

Market consultation

‘Optimisation waste collection Amsterdam’

Uncertified English translation.

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1 Market consultation

1.1 Subject and objectives

The subject of this market consultation is an envisaged capital expenditure of the City of Amsterdam in:

'Optimisation of the waste collection'

The objective of this capital expenditure is to realise efficiency improvements in emptying waste containers through the implementation of an integrated solution which provides dynamic transport planning, dynamic planning of routing and a fill level detection and signalling system for waste containers.

With this market consultation the City of Amsterdam explores the possibilities suppliers have on offer. Therefore, this market consultations seeks answers to the following questions:

- Are suppliers interested in and have suppliers possibilities to (partially or wholly) execute and realise the demands related to the described project?
- Are standard software solutions available that meet the desired functionality?
- Are there, besides standard products, alternative solutions and services available that meet the demands?
- Are there standard technical systems available meet the desired functionality?
- Is the commission feasible?
- Is the desired functionality feasible for suppliers to deliver?
- Is it possible to achieve improvement in quality of service and in addition to this to achieve improvement of efficiency?
- What will be approximately spent on CAPEX and OPEX?
- What do suppliers advise regarding to the implementation and exploitation of the desired solution?

Amsterdam invites interested suppliers to respond to this market consultation. The City of Amsterdam is interested in the latest developments including (standard) software solutions and (technical) systems that provide the desired functionalities to optimise the waste collection activities and its practices.

In order to process the market consultation effectively the City of Amsterdam invites interested suppliers to use the added registration form for your request of participation .

ATTENTION: Only answer the questions in chapter 4 if you are selected for participation in the market consultation. For more information about selection see section 1.4.3.

1.2 Reader's guide

The next sections of this chapter describes planning, communication and conditions and procedures of this market consultation.

Chapter 2 of this document describes the administrative context of the envisaged capital expenditure.

Chapter 3 contains, from an operational perspective, a detailed description of the present and desired situation. In the attachments you will find additional information about the present situation.

Chapter 4 contains the questions of the City of Amsterdam to the suppliers. The asked questions invite you to give concrete information about your products and services, your vision or your advice

1.3 Conditions for participation

1.3.1 Communication

All communication regarding to this market consultation should proceed via Mr. C.A. Steenbergen of the City of Amsterdam. You can communicate with messages via the online tender platform TenderNed or via e-mail: ICTMarktverkenningen@amsterdam.nl

Note: Please mention in the subject line of the e-mail header: 'Optimisation waste collection'.

If you need additional information about this document or about this market consultation then the City of Amsterdam prefers to receive an e-mail with your questions.. You can send your questions to aforementioned contact.

The languages of the market consultation are Dutch, English or German, although Dutch is preferred.

Note: Het market consultation document is only available in Dutch and English.

1.3.2 Confidentiality and conditions

By participating in this market consultation suppliers agree with the terms and conditions specified in this document.

Participating in this market consultation does not incur any costs for the City of Amsterdam.

This English translation is uncertified and made on the basis of best effort. The Dutch version prevails. Some information is Dutch only.

Participating supplier in this market consultation is aware that participating puts a claim on resources of its organisation. This includes human resources and / or company and product information. The City of Amsterdam assumes that senior management of the participating organisation agrees by participating in this procedure.

The City of Amsterdam handles the response of suppliers with confidentiality. Given information only will be shown to employees and consultants of the City of Amsterdam who are directly involved in the market consultation and / or subsequent tender(s). This unless the City of Amsterdam is held on the basis of legal provisions or court rulings to a certain extent of disclosure.

Your submitted ideas and information can be used by the City of Amsterdam in (the preparation of) any subsequent projects.

This market consultation and this document can not be considered as an invitation to tender for any (EU) tender or any other request for proposal for which this market consultation serves as preparation.

Participating suppliers cannot derive any rights by participating in this market consultation. The City of Amsterdam reserves the right to change the planning or temporarily or permanently cease the trajectory of this market consultation.

1.4 Procedure

1.4.1 Planning

1	Announcement of market consultation on TenderNed and Tenders Electronic Daily (TED) and publishing the market consultation document on TenderNed.	15 February 2017
2	Deadline: registration by suppliers to participate	9 March 2017
3	Announcement by City of Amsterdam of selection of participants in the written stage of the market consultation	13 March 2017
4	Written phase market consultation: Response to questions by selected suppliers	6 April 2017
5	Announcement by City of Amsterdam of selection of participants in the oral stage of the market consultation	20 April 2017
6	Oral stage market consultation: Explanatory interviews with selected suppliers	24 April 2017 – 8 May 2017
7	Completion market consultation	approx. mid-May 2017

1.4.2 Approach to suppliers

With publication of a prior information notice on TenderNed and Tenders Electronic Daily the City of Amsterdam has made a broad appeal to the supply market.

