p>CS2. Prepare and provide clear and simple instructions, details and sketches to co-workers/others</p> <p>CS3. Communicate effectively through writing as appropriate for the needs of the audience</p> <p>CS4. Use conversational communication methods such as E-mail, WhatsApp, etc</p> <p>CS5. Demonstrate good command of the English language</p>
	Reading Skills
	<p>The individual on the job must be able to:</p> <p>CS6. Read English and be able to or have the means to give simple instructions</p> <p>CS7. Research, read and interprets technical data from manuals, books and any other relevant literature</p> <p>CS8. Read and comprehend written information or communication</p>
	Oral Communication (Listening and Speaking skills)
	<p>The individual on the job must be able to:</p> <p>CS9. Demonstrate active listening and interpret communication/instructions from the supervisor, co-workers</p> <p>CS10. Convey information clearly and concisely to co-workers and others</p> <p>CS11. Illustrate ideas using presentation skills and applications such as PowerPoint, etc.</p> <p>CS12. Provide feedback on delegated tasks</p>
B. Professional Skills	Decision Making
	<p>The individual on the job must be able to:</p> <p>PS1. Adhere to the organisation decision making policies</p> <p>PS2. Make independent and sound decisions based on engineering judgement and considering public safety, subordinates and interest of other stakeholders</p> <p>PS3. Make prompt decisions on feedback on delegated tasks</p> <p>PS4. Demonstrate high ethical standards</p>
	Plan and Organise
	<p>The individual on the job should be able to:</p> <p>PS5. Plan, Organise, Lead and Control organisation activities in line with the applicable deadlines</p> <p>PS6. Schedule training tasks</p> <p>PS7. Work to achieve set goals</p>

	PS8. Employ SWOT Analysis to evaluate the performance of the delegated tasks, training, mentorship and teambuilding activities
	Customer Centricity
	The individual on the job should be able to: PS9. Provide leadership and supervision roles with the aim to enhance relationships with customers and satisfying their project requirements
	Problem Solving
	The individual on the job should be able to: PS10. Demonstrate ability to identify problems, brainstorm and analyse possible answers with the view of implementing the optimal solution PS11. Consult widely and identify possible remedies PS12. Escalate when required in line with the organisation procedures and protocols
	Analytical Thinking
	The individual on the job should be able to: PS13. Apply domain knowledge, observations and data to perform tasks related to the assignment PS14. Apply a methodical step-by-step approach to thinking and break down complex problems into smaller and manageable components PS15. Demonstrate creativity, interpersonal skills and organisational skills PS16. Employ data analysis, logical thinking, research and communication skills
	Critical Thinking
	The individual on the job should be able to: PS17. Demonstrate ability to observe and predict opportunities, threats and solutions PS18. Collect, understand and interpret data and other information PS19. Demonstrate ability to draw inferences based on relevant data and personal knowledge and experience PS20. Communicate resulting information with others verbally, nonverbally and in writing

5. EQUIPMENT, TOOLS AND CONSUMABLE MATERIALS

These include, but not limited to:

Equipment and Tools:

The individual on the job should be familiar with and able to operate the following equipment or their latest equivalent:

Survey Works: Automatic Level, Laser Level, Total Station, Laser Range Finder, Hand Tools (handheld GPS, measuring tape, spirit level, square etc.)

Field/Laboratory: Basic Field and laboratory testing equipment

Software: Structural Work: basic knowledge on structural design packages

Civil Work: basic knowledge on civil and digital terrain modelling software

Office Works: MS Suite (Word, Excel, PowerPoint, MS Project, Access, etc.)

Raw Materials and Consumables:

Basic knowledge on modern construction materials.

6. DILEMMAS/CHALLENGES AND COMPLEXITIES FOR A JOB HOLDER

Civil Engineers face challenges such as obsolete and/or inappropriate equipment and tools, budgetary constraints, inadequate product costing skills, poor technical skill base, bureaucracy in procurement procedures, lack of appreciation of preventive maintenance by non-engineering management staff, labour intensive nature of the work, rapid change of technology and materials, lack of personal protective equipment, climate change, cyber warfare, inconsistency in company and government policies and regulations, etc.

In some cases, the Civil Engineer encounters equipment that is more advanced than they trained on.

6.1 Alternative Choices (Solutions) to Dilemmas and Complexities

Solutions to challenges include: selecting and procuring appropriate equipment and tools for the job; supporting capacity building through training; identifying and utilising suitable adaptation and mitigation measure against the effect of climate change; utilising appropriate cyber security measures to protect against cyber warfare; include engineering professionals in management teams, deployment of automation where feasible, provision of personal protective equipment, participating in lobbying and formulation of policies, allocation of adequate financial resources, etc.

7. WORKING CONDITIONS/ENVIRONMENT

Civil Engineers work with a variety of construction equipment, toxic substances and volatile materials. Their work environment is susceptible to fires, explosions, structural failures and equipment malfunctions. Working conditions include cold, hot and wet conditions, climbing heights, standing/walking for long hours, lifting materials, working in day or night shifts, areas that are noisy and dusty, areas with limited lighting and ventilation, etc.

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

8.1 Internal/Within the Organisation

Management, supervisors, subordinates and other section members, etc.

8.2 External/Outside the Organisation

Government regulators, professional bodies, clients, suppliers, fellow engineers from other companies, labour unions, clients, students/interns, etc.

9. PHYSICAL DEMANDS ON THE BODY

- Physique to sustain strenuous conditions;
- Be able to walk and stand for long periods of time;
- Be able to sit for sustained period of time at the design desk;
- Bend, stretch, twist, or reach out;
- Be able to lift relatively heavy materials, tools and equipment;
- Be able to use fingers, hands and feet with ease to complete the assigned task (dexterity); 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 skills practical assessments.

A.1.2 Individual 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.CE.01		
ZQF Level	7	Version Number	01
Sector	Construction	Date of Approval	December 2023
Sub Sector	Building Works, Roads and Highways, Bridges, Railways, Airports, Ports, Renewable Energy, Infrastructure, Water and Sanitation, Dams and Tunnels, and Irrigation	Date of Last Review	N/A
Occupation	Civil Engineering	Date of Next Review	December 2028