IT2910

Renovation Calendar

Customer: Difi

Spring 2014

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1 Project introduction

This document a result of the project course IT2901 at the Norwegian University of Science and Technology(NTNU), spring 2014. The contents of this document describes the various parts of the project, including pre-studies, requirements, project management and organization, system architecture and the overall progress of the project.

1.1 The customer

The agency for Public Management and eGovernment(Difi) handles government digitalization, both by developing software to handle governmental tasks and by maintaining the systems developed. Difi also provides public sector managers to advise and assist governmental reports and evaluations, as well as producing their own.

1.2 Problem description

We have been given the task to make a user-friendly and intuitive way for the municipalities in Norway, to distribute information about the waste-handling in the respective municipalities. The information to be distributed, contains a list of different routes, covering parts of each municipality, the dates for when different waste types are picked up on any given route, and information about the classification of the waste types.

Research has revealed that the information is currently represented in a variety of ways. Some have simple text-representation of the information, others have set up calendars. The calendars have varied layout, different graphical representation of types of waste, different formats and some don't even offer the information at the municipalities' webpage. The current situation is elaborated upon in the pre-study section.

The task at hand is to find and implement a format which is first and foremost accessible to the users, whether it is the citizens, looking for the waste disposal plan for their area, or the administrative users who add and edit the routes. Our customer wishes for a intuitive and simple way to represent these renovation calendars, and in addition, a way to export the data to the iCal-format.The more formal requirements, and a more detailed description, is found in the requirements section.

1.3 The development team

The team consists of six third year students at NTNU with similar course background and skills, with the main exception of Beate Hay, who has an education as a graphical designer, and has worked with both print and web design previously. Most of the group has experience with Java, Python, some Django and HTML, CSS and Javascript. The group consists of the students Vetle Falck, Tord Kloster, Beate Hay, Kathrine Steffensen, Sverre Bjørke and Knut Fludal.

1.4 Contact info

Developers

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Project Supervisors

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1.5 Resources

The time estimated for the project is described in the following table. The average estimation for each person per week is 20 hours, but this varies from iteration to iteration. The first iteration was a more unstructured one than the following iterations, and so the estimation was not done before the second iteration. We estimated that March would be the busiest month, because half the group would be on a planned educational excursion to China the week before Easter, and so we would have to work extra in March to make up for that.

Period	Date range	Days	Hours
Iteration 1	22.01-09.02	11	- ?
Iteration 2	10.02-02.03	15	264
Iteration 3	03.03-16.03	13	260
Iteration 4	17.03-04.04	14	

Table 1.2: An estimation of available resources for the project

1.6 Assumptions and constraints

- The product will be used by users with varying computer experience, and will thus be designed to be as user friendly as possible.
- The majority of the group has not used MongoDB, Java Spring or Maven before.
- The software and equipment is limited to free software and the software provided to us by NTNU.
- Difi has their development office in Leikanger, Sogn og Fjordane, which means we won't be meeting with the customer face-to-face unless the circumstances are extraordinary. The communication will therefore be done via Skype, telephone and e-mail.
- The customer might be unavailable for meetings from time to time, and decisions might be delayed accordingly.

2 Pre-study

It is important to understand the problem domain when developing specific software. The initial phase of the project was spent exploring the existing alternatives. Drawing inspiration from some of the solutions as well as receiving information from the customer about how the routines in the municipalities varied helped a lot when formalizing the requirements and outlining the solution.

The problem domain did not introduce new technologies for us to learn, but the customer suggested technical frameworks and technologies which we had to learn while developing.

Our prestudy phase was divided into two main phase:

- Renovation calendar alternatives
- Development and project management tools

2.1 Renovation calendar alternatives

Different examples of calendars are collected in Appendix A.

During the pre-study phase, we first did research on how waste disposal plans are handled today across the country. The variation is vast, and there is no set standard. Some of the solutions are very intricate and difficult to understand.

In addition to collecting information ourselves, we've asked our customer about how things are handled. The different municipalities may have different names for the same sort of waste. For example, "matavfall" and "våtorganisk" are both used to describe organic waste. In addition to the name, the colour of the different waste bins may also vary.

We have only looked at the representation of the waste disposal plans available for the citizens, as we don't have any access to the administration of the municipalities. However, the customer has told us that the way the municipalities edit and publish the plans vary greatly. In addition, based on how different the plans available for the citizens are, it's only reasonable to guess that the administration of the plans is also very different from each other. This is something we need to think about when planning the system.

We have discovered different ways to:

- Refer to the different routes
- Displaying the waste disposal plan:
  - Different ways to write it as text (3.1, 4.1, Appendix A)
  - Different ways to display it as a calendar (1*, 2.2, 4.2, 5.2, Appendix A)
  - Some split the calendars by waste type. Separate calendars per waste type (4*, 2*, Appendix A)
- Different ways to distribute information to the citizen:
  - Info posted on the municipality's website, including downloadable PDFs(1*, 2*, 4*, 5*, Appendix A)
  - Different logics in finding your route (2.1, 3.1. 4.1, 4.2, 5.1, 6.1, 6.2, 7.1, Appendix A)
  - Distribute as paper in the mail
  - Redirect customers to the website of the companies collecting the waste (3.1, Appendix A)
  - Downloadable apps (6.2, 7.1, Appendix A)
  - SMS-alerts (6.1, Appendix A)
- Name the waste type
- Collect
  - Different bins with varying colour
  - Plastic bags in addition to bins
  - Containers available for several homes

Our customer has been very clear on one demand: The system we make should not interfere with the different routines in the municipalities. This means that we would need to make a system that is very flexible in regards to different ways of organizing information.

2.2 Tools, frameworks and version control

Some of the development tools, frameworks and technologies have been chosen on recommendation from the customer, since the technologies are already in use by Difi. Others were chosen based on our experiences from previous projects at NTNU.

Maven

Project automation build tool used, among other things, to build Java projects.

GitHub

Version control which we used to ensure everyone had a local workspace up to date with the one up one GitHub.

Spring

Java Framework to help integrate the different parts of the system.

MongoDB

Database used to hold the data in the project.

Eclipse or IntelliJ

IDE

Sublime text

Text editor for writing HTML, CSS and JavaScript.

Trello

Work breakdown and work allocation used extensively in the planning phase, especially in the beginning of the project. We later began using the activity plan more actively, updating progress there instead of the Trello boards.

Google Drive

Report material, meeting summaries and other written materials was contained here. The built in version control of Google Drive helped staying up to date. We were also able to work simultaneously on the same documents.

Pencil project

The GUI mock-ups were made in this drag-and-drop enviroment, allowing us to get a structural view of the GUI early on. This tool was also useful for getting meaningful response from the customer.

3 Requirements

The requirements section was not completed the week before the midterm report, delivery as the customer did not deliver a complete requirements specification. The requirements was therefore defined by the developers group, and then sent back to the customer for approval and possible comments. The requirements are divided into two main sections: The functional requirements and the non-functional requirements, or quality requirements. The functional requirements are easily measurable, while the non-functional requirements are not that easy to define whether they have been met or not. They should, however, affect the way the system is designed, and they should always be consulted when making new implemental and architectural decisions.

The system will be an integrated part of a system, not an entire system by itself. Therefore, login functions will not be a part of the system, but we assume that a login function exists. The same goes for the parts of the system which does not require login: There will be a surrounding web page, most likely the municipality web page, which will redirect the user to the renovation calendar.

3.1 Definitions

User: A citizen of a municipality using the renovation calendar. The user only has access to view functions and exporting the calendar to iCal format.

Administrative user: A municipality employee using the administration panel of the system. The administrative user should be able to add, edit and delete calendars, as well as adding, editing and deleting waste types. The administrative user should also be able to add, edit and delete a description about its municipality.

Admin: An abbreviation for Administrative user.

Start requirement: The requirements which need to be met to start the action.

End requirement: The requirements which need to be met to end the action with success.

Main flow: The system flow if everything goes as it should.

Alternate flow: The system flow if something else happens.

CP: Abbreviation for control panel. The main view will have three control panels, one for adding waste types, one for waste pick-up routes and one for information about the municipality.

Sveio: The dummy municipality used in our application. Reads as any municipality to be in a produced version of the system.

3.2 Functional requirements

ID	FR01
Name	Add waste type
Goal	To add a waste type to the collection of waste types
Actors	Admin
Start requirement	The system is up and running. The admin is registered. The admin is logged in.
End requirement	The waste type is added and displayed alongside the other waste types in the waste type panel.
Main Flow	1. The admin clicks “Legg til avfallsstype” in waste type CP. 2. The admin enters waste type name, description(optional), clicks on the desired colour and symbol. 3. The admin clicks “Lagre avfallstype”. 4. The system checks that no waste type exists with that name. 5. The new waste type is displayed.
Alternative Flow	3a. The admin chooses “Avbryt”. This leaves the list of current waste types unchanged. 4a. The system finds that the waste type already exists. The system then displays a popup to alert the admin that this name is already taken, and that it must be changed before the waste type is saved.
Priority	H

ID	FR02
Name	Edit waste type
Goal	To edit a chosen waste type.
Actor	Admin
Start requirement	The system is up and running. The admin is registered. The admin is logged in. The waste type is added and displayed in the list of current waste types.
End requirement	The changes should be reflected when displaying the waste type, either in the list or when inspecting the specific waste type.
Main Flow	1. If the admin is in the route CP, the admin clicks the collapsed controlpanel named “Avfallstyper” and clicks on the pencil icon next to the waste type to be edited. If the admin is in the start view, the admin clicks on the pencil icon next to the waste type to be edited. 2. The admin edits the parts of the waste type which needs to be edited. 3. The admin chooses “Lagre avfallstype”. 4. The system checks that no waste type exists with that name. 5. The new waste type is displayed.
Alternative flow	3a. The admin chooses “Avbryt”. This leaves the list of current waste types unchanged. 4a. The system finds that the waste type already exists. The system then displays a popup to alert the admin that this name is already taken, and that it must be changed before the waste type is saved.
Priotiy	H

ID	FR03
Name	Delete waste type
Goal	To delete a chosen waste type.
Actor	Admin
Start requirement	The system is up and running. The admin is registered. The admin is logged in. The waste type is added and displayed in the list of current waste types.
End requirement	The waste type is hidden and no longer displayed in the list of current waste types.
Main Flow	1. If the admin is in the route CP, the admin clicks the collapsed controlpanel named “Avfallstyper” and clicks on the waste bin icon next to the waste type to be edited. If the admin is in the start view, the admin clicks on the waste bin icon next to the waste type to be edited. 2. The system displays a dialogue box which tells the admin about the effects of this action. 3. The admin clicks “Slett avfallstype”. 4. The current list of waste types reflects the change. (I.e. the waste type has been deleted from the list.
Alternative flow	3a. The admin clicks “Avbryt”, leaving the list of current waste types unchanged.
Priotiy	M

ID	FR04
Name	Add route
Goal	To add a new route to the drop-down menu in the route CP.
Actor	Admin
Start requirement	The system is up and running. The admin is registered. The admin is logged in. The main panel is displayed.
End requirement	The route should be visible in the drop-down menu in the route CP.
Main Flow	1. The admin presses “Legg til rute” in the route CP. 2. The system displays a pop-up where the admin can add basic info about the route. 3. The admin fills in the name of the route, a description about where the route is used and pick-up time. 4. The admin clicks “OK”. 5. The system redirects the admin to a page where more details can be filled in about the route. 6. The admin adds the necessary info about waste types and when these are being picked up. 7. The admin clicks “Ferdig”.
Alternative flow	4a. The admin clicks “Avbryt”. The pop-up should disappear and the route list should remain unchanged.
Priority	H

ID	FR05
Name	Edit route
Goal	To edit a route in the drop-down menu under in the route CP.
Actor	Admin
Start requirement	The system is up and running. The admin is registered. The admin is logged in. The main panel is displayed. The route to be edited is in the drop-down menu.
End requirement	The changes made by admin should be found when selecting the route which has been edited.
Main Flow	1. The admin presses the dropdown-menu(“Velg rute”) in the route CP. 2. The admin clicks on the name of the route in the drop-down menu. 3. The system display the chosen route. 4. The admin makes the desired changes to the route. 5. The admin clicks “Ferdig”.
Alternative flow	5a. The admin clicks “Avbryt”. Nothing changes in the drop-down menu.
Priority	H

ID	FR06
Name	Archive/Delete route
Goal	To archive/delete a route in the drop-down menu in the route CP.
Actor	Admin
Start requirement	The system is up and running. The admin is registered. The admin is logged in. The main panel is displayed. The route to be edited is in the drop-down menu.
End requirement	The route is hidden and no longer displayed in the list of current waste types.
Main Flow	1. The admin presses the dropdown-menu(“Velg rute”) in the route CP. 2. The admin clicks on the name of the route in the drop-down menu. 3. The system displays a pop-up asking the admin if this is what he/she really wishes to do? 4. The admin clicks “Slett denne ruten”. 5. The system moves the route to the archive/deletes it.
Alternative flow	4a. The admin clicks “Avbryt”. The route is not deleted/archived.
Priority	M

ID	FR07
Name	Edit Municipality info
Goal	To edit the info shown to the user.
Actor	Admin
Start requirement	The system is up and running. The admin is registered. The admin is logged in. The main panel is displayed.
End requirement	The edited information is displayed when clicking on “Forhåndsvis info”.
Main Flow	1. The admin clicks “rediger info” in the CP called “Informasjon”. 2. The system displays a second smaller panel. 3. The admin enters the information in the text field. 4. The admin clicks “Lagre”.
Alternative flow	4a. The admin clicks “Avbryt”. The information will remain unchanged.
Priority	M

ID	FR08
Name	Preview Municipality info
Goal	To view the information previously edited.
Actor	Admin
Start requirement	The system is up and running. The admin is registered. The admin is logged in. The main panel is displayed.
End requirement	The information is stored and displayed as a user would see it.
Main Flow	1. The admin clicks “Forhåndsvis info”. 2. The system displays the last saved information.
Alternative flow	-
Priority	M

ID	FR09
Name	Repetition function
Goal	Adding types of waste to a specified number of weeks on the same weekday, or repetition a specified number of days from the selected date.
Actor	Admin
Start requirement	The system is up and running. The admin is registered. The admin is logged in. The current route calendar is displayed.
End requirement	The chosen waste type is added to a specified number of weeks on the same weekday.
Main Flow	1. The user clicks on the chosen day for waste pick-up. 2. The user chooses the “Gjenta” radio button and specifies how often the repetition should occur, as well as when it should end.
Alternative flow	2a. The user clicks “Avbryt”. The waste pick-up will not be saved.
Priority	M

ID	FR10
Name	View calendar
Goal	Show the calendar to the user
Actor	User
Start requirement	The system is up and running. The municipality is using the renovation calendar.
End requirement	The user can view the calendar of the municipality.
Main Flow	1. The user clicks on a link on the municipality website. 2. The calendar is displayed.
Alternative flow	-
Priority	H

ID	FR11
Name	Export to iCal
Goal	The user should be able to export the calendar to iCal format.
Actor	User
Start requirement	The system is up and running. The municipality is using the renovation calendar.
End requirement	The user should have the means to show the calendar in Google Calendar or something similar.
Main Flow	1. The user clicks “Export calendar”. 2. The user chooses the desired route to export to iCal. 3. The user receives a link/file which allows the user to export the calendar.
Alternative flow	-
Priority	H

ID	FR12
Name	Add waste pickup
Goal	The admin should be able to add waste pickups to the calendar.
Actor	Admin
Start requirement	The system is up and running. The admin is registered. The admin is logged in. The current route calendar is displayed.
End requirement	The chosen waste type is displayed in the correct day in the calendar.
Main Flow	1. The admin selects a waste type icon. 2. The admin drags the waste type to the selected day in the calendar. 3. The admin lets go of the waste type icon.
Alternative flow	2a. The admin lets go of the icon before it is placed into the calendar. The calendar will remain unchanged.
Priority	M

ID	FR13
Name	View Control Panels
Goal	The admin should be able to view the control panel.
Actor	Admin
Start requirement	The system is up and running. The admin is registered. The admin is logged in.
End requirement	The control panel is displayed.
Main Flow	-
Alternative flow	-
Priority	H

ID	FR14
Name	View route calendar
Goal	The admin should be able to view the calendar view of the chosen route.
Actor	Admin
Start requirement	The system is up and running. The admin is registered. The admin is logged in.
End requirement	The calendar view is displayed.
Main Flow	The admin either clicks on an existing route or “Legg til ny rute”.
Alternative flow	-
Priority	H

ID	FR15
Name	Edit waste pickup
Goal	The admin should be able to add waste pickups to the calendar.
Actor	Admin
Start requirement	The system is up and running. The admin is registered. The admin is logged in. The current route calendar is displayed.
End requirement	The chosen waste type is displayed in the correct day in the calendar.
Main Flow	1. The admin selects a waste type icon from the calendar. 2. The admin drags the waste type to a new day in the calendar. 3. The admin lets go of the waste type icon.1. The admin selects a waste type icon from the calendar. 2. The admin drags the waste type to a new day in the calendar. 3. The admin lets go of the waste type icon.
Alternative flow	2a. The admin lets go of the icon before it is placed into the calendar. The calendar will remain as it was.
Priority	M

3.3 Non-functional requirements

3.3.1 Usability

The main non-functional requirement or quality attribute is usability. From the very beginning, the customer has asked for a product which promotes usability above all else. Using the product should not require any kind of training, nor should it need an user-manual.

To achieve good usability, the GUI should be designed with the user in focus. It should behave and display the information our users will expect, and it should offer choices both for the IT-wise users and the ones with limited experience in IT. Explanatory text where needed, as well as a well-tested and logic organization of modules, buttons, fields and information is important.

3.3.2 Compatibility

The web application should run in the most common web browsers(Opera, Safari, Firefox, Chrome, Internet Explorer), but only in the newest versions of the browsers. As an example, IE 6 and 7 will not be supported.

3.3.3 Modifiability/Extendability

The web application should be as modular as possible, allowing Difi to make changes or extend the functionality as easily as possible.

3.3.4 Customizability

The way the municipalities organize their waste disposal routines should not be interfered with as a result of using the system. In other words, there should be a possibility to add waste types, icons, colours and any other type of modification alternative the municipalities would want. The system should also allow the municipalities to explain the different routes, in any way they want. This is closely related to the previous quality attribute, as the product will be taken over by Difi, and they must have the option to add customizable functionality.

4 Alternative solutions

4.1 Design alternatives

The customer was pretty clear from the beginning that there are many different part-solutions to our current problem, but none who don't impose more problems than they solve. Most of the ones we have found during the pre-study have formats which don't fit the other municipalities, and so they can't be introduced as a standard without influencing the workflow and organization of the remaining municipalities. They are not designed with customizability in mind, and this might impose a limitation for other municipalities. The different solutions which already exists are discussed in the prestudy chapter.

4.2 Technical alternatives

The customer suggested frameworks and technologies for the project, as they have implemented similar products in the past, and the technology is widely used by Difi. As they will be maintaining and expanding on the system, we decided to use Java Spring, Mongo DB and Maven as suggested.

Part-solutions, especially concerning calendar frameworks and representation, we explored solutions which let us omit implementing the calendar view, but rather modifying it to our use. The two solutions we looked at were named FullCalendar and Bootstrap Calendar. Both of these are OpenSource.

The reason we chose to use Fullcalendar was that it offers out of the box support for dragging and dropping events into the calendar from external lists. It also supports moving events around by dragging and dropping. This is functionality that we really want to offer the user as it is far more intuitive for the users and makes the workflow of the municipality-workers much more efficient than having to click a lot around and selecting everything from menus. This was not possible in Bootstrap Calendar, unless we implemented it ourselves. Adding too much functionality to OpenSource solutions was something we wished to reduce as much as possible.

4.3 Development process alternatives

Most agile method might have suited the project in some respects, but seeing as the working situation isn't suited to traditional software development, the customized solution seemed most appropriate. The waterfall method was also out of the question, because the requirements could change over time, and we wished to work in an evolutionary fashion.

4.4 Excluded requirements

5 Design

Through conversation with our customer and researching what solutions exists today, we have a pretty good idea of what the system should look like. Our customer's number one goal is to receive a system that is so simple to use that a user manual is not ever needed. We have been told to take into account that our typical user probably will have low computing skills.

5.1 GUI Design tactics

Because the GUI helps us visualize how the system will work underneath, we prioritized to get the wireframe sketches done as quickly as possible. A GUI sketch can be a very good tool to see if we should add or adjust some of the functionalities of the system, especially when developing functional requirements. If we discovered that we had forgotten something while we were sketching up the wireframes, we would not need to use a lot of time rewriting large amounts of code.

We wanted to achieve a simple-to-use interface by working in iterations, improving our sketches step by step based on feedback from our customer and the group. Feedback from user testing at an early stage contributed to discovering flaws in the design early on.

The wireframe sketches were implemented in HTML and used for user testing, and early testing of the system.

5.2 Organization of the User Interface

The system has two main GUI areas. The administrative interface is where the municipalities log in and edit or add waste pick-up routes. Then there is the external part, where the citizens can find the route that covers their area, and look at the calendar for waste pick-ups and/or download the data in iCal-format. The different parts of the user interface is described in appendix C.

5.3 Architecture

5.3.1 Architectural drivers

Resource limit

The time scheduled for the development of this project is limited, and will thus affect the way the way the product is designed. The group members also have other courses which require time, availability and energy. This requires the development process to be flexible, and the group needs to be kept up to date on every aspect of the project, in case another course takes more time than expected.

Developer skills

The group members has different skills which will benefit the group as a whole, but there are still technologies which we need to learn. This limitation opts for an evolutionary approach where the group can implement basic functionality in the beginning of the development phase, and later expand on that functionality.

Project lifetime

Difi is taking over the product after the group is done developing. This means that the product must be easily modifiable after completion. Alterations in one module should not break the entire program.

Market

The target users are adult municipality employees, with computer skills ranging from novice to experienced. The range in the knowledge means that the product needs to promote usability. This has also been specified by the customer.

