Project Design Phase-II
Solution Requirements (Functional & Non-functional)

Date	15 October 2022
Team ID	PNT2022TMID00928
Project Name	Smart Waste Management system for Metropolitan cities
Maximum Marks	4 Marks

Functional Requirements:

FR No.	Functional Requirement	Sub Requirement (Story / Sub-Task)
FR-1	**IOT Technology and sensors**	➢ IOT device is fixed to the dustbin. ➢ Sensors such as : ultrasonic sensor , IR sensor to sense the data and GPRS is used
FR-2	**Detailed bin inventory**	➢ The bins are been monitored and seen on the map via street view. ➢ Bins or stands are visible on the map as green, orange or red circles. ➢ The details such as waste level , weight of trash , GPS location can be seen through the application
FR-3	**Bin Monitoring**	➢ The details such as waste level , weight of trash , GPS location can be seen through the Dash board in the app created. ➢ The past data of the bins are also stored to check the accuracy of system. ➢ With real-time data and predictions, you can eliminate the overflowing bins and stop collecting half-empty ones.
FR-4	**Expensive Bins**	➢ We help you identify bins that drive up your collection costs. The tool calculates a rating for each bin in terms of collection costs. ➢ It also calculates the distance from depo-bin discharge

FR-5	**Predictions for bin Levels**	➢ It is a 24×7 monitoring system is designed for monitoring the dumpster. ➢ If the containers is full then an alert message is sent from the dustbin to employees and the cloud. ➢ In turn, employees can clear the corresponding dumpster. The bin has Sensors that can recognize picks as well ,so you can check when the bin was last collected. ➢ With real-time data and predictions, you can eliminate the overflowing bins and stop collecting halfempty ones.
FR-6	**Plan waste collection routes**	➢ The shortest and fastest routes is selected using the GPRS ➢ Based on current bin fill-levels and predictions of reaching full capacity, you are ready to respond and schedule waste collection. ➢ You can also compare planned vs. executed routes to identify any inconsistencies

Non-functional Requirements:

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	➢ Smart solution has been proposed to make the waste by sorting more simple and accurate. ➢ It aims to optimize ease of use while offering maximum functionality. ➢ The IOT technology is used to monitor the waste easily.
NFR-2	**Security**	➢ Building and deploying IoT-based smart waste management in cities

		can be a complex , time consuming and resource intensive process. ➢ Many municipal IT departments will not have the resources or in-house skills to support such a project internally.
NFR-3	**Reliability**	➢ Smart waste management is also about creating better working conditions for waste collectors and drivers. ➢ works without failure resulting in less manpower, emissions, fuel use and traffic congestion.
NFR-4	**Performance**	➢ There will be an accurate monitoring of garbage. ➢ It also Communicates with the authorities to keep environment clean. ➢ With the help of sensors and wireless communication will reduce the total number of trips required of Garbage collecting truck. ➢ It increases the efficiency
NFR-5	**Availability**	➢ Purpose of this project is to make the proposed waste management system as cheap as possible. ➢ By this we empower cities, businesses, and countries to manage waste smarter.
NFR-6	**Scalability**	➢ Using smart waste bins reduce the number of bins inside town and cities because we able to monitor the garbage more cost effective and scalability when we move to smarter systems. ➢ Also prevent the material from going to landfills and incineration and provide raw material for new products