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EU GPP Criteria for Public Space Maintenance

Technical report and criteria proposal (2nd draft)

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JRC Seville:

Oyeshola Kofoworola, Rocío Rodríguez Quintero, Nieves Espinosa, Miguel Gama Caldas, Oliver Wolf

Ecosistema Urbano:

Belinda Tato, Antonella Marlene Milano, Maria Gagliardi

Joint Research Centre

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1 Introduction

Public authorities' expenditures in the purchase of goods, services and works (excluding utilities and defence) constitute approximately 14% of the overall Gross Domestic Product (GDP) in Europe, accounting for roughly EUR 1.8 trillion annually (Buying Green, 2016).

Thus, public procurement has the potential to provide significant leverage in seeking to influence the market and to achieve environmental improvements in the public sector. This effect can be particularly significant for goods, services and works (referred to collectively as products) that account for a high share of public purchasing combined with the substantial improvement potential for environmental performance. The European Commission has identified Public Space Maintenance as one such product group.

Green Public Procurement (GPP) is defined in the Commission's Communication "COM (2008) 400 - Public procurement for a better environment" as "…a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured."

Therefore, by choosing to purchase products with lower environmental impacts, public authorities can make an important contribution to reducing the direct environmental impact resulting from their activities. Moreover, by promoting and using GPP, public authorities can provide the industry with real incentives for developing green technologies and products. In some sectors, public purchasers command a large share of the market (e.g. public transport and construction, health services and education) and so their decisions have considerable impact. In fact, in the above mentioned Commission's communication the capability that public procurement has to shape production and consumption trends, increase demand for "greener" products and services and provide incentives for companies to develop environmental friendly technologies is clearly emphasised.

GPP is a voluntary instrument, meaning that Member States and public authorities can determine the extent to which they implement it.

The development of EU GPP criteria aims to help public authorities ensure that the goods, services and works they require are procured and executed in a way that reduces their associated

environmental impacts. The criteria are thus formulated in such a way that they can be, if deemed appropriate by the individual authority, integrated into its tender documents with minimal editing.

GPP criteria are to be understood as being part of the procurement process and must conform to its standard format and rules as laid out by Public Procurement Directive 2014/24/EU (public works, supply and service contracts). Hence, EU GPP criteria must comply with the guiding principles of: Free movement of goods and services and freedom of establishment; Non-discrimination and equal treatment; Transparency; Proportionality and Mutual recognition. GPP criteria must be verifiable and it should be formulated either as Selection criteria, Technical specifications, Award criteria or Contract performance clauses, which can be understood as follows:

Selection Criteria (SC): Selection criteria refer to the tenderer, i.e., the company tendering for the contract, and not to the product being procured. It may relate to suitability to pursue the professional activity, economic and financial standing and technical and professional ability and may- for services and works contracts - ask specifically about their ability to apply environmental management measures when carrying out the contract.

Technical Specifications (TS): Technical specifications constitute minimum compliance requirements that must be met by all tenders. It must be linked to the contract's subject matter (the 'subject matter' of a contract is about what good, service or work is intended to be procured. It can consist in a description of the product, but can also take the form of a functional or performance based definition) and must not concern general corporate practices but only characteristics specific to the product being procured. Link to the subject matter can concern any stage of the product's life-cycle, including its supply-chain, even if not obvious in the final product, i.e., not part of the material substance of the product. Offers not complying with the technical specifications must be rejected. Technical specifications are not scored for award purposes; they are strictly pass/fail requirements.

Award Criteria (AC): At the award stage, the contracting authority evaluates the quality of the tenders and compares costs. Contracts are awarded on the basis of most economically advantageous tender (MEAT). MEAT includes a cost element and a wide range of other factors that may influence the value of a tender from the point of view of the contracting authority including environmental aspects (European Commission, 2016). Everything that is evaluated and scored for award purposes is an award

criterion. These may refer to characteristics of goods or to the way in which services or works will be performed (in this case they cannot be verified at the award stage since they refer to future events. Therefore the criteria are to be understood as commitments to carry out services or works in a specific way, and should be monitored/verified during the execution of the contract via contract performance clause(s)). As technical specifications, also award criteria must be linked to the contract's subject matter and must not concern general corporate practices but only characteristics specific to the product being procured. Link to the subject matter can concern any stage of the product's life-cycle, including its supply-chain, even if not obvious in the final product, i.e., not part of the material substance of the product. Award criteria can be used to stimulate additional environmental performance without being mandatory and, therefore, without foreclosing the market for products not reaching the proposed level of performance.

Contract Performance Clauses (CPC): Contract performance clauses are used to specify how a contract must be carried out. As technical specifications and award criteria, also contract performance clauses must be linked to the contract's subject matter and must not concern general corporate practices but only those specific to the product being procured. Link to the subject matter can concern any stage of the product's life-cycle, including its supply-chain, even if not obvious in the final product, i.e., not part of the material substance of the product. The economic operator may not be requested to prove compliance with the contract performance clauses during the procurement procedure. Contract performance clauses are not scored for award purposes. Compliance with contract performance clauses should be monitored during the execution of the contract, therefore after it has been awarded. It may be linked to penalties or bonuses under the contract in order to ensure compliance.

For each criterion there is a choice between two levels of environmental ambition, which the contracting authority can choose from according to its particular goals and/or constraints:

Core criteria are designed to allow easy application of GPP, focusing on the key areas of environmental performance of a product and aimed at keeping administrative costs for companies to a minimum.

Comprehensive criteria take into account more aspects or higher levels of environmental performance, for use by authorities that want to go further in supporting environmental and innovation goals.

The development of EU GPP criteria aims to help public authorities ensure that the goods, services and works they require are procured and executed in a way that reduces their associated environmental impacts and is focused on the products' most significant improvement areas, resulting from the cross-check between the key environmental hot-spots and market analysis. This requires an understanding of commonly used procurement practices and processes and the taking on board of learnings from actors involved in successfully fulfilling contracts.

For this reason, the European Commission has developed a process aimed at bringing together both technical and procurement experts to collate a broad body of evidence and to develop, in a consensus oriented manner, a proposal for precise and verifiable criteria that can be used to procure products with a reduced environmental impact.

A detailed environmental and market analysis, as well as an assessment of potential improvement areas, was conducted within the framework of this project and was presented in the Preliminary Report on EU Green Public Procurement (GPP) criteria for Public Space Maintenance. The report is available at http://susproc.jrc.ec.europa.eu/Public_space_maintenance/index.html. The main findings of the report are provided in the next section.

Based on the findings resulting from the Preliminary report, a draft first Technical Report (TR1.0) and criteria proposal was produced and presented at the 1st ad-hoc working group meeting in Seville on 15 November 2017. Apart from the comments received at this meeting, written feedback was conveyed by means of a written consultation. This draft second Technical Report (TR2.0) and criteria proposal has been produced taking into account the input received in the course of this consultation process.

2 Summary of the Preliminary Report

2.1 Product Group Scope and Definitions

2.1.1 Scope

There are no European Union Green Public Procurement (EU GPP) criteria on Public Space Maintenance. In defining the product group and the scope covered by the criteria, the following were conducted:

- A stakeholder survey. This asked stakeholders through a questionnaire for their views on the proposed activities and scope on the maintenance of public spaces.
- Research into existing legislation, standards and criteria. This included a review of relevant EU legislation, a review of national GPP criteria and relevant labels and a review of relevant standards and guidelines used by the private sector.
- A review of potential definitions. This provided an overview of the statistical and technical categories, such as those in EU legislation, including the Common Procurement Vocabulary (CPV) codes, which could be used to define different product groups for the EU GPP criteria for PSM.

Consequently, the EU GPP for Public Space Maintenance covers four categories:

- Cleaning products and services
- Gardening products and services
- Vehicles for public space maintenance
- Machinery for public space maintenance

The specific activities covered under the scope are:

- Cleaning, including manual or mechanical sweeping and water jet cleaning, graffiti removal, façade cleaning, litter removal, etc.
- Snow removal
- Pruning, trimming, planting, lawn replacement, irrigation
- Fertilization, weed control and pesticides use

The specific equipment covered are:

- Vehicles (human controlled or autonomous) for the transport of workers and equipment, and materials
- Sweepers, spreaders and street cleaning vehicles for winter operation
- Machinery used for cleaning and gardening (lawn-mowers, chainsaws, trimmers; leaf collectors, leaf blowers, etc.)

Following stakeholder's recommendations, the following activities are excluded from the scope:

- Replacement of pavement and municipal furniture
- Repairing or replacement of irrigation systems, fountains, street signs, municipal furniture and mechanical equipment (e.g., gates)
- Maintenance of sewage
- Painting and repainting activities

2.1.2 Definitions

A comprehensive analysis of the various technical categories included within the European statistical system was carried out (see Preliminary Report). Following a review, it was concluded that the most appropriate system to analyse the features of the maintenance of public space sector is the Common Procurement Vocabulary (CPV). The CPV is essential for the public procurement of goods and services within the European context although it is not included as part of the European statistical system (ESS). In addition to the recommendation of the European Commission inviting the contracting entities and authorities to use it, this classification might help to measure more accurately the size and characteristics of the maintenance of public spaces sector than the other technical categories which are more focused on commercial transactions. The CPV classification enables more accurate collation of the information registered on public procurement, by which public authorities, such as government departments or local authorities, purchase works, goods or services from companies.

It achieves this by establishing a single classification system for public procurement aimed at standardising by means of a single classification system for public procurement, the terms used by contracting authorities and entities to describe the subject of contracts, by offering an appropriate tool to potential users (contracting entities/authorities, candidates or tenderers in contract award procedure). Thus, this classification tool consists of a main vocabulary for defining the subject of a contract, and a supplementary vocabulary for adding further qualitative information.

As the first step in the definition of the scope of the EU GPP criteria for Public Space Maintenance, the following four categories were proposed, and where relevant, with appropriate CPV categories, i.e.:

1. Cleaning Products and Cleaning Services

a. Cleaning Services

In the Preliminary report and TR1.0, the types of public spaces which should be taken into consideration and defined as part of the scope of

cleaning services of the EU GPP for Public Space Maintenance was based on an analysis of the responses of stakeholders to the first questionnaire. The results indicated that the following types of infrastructure should be considered within the scope of cleaning services:

- Streets, roads, avenues and boulevards
- Sidewalks
- Bike lanes
- Parking lots
- Pedestrian areas, pathways and plazas
- Underways
- Stairways
- Public furniture and façade (surface) also have to be considered a target of cleaning services.

Following the suggestion of different stakeholders, playgrounds and public sports facilities are excluded from the scope of the EU GPP due to the complexity of these topics. It was suggested to consider them as separate product groups.

Therefore in TR1.0 the scope of activities covered within cleaning services include:

- Mechanical & manual sweeping of sidewalk, bike lane, road (asphalt, roadbed) and roadside (shoulders, curbs, green areas): corresponding to CPV code 90610000, street-cleaning and sweeping services
- Litter removal from the ground
- Bins' litter collection and sorting: corresponding to CPV code 90918000, bin-cleaning services
- Mechanical & manual water jet cleaning: corresponding to CPV code 42924730, pressurised water cleaning apparatus and 42924740-8, high-pressure cleaning apparatus
- Façade/surface cleaning
- Graffiti removal: corresponding to CPV code 90690000, graffiti removal services
- Snow and ice removal from sidewalks, bike lanes and roads, corresponding to CPV code 90620000, snow-clearing services and 90630000, ice-clearing services
- Beach cleaning: corresponding to CPV code 90680000, beach cleaning services
- Cleaning of fountains, lakes and ponds
- Clean-up after natural weather events (like storms or heavy rain/snow fall)

In the TR1.0, following the consensus achieved with stakeholders during the scoping phase of the project, some cleaning services remain outside of the scope of the EU GPP Criteria for Public Space Maintenance due to their occasional nature. These include "disaster assistance" which includes "debris removal" and "after event cleaning (events of a social nature like concerts, festivals, fairs, etc)" since they cannot be defined as routine maintenance services.

b. Cleaning products include:

- All-purpose cleaners
- Substances for snow and ice removal: (salt and sand-and-salt-mixture – called grit - used for removal and calcium chloride (CaCl2) used as a dust binder for spring cleaning)
- Other supplies /accessories/mechanical parts, e.g., brushes, rolls, etc.

Following the feedback from stakeholders during the 1st AHWG meeting, and extensive review of cleaning activities, beach cleaning has been removed from the scope of cleaning services as it is a seasonal activity which is also highly dependent on local conditions. Besides, there is no evidence that the activity – beach cleaning - negatively impacts the environment. Moreover, the machinery employed for the two mainly used forms of this activity (mechanical raking or sifting (screening)) are mechanical devices which are attached or mounted to tractors or walk-behind sifting unit. Tractor-towed sifters models are also available. As equipment including machinery and vehicles are discussed in Chapter 5 and 6 respectively, for these reasons, it is not considered in TR2.0.

In summary, cleaning services covered by this report are:

- Mechanical & manual sweeping of sidewalk, bike lane, road (asphalt, roadbed) and roadside (shoulders, curbs, green areas)
- Litter removal from the ground
- Bins' litter collection and sorting
- Mechanical & manual water jet cleaning, pressurised water cleaning apparatus and, high-pressure cleaning apparatus
- Façade/surface cleaning
- Graffiti removal
- Snow and ice removal from sidewalks, bike lanes and roads
- Cleaning of fountains, lakes and ponds
- Clean-up after natural weather events (like storms or heavy rain/snow fall)

In this report, cleaning products covered include:

- All-purpose cleaners

- Substances for snow and ice removal: (salt and sand-and-salt-mixture – called grit - used for removal and calcium chloride ($CaCl_2$) used as a dust binder for spring cleaning)

"Machinery parts" has been removed from the list of other supplies and accessories, e.g., brushes, rolls, etc. as these may be considered as part of the machinery products and services which are discussed in Chapter 5. Hence, only brushes, rolls, etc. are now considered under "Other supplies and accessories".

2. Gardening and Landscaping Services and Products

From the first stakeholder questionnaire, it emerged that the following green areas requiring gardening and landscaping services should be considered in the scope are:

- Man-made gardens and parks
- Street vegetation

It is possible to define different configurations of green areas by considering different vegetation typologies. The following classification is derived from the Dutch Criteria for Sustainable Procurements of Green Spaces, and is considered appropriate also for the EU GPP criteria on the subject of Public Space Maintenance.

- Trees: trees that stand on their own, in rows or in small groups, not as part of a forest or small cluster of trees and bushes.
- Cluster of trees and bushes: contiguous area covered by planted bushes possibly with scattered trees.
- Hedges and shrubs: bushes, on their own, in small groups or in rows, usually closely maintained by trimming or closing off.
- Plant patches: patches of permanent and annual herbaceous plants (usually decorative) and bulbous plants.
- Lawns: short grass that is frequently mowed.
- Rough grass and herbage: grass and rough herbage that is mowed at most twice per year.
- Banks and water: open water and the areas that border dry land.

Two items included in the Dutch Criteria have been excluded from the scope of the EU GPP criteria for Public Space Maintenance. These are:

- Forests, defined as "contiguous area covered by trees that may or may not have bushes (larger than 2500m^2)", excluded for not being man made green area; and
- Sports and playing fields (grass) defined as "grass fields primarily intended for sports and play activities", excluded for being associated with public sports facilities, previously excluded from the scope.

For general landscaping services, the statistical categories used as reference correspond to 77313000, parks maintenance services, 45112710, landscaping works for green areas, 45112711, landscaping work for parks, 45112712, landscaping work for gardens; 45112713, landscaping work for roof gardens; 77311000, ornamental and pleasure gardens maintenance services

a. Gardening and Landscape Services include:

- Pruning: corresponding to CPV code 77341000, Tree pruning
- Trimming: corresponding to CPV code 77342000, Hedge trimming
- Planting and Plant and trees replacement: corresponding to CPV code 77330000, Floral display services; 03121100. Live plants, bulbs, roots, cuttings and slips; 03440000, Forestry products; 03441000. Ornamental plants, grasses, mosses or lichens; 03451000, Plants; 03451100, Bedding Plants; 03451200, Flower bulbs; 03451300, Shrubs; 03452000, Trees; 77314100, Grassing services; 77315000, Seeding services
- Fertilization
- Weed control and pesticides use: partially corresponding to CPV code 77312000, Weed-clearance services
- Lawn replacement
- Manual & automated irrigation

b. Gardening products include:

- Soil improvers
- Ornamental plants
- Irrigation systems
- Herbicides and pesticides

The scope of gardening products considered in TR1.0 included lubricant oils. Based on inputs from stakeholders during the 1st AHWG meeting, and a review of gardening products, lubricant oils have therefore been removed from the scope of gardening products as they are considered as a part of machinery products and services.

3. Vehicles used for Public Space Maintenance
   - Human-controlled vehicles
   - Sweepers and street cleaning vehicles (e.g., mechanical brooms)
   - High pressure cleaner vehicle (water/sand)
   - Snow removal vehicles (with plough blades and salt spreader)
   - Maintenance utility vehicles for public green spaces
   - Maintenance utility vehicles for watering green spaces
   - Maintenance utility vehicles for transporting goods and branches

- Remote controlled, autonomous or robotic vehicles

On the scope of the EU GPP criteria for PSM, stakeholders advised on the need to distinguish between compact (self-propelled) sweepers and truck mounted sweepers based on the definition available in (EN15429-1:2007). According to the standard, sweepers can be classified either as truck mounted sweeper (sweeping machine, where the sweeping attachments fixed or mounted on a standard vehicle-chassis, e.g. truck) or compact (self-propelled) sweepers (these are sweepers having a special designed chassis, where the sweeping attachments are integrated).

Depending primarily on the net volume capacity, self-propelled machines are further subdivided into (1) maxi-compact-sweeper, (2) compact-sweeper, (3) midi-compact sweeper, and (4) mini-compact-sweeper. For similar reasons, special purpose motor vehicles such as spreaders which are also under the scope of European legislation for machinery cannot be considered as vehicles but as machines.

Spreaders are machines which are mounted permanently on truck chassis or as interchangeable equipment on truck chassis or load platforms (tippers). Only the combination of a truck chassis and a permanently mounted spreader can be considered as a special purpose vehicle according to 2007/46/EC. The portion of those vehicles on the EU market is less than 10% and limited to a few regional markets. The majority of spreaders are interchangeably fixed onto trucks. These combinations cannot be considered as special purpose vehicles. These spreaders are machines and when they are fixed on a standard truck load platform they are considered as load.

Therefore, following these responses hinged on existing European Union legislation (the machinery directive 2006/EC/EC, the outdoor noise directive 2000/14/EC, the NRMM exhaust emission regulation (EU) 2016/1628), self-propelled (compact) sweepers and spreaders are included into the machinery section (Chapter 5) of this report.

Therefore the scope of Vehicle activities covered in this report now includes:

- Human-controlled vehicles
- Truck mounted sweepers and street cleaning vehicles
- High pressure cleaner vehicle (water/sand)
- Snow removal vehicles (with plough blades)
- Maintenance utility vehicles for public green spaces
- Maintenance utility vehicles for watering green spaces
- Maintenance utility vehicles for transporting goods and branches
- Remote controlled, autonomous or robotic vehicles

4. Machinery used for Public Space Maintenance
- Lawn-mowers (including lawn tractors) and scarifiers

- Chainsaws
- Brush saws
- Strimmers
- Hedge trimmers
- Pruners and similar hand-operated machines
- Leaf collectors and leaf blowers
- Auto-scythes
- Auto-hoes
- Rotary cultivators
- Compost shredders

Following the feedback from stakeholders and in alignment with the Noise Directive 2000/14/EC of the European Commission during the 1st AHWG meeting, corrections have been made to the names assigned to the machinery detailed in TR 1.0., in addition to the inclusion of self-propelled sweepers as follows:

- Lawn-mowers (including walk-behind or ride-on grass cutting machines)
- Scarifers
- Chainsaws
- Brush cutters
- Grass trimmer/grass edge trimmer
- Hedge trimmers
- Pruners and similar hand-operated machines
- Leaf collectors and leaf blowers
- Motor-hoes
- Pedestrian controlled powered tillers
- Shredders /chippers (following the definition applicable to gardening equipment available in the guidelines for the application of the Noise Directive 2000/14/EC)
- Self-propelled or compact sweepers
- Spreaders

Brush saws have been removed from the list of equipment based on the recommendations of a major stakeholder and also as they are not explicitly listed in the Noise Directive. According to stakeholders, auto-scythes are officially called 'sickle bar mowers' (EN 12733:2009), and the equipment is a not a garden machinery but an agricultural machinery. Therefore, it has also been excluded from the revised scope.

2.2 Market Analysis

The Preliminary Report (Espinosa, et. al., 2017) presents the results of a market research on the situation of Maintenance of Public Spaces sector in the European context.

The market has been characterized according to market segmentation (geographical, technological, target group related), with an overview of

the respective products and services, also identifying the key manufacturers/service providers and consumer groups/procurement entities.

Therefore, following the methodology of the market analysis, the public space maintenance sector has been described according to the volume of the public procurement purchases in EU 28 (product/service supply and demand) and its market structure.

Market analysis indicates that the volume and number of cleaning activities and services contracted by the public authorities in each country fluctuates in different years, since the rate of purchase is highly dependent on budget constraints.

Another essential finding is that there are a large number of local small and medium-sized enterprises and a smaller number of large international companies with a large share of the European market. The latter are specialized in a unique segment and are able to propose a wide and coordinated offer, which generates a high level of competition.

2.3 Key Environmental Hotspots and Improvement Areas

The latter part of the Preliminary Report is divided into four chapters representing the four categories of products and services included in the scope of Public Space Maintenance.

The sections provide an environmental analysis of the different categories of products and services through a review of relevant LCA studies. This has enabled the identification of the main environmental impacts and hotspots of different categories across their life cycle.

2.3.1 Cleaning Activities

The analysis of cleaning products showed that they are associated with many environmental impacts and are potentially hazardous to human health. This is due to the use of substances derived from non-renewable sources (e.g. derived from petrochemical streams), and the release of toxic substances as well as waste from the manufacturing process (Nordic Ecolabelling, 2016a), (Nordic Ecolabelling, 2016b).

Related to the manufacturing of cleaning products, there are also impacts from the production chain of packaging. For the estimation of these impacts, the life cycle of packaging should be considered as well as the different levels of packaging (Medyna, et al, 2016).

Finally, the manufacture of Calcium Magnesium Acetate (CMA) has been found to contribute to the stronger environmental impacts across the lifecycle of cleaning products due to the great amount of energy and water involved in the production process (Ritthoff, 2011).

The analysis of the environmental hotspots showed strong environmental impacts related to the use phase and release of waste water (run-offs) which contain chemicals into the environment as documented in the preliminary report.

Another key environmental hotspot related to the provision of cleaning services is related to water depletion from product dilution and cleaning operations.

Street cleaning operations were also identified as contributing significantly to freshwater eutrophication, human toxicity, freshwater eco-toxicity, marine eco-toxicity, and ionizing radiation - mostly resulting from the generation of sludge during the operation.

2.3.2 Gardening Activities

The production of soil improvers or ornamental plants which are used for gardening activities could contribute to climate change, eco-toxicity and human health due to the extraction of raw materials. Particularly the extraction of peat has been shown to have a significant impact on climate change. Peat has biological origin and is a huge carbon sink. Due to its slow regeneration rate, it is considered non-renewable material. In addition, due to the lower amount of nutrients entrained in it as compared to other materials such as compost, the use of peat should be minimized(See Preliminary Report).

The production chain of ornamental plants also has strong environmental impacts because of the use of pesticides and fertilizers. The packaging of the plants represents another factor of pollution and environmental impact caused by the use of PVC pots or polystyrene plateau for the delivery of plants.

Finally, in the evaluation of environmental impacts, the delivery and transport of these products have to be considered for their contribution to greenhouse gas emissions and fuel depletion. Because of these impacts, the selection of an indigenous/native typology of plants is found to have a far less intense environmental impact (Fleisher, E.T, 2009).

The Preliminary Report identifies the use of chemicals such as pesticides and fertilizers as the main hotspot of gardening activities, as they could result in damage to the environment. Another impact related to gardening activities is water depletion due to the use of inefficient irrigation systems.

2.3.3 Machinery

The production phase has been found to be one of the main hotspots across the life cycle of machinery due to multiple concerns.

First, several fossil based materials (i.e. plastics and rubber components) that require large amounts of energy during their production, are needed. Within the raw materials, copper and iron have the largest individual impact from a life cycle perspective. Battery production is also associated with carcinogenicity and human toxicity, ozone depletion potential and ecotoxicity due to the use of hazardous substances (Nordic Ecolabelling, 2013), (Samaras, Constantine, and Kyle Meisterling, 2008) and their related disposal issues.

Fuel production results in resource depletion, and its combustion causes greenhouse effects due to carbon dioxide emissions, and it affects the tropospheric ozone and human health due to nitrogen oxide emissions. Additionally, fuel combustion in internal combustion engines during the operation of machinery generates particulate emissions, which are of environmental concern.

Gardening machinery for Public Space Maintenance used in environments such as forests and gardens could be harmful to the environment due to the use of lubricants in open systems, which could be lost or directly emitted into the surroundings. Particularly harmful are traditional mineral based lubricants that have a low rate of biodegradability and can contain harmful substances (Nordic Ecolabelling, 2013), (Wightman, et al, 1999).