The City of Amsterdam seeks contact with suppliers in the following categories:

- a) Suppliers of dynamic transport planning applications systems;
- b) Suppliers of dynamic route planning applications and navigation systems;
- c) Suppliers of IT solutions for logistics and transport industry;
- d) Suppliers of IoT technology and in particular of wireless fill level measurement systems for waste containers;
- e) Suppliers of expertise in the field of optimisation of logistical processes and transport planning and route planning;
- f) Suppliers of expertise in the field of systems integration;
- g) Other suppliers of relevant solutions.

The City of Amsterdam takes into account that objectives of the optimisation of waste collection possibly only can be realized by integrating products and services from multiple manufacturers or suppliers. The City of Amsterdam explicitly also invites suppliers who provide partial solutions.

The City of Amsterdam wants to do justice to the importance of SMEs. For this market consultation the City of Amsterdam also invites enterprises that meet the definition of SMEs of MKB Nederland. For more information see the following web page:

<http://www.mkb servicedesk.nl/569/informatie-over-midden-kleinbedrijf-nederland.htm>

Alternatively, you can use the European Commission's recommendation of 6 May 2003 concerning the definition of small, medium and micro enterprises. For more information see the following web page:

<http://eur-lex.europa.eu/legal-content/NL/ALL/?uri=CELEX:32003H0361&qid=1484208282237>

1.4.3 Registration and motivation for participation

Suppliers can apply for participating in this market consultation by filling in the added request-for-participation form, and sending this to the contact person mentioned in section 1.3.1. The City of Amsterdam asks you to provide your request for participation with a briefly worded motivation. This can be done in form of a letter, in your own format. The following should be addressed in your motivation:

- a) Category(ies) to which your company belongs as described in section 1.4.2;
- b) Your motivation why your organization can be of value in this market consultation and the envisaged capital expenditure in optimisation of waste collection;
- c) If possible, a list of recent implementations or references with similar contracts / projects with a short description.

ATTENTION: Only answer the questions in chapter 4 if you are selected for participation in the market consultation!

1.4.4 Selection of participants

Of all requests for participation 10 to 14 suppliers will be selected for participation in the written stage of the market consultation. Of these participants about 5 to 7 parties are selected to give an oral explanation. Aforementioned procedure is carried out in this way because of efficient use of time and resources of the City of Amsterdam as well as the participating suppliers. Furthermore, the City of Amsterdam can change the number of parties to consult on the basis of new insights or if the requests for participation do so require.

The criteria to be invited to the written stage of the market consultation are:

- a) The extent to which the product and service portfolio matches the envisaged capital expenditure;
- b) The extent to which expertise and experience in implementing and maintaining the solutions matches the envisaged capital expenditure;
- c) The motivation accompanying the request for participation contains surprising and innovative proposals.

Whether or not to be invited by the City of Amsterdam to participate in the written or oral stage of this market consultation makes no qualitative judgment about the knowledge and / or experience of the affected supplier. Also whether or not to be invited to participate in the written or oral stage of the market consultation does not give preference of the City of Amsterdam for a specific product or service.

Separately from this method of selecting the City of Amsterdam can directly invite suppliers to participate in this market consultation.

1.4.5 Decision on participation

The City of Amsterdam will compare the content of the received requests for participation and make a choice on that basis with which suppliers the market consultation will be carried out. The City of Amsterdam will send this decision by email to the contact person mentioned in the request for participation. No appeal can be made against this decision.

The date to give notice to the selection is listed in the planning in section 1.4.1 of this document.

1.4.6 Procedure of market consultation

Suppliers selected by the City of Amsterdam to participate in this market consultation are invited to reply to the questions in chapter 4. Unlike a European tender procedure suppliers are asked to give as much relevant information beyond the asked questions.

The deadline for submitting your response to the questions is listed in the planning in section 1.4.1. of this document.

Depending on the written response the City of Amsterdam makes a selection of suppliers for an oral explanation. On the registration form you can indicate whether or not you are willing to participate in this stage.

In consultation with the participating supplier the City of Amsterdam will decide whether the oral explanations will be held at the location of the supplier or at an location of the City of Amsterdam or at an alternative location.

The period for carrying out the oral explanations is listed in the planning in section 1.4.1 of this document. Dates will be determined by the City of Amsterdam in consultation with participating suppliers.

In the extension of this market consultation the City of Amsterdam considers to contact a few references. You can provide references in your request to participate (see section 1.4.3) or during this procedure, as described in this section.

1.4.7 Feedback to the market parties

After the market consultation, the City of Amsterdam will give a brief feedback to the participants of the market consultation. This feedback contains only general information in order to avoid any link to a supplier or a specific product and / or service from a supplier. Except for a list of participating suppliers to this market consultation the brief feedback will be anonymised and contain only general information so that in no way a link can be established to a supplier or a product or service of a supplier.

