BQA NCQF QUALIFICATION TEMPLATE

SECTION A:	QUALIFICATION DETAILS		
QUALIFICATION DEVELOPER (S)	Roads Training Centre		
TITLE	Certificate V in Road Construction and Maintenance	**NCQF LEVEL**	5
STRANDS (where applicable)	N/A		
FIELD	Physical Planning and Construction	**CREDIT VALUE**	240
SUB FIELD	Building Construction		

New Qualification	✓	Legacy Qualification		Renewal Qualification	
				Registration Code	

SUB-FRAMEWORK	General Education		TVET	✓	Higher Education										
QUALIFICATION TYPE	Certificate	I		II		III		IV		V	✓	Diploma		Bachelor	
	Bachelor Honours		Post Graduate Certificate		Post Graduate Diploma										
	Masters		Doctorate/ PhD												

RATIONALE AND PURPOSE OF THE QUALIFICATION

RATIONALE:

The SADC regional infrastructure development master plan (2012-2027) has identified that most rural areas in SADC struggle with accessibility due to poor road infrastructure. Therefore, there is emphasis on developing road infrastructure to help with accessibility to link the region with infrastructure like Platjaan and Kazungula Bridges, which connect Botswana - South Africa and Botswana - Zambia, respectively. Hence, there is a need to develop Artisans/Technical Assistants. Furthermore, the Government of Botswana, as per Vision 2036 intends to develop the country into a transport corridor for the region.

The Botswana Education and Training Sector Strategic Plan (ETSSP 2015-2020) marked a significant milestone in our collective efforts as a nation to bring about a more diversified, knowledge-based economy. In particular, the ETSSP was intended to strengthen the match between qualifications and labour market requirements, thereby ensuring that education and training outputs are more closely aligned to the socio-economic development needs of the country.

According to Technical and Vocational Education and Training (TVET), Pitso Action Plan Implementation through HRDC outlines the contribution of TVET to the development of the national economy, particularly in the sectors of construction and manufacturing, which has proven that opportunities for employment creation are abound. Hence, we aim to produce competent Road technical assistants who will work with technicians and engineers to raise the economy of the country.

The qualification, Certificate V in Road Construction and Maintenance, is developed as a response to assist civil engineers who have technical skills in highway Road construction and maintenance and the civil engineer's need established by Human Resources Development Council Report (HRDC priority skills 2023-2024) on Top Occupations in Demand.

Therefore, there is a need for skills development and training in the areas of Certificate V in Road Construction and Maintenance to assist Technicians and Engineers who play a crucial role in the design, construction, and maintenance of roads and also paving the way for education and training in the same line of field of study. The qualification equips learners with practical expertise in road construction, and maintenance, ensuring they can contribute effectively to the development and

upkeep of vital transportation infrastructure. Shortage of these technical skills will result in losses in the aforementioned sectors, which could negatively impact the economy. This qualification, which targets practising Technical Assistants, is unique in that no similar qualification is registered on the NCQF.

PURPOSE: (itemise exit level outcomes)

The purpose of this qualification is to produce graduates with broad technical knowledge, skills, and competence to:

1. Demonstrate broad technical skills in the construction and maintenance of a road and allied works to ensure compliance with design controls and prolong their life span.
2. Develop construction contracts for the administration of road projects.
3. Adhere to Safety, Health, and Environmental measures in road construction and maintenance areas to minimise accidents.
4. Apply broad entrepreneurial concepts associated with business establishment for business awareness.
5. Apply Information and Communication Technology (ICT) skills in road construction for planning and management.

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)

- BGCSE or any relevant qualification equivalent to NCQF Level 4(GE/ TVET) acceptable to the Institution.
- Candidates with relevant unaccredited prior learning may be considered for admission and or exemption through Recognition of Prior Learning (RPL) assessment.
- Applicants for inclusive education meeting any of the above requirements would be considered in accordance with institutional policy.