Portability and compatibility

5.3.2 Stakeholders

Stakeholder	Concerns
Customer	Usability: The system should be intuitive and easy to use. It should not require a manual. Modifiability: It should be easy to change and expand the product for further implementation.

Course staff	Reviewability: Well written architectural documentation, as well as easy to understand and well documented code.
Developers	Complexity: The application must be relatively easy to implement, as the group is pressed for time and must learn new technologies. Modifiability: It should be easy to change and expand the product. Testability: The application must be easy to test, in order to verify that it works as intended.
Users	Usability: The system should be intuitive and easy to use. It should not require a manual. The system should be usable for any computer skill level.

Table 5.1: List of stakeholders

5.3.3 Coding principle

The product is constructed in three separate layers which communicate by sending messages back and fourth. Other than that, the modules are separate. This promotes modularity and maintainability, because the separate modules can be altered with minimal impact on the other modules. This also allowed different developers to work on different parts of the system without affecting the other developers or the system itself, making the development process more effective.

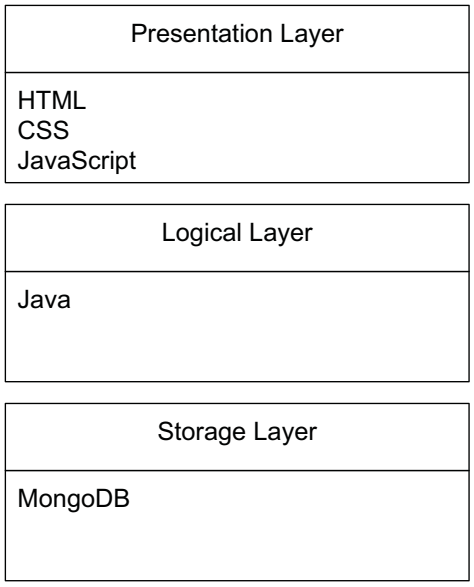


Figure 5.1: Construction layers

5.3.4 Class diagram

This diagram shows the relationships between the main classes in the system, as well as the methods available for the different classes.

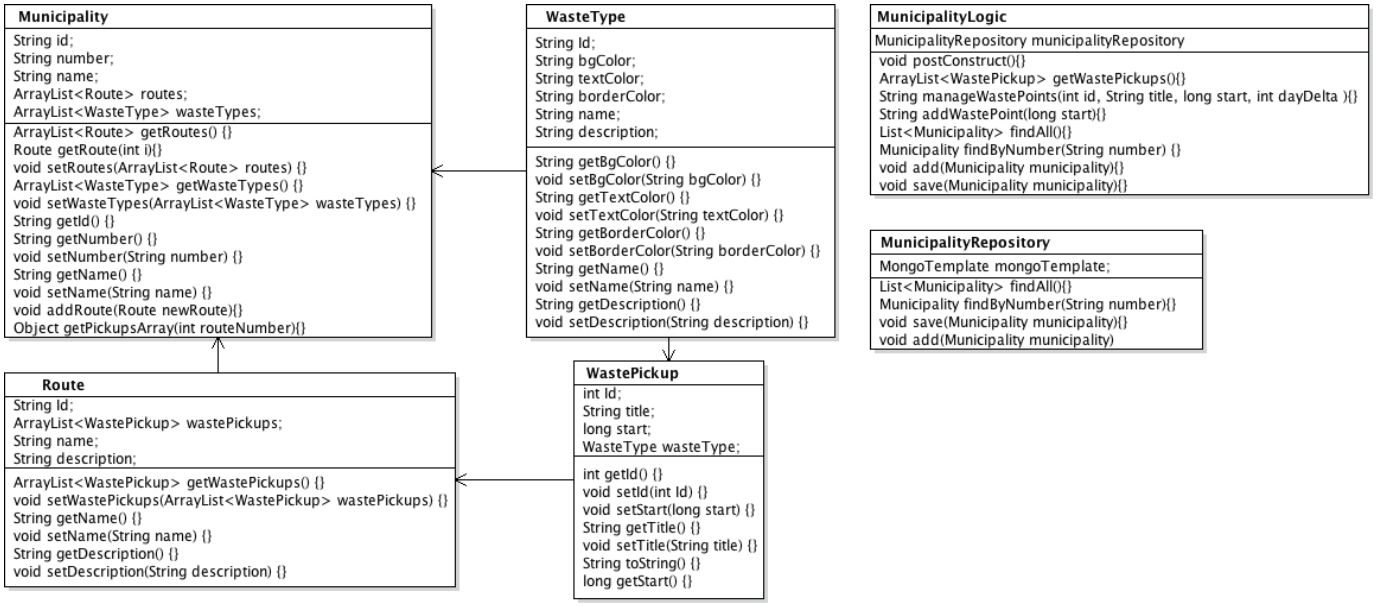


Figure 5.2: Class diagram

5.3.5 Sequence diagram for main functionality

The sequence diagrams describe the interactions between the different parts of the system. For a description of the user actions leading to the system interactions, see the different functional requirements referred to in the figure title.

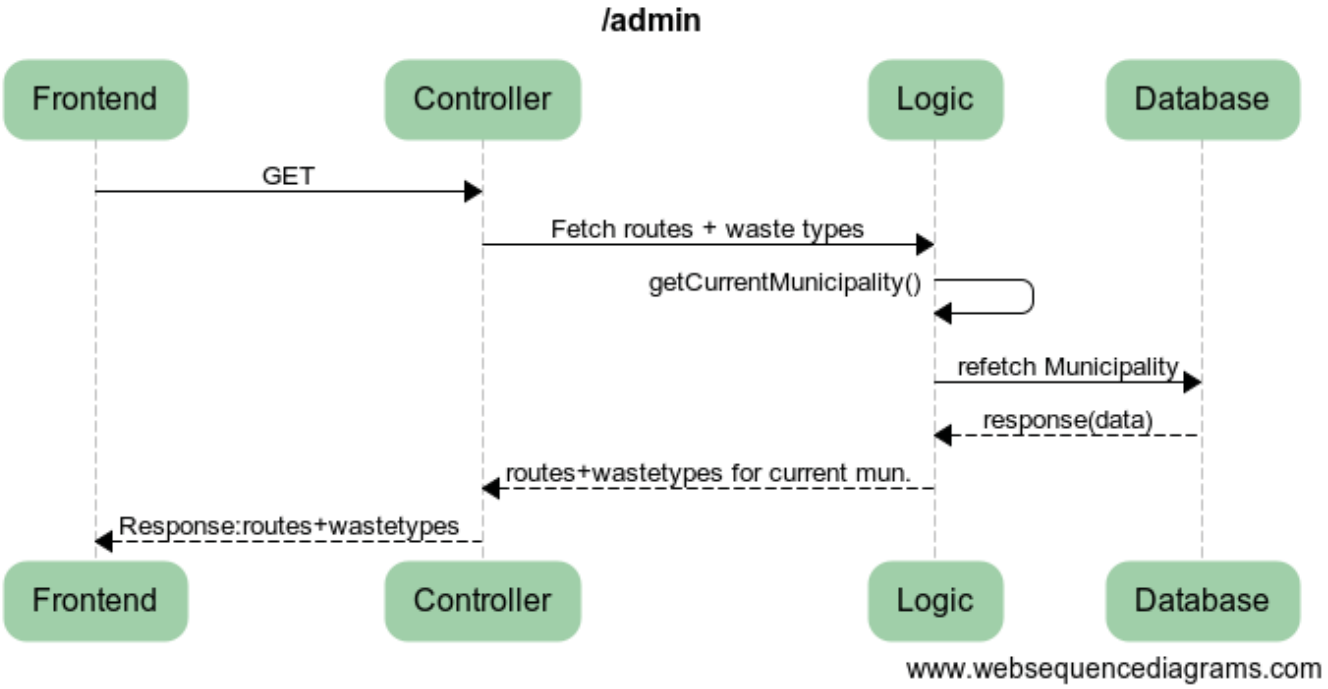


Figure 5.3: FR13: Admin

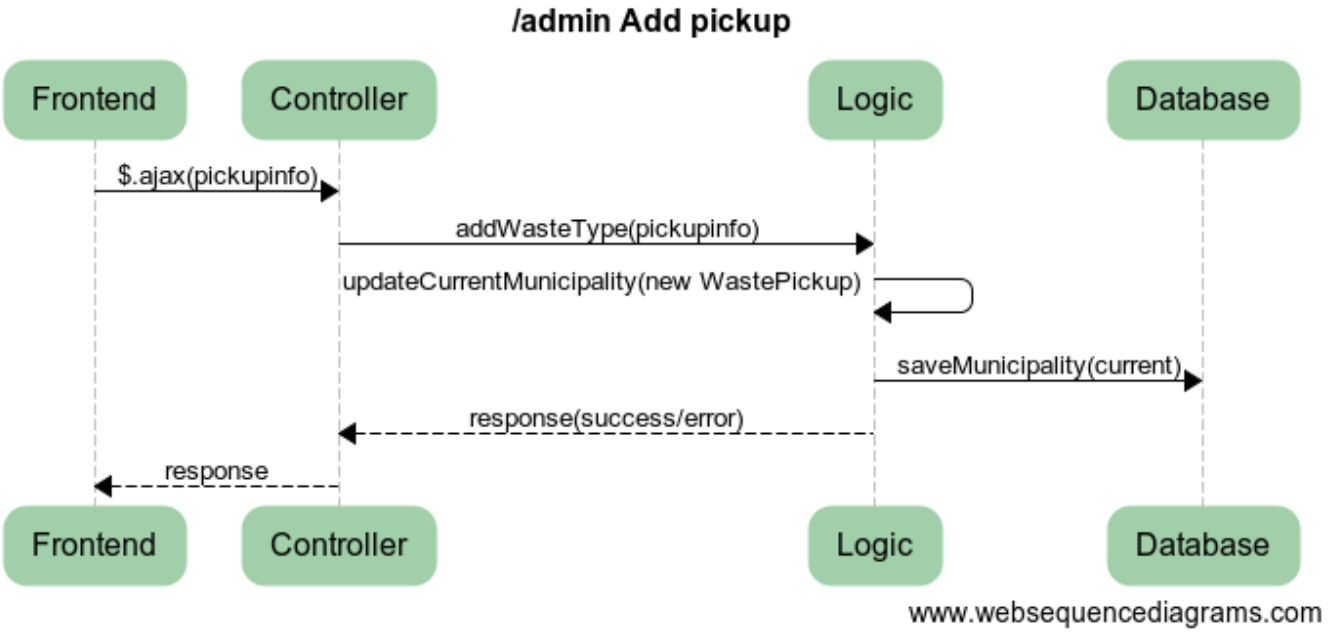


Figure 5.4: FR12: Add pickup

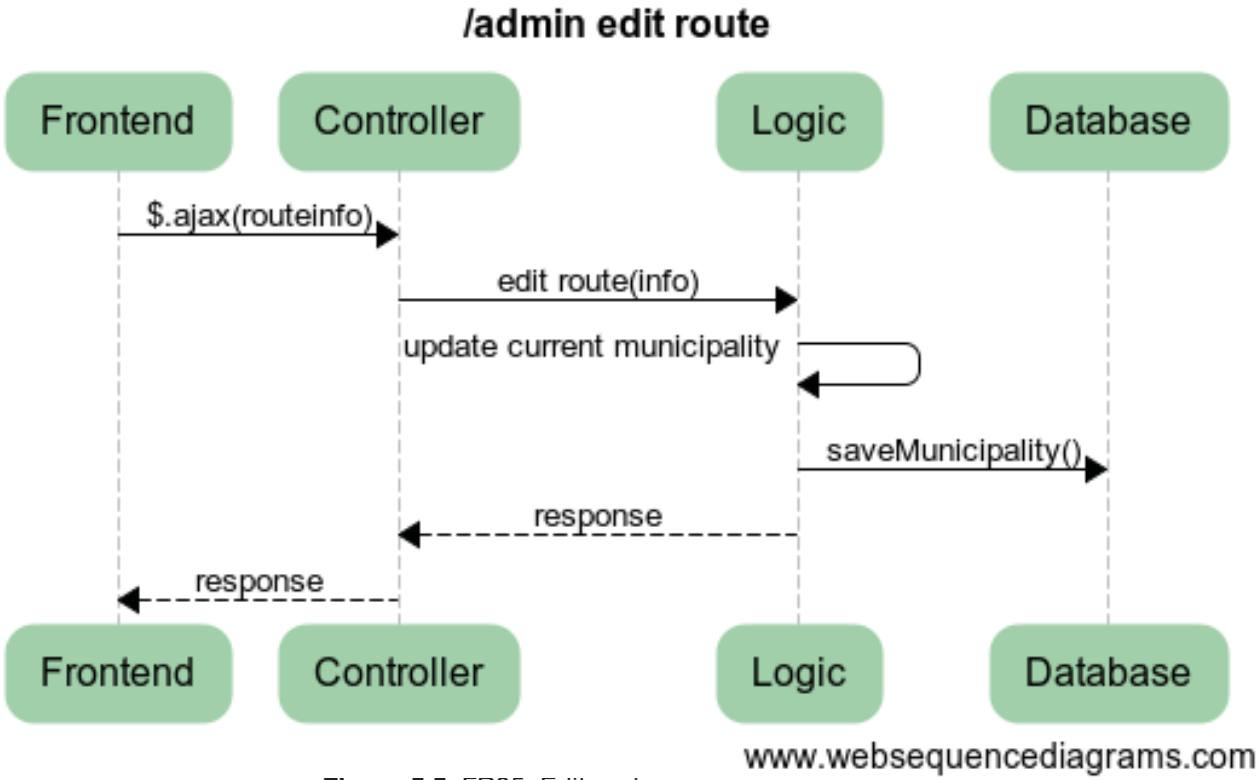


Figure 5.5: FR05: Edit route

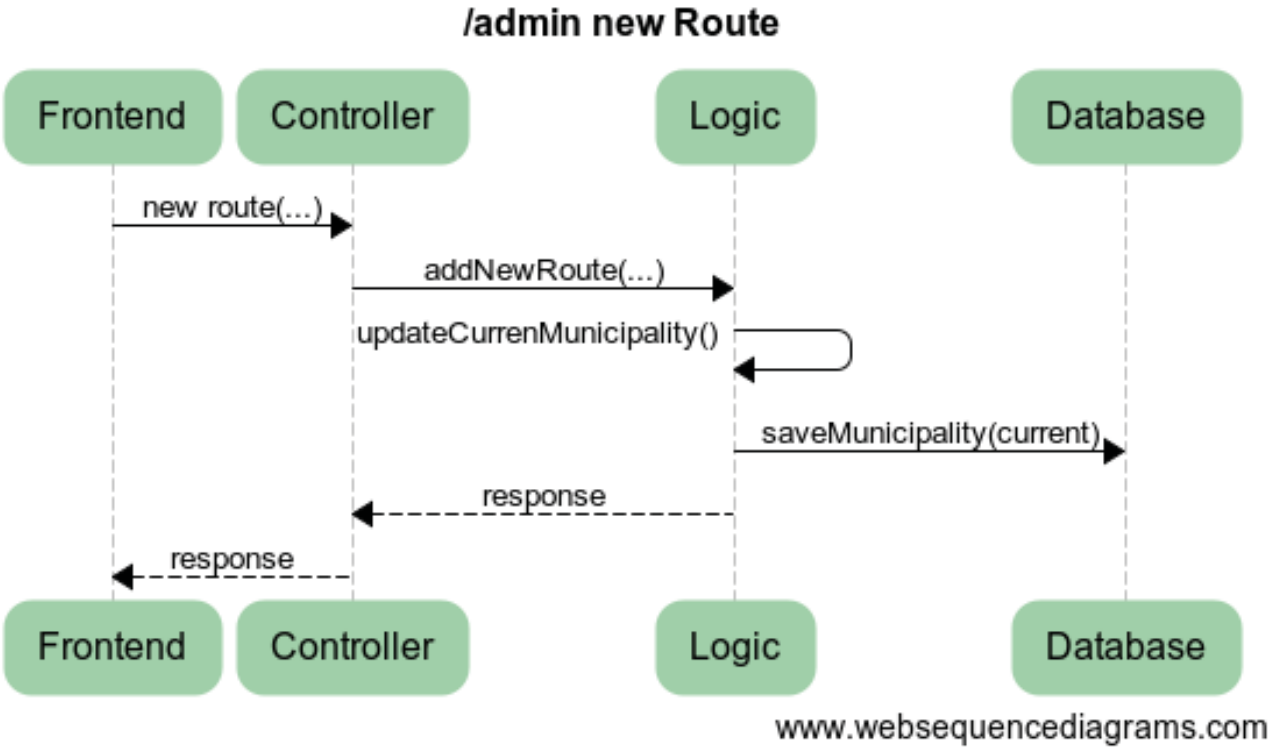


Figure 5.6: FR15: Edit waste pickup

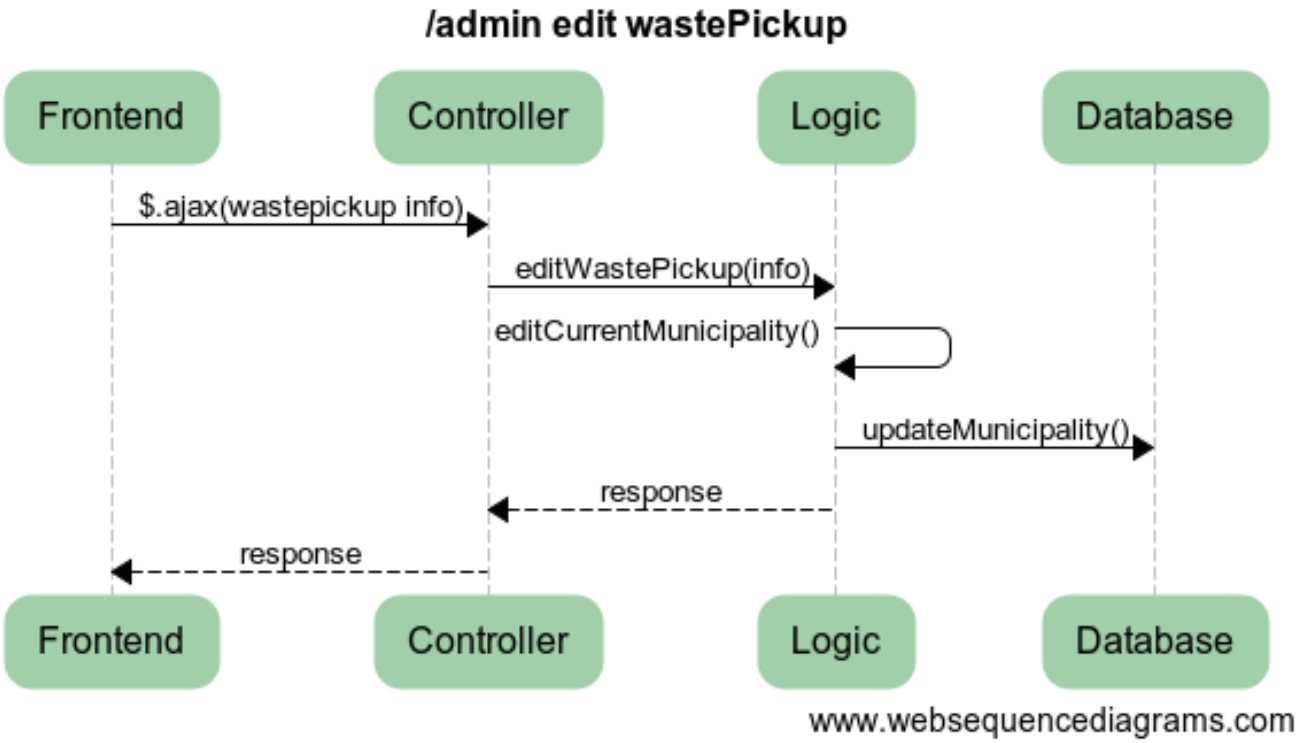


Figure 5.6: FR03: Add new route

6 Team organization

After the first meeting with our supervisor, we were advised to quickly decide on the organizational roles of the project. A few of the roles were mandatory to fill, and a few were added to specify other parts of the projects which weren't necessarily covered by the mandatory roles. Even though every person had roles within the project, we tried to focus the work distribution in such a way that no one were responsible for one part of the project. This helped distribute the workload in case some of the group members were taken ill or had unscheduled reasons for not participating on workdays.

Leader

Knut

The leader was mainly responsible for making decisions when arguments were deadlocked, and to have a good overview over the project. The leader also lead the meetings following the agendas prepared for each meeting, if nothing else was decided. He was also responsible for making sure everyone fulfills their responsibilities and the tasks they had assigned to them, while maintaining a good view of the project as a whole.

Supervisor contact

Kathrine

The role of supervisor contact consisted of contacting the supervisor of the group, in our case Hong Guo, with any questions the group might have. In addition, she was responsible for arranging meetings with the supervisor and sharing status reports, meeting summaries and intermediate reports with the supervisor. The choice for supervisor contact was based on oral English skills.

Customer contact

Sverre

The customer contact was responsible for communication between the group and the customer, and to arrange meetings between the group and the customer. Sverre was voted customers contact because he had worked with Erlend previously.

Organizing secretaries

Kathrine

We decided to break down the role of secretary in a way that everyone could take their turn taking notes or referring meetings. To organize the workload, we made Kathrine responsible, since she came across as structured and organized.

Design leader

Beate

The design leader was responsible for everything related to design, although it was encouraged for everyone to participate in the design processes and to provide input. The design leader had the final word in an argument, should the group disagree on a decision.

Beate was voted responsible for design, as she has an education as graphic designer. Design is typically something which everybody has an opinion on, and having someone with actual education on the subject helped us make decisions when the group could not agree on design issues.

Booking

Vetle

Vetle was responsible for booking rooms from one meeting to the next. He was also responsible for letting the other members of the groups know when and where the next meeting would be after booking the room.

Coding

Tord

Tord had the main responsibility for making sure the code was being worked on to meet the deadline and requirements specification.