Noise pollution from the operation of machinery is also another important issue that could cause injuries both for the workers and people. The use of electrically powered machines has considerable advantages in order to reduce noise and vibration (Nordic Ecolabelling, 2013).

2.3.4 Vehicles

The analysis of the environmental hotspots showed that for fuel-powered vehicles the main environmental impacts occur during the use phase, and are GHG emissions, air pollutant emissions and noise. The manufacturing phase is more relevant for electric vehicles where the battery manufacturing is the most impacting component.

The reduction of the environmental impact of electric vehicles during the use phase, however, outweighs the negative environmental impacts of the additional emissions in the production phase. Closely related to the use phase are the environmental impacts related to the production of energy carriers (liquid or gaseous fuels or electricity). The main environmental issues of the supply chain of energy carriers are GHG emissions and air pollutant emissions (JRC, 2016a).

From the literature review carried out in the Preliminary Report, it seems that hybrids provide a significant reduction in overall environmental impacts for the different categories of vehicles (Light Duty Vehicles - LDV, Heavy Duty Vehicles - HDV) used in urban duty cycles (JRC, 2016a).

3 Draft Proposed EU GPP criteria for Outdoor Cleaning Activities

3.1 Criteria proposal for outdoor cleaning products

Scope

This category covers the purchase of products used for the cleaning of public spaces or outdoor use. It includes as well the purchase of supplies and accessories needed to perform the task.

Products related to cleaning services are distinguished in three categories as identified in the Preliminary Report:

- All-purpose cleaners or industrial cleaning products for outdoor services
- Substances for snow and ice removal
- Binding agents for dust control
- Cleaning supplies and accessories (brushes, rolls, soft rags and microfiber cloths, brooms, etc).

Equipment including machinery and vehicles are discussed in Chapter 5 and 6 respectively.

3.1.1 Outdoor cleaning products

Rationale

Outdoor Cleaning Products

Cleaners used professionally outdoors are mainly classified in three categories: 1) acid based products used to remove hard water deposits, algae, rust and other oxidation, 2) alkali based products, to remove grease, dirt or oil and 3) solvent/petroleum based degreasers, which are able to remove grease. Outdoor cleaning products are anticipated to be applied to a wide variety of surfaces detailed within the scope of cleaning services of the PSM EU GPP, e.g., facades, paved areas, public space elements, etc. These surfaces can be made from materials such as steel, aluminium, concrete and plastic, or a combination of several materials.

One of the strong environmental impacts related to the use of cleaning products, is related to water depletion from product dilution and cleaning operations. In addition, the use phase in cleaning services contributes significantly to freshwater eutrophication, human toxicity, freshwater ecotoxicity, marine ecotoxicity and ionizing radiation. These impacts are mostly related to sludge production during street cleaning operations.

The amount of wastewater produced after street cleaning can be significant, and it does not always end up in the public waste water treatment system.

Cleaning products will always be required during cleaning operations. To minimize their impact on the environment, it is essential that those with the minimal amount of toxic substances are employed in a professional manner. Ecolabelled cleaning products have less impact on the environment as they comply with a strict set of limiting criteria relating to numerous environmental aspects including, *inter alia*, the toxicity and degradability of the constituent substances and the sustainable extraction of raw materials. In addition, purchasing cleaning products equipped with recommended dosing systems can help reduce over-dosing, which also contributes to their life cycle environmental impact.

The criterion proposal does not cover façade cleaning products in the context of graffiti removal, as they are covered in a separate criterion.

Criterion Proposal

Core criteria	**Comprehensive criteria**
Technical Specification	
TS1. Use of cleaning products with low environmental impacts 1) At least X%[a)] of all cleaning products per year, by volume at purchase, must be compliant with criterion 1 on toxicity to aquatic organisms and criterion 4 on excluded and restricted substances of the EU Ecolabel for hard surface cleaning products[b]. 2) All products that have not been awarded with an ISO Type I ecolabel must not be classified and labelled as being acutely toxic, a specific target organ toxicant, a respiratory or skin sensitiser, carcinogenic, mutagenic or toxic for reproduction, or hazardous to the environment, in accordance with Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (the 'CLP Regulation'). 3) Cleaning products must be provided with the recommended dosing systems (e.g. pump, graduated cylinder) when applicable. Information on the technical data sheet of the dosing system must specify the dose, and dispensing device.	**TS1. Use of cleaning products with low environmental impacts** 1) At least Y%[a)] of all cleaning products per year, by volume at purchase, must be compliant with criterion 1 on toxicity to aquatic organisms and criterion 4 on excluded and restricted substances of the EU Ecolabel for hard surface cleaning products[b]. 2) All products that have not been awarded with an ISO Type I ecolabel must not be classified and labelled as being acutely toxic, a specific target organ toxicant, a respiratory or skin sensitiser, carcinogenic, mutagenic or toxic for reproduction, or hazardous to the environment, in accordance with Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (the 'CLP Regulation'). 3) Cleaning products must be provided with the recommended dosing systems (e.g. pump, graduated cylinder) when applicable. Information on the technical data sheet of the dosing system must specify the dose, and dispensing device.

Verification: 1) The tenderer must supply a list of the cleaning products that will be supplied within the contract and provide documentation proving their compliance with the requirements. Where ISO type I ecolabel products are supplied, the applicant must provide a copy of the type I label certificate and/or packaging label. 2) The tenderer must provide a declaration of compliance with this criterion supported by the material safety data sheets for all products that have not been awarded with the EU Ecolabel for Hard Surface Cleaning Products or with another ISO Type I ecolabel.	**Verification**: 1) The tenderer must supply a list of the cleaning products that will be supplied within the contract and provide documentation proving their compliance with the requirements. Where ISO type I ecolabel products are supplied, the applicant must provide a copy of the type I label certificate and/or packaging label. 2) The tenderer must provide a declaration of compliance with this criterion supported by the material safety data sheets for all products that have not been awarded with the EU Ecolabel for Hard Surface Cleaning Products or with another ISO Type I ecolabel.
Core criteria	**Comprehensive criteria**
Award Criteria	
AC1. Use of additional cleaning products with low environmental impacts Points will be awarded in proportion to each 10 % improvement upon the minimum technical specification required in TS1. **Verification:** See above TS1.	**AC1. Use of additional cleaning products with low environmental impacts** Points will be awarded in proportion to each 10 % improvement upon the minimum technical specification required in TS1. **Verification:** See above TS1.
Explanatory Notes [a] Recommended values for a minimum volume of Ecolabel products purchased X=30%, Y=50%. [b]OJ L 180, 12.7.2017, p. 45-62; Commission Decision (EU) 2017/1217 of 23 June 2017 establishing the EU Ecolabel criteria for hard surface cleaning products. Available from: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017D1217&from=EN	

Consultation questions
○ Do you agree with the recommended values for a minimum volume of Ecolabel products purchased X=30% (at core level), Y=50% (at comprehensive level)? ○ Would do you consider the current technical specification and award criterion achievable based on your expert knowledge on the availability of ecolabelled cleaning products?

3.1.2 Graffiti removal products

Undesired graffiti creates aesthetic problems, can lead to the damage of surfaces, and is often also associated with vandalisation. Europe spends about 90 million Euros each year on graffiti attacks and associated cleaning procedures (CORDIS - European Commision, 2013). To maintain the appearance of buildings and structures, graffiti removal is desirable.

There are different types of graffiti materials and application methods including: paint (applied by brush or aerosol), felt-tip markers, ballpoint pens, waxy substances such as crayons and lipstick, chalk, scratching, flame, posters and adhesive labels. Of these, spray paint is the primary graffiti material used because it can be quickly and easily applied to any type of substrate (Sanmartín et. al., 2014).

Graffiti may be removed using a variety of methods. The more traditional method entails painting over as a permanent cover or as a temporary means of concealing graffiti until it can be removed. This method is the easiest and cheapest cleaning form but it can result in a heavy build-up of paint on a building surface due to repeated painting.

Other traditional methods of graffiti removal employ a variety of cleaning techniques such as scalpel, abrasive dust, water blasting (pressurized water), and sandblasting. However, the technique to be applied depends on the type of graffiti being removed. Scalpel and abrasive dust could be used as a preliminary step in removing spray paint or felt-tip marker but it is advisable that the procedure is only carried out by a trained professional, and only on polished granite, which is very hard and generally impervious to scratches, to avoid damage from scratches. Blasting systems currently deployed for routine graffiti removal from a variety of surfaces, particularly masonry surfaces are sodium bicarbonate blasting, referred to as soda blasting, and water blasting using pressure washers. Pressure washers are generally used in conjunction with graffiti removers because the water alone usually cannot remove graffiti very effectively. The main disadvantage of these systems is that produce a large volume of waste material (San Francisco Department of the Environment, 2014), (Carvalhão, M., et al., 2015) .

Other innovative physical methods being developed for graffiti removal include ultrasonic/megasonic agitation, plasma spray, arc or thermal spray, dry ice blasting (CO_2-based) and soda blasting. Although they have proven effective in removing graffiti, they have the potential to damage the substrate being cleaned (e.g. CO_2-based cleaning is limited by the problem of thermal shock to the substrate).

Laser-based (CO_2, Nd:YAG, etc) graffiti-removal systems have been applied to historic buildings and structures due to its numerous advantages (e.g. the non-contact nature of the treatment and its selectivity, gradual removal of graffiti, repeatability of the treatment, control of the area processed, and the low environmental impact). However, the effectiveness of the laser cleaning may depend on several

factors such as the porosity of the material as it determines the depth of paint penetration (Sanjeevan, et. al, 2007)

Heat related methods such as steam cleaning can be used to remove some paints but a high level of expertise is required to ensure that volatiles are not driven into porous concrete or masonry (Public Transport Victoria, 2008). Graffiti can also be removed by use of hot water, sometimes with the aid of a neutral or non-ionic detergent. However, this is only possible if it is fresh, not older than two days and carried out with water-soluble markers. Summarily, water is not very effective for removing graffiti because many of them are insoluble in it.

Bioremediation has been suggested as an innovative and alternative approach to chemical and physical cleaning methods for graffiti removal. It entails the use of living organisms to remove environmental pollutants, through biodegradation and results in the biological production of biodegradable substances. Its main advantages over the latter methods is that it is relatively cheap, simply to implement, and environmentally friendly. However, its application has been limited as only one published study which focused directly on bioremediation of graffiti spray paint exists.

Chemical removal agents have been suggested as the most convenient and least damaging to treated or untreated surfaces, and are generally recommended for the removal of all types of graffiti. There are two main types, organic solvent blends and inorganic, caustic based blends. Caustic based blends do not degrade, are not as effective and therefore are not preferred (some inorganic solvents (e.g. acids) attack concrete). As organic solvents are preferred as they evaporate completely, leaving no residual material on the substrate. However, they are toxic by ingestion, inhalation and skin contact (Sanmartín et. al., 2014), (Public Transport Victoria, 2008).

Chemical solvents (which typically contain methyl ethyl ketone, methylene, chloride and phenol) may penetrate into the substrate and cause irreversible damage. This is in addition to their potential environmental and health hazards. Conventional physical (not laser) or mechanical methods damage the texture due to unintended material removal from the surface. They can also generate pollutants; e.g., pollution control is particularly difficult with water or abrasive blasting, which release large volumes of very fine dust particles into the air. In addition to being very expensive, laser-cleaning techniques also have disadvantages as they may alter the colour of the substrate (Sanmartín et. al., 2014).

The use of graffiti removal products may result in serious environmental consequences (such eutrophication and ecotoxicity) due to the release of chemicals to the atmosphere and the inappropriate discharge of untreated waste water resulting from the operation. This impact can be mitigated by using environmentally friendly alternatives which are biodegradable, do

not bioaccumulate and limit emissions of toxic substances into the aquatic environment, in addition to performing effectively the same function as their traditional counterparts (which contain aromatic hydrocarbons, chlorine compounds and complexing agents).

Ecolabelled graffiti removal products would fulfil these demands as they comply with a strict set of limiting criteria that discourages the procurement and use of products classed as being acutely toxic, a specific target organ toxicant, a respiratory or skin sensitiser, carcinogenic, mutagenic or toxic for reproduction, or hazardous to the environment, in accordance with Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (the 'CLP Regulation').

A review of available Type I ecolabel criteria showed that only the Nordic Ecolabelling criteria for industrial cleaning and degreasing agents (Nordic Ecolabelling, June 2016), and the Green Seal Standard (GS-53 Specialty Cleaning Products for Industrial and Institutional Use, 2017) had criteria applicable to graffiti removers. Both type 1 ecolabels criteria set requirements in areas including toxicity and harm to health. There are also requirements relating to the degradability and aquatic toxicity. However, the criteria do not differentiate between the numerous types of commercially available graffiti removers. It is difficult to estimate what fraction of the available Nordic Ecolabelled industrial cleaning and degreasing agents are graffiti removers due to the absence of publicly available information. Due to the variety of substrates and the myriad types of graffiti-creating materials in the market complicated by the ability of most graffiti removal products to remove graffiti from varying surfaces, it is difficult to set surface/graffiti remover specific criteria. Therefore this proposal covers all products used to graffiti from all types of surfaces (steel, aluminium, concrete and plastic, etc). As painting and repainting activities are excluded from the scope of this EU GPP criteria (see preliminary report), no criterion relating to it is proposed. However, a separate EU GPP criteria for paints, varnishes and road marking is available and may be referred for the purchase of environmentally friendly outdoor paints (European Commision, 2017b)

Criterion Proposal

Core criteria	**Comprehensive criteria**
Technical Specification	
TS2. Graffiti removal products *(Same formulation for Core and Comprehensive)* Chemical graffiti removal products must not be classified and labelled as being acutely toxic, a specific target organ toxicant, a respiratory or skin sensitiser, carcinogenic, mutagenic or toxic for reproduction, or hazardous to the environment, in accordance with Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (the 'CLP Regulation').	

Verification:

The tenderer must provide a declaration of compliance with this criterion supported by the material safety data sheets for all products that have not been awarded with an ISO Type I ecolabel. Products that have been awarded with an ISO Type I ecolabel that covers this specific requirement are deemed to comply.

3.1.3 De-icing and snow removal products

Rationale

Two classes of de-icing and snow removal products are applied in Europe to mitigate the effects of snow and ice:

- Chemical de-icing materials – these substances modify the properties of snow and ice by either physical and/or chemical means.
- Abrasive materials are substances capable of mechanically increasing the friction coefficient of icy or compacted snow layers on the road surface, and include materials such as sand and grit.

Although abrasive materials are cheaper than chemical de-icing materials, they are associated with issues such as dust generation, sewage clogging, etc., which limits their widespread application as winter maintenance materials.

De-icers are essential to wintertime road maintenance and are applied for maintaining the friction or preventing the freezing of surfaces such as roads or footpaths. They may be liquid or solid and are considered necessary for road safety and accessibility.

Although road salts are the most popular material for de-icing due to their high effectiveness, easy operation, and low initial costs, the release of large quantities of salts can cause significant environmental impacts, such as damage to the soil, water, vegetation and wildlife (Transportation Research Board, 2007), (Joutti, et. al, 2003).

Salt has also been identified as contributing significantly to the corrosion of infrastructure and increasing maintenance costs. Thus, there is a growing concern about the environmental effects of de-icing resulting from the application of large amounts of road salts such as NaCl, $CaCl_2$ and $MgCl_2$ especially in Nordic countries (Joutti, et. al, 2003).

Anti-icing and de-icing agents contain chemicals that can have a negative effect on vegetation, surface and ground water aquifers (e.g. increase in the salinity) when they are used near freshwater ecosystems. Alternatives to road salts which are organic based de-icers are on the market, including carbohydrate-based solutions (corn or beet by-products), calcium magnesium acetate (CMA), potassium acetate, sodium acetate, sodium formate, and potassium formate. These products have lower biochemical

oxygen demand (BOD) and toxicity characteristics and are also bio-degradable (Ritthoff, 2011). These alternatives have minimal environmental impacts, but are also more expensive than road salts. A number of these alternatives are available in the market, and are ecolabelled according to the Nordic Ecolabel, the German Blue Angel, and the Canadian Environmental Choice Program. These labels have similar criteria for deicing agents (Nordic Ecolabelling 2016a).

A criterion which limits the deployment of products classed as being acutely toxic, a specific target organ toxicant, a respiratory or skin sensitizer, carcinogenic, mutagenic or toxic for reproduction, or hazardous to the environment, in accordance with Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (the 'CLP Regulation') is proposed.

Criterion Proposal

Core criteria	**Comprehensive criteria**
Technical Specification	
TS3. De-icing and snow removal products *(Same formulation for Core and Comprehensive)* De-icing and snow removal products must not be classified and labelled as being acutely toxic, a specific target organ toxicant, a respiratory or skin sensitiser, carcinogenic, mutagenic or toxic for reproduction, or hazardous to the environment, in accordance with Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures ('CLP Regulation'). **Verification**: The tenderer must provide data (material safety data sheet and amount) of the products to be supplied in the execution of the contract.	
Consultation questions	
○ Are you in agreement with the formulation of this criterion?	

3.1.4 Consumable goods

Rationale

Recyclable and organic materials make up the majority of public waste. Both are disposed by the public in waste receptacles. Bin bags (also known as garbage or trash bag) are disposable bags used to contain rubbish (or garbage). They can be employed independently, or used to line the insides of waste receptacles to prevent the insides of the receptacle from becoming coated in waste material.

Depending on the local authority, separated waste receptacles could be made available for recyclable waste and organic waste respectively.

Regardless of this, the bin bags used to line the receptacles also end up in the same treatment or disposal facility as the waste they contain. As bin bags are usually made of plastic, are intractable and are associated with numerous environmental issues, this criterion rewards the use of biodegradable bin bags as this will make the composting or organic degradation of biowaste easier to carry out, if the biowaste is collected separately and processed by composting plants that accept compostable bags without sorting them out.

Comments received from stakeholders on the TR1.0 on the criterion were positive as it could be applied for mixed waste (and not only the organic fraction), and that this could be positive for the regions and countries with a high level of landfill. An additional suggestion that it is only applicable if there is separation of organic waste in place and the compostable bin bags are not sorted out by the designated composting plant was made.

From an EU GPP perspective, these comments are already considered in the existing proposal. Therefore the criterion is retained with additional text provided in the rationale as justification. Some additional equivalent standards have also been included as part of the verification requirement.

Criterion Proposal

Core criteria	**Comprehensive criteria**
Award Criteria	
	AC2. Compostable bin bags *Note: This criterion applies if biowaste is collected separately and processed by industrial composting plants that accept compostable bags.* Points will be awarded to bin bags used to collect biowaste that are compostable according to standards EN 14995:2007, EN 13432:2000, or equivalent. **Verification**: Tenderers must present proof of third party certification in accordance with EN 14995:2007, EN 13432:2000, or equivalent.

3.2 Criteria proposal for outdoor cleaning services

Scope

Outdoor cleaning services encompass the purchase of services identified in TR1.0:

- Mechanical and manual sweeping of sidewalk, bike lane, road (asphalt, roadbed) and roadside (shoulders, curbs, green areas)
- Litter removal from the ground
- Bins' litter collection and sorting
- Mechanical and manual water jet cleaning
- Façade/surface cleaning
- Graffiti removal
- Snow and ice removal from sidewalks, bike lanes and roads, snow-clearing services, ice-clearing services
- Beach cleaning
- Cleaning of fountains, lakes and ponds

In TR2.0, beach cleaning is removed from the scope of cleaning services as it is a season activity which is also highly dependent on the local conditions. Also, there is no evidence that the activity negatively impacts the environment.

All machinery and vehicles employed in the provision of cleaning services shall respect the proposed EU GPP criteria for machinery and vehicles in Chapters 5 and 6 respectively as well as the common criteria for service categories in Chapter 7.

3.2.1 Purchase of outdoor cleaning products

The purchase of outdoor cleaning products included in a service offer must fulfil criteria specified in section 3.1.

3.2.2 Operational procedures and best practices

Employing good operational procedures and best practices that result in a reduction of the use of cleaning products can significantly minimize the environmental impacts resulting from the provision of cleaning services.

Rationale

Weed control

The cleaning of paved surfaces can also require the elimination of weeds using herbicides. Herbicides are substances toxic to plants, and are used to destroy unwanted vegetation. Spraying chemical herbicides is the

cheapest weed control method. Unfortunately, this causes unwanted side-effects when improperly or over applied. The significant side-effect is the runoff of herbicides into surface water. This has adverse effects on plant and animal life but also on the production of drinking water (Cauwer et. al., 2013). These problems can be mitigated by means of good practices, which ensure the proper and minimal application of chemical herbicides. Work aimed at the development of a sustainable system for weed management for pavements has been conducted since 2002 under the auspices of the Sustainable Weed control on Pavements (SWEEP PROJECT) with funding from the EU LIFE program.

SWEEP consists of a decision support system that translates information on weed prevention and weed control methods into simple guidelines for sustainable weed management, i.e., a cost-effective, environmentally-friendly and socially acceptable system.

The SWEEP method entails the application of herbicides (by means of selective spraying techniques) two times per season (on average based on a multi-year plan) at those places where herbicide use was permitted within the set of SWEEP guidelines. Whenever necessary, brushing, sweeping, burning or mowing are to be carried out at places where herbicide use is not permitted. The concept has proved to be effective in reducing the amount of herbicides runoff to surface water when implemented in practice in urban and industrial sites, in the catchment areas of the Rhine and Meuse.

However, due to increasing awareness about the adverse effect of the use of chemical herbicides, national and local authorities are regulating more strictly, the use of chemical based products (Kristoffersen et al., 2008). Less environmentally impacting alternatives – which could be used in combination - are being promoted. These include mechanical (brushing, sweeping, mowing, hand weeding) and thermal (flaming, hot water) weed control methods. From an EU GPP perspective, these methods eliminate the use of herbicides and their associated risks, and therefore are proposed at the comprehensive level.

Winter maintenance

The traditional methods for winter maintenance are outlined in section 3.1.2. Compared to these methods, relatively newer methods such as anti-icing and pre-wetting offer added benefits to snow removal operations as they accelerate the commencement of the melting process by directly providing necessary initial moisture.

The dilution and application of anti-icing and de-icing agents during cleaning operations can have a negative effect on vegetation, surface and ground water aquifers as it increases the salinity of freshwater ecosystems in proximity to salted roads (Kaushal et. al, 2005), (Ramakrishna D.M. & Viraraghavan, 2005) (Corsi, et. al, 2010), (Cañedo-Argüelles, et. al,

2016), (Kefford et. al, 2016). Therefore efforts must be made to use the most environmentally friendly de-icing and anti-freezing agents, and also reduce their use through more efficient application and best practices.

As the effectiveness of these products is highly dependent on various factors including snow moisture content, air and surface temperatures, and wind, it is important to be able to determine the optimal application rates for specific weather events and pavement conditions. It might also be necessary to apply a combination of chemical and abrasive materials to obtain the desired results. Therefore, the use of locally applicable guidelines in determining the best application rate for the specified form or type of public space during snow maintenance contract is recommended as well trained and competent personnel are essential (Section 7 details criteria related to competence and training). Several available resources could be adopted as guides in determining the best available practices suited to local conditions (Snow and Ice Databook, 2014), (Winter Parking Lot and Sidewalk Maintenance Manual, 2015), (Albers, 2015).

Dust suppression

To reduce the levels of respirable PM10 street dust in urban areas, it is important to apply best maintenance practices in the fields of traction control, dust suppression and street cleaning.

Studded winter tyres have been observed to quickly increase street dust emissions when the winter tyre season starts, even before any traction sanding material has been used. This effect has been observed repeatedly at the air quality monitoring stations of busy traffic environments. Measurements performed during several studies (REDUST 2014) support the hypothesis that reducing the share of studded tyres would decrease street dust originating from pavement wear.

Traction sanding is used in northern countries during winter depending on weather and local practices. Most commonly, traction sanding is used on walkways, stairs, cycle paths, intersections and bus stops. Traction sanding increases dust emissions, especially if the quality of the rock material used for traction sanding was sub-optimal. Wet sieved and wear resistant rock material from which smallest size fractions (<1-2 mm) have been removed, should be used when traction sanding is applied as they cause less short-term emissions than dry sieved material. Non-sieved and fine grained traction sanding material should also be avoided because they contain a large proportion of PM10 dust forming components.

Dust binding using a variety of dust suppressing/binding products was also found to be the most cost-efficient method to decrease PM10 emissions. Targeted spreading of dust binding solution is recommended as the main technique to decrease the possibility of harmful side effects such as corrosion, environmental effects or reduced traction on streets. Typically, a good time to perform dust binding with $CaCl_2$ would be when air

humidity is still high, for example very early in the morning before rush-hour.

Available studies on the use of salts and acetates for dust suppression show discordant results. Dust suppressants are effective where the road dust load is high, such as in region where the use of studded tires and de-icing agents lead to high PM10 concentrations when the snow melts in the spring. The effectiveness of dust suppressant has been noticed in regions with relatively wet climates (Scandinavia, Netherlands, UK, Germany, Austria and North Italy).