SECTION B	QUALIFICATION SPECIFICATION
GRADUATE PROFILE (LEARNING OUTCOMES)	**ASSESSMENT CRITERIA**
1. Apply road construction and maintenance Principles to systematically analyse and solve broadly-defined road construction and maintenance problems.	1.1 Identify a Road Construction and maintenance problem and an acceptable solution to the problem. 1.2 Identify the relevant information, road construction and maintenance knowledge and skills to solve problems. 1.3 Identify various approaches and formulate workable solutions. 1.4 Formulate solutions in terms of strengths and weaknesses for the overall solution. 1.5 Prioritise solutions in order of suitability. 1.6 Implement the preferred solution and present it in an appropriate format.
2. Apply scientific, road construction and maintenance knowledge to a variety of practical procedures and practices to solve problems in Road construction and maintenance.	2.1 Apply knowledge of Mathematics, Natural Science, Road construction, and maintenance at a fundamental level and in a road system situation. 2.2 Apply principles and laws for Road construction and maintenance. 2.3 Select appropriate Road materials, components, and processes for Road construction and maintenance. 2.4 Perform work within and outside the boundaries of the construction and maintenance area.

	2.5 Communicate concepts and ideas of Road construction and maintenance effectively. 2.6 Perform the reasoning about road construction and maintenance materials, components, systems and processes.
3. Perform procedural tasks of broadly defined components, systems, works, products or processes to meet desired needs normally within applicable standards, codes of practice and legislation.	3.1 Solve problems using applicable standards, codes of practice and legislation. 3.2 Plan and manage processes focusing on important issues and recognising them and dealing with their constraints. 3.3 Identify appropriate principles and tools used to perform work on site. 3.4 Perform component testing to relevant premises, assumptions and constraints. 3.5 Evaluate and implement a preferred solution selected on an elementary, technical and cost basis. 3.6 Communicate in a report format, relevant information in a logical manner. 3.7 Identify the occupational health and safety and environmentally related risks taking appropriate measures into consideration.
4. Conduct tests, experiments and measurements of Road construction and maintenance problems by applying relevant codes and manufacturer guidelines.	4.1 Test, experiment and measure appropriately and as required by the discipline. 4.2 Use equipment in accordance with original equipment manufacture's specifications. 4.3 Calibrate small equipment in the workplace for suitability of measurements.

	4.4 Record the purpose, process and outcomes of the task in a report. 4.5 Identify the occupational health and safety and environmentally related risks and take appropriate measures. 4.6 Evaluate all available evidence and draw conclusions.
5. Use appropriate established techniques, resources, and modern Road construction and maintenance tools including information technology for the solution of Road construction and maintenance problems, with an awareness of the limitations.	5.1 Select and apply appropriate methods and tools to achieve the required result. 5.2 Verify Results produced by the method, skill or tool against requirements. 5.3 Use as required the selected computer applications. 5.4 Integrate various Microsoft packages 5.5 Apply AutoCAD principles in different functional units 5.6 Use ICT to solve Road construction and maintenance problems. 5.7 Use ICT to capture and analyse data for use in Road construction and maintenance projects.
6. Communicate effectively, both orally and in writing, with Road construction and maintenance audiences and the affected parties.	6.1 Use appropriate structure, style and language of written and oral communication for the purpose of communicating to the target audience. 6.2 Use appropriate and effective graphics to enhance the meaning of text.

	6.3 Use appropriate and effective visual material to enhance oral communications 6.4 Provide Information in a format that can be used by others involved in the Road construction and maintenance activity. 6.5 Communicate orally and deliver the intended meaning.
7. Use safety and protection practices during construction and maintenance of roads to preserve society and environment.	7.1 Apply public health and safety measures during construction and maintenance of a road. 7.2 . Apply occupational health and safety measures during construction and maintenance of a road. 7.3 Apply environmental health and safety measures during construction and maintenance of a road.
8. Supervise construction processes and act professionally and ethically to exercise judgment and take responsibility within own limits of competence.	8.1 Under supervision, Plan, organise, lead, and control activities on site. 8.2 Use various design and maintenance manuals used in Botswana 8.3 Use effectively the codes of design and maintenance of roads. 8.4 Apply the codes to tasks outside the roads sector like buildings 8.5 Use acts related to road construction and maintenance to abide by the law.

