SECTION A:	QUALIFICATION DETAILS																
QUALIFICATION DEVELOPER (S)	New Era College of Arts, Science and Technology																
TITLE	Diploma in Civil Engineering													NCQF LEVEL	6		
FIELD	Manufacturing, Engineering and Technology		SUB-FIELD	Civil Engineering										CREDIT VALUE	370		
New Qualification		√	Review of Existing Qualification														
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 development of the qualification in Civil Engineering was guided by the findings from the market survey innovations which highlighted the need for this qualification from industry experts, Construction company employees, current and prospective students. Most of the respondents agreed that “the qualification meets with the skills demanded in the industry and also supports infrastructural development projects”.

The National Development Plan 11 (2017-2023) on infrastructure development projects identifies, that the Construction sector, amongst other sectors, plays a high impact in driving domestic economic growth. Further, NPD 11 asserts that infrastructure development will facilitate increased and inclusive beneficiation and access to the other sectors. For the years 2019/20 and 2020/21, NDP 11 expects the Construction sector growth to be at 4.0 percent and 3.7 percent, respectively. To achieve this growth rate or more beyond 2021 the sector will require skilled construction technicians, artisans and engineers to manage the infrastructure construction projects, hence the development of the Civil Engineering qualification.

According to HRDC priority occupations list of 2019; the occupations of manufacturing, construction and distribution forecast indicates an increasing deficiency in this occupation. This deficiency projection is from 2019 to 2028. Therefore, the Diploma in Civil Engineering qualification would strive to address the country's lagging occupation.

The HRDC- Top occupations in high demand of December 2016 also lists the construction sector as one of the occupations in demand. The construction sector's high demand was informed by its potential to create employment, contributing 6% of total employment, as third largest employer during NDP 10. It has a second highest work permit holders, a significant number of foreign nationals working in this sector. Hence the Diploma in Civil Engineering qualification will go a long way to create and contribute a skilled labour force in Botswana. It will also assist to reduce over reliance on foreign materials on skills provision, by increasing the quality and numbers of personnel trained in the sector.

PURPOSE OF THE QUALIFICATION

Diploma in Civil Engineering was developed to equip candidates with knowledge, skills and Competences to be able to do to:

- Demonstrate technical knowledge of fluids at rest and in motion and their effects on other bodies.
- Apply technical concepts of road geometrics, surveys and plan in the design and construction of highways.

- Demonstrate technical skills in the use of various surveying equipment.
- Apply technical drawing skills in the production of graphical information using manual and computer aided draughting techniques.
- Determine the behaviour of materials and the relevant technological processes involved in the construction project.
- Carry out design of various structural elements.
- Apply health and safety principles and methodologies in the working environment.

ENTRY REQUIREMENTS (including access and inclusion)

- NCQF Level 4- Botswana General Certificate of Secondary Education (BGCSE) or its equivalent, with a minimum pass of C or better in English, Mathematics, Physics and Chemistry or Physical Science.
- NCQF level 5-Certificate in Construction or equivalent with relevant work experience and satisfactory performance in assessments of their knowledge, skills and experience in the area as per the EPT and national RPL policies.

SECTION B	***QUALIFICATION SPECIFICATION***
GRADUATE PROFILE (LEARNING OUTCOMES)	***ASSESSMENT CRITERIA***
1. Demonstrate knowledge and understanding of health and safety principles in the working environment.	1.1 Adhere to health and safety measures in the daily operations. 1.2 Identify work hazards and put preventative control measures in place. 1.3 Demonstrate simulation of accident and emergency Procedures.
2. Apply basic drawing skills in the production of graphical information using manual and computer aided draughting techniques	2.1 Draw production graphics using computer aided draughting technique. 2.2 Produce drawings that match industry standards in 2D and 3D.
3. Determine the behaviour of materials and the relevant technological processes involved in the construction project.	3.1 Demonstrate knowledge of use and properties of materials in construction. 3.2 Apply relevant building technologies in addressing work related challenges
4. Demonstrate skills in the use of various surveying equipment.	4.1 Interpret measurements from maps, layout, and engineering plan. 4.2 Demonstrate the methods of linear and angular measurements. 4.3 Apply the principles of survey computations and plotting.

5. Carry out design of various structural elements	5.1 Determine suitable materials for structural engineering. 5.2 Analyse properties of structural sections. 5.3 Determine effects of loads on structural elements. 5.4 Design structural elements of various materials.
6. Apply the principles of management, law, and contract administration in the construction industry.	6.1 Determine suitable materials for structural engineering. 6.2 Analyse properties of structural sections. 6.3 Determine effects of loads on structural elements. *6.4* Design structural elements of various materials.
7 Demonstrate basic knowledge of fluids at rest and in motion and their effects on other bodies	7.1 Determine the basic properties of fluids. 7.2 Apply the fundamental laws of mechanics as used in fluids. *7.3* Apply the principles of hydraulics in the working of hydraulic machinery
8 Apply basic concepts of road geometrics, surveys and plan elements of traffic engineering and materials in the design, construction and maintenance of highways.	8.1 Carry out highway Surveys. 8.2 Design and prepare plans. 8.3 Demonstrate the ability to use various materials and equipment used for the construction of roads. *8.4* Carry out tests on highway materials
9 Conduct Construction engineering research project.	9.1 Identify a research problem/ topic. 9.2 Conduct research 9.3 Evaluate various techniques of data collection.

