

**THE UNIVERSITY OF ZAMBIA**  
**SCHOOL OF ENGINEERING**  
**DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING**  
**CEE 4412: ENVIRONMENTAL ENGINEERING I**

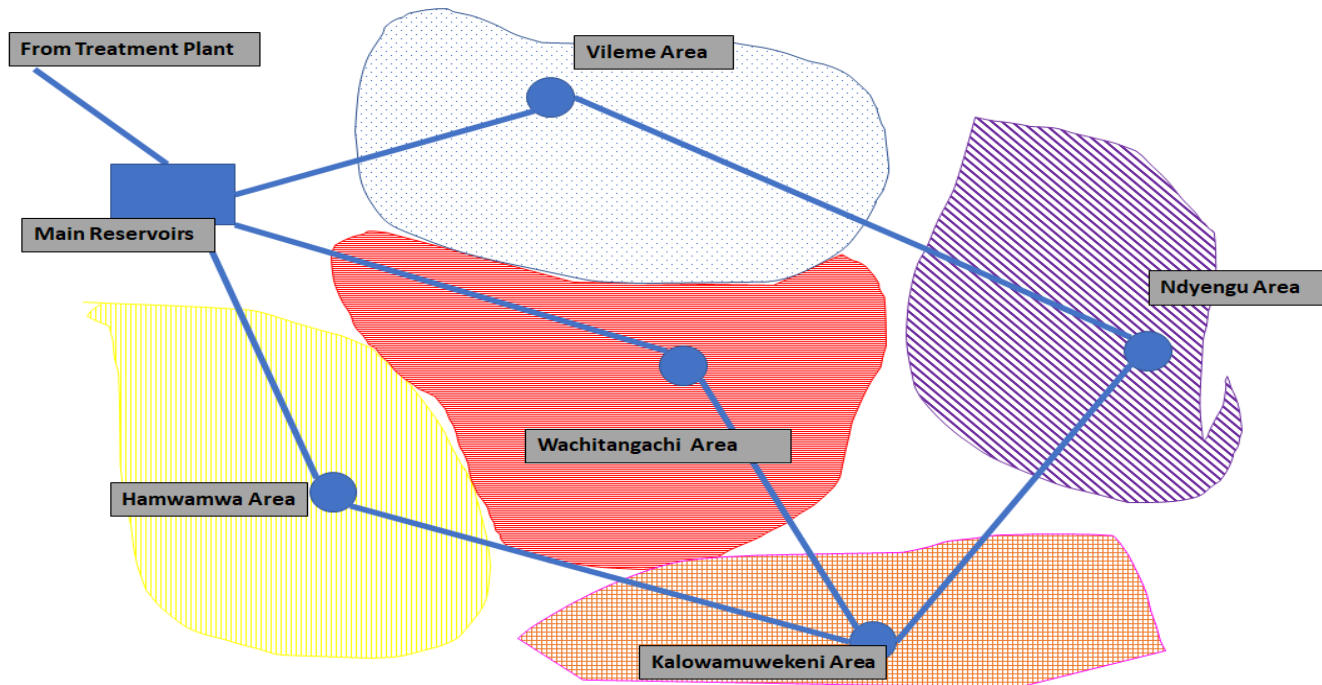
**ASSIGNMENT NO. 01.**

**DUE DATE: 02/09/2022 17:00HRS**

A water supply system is being designed for Ngwezi Town which is a new Town in Eastern Province. The layout of the town is presented in Figure 1. The demographic data for the various areas within the town is presented in Table 1. It is anticipated that the design and construction works will take a period of three years. The life span of the project is anticipated to be 22 years.

- i) Design the required diameter of the Trunk Main to adequately convey the water from the treatment plant to the main reservoir.
- ii) Given that the distance from the treatment plant to the main reservoir is 30km and that the difference in elevation between the two points is 37m, compute how much head (in bars and also in metres of water column (mwc)) the pump should provide.

Where information is not given, make and clearly state your assumptions.



**Figure 1: Layout of Ngwezi Town**

**Table 1: Demographical data for the various areas in Ngwezi Town**

Area	Type of Area	Size of Area (Ha)	Population Density (No./Ha)	Coverage (%)	Population to be serviced (No.)
Vileme	Medium Cost	30	-	-	70,000
Wachitangachi	High Cost	1200	25	-	15,000
Ndyengu	Low cost	52	-	-	80,000
Kalowamuwekeni	Peri-Urban	30	350	70	-
Hamwamwa	Low Cost	50	120	70	-