9. Demonstrate advanced competence to engage in independent learning through well-developed learning skills *(Independent learning ability).*	9.1 Write a comprehensive report for a given task independently 9.2 Present a report to a panel 9.3 Carry independent research to solve road maintenance and construction-related problems 9.4 Independently use engineering methods and ethics to unravel road components' shortcomings.
10. Demonstrate broad technical knowledge and understanding of Road construction and maintenance project management principles and economic decision-making	10.1 Produce estimates for a small-scale project in road construction and maintenance 10.2 Prepare a schedule for a small-scale project 10.3 Track a small-scale project using IT solutions for project management 10.4 Solve minor site conflicts and grievances 10.5 Use various engineering contracts to run a project
11. Understand and apply broad practical entrepreneurial concepts, essential entrepreneurial qualities and current policies/support structures for entrepreneurial success in Botswana.	11.1 Examine broad entrepreneurial concepts and contemporary issues that have an impact on present day entrepreneurial success. 11.2 Conduct a self-assessment in line with identifying necessary qualities for successful entrepreneurship 11.3 Identify business opportunities in a field of interest and select appropriate investment strategies to adopt, considering the associated risks. 11.4 Compile documents required for an entrepreneur to establish a company and

	take advantage of available support structures.
12. Apply effective fundamental and problem-solving skills while performing assigned duties/tasks according to the set industry standards in an actual work environment.	12.1 Communicate and Negotiate with stakeholders to initiate an industrious work-based learning experience 12.2 Perform assigned vocation-related tasks to the required standards 12.3 Apply effective fundamental (core) skills throughout the work-based learning program. 12.4 Adhere to health and safety requirements at all times 12.5 Demonstrate problem solving skills as and when problems are encountered during the work process 12.6 Contribute effectively to team work initiatives within the work environment 12.7 Evaluate the work based learning experience, to determine its benefits and or limitations

SECTION C	QUALIFICATION STRUCTURE				
COMPONENT	TITLE	Credits Per Relevant NCQF Level			Total Credits
		Level [4]	Level [5]	Level [6]	
FUNDAMENTAL COMPONENT Subjects/ Courses/ Modules/Units	Basic Entrepreneurship	6			6
	Computer studies		10		10
	Communication and study skills		10		10
	Health and Safety		10		10
CORE COMPONENT Subjects/Courses/ Modules/Units	Road Construction		20		20
	Road Maintenance		20		20
	Technical Mathematics		14		14
	Physics		7		7
	Engineering Surveying		20		20
	Road Building Materials		20		20

	Measurements and Specifications		7		7
	Estimating and Costing		7		7
	Road Design		20		20
	Engineering Drawing		14		14
	Construction Management		7		7
	Industrial Training (work based)		48		48
	Total Credits	***6***	**234**		**240**
STRANDS/ SPECIALIZATION	Subjects/ Courses/ Modules/Units	**Credits Per Relevant NCQF Level**			**Total Credits**
		Level [ ]	**Level [ ]**	**Level [ ]**	
1.					
	N/A				
2.					
Electives	**N/A**				

SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL	
TOTAL CREDITS PER NCQF LEVEL	
NCQF Level	**Credit Value**
Level 5	234
Level 4	6
TOTAL CREDITS	240

Rules of Combination:

(Please Indicate combinations for the different constituent components of the qualification)

For Certificate V in Road construction and maintenance to be completed, the learner must satisfy the following combination and have a minimum of 240 credits.