This brief feedback may only contain lessons learned for the City of Amsterdam. Aforementioned report will be added to the tender documents in the event of an EU tender.

2 Administrative context 'Optimisation waste collection'

2.1 Ambitions

The waste collection implementation plan¹ issued on June 14, 2016 sets the route of Amsterdam in the field of waste collection and processing by means of choices and actions. Three ambitions are central:

- A. Sustainability: Increasing the separation rate of collected waste from 19% in 2013 to 65% in 2020, causing more possibilities to recycle the collected waste.
- B. Service: facilitating citizens of Amsterdam to quickly and easily dispose of their (separated) waste. Appealing to the citizens of Amsterdam on their responsibility by properly inform them about how they can dispose of their waste better and why separating waste is essential (inspire).
- C. An efficient organisation of activities to keep the waste collection charges and keep the costs for the citizens of Amsterdam as low as possible while being able to do the continuous necessary capital expenditures.

Route optimisation of waste collection, the subject of this market consultation, is part of the ambition to realise a service-oriented, sustainable and efficient organisation of waste collection.

2.2 An efficient organisation for waste collection

In 2015, the city council decided to organise the waste chain differently and establish a new organisation with a single management, a single administration and a single information office². In the present situation, with seven city districts carrying out their own policies, efficient cooperation is hardly possible, while this is essential for achieving the objectives. Waste collection is a logistic process that recognises no boundaries of city districts. At the same time the city districts have a lot of knowledge, expertise, enthusiasm and the experience necessary to meet the objectives for the waste collection.

The key to success therefore lies in removing unnecessary internal barriers and combining forces. The city districts already work together, for example in the collection of plastic and commercial waste, the standardisation of work processes, communication and staff exchange. In 2016 the City started with establishing a single management, a single administration and a single information office. This is an administrative priority and unique in the history of Amsterdam and requires the full commitment of all parties involved. There is a lot at stake: organising the strategic human resource planning, ICT, communication, route optimisation and other innovations, asset management, purchasing, et cetera. Cooperation in the form of performance agreements between waste collection, environmental surveillance and street sanitation is also a focus of attention in the establishment of the new organisation. Not least because citizens contribute to environmental surveillance and street sanitation by means of a waste collection charges. In November 2015 a dedicated programme manager started working on an implementation plan for this new organization. This is therefore a plan that shows how we are going to grow towards a new operational organization.

¹ Full texts are available in Uitvoeringsplan Afval of 14 June 2016. the implementation plan is only available in Dutch language and to be downloaded through the next link:

https://www.amsterdam.nl/publish/pages/782086/uitvoeringsplan_afval.pdf

² This decision is taken by the Council during the determination of the new tariffs for the waste charge tax in November 2015.

2.2.1 Introduction of a business intelligence unit

Part of the new organisation (implementation plan optimisation waste chain Amsterdam) is examining ways to set up a business intelligence unit that controls and monitors the whole waste chain. The unit must ensure that Amsterdam receives information about waste separation behaviour, driving movements, the value of the different waste types, et cetera. At present this information is insufficiently available. Because of this, one of the first concerns of the unit is the choice of a good monitoring system.

2.3 Harmonisation and standardisation

2.3.1 The standardisation of waste containers

That the City works on a single organisation and the harmonisation of the waste collection will soon be visible on the streets. There will be a new throw-in column with standard sizes for all underground waste containers in Amsterdam (the concrete pits have a size of about 1.85 x 1.85 m and the waste containers themselves a volume of 5m³). All districts will replace the old columns in the next three years. There are now several types of waste containers in the districts for separate waste types. The present differences in volume, dimensions, and methods of recording and emptying affect the business operations.

2.3.2 The standardisation of waste collecting and reducing driving movements

Another example of the harmonisation is the project 'route optimisation waste collection' launched in 2015 involving all city districts. Very important in the prevention of domestic litter and stimulating waste separation is that the waste containers are emptied on time. In addition, the City wants to reduce the number of driving movements of collection services to get a better flow of traffic, more safety and cleaner air. Through the project 'route optimisation' the city districts work together towards emptying only nearly filled waste containers (with a fill level of at least 80 %). By placing a fill-level sensor in each waste container, the waste containers can be optimally used and the number of travel movements can be reduced. In addition, such a system can record defects and blockages. The objectives are:

- Emptying only (nearly) full waste containers (with a fill-level of at least 80%).
- Saving on the costs of waste collection (working smarter and do more in less time).
- Customisation (e.g., time windows for waste collection possibilities nearby schools and commercial streets, and to be able to anticipate on potential congestion at the disposal of the cargo at AEB³).
- Signalling function for failures (if the fill level does not increase, something is wrong).
- Generating additional management information, with a continuous focus on efficiency (including driving style analysis, safety).
- Generating specific and detailed information about the degree of waste separation for the waste types paper, glass and plastic.