According to the AIRUSE project, for Southern Europe, where solar radiation is higher, street washing has been shown as a more effective method for dust suppression compared with binding agent spreading (European Commission, 2016).

Dust suppression can also be achieved by street sweeping. There are three principal types of street sweeping technologies that are recognized: mechanical broom sweepers, vacuum sweepers and regenerative air sweepers. Modern street scrubbers with captive hydrology have been found to be the most effective street cleaning technique. It is especially efficient when used on very dirty streets, which have high load of fine street dust material. Emissions can be reduced by up to 40% during the first day after treatment and 20% by average during the first week after treatment (REDUST 2014). Traditional vacuum sweeping alone has not proved completely effective in reducing PM10 street dust levels, possibly because it does not remove the finest dust from the pores of street surfaces. When traditional vacuum sweepers were used in conjunction with a separate washing lorry, which flushed the street with high pressure water sprays (combination cleaning), reductions in PM10 street dust emissions were achieved. The key feature to achieve reduction in PM10 street dust is believed to be the high pressure water washing in both modern street scrubber and combination cleaning techniques.

Modern street scrubber machinery is recommended to achieve the best street cleaning result for PM10 emission reductions. Traditional vacuum sweeper may still be efficient to reduce larger size fractions of street dust but a combination of cleaning techniques may be needed to reduce PM10 emissions. Street cleaning should be done as early as practically possible. Priority should be given to busy and very dusty streets, where many inhabitants or pedestrians are exposed to air pollutants. This strategy has been proven to be cost efficient and effective in PM10 dust reduction.

A set of criteria that gathers the best practices in order to reduce the environmental impact of the cleaning activities is presented below. Public authorities are advised to select the most appropriate practices best suited to the requested cleaning service and the local conditions (precipitation, road conditions and weather).

One recurring comments from stakeholders on the cleaning services criteria was to design the technical specifications to ensure that the use of

chemical products are eliminated. These have been taken into consideration in the reformulation of the existing criteria. Also, additional criteria, including contract performance clauses which are aimed at reducing the application of chemical products in conjunction with best practice have been proposed.

Criterion Proposal

Core criteria	**Comprehensive criteria**
Technical Specifications	
TS4. Cleaning, de-icing and snow removal products used for the provision of cleaning services • The cleaning products used for the provision of the cleaning services must be compliant with the requirements of the relevant technical specifications (TS1) at Core level. • The de-icing and snow removal products used for the provision of the cleaning services must be compliant with the requirements of the relevant technical specifications (TS2) at Core level. **Verification:** See the verification of the relevant technical specifications.	**TS4. Cleaning, de-icing and snow removal products used for the provision of cleaning services** • The cleaning products used for the provision of the cleaning services must be compliant with the requirements of the relevant technical specifications (TS1) at Comprehensive level. • The de-icing and snow removal products used for the provision of the cleaning services must be compliant with the requirements of the relevant technical specifications (TS2) at Comprehensive level. **Verification:** See the verification of the relevant technical specifications.
Core criteria	**Comprehensive criteria**
Technical Specifications	
TS5. De-icing and snow removal operations *(Same formulation for Core and Comprehensive level)* The tenderers must have written procedures on de-icing and snow removal operations which must be implemented by a combination of any of the following techniques: – *Mechanical removal of snow (shovelling, brushing, ploughing and scraping combinations)* – *Anti-icing* – *Prewetting (based on an adjustment to the variable application rate),* **Verification:** Tenderers must provide written procedures and a de-icing and snow removal plan (in accordance with the applicable elements of the common criteria for service categories TS1. Environmental Management Measures) including equipment and products to be	

employed in the execution of the contract.	
TS6. Reduction of PM10 street dust *(Same formulation for Core and Comprehensive level)* The tenderers must have written procedures on PM10 street dust reduction measures which must be implemented by means of the following best practices or other relevant measures: - Traction control practices (traction sanding using wet sieved and wear resistant rock material); - Implement dust binding practices (dust binding solutions, dispersion techniques); - Street cleaning practices (mechanical & vacuum sweepers, street scrubbers, combinations). **Verification:** Tenderers must provide written procedures and a cleaning services plan for PM10 street dust reduction operation (in accordance with the applicable elements of the common criteria for service categories TS1. Environmental Management Measures) including equipment and products to be employed in the execution of the contract.	
Core criteria	**Comprehensive criteria**
Contract Performance Clauses	
CPC1. Cleaning services plan *(Same formulation for Core and Comprehensive level)* *Note: the contracting authority needs to agree with the contractor a cleaning plan aimed at gradually reducing the amount of cleaning products to be used, for the purchase of cleaning services in order to allow the contractor to comply with this contract performance clause.* The cleaning plan must cover all applicable elements of the service categories (see common service criteria category in Chapter 7) including at least the following: – energy and water consumption – use of cleaning agents – staff training and working instructions The contractor must track quantities of cleaning products used and provide every six months reports on the quantity of each cleaning product used, the task for which it was used to the contracting authority for verification purposes. The contracting authority may set rules for penalties for non-compliance.	
CPC2. Weed control In addition to the requirements set up by local regulations concerning their application, chemical herbicides must not be applied: 1) 4 days before or after the area is swept; and 2) in the event (or high probability of occurrence) of precipitation or dew, to prevent herbicides from	**CPC2. Weed control** Weed control must be carried out by applying non-chemical treatment methods such as thermal, mechanical or biological treatments. Records of non-chemical treatment methods and application schedules must be kept and available to the contracting authority for verification purposes. The contracting

being washed off the plants. Also, herbicides must be used in line with the most recent valid version of the sustainable weed control on pavements method [1]. Records of herbicides, application rates and schedules must be kept and made available to the contracting authority for verification purposes. The contracting authority may set rules for penalties for non-compliance. [1]http://www.wur.nl/en/Research-Results/Projects-and-programmes/SWEEP/Results.htm	authority may set rules for penalties for non-compliance.
Consultation questions	
○ Are geographical conditions determining the best environmental practices? Would the TS5 on de-icing and snow removal operations be implementable regardless of geographical condition? ○ Are there protocols in place to apply these snow removal/de-icer products causing the least environmental damage? ○ Do you agree with the criterion excluding the use of herbicides and chemical treatment methods at the comprehensive level?	

Rationale

Graffiti removal

Different graffiti removal methods exist (for a comprehensive overview see Section 3.1).

The effectiveness of graffiti removers is highly dependent on various factors including the graffiti material, the type of substrate material, the duration of the graffiti on the substrate surface, etc. Some substrates of the same family may require the application of a combination of graffiti removal methods to obtain the desired results without negatively impacting the substrate surface (e.g. for some masonry substrates, the application of chemical remover followed by high pressure water spray has been shown to achieve very good results).

When removing graffiti from façades, the product is generally sprayed onto the façade undiluted. After about 10-15 minutes, the façade is cleared of the dissolved graffiti using a jet washer (for larger surfaces) and warm water. For smaller surfaces a cloth is used before rinsing with water. Although equipment for collecting water and the dissolved graffiti exist, it is expensive and is not popularly used. Therefore the wastewater, cleaning agents and graffiti end up directly in the environment or in the municipal sewerage system (Nordic Ecolabelling, June 2016). To minimize this, efforts must be made to use the most environmentally friendly products, and also reduce their use through more efficient application and best practices.

Several available resources e.g. (San Francisco Department of the Environment, 2014) could be adopted as guides in determining the best available practices suited to the type of surface to be cleaned. A set of criteria that gathers the best practices in order to reduce the environmental impact of graffiti removal activities is presented below. Public authorities are advised to select the most appropriate practices best suited to the requested cleaning service and the surface conditions.

Criterion Proposal

Core criteria	**Comprehensive criteria**
Technical Specifications	
TS7. Graffiti removal products used for the provision of cleaning services *(Same formulation for Core and Comprehensive level)* The graffiti removal products used for the provision of the cleaning services must be compliant with the requirements of the relevant technical specifications (TS2). **Verification:** See the verification of the relevant technical specifications (TS2).	
Core criteria	**Comprehensive criteria**
Contract performance Clauses	
CPC3. Graffiti removal operation *(Same formulation for Core and Comprehensive level)* *Note: This criterion is applicable only if the removal of graffiti is from surfaces other than building fronts and requires the use of a high-pressure water sprayer.* The removal of graffiti from surfaces other than building fronts must take place using a high-pressure water sprayer (and cleaning solutions, if necessary) provided with a separation system whereby the dirty water is recovered and can be subsequently treated. For example, with a water recycling system that catches the water used, filters it and re-uses it. The contractor must document information on the volume and means of disposal of the wastewater and waste resulting from the graffiti removal operation as proof of compliance with the requirements above. Records of graffiti removal operations, including operational conditions and products used must be kept and made available to the contracting authority for verification purposes.	
Note on graffiti removal operation *Graffiti removal operation must ensure that that the method employed is suited to the surface to be cleaned. For the following types of surfaces, the following graffiti removal methods (San Francisco Department of the Environment, 2014) are generally*	

recommended:

a. Masonry substrates – use blasting system removal

b. Wood substrates – paint over.

c. Non porous substrates – use chemical removers

d. Glass graffiti or etching- use chemical removers

e. Street signs – apply sensitive surface chemical graffiti removers (however the effectiveness depends on the graffiti

4 Draft Proposed EU GPP criteria for Gardening Activities

4.1 Ornamental plants

Rationale

Organic and integrated production of plants

The inclusion of a criterion on organic produce was proposed in the previous draft of the Technical report based on studies that demonstrate that the possibility of achieving some environmental benefits can be brought under certain conditions, for example benefits regarding biodiversity or the quality of soil.

The verification of the proposed criterion is based on the Regulation (EC) No 834/2007 on organic production and labelling of organic products and an accounting document of the expected annual purchases. In accordance with Regulation (EC) No 834/2007, organic products can be certified and labelled as such being easily recognized and making feasible the verification of this criterion.

Procurers can also verify the purchases of organic products throughout detailed invoices. Invoices of the products purchased should be detailed enough and include the name of the product, the quantity and the costs. However, a key concern for stakeholders on this criterion was the availability of organic ornamental plants in the market as most producers are certified according to integrated production.

Integrated production is a system of management that involves a combination of biological and chemical measures that aims to provide a cost-effective and environmentally sound management of diseases, insects, weeds and other pests. In 2006, the European Union published a *Thematic Strategy on the Sustainable Use of Pesticides* and this was followed up by (Directive 2009/128/EC) otherwise known as the Sustainable Pesticides Directive. It focuses on achieving sustainable use of pesticides in the EU and promotes the use of Integrated Pest Management (IPM) and of alternative approaches or techniques, such as non-chemical alternatives to pesticides.

Although IPM does not completely eliminate the use of conventional chemicals, it still offers the benefit of significantly reducing the use of synthetic pesticides (UN Environment, 2016), (Cuyno, et. al., 2001), (Jonathan et. al.,, 2017), (Young, S.L., 2017). Furthermore, studies on the European availability of certified nurseries from organic production and IPM shows that nurseries certified according to IPM principles account for a greater market share than certified organic production.

Additionally, many certification schemes in the last few decades have evolved beyond general IPM practices ensuring new market opportunities

for products managed with IPM. Schemes such as the MPS-GAP certification, the GLOBALGAP flowers and plants scheme have embedded within them principles of IPM as a requirement (EUREPGAP, 2007). Organic nurseries have the benefit of avoiding the use of synthetic fertilizers and pesticides. Information obtained from a survey of several databases including the Eurostat, the FAOSTAT data, and the Swiss Research Institute of Organic Agriculture (FiBL) indicate that although there is production of organically cultivated nursery bulbs and ornamental plants, there is virtually no data on the share available in Europe, so the availability of sufficient quantities of organic ornamental plants cannot be guaranteed.

To ensure that purchased plants are produced with the least amount of chemical inputs, and also encourage the continued growth of the market of organic plants, ornamental plants produced via either of these methods are being requested at both the core and comprehensive levels as technical specifications. The percentage of organic or IPM ornamental plants is not set by the technical specification, since the market availability varies widely across the EU. Therefore, the contracting authority will need to set a percentage based on the national or local market of ornamental plants.

Plant containers

Plant delivery could generate a large amount of waste because plants are normally delivered in PVC pots or in polystyrene plateau, which are not always reusable or reused. The nurseries usually do not provide the option of taking back the pots for reuse. For that reason, most of the time this material is disposed of in a landfill.

The use of reusable long-lasting (Deepdale Trees Ltd, 2017) (some products have a life span of 10 years (Proptek, 2017) could help reduce the volume of plastic waste from the ornamental plants sector. Biodegradable pots are also available and can be of natural raw materials or processed materials. The former is composed of materials such as cork, wood fibres, or other materials. Another alternative is the use of compostable pots if they are suitable for the plants storage and transport, and if there are composting facilities available. The standards defining biodegradability and compostability are EN 14995:2007, or EN 13432:2000, and are widely recognised and used by biobased packaging manufacturers.

The criterion for plants containers and packaging was welcomed by stakeholders but there were concerns about the suitability of compostable and biodegradable pots for those plants which require storage for an extended time span. It was recommended that other options should be included if biodegradable or compostable solutions were not feasible. The criterion has been reformulated accordingly.

Species suitable for local conditions and prevention of invasive alien species

Based on the stakeholders input, the technical specification on plant characteristics present in the previous version of EU GPP for Gardening Products and Services has been reformulated as a note that requires the plant species to be suitable for the local growing conditions (e.g., soil acidity, average rainfall, range of temperature over the year, etc). This is complemented with a technical specification according to the legal requirements on invasive alien species. According to (Regulation (EU) No 1143/2014) on invasive alien species 'invasive alien species' means an *alien species whose introduction or spread has been found to threaten or adversely impact upon biodiversity and related ecosystem services*. While all species compete to survive, invasive *alien* species are characterized by traits that allow them to out-compete native species. The invasive *alien* species are found to have an efficient rate of growth and reproduction, as well as a higher rate in using the resources from the ecosystem.

There was a general consensus that EU GPP should address loss of biodiversity, setting criteria to promote species locally adapted, and also aligning with the Biodiversity Strategy aimed at halting the loss of biodiversity, including avoiding and eradicating invasive alien species. In the case of species suitable for local conditions, they also demand fewer resources to grow, helping the minimization of water consumption, fertilizers, etc.

Criteria proposal

Core criteria	**Comprehensive criteria**
Technical Specifications	
TS1. Ornamental plants *Note: In order to reduce water and fertilizer consumption, purchased ornamental plants should be plant species suitable for the local growing conditions (e.g., soil acidity, average rainfall, range of temperature over the year, etc). A list of plant species defined as suitable for the local growing conditions must be provided by the local authority.* At least X%[a] of purchased ornamental plants must be either: 1. Organic: grown according to the requirements laid down in Regulation (EC) No 834/2007, the US National Organic Programme (NOP) or equivalent legal obligations set by trade partners of	**TS1. Ornamental plants** *Note: In order to reduce water and fertilizer consumption, purchased ornamental plants should be plant species suitable for the local growing conditions (e.g., soil acidity, average rainfall, range of temperature over the year, etc). A list of plant species defined as suitable for the local growing conditions must be provided by the local authority.* At least Y%[a] of purchased ornamental plants must be either: 1. Organic: grown according to the requirements laid down in Regulation (EC) No 834/2007, the US National Organic Programme (NOP) or equivalent legal obligations set by trade partners of

the EU; or 2. Integrated Pest Management (IPM): grown according to IPM principles as defined by the UN Food and Agricultural Organisation (FAO) IPM programme or EU Directive 2009/128/EC **Verification:** The tenderer must provide information (name and amount) of ornamental plants to be supplied in the execution of the contract indicating specifically the products that comply with the requirement for IPM or organic production. Documented transaction records that allow for the verification of compliance of individual plants or batches of plants as well as traceability back to the point of certification must be accepted. This includes valid certification for organic or IPM production[b].	the EU; or 2. Integrated Pest Management (IPM): grown according to IPM principles as defined by the UN Food and Agricultural Organisation (FAO) IPM programme or EU Directive 2009/128/EC **Verification:** The tenderer must provide information (name and amount) of ornamental plants to be supplied in the execution of the contract indicating specifically the products that comply with the requirement for IPM or organic production. Documented transaction records that allow for the verification of compliance of individual plants or batches of plants as well as traceability back to the point of certification must be accepted. This includes valid certification for organic or IPM production[b].
	TS2. Plants containers and packaging Plants must be delivered in containers (or crates or boxes in the case of small plants) that are one of the following: – Reusable (the tenderer must have a take-back system in place) – Biodegradable according to EN 14995:2007 or EN 13432:2000 standard If there are municipal composting facilities, compostable according to EN 14995:2007 or EN 13432:2000 standard **Verification:** If containers are reusable, tenderers must provide a description of the take-back system. Tenderers must also provide a copy of the signed agreement with the plant nursery, if they are not the plant nursery. If containers are biodegradable or compostable, tenderers must provide test reports showing that the composition of the materials fulfills the requirements according to EN 14995:2007, EN 13432:2000 standard, or equivalent.
TS3. Invasive alien species *(Same formulation for Core and Comprehensive)*	

Note: Preference should be given to plant species native to the area. If alien species are planted, ascertain that they will not become invasive, and take into account local or national policies for the control of invasive alien species, and the European policies on invasive alien species (EU Regulation 1143/2014).

The ornamental plants purchased must be native. If alien species are planted, it shall be ascertained that they will not become invasive.

Verification:

The tenderer must provide information (name) of ornamental plants to be supplied.

Explanatory Note

Experts are to be consulted for guidance to determine whether the plant species are native species, or if they are alien, that they will not become invasive if there is limited information on the types of species. In addition, it must be ascertained that the plant species match the local site conditions (soils, hydrology, precipitation, drainage, sun distribution, etc). Local or national lists of invasive plant species, as well as the List of Invasive Alien Species of Union concern detailed in Regulation 1143/2014 must be referred to.

Award Criteria

AC1. Additional ornamental plants Points will be awarded in proportion to each 10 % improvement upon the minimum technical specification of certified IPM or organic ornamental plant. **Verification:** See above TS1.	**AC1. Additional ornamental plants** Points will be awarded in proportion to each 10 % improvement upon the minimum technical specification of certified IPM or organic ornamental plant. **Verification:** See above TS1.

Explanatory notes

Ornamental plants

The contracting authority will have to specify how the percentage of purchase will be calculated, either in number or value. It could also require that for specific plants all of them should be organic to facilitate verification.

[a)] X% and Y% thresholds to be defined by the procurer

[b)] At the time of writing, the MPS-GAP certification scheme, the GLOBALGAP flowers and plants scheme have embedded within them principles of IPM as a requirement and may be considered to provide sufficient assurance for IPM production.

Consultation questions

- Do you agree with the current formulation of the criterion on ornamental plants?

4.2 Soil improvers

Rationale

Soil improvers are materials added to a soil to improve its physical properties, such as water retention, permeability, water infiltration, drainage, aeration and structure. The goal is to provide a better environment for roots.
A mulch is a layer of material (usually of organic nature) applied to the surface of soil. Although they are not, strictly speaking, considered soil improvers (soil improvers must be thoroughly mixed into the soil, while mulch is left on the soil surface), organic mulches reduce evaporation and runoff, inhibit weed growth, and create an attractive appearance. Organic mulches may be incorporated into the soil as amendments after they have decomposed to the point that they no longer serve their purpose.
There are two broad categories of soil improvers: organic and inorganic. Organic improvers include peat, wood chips, grass clippings, straw, compost, manure, biosolids, sawdust and wood ash. Inorganic improvers include vermiculite, perlite, and tyre chunks.
Peat is an accumulation of decayed vegetation or organic matter. It forms when plant materials are inhibited from decaying fully by acidic conditions. Even though peat has a biological origin, due to the slow regeneration rate it is considered non-renewable material. This means that peatlands store large amounts of carbon that is released due to peat mining, so they are an important source of GHG emissions. Because of that, the use of peat should be minimized.
The alternatives to peat-based soil improvers are compost and digestate, among others. Compost is the result of the 'composting' of organic waste, meaning a stabilisation and conditioning treatment based on the aerobic degradation of biodegradable waste. Nowadays, many municipalities have facilities to process the compost and provide it for horticulture. Anaerobic digestion is another process to stabilise waste that produces biogas as by-product. The output of this process is known as digestate. Nevertheless, the control of the quality of compost and digestate is important to minimize emissions from hazardous substances or from the presence of heavy metals in the mixture. This can be done by setting limit values on heavy metals or by restricting the use of some waste streams that may entail environmental risks to soil. In this regard, the core criterion excludes the use of compost and digestate from sewage sludge, the organic fraction of mixed municipal household waste and category 1 of animal by-products. These materials often fail to comply with the limit values on heavy metals or may be a risk for human health.

The comprehensive criteria proposal is partially aligned to the EU Ecolabel of soil improvers and mulch. Further information and technical indications about soil improvement and mulch can be consulted in (Commission decision (EU) 2015/2099) of 18 November 2015 establishing the ecological criteria for the award of the EU Eco-label for growing media, soil improvers

and mulch. These criteria aim at promoting the recycling of materials and the use of renewable and recycled materials, thus reducing environmental degradation and decreasing soil and water pollution by means of establishing strict limits on pollutant concentrations in the final product. The criterion proposal on organic constituents is aligned with the terms used by the Waste Framework Directive (Directive 2008/98/EC). They define the legal status of materials, i.e. waste, by-products, agricultural material, etc. which entails legal consequences for their treatment and disposal. However, they may be difficult to interpret and apply in real-life procurement cases. An explanatory note has been added to help clarify these terms.

Criteria proposal

Core criteria	**Comprehensive criteria**
Technical Specifications	
TS4. Organic constituents of soil improvers and mulch The following materials are not allowed as organic constituents of a final product: • Peat; • Materials totally or partially derived from the organic fraction of mixed municipal household waste separated through mechanical, physicochemical, biological and/or manual treatment; • Materials totally or partially derived from sludges derived from municipal sewage water treatment and from sludge derived from the paper industry; • Materials totally or partially derived from category 1 animal by-products according to Regulation (EC) No 1069/2009. **Verification:** Tenderers must provide the detailed composition of the product, the origin of organic matter and a declaration of compliance with the above requirements. Products holding the EU Ecolabel for growing media, soil improvers and mulch in accordance with the Commission Decision 2015/2099/EC or another relevant type I ecolabel fulfilling the listed criteria, will be deemed to comply. Other appropriate means of proof, such as a technical dossier of the manufacturer or a test report of an independent body, will	**TS4. Organic constituents of soil improvers and mulch** 1) The following materials are allowed as organic constituents of a final product: • Materials derived from the recycling of bio-waste from separate collection, as defined in Article 3 of Directive 2008/98/EC of the European Parliament and of the Council; • Materials derived from category 2 and 3 animal by-products as laid down in Article 32 of (Regulation (EC) No 1069/2009) of the European Parliament and of the Council and technical standards which are laid down by implementing Regulation (EU) 142/2011; • Materials derived from fecal matter, straw and other natural non-hazardous agricultural or forestry material as defined in Article 2.1(f) of Directive 2008/98/EC; • Materials derived from any other biomass by-products, as defined in article 5 of Directive 2008/98/EC, that are not mentioned above, subject to the provisions of 2) and 3); • Materials derived from recycling or recovery of any other biomass waste not mentioned above, subject to the provisions of 2) and 3). 2) The following materials are not allowed as organic constituents of a final product: • Peat;

also be accepted.	• Materials totally or partially derived from the organic fraction of mixed municipal household waste separated through mechanical, physicochemical, biological and/or manual treatment; • Materials totally or partially derived from sludge derived from municipal sewage water treatment and from sludge derived from the paper industry; • Materials totally or partially derived from category 1 animal by-products according to Regulation (EC) No 1069/2009; • Materials totally or partially derived from sludge other than those allowed in 3) below. 3) Materials derived from recycling or recovery of sludge are only allowed if the sludge comply with the following requirements: a) They are identified as one of the following types of waste according to the European List of Wastes, as defined by (Commission Decision 2000/532/EC). • 020305 sludge from on-site effluent treatment in the preparation and processing of fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco; conserve production; yeast and yeast extract production, molasses preparation and fermentation. • 020403 sludge from on-site effluent treatment in sugar processing. • 020502 sludge from on-site effluent treatment in dairy products industry. • 020603 sludge from on-site effluent treatment in baking and confectionery industry. • 020705 sludge from on-site effluent treatment in the production of alcoholic and non-alcoholic beverages (except coffee, tea and cocoa). b) They are single-source separated, meaning that there has been no mixing with effluents or sludge outside a specific production process. **Verification:** Tenderers must provide the detailed composition of the product, the origin of organic matter and a declaration of compliance with the above requirements.

<table>
<tr><td></td><td>Products holding the EU Ecolabel for growing media, soil improvers and mulch in accordance with the Commission Decision 2015/2099/EC or another relevant type I ecolabel fulfilling the listed criteria, will be deemed to comply. Other appropriate means of proof, such as a technical dossier of the manufacturer or a test report of an independent body, will also be accepted.</td></tr>
<tr><td>TS5. Hazardous substances (heavy metals) in soil improvers

The content of the following elements in the final product or constituent must not exceed the values shown below, measured in terms of dry weight (DW) of the product.