7 Project management

Previous courses have taught us the valuable lesson that no software development project should be executed without a project management plan. The courses have also taught us that no project conducted by the university through a course can model a working situation accurately, and so it is necessary for the project management plan to be adapted to the situation. This chapter covers the choices which were made while forming our project management plan.

7.1 Choice of process model

Customizability was one of the main features we needed in our process model to handle our varying student schedules. We therefore decided early on to specify our own process model, drawing inspiration from established software development philosophies as they fitted our working environment. During the process planning phase of the project, it became clear that even though we would make our own process model, it would most likely draw inspiration from many agile development models, especially with regards to evolutionary and iterative development. It was clear early in the process that we would be in a situation where not all of the project specifications and requirements would be in place before we would begin implementation. A sequential process model was therefore out of the question.

The development process was divided into five major parts: Planning, design, implementation and testing. Each phase would be executed during an iteration over one to two weeks. The five phases could also be used on a project level, depending on which phase was more dominant.

7.1.1 Planning

The planning phase was most intense in the beginning of the project. It consisted of getting an overview of the tasks which needed to be completed or started during the current iteration, as well as time estimation and task delegation. The time estimation was done by looking back on previous similar activities and observing how well we estimated, drawing experience from these estimations to delegate hours to new activities. The aim was to rather overestimate than the opposite, but our general experience was that almost everything took more time than estimated. This was especially apparent in the first half of the project. After delegation and estimation was done for each activity, they were placed into a Trello-board, or later the Activity plan.

In addition to always having a more detail-oriented planning phase in the beginning of each iteration, the overall project was planned on a project level during the first weeks.

7.1.2 Design

The design phase included design of the system architecture, the GUI design and the requirements of the system. If there had been planned design activities during the planning phase of the iteration, the design phase would begin with outlines of the specific design part, typically through dialogue and superficial sketches and notes. These would later be formalized either through a more detailed textual description, like the functional requirements, or through a more detailed graphical representation, like the GUI with wireframe sketches. The design of the different components were often revisited the next iteration to re-evaluate the design. The customer was thoroughly involved in the design phase. No sketches were submitted to the implementation phase without the customers approval. As far as time allowed, we also let the customer suggest changes in design, even when it originally was finished.

7.1.3 Implementation

The implementation phase began as soon as the first designs were approved by the customer. Implementation would be done separately or in pairs. There should always be a working version of the software once this phase ended.

7.1.4 Testing

The testing phase would vary greatly depending on what types of software was ready for testing. See testing plans for a more detailed description. The user tests were conducted early in the project lifetime, while the other tests were conducted later on, depending on when components were ready.

7.3 Iterations

We arranged to have meetings and planned work days 2-4 days per week during the project. The number was flexible to account for varying workloads in other courses, part time jobs and so on. This, however, proved to be too little, and we soon decided to try and meet at least four days a week, five hours a day.

The iterations are represented in figure 7.1 and consisted of a few recurring meetings to ensure progress:

7.3.1 Group meeting

The group meetings can be separated into two categories: Iteration start and iteration keep up. Iteration start meetings would consist of the planning phase, more or less. It would also contain an oral status report from each member about what was done last iteration and experience drawn from it. The iteration keep up would re-estimate the time delegated and a new status report would be given for each activity.

7.3.2 Supervisor meeting

The supervisor meeting was held mainly every second Thursday throughout the project. Here the group would go through the project progress, adding activities to the activity plan which needed to be completed before the next meeting.

7.3.3 Readying of documents

Before each supervisor meeting, a meeting agenda, meeting summary from last time, a status report and a new edition of the report would be made and uploaded on it's learning. In the status report, we would also discuss progress, which would have been discussed in the group before adding it to the status report.

Figure 7.1: Iteration example

7.3 Project level planning

The project level planning was done by defining work packages which when combined would represent all the workload in the project. This, along with project milestones were represented in a GANTT chart, using software from http://www.ganttproject.biz/. It describes the different milestones, both the ones set up by the project description and the ones we have added ourselves. The project level phases can be more or less directly translated to the work packages, with prestudy as the planning phase. Project management is running throughout the project, as this is not a phase in itself, but more of a continuous task. The plan was initially to have a code wrap-up after the fourth iteration, and keep the following week as a buffer for any estimations gone awry.

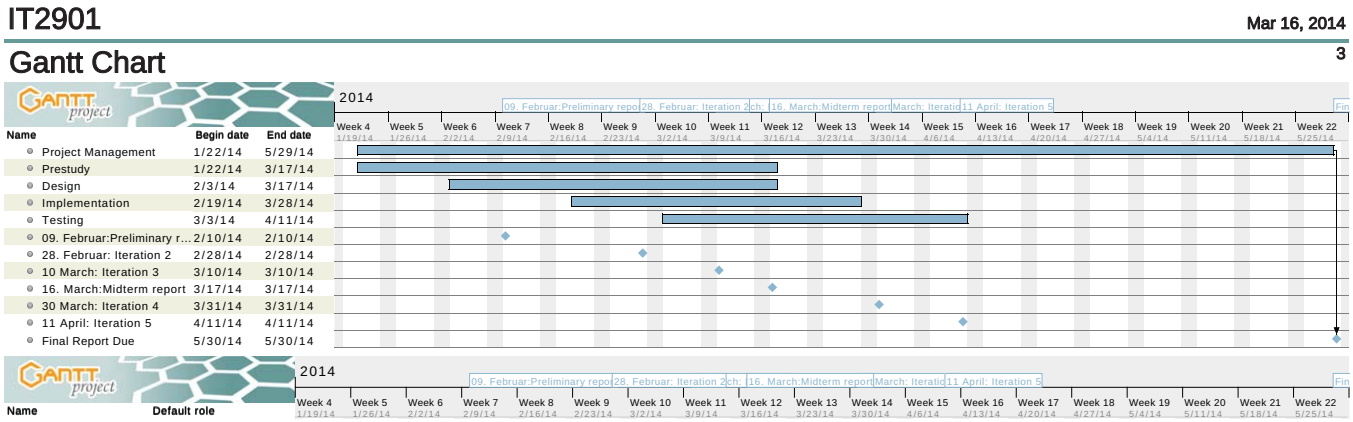


Figure 7.2: GANTT diagram

7.3.1 Milestones

The project setup described a few milestones throughout the project. They were used as project level deadlines, in addition to a few which we added to reduce the amount of weeks between each milestone.

09.02.14 Preliminary report delivery

28.02.14 Iteration 2

10.03.14 Iteration 3

16.03.14 Midterm report delivery

30.03.14 Iteration 4

11.04.14 Iteration 5

30.05.14 Final report delivery

7.4 Risk Analysis

The risk analysis contains different problems the group could encounter during the project. They also include an evaluation of how serious the issue would become, should it occur, and remedial measures to recover from the problem. The seriousness, or importance, is calculated by two factors, likelihood and importance. They are ranked on a scale from 1 to 10, where 1 is the lowest and 10 is the highest. Likelihood represents, as the name implies, how likely it is that the risk will occur, and the impact describes how much it will affect the project. The two factors multiplied give the importance of the risk.

Problem description	Likelihood	Impact	Importance	Preventive measure	Remedial action
Deviation from what we have created and what the customer want.	3	8	24	Write down all wishes and requirements from the customer, and make the customer sign or otherwise confirm the project plan when it is written. All communication between us and the customer should be either written or referred.	Start a dialogue between us and the customer to address the issue. Have a meeting where we asses the variance
Estimated too little time for the project	3	7	21	Time schedule must include extra time.	Lower the requirements, or allocate more time.
Bad workload distribution	5	4	20	Weekly meetings, and have good communication what each person do.	redistribution
Lack of skill in the group as a whole.	3	6	18	Map what different skills the group possess as a whole, and have in mind the things might take longer timer, because people may have to learn something new and unknown.	Have the group dedicate time to ourselves in areas needed.
Technical failures, loss of work	4	4	16	Take back-ups regularly, and use common sense. Git, cloud, local.	Go to an earlier backup and redo the needed work.
Miscommunication about what the customer will provide for us.	3	5	15	Always refer meetings properly. Contact customer if some things remain unclear.	Extra meeting to address the issue. Include supervisor if necessary.

Problem description	Likelihood	Impact	Importance	Preventive measure	Remedial action
Long-term Sickness	2	7	14	Be aware it might happen. At least two people have knowledge about all parts of the project.	Equally distribute the workload among the rest of the group. Talk to project supervisor to solve problem.
Estimated too much time.	2	3	6	Have a decent margin of error	Add more features, or finish the project early.
Software incompatibility	3	6	18	Use fewer operating systems within the group, when develop the system.	Check for other solutions which have been known to work.

Table 7.1: Risk analysis

7.5 Work breakdown structure

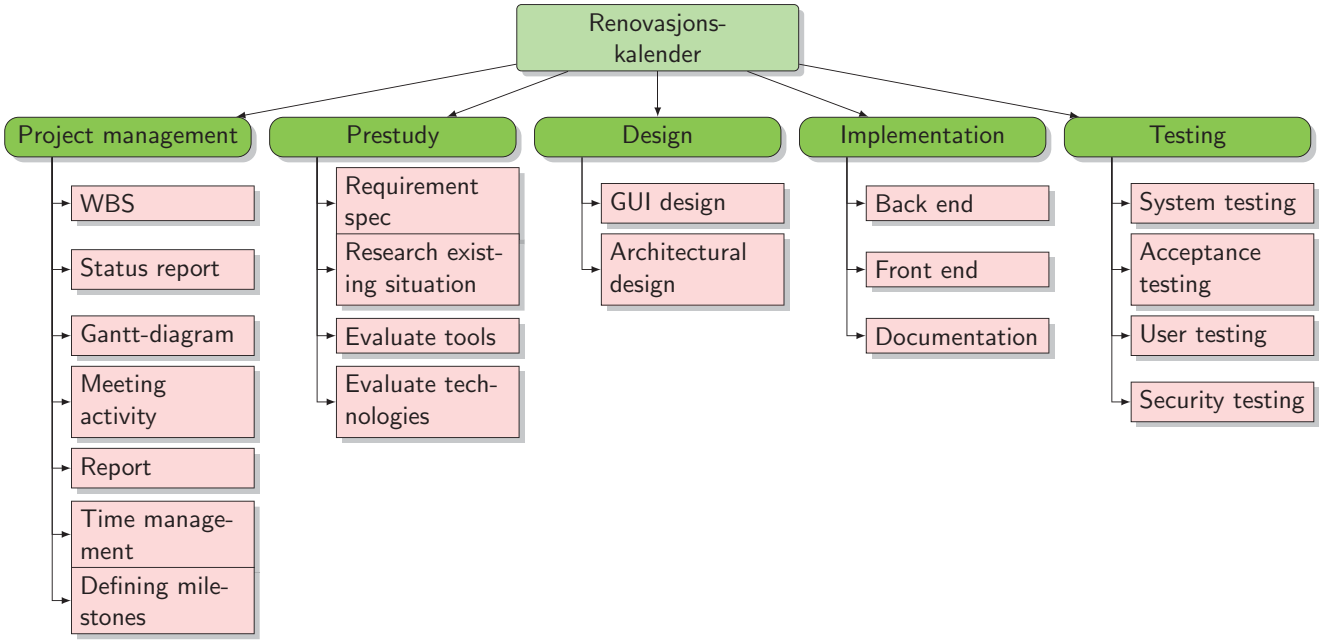


Figure 7.3: WBS

8 Construction

8.1 Iterations

8.1.1 Iteration 1

Time span: Week 4, 5 and 6

Summary:

We had our first meetings this week. Some of us met for the first time, while others had known each other for quite some time. We mapped the expertize between us, and found that mostly have the same type of experience. Sverre was the only one who had any experience with Maven, Spring and Vagrant, but we all agreed that could be fixed with him having lectures for the rest. We had a meeting with both the customer and supervisor week 5, and we felt we got a good dialogue going.

9th of February was the deadline for the preliminary report. In retrospect, this can be seen as our first milestone.

Work done:

- Schedule for possible meeting dates
- Functional requirements - first draft
- Non functional requirements - first draft
- WBS - first draft
- Gantt-diagram - first draft
- Risk analysis
- Setting up google docs file system
- Contact and meeting with customer
- Contact and meeting with supervisor
- Set up areas of responsibility
- Work breakdown and distribution on Trello
- Preliminary report
- Set up database

8.1.2 Iteration 2

Time span: Week 7 and 8

Summary:

In these two weeks we focused mainly on project planning. We all agreed that it is important that we set up the project properly, and plan it, before we start the implementation of the program itself. GUI sketches and wireframes were made and revised iteratively, which led to a phone-meeting with the customer to discuss the current GUI solutions. The customer gave us some input and asked for the reasoning behind the decisions. He also sent a sketch to Beate to illustrate his ideas, as Skype had too much latency due to the Olympics. She maintained a more informal connection with the customer during this process of revising the GUI.
We had made an agreement with the customer that he would deliver us a requirement list. However, this did not happen, so we decided that we would have to create this ourselves in the next milestone, and then send it to the customer for confirmation and comments.

We had a new meeting with our supervisor 13.02, and she provided feedback on the preliminary report, and our status report.

Work done:

- Research Bootstrap Calendar/FullCalendar
- Set up environment
    - Git
    - Maven
    - Vagrant
    - Check connection and permissions for DB
    - Spring
- Mockup sketches of GUI
- Revised mockups after meeting with customer
- Revised Risk analysis
- Revised requirements
- Customer meeting
- Supervisor meeting
- Planned user test with city hall employees

- Early HTML-prototyping

8.1.3 Iteration 3

Time span: Week 9 and 10

Summary:

In week 9, when we had our biweekly meeting with our supervisor, she pointed out that the changes discussed in the previous meeting was not reflected in the report, even though much of the documentation was done. We decided to make an activity list for each supervisor meeting, which would be checked and revised to make sure we stay on track and that we understood each other. The extra work also resulted in an extra meeting the day after, where we made a plan for how to remedy this. We started by remaking the WBS from scratch, but with package IDs, which would be referred to in the time schedule and overall. We went through the supervisor meeting summaries and made sure everything was up to date. We also finished the requirements, both functional and non-functional, with a few exceptions which needed further specifications before sending the list to the customer.

Work done:

- Graphical and textual WBS, the first for the report, the second for own use.
- Requirements
- Transferred time estimation to activity plan
- Planned user test
- HTML prototype with local functionality based on mockups
- Conducted user test and revised report with new information
- Began test planning
- Finished Gantt-diagram
- Backtracked and reported previous iterations

8.1.4 Iteration 4

Time span: Week 11

Summary:

This week was primarily focused on finishing the midterm report, as the delivery date was set the 16. March. We also started to work more on the back end coding, mainly

to set up a proper way of communicating with the database and to find a reliable way of sending the data to the view. 12. March we had another meeting with the customer, who reviewed and approved the requirements. We also talked over different solutions for back end as we had some questions about some details. We didn't have a supervisor meeting this week because our schedules didn't fit, but we had some interaction via e-mail.

Work done:

- Acceptance testing and unit testing plan
- Got requirements approved
- Report improvements
- Back end: Communication with database
- Back end: Controller-view communication
- System architecture
- Javascript course

9 Testing

Because we relied on an iterative process model, testing was a part of the workflow as soon as we had something testable. Evaluating progress versus estimated progress was a major part of the process, and testing helped evaluate if parts of the system were working at an acceptable level for that iteration. This chapter is divided into x main parts: Unit testing, system testing and usability testing.

9.1 Strategy overview

9.1.1 Unit testing

Unit testing lets us test the smallest testable component in the system. We define methods in Java as the smallest testable modules as far as this is possible. If there is parts of the code which does not residen inside a method, we will use a larger bit of code, often including a method to test those parts.

This testing will done when a unit is considered completed, e.g. when we believe it does what it should do. The testing will reveal possible flaws in the design and/or code. The testing began in iteration 2, when the prototype had testable components.

9.1.2 Integration testing

The integration testing are conducted as newly created modules are integrated with completed parts of the system, or modules are combined to create a larger module. The purpose is to reveal potential problems with the cooperation between the modules. This will be done when a component has been integrated with the system, and more thoroughly at the end of every iteration.

9.1.3 System testing with acceptance testing

The system testing was not begun until the functional requirements were completed and approved by the customer. The purpose of this testing was to ensure the requirements were met

9.1.4 Usability testing

One of the main quality requirements was to have a product with as high usability as possible. We therefore decided early to prioritize early testing to allow several iterations of the graphical design with feedback from other sources than ourselves and the customer. We conducted a usability test rather early in the implementation

stage of the project.

9.2 Strategy implementation

9.2.1 Unit testing

The unit testing was performed whenever a testable component was completed. Any problems discovered by other group members than the one responsible for the code in question would be reported directly.

9.2.2 Integration testing

At the end of each iteration we would do a test with specific regards to the newly introduced units. We would begin with affected functional and non-functional requirements, then extend the testing to provoke bad output or unexpected behaviour.

9.2.3 System testing

Testing compliance with functional and non-functional requirements would be executed during the end of each iteration using the testing template (appendix F).

9.2.4 Usability testing

Usability tests would be conducted when deemed necessary, once early the project phase, when the GUI design was complete, and one later when system functions had been implemented. The usability aspect would also be included in the final system test with acceptance test to ensure the usability requirement was met in the final delivery.

9.3 Usability test

The first testable component we completed was a html-prototype with limited functionality based on the GUI-mockups and the requirements. We had earlier discussed the possibility of testing a preliminary version of the design to receive feedback from other sources than the customers and ourselves. We decided to conduct a user test with employees at the city hall of Trondheim to improve our current design and perhaps expand the functional requirements.

The test was conducted in two main phases. In the first phase the subjects were informed about the project and our product. The second phase was conducted individually and consisted of a set of tasks which the subjects would perform without any interference or help from the testers themselves. The subject received the tasks

on a separate sheet to be able to read the tasks in their own tempo. They were also encouraged to think aloud so we could take notes on their reactions and their thoughts about different solutions. The tasks were created with the purpose of using all the implemented functionality.

After the tasks were completed, the subjects were asked to rank the system, the difficulty of the different tasks and comment on any difficulties or inconsistencies about the system i general.

The tasks were as follows:

- Task 1: Add a route to the system, add information about the route and add pick-up of paper, plastic and residual waste on the 27th of February and four weeks from that date on the same weekday.
- Task 2: Collect plastic on Monday instead of Thursday.
- Task 3: Add a new waste type.

Both test subjects were in general pleased with the interface and the mechanics, but there were a few comments we decided to take into consideration for the next iteration of the design:

- Default text should be removed when the user clicks on the text fields.
- Help text on how to "drag'n'drop should be more visible.
- The interface should not require scrolling if possible
    - Banners could stick to the top while scrolling, if scrolling is indeed necessary.
- The calendar needs a continuity function for adding waste types on the same weekday every week(or something similar).
- Clicking in the calendar could have some response.
- "Add a new route" needs a better description about what "beskrivelse" means.
- Expected "add waste type", not "edit waste type", since it said "add route".
- The "banners" are clickable, this should be shown more explicitly!
- Preview function

9.4 System test

See appendix F for the testing template.

Appendices

Appendix A: Existing solutions

Examples of calendars used in different municipalities.

Rest-/matavfall NUMMER
Papp/papir NUMMER

Nummeret på den innsamlingsruta som du tilhører, vil stå på avfallsbeholderen/avfallsbrønn. Dette rutenummeret finner du igjen på kalenderen på de datoene hvor det er henting hos deg.

	Restavfall Matavfall	Papir Plast
JANUAR		
1 ons		
2 tor	323/423/424 523/524/623/624	122/123 323
UKE 1 3 fre	323/424/425 524/525/624/625	124/125 323
6 man	511/611	125/211
7 tir	512/612	211/212
8 ons	513/613	213
UKE 2 9 tor	514/614	214
10 fre	515/615	215
13 man	521/621	221
14 tir	412/522/622	222/312
15 ons	323/413/423 523/623	223/313 423
UKE 3 16 tor	414/424/524/624	224/ 314 424
17 fre	425/525/625	225/425
20 man	511/611	111
21 tir	512/612	112
22 ons	513/613	113
UKE 4 23 tor	514/614	114
24 fre	515/615	115
27 man	521/621	121
28 tir	412/522/622	122
29 ons	323/413/423 523/623	123/323
30 tor	414/424/524/624	124
UKE 5 31 fre	425/525/625	125

	Restavfall Matavfall	Papir Plast
FEBRUAR		
3 man	511/611	211
4 tir	512/612	212
5 ons	513/613	213
UKE 6 6 tor	514/614	214
7 fre	515/615	215
10 man	521/621	221
11 tir	412/522/622	222/312
12 ons	323/413/423 523/623	223/313 423
UKE 7 13 tor	414/424/524/624	224/314 424
14 fre	425/525/625	225/425
17 man	511/611	111
18 tir	512/612	112
19 ons	513/613	113
UKE 8 20 tor	514/614	114
21 fre	515/615	115
24 man	521/621	121
25 tir	412/522/622	122
26 ons	323/413/423 523/623	123/323
UKE 9 27 tor	414/424/524/624	124
28 fre	425/525/625	125

	Restavfall Matavfall	Papir Plast
MARS		
3 man	511/611	211
4 tir	512/612	212
5 ons	513/613	213
UKE 10 6 tor	514/614	214
7 fre	515/615	215
10 man	521/621	221
11 tir	412/522/622	222/312
12 ons	323/413/423 523/623	223/313 423
UKE 11 13 tor	414/424/524/624	224/314 424
14 fre	425/525/625	225/425
17 man	511/611	111
18 tir	512/612	112
19 ons	513/613	113
UKE 12 20 tor	514/614	114
21 fre	515/615	115
24 man	521/621	121
25 tir	412/522/622	122
26 ons	323/413/423 523/623	123/323
UKE 13 27 tor	414/424/524/624	124
28 fre	425/525/625	125
UKE 14 31 man	511/611	211

1.1 Ullensaker avfallskalender 2014

Rest-/matavfall NUMMER
Papp/papir NUMMER

Innkjøring i forbindelse med offentlige høytidsdager: Der rutenumrene fremkommer på flere tømmedager, settes avfallet ut på den første datoen.