³ AEB is the waste incineration plant for the region of Amsterdam. See: www.aebamsterdam.nl

2.3.3 Business case

In 2016 the City of Amsterdam has launched a pilot project with a fill level sensor system that could complement the on-board computers of an earlier pilot project, or as a completely new system that focuses on route optimisation based on the fill level of waste containers. The results of this pilot and the one with on-board computers shall serve as a start for a new business case. Efficiency can also be increased by investing in other smart ICT applications and (technical) systems.

In this context, this market consultation will take place. Besides investigating the possibilities in the market this market consultation aims to establish whether proposed investments contribute to a positive business case for the city of Amsterdam.

3 Description of present and desired situation

In the desired situation the waste collection of Amsterdam operates with an integrated solution for:

- a) Measuring and collecting fill level data of waste containers;
- b) Determining the most efficient emptying moment;
- c) Calculating the most optimal transport scheduling;
- d) Generating dynamic route planning and navigation directions;
- e) Putting together and consolidating relevant information on transport planning;
- f) Collecting and providing relevant information about waste collection to the department Business Intelligence.

With the desired solution the City of Amsterdam wants to give substance to a more 'intelligent' waste collection process.

3.1 Project objectives and scope of the desired solution

The City of Amsterdam is working permanently on a sustainable and efficient waste collection organization and on improvement of its services. To achieve these objectives the City of Amsterdam is aiming for the introduction of an integrated solution that foresees in the implementation of a dynamic transport scheduling and dynamic routing system. This integrated solution has to capture and issue alerts when waste can be picked up 'just-in-time' (i.e.: on time and economical). Subsequently, it must calculate the optimal collection route based on the most current information.

The desired solution should contribute to the following objectives:

- Reducing transportation movements and emissions (CO₂, NO_x and particulate matter);
- Increasing vehicle productivity (higher tonnage and a larger number of cargo per day).
- Reducing the number of overflowing waste containers in order to prevent demotivation to sort waste among citizens;
- The realization of comprehensive and accurate information on waste collection;
- Realizing location intelligence to measure the level of service by waste container;
- Support drivers on safe driving;
- Providing drivers an ergonomic, efficient and stress free workplace;
- A more cost-efficient organization of the waste collection process.

The dynamic transport scheduling and dynamic routing of waste collection requires data input. The City of Amsterdam already knows the most relevant influencing factors but challenges suppliers to propose a complete and future proof solution. In the following sections of chapter 3 describes the main data sources and functionalities in the present and in the desired situation.

The scope of the desired solution consists of the implementation of integrated software and hardware solutions for dynamic scheduling, dynamic routing and a fill level measuring system for waste containers for the purpose of the waste collection process in the City of Amsterdam. The desired solution should interact with all means of waste collection and waste fractions as mentioned in paragraph 3.3 and is initially meant for the process of waste collection.

The solution does not interact with other operational processes as collecting commercial waste, street sanitation, and environmental surveillance and law enforcement⁴. However, the desired solution needs to be scalable and flexible, allowing to include other operational processes in the future and to anticipate on evolving requirements.

Furthermore, the solution(s) contains support services (helpdesk, SLA) and is preferably web based so that access can be obtained on each location with an internet connection.

The City of Amsterdam is the financier and the owner of the envisaged solution. The premise is that there occurs no outsourcing of personnel. Cooperation with suppliers during the operational phase of the contract in order to achieve the objectives is possible.

3.2 Planning and operations

In the present situation transportation planning, routing and the operations takes place in seven different city districts. Furthermore, the waste collection activities are carried out in fixed cycles and fixed routes. At present the transportation planning and routing is only marginally subject to mutation.

In 2017 a shift takes place towards a centralized transportation planning and routing. City districts will collaborate more and more in planning and execution but still by means of the installed base of systems and applications. In the end a central planning and routing office will manage all of the waste collection processes and will provide the organisation with the optimal transportation planning and routing information. Ideally, the operational execution takes place from two to four locations.

3.2.1 Information provision transportation planning

In the desired situation the central transportation planning and routing office prepares the ideal transportation planning and makes this available for the team leaders and drivers. The planners safeguards the quality of the proper information to prepare the ideal planning. This proper information consists mainly of:

- a) All waste containers and collection sites;
- b) The desired emptying moment per waste container;
- c) The (desired) collecting time per reported bulky waste;
- d) The fixed waste collection days;
- e) The availability of vehicles;
- f) The availability of personnel.

3.3 Waste containers

The City of Amsterdam facilitates the emptying of ± 12.000 underground waste containers, spread over more than 10.000 locations. Currently, waste containers are fitted with three (3) different emptying systems. In the next two years a transition to one emptying system takes place.