<table><tr><th>Element</th><th>mg/kg (dw)</th></tr><tr><td>Cadmium (Cd)</td><td>1</td></tr><tr><td>Chromium total (Cr)</td><td>100</td></tr><tr><td>Copper (Cu)</td><td>100</td></tr><tr><td>Mercury (Hg)</td><td>1</td></tr><tr><td>Nickel (Ni)</td><td>50</td></tr><tr><td>Lead (Pb)</td><td>100</td></tr><tr><td>Zinc (Zn)</td><td>300</td></tr></table>
Verification:

Tenderers must provide the relevant test reports (EN 13650 or equivalent; EN 16175 or equivalent for Hg) demonstrating that the above criterion is met.

Products holding the EU Ecolabel for growing media, soil improvers and mulch in accordance with the Commission Decision 2015/2099/EC or another relevant type I ecolabel fulfilling the listed criteria, will be deemed to comply. Other appropriate means of proof, such as a technical dossier of the manufacturer or a test report of an independent body, will also be accepted.</td><td>TS5. Hazardous substances (heavy metals) in soil improvers

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Verification:

Tenderers must provide the relevant test reports (EN 13650 or equivalent; EN 16175 or equivalent for Hg) demonstrating that the above criterion is met.

Products holding the EU Ecolabel for growing media, soil improvers and mulch in accordance with the Commission Decision 2015/2099/EC or another relevant type I ecolabel fulfilling the listed criteria, will be deemed to comply. Other appropriate means of proof, such as a technical dossier of the manufacturer or a test report of an independent body, will also be accepted.</td></tr>
<tr><td></td><td>TS6. Physical contaminants in soil improvers

The content of glass, metal and plastic with mesh size of > 2 mm (the sum of each contribution) in the final product must not exceed 0.5 %, measured in terms of dry weight.

Verification:</td></tr>
</table>

	Tenderers must provide the relevant test reports (CEN/TS 16202 or equivalent) demonstrating that the above criterion is met. Products holding the EU Ecolabel for growing media, soil improvers and mulch in accordance with the Commission Decision 2015/2099/EC or another relevant type I ecolabel fulfilling the listed criteria, will be deemed to comply. Other appropriate means of proof, such as a technical dossier of the manufacturer or a test report of an independent body, will also be accepted.
	TS7. Product performance of soil improvers a) Products must not adversely affect plant emergence and subsequent growth; b) The organic matter as loss on ignition of the final product must be at least 15% dry weight (% DW); c) The dry matter content of the final product must be at least 25% of the fresh weight (% FW). **Verification:** Tenderers must provide the relevant test reports (a: EN 16086-1 or equivalent; b: EN 13039 or equivalent; c: EN 13040 or equivalent) demonstrating that the above criterion is met. Products holding the EU Ecolabel for growing media, soil improvers and mulch in accordance with the Commission Decision 2015/2099/EC or another relevant type I ecolabel fulfilling the listed criteria, will be deemed to comply. Other appropriate means of proof, such as a technical dossier of the manufacturer or a test report of an independent body, will also be accepted.
	TS8. Primary pathogens in soil improvers The content of primary pathogens in the final product must not exceed the following levels: a) Salmonella spp: absent in 25g fresh weight b) E.coli: <1000 CFU/g fresh weight (CFU: colony-forming units) **Verification:** Tenderers must provide the relevant test

	reports (a: ISO 6579 or equivalent; b: CEN/TR 16193) demonstrating that the above criterion is met. Products holding the EU Ecolabel for growing media, soil improvers and mulch in accordance with the Commission Decision 2015/2099/EC or another relevant type I ecolabel fulfilling the listed criteria, will be deemed to comply. Other appropriate means of proof, such as a technical dossier of the manufacturer or a test report of an independent body, will also be accepted.

Explanatory notes

The technical specification on organic constituents of soil improvers is aligned with the terms used by the Waste Framework Directive. They define the legal status of materials, i.e. waste, by-products, agricultural material, etc. which entails legal consequences for their treatment and disposal. Some definitions and examples are listed below to help their application :

- "Materials derived" means that the constituents need to be the result of stabilisation and conditioning treatments of the waste, animal by-product, etc. Those treatments may be anaerobic digestion, composting, pyrolysis, or combinations of different treatments.
- "Recycling of bio-waste from separate collection, as defined in Article 3 of Directive 2008/98/EC of the European Parliament and of the Council" means composting or anaerobic digestion of the biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, separately collected.
- "Category 2 and 3 animal by-products as laid down in Article 32. of Regulation (EC) No 1069/2009 of the European Parliament and of the Council and technical standards which are laid down by implementing Regulation (EU) 142/2011" means bodies or parts of animals, products of animal origin, etc., not intended for human consumption, that are allowed to be treated by means of composting and anaerobic digestion;
- "Fecal matter, straw and other natural non-hazardous agricultural or forestry material as defined in Article 2.1(f) of Directive 2008/98/EC" means the residues resulting from agricultural and forestry activities that do not have the legal status of waste or by-product. They do not pose any environmental or health risk and are usually reused within the same agricultural or forestry activity;
- "Organic fraction of mixed municipal household waste separated through mechanical, physicochemical, biological and/or manual treatment" means bio-waste that has not been collected separately;
- "Category 1 animal by-products according to Regulation (EC) No 1069/2009" pose health and environmental risks related to diseases and contaminants and require specific treatments

Consultation questions

- Do you agree with the alignment of the soil improvers' chapter of EU GPP criteria for Gardening Products and Services with the revised criteria for the EU Ecolabel for growing media, soil improvers and mulch?
- Do you agree with the introduction of a technical specification at Core level (identical to the one at Comprehensive level) limiting heavy metals contents?

4.3 Automatic irrigation systems

Rationale

Irrigation of green areas may lead to significant water consumption, and non-efficient irrigation systems often provoke great loss of water. The main purpose of the proposed criteria is to contribute to the reduction of water consumption for irrigation, by setting criteria that ensure the efficiency of the automatic irrigation systems.

Following the 1st AHWG meeting, the formulation of the criterion on Automatic Irrigation has been made clearer.

Criteria proposal

Core criteria	**Comprehensive criteria**
Technical Specifications	
TS9. Automatic irrigation *(Same formulation for Core and Comprehensive levels)* The automatic irrigation systems must allow for detailed parametrization, namely in what concerns: • Allowing the set-up of different irrigation zones; • Possibility to adjust the volume of dispensed water by zones; • Possibility to program watering time periods by zones; • Possibility to measure soil humidity level and to automatically block the irrigation when it is high enough (as defined by the contracting authority), for example after rain, by zones. **Verification:** Tenderers must provide appropriate documentation demonstrating that these criteria are met. The contracting authority will provide the guidelines based on the water resources availability characteristics specific to the climate and location of the irrigation system.	

Consultation questions
○ Do you agree with this criterion?

4.4 Gardening Services

Rationale

Pest control and invasive alien species
The products aimed at the protection of plants could be biological, physical or chemical. Those products do not just refer to insecticides but also herbicides, fungicides, bactericides and other substances. Plant protection is used in gardening services to control disease, competitors and to ensure growing and healthy plants. Usually, pest control is aimed at a special group of organisms; this means that this typology of products has a selective effect against specific pests. Nevertheless, products for pest control can have counterproductive side effects, e.g. they could adversely affect the pest's natural predators or induce the appearance of resistant lineages of weeds, pests or diseases in general. They can also affect species that are crucial for biodiversity, i.e. pollinators. Overall, pest control actions may produce a negative alteration of biodiversity. Other impacts relate to the eco-toxicity in soil, water and air.

The use of plant protection products in the EU is highly regulated. All products available on the market have to be submitted to a control and a risk evaluation to human health and the environment (European Commission, 2018). Directive 2009/128/EC Directive 2009/128/EC establishes the framework for the sustainable use of pesticides, addressing topics such as the training of users, advisors, and distributors of pesticides, inspection of pesticide application equipment, the prohibition of aerial spraying, limitation of pesticide use in sensitive areas etc. It promotes the use of Integrated Pest Management (IPM) in order to enhance low pesticide-input management including non-chemical methods.

The invasion of alien species is one of the major causes of biodiversity loss in Europe. In addition, it constitutes economic (affecting human health, damaging infrastructures and causing agricultural losses) and ecological problems (damage to ecosystems and extinction of species), causing as result EUR 12 billion damages per year. The EU Regulation 1143/2014 on Invasive Alien Species has been developed to contain this problem, and minimize the environmental and economic consequences. The European Commission prioritises action on a list of invasive alien species of Union concern, and the Regulation provides a set of measures that include prevention, early detection and rapid eradication, and management (European Commission, 2013).

The proposed criterion on pest control and invasive alien species management is based primarily on the provision of an annual Phytosanitary Treatment Plan that encompasses the actions aimed at pest and invasive alien species control according to the legal framework for invasive alien species and IPM.

The comprehensive level for this criterion is aligned with the suggestions from stakeholders seeking a more ambitious position of the GPP criteria. The criteria proposal sets the exclusion of chemical pests for the control of pest and invasive species, in line with local practices developed by some municipalities.

Water depletion

Due to climate issues, especially in the South of Europe, water depletion constitutes a strong environmental impact of gardening activities. Improvement areas for these activities were proposed in the GPP for gardening activities, and include:

- Use non-potable water for watering
- Calculate accurately the water needs of each green area
- Install and programme correctly efficient irrigation systems
- Apply mulching as a prevention and water saving techniques
- Arrange plants according to their hydric requirements
- Select regional plants adapted to the weather conditions

The purification of water to make it safe to drink (also known as potabilization) is a productive chain that has environmental impacts and costs itself, which is why potable water should not be used for irrigation activities.

With respect to watering practices, the revised proposal does not include the contract clause on a water requirement study from the tenderer as it could potentially discriminate against small tenderers due to the perceived high cost of the exercise as pointed out by stakeholders. Whereas, in order to guarantee the sustainable use of water, the local authority should outline detailed guidelines on both water requirements and watering practices specific to the climate and the water resource availability.

Furthermore, as pointed out in the note of the contract performance clause, the contracting authority should specify the water source, preferably as a combination of rain water, ground water and filtered grey water, based on the availability of infrastructure.

The current formulation of the contract performance clause does not include a specification on manual irrigation as it would not be aligned with the technical specification of the automatic irrigation systems or with the content of the contract clauses on watering practices.

Waste generation

Plant delivery could generate a large amount of waste (see section 4.1). Gardening services should ensure the correct management of this waste flow and separate as much as possible recyclable or reusable material. In addition, all the organic waste (if available) must be collected separately and composted or sent to a public composting plant.

The gardening service should provide machines to shred the resulted wood from forest activities and re-use it as mulch in situ.

Enhancement of biodiversity
Inputs from stakeholders called for the inclusion of criteria to promote biodiversity. This has been addressed in the revised proposal, which includes a contract performance clause to ensure that gardening practices, which enhance biodiversity, are carried out. The proposed contract performance clause is aimed primarily at ensuring that: natural flora and fauna is developed, best landscaping and forestry activities are implemented, and no plant species is dominant (in relative proportion to other plant species). Many countries, regions, and cities are developing their own Biodiversity strategies at a local level, according to the European framework (Ajutament de Barcelona, 2013), (Belgian National Focal Point to the Convention on Biological Diversity (ed.), 2013), (DEFRA, 2011). These plans are an important contribution in order to provide local data on both native and invasive alien species, and to set the policies of conservation and promotion of natural spaces. In line with these strategies, the contract performance clause and the explanatory note propose a set of gardening practices meant to enhance biodiversity in public spaces. These come from examples of public procurement provided by stakeholders. The contracting authority would have to provide the contractor with the list of local species and gardening practices adapted to the local conditions.

All machinery and vehicles employed in the provision of gardening services must respect the proposed EU GPP criteria for machinery and vehicles in Chapters 5 and 6 respectively, as well as the common criteria for service categories in Chapter 7.

Criteria proposal

Core criteria	Comprehensive criteria
Technical Specifications	
TS10. Ornamental plants and soil improvers used for the provision of gardening services • The ornamental plants supplied during the provision of the gardening services must be compliant with the requirements of the relevant technical specifications (TS1 to TS3) at Core level. • The soil improvers used for the provision of the gardening services must be compliant with the requirements of the relevant technical specifications (TS4 and TS5) at Core level.	**TS10. Ornamental plants and soil improvers used for the provision of gardening services** • The ornamental plants supplied during the provision of the gardening services must be compliant with the requirements of the relevant technical specifications (TS1 to TS3) at Comprehensive level. • The soil improvers used for the provision of the gardening services must be compliant with the requirements of the relevant technical specifications (TS4 to TS9) at Comprehensive level.

Verification: See the verification of the relevant technical specifications.	**Verification:** See the verification of the relevant technical specifications.
TS11. Pest control and invasive alien species management The tenderer must present an annual Phytosanitary Treatment Plan. *(this could be combined with an award criterion evaluating the quality of such a plan)* This plan will take into account local or national policies for control of invasive alien species, and of the European policies on invasive alien species (EU Regulation 1143/2014). The plan must comply with the provisions of EU Directive 2009/128 / EC on the sustainable use of pesticides and according to the local policies on the use of chemicals. **Verification:** The tenderer must present the Phytosanitary Treatment Plan.	**TS11. Pest control and invasive alien species management** The tenderer must present an annual Phytosanitary Treatment Plan, which must only include non-chemical treatment methods such as thermal, mechanical or biological treatments. *(this could be combined with an award criterion evaluating the quality of such a plan).* This plan will take into account local or national policies for the control of invasive alien species, and the European policies on invasive alien species (EU Regulation 1143/2014). **Verification:** The tenderer must present the Phytosanitary Treatment Plan.
Core criteria	**Comprehensive criteria**
Contract Performance Clauses	
CPC1. Watering practices *(Same formulation for Core and Comprehensive)* *Note: The contracting authority needs to specify the use of locally recovered water sources (as a combination of rainwater, ground water and filtered grey water) based on the availability of infrastructure in order to allow the contractor to comply with this contract performance clause.* Watering practices must: • Use rain, reclaimed, recycled or phreatic water when technically possible. • Minimize the use of potable water. • Apply mulching to avoid evaporation in the areas specified by the contracting authority. • Use automatic irrigation systems as provided by the contracting authority and fit the volume of dispensed water according with plant needs. In this case the contractor will be in charge of the maintenance of the said irrigation system. Records of watering practices must be kept and made available to the contracting authority for verification purposes. The contracting authority may set rules for penalties for non-compliance.	

CPC2. Waste management

(Same formulation for Core and Comprehensive)

Waste produced during the carrying out of gardening services must be collected separately and managed as follows (*the contracting authority can/should limit the management options according to the local circumstances)*:

- All organic waste (dry leaves, pruning, grass) must be composted "in-situ", in the company facilities or by contracting out this practice to a waste treatment enterprise.
- Woody organic waste from branches, etc. must be shredded "in situ" or in the company facilities and used as mulching in the agreed areas.
- Packaging waste must be separated into the existing urban waste fractions and placed into the corresponding street containers (*paper, plastic and other - available waste streams to be inserted*.). However, packaging waste of dangerous substances, such as plant protection products, must be disposed of safely in approved collection points or through an authorized waste manager for further treatment.

Records of the management of waste produced during gardening operations must be kept and made available to the contracting authority for verification purposes. The contracting authority may set rules for penalties for non-compliance.

CPC3. Pest control and invasive alien species management

(Same formulation for Core and Comprehensive)

The contractor will carry out the service according to the *Phytosanitary Treatment Plan* following the Directive 2009/128/EC on sustainable use of pesticides.

The presence of any plants or animals suspected to be invasive must be reported to the contracting authority and adequate control measures must be defined in joint agreement.

Records of plant protection operations for pest control and invasive alien species management actions, including specific techniques and products used must be kept by professional users following the Regulation (EC) No 1107/2009 and made available to the contracting authority for verification purposes.

The contracting authority may set rules for penalties for non-compliance.

CPC4. Gardening practices and enhancement of biodiversity

(Same formulation for Core and Comprehensive)

*Note: The contracting authority needs to provide the contractor with the practices to be implemented to enhance biodiversity**

The contractor must carry out gardening practices to enhance biodiversity that may involve a combination of the following:

- ensuring that no species will exceed the X% of all the ornamental plants or trees planted

- developing spontaneous natural flora and fauna**

- implementing best landscaping and forestry activities measures[+]

Records of plant species introduced, landscaping and forestry activities implemented must be kept and made available to the contracting authority for verification purposes. The contracting authority may set rules for penalties for non-compliance.

Explanatory notes

Gardening practices and enhancement of biodiversity

The contracting authority will have to specify the maximum percentage of all the ornamental plants or trees planted that should not be exceeded by each species. Recommended values X=15%.

**Experts are to be consulted to check whether the planted species are native species, or if they are alien, that they will not become invasive. Local or national lists of invasive plant species, as well as the List of Invasive Alien Species of Union concern detailed in Regulation 1143/2014 must be referred to.*

***Where possible, the following practices should be implemented to encourage the development of spontaneous natural flora and fauna:*

- *employ nectar-rich native plants able to provide wildlife benefits*
- *use just organic means of pest control*
- *leave standing decaying wood on site where appropriate to provide a habitat for wildlife*
- *encourage the well-being of desired native species*
- *mark some of the most visible areas with informative posters that explain the purpose of these measures*

+Landscaping and forestry activities should account for the natural cycle of the plants and the wellbeing of the local fauna, by ensuring that:

- *natural grass areas will, in the main, be cut and maintained as 'meadow grassland'*
- *the pruning activities will be carried out outside of the breeding season*
- *the isolation of the habitats will be avoided ensuring the continuity of the natural systems where possible*

Consultation questions

- Do you agree with the criterion on watering practices?
- Do you agree with the requirement of an annual Phytosanitary Treatment Plan for the management of pests and invasive alien species?
- Would the requirement at the comprehensive level that asks to only include non-chemical treatment methods be implementable at the practical level?
- Do you agree with the criterion on gardening practices and enhancement of biodiversity? Do you think that this criterion should be either more specific or stringent?

4.5 Cost considerations

The practices for gardening activities proposed in this study can result in cost savings for administrations. As shown in the experience carried out at (Havard University, 2018) with an organic landscaping maintenance program, the sustainable management of green areas can result in overall advantages, both economic and environmental. In the first year of

implementation the program was able to save 30% of water and reduce the use of products including fertilizer and products for disease control.
With this in mind, we can consider that performing gardening activities in accordance with environmental criteria may enhance savings for public administrations. Nevertheless, we have to consider that additional costs can occur because often organic and environmentally friendly products have a higher price on the market (e.g. ornamental plants, eco-labelled certified products, reusable packaging etc). Even still, experience shows that boosting biodiversity and sustainable maintenance of green areas can result in a reduction of irrigation needs and plant protection.

5 Draft Proposed EU GPP criteria for Machinery

Scope

Machinery comprises a wide range of equipment defined under the scope of the following legislations:

- the machinery directive 2006/46/EC
- the outdoor noise directive 2000/14/EC (Annex I, item No. 46)
- the NRMM exhaust emission regulation Reg(EU) 2016/1628

A listing of the equipment considered within the criteria for machinery is provided in the revised scope and includes:

- gardening machinery (e.g. lawnmowers, hedge cutters, etc)
- municipal machinery (e.g. compact sweepers and spreaders).

5.1 Machinery for Cleaning and Gardening Activities

This category initially covered the procurement of the machinery products identified in the Preliminary Report and TR1.0. Following stakeholders inputs, the names of some of the products have been corrected as follows:

- Lawn-mowers (including walk-behind or ride-on grass cutting machines)
- Scarifers
- Chainsaws
- Brush cutters
- Grass trimmer/grass edge trimmer
- Hedge trimmers
- Pruners and similar hand-operated machines
- Leaf collectors and leaf blowers
- Motor-hoes
- Pedestrian controlled powered tillers
- Shredders /chippers (following the definition applicable to gardening equipment available in the guidelines for the application of Directive 2000/14/EC (European Commission, 2017)

Additionally, compact sweepers and spreaders previously categorized as vehicles are now reclassified in Chapter 5 following comments received from stakeholder on TR1.0. Chapter 6 presents an extensive overview of the environmental and technical issues relating to these products. An extensive justification for this reasoning is provided in Section 2.1.

5.1.1 Machinery Engine Exhaust Emission

Rationale

The main environmental impact related to the use of machinery are exhaust emissions (such as carbon monoxide, nitrogen oxide, etc) generated from internal combustion engines with human health and environmental implications as detailed in the Preliminary Report.

A wide variety of internal combustion engines (compression-ignition (CI), or spark-ignition (SI)) are used in mobile machinery deployed for the maintenance of public spaces. CI and SI engines are referred to as carburettor and injection engines respectively, and depending on the working cycle of both engines types may be either two-stroke or four-stroke.

Two-stroke engines with carburettor or pre-chamber fuel injection are overall noisier, more polluting (emitting more VOCs and CO but lower NOx) due to their inability to completely separate the inlet gases from the exhaust gases. Consequently, up to 30% of the fuel is unburnt, with the additional need to introduce lubricating oil into the fuel chamber. Four - stroke engines have a separate reservoir for fuel and oil, are generally quieter, more fuel efficient and are less polluting than conventional two - stroke engines.

Two-stroke engines are mostly utilized in off-road applications (chainsaws, leaf blowers, trimmers, etc) due to their light weight and handling ability (particularly in over-head situations). In contrast, machinery equipped with four-stroke engines (such as lawn mowers) are used in on-ground applications. Lawnmowers with two-stroke engines are no longer produced.

Machinery equipped with engines capable of using cleaner burning fuels (e.g. compressed natural gas, propane) can help reduce exhaust air emissions. However, the use of electrically powered machinery (corded or cordless) could completely eliminate direct exhaust air pollutant emissions. As they do not require hydrocarbon fuels for their operation, electric powered and battery powered products are generally more environmentally positively ranked across most impact categories (e.g. the absence of direct air pollutant emissions).

Cordless electric machines use the energy stored in on-board batteries with the advantage that there are no cords to pull around and they do not depend on the availability of electric grid and mains power. Although operating time is limited by the capacity of the battery which depends on the time for a single charge (20 to 60 minutes), reports indicate that advancements in battery technology has increased runtimes by 50% on most tools and provides four to eight hours of continuous runtime on most types of equipment (STIHL, 2017a) (STIHL, 2017b).

Available market information indicates that there is a growth in the share of corded and cordless units, and a decrease in the amount of petrol units

being sold being sold (EGMF, 2017), (Husqvarna Group, 2018). In 2015, of the 17 million PSM machinery and equipment sold in Europe, 9.9 million were petrol units, 4.7 million corded units, and 2.4 million cordless units.

In Europe, engines exhaust emissions are currently regulated by Regulation (EU) 2016/1628 of the European Parliament and of the Council of 14 September 2016 which applies as of 1 January 2017 (this is also known as the "NRMM Regulation"). The NRMM regulation sets Stage V engine emission requirements relating to gaseous and particulate pollutant emission limits (Carbon monoxide (CO), Hydrocarbons (HC), Nitrogen oxides (NOx), and Particulates (PT)) and type-approval for a very wide variety of engines for non-road mobile machinery including those used for the maintenance of public spaces. It applies as from 1 January 2018 for approval of new engine types, and will be effective in 2019 for all sales. It sets for the first time, for CI engines >19kW, a limit on the number of particulates which should drive the adoption of diesel particulate filters (DPFs) engines with power ranges >19 kW (Perkins Engines Company Limited, 2018).

To encourage the purchase of machinery with lower engine exhaust emissions, the best available performing technologies in the market could be used as starting points for drafting GPP criteria. A review of Type I ecolabel criteria showed that apart from the Nordic Ecolabelling criteria relating to fuel consumption and exhaust gas emissions of Machines for parks and gardens (Nordic Ecolabelling, 2018), no other ecolabel had criteria for this product group. The (German Blue Angel, 2017) does not include requirements for engine exhaust emissions). Therefore, it is proposed to set the technical specification at the core level to align with existing exhaust air pollution emission to promote machinery operating with engines that comply with Stage V limits.

At the comprehensive level, the technical specification is designed to encourage the purchase of machinery capable of being operated with zero engine exhaust emissions. These would include corded and cordless machinery technologies.

During the 1st AHWG meeting, stakeholders welcomed the alignment of the core criteria with the Stage V limits but there was a lack of consensus on the criterion at the comprehensive level – the criterion required zero exhaust emission. A stakeholder complained that the criterion at the comprehensive level was too stringent and could not be met by manufacturers.

From an EU GPP perspective, requesting only Stage V emission limits at both the core and comprehensive level of the criterion would not be sufficiently ambitious as the Stage V limits are anticipated to apply by January 2019 and there is evidence that a market exists for a majority of handheld machinery which have corded and cordless versions (STIHL, 2013), (Husqvarna, 2017a), (Husqvarna, 2017b), (STHIL, 2018), (Robert Bosch GmbH, 2018). Battery powered riding mowers are also currently

available (STIGA, 2017) and (Hasqvarna, 2017c), but the scale of their availability is unknown. Nevertheless, to incentivise their further development and deployment, zero emissions ride on mowers are also covered within the scope of the proposed comprehensive criterion.

During the 1st AHWG meeting, feedback was sought from stakeholders on whether the engine useful life measured by the emission durability period (EDP) should be introduced to support the criterion on engine exhaust emissions. The EDP is the number of hours or, where applicable, the distance used to determine the deterioration factors. The deterioration factors are a set of factors that indicate the relationship between emissions at the start and end of the emission durability period (Cummins Inc, 2017).