Dagene er merket med GRØNN farge

APRIL

		Restavfall Matavfall	Papir Plast
UKE 14	1 tir	512/612	212
	2 ons	513/613	213
	3 tor	514/614	214
	4 fre	515/615	215
	7 man	521/621	221
	8 tir	412/522/622	222/312
	9 ons	323/413 423/523/623	223/313 423
UKE 15	10 tor	414/424/524/624	224/314 424
	11 fre	425/511/525 611/625	111/225 425
	14 man	511/512 611/612	111/112
	15 tir	512/513 612/613	112/113
	16 ons	514/515 614/615	114/115
UKE 16	17 tor	Skjærtorsdag	
	18 fre	Langfredag	
	21 man	2. Påskedag	
	22 tir	412/521/522 621/622	121/122 323
	23 ons	323/413/423 522/523/622/623	122/123 323
UKE 17	24 tor	414/523/524 623/624	123/124
	25 fre	425/525/625	125
	28 man	511/611	211
	29 tir	512/513 612/613	212/213
	30 ons	513/514/524 613/614/624	213/214
UKE 18			

MAI

		Restavfall Matavfall	Papir Plast
UKE 18	1 tor	Off. høytidsdag	
	2 fre	424/425/514 515/524/525 614/615/624/625	214/215
	5 man	511/521 611/621	215/221
	6 tir	412/512/522 612/622	222/312
	7 ons	323/413/423 513/523/613/623	223/313 423
UKE 19	8 tor	414/424/514 524/614/624	224/314 424
	9 fre	425/515/525 615/625	225/425
	12 man	511/521 611/621	111
	13 tir	512/522 612/622	112
	14 ons	323/423 513/523/613/623	113
UKE 20	15 tor	424/514/524 614/624	114
	16 fre	425/515/525 615/625	115
	19 man	511/521 611/621	121
	20 tir	412/512/522 612/622	122
	21 ons	323/413/423 513/523/613/623	123/323
UKE 21	22 tor	414/424/514 524/614/624	124
	23 fre	425/515/525 615/625	125
	26 man	511/512/521/522 611/612/621/622	211/212
	27 tir	512/513/522/523 612/613/622/623	212/213
	28 ons	323/423 513/514/523/524 613/614/623/624	213/214
UKE 22	29 tor	Kr himmelfartsdag	
	30 fre	425 514/515/524/525 614/615/624/625	214/215

JUNI

		Restavfall Matavfall	Papir Plast
	2 man	511/521 611/621	221
	3 tir	412/512/522 612/622	222/312
	4 ons	323/413/423 513/514/523/524 613/614/623/624	223/224 313/423
UKE 23	5 tor	414 514/515/524/525 614/615/624/625	224/225 314/424
	6 fre	425 511/515/524/525 611/615/621/625	111/225 425
	9 man	2. Pinsedag	
	10 tir	511/512/521/522 611/612/622	111/112
	11 ons	323/423/513/523 613/623	113
UKE 24	12 tor	424/514/524 614/624	114
	13 fre	425/515/525 615/625	115
	16 man	511/521 611/621	121
	17 tir	412/512/522 612/622	122
	18 ons	323/413/423 513/523/613/623	123/323
UKE 25	19 tor	414/424/514 524/614/624	124
	20 fre	425 515/525/615/625	125
	23 man	511/521 611/621	211
	24 tir	512/522 612/622	212
	25 ons	323/423 513/523/613/623	213
UKE 26	26 tor	424/514/524 614/624	214
	27 fre	425/515/525 615/625	215
UKE 27	30 man	511/521 611/621	221

Tømmeruter for papir og plastemballasje 2014

Slik finner du riktig tømmerute for din husstand:

1. Finn din adresse i adresseregisteret
2. Noter deg tømmeruten du tilhører (rute 1 – 67). Vær oppmerksom på at enkelte gater/veier er delt på to eller flere ruter. I så fall er dette spesifisert med husnummer.
3. Merk av hvilken rute du tilhører i tømmeplanen (innbrett bak i guiden). Her er tømmedatoene for den enkelte rute.

Adresseregister

A	
A.Syvertsens vei	rute 12
Abelborgsveien	rute 35
Agatveien	rute 2
Agentgaten	rute 39
Aksel Jacobsens vei	rute 34
Albert Torps vei 3 - 13	rute 34
Albert Torps vei 14 - slutt	rute 35
Aldershjemveien	rute 51
Alf Prøysens vei	rute 25
Almgrensvei	rute 4
Almveien	rute 54
Alshusbuen	rute 13
Alshusveien	rute 13
Alv Erlingsens gate	rute 24
Alvheim	rute 10
Amalie Skrams vei	rute 32
Ambjørnrødveien	rute 44
Ambolten	rute 41
Amerikagaten	rute 54
Ametystveien	rute 2
Anders Forsbergs vei	rute 36
Anders Olufsens gate	rute 43
Andeveien	rute 60
Anisveien	rute 6
Anton Brekkes vei	rute 5
Anton Davidsens vei	rute 9
Anton Hansens vei	rute 24
Anton Kinns vei	rute 30
Anton Rosings vei	rute 41
Antoniskogen	rute 15
Apenes gate 1 - 5 , 7	rute 67
Apenes gate 6, 8 -11	rute 39
Apotekerveien	rute 24
Arne Garborgs vei	rute 33
Arne Stangebyes gate	rute 67
Arne Svendsens gate	rute 67
Arntzens vei	rute 37
Arups gate	rute 64
Asbjørnsens vei	rute 32
Aslaugsvei	rute 24
Aspelundveien	rute 61
Asylgata	rute 67
Atriumsveien 1 - 52	rute 39
Atriumsveien 53 - 57	rute 1
Audunsvei	rute 13
Augensens vei	rute 64
Autogaten	rute 24
Avstikkeren	rute 25
B	
Badehusveien	rute 67
Bakerikroken	rute 40
Bakeriveien	rute 49
Bakkegata	rute 67
Bakken	rute 49
Balders gate	rute 10
Ballastveien	rute 56
Bankbrygga	rute 39
Barkedalen	rute 55
Barkedalsskogen	rute 55
Barkveien	rute 53
Barveien	rute 20
Batteriveien	rute 37
Bauveien	rute 13
Bedriftsveien	rute 61
Begbyveien 1 - 8	rute 24
Begbyveien 9 - slutt	rute 25
Bekkevold	rute 41
Bekkhus	rute 13
Bellevue	rute 38
Belsbyveien	rute 30
Bergerhavna	rute 15
Bergerveien	rute 15
Bergfruelia	rute 20
Bergfrueveien	rute 20
Berggata 1, 3, 5	rute 38
Berggata 2, 4 - slutt	rute 67
Bergkollen	rute 51
Bergliveien	rute 20
Bergstien	rute 13
Berjmannsveien	rute 51
Beryllveien	rute 57
Bevøveien	rute 52
Bilettveien	rute 23
Bings gate	rute 38
Biveien	rute 50
Bjarne Aas gate	rute 38
Bjerkelundsveien 2 - 77	rute 4
Bjerkelundsveien 79	rute 7
Bjerkestien	rute 10
Bjølstadveien 1 - 11	rute 56
Bjølstadveien 13 - slutt	rute 10
Bjørndalsveien	rute 30
Bjørnebyveien	rute 12
Bjørnefjellet	rute 64
Bjørnerød	rute 45
Bjørnevågveien	rute 11
Bjørningstadveien	rute 33
Bjørnstjerne Bjørnsons vei	rute 33
Blekedamsveien	rute 8
Blomsterberget	rute 10
Blomsterveien	rute 43
Blåbærstien	rute 10
Blåklokkeveien	rute 23
Blåveisveien	rute 54
Blåveisåsen	rute 55
Bokfinkveien	rute 4
Bordhusveien	rute 24
Borgarhallveien	rute 25
Borgarveien	rute 41
Borgeveien 1 - 44	rute 24
Borgeveien 37 - 74	rute 25
Borgeveien 101 - slutt	rute 46
Borggata	rute 40
Bossumdalen	rute 63
Bossumveien	rute 63
Bramers vei	rute 28
Bratliveien	rute 31
Bratthammeren	rute 65
Brattveien	rute 4
Bregneveien	rute 23
Breidablikk	rute 40
Brekkefaret	rute 5
Brekkekroken	rute 5
Brekkelia	rute 5
Brekkeskrenten	rute 5
Briggveien	rute 53
Brisingaveien	rute 46
Brochs gate	rute 39
Brogata	rute 40
Bronns gate	rute 67
Brostrøms vei	rute 50
Bruberggata	rute 42
Bruket	rute 3
Bruksgata	rute 58
Bruuns gate	rute 40
Bryggeriveien 1 - 17	rute 39
Bryggeriveien 30 - slutt	rute 34
Bryggeveien	rute 3
Brynjarsvei	rute 22
Brynjeveien	rute 46
Brønneløkkveien	rute 35
Brønnerødlia	rute 45
Brønnerødskogen	rute 45
Brønnerødveien	rute 45
Bråtenveien	rute 22
Bunterveien	rute 25
Bureveien	rute 61
Buskogen	rute 55
Buvikstranda	rute 48
Buvikåsen	rute 48
Bydalen allé	rute 34
Bydalsveien	rute 34
Bødkergaten	rute 66
Bøkveien	rute 54
Båthavnveien	rute 46
C	
C.F.Michelsens gate	rute 43
Carlheims vei	rute 37
Carsten Ankers gate	rute 42
Christianslund allé	rute 28
Cicignongata	rute 38
Citrintunet	rute 57
Claseveien	rute 65

2.1 Fredrikstad kommune paper/plastic (unable to find the plan for "restavfall" after 20min search on the website.)

Tømmeplan papir og plastemballasje 2014

Min rute er:

Din rute finner du i adresseregisteret

	TØMMING										
Rute	1	2	3	4	5	6		7	8	9	10	11
1	06-jan	03-feb	03-mar	31-mar	02-mai	02-jun		04-aug	01-sep	01-okt	29-okt	26-nov
2	07-jan	04-feb	04-mar	01-apr	05-mai	03-jun		05-aug	02-sep	02-okt	30-okt	27-nov
3	16-jan	13-feb	13-mar	10-apr	14-mai	13-jun		14-aug	11-sep	13-okt	10-nov	08-des
4	17-jan	14-feb	14-mar	11-apr	15-mai	16-jun		15-aug	12-sep	14-okt	11-nov	09-des
5	20-jan	17-feb	17-mar	14-apr	16-mai	17-jun		18-aug	15-sep	15-okt	12-nov	10-des
6	21-jan	18-feb	18-mar	15-apr	19-mai	18-jun		19-aug	16-sep	16-okt	13-nov	11-des
7	22-jan	19-feb	19-mar	16-apr	20-mai	19-jun		20-aug	17-sep	17-okt	14-nov	12-des
8	23-jan	20-feb	20-mar	22-apr	21-mai	20-jun		21-aug	18-sep	20-okt	17-nov	15-des
9	24-jan	21-feb	21-mar	23-apr	22-mai	23-jun		22-aug	19-sep	21-okt	18-nov	16-des
10	27-jan	24-feb	24-mar	24-apr	23-mai	24-jun		25-aug	22-sep	22-okt	19-nov	17-des
11	28-jan	25-feb	25-mar	25-apr	26-mai	25-jun		26-aug	23-sep	23-okt	20-nov	18-des
12	29-jan	26-feb	26-mar	28-apr	27-mai	26-jun		27-aug	24-sep	24-okt	21-nov	19-des
13	30-jan	27-feb	27-mar	29-apr	28-mai	27-jun		28-aug	25-sep	27-okt	24-nov	22-des
14	08-jan	05-feb	05-mar	02-apr	06-mai	04-jun		06-aug	03-sep	03-okt	31-okt	28-nov
15	09-jan	06-feb	06-mar	03-apr	07-mai	05-jun		07-aug	04-sep	06-okt	03-nov	01-des
16	10-jan	07-feb	07-mar	04-apr	08-mai	06-jun		08-aug	05-sep	07-okt	04-nov	02-des
17	13-jan	10-feb	10-mar	07-apr	09-mai	10-jun		11-aug	08-sep	08-okt	05-nov	03-des
18	14-jan	11-feb	11-mar	08-apr	12-mai	11-jun		12-aug	09-sep	09-okt	06-nov	04-des
19	15-jan	12-feb	12-mar	09-apr	13-mai	12-jun		13-aug	10-sep	10-okt	07-nov	05-des
20	17-jan	14-feb	14-mar	11-apr	15-mai	16-jun		15-aug	12-sep	14-okt	11-nov	09-des
21	20-jan	17-feb	17-mar	14-apr	16-mai	17-jun		18-aug	15-sep	15-okt	12-nov	10-des
22	21-jan	18-feb	18-mar	15-apr	19-mai	18-jun		19-aug	16-sep	16-okt	13-nov	11-des
23	22-jan	19-feb	19-mar	16-apr	20-mai	19-jun		20-aug	17-sep	17-okt	14-nov	12-des
24	08-jan	05-feb	05-mar	02-apr	06-mai	04-jun		06-aug	03-sep	03-okt	31-okt	28-nov
25	09-jan	06-feb	06-mar	03-apr	07-mai	05-jun		07-aug	04-sep	06-okt	03-nov	01-des
26	06-jan	03-feb	03-mar	31-mar	02-mai	02-jun		04-aug	01-sep	01-okt	29-okt	26-nov
27	07-jan	04-feb	04-mar	01-apr	05-mai	03-jun		05-aug	02-sep	02-okt	30-okt	27-nov
28	08-jan	05-feb	05-mar	02-apr	06-mai	04-jun		06-aug	03-sep	03-okt	31-okt	28-nov
29	09-jan	06-feb	06-mar	03-apr	07-mai	05-jun		07-aug	04-sep	06-okt	03-nov	01-des
30	10-jan	07-feb	07-mar	04-apr	08-mai	06-jun		08-aug	05-sep	07-okt	04-nov	02-des
31	13-jan	10-feb	10-mar	07-apr	09-mai	10-jun		11-aug	08-sep	08-okt	05-nov	03-des
32	14-jan	11-feb	11-mar	08-apr	12-mai	11-jun		12-aug	09-sep	09-okt	06-nov	04-des
33	15-jan	12-feb	12-mar	09-apr	13-mai	12-jun		13-aug	10-sep	10-okt	07-nov	05-des
34	16-jan	13-feb	13-mar	10-apr	14-mai	13-jun		14-aug	11-sep	13-okt	10-nov	08-des

Ingen tømming i juli

Det utplasseres papircontainere på utvalgte steder i perioden 7. juli – 1. august. Se side 11.

MOVAR | VANN og AVLØP | RENOVASJON | BRANN

Du er her: RENOVASJON / Husholdningsrenovasjon / Tømmekalender

- Husholdningsrenovasjon
  - Henvendelser
    - Ofte stilte spørsmål
  - Generell sorteringsveiledning
  - Renovasjonsforskrifter
  - Renovasjonsgebyrer
    - Moss kommune
    - Rygge kommune
    - Råde kommune
    - Vestby kommune
    - Våler kommune
  - Renovasjonssystem
    - Moss kommune
    - Rygge kommune
    - Råde kommune
    - Vestby kommune
    - Våler kommune
  - Tømmekalender
  - Avfallsbeholdere - type og størrelser
  - Sommerrenovasjon
  - Hjemmekompostering
  - Returpunkter
  - Klær og sko
  - Sekker til plastemballasje
  - Blå ekstrasekk
  - Slamtømming
  - Linker
- Solgård Avfallsplass
- Vestby Gjenbruksstasjon

Tømmekalender

MOSS

Abonnenter i Moss skal ved spørsmål vedr. tømmekalender henvende seg til MOVAR eller benytte Moss kommune sin tømmekalender på nett.

RYGGE

Abonnenter i Rygge skal ved spørsmål vedr. tømmekalender henvende seg til MOVAR

RÅDE

Kildesorteringsbeholderen med blått lokk (papp/ papir, drikkekartonger og plast) tømmes FREDAG følgende uker:

Mandagsrute (abonnenter som har tømming av restavfall på mandager)

Uke 2 – 6 – 10 – 14 – 18 – 22 – 26 – 30 – 34 – 38 – 42 – 46 – 50

Tirsdagsrute (abonnenter som har tømming av restavfall på tirsdager)

Uke 3 – 7 – 11 – 15 – 19 – 23 – 27 – 31 – 35 – 39 – 43 – 47 – 51

Onsdagsrute (abonnenter som har tømming av restavfall på onsdager)

Uke 4 – 8 – 12 – 16 – 20 – 24 – 28 – 32 – 36 – 40 – 44 – 48 – 52

Torsdagsrute (abonnenter som har tømming av restavfall på torsdager)

Uke 1 – 5 – 9 – 13 – 17 – 21 – 25 – 29 – 33 – 37 – 41 – 45 – 49

VESTBY

Abonnenter i Vestby skal ved spørsmål vedr. tømmekalender henvende seg til MOVAR

VÅLER

Abonnenter i Våler skal ved spørsmål vedr. tømmekalender henvende seg til MOVAR

3.1 Movar renovation. Screensht from website January 2014.

Kunder med standardabonnement og henting kvar veke må sjå vekk frå partals- og oddetalsveker.
Bruk Ctrl + F for å søke etter gate- eller stadnamn på denne sida.

Rute 2 måndag, tøming i partalsveker
Andanesvegen - Bøen - Elvegata - Granheim - Hans Strømvegen - Haslevegen - Kleppevegen - Kusymrevegen - Lægdavegen - Lønnevegen - Markvegen - Mylnevegen - Myravegen - Naustvegen - Ottamarka - Ottasvingen - Prestegata - Ristevegen - Rotsetgeila - Rotsetvegen - Sagebakken -Sagvegen - Skrivarvegen - Steinbakken - Øvrelidvegen

Rute 2 tysdag, tøming i partalsveker
Follabygda - Fyrde (t.o.m. Ullaland) - Høydal - Håvik - Osdal - Sunndal

Rute 2 onsdag, tøming i partalsveker
Bregnevegen - Brenslene - Bøkevegen - Einebakken - Lindevegen - Lyngåsen - Mosevegen - Nytun - Røyslidvegen - Røysmyrvegen - Smalebakken - Symrevegen

Rute 2 fredag, tøming i partalsveker
Dalsbygd - Dravlaus - Folkestad til Mek - Steinsvik - Åmelfot

Rute 2 måndag, tøming i oddetalsveker
Bakketeigen - Doktorvegen - Ekornvegen - Engesetgeila - Eplehagen - Fedentunet - Fjellvegen - Gamle Engesetvegen - Gamletunvegen - Gamlevegen - Hauane - Kapteinsvegen - Kleppesjøvegen - Klokkarvegen - Korsavegen - Martavegen - Nesavegen - Ragnvaldmarka - Rognelida - Seljebakken - Sevrinhaugen - Smithsgate - Vikenesvegen - Øvrevegen

Rute 2 tysdag, tøming i oddetalsveker
Bjørkedal - Bjørneset - Fylsvik - Kalvatn - Kile - Straumshamn

Rute 2 onsdag, tøming i oddetalsveker
Bakkevegen - Berknes - Bjørkelunden - Brauta - Egset - Eikrem - Furebakken - Granlida -Grendavegen - Grønbakken - Heltnebøen - Heltnevegen - Hjellegjerdet - Koldå - Kvisla - Lerkvegen - Lisjenakkvegen - Monsvegen - Nygardsvegen - Ospelida - Raudemyrvegen - Reset - Solhøgda - Sollida - Steingardsvegen - Storsteinvegen - Uravegen

Rute 2 fredag, tøming i oddetalsveker
Lauvstad - Velsvik

Rute 3 måndag, tøming i partalsveker
Anders Vassbotnvegen - Elvegata - Engesetvegen - Halkjelsgata - Hamnegata - Industrigata - Kvennavegen - Kylnevegen - Kyrkjegata - Porsemyrvegen - Røysbakken - Røysgata - Røystunvegen - Rådhusgata - Skjervavegen - Skogane - Snarvegen - Snippa - Stormyra

Rute 3 torsdag, tøming i partalsveker
Bakkelida - Bakkelidvegen - Elvavegen - Fransvegen - Gamletufta - Gjerdsvegen - Hagen -Hjartåbygda - Hjellbakkane - Krikebøvegen - Linavegen - Midttun - Nylenda - Nymarkvegen - Osgarden - Smiebakken - Storhagen - Vikebygdvegen

Rute 3 måndag, tøming i oddetalsveker
Dr. Halkjelsvikvegen - Gymnasvegen - Kløvegen - Kløvertunvegen - Kårstadvegen - Legene - Norddalsvegen - Sjukehusvegen - Storgata - Teinene - Vevendelvegen - Øggardsvegen - Ørstavegen

Rute 3 torsdag, tøming i oddetalsveker
Bergshagen - Bjørnevegen - Bratteberg - Bøgardsvegen - Plassevegen - Nybråtet - Rasmusvegen -Uravegen - Vassbotnen - Vidjevegen - Vikebygda

FINN DIN hentedag:

1 Finn ut kva rute som dekkjer ditt område

2 Merk deg hentedagen og fargen på den ruta

3 På kalenderen kan du, ved hjelp av desse opplysningane, merke deg når du har henting

Når det gjeld høgtidsdagar, sjå vår heimeside www.vor.no, eller annonse i lokalavisa. Er du i tvil? Ring tlf 700 48 600

RUTE 1

Måndag - Ørsta
Norangsfjorden, Sæbø, Bondalen, Vatnebakk, Bjørdal, Vatne, Hovdenakk

Tysdag - Ørsta
Mosmarka, Øvre / Nedre Mo med Dalevegen, Engeset, Nupen, Engesetvegen, Gamlevegen, Langebakkane, Anders Hovdengata, Ripateigane, Holmegata, Parkvegen, Osoddane, Osøyrane, Osborg, Voldavegen, Osstranda