- Core 156 credits
- Fundamental 36 credits
- Work-Based Learning 48 credits

(Note: Please use Arial 11 font for completing the template)

ASSESSMENT ARRANGEMENTS

Summative assessment (40 % each)

Formative assessment (60% each)

MODERATION ARRANGEMENTS

- A qualified and accredited (Diploma holder or above) moderator would be appointed to moderate a subject(s).
- The moderator would be expected to be a subject matter specialist, experienced subject expert or as acceptable to the institution.
- Internal/External moderators would be used where necessary/applicable.
- Both internal and external moderation are done in line with the national moderation expectations.

RECOGNITION OF PRIOR LEARNING

- Candidates with relevant unaccredited prior learning may be considered for award of credits towards graduation through Recognition of Prior Learning (RPL) ad per ETP policy.

CREDIT ACCUMULATION AND TRANSFER

Credit Accumulated Transfer (CAT) for award of credits towards graduation will be administered in line with the national and institutional policy.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

1) **Learning-Vertical**

- Diploma in Civil Engineering
- Diploma in Transportation

- Diploma in Highway Engineering
- Diploma in Construction Technology
- Diploma in Project Management
- Diploma in Construction and management

2) <u>Learning-Horizontal</u>

- Certificate in Construction Project Management
- Certificate V in Construction Management
- Certificate V in transportation
- Certificate V in Civil Construction
- Certificate V in Environmental Engineering

3) <u>Employment opportunity</u>

- Technical Assistant
- Engineering Technical Assistant
- Soil Laboratory Artisan
- Draughtsman
- Site Agent
- Surveying assistant
- Self-employment

QUALIFICATION AWARD AND CERTIFICATION

A candidate shall qualify for certification of Certificate V in Road Construction and Maintenance after completing 36 Credits from the Fundamental subjects, 156 credits from the Core subjects and 48 credits of work-based learning. This entails 240 credits, which must be achieved for a learner to be awarded the certificate.

Certification

The awarding body shall award a Certificate to graduates.

SUMMARY OF REGIONAL AND INTERNATIONAL COMPARABILITY

Similarities

The exit level outcomes in developed qualification are aligned with the attributes of the Engineering Council of South Africa (ECSA) standard for Higher Certificate in Engineering, which has also aligned to Dublin Accord technician graduate in the International Engineering Alliance's Graduate Attributes and Professional Competencies. The two qualifications, *Higher Certificate in Construction Engineering* and *Higher Certificate in Civil Engineering by Apprenticeship,* which benchmarking is done against are also developed through the two standards respectively. The modules for the developed qualification were developed from the following standard knowledge area.

- Mathematical Sciences,
- Natural Sciences
- Engineering Sciences
- Design and Synthesis
- Complementary studies
- Work-integrated learning

Differences

The developed qualification has more credits than the ones stipulated in the standard because in the standard, credits for work-based learning are not included. The two qualifications where comparison is made also do not have credits allocated for work-based learning. The developed qualification and benchmarked qualifications have different qualification titles, but all were developed from the same standard attributes; even though the qualification where benchmarking was done has engineering, the developed qualification does not have engineering in its title because it is developed in the form of vocational education whereas the benchmarked qualifications are developed as higher education.

The learners from developed qualification will be able to do all the higher studies in Advanced Certificate in Construction Engineering at NQF Level 6, Diploma in Construction Technology at NQF Level 6, Bachelor of Science in Construction Management, at NQF Level 7, and Bachelor of Construction, at NQF Level 7 as they can be done by learners from Higher Certificate In Construction Engineering. Furthermore, the Level 7 BSc in Civil Engineering by Apprenticeship programme as done by learners from Higher Certificates In Civil Engineering can also be done by learners from

developed qualification since all these qualifications are developed from the same standard of engineering. Learners who complete developed qualification will be employed as Technical Assistant in road works and maintenance.
REVIEW PERIOD
This qualification shall be reviewed every 5 years.

For Official Use Only:

CODE (ID)			
REGISTRATION STATUS	**BQA DECISION NO.**	**REGISTRATION START DATE**	**REGISTRATION END DATE**
LAST DATE FOR ENROLMENT		**LAST DATE FOR ACHIEVEMENT**	