The attachment with data on the present situation provides you with information about the fleet of waste containers. In a separate file all the waste containers are listed with the GPS coordinates.

NOTE: The acquirement of waste containers and/or a waste container management system does is not a part of the scope of this market consultation and any subsequent (European) tender(s).

⁴ In the near future, the municipality of Amsterdam, considers to implement new functionalities on scheduling and routing in other departments and processes too. This market consultation does not focus on these other processes.

3.3.1 Asset management waste containers

In the present situation all information on waste collection containers in the City of Amsterdam is held in a container management system. (Supplier: Koninklijke Bammens / Mic-O-Data.) This system contains for each waste collection container, at least, the following data:

- a) Location number;
- b) Container ID number;
- c) Location (address and GPS);
- d) Waste type;
- e) Capacity in m³;
- f) Type of emptying system;
- g) Operational condition;
- h) Fill level (see section 3.4.2), frequency of emptying and most recent emptying moment.

The container management system functions as a main source for the planning system. At the same time it should be possible that drivers can give feed back about the state of a container in case of for instance a required repair.

3.3.2 Fill-level of waste container

In the desired situation the emptying moment of a waste container is determined by use of the fill level. The fill-level can be determined by:

- a) Real time information of the fill level per waste container given by a fill level sensor⁵. By measuring the fill-level and rate of filling the advisable emptying moment of the waste container can be calculated and planned;
- b) Analysing historic weighing data, per waste container. Weighing data can be obtained by studying the weigh of a loaded and an unloaded waste collection container. Weighing can be done with an on-vehicle weighing system⁶;
- c) Indicating an average fill-level by using the landfill data. The waste incinerator registers per cargo the landfill data and communicates this to the City of Amsterdam. By dividing the landfill data of one cargo by the amount of collected waste containers one can depict the average fill-level of a group of waste collection containers;
- d) A prediction based on data-analysis. By adopting insights in data trends the prediction on the fill-level degree could potentially be sharpened.

To determine the ideal collection moment for each waste collection container an unspecified number of waste collection containers should be accommodated by a fill-level sensor and an unspecified number of vehicles should be accommodated by an automatic weighing system.

The City of Amsterdam challenges suppliers to come up with alternative solutions to predict the ideal collection time.

⁵ All plastic waste containers are already accommodated with fill-level sensors, type Enevo. All electric compactors (type Ecopers 1 and Sidcon) are also accommodated with sensors.

⁶ In the current situation over 30 vehicles are accommodated with a weighing system. The weighing system calculates the weight of the waste before and after emptying of the waste container.

3.4 Collection method per waste type

In the desired situation a transport planning and routing system will be available for the following waste collection methods:

- a) Underground waste containers, aboveground waste containers, semi underground waste containers and underground compactors;
- b) Domestic bulky waste;
- c) Manual waste collection of garbage bags and emptying of mini containers (wheelie bins) and mobile (Indoor) containers.

In the desired situation citizens make an appointment for the disposal of bulky waste. Citizens can also report side placements and bulky waste wrongly disposed of⁷. Appointments can be made through several communication channels and are processed as orders in the planning system. The moments of collection are subject to the service levels of the City of Amsterdam.

In the desired situation manual waste collection takes place on set days.

Aforementioned methods of collection are applied for the following waste types⁸:

Waste type	Collection method		
	Waste containers	Bulky waste	Manual
Domestic waste	✓		✓
Glass	✓		
Paper and cardboard	✓		✓
Plastic, tin-plate and beverage carton	✓		
Organic waste			✓
(Domestic) bulky waste		✓	

The document⁹ "Afvalketen in Beeld" (Waste Chain Portrayed) and the attachment with data on the present situation gives you information about the amount of collected waste (per waste type) in the City of Amsterdam.

3.5 Vehicle fleet

The fleet mainly consists of following collection vehicles:

- a) Collection vehicle with rear loader for manual collection (26);
- b) Collection vehicle with fixed body and loading system for emptying of (underground) waste containers (43);
- c) Collection vehicles with demountable body system and fixed loading system for emptying of (underground) waste containers (10)¹⁰;
- d) Vehicles with a hook lift system (5);
- e) Vehicles with tipper and crane (33).

In the course of 2017 the waste collection vehicles of the city districts will be city wide deployed. Centralized fleet management manages availability, maintenance and repairs, claim settlement and

⁷ 'Bijplaatsingen' or 'side-placements' are situations in which waste is disposed of next to the waste container.

⁸ The scope of this solution does not include the collection of waste fraction such as domestic chemical waste, textile, diapers/incontinence material, wood and garden waste. The solution should be flexible to extend the range of waste fractions.