Onsdag - Ørsta
Standal, Barstadvik, Roth, Masdal, Nordre / Søre Vartdal til Rjånes

Torsdag - Ørsta
Mo (frå 60-sone), Brekke, Brungot, Follestaddalen, Åmdal, Melsbygda, Grimvegen, Hansholen, Eliholen, Andersholen, Osgeila, Osholane, Industrivegen, Sjøvegen, Sjømyrane, Ytrehovden

Fredag - Ørsta / Volda
Rystefeltet, Osmarka, Rystene, Indrehovdevegen, Hovdebygda, Håskjold, Ytrestøyl, Mork, Furene, Liaskar

Dei abonnentane som har tøming av restavfallsdunken kvar 14. dag, kan sjå i loket på dunken etter gul lapp med oversikt over hentedagar. **NB! Papirkalenderen gjeld sjølv om du ikkje har tøming av avfallsdunken i same veke.**

RUTE 2

Måndag - Volda
Øvre / Nedre Rotset, Andanesvegen, Engeset, Ragnvaldmarka, Øvre / Nedre Klepp, Ottamarka, Seljebakken, Doktorvegen, Smithsgate, Nesavegen, Hauane, Gamlevegen, Klokkarvegen

Tysdag - Volda
Austefjorden, Bjørke, Bjørneset, Bjørkedal, Straumshamn, Mek

Onsdag - Volda / Ørsta
Røysmyrvegen, Nytun, Lindevegen, Bøkevegen, Symrevegen, Røyslidvegen, Smalebakken, Einebakken, Bregnevegen, Mosevegen, Lyngåsen, Brenslene, Solhøgda, Granlida, Furebakken, Lerkevegen, Brauta, Koldå, Storsteinvegen, Raudemyrvegen, Grønbakken, Sollida, Monsvegen, Heltnebøen, Bakkevegen, Nygardsvegen, Egset, Reset, Kvisla, Hjellegerdet, Olaskogen, Eikrem, Berkneshalvøya, Digernes

Torsdag - Ørsta
Vinjevollvegen, Bøvegen, Bakkevegen, Garvargata, Sollia, Austlidvegen, Berte Kanuttevegen, Vikebøen, Vikegeila, Prestebrauta, Nedre Farkvamen, Øvre Farkvamen, Grepalivegen, Haraldsgata, Skogvegen, Håkonsgata, Liadal, Lianes, Lystad, Skorgeura, Hagen, Sætre-bakkane, Hagevegen, Strandgata

Fredag - Volda
Folkestad, Dalsfjord til og med Velsvik

RUTE 3

Måndag - Volda
Storgata, Kårstadvegen, Teinene, Legene, Dr. Halkjelsvikvegen, Kløvertunvegen, Sjukehusvegen, Gymnasvegen, Vevendelvegen, Ørstavegen, Klørivegen, Øggardsvegen, Nordalsvegen, Kvennavegen, Snarvegen, Porsemyrvegen, Skogane, Kylnevegen, Anders Vassbotnvegen, Elvegata, Røysbakken, Hamnegata, Halkjelsgata, Kyrkjegata, Industrigata, Rådhusgata, Snippa, Stormyra, Skjervavegen, deler av Engesetvegen, Røysgata, Vikenesvegen, Røystunvegen

Torsdag - Volda
Vikebygdvegen, Smiebakken, Linavegen, Midttun, Osgarden, Bakkelidvegen, Krikebøvegen, Bakkelida, Hagen, Storhagen, Nymarkvegen, Fransvegen, Elvavegen, Nylenda, Hjellbakkane, Gamletufta, Gjerdsvegen, Plassevegen, Uravegen, Bøgardsvegen, Bergshagen, Nybråtet, Bjørnevegen, Bratteberg, Vikebygda, Vassbotnen, Rasmusvegen, Vidjevegen, Hjartåbygda

Fredag - Ørsta
Håkonsgata, Vallabøvegen, Storebakken, Fonnavegen, Bjørkevegen, Lyngvegen, Porsevegen, Starevegen, Olavsgata, Lerkevegen, Rognevegen, Erlevegen, Svalevegen, Asalvegen, Stampevegen, Heggjadalen, Haugevegen, Haugegjerdet, Støylane, Støylevegen, Vallageila, Haslevegen, Webjørn Svendsengata, Ivar Aasengata, Vikegata, Kyrkjegata, Vikeøyrane, Anders Aarsætergata

For meir informasjon, sjå vår heimeside: www.vor.no

VOLDA OG ØRSTA REINHALDSVERK HAR FØLGJANDE ORDNINGAR:

Papp og papir: Innsamling i behaldar med blått lok jf. denne kalenderen eller gul lapp i dunken.

Restavfall: Innsamling i behaldar med grønt lok med henting kvar veke eller annankvar veke.

Plastemballasje: Innsamling i eigne sekkar som skal leggjast i papirdunken.
NB! Sekkar for innsamling av plastemballasje vert utlevert av VØR ein gong i året.

Glas- og metallemballasje: Kan leverast fritt i utplasserte behaldarar eller på Miljøstasjonen.
NB! Det må IKKJE leverast drikkeglas, keramikk, porselen eller eldfaste former i desse behaldarane.

Miljøfarleg avfall: Kan leverast fritt i container for farleg avfall eller på Miljøstasjonen.

Grovavfall: Kan leverast på Miljøstasjonen i Hovdebygda

Hageavfall: Private hageeigarar kan levere hageavfall fritt på Miljøstasjonen.

Heimekompostering: VØR tilbyr avtale om dette, der de ved å nytte ein isolert kompostbinge til matavfallet får lågare renovasjonsgebyr.

Gjenbruk: Kontakt NMS Gjenbruk Ørsta og Volda direkte om du har brukbare ting som andre kan ha nytte av.

EE-avfall: Alle elektriske og elektroniske produkt kan leverast fritt på Miljøstasjonen. Vi gjer merksam på at også alle forhandlarar av slike produkt har plikt til å ta i mot EE-avfall gratis.

NB! Vi minner om at bos- og papirdunkane skal stå framme frå kl. 06.00 på hentedag.

PAPIRHENTING 2014

Januar 2014

Veke	Man	Tirs	Ons	Tors	Fre	Laur	Søn
1			1	2	3	4	5
2	6	7	8	9	10	11	12
3	13	14	15	16	17	18	19
4	20	21	22	23	24	25	26
5	27	28	29	30	31		

Februar 2014

Veke	Man	Tirs	Ons	Tors	Fre	Laur	Søn
5						1	2
6	3	4	5	6	7	8	9
7	10	11	12	13	14	15	16
8	17	18	19	20	21	22	23
9	24	25	26	27	28		

Mars 2014

Veke	Man	Tirs	Ons	Tors	Fre	Laur	Søn
9						1	2
10	3	4	5	6	7	8	9
11	10	11	12	13	14	15	16
12	17	18	19	20	21	22	23
13	24	25	26	27	28	29	30
14	31						

April 2014

Veke	Man	Tirs	Ons	Tors	Fre	Laur	Søn
14		1	2	3	4	5	6
15	7	8	9	10	11	12	13
16	14	15	16	17	18	19	20
17	21	22	23	24	25	26	27
18	28	29	30				

Mai 2014

Veke	Man	Tirs	Ons	Tors	Fre	Laur	Søn
18				1	2	3	4
19	5	6	7	8	9	10	11
20	12	13	14	15	16	17	18
21	19	20	21	22	23	24	25
22	26	27	28	29	30	31	

Juni 2014

Veke	Man	Tirs	Ons	Tors	Fre	Laur	Søn
22							1
23	2	3	4	5	6	7	8
24	9	10	11	12	13	14	15
25	16	17	18	19	20	21	22
26	23	24	25	26	27	28	29
27	30						

Juli 2014

Veke	Man	Tirs	Ons	Tors	Fre	Laur	Søn
27		1	2	3	4	5	6
28	7	8	9	10	11	12	13
29	14	15	16	17	18	19	20
30	21	22	23	24	25	26	27
31	28	29	30	31			

August 2014

Veke	Man	Tirs	Ons	Tors	Fre	Laur	Søn
31					1	2	3
32	4	5	6	7	8	9	10
33	11	12	13	14	15	16	17
34	18	19	20	21	22	23	24
35	25	26	27	28	29	30	31

September 2014

Veke	Man	Tirs	Ons	Tors	Fre	Laur	Søn
36	1	2	3	4	5	6	7
37	8	9	10	11	12	13	14
38	15	16	17	18	19	20	21
39	22	23	24	25	26	27	28
40	29	30					

Oktober 2014

Veke	Man	Tirs	Ons	Tors	Fre	Laur	Søn
40			1	2	3	4	5
41	6	7	8	9	10	11	12
42	13	14	15	16	17	18	19
43	20	21	22	23	24	25	26
44	27	28	29	30	31		

November 2014

Veke	Man	Tirs	Ons	Tors	Fre	Laur	Søn
44						1	2
45	3	4	5	6	7	8	9
46	10	11	12	13	14	15	16
47	17	18	19	20	21	22	23
48	24	25	26	27	28	29	30

Desember 2014

Veke	Man	Tirs	Ons	Tors	Fre	Laur	Søn
49	1	2	3	4	5	6	7
50	8	9	10	11	12	13	14
51	15	16	17	18	19	20	21
52	22	23	24	25	26	27	28
1	29	30	31				

Sortert avfall gir verdi!

Opningstider Miljøstasjonen
Måndag til fredag: kl 08.00 - 15.30. Langope tysdag til kl 19.00
Laurdag ope frå kl 09.00 - 12.00 frå påske til midten av oktober (med unntak av juli månad)

Volda og Ørsta Reinhaldsverk IKS

Renovasjonens tømmedager i Stavanger kommune

Angi adressen du ønsker å finne tømmedagen for: håhammarbrautene

Din tømmedag er som vist nedenfor. Kortversjonen viser KUN endringer fra din faste tømmedag. Lenkene går til kort- og fullversjon av elektronisk kalender. Velg tømmekalender dersom du ønsker pdf-utgave.

Adresse	Tømmekalender/dag	Elektronisk kalender
Håhammarbrautene 22 A	Nr.2/Mandag	Fullversjon
Håhammarbrautene 20 B	Nr.2/Mandag	Fullversjon
Håhammarbrautene 44	Nr.2/Mandag	Fullversjon
Håhammarbrautene 32	Nr.2/Mandag	Fullversjon
Håhammarbrautene 52	Nr.2/Mandag	Fullversjon
Håhammarbrautene 64	Nr.2/Mandag	Fullversjon
Håhammarbrautene 117	Nr.2/Mandag	Fullversjon
Håhammarbrautene 100	Nr.2/Mandag	Fullversjon
Håhammarbrautene 112	Nr.2/Mandag	Fullversjon
Håhammarbrautene 118	Nr.2/Mandag	Fullversjon
Håhammarbrautene 12	Nr.2/Mandag	Fullversjon
Håhammarbrautene 46	Nr.2/Mandag	Fullversjon
Håhammarbrautene 48	Nr.2/Mandag	Fullversjon
Håhammarbrautene 38	Nr.2/Mandag	Fullversjon
Håhammarbrautene 106	Nr.2/Mandag	Fullversjon
Håhammarbrautene 9	Nr.2/Mandag	Fullversjon
Håhammarbrautene 56 A	Nr.2/Mandag	Fullversjon
Håhammarbrautene 54	Nr.2/Mandag	Fullversjon
Håhammarbrautene 56 B	Nr.2/Mandag	Fullversjon
Håhammarbrautene 93	Nr.2/Mandag	Fullversjon
Håhammarbrautene 68	Nr.2/Mandag	Fullversjon
Håhammarbrautene 36	Nr.2/Mandag	Fullversjon
Håhammarbrautene 50	Nr.2/Mandag	Fullversjon
Håhammarbrautene 3	Nr.2/Mandag	Fullversjon
Håhammarbrautene 72	Nr.2/Mandag	Fullversjon

Det er flere treff, benytt fullt gatenavn og husnummer for å snevre inn søket...

5.1 Stavanger kommune, Find correct route. Screenshot February 2014.

TØMMEKALENDER 1 2014

Tømming av de ulike dunkene foregår samme tømmedag. Symbolene på kalenderen forteller deg hvilken dunk som tømmes de ulike ukene.

Endrede tømmetider ved høytidsdager og bevegelige helligdager

Torsdag 02. januar:	Tømming av onsdagsrutene
Mandag 14. april:	Tømming av mandags- og tirsdagsrutene
Tirsdag 15. april:	Tømming av onsdags- og torsdagsrutene
Onsdag 16. april:	Tømming av fredagsrutene
Tirsdag 22. april:	Tømming av mandags- og tirsdagsrutene
Mandag 28. april:	Tømming av mandags- og tirsdagsrutene
Tirsdag 29. april:	Tømming av onsdags- og torsdagsrutene
Onsdag 30. april:	Tømming av fredagsrutene
Mandag 26. mai:	Tømming av mandags- og tirsdagsrutene
Tirsdag 27. mai:	Tømming av onsdags- og torsdagsrutene
Onsdag 28. mai:	Tømming av fredagsrutene
Tirsdag 10. juni:	Tømming av mandags- og tirsdagsrutene

JANUAR

U01	30 / Ma	
	31 / Ti	
	01 / On	
	02 / To	
	03 / Fr	
	04 / Lø	
	05 / Sø	
U 02	06 / Ma	
	07 / Ti	
	08 / On	
	09 / To	
	10 / Fr	
	11 / Lø	
	12 / Sø	
U 03	13 / Ma	
	14 / Ti	
	15 / On	
	16 / To	
	17 / Fr	
	18 / Lø	
	19 / Sø	
U 04	20 / Ma	
	21 / Ti	
	22 / On	
	23 / To	
	24 / Fr	
	25 / Lø	
	26 / Sø	
U 05	27 / Ma	
	28 / Ti	
	29 / On	
	30 / To	
	31 / Fr	

FEBRUAR

U 05	01 / Lø	
	02 / Sø	
U 06	03 / Ma	
	04 / Ti	
	05 / On	
	06 / To	
	07 / Fr	
	08 / Lø	
	09 / Sø	
U 07	10 / Ma	
	11 / Ti	
	12 / On	
	13 / To	
	14 / Fr	
	15 / Lø	
	16 / Sø	
U 08	17 / Ma	
	18 / Ti	
	19 / On	
	20 / To	
	21 / Fr	
	22 / Lø	
	23 / Sø	
U 09	24 / Ma	
	25 / Ti	
	26 / On	
	27 / To	
	28/ Fr	

MARS

U 09	01 / Lø	
	02 / Sø	
U 10	03 / Ma	
	04 / Ti	
	05 / On	
	06 / To	
	07 / Fr	
	08 / Lø	
	09 / Sø	
U 11	10 / Ma	
	11 / Ti	
	12 / On	
	13 / To	
	14 / Fr	
	15 / Lø	
	16 / Sø	
U 12	17 / Ma	
	18 / Ti	
	19 / On	
	20 / To	
	21 / Fr	
	22 / Lø	
	23 / Sø	
U 13	24 / Ma	
	25 / Ti	
	26 / On	
	27 / To	
	28 / Fr	
	29 / Lø	
	30 / Sø	
U 14	31 / Ma	

APRIL

U 14	01 / Ti	
	02 / On	
	03 / To	
	04 / Fr	
	05 / Lø	
	06 / Sø	
U 15	07 / Ma	
	08 / Ti	
	09 / On	
	10 / To	
	11 / Fr	
	12 / Lø	
	13 / Sø	
U 16	14 / Ma	
	15 / Ti	
	16 / On	
	17 / To	
	18 / Fr	
	19 / Lø	
	20 / Sø	
U 17	21 / Ma	
	22 / Ti	
	23 / On	
	24 / To	
	25 / Fr	
	26 / Lø	
	27 / Sø	
U 18	28 / Ma	
	29 / Ti	
	30 / On	

MAI

U 18	01 / To	
	02 / Fr	
	03 / Lø	
	04 / Sø	
U 19	05 / Ma	
	06 / Ti	
	07 / On	
	08 / To	
	09 / Fr	
	10 / Lø	
	11 / Sø	
U 20	12 / Ma	
	13 / Ti	
	14 / On	
	15 / To	
	16 / Fr	
	17 / Lø	
	18 / Sø	
U 21	19 / Ma	
	20 / Ti	
	21 / On	
	22 / To	
	23 / Fr	
	24 / Lø	
	25 / Sø	
U 22	26 / Ma	
	27 / Ti	
	28 / On	
	29 / To	
	30 / Fr	
	31 / Lø	

JUNI

U 22	01 / Sø	
U 23	02 / Ma	
	03 / Ti	
	04 / On	
	05 / To	
	06 / Fr	
	07 / Lø	
	08 / Sø	
U 24	09 / Ma	
	10 / Ti	
	11 / On	
	12 / To	
	13 / Fr	
	14 / Lø	
	15 / Sø	
U 25	16 / Ma	
	17 / Ti	
	18 / On	
	19 / To	
	20 / Fr	
	21 / Lø	
	22 / Sø	
U 26	23 / Ma	
	24 / Ti	
	25 / On	
	26 / To	
	27 / Fr	
	28 / Lø	
	29 / Sø	
U 27	30 / Ma	

BIOAVFALL
(matrester og hageavfall) kastes i brun dunk.

PAPIR OG PAPP
Væske-/drikkekartonger legges i egen pose før de kastes i den grønne dunken.

RESTAVFALL
(avfall det ikke finnes gjenvinningsordninger for) kastes i sort dunk.

JULETRÆR
Innsamling i uke 2.

SØNDAGSÅPNE GARASJER 27. APRIL
Arranger eget garasjesalg fra kl 12 til 16 eller legg søndagsturen til garasjer som kan være interessante. Se **www.apengarasje.no** for mer informasjon.

TØMMEKALENDER 1 2014

Tømming av de ulike dunkene foregår samme tømmedag. Symbolene på kalenderen forteller deg hvilken dunk som tømmes de ulike ukene.

Endrede tømmetider ved høytidsdager og bevegelige helligdager

Mandag 22. desember:	Tømming av mandags- og tirsdagsrutene
Tirsdag 23. desember	Tømming av onsdags- og torsdagsrutene
Onsdag 24. desember	Tømming av fredagsruten

JULI

U 27	01 / Ti	
	02 / On	
	03 / To	
	04 / Fr	
	05 / Lø	
	06 / Sø	
U 28	07 / Ma	
	08 / Ti	
	09 / On	
	10 / To	
	11 / Fr	
	12 / Lø	
	13 / Sø	
U 29	14 / Ma	
	15 / Ti	
	16 / On	
	17 / To	
	18 / Fr	
	19 / Lø	
	20 / Sø	
U 30	21 / Ma	
	22 / Ti	
	23 / On	
	24 / To	
	25 / Fr	
	26 / Lø	
	27 / Sø	
U 31	28 / Ma	
	29 / Ti	
	30 / On	
	31 / To	

AUGUST

U 31	01 / Fr	
	02 / Lø	
	03 / Sø	
U 32	04 / Ma	
	05 / Ti	
	06 / On	
	07 / To	
	08 / Fr	
	09 / Lø	
	10 / Sø	
U 33	11 / Ma	
	12 / Ti	
	13 / On	
	14 / To	
	15 / Fr	
	16 / Lø	
	17 / Sø	
U 34	18 / Ma	
	19 / Ti	
	20 / On	
	21 / To	
	22 / Fr	
	23 / Lø	
	24 / Sø	
U 35	25 / Ma	
	26 / Ti	
	27 / On	
	28 / To	
	29 / Fr	
	30 / Lø	
	31 / Sø	

SEPTEMBER

U 36	01 / Ma	
	02 / Ti	
	03 / On	
	04 / To	
	05 / Fr	
	06 / Lø	
	07 / Sø	
U 37	08 / Ma	
	09 / Ti	
	10 / On	
	11 / To	
	12 / Fr	
	13 / Lø	
	14 / Sø	
U 38	15 / Ma	
	16 / Ti	
	17 / On	
	18 / To	
	19 / Fr	
	20 / Lø	
	21 / Sø	
U 39	22 / Ma	
	23 / Ti	
	24 / On	
	25 / To	
	26 / Fr	
	27 / Lø	
	28 / Sø	
U 40	29 / Ma	
	30 / Ti	

OKTOBER

U 40	01 / On	
	02 / To	
	03 / Fr	
	04 / Lø	
	05 / Sø	
U 41	06 / Ma	
	07 / Ti	
	08 / On	
	09 / To	
	10 / Fr	
	11 / Lø	
	12 / Sø	
U 42	13 / Ma	
	14 / Ti	
	15 / On	
	16 / To	
	17 / Fr	
	18 / Lø	
	19 / Sø	
U 43	20 / Ma	
	21 / Ti	
	22 / On	
	23 / To	
	24 / Fr	
	25 / Lø	
	26 / Sø	
U 44	27 / Ma	
	28 / Ti	
	29 / On	
	30 / To	
	31 / Fr	

NOVEMBER

U 44	01 / Lø	
	02 / Sø	
U 45	03 / Ma	
	04 / Ti	
	05 / On	
	06 / To	
	07 / Fr	
	08 / Lø	
	09 / Sø	
U 46	10 / Ma	
	11 / Ti	
	12 / On	
	13 / To	
	14 / Fr	
	15 / Lø	
	16 / Sø	
U 47	17 / Ma	
	18 / Ti	
	19 / On	
	20 / To	
	21 / Fr	
	22 / Lø	
	23 / Sø	
U 48	24 / Ma	
	25 / Ti	
	26 / On	
	27 / To	
	28 / Fr	
	29 / Lø	
	30 / Sø	