SECTION C	***QUALIFICATION STRUCTURE***				
COMPONENT	***TITLE***	***Credits Per Relevant NCQF Level***			***Total (Per** Subject/ Course/ Module/ Units)*
		Level [4]	***Level [5]***	***Level [6]***	***Credits***
FUNDAMENTAL COMPONENT *Subjects/ Courses/ Modules/Units*	Information and Computing Skills		10		10
	Professional Practice and Communication Skills		10		10
	Health and safety		10		10
	Engineering Mathematics I		10		10
	Technical Drawing		10		10
CORE COMPONENT *Subjects/Courses/ Modules/Units*	Building Construction and Workshop Practice I		13		13
	Science and Materials for Construction and the Built Environment			13	13
	Building Technology			14	14

	Engineering Mathematics II			10	10
	Building Construction and Workshop Practice II		14		14
	Engineering Science & Mechanics			14	14
	CAD for Civil Engineers			13	13
	Surveying I		***14***		14
	Engineering Mathematics III			10	10
	Structural Mechanics			13	13
	Hydraulics & Soil mechanics			14	14
	Building Services in construction			10	10
	Quantity Surveying			14	14
	Engineering Mathematics IV			10	10
	Design of Steel and Timber structures			14	14
	Design of Reinforced Concrete structures			14	14
	Construction Management			10	10

	Surveying II			14	14
	Industrial Attachment			60	60
	Entrepreneurship Development			10	10
	Project			25	25
	Highway Engineering			12	12
	Water supply and wastewater Engineering			10	10
	Total				395

SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL	
TOTAL CREDITS PER NCQF LEVEL	
NCQF Level	***Credit Value***
Level 5	91
Level 6	304
TOTAL CREDITS	**395**
Rules of Combination:	

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

No	*Component*	*Modules*	*Credits*
1	*Fundamental Component*	*5*	*50*
2	*Core Component*	*23*	*345*
	Total	***28***	***395***

ASSESSMENT ARRANGEMENTS

Formative Assessment

Formative assessment or continuous assessment:

This form of assessments contributes to 40% of the final course grade.

Summative Assessment

The Final Examination **60%** of the final course grade.

Final Examinations are written at the end of each semester.

Industrial Attachment and Project

Each of these are assessed at **100%**

MODERATION ARRANGEMENTS

It is conducted internally and externally by professionals registered an accredited by BQA as Assessors and Moderation

RECOGNITION OF PRIOR LEARNING

There will provision for recognition of prior learning (RPL) related to prospective students who had on-the-job Training and assessed in accordance with the EPT policy for purposes of exemption.

CREDIT ACCUMULATION AND TRANSFER

Learners who have accrued credits from a recognised EPT may be exempted from the credits already earned.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Horizontal Progression

Graduates of this qualification may consider pursuing related qualification for the purpose of multiskilling, retooling and gain expert knowledge in the Civil Engineering field.

- Diploma in Geomatics
- Diploma in Surveying
- Diploma in Construction Engineering
- Diploma in Quantity Surveying
- Diploma in Architectural Design
- Diploma in Building and Civil Engineering
- Diploma in Mechanical Engineering

Vertical Progression

Graduates may progress to qualifications such as:

- Bachelor of science in Civil Engineering.
- Bachelor of science in Civil and Environmental Engineering.
- Bachelor of science in Construction Engineering.

- Bachelor of Science in Quantity Surveying.
- Bachelor of science in Architecture

Employment pathways

The graduates of this qualifications can be employed as:

- Civil Engineer
- Senior water Engineer
- Civil Design Technician
- Engineering Manager

QUALIFICATION AWARD AND CERTIFICATION

Minimum standard of achievement for the award of the qualification.

To be awarded the qualification the graduate, must complete 50 credits of the Fundamental Component, 345 Credits of the Core component which makes a total credit of 395.

Certification

Candidates must pass all modules for the Diploma in Civil Engineering to be awarded the qualification according to the applicable policies for the award of the qualification.

REGIONAL AND INTERNATIONAL COMPARABILITY

Summary of Similarities and Differences Observed

Similarities

- The proposed qualification being Diploma in Civil Engineering generally compares well with all the qualifications reviewed since the exit outcomes cover similar scope and depth and are aligned to exit-level descriptors typical to NCQF level 6 at a minimum of 360 credits.
- The qualification provides competencies required for registration and accreditation with professional bodies such as ERB – Engineering Registration Board, and BIE- Botswana and Botswana Institution of Engineers and other professional bodies in the region and beyond.
- All the qualifications equip the Civil Engineering Technician candidate with sufficient academic knowledge and practical experience in the areas of materials, Water, structural design, design, construct and manage projects in the Civil Engineering field.
- The qualifications have similarities in education and employment pathways which include civil design technician roads. Project manager-civil, resident engineer and engineering manager

Differences

- What sets it apart from the other qualifications examined is that there is provision for development of attributes such as Quantity Surveying, Surveying, Hydraulics, Soil Mechanics, Water and wastewater Engineering, Computer Aided design, Structural Design and Analysis, Materials testing and Highway Engineering which are crucial for Civil Engineering.
- This qualification is outcome based and is anchored on a competency and credit-based qualification framework.
- Although these qualifications generally follow similar structures and standards, there are differences, though not significant, in that their niche market and qualification layout are focusing in certain sectors of the economy which are different from one another.

REVIEW PERIOD
The review period shall be 5 years or as and when the need arises.