No consensus was found between the Stakeholders. Stakeholders supporting the introduction of the EDP stated that it would be a significant improvement to support the engine exhaust emissions. However, those opposed to it questioned the "value added" of its introduction as machines would be relatively new even at the end of a lease period of 3 to 5 years.

Moreover, as the emission testing of engines that have been operated in the field within the regulatory useful life timeframe are aimed at ensuring compliance with the limits imposed by the NRMM, no value is added by the introduction of the EDP. Therefore, the introduction of the EDP is not explored further.

Compact sweepers are machines as defined by the Machinery Directive 2006/42/EC- since it is a vehicle not intended for use on the road and with a maximum design speed not exceeding 25 km/h. The engines of compact sweepers are covered by several pieces of EU legislation. These include: (1) (Regulation 715/2007 on type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information, (2). Regulation 595/2009 on type approval of motor vehicles and engines with respect to emissions from heavy duty vehicles (Euro VI) and on access to vehicle repair and maintenance information, as amended by Commission Regulation (EU) No 582/2011, and (3), REG (EU) 2016/1628 emission limits for internal combustion engines for non-road mobile machinery (See Task 1 Report: Scope, definitions and Legislation).

Therefore, compact sweepers can be equipped with any combination of engines including EURO 6, EURO VI or Stage V engines (Johnston Sweepers, 2017a), (FPT Industrial, 2016), (Hatz Diesel, 2014). It is anticipated that all compact sweepers and spreaders in the market should be compliant with the Stage V limits, and publicly available information suggests that there are compact sweepers in the market with engines complying with Euro 6 emission standard (Bucher Municipal AG, 2012). Therefore, the legal background is used a basis for technical specification for this criterion at the core level.

Setting technology based requirements, which demand less or zero air pollution emissions could mitigate the environmental impacts from compact sweepers. Electric powered options are favoured as the future for compact sweepers. These electrically-driven versions are already available (Johnston Sweepers, 2017b), (The Tennant Company, 2012), run on a lithium ion battery, have no air pollutant emissions, and are viable options for achieving environmental improvements. To push environmental improvements via the purchase of these, an award criterion is proposed.

Criterion Proposal

Core criteria	**Comprehensive criteria**
Technical Specification	
TS 1. Engine Exhaust Emissions The engine exhaust emissions of the mobile machinery must be in compliance with at least one of the following: i. Euro 6 - Regulation 715/2007 ii. Euro VI - Regulation 595/2009 iii. Stage V - REG (EU) 2016/1628 **Verification**: The tenderer must provide an engine test report or type approval certificate demonstrating that the engine emission performance limits are in conformity with the criterion. The test report must be from an independent body that meets the requirements of EN-ISO/IEC 17025. The type approval certificate must indicate the type approval number of the engine.	**TS 1. Engine Exhaust Emissions** The machinery must operate with zero exhaust emissions. **Verification**: The tenderer must provide a copy of the type-approval certificate of the power unit of the machinery.
Award Criteria	
AC1. Zero Exhaust Emissions Points will be awarded to machines that can demonstrate zero exhaust emissions capability meaning the machinery can run without any direct engine exhaust emission. **Verification**: The tenderer must provide a copy of the type-approval certificate of the power unit of the machinery.	

Consequences

The criterion is anticipated to ensure that machinery complying with the emission limits of the most current regulations – at the core level, and those with the lowest possible exhaust emissions performance – at the comprehensive level are procured.

Consultation questions
○ What are your opinions about the reformulated criterion at the comprehensive level. ○ Are there enough accredited testing laboratories competent for conducting these tests?

5.1.2 GHG emissions of compact sweepers and spreaders

Refer to Section 6.1.1. The same rationale and criteria as for truck-mounted sweepers and spreaders applies.

5.1.3 Water consumption (for compact sweepers using water for dust suppression)

Refer to Section 6.1.3.

5.1.4 Distribution performance of spreaders

Refer to Section 6.1.4.

5.1.5 Battery quality

Rationale

Given the increasing market shares of electric, battery-operated, robotic products - robotic mowers gained rapidly in popularity as their total market for Europe was 170 million dollars in 2012, with a 30 % growth rate per year (EU Commission – DG ENTR, 2014) - the potential impacts, which could arise from the deployment of batteries as well as their operational lifetime, need to be addressed. The results of environmental assessments of different battery types for stationary applications indicates that battery technologies using lead-acid, nickel-cadmium and nickel-metal have a higher environmental impact than nickel chloride batteries (Hiremath, M., et al., 2015), (Matheys, J. et al., 2009).

The EU Batteries Directive 2006/66/EC of September 6, 2006 prohibited the use of cadmium in cordless power tools until 31 December 2016 after which its use is prohibited. A similar prohibition also applies to mercury in all batteries.

PSM machinery generally use two main types of secondary (i.e. rechargeable) battery types available in the market, Ni-MH and Li-Ion. NiCd batteries are being phased out. Li-ion batteries have the highest energy density of all battery types (The Battery University, 2018). Due to technology evolution there is a trend toward the deployment of these powerful, higher-cost, and lighter-weight Li-ion batteries. Global battery consumption is projected to increase in the coming years, and Li-ion is showing the largest market growth of all the available battery technologies (Pillot, C, 2016). As suitable cadmium-free substitutes for use in cordless power tools applications are available on the market, namely nickel-metal hydride and lithium-ion battery technologies (Pillot, C, 2016), a criterion on battery was introduced in TR1.0.

During the 1 AHWG meeting, a stakeholder noted that garden and outdoor power manufacturers are dependent on their suppliers for the availability of batteries. The same stakeholder also expressed concern that the EN 61960 standard is too general and not suitable for several applications in the garden machinery sector, and requested that the EU GPP criteria should also include the possibility of the appropriate testing by the manufacturer in addition to the EN 61960 standard.

The same stakeholder was also of the opinion that the criteria on battery heavy metal content with the suggested award criterion on battery heavy metal content (mercury, lead and cadmium) limits which are much lower than the current applicable legislation, namely the Batteries Directive and the REACH Regulation. In addition, the proposed limits, notably for mercury, are very low and even close to detection limits.

In TR2.0, from an EU GPP perspective, as public space maintenance equipment and machinery are produced by companies with an obligation to comply to regional quality and legislations, the verification requirements

have been retained but updated to reflect applicable European battery testing standards with a slight modification due to the addition of "equivalent standards" cited in (European Commission – DG ENV., 2008).

It is acknowledged that the heavy metals content limits proposed in TR.1.0 are lower than the levels stipulated in the existing regulation. However, this is linked to the high quality (replacement rate, power density, and minimal environmental issues) anticipated of rechargeable batteries that the EU GPP criteria seek to promote. Current market figures indicate that Li-Ion batteries are showing the largest market growth of all the available battery technologies (Pillot, C, 2016). This should result in lower amounts of these heavy metals in rechargeable batteries. Moreover, the requirements are aligned with similar criteria available in two Type I Ecolabels (Nordic Ecolabelling and German Blue Angel). Although special care might be needed to detect mercury content levels close to the detection limits of <0.1 ppm, the technology for conducting this analysis appears to be available. This was supported by stakeholders who stated that manufacturers use batteries from main battery manufacturers (as batteries are seldom built in-house), and battery manufacturers should be able to provide accredited testing laboratories certificates following standards from battery industry.

Therefore, no change has been made to the award criterion on heavy metal content.

Criterion Proposal

<table>
<tr><th>Core criteria</th><th>Comprehensive criteria</th></tr>
<tr><td colspan="2">Technical Specification</td></tr>
<tr><td colspan="2">TS2. Battery rechargeability and quality
(Same formulation for Core and Comprehensive)

The battery must meet the performance requirements specified below:
1) EN 61951-2 – Nickel-Metal Hydride Batteries
2) EN 61960 – Lithium Ion Batteries

Verification:
Tenderers must provide a test report verifying battery quality and performance to EN 61951-2 for NiMH or to EN 61960 for lithium ion batteries. Test reports verifying battery quality and performance to equivalent standards will be deemed to comply. The test report must be from an independent testing laboratory that fulfils the requirements for the competence of testing and calibration laboratories according to EN ISO/IEC 17025.</td></tr>
<tr><td colspan="2">Award Criteria</td></tr>
<tr><td colspan="2">AC2. Battery heavy metal content
(Same formulation for Core and Comprehensive)</td></tr>
</table>

Points will be awarded for the provision of battery-powered machinery employing rechargeable batteries with lower heavy metal concentration than those specified below:

Mercury < 0.1 ppm

Cadmium < 1.0 ppm

Lead < 5 ppm

Verification:

See above TS2.

Consequences

This criterion proposal will encourage the use of PSM equipment with reduced environmental impacts.

Consultation questions
○ What could be the average limits available in practice for each of the heavy metals considered in this criterion? ○ Are there enough battery products in the market able to comply with the award criterion?

5.1.6 Criterion withdrawn

Noise Emission

Rationale

Noise pollution has been identified in the preliminary report as one of the significant environmental impacts from the use of machinery for the maintenance of public spaces. In Europe, machinery noise regulation is carried out through the outdoor equipment directive 2000/14/EU which sets out noise requirements for equipment used outdoor indicated through the sound power level which must be declared.

The Machinery Directive 2006/42/EC regulates the noise level for the operator. This mandates a determination and declaration of the emission sound pressure level. However, this declaration is only required if the emission sound pressure level exceeds 80 dB(A). All types of machinery covered by the outdoor equipment directive must be labelled with the guaranteed sound power level before they can be sold in Europe.

Developments in battery technologies such as improved performance and the increasing lower prices of rechargeable battery packs have enabled manufacturers to develop a range of cordless machinery (Technavio Research, 2016) which are capable of operating with very low noise emissions and zero exhaust emissions. As they are electrically powered, these products do not have any direct emissions and are quieter than the

conventional machines running with diesel or petrol powered engines. Electric lawn mowers generate roughly a tenth of the noise level of gasoline powered mowers, at 84-88 db(A), and robotic mowers produce less noise emission (EU Commission – DG ENTR, 2014) (Table 1).

This represents a potential market sector where growth can be expected in the future. If this trend continues, it is anticipated that they could replace a certain percentage of internal combustion engine equipment, although it is currently difficult to predict what share of the market this could be as there is a lack of information for this sector.

The electric category, which covers corded and battery-powered products, is showing the strongest growth rate due to the introduction of new innovation and technology. Particularly, growth in electric products is being driven by battery-powered products (robotic lawn mowers and handheld products) such as trimmers, hedge cutters and chainsaws (Husqvarna Group, 2018). Although the initial costs of these products are high, as their performance improves, demand for them is also projected to increase.

Table 1. Comparison of Lawnmowers, (www.topten.ch, 2018)

Type	Battery type	Charging time (mins)	Noise level (dB)	Cost (EUR)
Robotic	Li –Ion, LiFePO4	60-110	51-94	999 - 4200
Battery powered	Li –Ion	55 – 150	78 – 94	449 - 965
Electric cable (corded)			77 - 96	450 - 999

The criterion on noise emission proposed in TR 1.0 at the comprehensive level was based on the review of noise limits available for the relevant products in Type I Ecolabels (German Blue Angel and Nordic Ecolabel) and the increasingly positive developments envisaged in the electric powered machinery product sector as evidenced by noise emission limits available from the websites of several manufacturers.

Most stakeholders agreed with the importance of the criterion, and suggested that it might be simpler address energy use, noise and air pollution together by simply increasing the percentage of efficient electric machines being used. Such an approach would simplify the GPP approach on these issues and would be better understood both by procurers and tenderers. A stakeholder objected to the proposed criterion with arguments that: the market share of battery electric powered machinery is still small, the noise emissions limits are too stringent (especially for professional equipment), and could be counter-productive as it could stifle

the development of powerful electrically-driven products to replace combustion engine powered machines.

There is an ongoing consultation on the evaluation and impact assessment of the Directive and a possible revision of Directive 2000/14/EC, for which the ODELIA study is a very important element (European Commission, 2018b). The ODELIA study was commissioned by the European Union to study the suitability of the current scope and limit values of Directive 2000/14/EC relating to noise emission by equipment used outdoors. Also, as there is not enough available data to produce the necessary benchmarks for deriving an acceptable noise emission criterion, the only alternative would be to revert to the best available technologies demonstrating a better performance than those conventionally available.

Only battery electric machinery can achieve additional noise reductions. However setting an award criterion to complement a technical specification which specifies limits based on the existing Noise regulation would be unambitious from GPP perspective and also redundant as the criterion for exhaust emissions invariably, by default, serves the same purpose. Given the complexity of the situation described above, the criterion is withdrawn, also for the provision of machinery service.

5.1.7 Machinery Lubricant

Rationale

Lubricants are substances introduced between surfaces in contact, to reduce friction and also minimize the heat generated when the surfaces move. The lubricants relevant to PSM product group are those related to machinery and equipment lubrication and are detailed in the Preliminary Report. They include:

- Engine oils used in internal combustion engines of machinery. This includes two - stroke and four – stroke lubricant oils.
- Gears oils used in transmissions and differentials in machinery
- Hydraulic fluids used in machines and equipment to transfer pressure from one point to another
- Chainsaw oils
- Greases - semi-solid lubricants usually consisting of soap emulsified with oil

Lubricants are commonly manufactured from base fluids and additives. The main classes of lubricants according to the specific kind of base oil are: renewable (mainly vegetable) oil based lubricants and mineral oils based lubricants. In addition, there are synthetic lubricants based on artificially made oils (i.e chemically modified petroleum or other chemically modified raw material) and regenerated oils based lubricants. For the technical characterization of lubricants, the Preliminary Report provides a comprehensive background.

The vast majority of lubricants use mineral oil as base fluid. It is derived from petroleum sources, such as crude oil, shale oil, and coal-bed methane. After the refining process, these mineral oils can be of different types, paraffinic oils, naphthenic oils, and aromatic oils. A few lubricants use renewable (mostly vegetable) oils as base oil instead of mineral oil; these vegetable oils are primarily triglyceride esters derived from plants. From an environmental perspective, toxicity and biodegradability are important aspects to consider in case of spillage of the lubricant in the environment. Considering that the lubricants which are relevant for this PSM machinery are spilled to the environment, biodegradability and toxicity are relevant issued to take into consideration for the criteria setting. Traditional mineral oil based lubricants are not the best performing option due to their inability to biodegrade, and to the fact they remain in the ecosystem for a long time. Renewable oils, due to their natural origin and synthetic oils that can be fine-tuned during its synthesis to have a proper biodegradability and toxicity level seems to be best options for loss lubricants.

The operation of machinery results in the generation of wastes oils (lubrication and industrial). Regeneration is used to recycle these used oils from a wide variety of industrial applications. It results in the production of high quality base oils that can be blended with suitable additives by formulators to meet required lubricating oils specifications for the intended application. Regenerated has been re-termed "re-refined" as re-refining is the process that returns the oil to a quality suitable for its original use. Regeneration does not necessarily mean that the lubricant is suitable for its original use. Re-refined lubricant oils are mostly deployed in four-stroke applications, and can reduce the use of raw materials in mineral oils. They also have additional environmental benefits because the toxic heavy metals (e.g., zinc, lead, cadmium, and chromium) are extracted from the used oil. These metal compounds are solidified and stabilized into asphalt flux, thereby posing minimal environmental risk. If used oils are combusted, however, metals in the flue gases can be released into the atmosphere unless they are captured by air pollution abatement equipment.

Machinery equipped with engines requires lubricants. Two - stroke engines run on a mixture of gasoline and two - stroke lubricant oil. Two - stroke oil is a particular type of motor oil intended for use in crankcase compression two-stroke engines. The oil is mixed with gasoline (resulting in petroil) and is distributed throughout the engine for lubrication. The lubricant is consequently released into the environment during the combustion cycle of the engine.

Lubricants (chainsaw oils and/or greases) are also required for cutting parts of machinery that are not enclosed such as the bar and chain of chain saws and there is essentially no difference in the type of lubrication used regardless of the power source of the machine (i.e. electric or gasoline-powered).

Machinery such as lawn mowers as well as sweepers and spreaders operating on four - stroke cycle engines also require lubrication with the aid of four - stroke oils. In four - stroke engines, the oil and fuel are contained in separate chambers. Four-stroke engines are lubricated by oil contained in the oil sump. The oil is distributed through the engine by splash lubrication or a pressurized lubrication pump system to ensure cooling and the reduction of friction; these systems may be used alone or together. Although the four - stroke lubricants are not totally lost due to combustion with the fuel (as in the two - stroke), accidental losses (due to spills, improper waste or disposal) can occur.

Hydraulic fluids (pressure fluids) and gear oils are used in systems for the protection of hydraulic machine components and also to transfer power. They are commonly found in hydraulic machinery such as excavators and backhoes, hydraulic brakes, transmissions, garbage trucks, aircraft flight control systems, lifts, and industrial machinery. Gear oils perform a similar function, although they are made specifically for transmissions, transfer cases, and differentials in automobiles, trucks, and other machinery.

For the first proposal (TR1.0), the criterion on lubricants focused only on two - stroke and chainsaw oils. Therefore, the criterion and the verification requirements were aligned with the version of the revision of the EU Ecolabel of Lubricants (Commission Decision 2011/381/EU) available at the time of the drafting of the report. The latter aims to promote in addition to bio-based lubricants, several alternatives to conventional mineral lubricants that present good biodegradability potential, low toxicity and are not bioaccumulative.

The majority of stakeholders agreed with the criterion proposed but asked that: 1) it is aligned with the EU Ecolabel for Lubricants that are currently being revised; 2) the use of regenerated lubricant oils should also be considered. However, an objection was raised that poly-alphaolefins (PAOs) or poly-alkylene glycols (PAGs) are highly refined chemicals that require a lot of energy to produce. According to the stakeholders, this contradicts the EU objectives of improving energy and resource efficiency. Furthermore, as regards carbon derived from renewable raw materials, there are not enough raw materials in the market that would be suitable for combustion lubrication without increasing emissions.

In this report TR2.0, the criterion and the verification requirements are aligned with the latest version of EU Ecolabel for lubricants, as established in Commission Decision (EU) xxx/xx/EU (currently under revision). This version of the EU Ecolabel for lubricant followed a technology neutral approach opening the scope to all type of lubricants (independent to the nature) that are able to comply with the environmental criteria. Therefore, criteria on renewability, PAG, PAO_S minimum content were finally not proposed.

For these GPP criteria it is proposed to set requirements in line with the basic toxicity and biodegradability requirements of the EU Ecolabel for

lubricant. Going beyond the product classification and the w/w% of non-biodegradable/bioaccumulative substances, would be very complex requirements to be used for the GPP. This approach has been followed in the EU GPP for transport. (Quintero, R.R., et al, 2018). Following this approach renders the award criterion proposed in TR.1.0 redundant. It has therefore been removed from this version of the technical report.

The scope of the proposed criterion in TR1.0 is also updated to consider greases, gear oils, hydraulic fluids and four - stroke oils previously omitted in the first technical report. Considering that four - stroke oils for four-stroke engines are not covered by the EU Ecolabel for Lubricants, this is addressed in this technical report (TR2.0) through the introduction of a technical specification on low viscosity lubricants (LVL). The specification is aimed at improving the performance of four - stroke engines, complemented with a requirement for the use of re-refined lubricating oils. This proposal is in alignment with section 11.3 of the EU GPP for transport (Quintero, R.R., et al, 2018).

Criterion Proposal

Core criteria	**Comprehensive criteria**
Technical Specification	
TS3. Machinery Lubricant *This criterion is applicable only if the relevant lubricants are included at the time of purchase.* Hydraulic fluids, gear oils, chainsaw oils, two-stroke oils and greases used in PSM machinery must not have Health or Environmental Hazard statement or R-phrase at the time of application (Lowest classification limit in Regulation (EC) No. 1272/2008 or Council Directive 99/45/EC). The cumulative mass percentage of substances present in the hydraulic fluids and greases that are both non-biodegradable and bioaccumulative must not be more than 0.1% (w/w). **Verification**: The tenderer must provide the technical sheets of the relevant lubricant to be supplied. Products that are compliant with EU Ecolabel or equivalent type 1 ecolabel fulfilling the above requirement will be deemed to comply. For four-stroke lubricants, unless the manufacturer of the machinery recommends another type of lubricant, the lubricant of the machinery must be low viscosity engine lubricant oils (LVL) or re-refined lubricant oils, with a minimum of 25% re-refined base oils. LVL are those corresponding to SAE grade number 0W30 or 5W30 or equivalent. **Verification**: The tenderer must provide a declaration of compliance with this criterion supported by the material safety data sheets for all products supplied in the execution of the contract.	

Consequences

This criteria proposal will enable the use of high performing, environmentally friendly lubricants.

Consultation questions
○ Do you agree with the technical specification for machinery lubricants? ○ Does this result in additional difficulties in sourcing environmentally friendly, non-toxic and biodegradable lubricants?

5.1.8 Criterion withdrawn

Machinery Materials

Rationale

The manufacture of PSM machinery requires the utilization of different materials such as petrol based material (plastics and rubbers), or metallic materials, which require a large amount of energy during their production as detailed in the Preliminary report. Thus the production of these raw materials contributes significantly to the life cycle environmental impacts of the machinery examined.

Plastics are the second most dominant materials used after metals in making machinery which are employed for PSM, and most of them have been chemically modified to enable the material withstand outdoor working conditions through the addition of various chemicals such as Phthalates (e.g. DEHP (di(ethylhexyl) phthalate), dibutyl phthalate (DBP) and butyl benzyl phthalate (BBP)). As phthalates are not chemically bound to the material, they can leak from materials and be absorbed by the body.

These substances are classified as toxic to human life and the environment and as highly toxic to aquatic organisms. The EU has introduced restrictions for a few of these phthalates. In the European Union the use of DEHP, BBP, and DBP are restricted for all toys; DINP, DIDP, and DNOP are restricted only in toys that can be taken into the mouth. The restriction is hinged to the condition that the amount of these phthalates may not be greater than 0.1% mass percent of the plasticized part of the toy.

The high molecular weight phthalates DINP, DIDP and DPHP are not classified for any health or environmental effects and have been registered under REACH. However, the lower molecular weight products BBP, DEHP, DIBP, and DBP have been included in the Candidate list of Substances for Authorization under REACH in February 2011. Therefore from February 2015 they are not allowed to be produced in the EU unless authorization has been granted for a specific use, however they may still be imported in consumer products.

In the TR1.0, a criterion limiting the presence of a whole group of phthalates used as plasticizers in the manufacture of PSM related machinery was proposed. The introduction of this was based on research results that indicating that biobased plasticizer based on vegetable oils could be manufactured at the same price with similar performance compared to the one of the most commonly used, phthalate, dioctyl phthalate. Information available from countries such as Denmark also indicated a potential trend of Member states towards limiting and phasing out phthalates in the public demand for products and services on a voluntary basis.

Stakeholders had split views on this criterion. Those in favour acknowledged that the criterion might be used only when purchasing the machines but hardly when purchasing services. This is because requiring detailed information on machinery materials might be too complicated when buying services. They suggested it could still be acceptable if it was proposed only as an Award Criteria at the comprehensive level, but it might be limited in its impact. The stakeholder against the criterion questioned the added value of the criterion to improve health and environment protection. It was the opinion of the latter that the use of some chemicals, such as cadmium, lead and mercury, are necessary in very specific applications to ensure performance, durability and safety of equipment as such a "ban" could compromise equipment safety. This concern was also raised by another stakeholder who commented that proposing percentages as parameters would only help if the impact of implementation of the criterion did not affect the structural stability or integrity of manufactured parts.

Furthermore, the verification of the compliance and enforcement of the requirements of the criterion was questioned as according to the same stakeholder, the current available methods used in the garden machinery sector for phthalates has a detection limit of 50 mg / kg.

In considering how to address the comments from the stakeholders, the two Type I ecolabels have criteria specifying limits for this criterion were reviewed. Although there is an indication that there may be some gardening machinery capable of meeting this criterion (VIKING, 2012), (www.topten.ch, 2018), the information is not conclusive. Also phthalate-free plasticizer has applications in medical devices, child products, and food packaging but it is unclear if it can be applied for use for plastics used for PSM related machinery used. Summarily, there is not enough information to assess the number of ecolabelled machinery to retain the criterion.

This coupled with the difficulty of verifying compliance due to the current detection limits, has led to a decision to withdraw the criterion, also for the services section.

5.1.9 Machinery operation and maintenance

Rationale

As described in the preliminary report, the operation of machinery is a major contributor to the overall impacts arising throughout its life span. Proper operation of machinery and equipment can result in a reduction in both fuel consumption and environmental impacts.

Criterion Proposal

Core criteria	**Comprehensive criteria**
Technical Specification	
TS4. Operation and maintenance instructions The machinery must be supplied together with its technical specifications and also user information relevant for operating the machinery with reduced fuel and energy consumption, maintaining, and extending its lifespan. **Verification**: The tenderer must provide user instructions containing information about operating and maintaining the machinery.	

Consequences

The provision of operation and maintenance instructions will lead to the proper operation of supplied equipment and machinery with the consequence of minimized environmental impacts arising from its use.

