In order to answer all the core questions that this project knows, work packages have to be identified. This has to be done in order to be able to keep track of the progress that is being made towards the completion of this project.

**Core questions**

1. How can the garbage collection system in Venlo be improved?
   1. What is the current situation?
   2. What are the main problems of the current situation?
2. How to measure the fill-level of a container?
   1. Is extra power necessary to measure?
   2. How do existing solutions measure the fill-level of a container?
   3. What other techniques could be used?
3. How to collect data from the containers?
   1. Is extra power needed to collect and send data?
   2. What kind of data is needed?
   3. How do existing solutions collect data from the containers?
   4. What other techniques could be used?
4. How to analyze the collected data?
   1. How do existing solutions analyze the data?
   2. What other techniques could be used?
5. How to incorporate collected data into the garbage collection schedule?
   1. What does the current garbage collection scheduling process look like?
   2. How could the collected data be used to improve the scheduling process?

**Deliverables**

* Current situation analysis
* Sensor research paper
* Theory research paper
* Budget request
* prototype application
* back end infrastructure
* front end application
* test application

**Work packages**

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| ID | 1 |
| Related sub questions | 2.3, 3.4 |
| Measured deliverable | Sensor research paper |
| Availability for the assignment | 1 week |
| Approach statement | Document the entire sensor research process. From planning to results and conclusion |
| Input deliverables | Budget request, test application |
| Output deliverables | A research report that describes the best sensor technology for this project |

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| ID | 2 |
| Related sub questions | 3.2, 4.2 |
| Measured deliverable | Theory research paper |
| Availability for the assignment | 1 week |
| Approach statement | Perform and document all the theory research that is required for continuing on with the project |
| Input deliverables | Documentation of the interview with the local government |
| Output deliverables | A research report that |

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| ID | 3 |
| Related sub questions |  |
| Measured deliverable | Budget request |
| Availability for the assignment | 1 week |
| Approach statement | Make a budget request for the necessary equipment to perform the practical research |
| Input deliverables |  |
| Output deliverables | A budget request has been filed towards the school |

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| ID | 4 |
| Related sub questions | 5.2 |
| Measured deliverable | Criticality analysis |
| Availability for the assignment | 1 week |
| Approach statement | Using the mapped processes to find possible enhancements in the garbage collection process |
| Input deliverables | As-is process map |
| Output deliverables | To-be process map |

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| ID | 5 |
| Related sub questions |  |
| Measured deliverable | Prototype application |
| Availability for the assignment | 2 weeks |
| Approach statement | Use all the findings of the research to produce a working prototype application |
| Input deliverables | Theory research, practical research |
| Output deliverables | Prototype application   * measure fill level of a container * communicate with the LORA network |

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| ID | 6 |
| Related sub questions |  |
| Measured deliverable | Back end infrastructure |
| Availability for the assignment | 2 weeks |
| Approach statement | Build the back-end infrastructure with which the prototype devices can communicate |
| Input deliverables | Prototype devices, documentation |
| Output deliverables | Back end infrastructure   * receives data from the LORA network * Mutates this data * Saves data to a cloud service * Route |

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| ID | 7 |
| Related sub questions |  |
| Measured deliverable | Front end application |
| Availability for the assignment | 2 weeks |
| Approach statement | Build a prototype web application that retrieves data from the back-end infrastructure, and performs operations on them |
| Input deliverables | Back end infrastructure |
| Output deliverables | Web application   * Dashboard for the local government * Retrieves data from the cloud service * Monitor states of the containers * Display current schedule information |
| N0ID | 8 |
| Related sub questions |  |
| Measured deliverable | Test application |
| Availability for the assignment | 1 week |
| Approach statement | Application to test and collect data from different sensors |
| Input deliverables |  |
| Output deliverables | Test data |

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| ID | 9 |
| Related sub questions | 1.1, 2.1, 3.1, 5.1 |
| Measured deliverable | Process mapping |
| Availability for the assignment | 2 weeks |
| Approach statement | Use interview information to document the current garbage collection process |
| Input deliverables | Interview documentation |
| Output deliverables | As-is Process map |

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| ID | 10 |
| Related sub questions | 1.2 |
| Measured deliverable | New process mapping |
| Availability for the assignment | 1 week |
| Approach statement | Use the criticality analysis to enhance the to-be process map |
| Input deliverables | Criticality analysis |
| Output deliverables | New mapped processes |

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| ID | 11 |
| Related sub questions | 2.2, 3.3, 4.1 |
| Measured deliverable | Analysis of competitors |
| Availability for the assignment | 1 week |
| Approach statement | Analyze what technologies similar existing solutions use |
| Input deliverables |  |
| Output deliverables | Overview of potential products |

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| ID | 12 |
| Related sub questions |  |
| Measured deliverable | Interview questions |
| Availability for the assignment | 2 week |
| Approach statement | Analyze what technologies similar existing solutions use |
| Input deliverables |  |
| Output deliverables | Overview of potential products |