DESEMBER

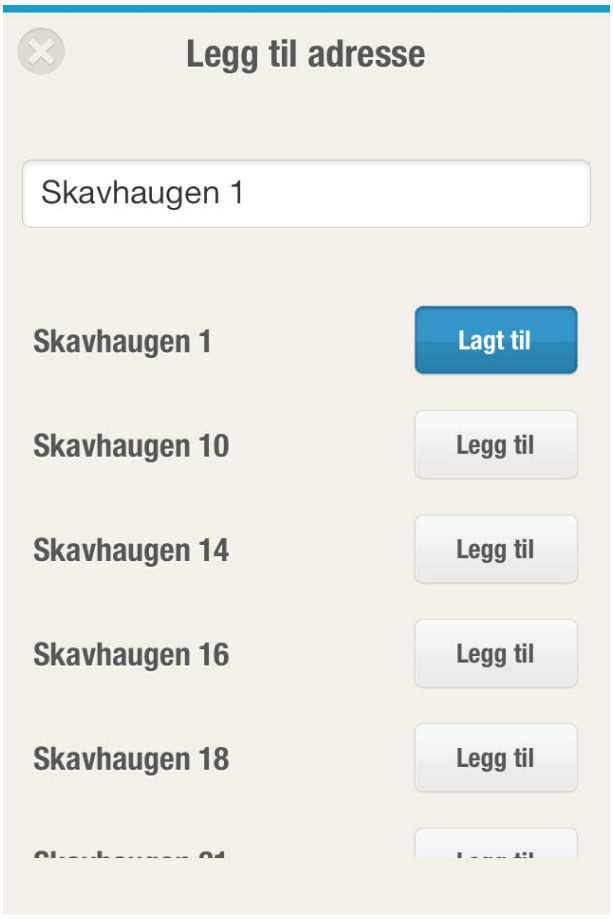
U 49	01 / Ma	
	02 / Ti	
	03 / On	
	04 / To	
	05 / Fr	
	06 / Lø	
	07 / Sø	
U 50	08 / Ma	
	09 / Ti	
	10 / On	
	11 / To	
	12 / Fr	
	13 / Lø	
	14 / Sø	
U 51	15 / Ma	
	16 / Ti	
	17 / On	
	18 / To	
	19 / Fr	
	20 / Lø	
	21 / Sø	
U 52	22 / Ma	
	23 / Ti	
	24 / On	
	25 / To	
	26 / Fr	
	27 / Lø	
	28 / Sø	
U 01	29 / Ma	
	30 / Ti	
	31 / On	

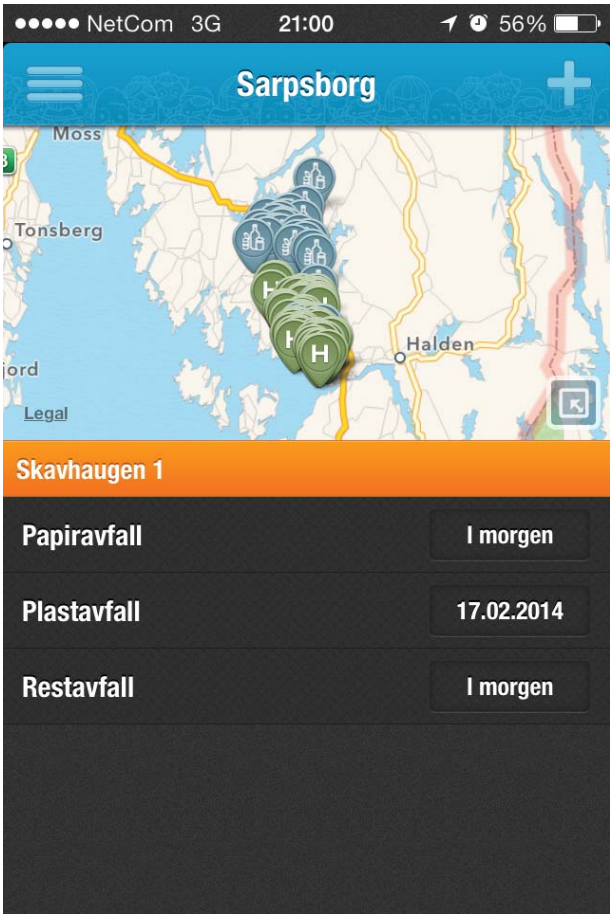
BIOAVFALL
(matrester og hageavfall) kastes i brun dunk.

PAPIR OG PAPP
Væske-/drikkekartonger legges i egen pose før de kastes i den grønne dunken.

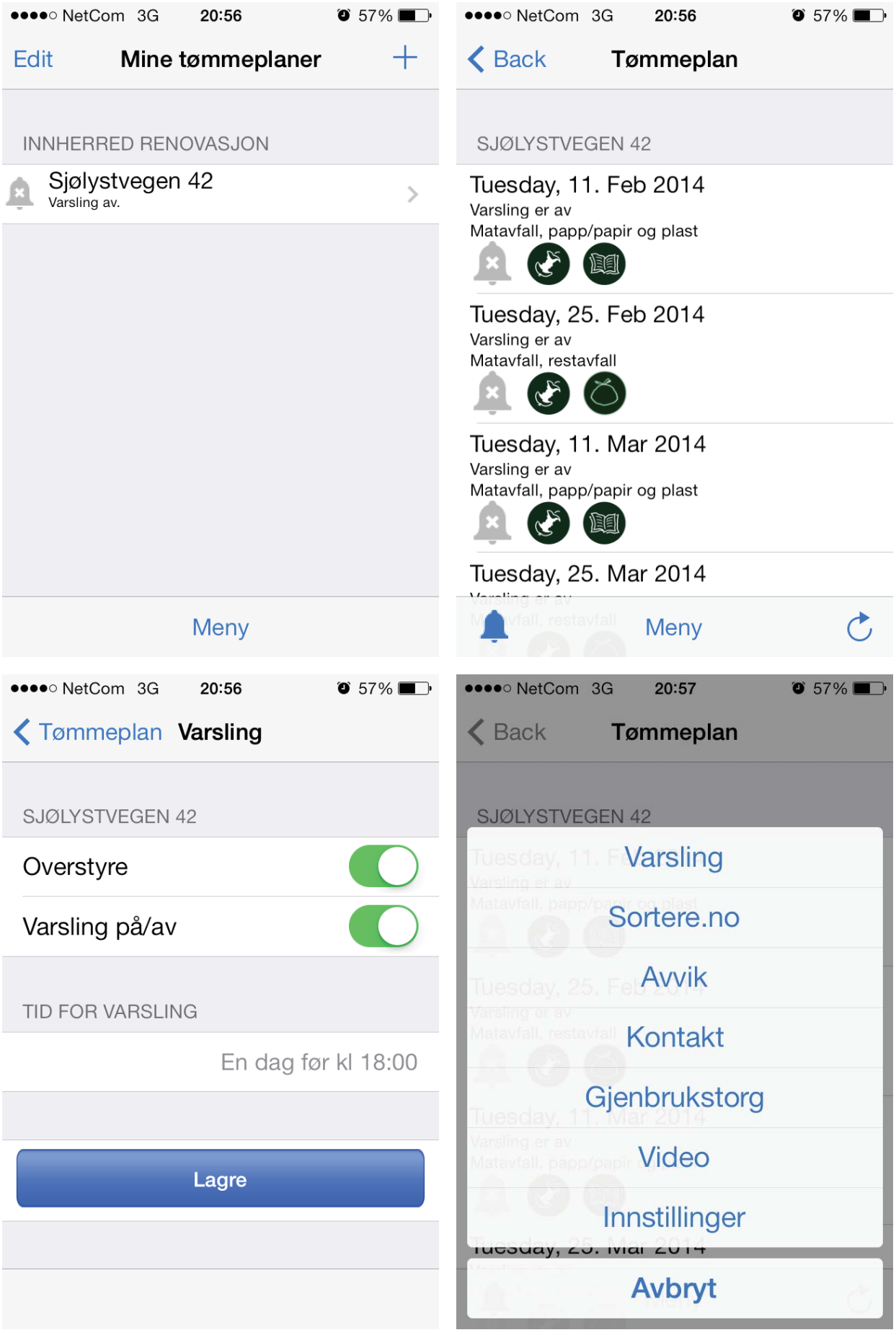
RESTAVFALL
(avfall det ikke finnes gjenvinningsordninger for) kastes i sort dunk.

6.1 Sarpsborg kommune webpage. Screenshot February 2014.





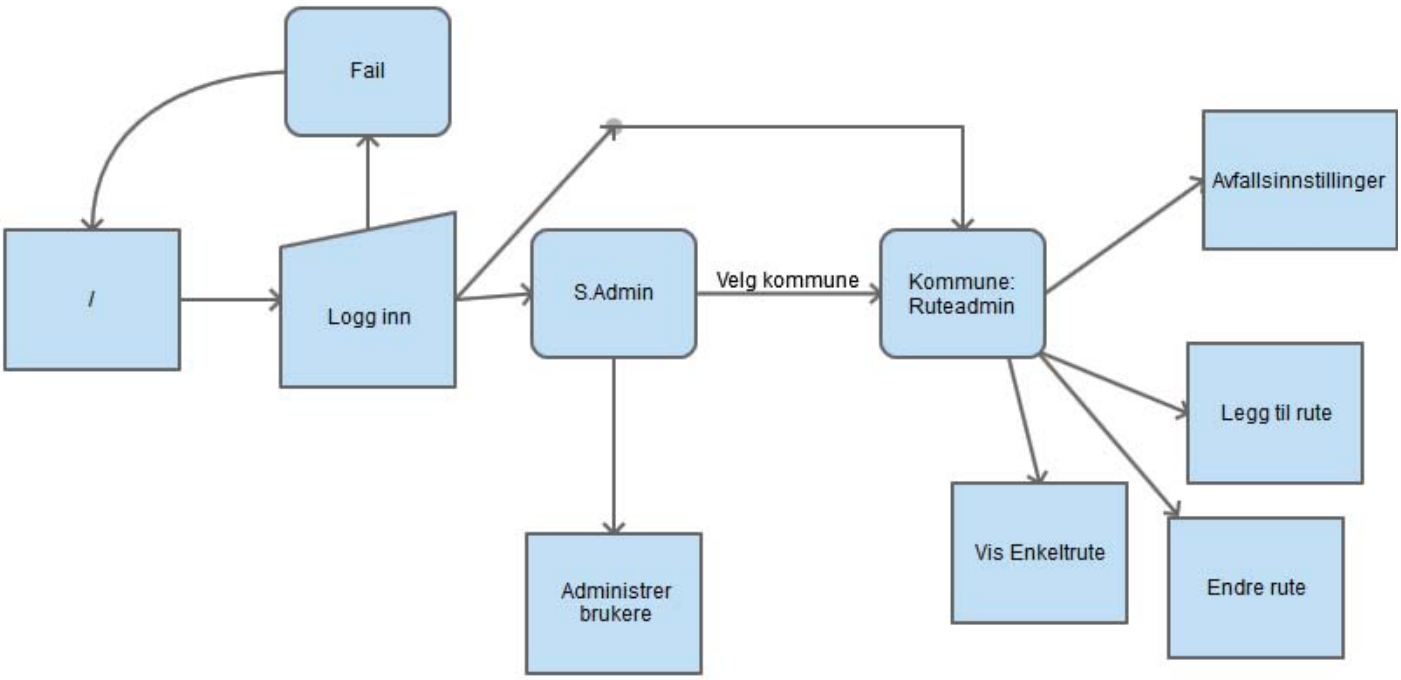
6.2 Sarpsborg kommune. Renovation app, screenshots.



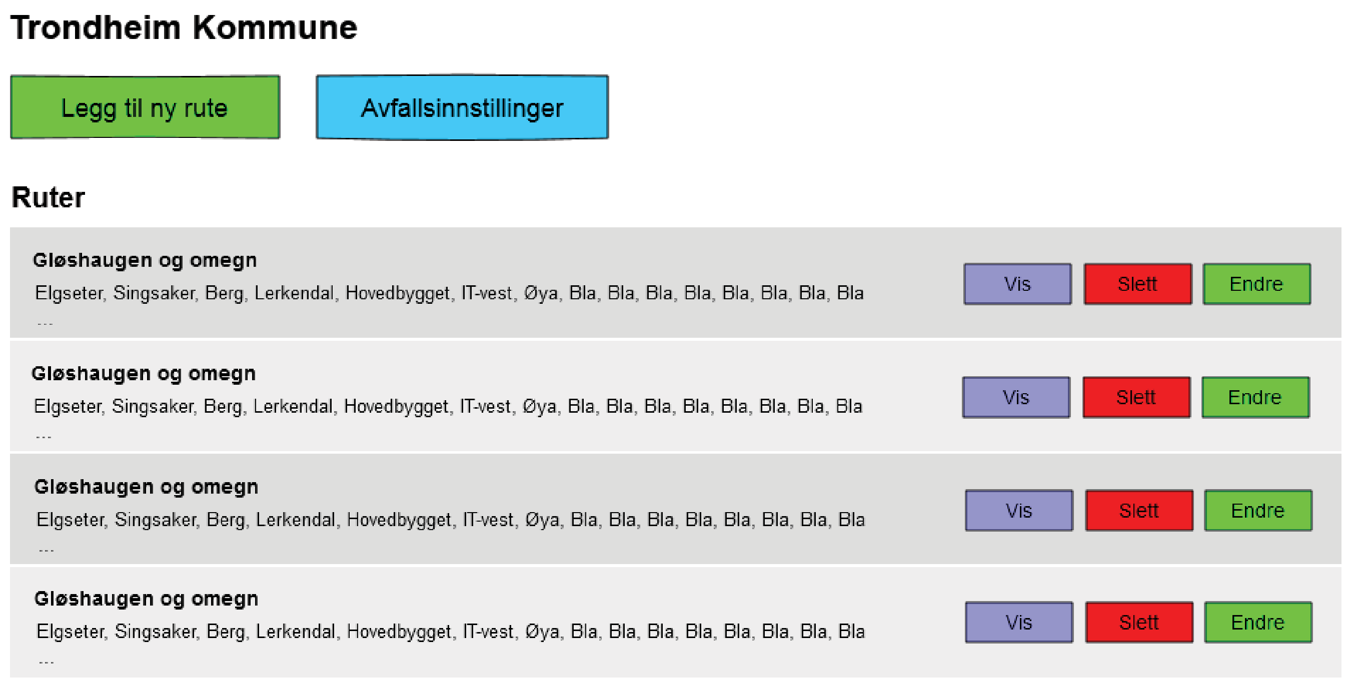
7.1 Innherred Renovation. App, screenshots.

Appendix B: GUI Design

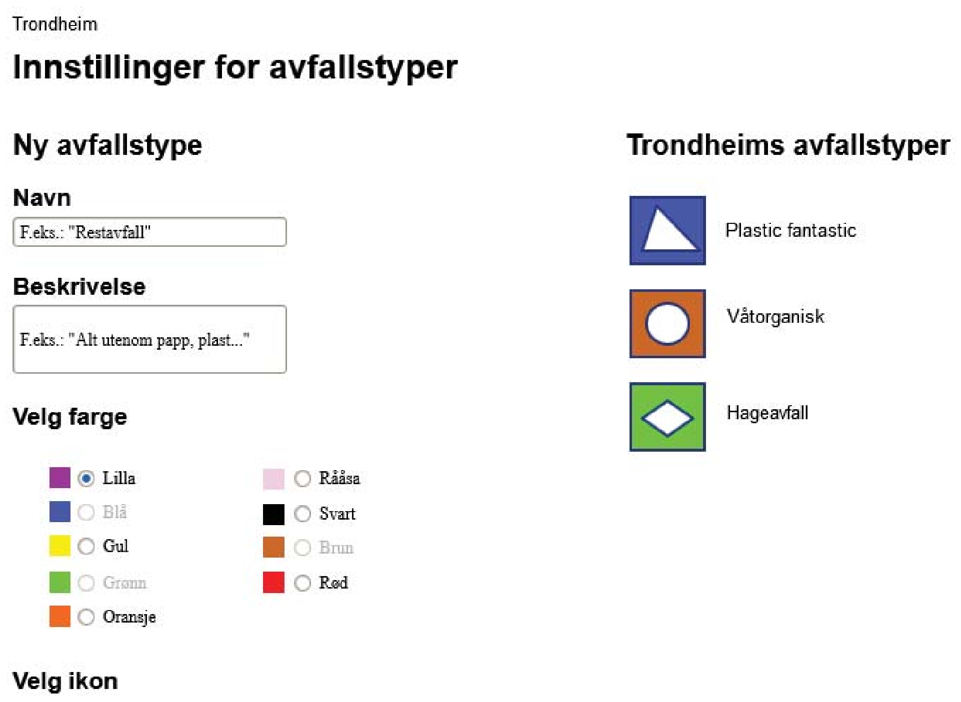
1 FIRST SET OF ADMIN-VIEW SKETCHES



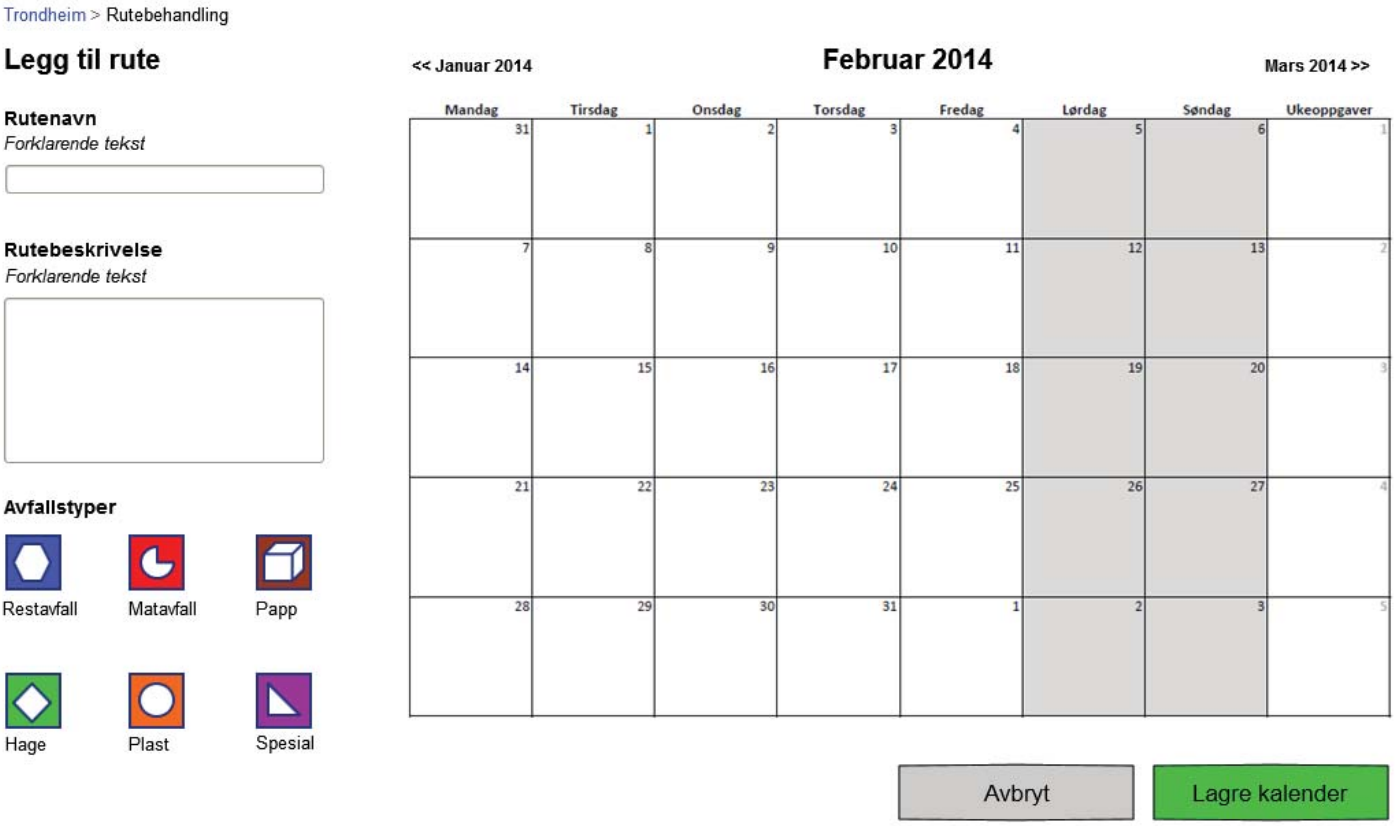
1.1 Flowchart showing how the GUI is connected.



