Startup Elektron

You and your group have just formed a Startup and you are faced with the following situation:

A new power substation is to be built in a city. The substation consists of several electricity poles that must be installed in different places in the city. The current electrical arrangement is shown in figure 1.

The problem arises when the poles are found to be near some high-rise apartment buildings. You also know that the electric charge in apartment buildings is large enough to affect the electric field generated by power poles.

The power company needs to determine the proper location for each utility pole to ensure that the electrical load from the apartment buildings does not affect the distribution of electrical power or to verify that the current plans are correct. They ask their startup for a consultancy to find out the minimum distance without changing the distribution of the poles. Detailed calculations using Coulomb's law are needed to determine the proper distance between utility poles and apartment buildings to ensure proper distribution of electrical power without affecting the electrical load of nearby buildings.

The legal regulations of the company determine that the acceptable values of electric field must be less than 2 [kV/m] of electric field.

- **Electric charge in apartment buildings:1.25**
- **Height of apartment buildings: 50 m**
- **Electrical load on each electricity pole:5**

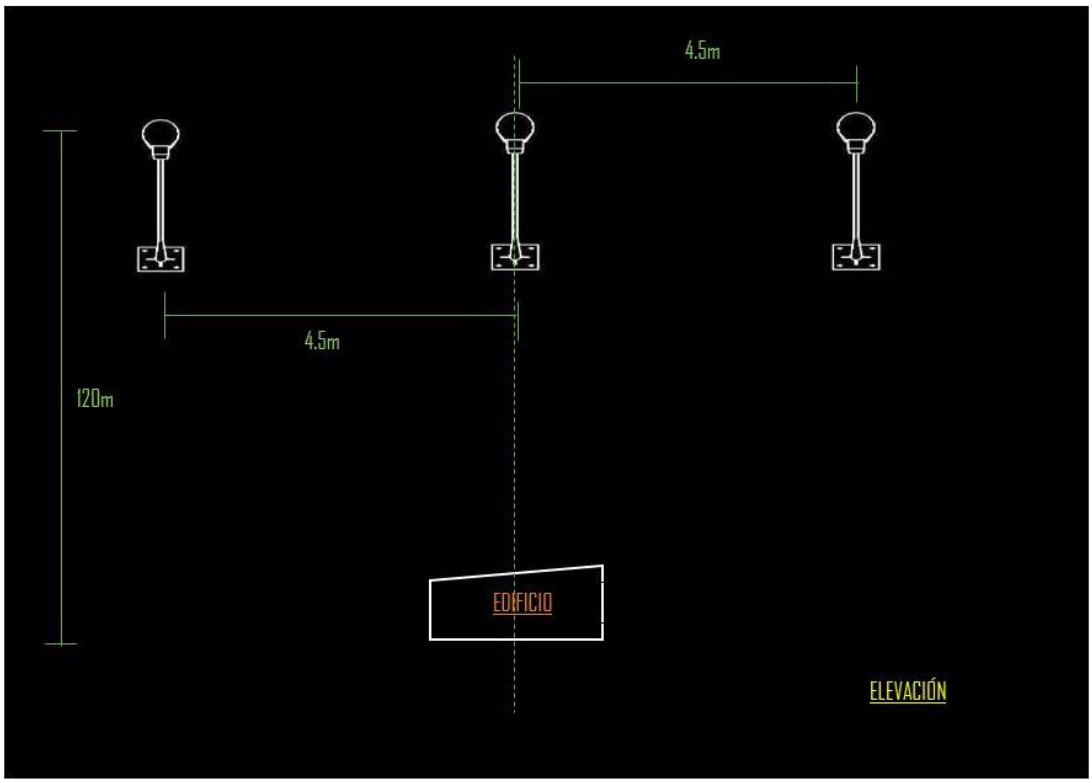

Figure 1. Plan view plans of the substation.