5.2 Machinery used in the provision of services

This criteria set covers the requirements on machinery used for the delivery of public maintenance services including:

- Gardening services
- Cleaning services

These services are to be achieved with the aid of gardening machinery (e.g. lawnmowers, hedge cutters, etc), and municipal machinery (e.g. for compact street sweepers and spreaders) as detailed in the machinery products section.

Inputs gathered from stakeholders on machinery used for the provision of services agreed that although there is a positive trend in the development of battery electric equipment, a complete switch by service providers may not be practically feasible. According to a stakeholder, the introduction of the electric battery technology in the professional public space maintenance sector is subject to the condition that the equipment has an equivalent performance to the petrol-powered products. It was also argued that this is not the case now, nor will not be the case in the near future as the energy content of a battery does not match the energy content of petrol at equivalent weight.

From an EU GPP perspective, it is acknowledged that these comments could be more applicable to certain types of machinery rather than the complete range of machinery equipment deployed for the maintenance of public spaces. Consequently, the criteria originally proposed in TR1.0 have been partially amended in this report TR2.0.

5.2.1 Machinery Engine Exhaust Emissions

Rationale

The maintenance of public spaces requires the deployment of a variety of machinery and equipment (which may be based on different technologies) in parallel. Over time, older machinery will be retired and replaced by those based on current technologies.

Electric battery powered machinery is increasingly being used as it has zero direct emissions and very low noise emission levels but it does not constitute the only technology in any machinery fleet. No publicly available information detailing the inventory of machinery employed by public authorities was available to enable a disaggregation of the different technologies. However, information obtained from the Waste and Public Space Maintenance Authority of the city of Seville, indicated that a significant proportion of the engines of the machinery deployed for the professional maintenance of public spaces in the city, are fuel engines, and only a small fraction are electric battery powered. This resulted in the first proposal presented documented in TR1.0 requesting percentages (X% at

the core level, and Y% at the comprehensive level) of the machinery fleet used in carrying out the service to operate with zero exhaust emissions. See also 5.1.1.

During the 1st AHWG meeting, the opinion of stakeholders was sought on what would be reasonable percentages to be proposed at the core and comprehensive levels for machinery employing zero exhaust emission engines. Stakeholders commented that only a low number of machines would be capable of meeting the engine exhaust emission criterion but none provided any values for the percentage of the machinery to be used in carrying out the service that should fulfil the requirements of engine emissions as stated in TS8 of TR1.0.

However, a stakeholder mentioned that the percentages would differ in different markets and suggested that alternative ways to limit the use of outdated machinery should be considered. This could be by indicating, for example, the number of year machinery can be used before they need to be replaced by electric machines. It might also be helpful to include minimum warranties for purchasing new machinery.

In this report (TR.2.0), to address the comments from the stakeholders through a balanced approach while retaining elements of the original criterion, a reformulated criterion which reflects this market situation is adopted.

Table 2. Machinery useful life (Switzerland Federal Office for the Environment, 2015)

Machine type	Engine type	Lifetime (years)
Chainsaws (professional)	Petrol (2-str)	2.4
Motor scythes, trimmers, cutters (professional)	Petrol (4-str)	2.9
Motor scythes, trimmers, cutters (professional)	Petrol (2-str)	2.9
Hedge cutters (professional)	Petrol (2-str)	3.6
Hedge cutters (professional)	Electricity	3.6
Blowers (professional)	Petrol (4-str)	3.0
Blowers (professional)	Petrol (2-str)	4.2
Lawn mowers (professional)	Petrol (4-str)	2.9
Ride-on mowers (professional)	Petrol (4-str)	3.6
Scarifiers (professional)	Petrol (4-str)	3.6
Mill cutters/shredders (professional)	Petrol (4-str)	3.6
Shredders (professional)	Petrol (4-str)	3.6

The NRMM regulation will result in an increase in the number of machinery complying with Stage V. Therefore a technical specification at both the core and comprehensive level is proposed that all machinery satisfy this regulation as a minimum. The average useful life of machinery employed in the provision of gardening services is about 3.5 year (when rounded up) after which it is replaced (see Table 2), (and it is very likely that less polluting machinery powered by battery will be procured as replacement). This corresponds to a replacement rate of roughly 25% of the machinery fleet. This percentage is thus applied as a minimum at the core level. At the comprehensive level, it is proposed that this minimum is fixed at 50% of the machinery being equipped with zero exhaust emission engines, the remaining percentage will be in compliance with the Stage V limits specified by the NRMM regulation. The current average share of battery powered machinery in a sweeper fleet is unknown. However, as the proportion of this type of machinery will increase over time, a percentage yearly increase of 10% is proposed which includes different yearly tiers from 2019 to 2021 to reflect the market evolution, maintain the ambition level, and to prevent the deployment of non-complaint equipment. The objectives of the technical specification are complemented by an award criterion and contract performance clause.

Criterion Proposal

Core criteria	**Comprehensive criteria**
Technical Specification	
TS5. Machine Engine Exhaust Emissions *Note: this criterion is not applicable to compact sweepers and spreaders* Mobile machinery used in carrying out the service must be in compliance with the following: 1) Meet at least Stage V 2) Must be zero exhaust emission – 2019: 25% of machinery must be zero exhaust emission – 2020: 35% of machinery must be zero exhaust emission – 2021: 45% of machinery must be zero exhaust emission – 2022: 55% of machinery must be zero exhaust emission	**TS5. Machine Engine Exhaust Emissions** *Note: this criterion is not applicable to compact sweepers and spreaders* Mobile machinery used in carrying out the service must be in compliance with the following: 1) Meet at least Stage V 2) Must be zero exhaust emission – 2019: 50% of machinery must be zero exhaust emission – 2020: 60% of machinery must be zero exhaust emission – 2021: 70% of machinery must be zero exhaust emission – 2022: 80% of machinery must be zero exhaust emission

Verification: Same as TS1 together with the list of the machinery intended to be used for providing the PSM service, their certificates of conformity, and copies of the type-approval certificate of the power unit of the machinery.	**Verification**: Same as TS1 together with the list of the machinery intended to be used for providing the PSM service, their certificates of conformity, and copies of the type-approval certificate of the power unit of the machinery.
Award Criteria	
AC3. Machine Engine Exhaust Emissions (*Same for core and comprehensive)* Points will be proportionately awarded to the tenderer with a proportion of machinery fleet exceeding the requirements of TS5. **Verification:** Same as TS5.	
Contract Performance Clause	
CPC 1. Machine Engine Exhaust Emissions (*Same for core and comprehensive)* *Note: this criterion applies only if the replacement machinery satisfies operational needs as defined by the contracting authority and is agreed with the service provider.* If the machinery employed for the service is to be replaced during the contract, the replacement must be machinery with zero exhaust emission. The yearly records on the machinery maintenance and replacement schedule must be made available to the contracting authority for verification purposes. The contracting authority may set rules for penalties for non-compliance.	
Explanatory Notes • The replacement of machinery is recommended when the machinery is approaching the end of its useful life or due to irreparable damage. • Zero exhaust emissions machinery can run without any direct engine exhaust emission.	

Consequences

This criteria proposal will enable the provision of PSM services with a reduction in direct release of environmental pollutants.

Consultation questions

- Do you agree with the criterion at both core and comprehensive level?
- What could be possible exceptions to the applicability of the current criterion?

5.2.2 Air pollutant emissions

Rationale

This criterion is applicable only to the engines of compact sweepers and spreaders, and seeks to minimize air pollutant emissions by setting technology based requirements which demand less or zero air pollution emissions from engines built into these machinery (see Section 5.1.1 and 5.1.2).

All machines which fall within the scope of Stage V, must comply with the exhaust emission limits specified in the regulation as of 2019. The regulation applies the EU as of 1 January 2017 and must be implemented as of 1 January 2019. The regulation also has a 24-month transition period and a replacement engine provision.

The transition period commences with the effective date for placing Stage V engines on the market and applies to all engine categories. During this period, it is possible to put engines of a previous emission stage on the EU market. However, they must comply with the previous emission stage and must have been produced by the effective date of Stage V.

Also machines with transition engines must have been produced 18 months after the effective date of Stage V at the latest and put on the market no later than 6 months after that. However, engines with a power range of 56 kW up to 130 kW are exempt, and have an effective date of 1 January 2020, followed by the applicable 24-month transition period.

The replacement engine provision will enable the replacement of broken engines by new previous-Stage engines (e.g. Stage IIIB, Stage IV), and effectively enhances the possibility of replacing a broken engine by another engine meeting the same characteristics to keep it in use.

The criterion proposal seeks to ensure that the most environmentally benign technologies are deployed for the delivery of machinery services. However, it is difficult to set the same requirements for the contracting of services as those that apply for procurement. This would entail requiring the service provider to renew all their compact sweepers and spreaders (which comply with lower phase standards) which would be very capital intensive. This situation is not anticipated to change quickly given the provisions in the regulation.

The effective service life of a compact sweeper is 6 to 7 years (Government of Southampton, 2007), (Switzerland Federal Office for the Environment, 2015). This corresponds to replacing on average every year less than 20% of the sweepers. No information on the average share of compact sweepers and their engine technologies in current fleets is

available at the European level. However, it is expected that service providers will already be able to guarantee fleets which comply with the different regulations applicable to compact sweepers.

Consequently, the technical specification at the core level reflects the existing state of play vis-a-vis regulation and industry practice for self-propelled (compact) sweepers with low noise commercial diesel engines (German Blue Angel, 2018a) . It is proposed that all sweepers comply with Stage IV or Euro 5/V at the core level to prevent the deployment of non-complaint sweepers.

The NRMM regulation will result in an increase in the number of sweepers that are compliant with Stage V or Euro 6/VI emission limits. A minimum percentage of 30% is proposed at the core level and 50% at the comprehensive level. The current share of compact sweepers capable of meeting Stage V or Euro 6/VI emission limits in a service provider's sweeper fleet is unknown. However, as the proportion of sweepers complying with Stage V or Euro 6/VI emission limits will increase naturally over time, a percentage yearly increase of 10% is proposed as a basis to ensure that the ambition level is maintained.

There is a positive trend in the development and deployment of battery powered compact sweepers (IEM Magazine, 2018), but service providers may not be able to guarantee that a sweeper fleet composed only of battery powered compact sweepers. Therefore at the core level, it is suggested that 20% of the compact sweepers be battery powered (as the technology is already available and in use), and 50% at the comprehensive level. It is anticipated that service providers will progress from offering compact sweepers complying with Stage V or Euro 6/VI emission limits to those that are battery powered. Therefore, a percentage yearly increase of 5% is proposed as a basis to promote the technology and drive its deployment.

An award criterion is proposed to reward service providers capable of offering a service fleet with a higher proportion of battery electric compact sweepers. At the comprehensive level, same scenario is maintained but with a requirement for a higher proportion of battery electric power compact sweepers.

Criterion Proposal

Core criteria	**Comprehensive criteria**
Technical specification	
TS6. Air pollutant emissions performance *Note: this criterion is only applicable to compact sweepers and spreaders* The air pollutant emissions performance of the engine of the sweepers and spreaders used in carrying out the service	**TS6. Air pollutant emissions performance** *Note: this criterion is only applicable to compact sweepers and spreaders* The air pollutant emissions performance of the engine of the compact sweepers used in carrying out the service must be in

must be in compliance with the following: 1) Must be at least Stage IV or Euro 5/V 2) Must be Stage V or Euro 6/VI – 2019: 30% of sweepers and spreaders must meet Stage V or Euro 6/VI – 2020: 40% of sweepers and spreaders must meet Stage V or Euro 6/VI – 2021: 50% of sweepers and spreaders must meet Stage V or Euro 6/VI – 2021: 60% of sweepers and spreaders must meet Stage V or Euro 6/VI 3) Must be zero exhaust emission – 2019: 20% of sweepers and spreaders must be zero exhaust emission – 2020: 25% of sweepers and spreaders must be zero exhaust emission – 2021: 30% of sweepers and spreaders must be zero exhaust emission – 2022: 35% of sweepers and spreaders must be zero exhaust emission The tier applicable will correspond to the year that the call for tender is launched. Where sweepers and spreaders are not certified as meeting Stage IV or higher, but technical after-treatment* has achieved the same standard, this should be documented in the tender. **Verification:** Same as TS1 together with the list of the machinery intended to be used for providing the PSM service, their certificates of conformity, and copies of the type-approval certificate of the power unit of the machinery. For those vehicles having achieved above-mentioned standard following a technical upgrade the measures must be documented and included in the tender, and this must be verified by an independent third party that meets the requirements of EN-	compliance with the following: 1) Must be Stage V or Euro 6/VI – 2019: 50% of sweepers and spreaders must meet Stage V or Euro 6/VI – 2020: 60% of sweepers and spreaders must meet Stage V or Euro 6/VI – 2021: 70% of sweepers and spreaders must meet Stage V or Euro 6/VI – 2022: 80% of sweepers and spreaders must meet Stage V or Euro 6/VI – 2) Must be zero exhaust emission – 2019: 50% of sweepers and spreaders must be zero exhaust emission – 2020: 60% of sweepers and spreaders must be zero exhaust emission – 2021: 70% of sweepers and spreaders must be zero exhaust emission – 2022: 50% of sweepers and spreaders must be zero exhaust emission **Verification:** Same as TS1 together with the list of the machinery intended to be used for providing the PSM service, their certificates of conformity, and copies of the type-approval certificate of the power unit of the machinery.

ISO/IEC 17025.	
Notes: **Engines complying with a prior emission stage to Stage V are allowed to be installed, if they are retrofitted with DPF system certified according one of the following certificates and if they have a gravimetric separation efficiency of at least 90%:* – *Anlage XXVII Nummer 3 StVZO* – *UNECE Regulation R 132, reduction stage 01, Class I or II* – *FAD e.V. Siegel (Status February 2015 or newer)* – *VERT filter list (Status September 2016 or newer)* – *BAFU filter list*	
Award criteria	
AC4. Improved air pollutant emissions performance (*Same for core and comprehensive)* Points will be awarded in proportion to each percentage improvement upon the minimum technical specification required in TS6. **Verification:** Same as TS6.	

5.2.3 Water consumption (for compact sweepers that use water for dust suppression)

Refer to Section 6.2.3.

5.2.4 Distribution performance of spreaders

Refer to Section 6.2.4.

5.2.5 Maintenance of the mobile machinery equipment

Refer to Section 6.2.6.

5.2.6 Battery quality

Rationale

The rationale presented during the 1st AHWG meeting is provided in section 5.1.2. Stakeholders supported this criterion as it was considered important from an environmental view point. Also, meeting the criteria should not present any major hurdles as the majority of machinery producers/manufacturers use batteries from main international battery manufacturers, which are able to satisfy the requirements. They pointed out that there might be costs associated with providing test reports which might be passed on in the cost of the tender but these cases should/would not represent the common practice as the battery manufacturers should ideally provide tested/ certified batteries to the machinery manufacturer.

It was suggested that the criteria could be considered only at the comprehensive level as it might be easier to implement when purchasing machinery but more difficult when purchasing services. The criterion is accordingly modified so it is only at the comprehensive level.

Criterion Proposal

Core criteria	Comprehensive criteria
Technical Specification	
	TS7. Machinery battery rechargeability and quality All the machines must be equipped with battery systems compliant with the technical specification TS2 in section 5.1.5. **Verification:** Same as TS2 in section 5.1.5 together with the list and technical data sheet of the machinery fleet to be employed for the service provision.
Award criteria	
	AC5. Battery heavy metal content Points must be awarded to tenders offering a service fleet proportionally to the share of machines that are equipped with battery systems compliant with AC2 on machine battery heavy metal concentration as defined in section 5.1.5. **Verification:** Same as AC2 in section 5.1.5 together with the list and technical data sheet of the machinery fleet to be employed for the

	service provision.

Consequences

Please refer to section 5.1.5.

Consultation questions
○ Do you agree that this criterion should be only at the comprehensive level?

5.2.7 Criterion withdrawn

Noise Emission

Rationale

There is a potential for providing a PSM service with machinery having much lower noise levels than the limits specified in the Noise Regulation because products with this feature are already available (see section 5.1.6 and the Preliminary Report). However, the criterion is withdrawn following the same reasoning as outlined in section 5.1.6

5.2.8 Machinery Lubricant

Rationale

These criteria apply only if the service provider claims ownership of the lubricants, or employs the lubricants detailed in under criterion 5.1.7 in machinery used for the execution of the contracted service.

Following the 1st AHWG meeting, it has been updated to reflect the requirements of the EU Ecolabel for Lubricants with the reformulation of the criterion and the deletion of the award criterion.

Criterion Proposal

Core criteria	**Comprehensive criteria**
Contract Performance Clause	
CPC2. Machinery Lubricant (*Same for core and comprehensive)* The contractor must ensure that the hydraulic fluids, gear oils, chainsaw oils, two-stroke oils and greases used in PSM machinery employed for the service are complaint with TS3 on machinery lubricants tyres as defined in the section 5.1.7. The contractor will keep records which shall be made available to the contracting authority. The contracting authority may set rules for penalties for non-compliance. For four-stroke lubricants, unless the manufacturer of the machinery recommends another type of lubricant, the contractor must replace the lubricants used in PSM machinery employed for the service with that complaint with TS3 on machinery lubricants for four-stroke engines. The contractor will keep records which must be made available to the contracting authority. The contracting authority may set rules for penalties for non-compliance.	

Consequences

This criteria proposal will enable the provision of PSM services with a reduction in environmental pollution.

Consultation questions
○ Do you agree with the reformulation of the criterion?

5.2.9 Criterion withdrawn

Machinery Materials

Rationale

See 5.1.8

5.3 Cost considerations

There is hardly any information on the life cycle cost (LCC) of machinery. However, generally, similar to vehicles, in order to estimate the total LCC, operating and disposal costs should be considered in addition to the purchasing price. Other costs that will be incurred in the operating phase of the machinery (relating to fuel or energy consumption, maintenance, and replacement (substitution of engine oil and spare parts)) costs also have to be considered.

Across all types of engines, battery electric operated products have significantly less exhaust and noise emissions. However, they are more expensive to buy. No specific data was found on the LCC of PSM machinery to enable a proposal to be made based on this criterion.

A major concern of an industry stakeholder is that the investment cost of battery electric machinery is two to three times higher than that of equivalent petrol-powered machine, and that it would be impossible for buyers to recover this over the lifetime of the product. It was also stated that batteries have disadvantages due to their limited power range and capacity in terms of size and costs, as they require a stationary power source for recharging. The sensitivity of batteries to extreme climate and temperature conditions was also viewed as a constraint to recommending them.

From an EU GPP perspective, a number of manufacturers have launched machinery capable of meeting the requirements of professional users in extreme climate and weather conditions. These technologies are evolving and are anticipated to address weight–balance issues as depicted by examples which are currently being marketed (HortWeek, 2016). Also battery electric powered machinery consume less energy than combustion engine machinery (EU Commission – DG ENTR, 2014). This is expected to translate into lower overall life cycle cost, for example battery-powered ride-on mowers have a lower cost of ownership compared with the diesel-fuelled mowers over a projected service life of seven years (Charif, M., 2013). In addition, information available from the website of a manufacturer suggests that the annual energy cost of battery versus petrol tools well below 10 per cent, assuming fuel costs of around £1.07 per litre and electricity £0.10 per kWh (Robert Bosch GmbH).

Lastly, a forward commitment by public authorities articulated through public contracts that promote advanced technologies would incentivise manufacturers and push the market to respond.

6 Draft Proposed EU GPP criteria for vehicles and service fleets

6.1 Vehicles for Cleaning and Gardening activities

Procurement of vehicles with reduced environmental impact

The scope of these criteria comprises:

- Heavy duty vehicles, meaning vehicles of category N_2 and N_3, as defined by Directive 2007/46,
- Special vehicles and other special purposes vehicles as defined by Directive 2007/46:
  - Street cleaning vehicles (sweepers)
  - Vehicles for winter maintenance (spreaders)

The scope excludes compact sweepers and spreaders that are considered non-road mobile machinery and therefore covered by section 5.

6.1.1 GHG emissions

Rationale

Technologies

There is currently a data gap that hinders an EU-harmonised approach to formulate criterion based on energy consumption or CO_2 emissions performance for heavy duty vehicles and special purpose vehicles. The European Commission has already developed a simulation tool called VECTO (Vehicle Energy Consumption calculation Tool), which is aimed to support the certification, monitoring and reporting of CO2 emissions from heavy duty vehicles. However, not enough data based on VECTO are available to produce the necessary benchmarks, and in the case of special purpose vehicles, VECTO is not expected to model their duty cycles in the mid-term. Therefore, the only alternative is formulating criteria based on the available technology options that have demonstrated a better performance than the average.

For rigid trucks, a literature review has been carried out to identify the technologies that are able to reduce GHG emissions compared to a conventional diesel vehicle. The fuel consumption of heavy duty vehicles are highly dependent on the duty cycle, therefore, a distinction is made between urban and regional cycles. Table 1 gathers the information from the literature reviewed (JRC, 2016b), (ICCT, 2017), including the type of technology, and whether it is appropriate for one cycle or other, or both.

Table 1. Technologies for rigid trucks (JRC, 2016b), (ICCT, 2017)

Type of technology	Technology	Urban cycle	Regional cycle
Hybridisation	Stop/start battery systems	Yes	Yes, but worse than urban
Hybridisation	Mild hybrid	Yes	Yes, but worse than urban
Hybridisation	Full hybrid	Yes	Yes, but worse than urban
Alternative fuels	Full electric and plug-in vehicle	Yes	No
Alternative fuels	Fuel cell vehicle	Yes	Yes
Aerodynamics	Active flow control	No, due to low speed operation	Yes
Aerodynamics	Boat tails/ extension panels	No, due to low speed operation	Yes

The use of natural gas vehicles may result in better performance than their equivalent diesel vehicles using specific technologies, according to the latest published studies. First of all, there are two different engines used in natural gas vehicles that determine their performance: compression-ignition engines used in dual-fuel vehicles and spark-ignition engines used in dedicated vehicles. According to basic thermodynamics, compression-ignition engines are, in general, more efficient than spark-ignition since they work at higher compression ratios. The efficiency losses of dedicated vehicles due to this reason vary between 20 and 45% (LowCVP, 2017). LowCVP report also indicates that dedicated natural gas vehicles will be optimised in the coming years; however, the improvement is expected to be marginal.

Dual-fuel engines run on both diesel and natural gas, with gas-energy ratios (meaning the percentage of diesel fuel replaced by gas in dual-fuel mode) from 24 to 47%. Efficiency losses of dual-fuel vehicles compared to conventional diesel are small, but most dual-fuel vehicles are aftermarket conversions and they show high levels of methane slips. These emissions of methane, with a GWP of 25, cancel the potential benefits of the lower carbon intensity of natural gas (IEA, 2017), (LowCVP, 2017). New dual-fuel vehicles by original equipment manufacturers (OEM vehicles) still represent a very small share of the market, but the number is growing (Ricardo-AEA, 2015). Since they are new vehicles in the market, they shall be compliant with Euro VI limit for methane, which is expected to entail a significant decrease in methane slip (LowCVP, 2017), (ICCT, 2016a). According to Ricardo-AEA, methane slip could be abated to 1% of the total GHG emissions of the vehicle. However, none of the test programmes consulted (Ricardo-AEA, 2015), (Cenex and Atkins, 2016), (LowCVP, 2017), measured the methane slips of OEM dual-fuel vehicles. Substitution

rates will also improve in OEM dual-fuel vehicles, up to 50%. Manufacturers are also developing high pressure direct ignition (HPDI) engines that use diesel fuel as a pilot in a compression ignition engine. This technology is expected to achieve gas substitution ratios above 95% with no loss of engine efficiency. This engine was developed by Westport, and Volvo has recently implemented it in trucks (Ricardo, 2013), (Cenex and Atkins, 2016).

With all this data, it is feasible to estimate the theoretical relative performance of a natural gas vehicle compared to an equivalent diesel vehicle, assuming both are identical in engine size and transmission, which might not be reproducible in real practice. The natural gas vehicles are also assumed to be compliant with Euro VI methane limit. The results are shown in Table 2.

Table 2: Theoretical relative performance of natural gas vehicles compared to diesel vehicle

	Efficiency loss	Gas energy ratios	% WTW reduction
OEM Dual-fuel	4%	45 - 50%	5.2 - 6.4
Dedicated	20 - 45%	100%	5.2 – (-15.0)
High pressure diesel/gas injection	0%	95%	14.3

WTW factors (JEC - Joint Research Centre-EUCAR-CONCAWE collaboration, 2014)

Diesel = 88.6 gCO_{2eq}/MJ

CNG = 69.3 gCO_{2eq}/MJ

LNG = 74.5 gCO_{2eq}/MJ

This analysis is based on a literature review of the performance of natural gas trucks, in particular a report from LowCVP, *Emissions Testing of Gas-Powered Commercial Vehicles* (LowCVP, 2017) that gathers the results of a test programme carried out on dedicated and dual-fuel natural gas trucks, and the Low Carbon Truck Trial (LCTT) (Cenex and Atkins, 2016) that consists of 12 consortia projects with 35 participating companies which tested a sample of 371 vehicles under different duty cycles.