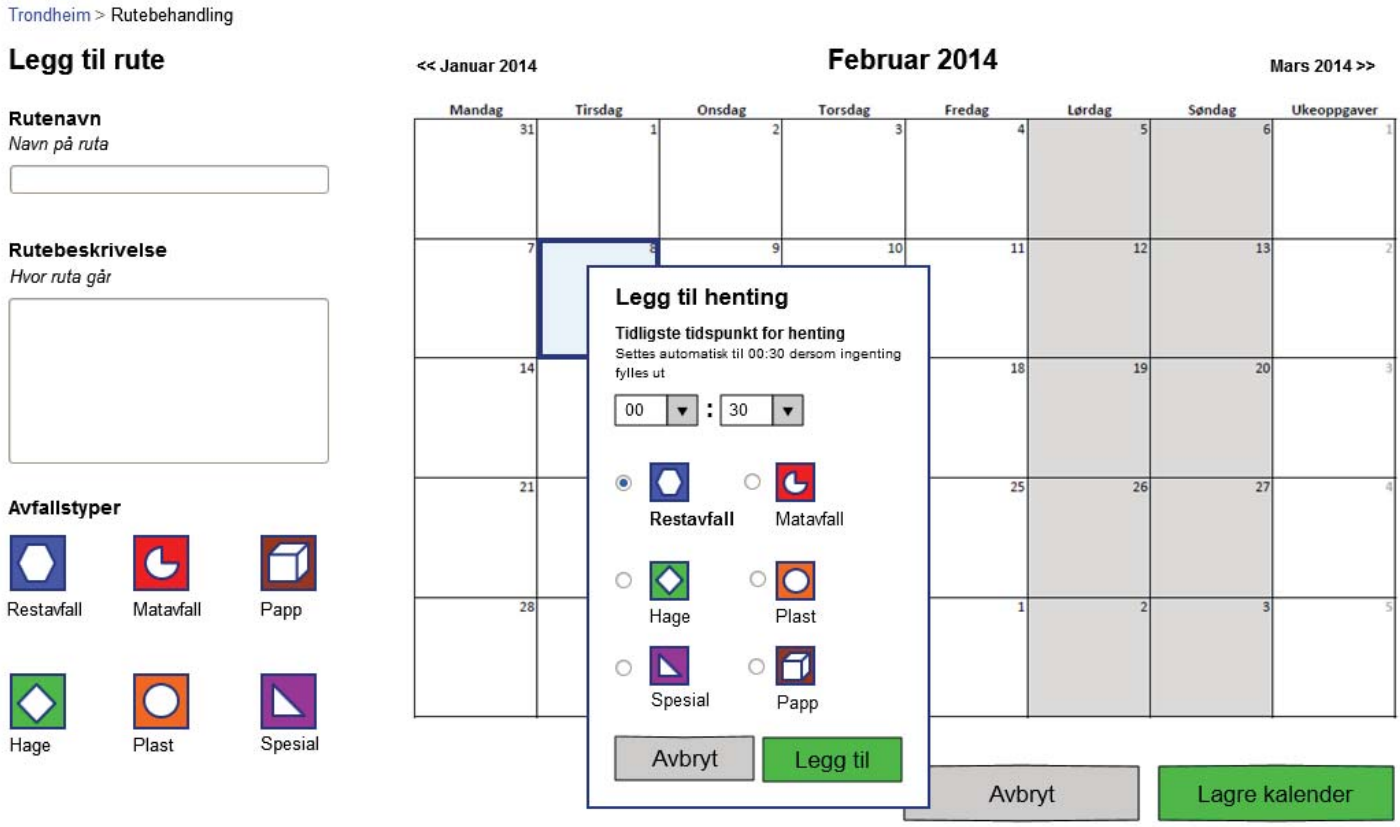
1.2 First view after logging in as a municipality



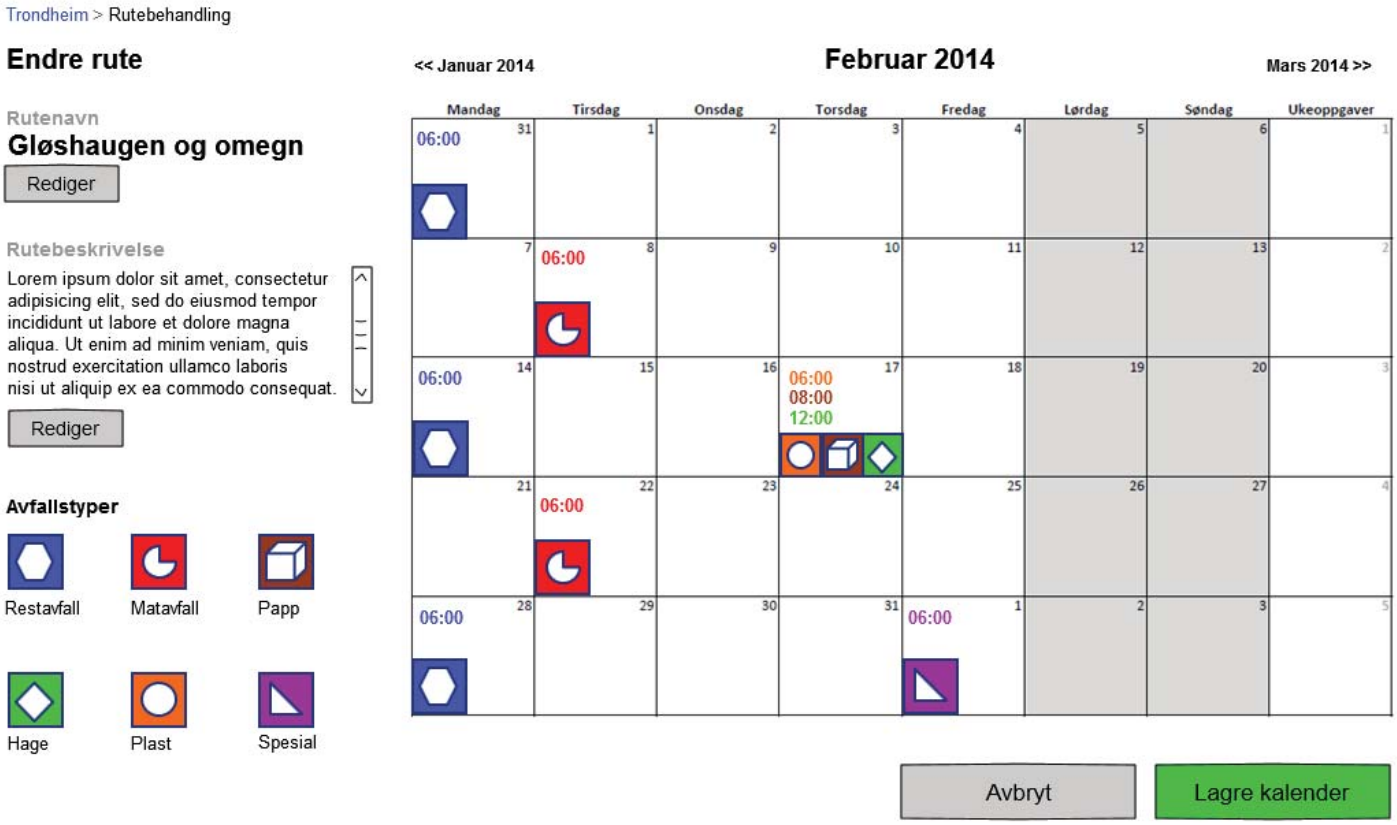
1.3 Waste type settings



1.4 Adding a new route

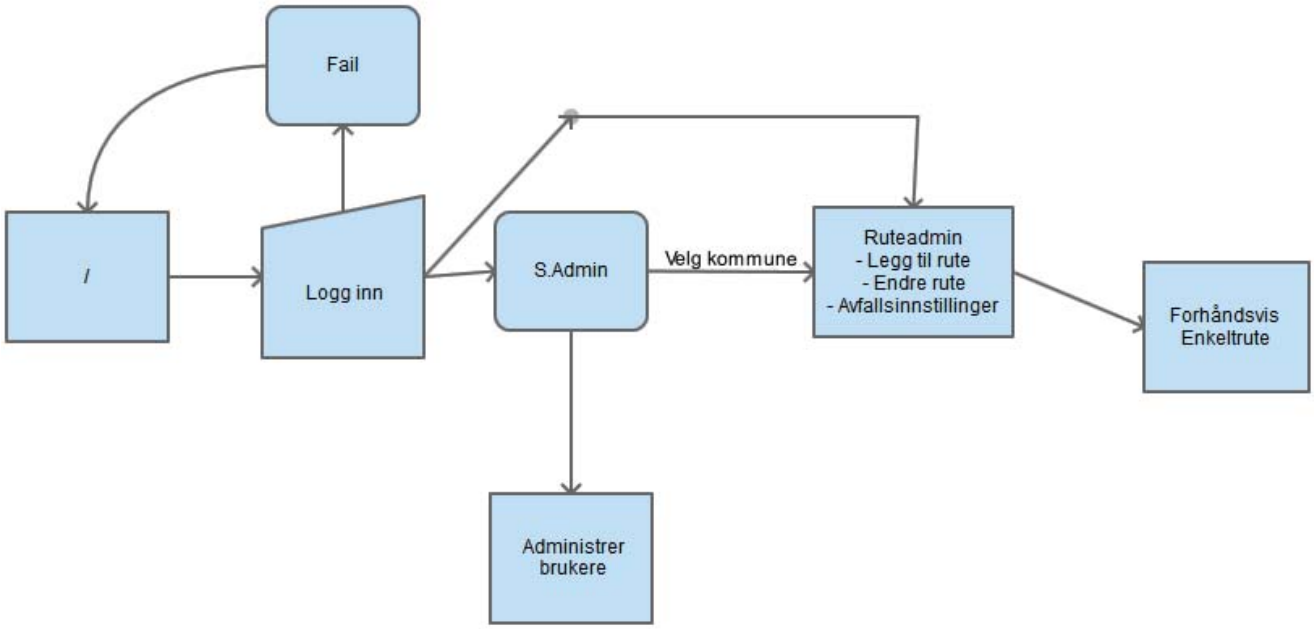


1.5 Adding a waste pick-up



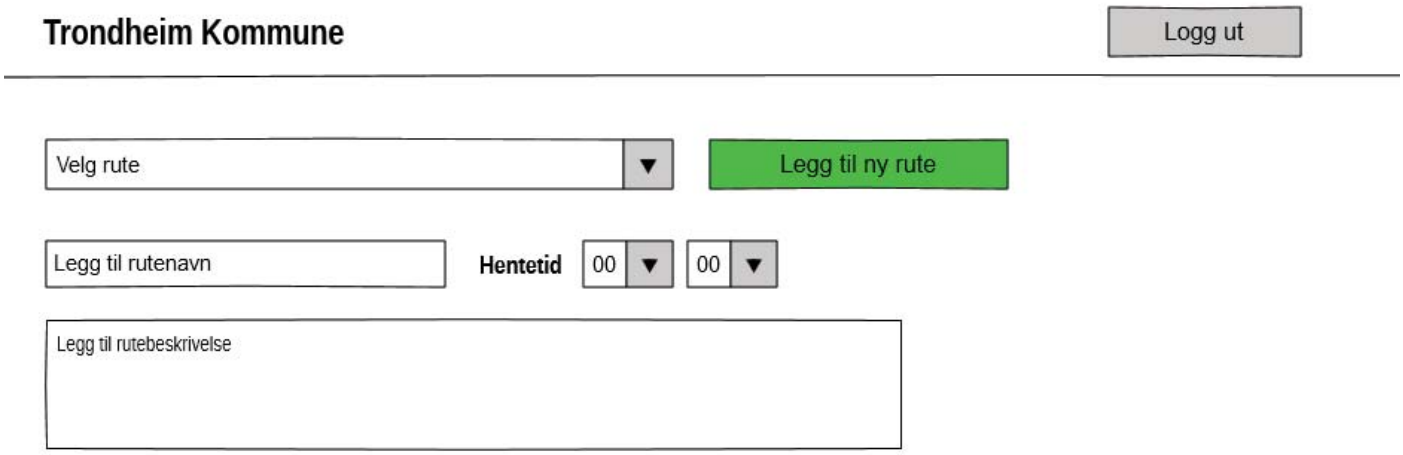
1.5 Editing an existing route.

2 SECOND SET OF ADMIN-VIEW SKETCHES

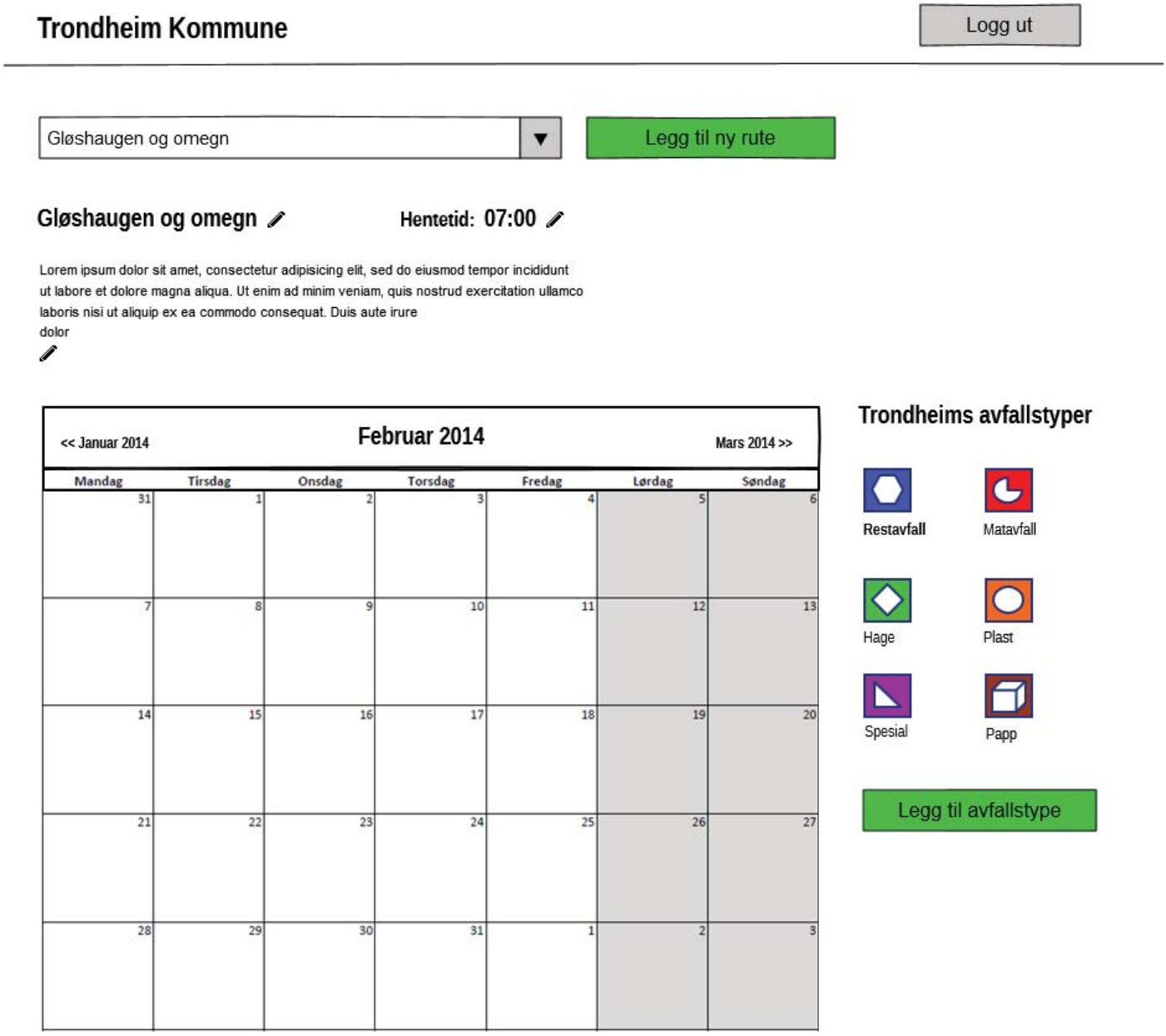


2.1 Flowchart showing how the GUI is connected.

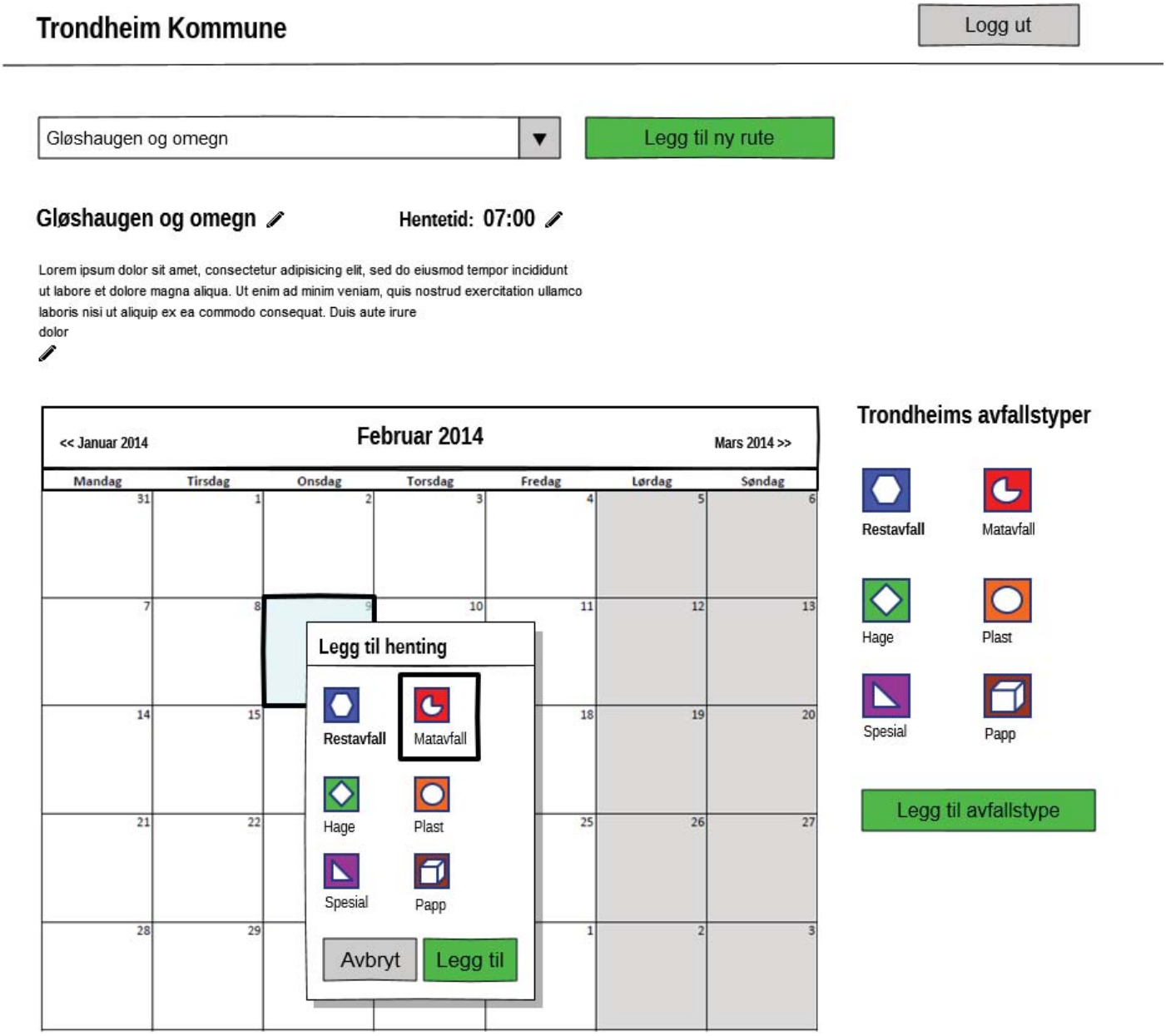
2.2 What the user sees when logged in as a municipality.



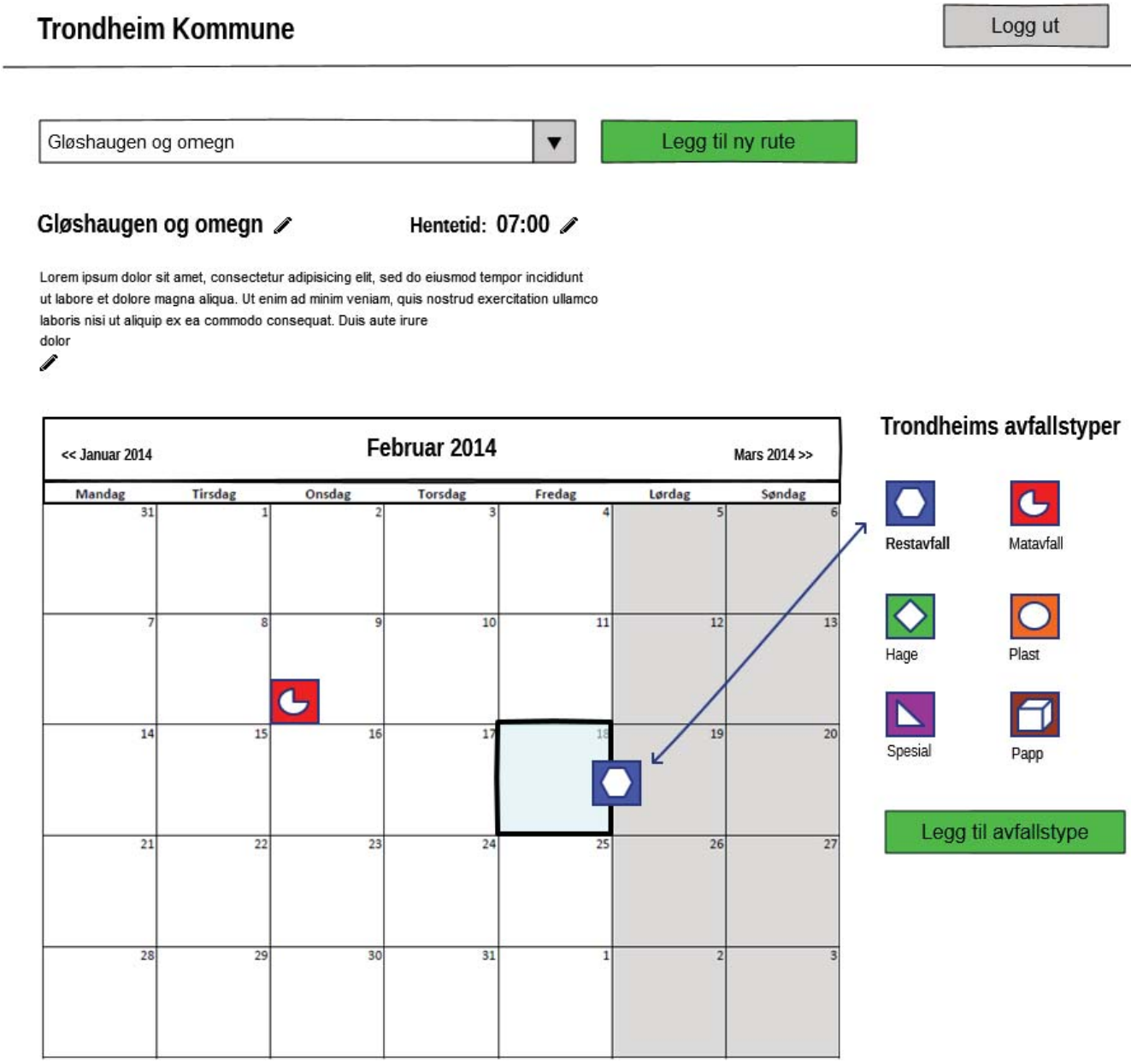
2.3 After pressing “Legg til ny rute”.