⁹ See: <https://www.amsterdam.nl/bestuur-organisatie/volg-beleid/agenda-duurzaamheid/publicaties-duurzaam/afvalketen/>

¹⁰ For more information on 'demountable body system', see: <https://www.youtube.com/watch?v=hB8WW7tqNaA>.

rental of vehicles. Furthermore fleet management has a consultative voice in the matter of acquiring and disposal of vehicles.

Information on the vehicle fleet is registered in an Excel sheet and a SaaS application of Leaseplan. In the present situation following data of collection vehicles is registered:

- a) Registration and fleet number;
- b) Garage location;
- c) Vehicle dimensions (i.e. length, width, wheelbase and turning circle);
- d) Body and special equipment; left hand drive or right hand drive;
- e) Vehicle volume in m³ and crane capacity in (metric) ton;
- f) Additional features (e.g. loading system; weighing system; on board systems);
- g) Mileage and machine hours;
- h) MOT status, maintenance planning and damages.

Above mentioned enumerative description provides an overview of vehicles and vehicle functionalities¹¹. In the desired situation transport planners or planning officers have a real time overview over available vehicles and vehicles in service.

3.6 Service area and logistics

Waste collection only takes place within the boundaries of the City of Amsterdam. In the present situation each of the seven city districts has its own waste collection operations. In the desired situation the operations are city wide harmonized and take place out of two to four locations. Operations will take place on the basis of rationally allocated geographical areas. No decision has been taken yet about the closure of some of the locations.

Fully loaded collection vehicles transport the collected waste to different relevant waste treatment plants in and around Amsterdam.

Collection vehicles fitted with a demountable body system (see section 3.5, categories collection vehicles footnote 9) exchange the fully loaded demountable body to a transshipment hub. From this transshipment location articulated trucks transport the fully loaded demountable bodies to the different waste type relevant treatment plants in and around Amsterdam. In the desired situation two strategically located transshipment hubs are being operated.

In the attachment with data on the present situation you will find information about locations of the public works yards, transshipment location and waste treatment plants. Advice on the optimisation of transshipment locations and public works yards are not directly linked to this market consultation, but do add value to the optimisation of waste collection.

3.7 Personnel

The City of Amsterdam employs approximately 300 full time and part time drivers who are qualified for working on most methods of waste collection. In the desired situation drivers are employable throughout the whole city. Nevertheless, it is undesirable that drivers should change work location very often as a result of dynamic transport planning. In the present situation the City of Amsterdam Drivers have their home base at one of the seven public works yards, they return to their home base for lunch and return to their home base at the end of their service.

¹¹ Vehicles are not deployable for all methods of waste collecting, waste container emptying or geographical areas (e.g. vehicles with a rear loader are not compatible for lifting waste containers and vehicles with a wide wheel-base are not compatible to navigate through narrow passages).

Emptying of (underground) waste containers is usually carried out by the driver only. The collection of bulky waste or the manual collection is carried out in a teams of two (2) or three (3) employees. All team members can be employed as driver. This allows rotation of tasks so that the physical strain per team member is limited.

In the present situation working on weekends is limited and primarily gets done voluntarily. This actually means that in the desired situation there will be a limited availability of personnel on Saturdays and almost no availability of personnel on Sundays.

The deployment of personnel also depends on applicable law and regulations concerning driving time and rest periods. Also health and safety standards concerning physical strain and work place hazards apply to the deployment of drivers and other crew members.

The attachment with data on the present situation provides information and key figures on the workforce.

3.7.1 Driver performances

In the desired situation the City of Amsterdam is provided with a solution which enables driving style monitoring and analysis. The City of Amsterdam values the wellbeing of its drivers. In the desired situation driving style analysis serves to coach and support the driver to drive stress free, safe and energy efficient.

Advise how driving style analysis concerning stress free, safe and energy efficient driving can be implemented in the desired solution is part of this market consultation.

3.8 Scheduling and routing systems

In the desired situation an integrated set of software and hardware solutions provide a dynamic transport planning and dynamic routing of collection vehicles. The desired solution has to signal or forecast which waste containers with a fill level of approximately 80% can be emptied (see section 3.4.) whereafter the system calculates a transport planning and proposes a routing for the collection vehicles to follow.

Ideally the transport planning is real-time and also takes into account surrounding waste containers with a fill level of nearly 80%. Also the transport planning ideally recalculates the transport planning if the driver is forced to deviate from the proposed routing. The transport planning also should take into account the availability of collection vehicles and human resources.

Vehicles will be provided with board computers or tablets that give drivers information about the transport planning and that give the driver clear navigation instruction about the routing. The driver has to be able to tick the task as completed. Subsequently not completed tasks must be rescheduled immediately.

At this moment applications are dispersed over seven city districts. Moreover, there is no integrated approach to transport planning and routing. In the desired situation an integrated solution replaces existing applications and systems.