Based on this information, OEM dual-fuel natural gas vehicles that can demonstrate a gas-energy ratio of at least 50% are included in the criterion proposal as eligible technologies. Vehicles equipped with HPDI are also eligible. Dedicated natural gas vehicles are eligible only if there is a supply of renewable methane that meets 15% of the fuel demand. This percentage ensures the GHG emissions reduction compared to diesel vehicles.

Specific technologies for special purpose vehicles have been explored as well. Not much information has been found, but some models of sweepers claim a reduction of fuel consumption when equipped with a load-sensing-hydraulic system (Macro, 2017), (Bucher Municipal, 2017).

Tyre pressure monitoring systems (TPMS)

Tyre pressure monitoring systems (TPMS) are monitoring tools that help a driver to adjust their behaviour and can reduce fuel consumption by a few percent. Tyre pressure monitoring systems (TPMS) are mandatory for new passenger cars, but not for LCVs and heavy duty vehicles. TPMS can result in an average fuel consumption reduction of 1% (JRC, 2016a) at relative low cost (€220 without shipping and installation). However, TPMS do not result in significant fuel reductions in vehicles driven at very low speed such as sweepers and spreaders, and for that reason, special purpose vehicles are out of the scope of this criterion.

Vehicle tyres/rolling resistance

Low rolling resistance tyres can reduce fuel consumption by a few percent. The best performing tyres according to the Tyre Labelling Directive are widely available, and besides, the Energy Efficiency Directive 2012/27/EU states:

'Central governments that purchase products, services or buildings, insofar as this is consistent with cost-effectiveness, economical feasibility, wider sustainability, technical suitability, as well as sufficient competition, shall:
…

..- purchase only tyres that comply with the criterion of having the highest fuel energy efficiency class, as defined by Regulation (EC) No 1222/2009 of the European Parliament and of the Council of 25 November 2009 on the labelling of tyres with respect to fuel efficiency and other essential parameters. This requirement shall not prevent public bodies from purchasing tyres with the highest wet grip class or external rolling noise class where justified by safety or public health reasons'

Given the market availability, it seems justified to propose that public procurers purchase vehicles equipped with new tyres of the highest fuel energy efficiency class, as part of the EU GPP criteria. Therefore, it is included as a technical specification for core and comprehensive. However, low rolling resistance tyres do not result in significant fuel reductions in vehicles driven at very low speed such as sweepers and spreaders, and for that reason, special purpose vehicles are out of the scope of this criterion.

The Regulation (EC) No 1222/2009 does not apply to retreaded tyres, which shall comply with the provisions of UNECE Regulation 109 as a compulsory condition to be placed on the market. The use of retreaded tyres instead of new tyres brings environmental benefits due to the reduction of raw materials consumption and waste generation. Therefore, the technical specification can be complied with both low rolling resistance

tyres and retreaded tyres. An award criterion for these tyres is proposed separately at comprehensive level for special purpose vehicles.

The Regulation (EC) No 1222/2009 is currently under revision and hence this criterion will need to be updated accordingly.

Air conditioning

Air conditioning gases are relevant for heavy duty vehicles, because they are excluded from the MAC Directive (2006/40/EC) which provides a gradual phase-out of refrigerant HFC-134a from mobile air conditioners in passenger cars and light commercial vehicles. However, the HFCs used in these systems are affected by the phase-down put in place by the F-gas Regulation (Regulation (EU) No 517/2014), which will exert a strong pressure on prices of these gases as the supply will become more restricted. Therefore, there is a strong regulatory driver in place that favours the use of low GWP or even non-HFC (e.g. CO_2) technologies in this sector.

Criteria Proposal

Core criteria	**Comprehensive criteria**
Technical specifications	
TS1. Technological options to reduce GHG emissions ***Note:*** *this criterion is applicable to heavy duty vehicles and special purpose vehicles* The vehicle must be equipped by one of the following technologies demonstrating WTW GHG emissions reduction • Improvement in aerodynamics: active flow control (only for trucks used in regional duty cycles) • Improvement in aerodynamics: Boat tails / extension panels (only for trucks used in regional duty cycles) • Hybrid vehicles, both diesel and natural gas • Full Electric vehicles • Hydrogen fuel Cell Electric vehicles. • OEM dual-fuel natural gas vehicle with a gas energy ratio over the hot part of the WHTC test-cycle of at least 50%.	**TS1. Technological options to reduce GHG emissions** ***Note:*** *this criterion is applicable to heavy duty vehicles and special purpose vehicles* The vehicle must be equipped by one of the following technologies demonstrating WTW GHG emissions reduction • Full Electric vehicles • Hydrogen fuel Cell Electric vehicles. • OEM dual-fuel natural gas vehicle with a gas energy ratio over the hot part of the WHTC test-cycle of at least 50%. • High pressure direct injection natural gas vehicles • Plug-in hybrid: Vehicle equipped with a battery pack which can be charged from the grid and provides the energy for the electrical drive of the body and equipment • Load-sensing-hydraulic system (for sweepers and spreaders): the flow-capacity of the pump will be regulated through the load-sensing-pressure. • Dedicated natural gas vehicles under the conditions set in the note below.

• High pressure direct injection natural gas vehicles • Plug-in hybrid: Vehicle equipped with a battery pack which can be charged from the grid and provides the energy for the electrical drive of the body and equipment • Load-sensing-hydraulic system (for sweepers and spreaders): the flow-capacity of the pump will be regulated through the load-sensing-pressure. • Dedicated natural gas vehicles under the conditions set in the note below. *Note: The contracting authority may include dedicated natural gas vehicles if they have a supply of renewable methane meeting at least 15% of their demand.* **Verification:** The tenderer must present the technical sheet of the vehicle where these technical or fuel technology specifications are stated.	*Note: The contracting authority may include dedicated natural gas vehicles if they have a supply of renewable methane meeting at least 15% of their demand.* **Verification:** The tenderer must present the technical sheet of the vehicle where these technical or fuel technology specifications are stated.

TS2. Tyre Pressure Monitoring Systems (TPMS)

(*Same for core and comprehensive)*

Note: this criterion is not applicable to special-purpose vehicles

LCVs and heavy-duty vehicles must be equipped with tyre pressure monitoring systems (TPMS) or with sensors that enable the monitoring at the operator site.

Verification:

The tenderer must provide the technical sheet of the vehicle where this information is stated.

TS3. Vehicle tyres – rolling resistance

(*Same for core and comprehensive)*

Note: this criterion is not applicable to special-purpose vehicles

The vehicles must be equipped with:

a) Tyres that comply with the highest fuel energy efficiency class for rolling resistance expressed in kg/tonne, as defined by Regulation (EC) No 1222/2009 of the European Parliament and of the Council of 25 November 2009 on the labelling of tyres with respect to fuel efficiency and other essential parameters. This requirement must not prevent the public authority from purchasing tyres with the highest wet grip class where justified by safety.

   OR

b) Retreaded tyres

Verification:

The tenderer must provide the label of the tyre according to Regulation (EC) No 1222/2009 for tyres under case a, or the Notice of approval according to Annex 1 of UNECE Regulation 109 for retreaded tyres (case b)

Award criteria

	AC1. Air conditioning gases Points will be awarded to those HDVs equipped with an air conditioning system that use a refrigerant with a global warming potential (GWP), related to CO_2 and a time horizon of 100 years, < 150. **Verification**: The tenderer must provide the name, formula and GWP of the refrigerating gas used in the air conditioning system. If a mixture of gases is used (n number of gases), the GWP will be calculated as follows: GWP= Σ(Substance X1 % x GWP(X1)) + (Substance X2 % x GWP(X2)) + … (Substance Xn % x GWP(Xn)) where % is the contribution by weight with a weight tolerance of +/- 1 %. Information on the GWP of gases can be found in Annexes I and II of Regulation (EU) No 517/2014 (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.150.01.0195.01.ENG)
	AC2. Vehicle tyres – retreaded tyres Points will be awarded to special purpose vehicles equipped with retreaded tyres **Verification:** The tenderer must provide the Notice of approval according to Annex 1 of UNECE Regulation 109 for retreaded tyres.

Consultation questions
○ Do you agree with the technologies proposed? ○ Are you aware of other technologic specific for special purpose vehicles? ○ Are you aware of any limitation for the application of this criterion: verification, not enough manufacturers, too expensive technology? ○ Do you agree with the ambition levels proposed for the different sets, core and comprehensive?

6.1.2 Air pollutant emissions

Rationale

All new heavy duty vehicles placed on the market shall comply with Euro VI, which sets comparatively strict limits on air pollutants. Euro VI reduces the PM emission limits by 67% compared to Euro IV and V, and includes a PN (particle number) limit. It also decreases the NOx emission limit by 77% compared to Euro V. The standard also replaces the European Stationary Cycle and Transient Cycle used for testing by the World harmonized Transient cycle, which covers cold and hot start, and in general stricter testing conditions (load, idle time). Euro VI introduces in-service conformity testing using Portable Emission Measurement Systems, the first one to be carried out within 18 months of the approval and then every 2 years. Other changes are a new limit for ammonia emissions -due to the selective catalytic reduction systems using urea- and stricter limits for methane on CNG and LNG vehicles (ICCT, 2015).

The lifetime of heavy duty vehicles is comparatively long, with an average of 12 years (ACEA, 2017). For this reason, there is a market for used trucks that shall be taken into account. That leads to a technical specification requesting the compliance with Euro VI, if needed by means of retrofitting exhaust-after-treatment technology to existing trucks.

Tests carried out by LowCVP (LowCVP, 2017) in heavy good vehicles showed that Euro VI had been effective in cutting overall NOx emissions by over 98% when compared to Euro V vehicles. Euro VI dedicated natural gas vehicles increase that reduction in NOx emissions to 99%. According to this report, NOx emissions of dedicated natural gas trucks were 140 mg/km in average, while diesel vehicles emitted 300 mg/km. Only electric and hydrogen vehicles can reduce the emissions further, to zero tailpipe air pollutants emissions. However, the compliance of HDVs with Euro VI is measured as mg per kWh delivered by the engine, and therefore, those results are only valid to evaluate compliance and not to compare different vehicles. For this reason, the criterion must set the technologies able to outperform Euro VI, i.e. natural gas, plug-in hybrid, electric and hydrogen vehicles. This set of technologies is equivalent to those included in the definition of clean vehicles within by the Proposal for a Directive amending Directive 2009/33/EU on the promotion of clean and energy-efficient road transport (COM(2017) 653 Annex Table 5).

The scope of the criterion has been clarified, since some N_2 vehicles and special purpose vehicles are subject to Euro 6 standards, not Euro VI

Criteria Proposal

Core criteria	Comprehensive criteria
Technical specification	
TS3. Air pollutant emissions performance (*Same for core and comprehensive)* N_3 vehicles and N_2 vehicles with a reference mass[1)] exceeding 2 610 kg must meet Euro VI. N_2 vehicles with a reference mass[1)] not exceeding 2 610 kg must comply with the TS2 Air pollutant emission performance of the EU GPP of Transport criteria for cars and LCVs (Category 1). Special purpose vehicles must meet Euro VI or Euro 6, depending on the reference mass of the vehicle they are mounted. **Verification:** The tenderer must present the certificate of conformity of the vehicle. For those vehicles having achieved above-mentioned standard following a technical upgrade the measures must be documented and included in the tender, and this must be verified by an independent third party.	
Award criteria	
AC3. Improved air pollutant emissions performance (*Same for core and comprehensive)* N_3 vehicles and N_2 vehicles with a reference mass[1)] exceeding 2 610 kg and special purpose vehicles: Points will be awarded to the following technologies: • natural gas • plug in hybrid electric vehicles (PHEV) • battery electric vehicles (BEV) and • hydrogen fuel cell electric vehicles (FCEV). *(to be detailed to which extent more points will be attributed to zero tailpipe capable vehicles, i.e. plug in hybrid electric vehicles (PHEV), battery electric vehicles (BEV), and fuel cell electric vehicles (FCEV).)*. N_2 vehicles with a reference mass not exceeding[1)] 2 610 kg: the formula of the AC3 Improved air pollutant emissions performance and AC4 Zero tailpipe emission capability of the EU GPP of Transport criteria for cars and LCVs (Category 1). **Verification:** The tenderer must provide the Certificate of Conformity of the vehicle. For those vehicles having achieved the abovementioned standard following a technical upgrade the measures must be documented and included in the tender, and this must be verified by an independent third party.	
Notes:	

[1)] 'Reference mass' means the mass of the vehicle in running order, as declared in the Certificate of Conformity, less the uniform mass of the driver of 75 kg and increased by a uniform mass of 100 kg;

Consultation questions
○ Are you aware of any limitation for the application of this criterion: verification, not enough manufacturers, too expensive technology?

6.1.3 Water consumption (for sweepers that use water for dust suppression)

Rationale

Some sweepers use water for dust suppression, which might entail significant water consumption. WRAP studied the water consumption of a construction site (WRAP, 2013) and the water consumption of the sweepers was estimated to be 11% of the total demand. The model used sprayed 35 litres of water per minute and the monthly consumption was 163 m^3. Although these figures cannot be considered representative of the water consumption profile of street cleaning services, they help to outline the impact that sweepers might have in water consumption.

WRAP case study proposed the use of sweepers equipped with water recirculation systems, since the estimated saving potential was 30% approximately. Some manufacturers offer models equipped with optional water recirculation systems, both in compact sweepers and truck mounted sweepers (Bucher Municipal, 2017), (Johnston, 2017).

It is proposed that a technical specification requiring a water recirculation system is set at comprehensive level, while an award criterion would promote these systems at core level.

Criteria proposal

Core criteria	**Comprehensive criteria**
Technical specification	
	TS5. Water recirculation systems *If the contracting authority is requiring sweepers that use water for dust suppression* Sweepers must be equipped with a water recirculation system meaning a system that recirculate part of the water that is used for dust suppression. The water is sprayed and then removed together with the dust by the sweeper. The machine filters the wastewater and it is recirculated to the water tank

	Verification: The tenderer must present the technical sheet where the water recirculation system is described.
Award Criteria	
AC4. Water recirculation systems *If the contracting authority is requiring sweepers that use water for dust suppression* Points will be awarded to sweepers that are equipped with a water recirculation system meaning a system that recirculate part of the water that is used for dust suppression. The water is spread and then removed together with the dust by the sweeper. The machine filters the wastewater and it is recirculated to the water tank **Verification:** The tenderer must present the technical sheet where the water recirculation system is described.	

Consultation questions
○ Do you agree with the criterion proposed? Do you have data on cost and water saving potential of the recirculation systems? ○ Are you aware of any limitation for the application of this criterion: verification, not enough manufacturers, too expensive technology?

6.1.4 Distribution performance of spreaders

Rationale

Spreaders apply de-icing and thawing agents such as salt or brine on traffic roads to ensure the safety of road traffic. The de-icing and thawing agents are released in the environment and may have negative effects as explained in section 3.1.3. One way to minimise this impact is reducing the use of these agents to the minimum necessary. This can be achieved by operating the spreader in a manner that achieves a homogeneous distribution of spreading material within the set spreading dosage, width and spreading pattern track (EUnited, 2017).

The manufacturers of spreading machines association EUnited Municipal Equipment and the Engineering Center Bygholm in Denmark have developed an agreed test for spreading quality (EUnited, 2017). This test method is now being adopted by a CEN technical committee, and will become a European Standard soon. This will enable setting spreading performance requirements for spreaders based on harmonised test procedures which will produce comparable results. Currently, the draft *PrEN 15597 Winter maintenance equipment - Spreading machines (gritting machines) - Part 2: Requirements for distribution and their tes*t is undergoing the final deliberations and is expected to be approved soon.

Criteria proposal for spreaders

Core criteria	**Comprehensive criteria**
Technical Specification	
TS6. Distribution performance The spreader model must comply with the requirements on distribution performance set by EN 15597-2, which comprises the following parameters: • dosage • spreader start • lateral distribution **Verification:** The tenderer must present the test report according to the standard EN 15597-2, showing that the test results on: • Dosage test • Spreader start • Dynamic test lateral distribution are that the "spreader is qualified" The test must be carried out by an independent laboratory	

Consultation questions
○ Do you agree with the EN standard proposed for requirements and verification? ○ Are you aware of any limitation for the application of this criterion, e.g., not enough laboratories, too expensive tests?

6.1.5 Noise emissions

Rationale

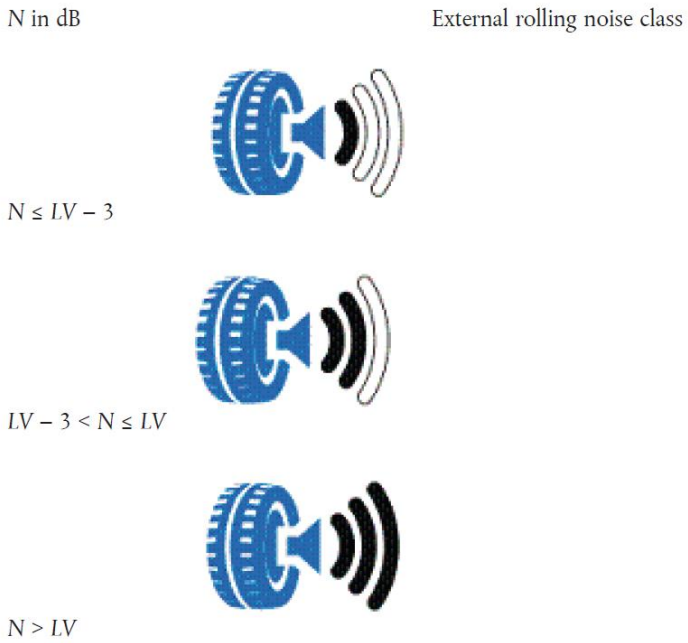
Vehicle noise can have significant negative impacts on the health of residents, especially in case of traffic in or nearby residential areas. The

market should therefore gradually reduce the noise levels of both the tyres and vehicle.

Tyre noise

Vehicle tyre noise is regulated by Regulation (EC) No 661/2009 and the labelling Regulation (EC) No 1222/2009, which obliges the tyre manufacturer to inform the customer about the external rolling noise class as follows:

Figure 1: External rolling noise classes (LV = Limit Values)



The Regulation (EC) No 1222/2009 does not apply to retreaded tyres, which shall comply with the provisions of UNECE Regulation 109 as a compulsory condition to be placed on the market. Similar to the rolling resistance criterion, it is proposed that this criterion can be complied with both low noise tyres and retreaded tyres.

Since currently all tyres have to meet the limits set by Regulation (EC) No 661/2009, only the top category of the labelling Regulation (N≤ LV -3) can provide an additional incentive. In Table 3 the limits values for C1 tyres according to Regulation (EC) No 611/2009 are listed. The proposed limits that are 3 dB below the limit values are presented in the last column. Compliance with these limits will mean the tyres fall within the best performing class of labelling Regulation (EC) No 1222/2009.

Table 3: Limit values for C1 tyres according to Regulation 611/2009 and proposed limits

Tyre class	**Nominal section width (mm)**	**Limit values (dB(A))**	**Proposed limit (dB(A))**
C1A	≤185	70	67
C1B	>185 ≤215	71	68

C1C	>215 ≤245	71	68
C1D	>245 ≤275	72	69
C1E	>275	74	71

The Regulation (EC) No 1222/2009 is currently under revision and hence this criterion will need to be updated accordingly.

The criterion is proposed to be a technical specification only at comprehensive level, for the sake of simplifying the core level which will focus on GHG and air pollutant emissions.

Vehicle noise

The Directive 2007/46/EC has been amended by Regulation (EU) No 540/2014, which will introduce stricter emissions limits for vehicle noise in three phases. In the case of heavy duty vehicles, Regulation (EU) No 540/2014 sets noise limits for N3 vehicles between 79 and 82 dB(A) for phase 1 and is applicable for new vehicles types from 1 July 2016. Phase 2 (range 77 – 81 dB(A)) will be applicable for new vehicle type from 1 July 2020 and for first registration from 1 July 2022, and phase 3 (range 76 – 79 dB(A)) will be applicable for new vehicle type from 1 July 2024 and for first registration from 1 July 2026. The regulation does not include any provision to exclude vehicles for special purposes, in general. According to a report from TNO (TNO, 2012), there was technology commercially available for shielding and encapsulation for trucks in 2010, and there were models that fulfilled phase 3 limits available in the market.
Therefore, the award criterion at comprehensive level is proposed to promote phase 3 compliant vehicles.

Road sweepers are subject to noise marking only, according to the article 13 of the Directive 2000/14/EC. However, the study on the suitability of the current scope and limit values of Directive 2000/14/EC carried out by TNO (TNO, 2016) recommends setting limit values to road sweepers. Apart from that, the Blue Angel criteria for sweepers (*RAL-UZ 59: Low-Noise and Low-Pollutant Municipal Vehicles and Buses)* are currently being revised to enhance the reduction of noise emissions; however the proposal is still being discussed. Since all the potential benchmarks are under discussion, no limit values are proposed for sweepers in this criterion proposal, only an award criterion that would give points proportionally to the noise levels.

Criteria proposal for vehicles

Core criteria	Comprehensive criteria
Technical Specifications	
	TS7. Tyre noise *(not to be used if, for safety reasons, tyres with the highest wet grip class, snow tyres or ice tyres are needed)* *Note: this criterion does not apply to special purpose vehicles* The HDVs must be equipped with a) tyres with external rolling noise emission levels 3dB below the maximum established in Regulation (EC) No 661/2009 Annex II Part C. This is equivalent to the top category (of the three available) of the EU tyre label external rolling noise class. OR b) retreaded tyres c) **Verification:** The tenderer must provide the label of the tyre according to Regulation (EC) No 1222/2009 for tyres under case a) or the Notice of approval according to Annex 1 of UNECE Regulation 109 for retreaded tyres (case b)
Award Criteria	
	AC5. Vehicle noise *Note: this criterion does not apply to special purpose vehicles* Points will be awarded to the vehicles with noise emissions compliant with the Phase 3 limits of Regulation (EU) No 540/2014. The noise emissions will be tested according to the Annex II of Regulation (EU) No 540/2014. **Verification:** The tenderer must provide the Certificate of Conformity of the vehicle.
	AC6. Sweepers Points will be awarded to the sweepers with lower guaranteed sound power level, according to the Directive 2000/14/EC **Verification:** The tenderer must provide a copy of the CE marking together with the indication of the guaranteed sound power level according to the

	Directive 2000/14/EC of the sweeper.

Consultation questions
○ Are you aware of any limitation for the application of this criterion: for example not enough vehicles compliant with this criterion, too expensive technologies? ○ Do you agree with placing noise criteria only at comprehensive level? ○ Do you think that the criterion should set specific limit values for sweepers? If so, which ones?

6.1.6 Criteria withdrawn

Efficiency of particulate matter collection (for sweepers)

Rationale

Street sweepers are classified as special purpose vehicles, and the environmental issues associated with their life cycle are very similar to vehicles. Apart from that, the street sweepers contribute to air quality issues in urban areas. Part of the particulate matter (PM) emissions in cities come from non-exhaust sources, such as wear of vehicle parts, and of the road surface, and the resuspension of dust deposited on the pavement (Idaea - CSIC, 2016a).

Road sweepers are currently designed to reduce ambient PM10 concentrations, while that was not usually a common practice in the past (Idaea - CSIC, 2016a). The parameters that affect the potential reduction of PM10 emissions are the removal efficiency of the sweeper and its ability to retain the particles.

The LIFE project 'AIRUSE' is meant to identify the most effective mitigation measures to reduce PM levels in urban areas in Southern European and Mediterranean countries (European Commission, 2016). The deliverable *The scientific basis of street cleaning activities as road dust mitigation measure* (Idaea - CSIC, 2016b) described the three main types of road sweepers used in Europe.

- Mechanical broom sweepers remove debris by sweeping material with gutter brooms rearward into the path of a pick-up broom. The pick-up broom sweeps the material moving it upward with a conveyor system into a hopper.
- Vacuum sweepers have gutter brooms and strong vacuum head(s) for picking-up both large and small materials. While some models use water as a dust suppressor, others can operate in a dry mode.
- Regenerative-air sweepers are equipped with gutter brooms and a pick-up head. The gutter brooms direct materials towards the pick-up head. The regenerative-air process blows air into one end of the horizontal pick-up head and onto the pavement dislodging materials entrained within cracks and uneven pavement. The other end of the

pick-up head has a suction hose that immediately vacuums out the materials within the pick-up head into a hopper.

The main conclusions of Airuse reports were that the removal efficiency improves with increasing particles size, and that vacuum-assisted and regenerative air sweepers are more suitable for removing finer sediments, while mechanical sweepers are the best choice for larger particles (Idaea - CSIC, 2016a). This information suggests that each technology is suitable for each particular situation and cannot be considered better than the others. Most of the recommendations of Airuse reports are based on best practices on street cleaning.

Manufacturers use EN 15429-3:2015 to test the performance of their sweepers, and the standard is currently under revision to include measurements on PM2.5. The results are not comparable between them because they depend on the features of each sweeper, such as size and load. Setting benchmarks would require the test results of many different samples of sweepers, which are not available. Stakeholders from the manufacturing sector also indicated that, even for the same size and load, the results of the tests are not comparable and that it is not possible to determine which difference would be significant to allocate the points. Besides, the lack of laboratories hinders the verification of the criterion.

