Scope of Work

Team members: Riley Ibero, Sofia Lopez, Matthew Mendenhall, Trey Williamson

Date Submitted: February 24, 2026

Submitted To: Nebraska Department of Transportation (NDOT)

Project Goals:

The objective of this project is to automate the NDOT concrete mix Excel sheet into a fully automated Python program. This program will allow users to input their concrete's specific properties. Our program will complete a full chart detailing the specific weight of each component of the concrete mixture. Creating this program will provide very reliable and accurate results, creating a very strong and diverse tool to calculate specific traits or different concrete mixes.

Task 1: Review Excel Model

First, our group will review the NDOT concrete design Excel sheet that was provided. From this Excel sheet, we can identify all the equations we will need to create our Python code. We can also determine the user input needed to create the concrete model.

Task 2: Create Functions

Next, our group created functions to calculate all the calculated weights and volumes based on the user's input. Each function will do its own task of calculation, output a value, and store that value.

Task 3: User Interface

We will then create a user interface to ask for all the elements in their concrete mix. This interface will have users enter values in a specific order, after which the program will calculate the weight of each component in the final concrete mix.

Task 4: Output

Our code will provide a labeled value for all calculated values in your concrete mix. All these weights are based on one cubic yard of concrete. These values will be output in a very organized and easy-to-read manner.

Task 5: Develop 4 Concrete Mix Designs

Our team will create 4 possible mix designs to provide models of our code. These models will show the client the format of the Python output as well as provide a calculation check for the code.

Task 6: Documentation

We will provide an annotated code used for our Python. This document will explain what each line and every function is doing and how, so that there is easy troubleshooting if errors were to arise.

Task 7: Deliverables

We will provide a Python-based concrete mix design program that will calculate the weights of different components. We will create a GitHub repository full of all the files used to create this program. In the GitHub repositor there will be a read me tab which will provide all user instructions. We will also provide a fully written report as well as a gnatte chart to see all tasks completed and when.