The attachment with data about the present situation gives you an overview of available applications and systems. Preferably, relevant existing applications will be replaced by the new applications which are part of the solution to choose. Although the City of Amsterdam fully respects existing contracts with suppliers, decommissioning of existing applications is included in the scope of this project. Capital expenditure and disposals will only take place if it contributes positively to the business case.

3.8.1 Desired interfaces

In the desired situation, per collection method, interfaces with the following systems are required:

System	Collection method			
	Waste containers	Bulky waste	Manual	Side-placements
Waste container management system	✓			✓
Vehicle fleet management	✓	✓	✓	✓
Personnel information system	✓	✓	✓	✓
Reports bulky waste		✓		
Reports public space				✓

It is also desirable that interfaces are available with the financial system (Oracle JD Edwards).

3.8.2 Transport planning

In the present situation each of the city districts has its own methods and applications for transport planning. A city wide integration of transport planning does not exist. Also within the city districts integration with applications for personnel planning and route planning is not available. Composing transport orders and compiling information is a manual job with the use of Word, Excel and route maps on paper. The process of producing management information isn't optimal.

In the desired situation transport planning takes places in one city wide integrated system, which can be linked with relevant applications in the application chain or with external data sources.

3.8.3 Routing and navigation system

In the desired situation collection vehicles are equipped with navigation systems in which the composed transport planning can be transferred and the most efficient collection route can be calculated. The navigation system will thereby take into account amongst others the next variables:

- Real-time traffic information with information about road closures, road construction sites etc.;
- Accurate route-information for trucks;
- Specific traffic conditions for trucks concerning prohibition signs, length and with restrictions, axle load and weight restrictions amongst others;
- Hours of restricted access of entertainment areas, shopping areas and market areas on market days;
- Hours of restricted access of school zones.

In the attachment with data on the present situation you will find relevant information about routes in Amsterdam.

3.8.4 Track and trace system

In the desired situation the vehicle is equipped with a tracking and trace system which:

- a) Identifies and specifies the (real time) position of a collection vehicle;
- b) Identifies and registers the driver performances (see section 3.7);
- c) Identifies and registers the fuel consumption, emission and driven mileage.

The information should consequently be accessible on the base station.

3.8.5 Management information

In the desired situation a business intelligence department monitors and analyses the waste collection processes in the City of Amsterdam. This department takes care of information on waste types, citizen behaviour on waste type separation, the value of different waste fractions in residual waste, driving movements et cetera. Also the integrated system makes the following information is available:

- a) For each vehicle: deployment (in kilometres and hours), productivity (in tonnage and freights) and fuel consumption (in litres and m³ CO₂ emissions) and other emissions (NO_x and particulate matter);
- b) For each driver: deployment (in hours);
- c) For each waste container: frequency of emptying and productivity (in tonnage and fill-level).

In the desired situation the integrated can export all generated data to applications for analysis and generating management reports. The desired integrated system also has an integrated dashboard functionality or is able to connect with specific applications with dashboard functionalities.

3.9 Finances

In previous sections the City of Amsterdam has described (detailed) the desired situation to achieve the optimisation of the waste collection in Amsterdam. Besides qualitative improvements the City of Amsterdam also aims to achieve a lowering of total costs for waste collection activities. In cooperation with the city of Amsterdam and within the scope of the (intended) contract the supplier can have an active role to contribute to a reduction of over all costs of the collection of waste processes.

As information, in the following table, the City of Amsterdam supplies the, in greater and lesser degree, consolidated cost components (of the budget plan of 2017) that are to be influenced.

Cost component	Amount in €
Vehicle fleet	12.160.000,-
Waste containers	12.900.000,-
Housing costs	920.000,-
Other direct costs	760.000,-
Personnel	21.740.000,-
Direct costs for waste collection	48.580.000,-
Indirect costs / overhead	9.330.000,-
Total costs waste collection	57.910.000,-

4 Questions to suppliers

ATTENTION: Only answer the questions if you are selected for participating the market consultation. For more information about selection see section 1.4.3.

The City of Amsterdam invites participating suppliers to answer the questions as specific as possible. Contrary to a European tender process the City of Amsterdam asks explicitly you to give as much information as possible. The City of Amsterdam asks you, if possible, to relate your answers with the questions, sections or other information from this document or its attachments, by using specific references.

The City of Amsterdam takes into account that objectives of the optimisation of waste collection possibly only can be realized by integrating products and services from multiple manufacturers or suppliers. The City of Amsterdam explicitly also invites suppliers who provide partial solutions.

4.1 Identification suppliers and opportunities

In chapter 3 the City of Amsterdam has described in detail from the present situation the desired situation. Apart from standard solutions the City of Amsterdam also asks for innovative solutions and alternative perspectives.