2.4 After filling in the name and description of the route.



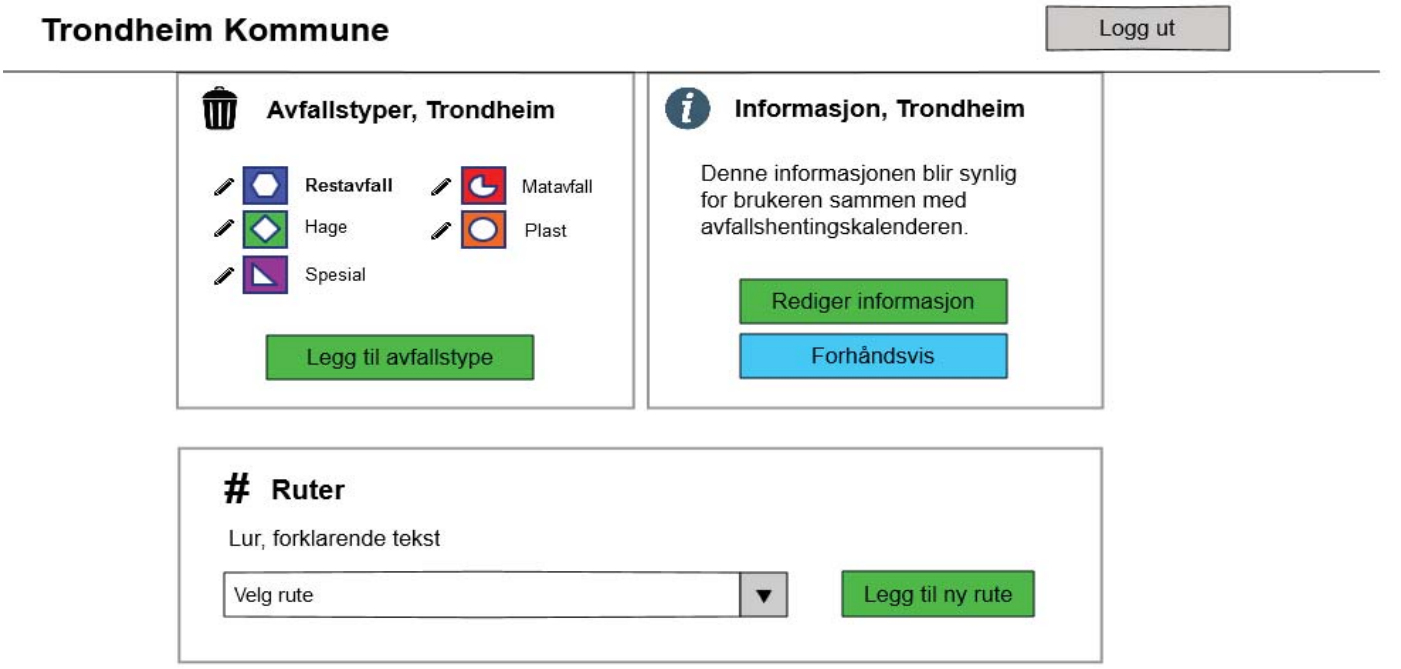
2.5 Adding waste pick-up by clicking on a day in the calendar.

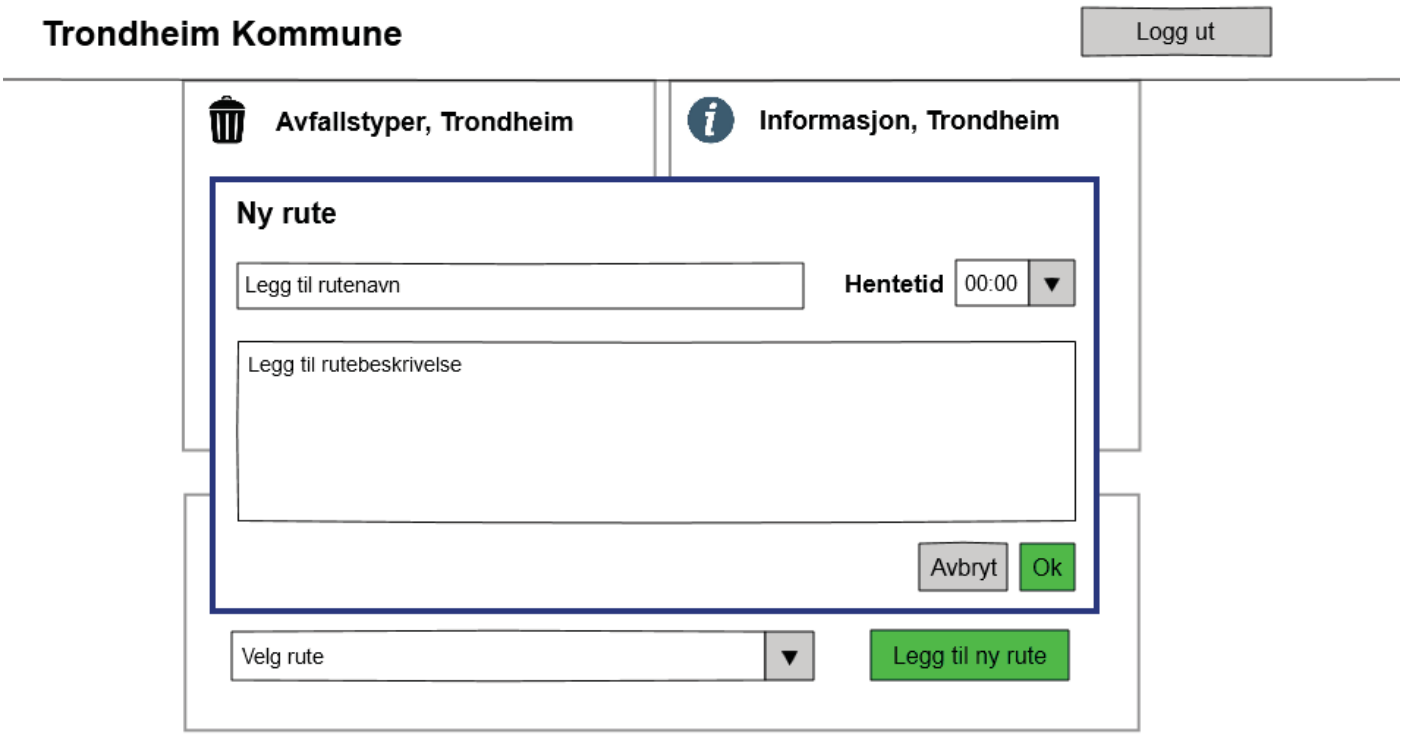


2.6 Adding waste pick-up by dragging and dropping icons.

Appendix C: GUI Design v.2

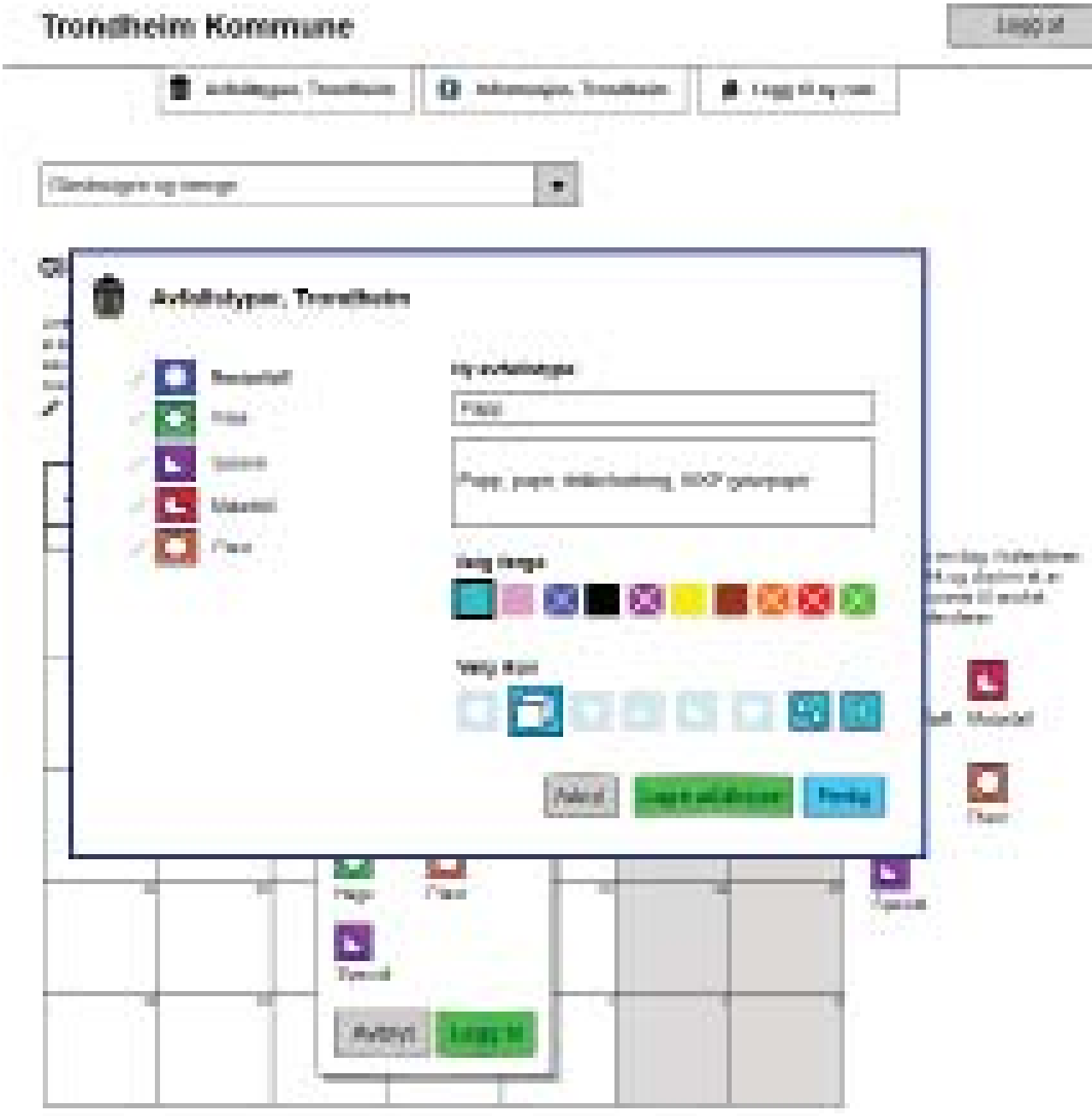
1 SECOND ITERATION OF ADMIN-VIEW SKETCHES

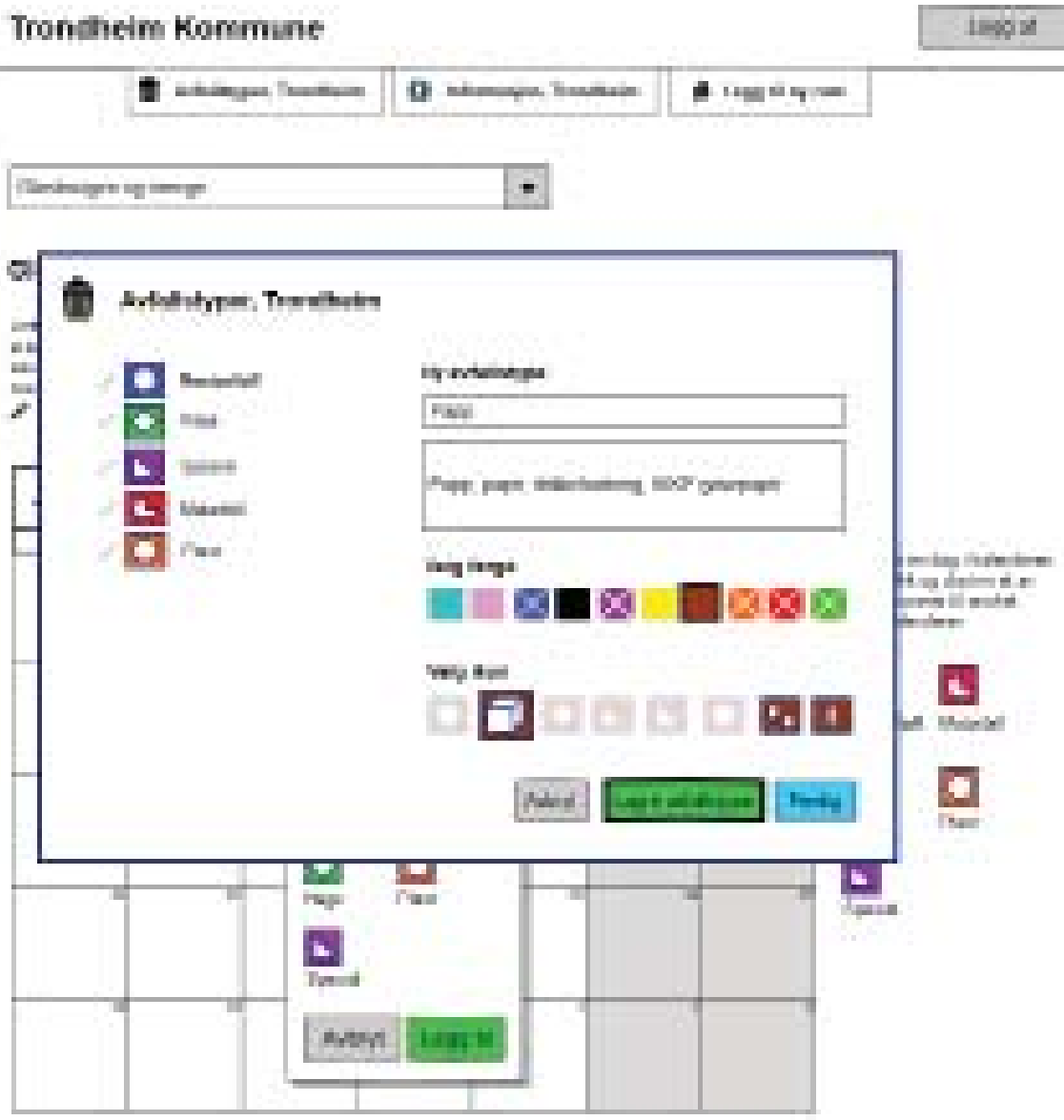


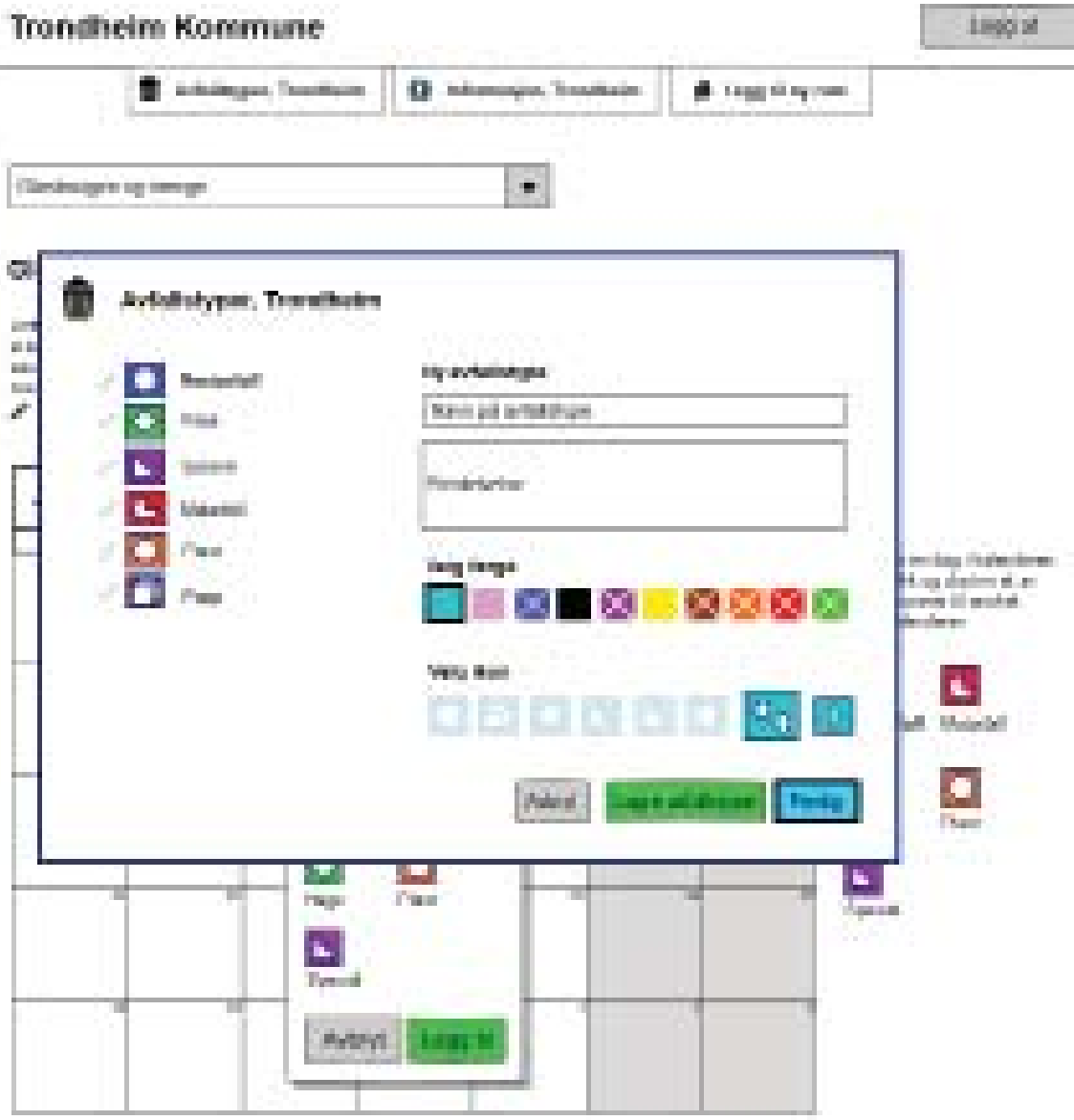



Trondheim Kommune
Glashaugen og omegn
Hentetid:
07:00
Februar 2014


Trondheim Kommune
Februar 2014
Legg til hendelse

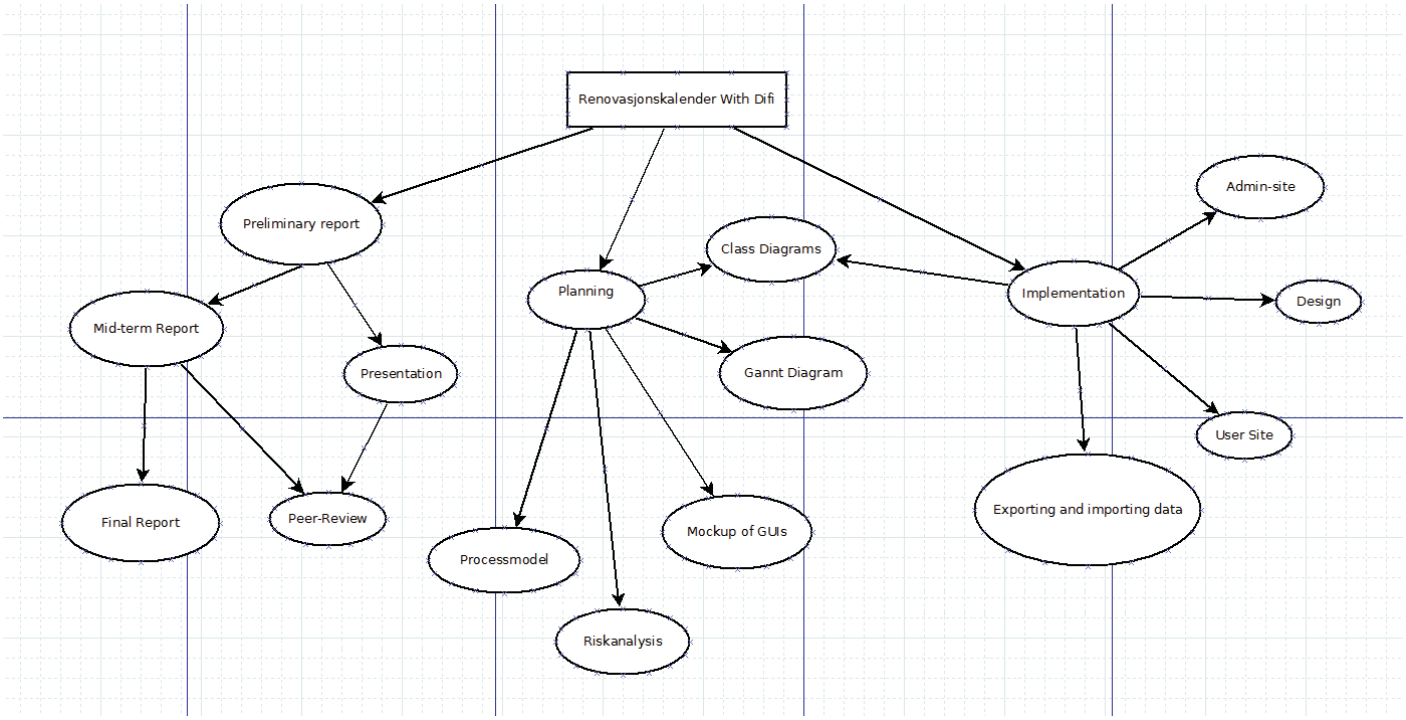

Trondheim Kommune
Avfallstyper, Trondheim


Trondheim Kommune
Avfallstyper, Trondheim
Ny avfallstype
Velg farge
Velg ikon


Trondheim Kommune
Logg ut
Avfallstyper, Trondheim
Ny avfallstype
Velg farge
Velg ikon
Avbryt
Lagre


Trondheim Kommune
Logg ut
Februar 2014

Appendix D: Work Break Down Schedule



Appendix E: System Architecture