- 1) Could you indicate with which (standard) products and services your organisation can contribute to (parts of) the desired solution and the project objectives?
- 2) Could you indicate in what alternative or innovative way your organisation can make a contribution to the desired solution (or part of the solution)? This also applies for additional services and the like.
- 3) Which technical and logistic developments in the market should be taken into account by the City of Amsterdam with regards to this project? Are there, in the future, any opportunities or risks?
- 4) Does your organisation offer consultation and advice for optimal use of the desired application(s), techniques and functionalities?

4.2 Scope

In chapter 3 the City of Amsterdam has described the project objectives and in detail the present and desired solution.

- 1) Regarding to the optimisation of the waste collection, what should be included in the scope of the tender? Could you, in your reply, make a distinction between the initial deliveries and the deliveries and services during the exploitation / operational phase of the contract?
If relevant: Which effort do you expect from the City of Amsterdam? Could you elaborate on your vision?

4.3 Technology

The City of Amsterdam wants to invest in future proof and flexible solutions which are scalable and modular build. Generated and collected data should be freely accessible by the City of Amsterdam. Systems or system components of different suppliers should be interoperable and should therefore have interfaces with open standards. The up time of the complete system should have an appropriate level in order to secure an efficient process of waste collection. And if relevant an adequate level of data security should be provided.

- 1) Is your system flexible and modular? In other words: is your system scalable and are parts or components easily exchangeable? Could you elaborate on this?
- 2) Is generated and collected data freely accessible for the City of Amsterdam and are systems or system components interoperable with other systems or system components? In other words: does your systems or system components have open interfaces? Could you elaborate on this?
- 3) What is the up time of your (complete) system? Could you elaborate on this?
- 4) What is the level of information security of your systems or system components? Could you elaborate on this?

4.4 Finances

The envisaged contract should facilitate the initial capital expenditure including operational expenditures during a period of seven (7) years. If you only supply a part of the solution your answers can be restricted to the financial information about that specific part.

- 1) Could you give an estimate for the initial capital expenditure which is broken down into main lines?
- 2) Could you give an estimate the costs for support and maintenance or operational costs which is broken down into main lines?
- 3) Are there any other costs that have to be taken into account?
- 4) The City of Amsterdam is interested to hear your opinion on whether a structural improvement in financial efficiency can be achieved. Do you have insights or calculations about a possible improvement of the financial efficiency? Do you have examples or references?

4.5 Implementation

The City of Amsterdam seeks a solution that does not (or only minimally) disturb the waste collection process.

- 1) In relation with your products and services: How do you think a responsible implementation plan should look like?
- 2) What are, in your opinion, the most important risks during the migration from the current to the new situation?

4.6 Exploitation

To maintain the quality of the investment, the City of Amsterdam considers a contract with a duration of seven (7) years, including extensions. During the exploitation phase the contract includes support and maintenance and, for example, renewals of licenses.

- 1) Could you give your opinion on which support and maintenance are necessary and how you would organise this?
- 2) Which other value-added could you supply during the exploitation phase?

4.7 Tender and type of contract

In the event of an (European) tender the City of Amsterdam considers to use the method of Best Value Procurement¹².

- 1) Does your organisation have experience with bidding for Best Value Procurement tenders? What is your opinion on this?
- 2) Do you have (other) suggestions for quickly and efficiently carrying out a tender procedure in which supply and demand can be perfectly matched?
- 3) What is your opinion if the City of Amsterdam pursues an integrated type of contract with one (main) contractor for the duration of seven (7) years? Do you have any other ideas about the type of contract?

¹² For more information on the Best Value procurement, see the following link:
www.pianoo.nl/praktijk-tools/methodieken/best-value-procurement-bvp (Dutch)
www.pbsrq.com (English)

Attachment: Data present situation

The attachment with data of the present situation is added separately to this document.

Registration form market consultation Optimisation Waste Collection Amsterdam

Did you read the conditions in Chapter 1 and do you agree with these conditions?	YES / NO*
Did you include a motivation for participating in your registration?	YES / NO*
Are you willing to participate in the oral explanation sessions?	YES / NO*
Company information	
Trade name of the company:	
Address and location company:	
If applicable: registration number KVK (Dutch Chamber of Commerce) or comparable in country of establishment:	
Internet address:	www.
Does the company belong to segment small or medium sized (SME) enterprises?	YES / NO
If the company belongs to segment small or medium sized (SME) enterprises, please include the turnover (in €, excl. VAT) and the number of FTE (incl. temporary employees) of the last fiscal year.	FILL IN: TURNOVER 2015 / # FTE 2015
Contact information of contact person for this market consultation	
Name contact person:	
Function / title:	
Telephone number:	
E-mail address:	

* Cross out what is not applicable.