Given the situation described above, the criterion is proposed to be withdrawn, also for the service fleets.

Lubricant oils

This criterion related to low viscosity lubricants (LVL) is relevant to improve the engine performance, and it is a cost-effective option (JRC, 2016a). However, the type of lubricant of the vehicle is seldom included in the technical sheets, and sometimes it is not a technical feature offered to the consumers. Therefore, it is proposed to drop this criterion for vehicles, but keep it as part of the maintenance criteria of the service categories.

6.2 Service fleets

Where services entailing the deployment of vehicles are contracted out, criteria have been recommended for service fleet employed in carrying out the service.

6.2.1 GHG emissions

Rationale of the criteria proposal for service fleets

In terms of alternative fuels Eurostat statistics show that the share of alternative fuels is very limited in LCV and particularly narrow in heavy duty vehicles (JRC, 2016a). The average lifetime of vehicles is a key parameter in the replacement ratio of fleets. According to ACEA, the average lifetimes of LCVs and HDVs trucks in 2015 were 10.7 and 11.7 years, respectively (ACEA, 2017). Therefore, the criteria proposal should reflect this market situation. The thresholds of 20% and 32% of the fleet are meant to select the tenderers that have invested to renovate their fleets quicker, phasing out less efficient technologies. These values are aligned with the last criteria proposal for the revision of the EU GPP for transport (JRC, 2018). The criterion proposal also includes different yearly tiers from 2019 to 2021 to reflect the market evolution and the action of natural fleet replacement. For HDVs and L-category vehicles, the percentage is increased 8% and 10% each year, which would be the replacement rate for vehicles with an average lifetime of 12 and 10 years, respectively. In the case of LDVs, the criterion refers to the proposal of TS1 CO_2 emissions for the category 'Purchase, lease or rental of LCVs' of the EU GPP criteria for transport, which sets tiers to increase the ambition level yearly (JRC, 2018).

Cyclelogistics has demonstrated its capability to operate in urban areas. According to CIVITAS, 42% of all motorized trips in urban areas could be shifted to logistics by bicycle (this corresponds to 25% of all trips) (EPOMM, 2012). The project *Cyclelogistics ahead* gathered several examples of municipalities (including Nîmes, Zadar, Strasbourg, Graz, San Sebastian, and Sevilla) that use cargo bikes for street cleaning (Austrian Mobility Research, 2014), (Traject Mobility Management, 2017). It also recommends that the municipalities make use of this measure to provide their municipal services (Wrighton, 2017). Therefore, it is proposed as technical specification, requiring that the fleet contains cycles and cycle trailers, within the framework of the emissions minimisation measures set by the TS1 Environmental management practices within the common criteria for service categories (see section 7.2).

Criteria proposal for service fleets

Core criteria	Comprehensive criteria
Technical Specification *(These criteria apply only if the operators owns or leases the service fleet)*	
TS1. GHG emissions For HDVs and special purpose vehicles: The fleet must be composed by following shares of vehicles equipped with one the eligible technologies set by the core TS1 Technological improvement options to reduce GHG emissions of vehicles (see section 0) • 2019: 20% • 2020: 28% • 2021: 36% • 2022: 44% For L-category vehicles: The fleet must be composed by following shares of electric vehicles • 2019: 25% • 2020: 35% • 2021: 45% • 2022: 55% For LCVs • 12% of the fleet to be used under the contract must comply with the core TS1 CO2 emissions for the category 'Purchase, lease or rental of LCVs' of the EU GPP criteria for transport The tier applicable will correspond to the year that the call for tender is launched. **Verification:** same as the TS1 of vehicles together with the list and technical sheets or certificates of conformity of the whole fleet.	**TS1. GHG emissions** For HDVs and special purpose vehicles: The fleet must be composed by following shares of vehicles equipped with one the eligible technologies set by the core TS1 Technological improvement options to reduce GHG emissions of vehicles (see section 0) • 2019: 32% • 2020: 40% • 2021: 48% • 2022: 56% For L-category vehicles: The fleet must be composed by following shares of electric vehicles • 2019: 40% • 2020: 50% • 2021: 60% • 2022: 70% For LCVs • 12% of the fleet to be used under the contract must comply with the comprehensive TS1 CO2 emissions for the category 'Purchase, lease or rental of LCVs' of the EU GPP criteria for transport • 25% of the fleet to be used under the contract must comply with the core TS1 CO2 emissions for the category 'Purchase, lease or rental of LCVs' of the EU GPP criteria for transport The tier applicable will correspond to the year that the call for tender is launched. **Verification:** same as the TS1 of vehicles together with the list and technical sheets or certificates of conformity of the whole fleet.
TS2. Cyclelogistics (same for core and comprehensive) *(in cities where the urban infrastructure is suitable).* The tenderer must offer a service fleet that includes the use of cycles and cycle trailers, which may be electrically power assisted cycles, to minimise the use of motorised vehicles, according to the measures to minimise the environmental issues set by the TS1	

Environmental management practices within the common criteria for service categories (see section 7.2) **Verification:** The tenderer will present the specifications of the service fleet and the description of the way that cycles and cycle trailers will be used to minimise the use of motorised vehicles.
TS3. Vehicle tyres – rolling resistance (*Same for core and comprehensive)* *Note: this criterion is not applicable to special purpose vehicles* All the vehicles must be equipped with tyres compliant with TS3 on vehicle tyres as defined in in the section 6.1. **Verification:** Same as TS3 on vehicle tyres as defined in in the section 6.1 together with the list and technical sheets of the whole fleet.
TS4. Tyre Pressure Monitoring Systems (TPMS) (*Same for core and comprehensive)* *Note: this criterion is not applicable to special purpose vehicles* All the LCVs and heavy duty vehicles must be equipped with systems compliant with TS2 on TPMS as defined in the section 6.1 **Verification:** Same as TS2 on TPMS as defined in the section 6.1 together with the list and technical sheets of the whole fleet.
TS5. Fuels (*Same for core and comprehensive)* *Note: this criterion is applicable only if the contracting authority qualifies dedicated natural gas vehicles as eligible technology and the tenderer offers dedicated natural gas vehicles to comply with TS1 of vehicles* (see section 6.1.1)*. The contracting authority may set higher percentages of renewable fuel supply according to the available supply in their national or regional market.* At least 10% of the methane supply must be renewable methane. **Verification:** The tenderer must provide the contract(s) with supplier(s) and the description and technical specifications of the production and the dedicated fuel supply system.
Award Criteria *(These criteria apply only if the operators owns or leases the service fleet)*
AC1. GHG emissions (*Same for core and comprehensive)* Points will be awarded to the fleet to be used under the contract with proportion of vehicles (%) larger than the TS1 GHG emissions, in proportion to the excess over the TS1. **Verification:** Same as TS1

Consultation questions

- Do you agree with the thresholds on fleet composition proposed?
- Do you agree with the criteria proposal on cyclelogistics? Are you aware of any limitation to its application?
- Are you aware of any limitation to the application of this criterion: for example not enough vehicles compliant with this criterion?

6.2.2 Air pollutant emissions

Rationale

Similarly to the GHG emission criteria, the criteria on air pollutant emissions and Euro compliance should be set as a proportion of the fleet. The average share of Euro VI heavy duty vehicles in the current fleets is 8% (data from ICCT, ACEA and OICA, EU-28 and EFTA average). More than 60% of the heavy duty vehicles using diesel is still equipped with Euro III (implemented in 2000), 11% with Euro IV (in 2005) and 15% complies with Euro V. The average age of the bus fleet has been increasing the last year to reach 55% of buses above 10 years and less than 10% below 2 years. With regards of LCVs, 55% of the diesel fleet in 2015 complied with Euro 4 or below and 15% met Euro 6. In the case of L-category vehicles, the shares of moped and motorcycles complying with Euro 3 in 2011 were 65% and 60% respectively (JRC, 2016a).

It is proposed that all vehicles comply with Euro V/5/3 at core level, in order to prevent the use of low performance vehicles. A minimum percentage of 40% of Euro VI/6/4 is proposed for core and 60% for comprehensive level. The replacement of vehicles will naturally increase the penetration of Euro 4/6/VI in the fleets, and therefore these percentages need to rise yearly to maintain the same ambition level. For this reason, the criteria proposal includes yearly increments of 10% for LDVs and L-category vehicles and 8% for buses. This will stimulate the acceleration of the replacement rate to increase the share of Euro VI/6/4 vehicles.

These technical specifications are complemented with award criteria to promote a better performance of the fleet. It is also proposed a percentage of vehicles complying with Euro 6d-TEMP standard at comprehensive level, to incentivise the penetration of the Euro 6d stage. Euro 6d-TEMP standard requires a real driving emissions conformity factor of 2.1.

Criteria Proposal

Core criteria	**Comprehensive criteria**
Technical Specification *(These criteria apply only if the operators owns or leases the service fleet)*	
TS6. Air pollutant emissions All HDV used in carrying out the service must meet at least Euro V. 2019: 48% of HDV must meet Euro VI. 2020: 56% of HDV must meet Euro VI.	**TS6. Air pollutant emissions** TS6.1. All HDV used in carrying out the service must meet at least Euro V. 2019: 68% of HDV must meet Euro VI. 2020: 76% of HDV must meet Euro VI.

2021: 64% of HDV must meet Euro VI. 2022: 72% of HDV must meet Euro VI. Where vehicles are not certified as meeting Euro V or higher, but technical after-treatment has achieved the same standard, this should be documented in the tender. All LDV used in carrying out the service must meet at least Euro 5. 2019: 50% of LDV must meet Euro 6. 2020: 60% of LDV must meet Euro 6. 2021: 70% of LDV must meet Euro 6. 2022: 80% of LDV must meet Euro 6 All L-category vehicles used in carrying out the service must meet at least Euro 3. 2019: 50% of L-category vehicles must meet Euro 4. 2020: 60% of L-category vehicles must meet Euro 4. 2021: 70% of L-category vehicles must meet Euro 4. 2021: 80% of L-category vehicles must meet Euro 4. The tier applicable will correspond to the year that the call for tender is launched. **Verification:** The tenderer must provide the technical sheets of the vehicles where emission standards are defined. For those vehicles having achieved above-mentioned standard following a technical upgrade the measures must be documented and included in the tender, and this must be verified by an independent third party.	2021: 84% of HDV must meet Euro VI. 2022: 92% of HDV must meet Euro VI. Where vehicles are not certified as meeting Euro V or higher, but technical after-treatment has achieved the same standard, this should be documented in the tender. All LDV used in carrying out the service must meet at least Euro 5. 2018: 60% of LDV must meet Euro 6. 2019: 70% of LDV must meet Euro 6. 2020: 80% of LDV must meet Euro 6. 2021: 90% of LDV must meet Euro 6. 2022: 100% of LDV must meet Euro 6. 2019: 15% of LDV must meet the Euro 6d-TEMP or Euro 6d standard. 2020: 20% of LDV must meet the Euro 6d-TEMP or Euro 6d standard. 2021: 25% of LDV must meet the Euro 6d-TEMP or Euro 6d standard. 2022: 35% of LDV must meet the Euro 6d-TEMP or Euro 6d standard. All L-category vehicles used in carrying out the service must meet at least Euro 3. 2019: 70% of L-category vehicles must meet Euro 4. 2020: 80% of L-category vehicles must meet Euro 4. 2021: 90% of L-category vehicles must meet Euro 4. 2022: 100% of L-category vehicles must meet Euro 4. The tier applicable will correspond to the year that the call for tender is launched. TS6.2. *In case of urban areas with air quality issues:* LDVs and L-category vehicles must have zero tailpipe emissions If there is no charging infrastructure available, or the expected use profile requires large ranges: The vehicles may at the least be zero tailpipe emissions capable,

	meaning a LCV that can run the minimum range of 40 km without emitting any tailpipe emissions. **Verification:** The tenderer must provide the technical sheets of the vehicles where emission standards are defined, and where applicable the partnership agreement with the urban consolidation centre. For those vehicles having achieved above-mentioned standard following a technical upgrade the measures must be documented and included in the tender, and this must be verified by an independent third party.

AC2. Air pollutant emissions (*(Same for core and comprehensive, not applicable if zero tailpipe emissions required for all vehicles in the technical specification TS6.2)*

Points will be awarded to those tenders offering a

(a). higher percentage than the one set by the TS6 (see above), OR

(b). LDVs and L-category vehicles that have an emission performance better than Euro 6/4 OR

(c). Natural gas HDVs and zero-emission capable vehicles, meaning with a minimum range of 40 km without emitting any tailpipe emissions for cars and LCVs, and plug in hybrid electric vehicles (PHEV), battery electric vehicles (BEV), and fuel cell electric vehicles (FCEV) for buses

for the fleet to be used under the contract, in proportion to the excess over the TS6 (see above) *(to be detailed to which extent points will be attributed to higher percentages, better performance and zero tailpipe vehicles).*

Verification:

See above TS2

6.2.3 Distribution performance of spreaders

Rationale

The rational would be the same as for the vehicle criterion proposal. Given that the European standard is not approved yet, and that there are very few laboratories available, the criterion is proposed to be an award criterion to reward those fleets whose spreaders can demonstrate their distribution performance.

Criteria proposal

Core criteria	**Comprehensive criteria**
Award Criteria	
AC3. Distribution performance of spreaders Points will be awarded to those tenders offering a service fleet proportionally to the share of spreaders that are qualified according to the EN 15597-2. **Verification:** The tenderer must present the list of the vehicles of the service fleet and their test reports according to EN 15597-2 issued by an independent laboratory.	

Consultation questions
○ Are you aware of any limitation for the application of this criterion: verification, not enough manufacturers, too expensive tests?

6.2.4 Water consumption (for sweepers fleets that use water for dust suppression)

Rationale

Same as for the vehicle criterion proposal.

Criteria proposal

Core	**Comprehensive**
Award criteria	
AC4. Water recirculation *If the contracting authority is requiring sweepers that use water for dust suppression* Points will be awarded to those tenders offering a service fleet proportionally to the	

share of vehicles equipped with a water recirculation system. **Verification:** The tenderer must present the list of the vehicles of the service fleet and their technical sheets

Consultation questions
○ Do you have data on cost and water saving potential of the recirculation systems? ○ Are you aware of any limitation for the application of this criterion: verification, not enough manufacturers, too expensive technology?

6.2.5 Noise emissions

Rationale

Same as for the vehicle criterion proposal.

Criteria proposal

Core	**Comprehensive**
Award criteria	
	AC5. Noise emissions Points will be awarded to those tenders offering a service fleet totally composed by vehicles compliant with the AC5 on vehicle noise emissions set in the section 6.1.5. **Verification:** The tenderer must present the list of the vehicles of the service fleet and their certificates of conformity.

Consultation questions
○ Are you aware of any limitation for the application of this criterion: for example not enough vehicles compliant with this criterion, too expensive technologies? ○ Do you agree with placing noise criteria only at comprehensive level?

6.2.6 Maintenance of the fleet

Rationale

Sections 6.1.1 and 6.1.5 describe the requirements on rolling resistance and noise proposed for tyres used in new purchased vehicles. Tyres are replaced along the lifetime of the vehicle, and therefore the same requirements should apply in maintenance activities. For this purpose, contract performance clauses are proposed requiring the contractor to comply with the tyres criteria over the service contract. In the case of rolling resistance of tyres, it is proposed to be part of both core and comprehensive levels to be fully harmonised with the provisions of the Energy Efficiency Directive on the purchase of tyres by governments.

The use of low viscosity lubricants (LVL) is relevant to improve the engine performance, and it is a cost-effective option (see Preliminary report). Since lubricants are degraded and replaced regularly along the lifetime of the vehicle, LVL should be required as part of the maintenance criteria of the service categories.

Criteria proposal

<table>
<tr><th>Core criteria</th><th>Comprehensive criteria</th></tr>
<tr><td colspan="2">Contract performance clause</td></tr>
<tr><td></td><td>CPC1. Low viscosity lubricant oils
Unless the manufacturer of the vehicle recommends other type of lubricant, the contractor must replace the lubricants of the vehicles providing the service with low viscosity engine lubricant oils (LVL). LVL are those corresponding to SAE grade number 0W30 or 5W30 or equivalent.
The contractor will keep records which must be made available to the contracting authority. The contracting authority may set rules for penalties for non-compliance.</td></tr>
<tr><td colspan="2">CPC2. Vehicle tyres – rolling resistance
(Same for core and comprehensive)
The contractor must replace the worn tyres of vehicles providing the service with
a) new tyres that comply with the highest fuel energy efficiency class for rolling resistance expressed in kg/tonne, as defined by Regulation (EC) No 1222/2009 of the European Parliament and of the Council of 25 November 2009 on the labelling of tyres with respect to fuel efficiency and other essential parameters. This contract performance clause must not prevent the use of tyres with the highest wet grip class where justified by safety.
OR
b) retreaded tyres
The contractor will keep records which must be made available to the contracting authority. The contracting authority may set rules for penalties for non-compliance</td></tr>
<tr><td></td><td>CPC3. Tyre noise
Note: This CPC does not apply to retreaded tyres.
The contractor must replace the worn tyres of vehicles providing the service with new tyres with external rolling noise emission levels 3dB below the maximum established in Regulation (EC) No 661/2009 Annex II Part C. This is equivalent to the top category (of the three available) of the EU tyre label external rolling noise class.
The external rolling noise emissions will be tested according to the Annex I of Regulation (EC) No 1222/2009.
The contractor will keep records which must be made available to the contracting authority. The contracting authority may set rules for penalties for non-compliance</td></tr>
<tr><td colspan="2">Note on the purchase of maintenance services
The contracting authority may include these criteria within the call for tenders of vehicles maintenance services, however these criteria just cover a small part of the</td></tr>
</table>

maintenance activities and cannot be considered as EU GPP criteria for vehicles maintenance services

Note on requirements for Central Government procurement on the purchase of tyres

Article 6 and Annex III of the Energy Efficiency Directive (2012/27/EU), which had to be transposed into national law by June 2014, set out specific obligations for public authorities to procure certain energy efficient equipment. This includes the obligation to purchase only those tyres that:

'comply with the criterion of having the highest fuel energy efficiency class, as defined by Regulation (EC) No 1222/2009 of the European Parliament and of the Council of 25 November 2009 on the labelling of tyres with respect to fuel efficiency and other essential parameters. This requirement must not prevent public bodies from purchasing tyres with the highest wet grip class or external rolling noise class where justified by safety or public health reasons'

This obligation is limited to central government and for purchases above the thresholds set out in the procurement directives. Moreover, the requirements have to be consistent with cost-effectiveness, economic feasibility, wider sustainability, technical suitability and sufficient competition. These factors can differ between public authorities and markets. For more guidance on the interpretation of this aspect of Article 6 and Annex III of the EED regarding procurement of energy-efficient products, services and buildings by central government authorities, please see the Commission guidance document COM/2013/0762 final, Communication from the Commission to the European Parliament and the Council, Implementing the Energy Efficiency Directive – Commission Guidance.

7 Draft of common criteria for service categories

7.1 Competence of tenderer and staff training

Rationale

The selection criteria proposal requires a minimum experience on identifying, evaluating and implementing technologies and measures to reduce water and energy consumption, GHG emissions and air pollutants emissions. This selection criterion is aimed at ensuring the competences of the tenderer to carry out the service according to environmental performance.

This is complemented with a staff training contract performance clause, which requires staff to be trained in operational procedures set out by the company to increase their environmental performance. This would ensure that these procedures are properly implemented by the staff carrying out the service.

Criterion Proposal

<table>
<tr><th>Core criteria</th><th>Comprehensive criteria</th></tr>
<tr><td colspan="2">Selection criteria</td></tr>
<tr><td colspan="2">SC1. Competences of the tenderer
(Same for core and comprehensive)

The tenderer must have relevant competences and experience in providing environmentally conscious maintenance services that, at a minimum, included the following:
• use of products that have been awarded the EU Ecolabel or other relevant EN ISO 14024 type I ecolabels that are nationally or regionally officially recognised in the Member States for the cleaning tasks in a contract,
• internal or external staff training that covers environmental aspects such as correct product dilution and dosage use, discarding of wastewater and waste sorting,
• identifying, evaluating and implementing the best available technologies and measures (if applicable to the specific service provided) aimed at:
o Minimising water and energy consumption,
o Minimising GHG emissions and air pollutants emissions
o Minimising waste generation
o Optimising waste management
o Minimising use of pesticides, including herbicides
o Minimising use of fertilisers
o Minimising use of cleaning products
o Minimising use of de-icing products
o Protecting and promoting biodiversity
• monitoring and reporting procedures of the environmental issues listed above.</td></tr>
</table>

Verification:

Tenderers must provide evidence in the form of information and references in relevant contracts, carried out in the previous 5 years, which included the above elements. This must be supported by records of staff training activities, where the subjects covered are listed.

Contract performance clause

CPC1. Staff training
(*Same for core and comprehensive)*

For the duration of the contract, the contractor must have in place an internal staff training programme or provide staff with the means to participate in an external training programme that covers the topics listed below, where they are pertinent to the tasks performed by the staff member, as part of the contract:

<u>For the provision of Gardening services:</u>

- Staff must be trained on gardening practices with less environmental impact to be applied in carrying out the service. This should include at least water and energy saving practices; waste minimization, management and selective collection, protection of biodiversity, use of products based on renewable raw materials; chemical product and container handling and management; safe, legal use of pesticides including herbicides.
- Training in critical applications, including the use of chemicals, must be undertaken before the staff allowed to undertake that type of work.

The contractor must present a training plan once the contract is awarded.

<u>For the provision of Cleaning services:</u>

- Staff must be trained on cleaning practices with less environmental impact to be applied in carrying out the service. This should include water and energy saving practices; waste minimization, PM10 street dust reduction, minimisation of consumable goods and safe use of chemicals.
- Training in critical applications, including the use of chemicals, must be undertaken before the staff allowed to undertake that type of work.

The contractor must present a training plan once the contract is awarded.

<u>For the operation of machinery and vehicles:</u>

- All operators of machinery and vehicles involved in carrying out the service must be sufficiently trained to deliver the contracted service in an environmentally responsible manner through the efficient utilization of applicable machinery and vehicles.
- All operators of machinery and vehicles involved in carrying out the service for the duration of the contract period must receive regularly information on their fuel efficiency performance (at least once per month).

The yearly staff training records must be made available to the contracting authority for verification purposes. The contracting authority may set rules for penalties for non-compliance.

Explanatory notes

Recommended values

For permanent staff and temporary staff with contracts exceeding 1 year: 16h of initial training, 8h of training as part of annual updates.

For temporary staff with contracts that do not exceed 1 year: 8h of initial training.

The duration of the training can be adjusted to the needs and conditions of the tenders.

Consequences

The acceptance of these criteria would stimulate tenderers to ensure that their staffs are equipped with the appropriate skills to deliver more environmentally neutral public space maintenance services.

Consultation questions
○ Would you deem it necessary to add further requirements to this proposal? ○ What could be the minimum duration of training for all new staff in hours?

7.2 Environmental management measures

Rationale

The criteria aimed at promoting best operational practices need to be supported by management measures, meaning monitoring and planning. This would ensure a proper implementation and guarantee continuous improvement. An environmental management system (EMS) is a systematic way to minimise the environmental issues of an organisation. It is particularly helpful to ensure the environmental performance of services, where an important part of the criteria must rely on best practices, staff training and other operational requirements. Some national GPP criteria require the company to have a certified environmental management system.

Although EMS is a very useful tool to develop systematic improvement processes, the leeway offered by the ISO standards may hinder their application in real practice. Their requirements are so general that their interpretation may be difficult for the non-expert users. In addition, EMS might be particularly difficult to be achieved by SMEs which may lead to their exclusion of the tender process. It is therefore proposed a technical specification inspired on the plan-do-check-act (PDCA) principles which constitute the basis of the management systems, and structured as follows:

- Monitoring the environmental issues by means of environmental indicators: in this case, the environmental issues are water and energy consumption, GHG and air pollutant emissions, consumable goods consumption and waste generation.
- Implementation of the operational procedures to minimise the environmental aspects: this would mean a plan to minimised the

environmental issues identified that covers the service provided over contract period.

- Evaluation of the implementation of the procedures and correction of the deviations found: there must be a systematic way to ensure the proper implementation of the emissions reduction plan and the minimisation of indicators. For this purpose, it is necessary to carry out a regular evaluation of both indicators and plan, and to set corrective and preventive actions where needed. This is proposed to be done by tracking the evolution of the indicators over the contract duration, and checking how the emissions reduction plan is deployed real practice.

The technical specification is complemented with a contract performance clause to ensure the implementation of the environmental management measures. It also works as a tool for the contracting authority to reward those contractors that achieve more ambitious targets, by means of bonuses. Besides, the technical specification indicates that the contracting authorities may award points to environmental management measures that entail a significant improvement compared to the conventional practices.

Criterion Proposal

Core criteria	**Comprehensive criteria**
Technical Specification	
TS1. Environmental management measures (*Same for core and comprehensive)* The tenderers must have written procedures to: 1. monitor, record and implement measures for the following: • Minimising GHG and air pollutant emissions • Minimising energy consumption • Minimising water consumption • Minimising products consumption (e.g. cleaning products, mineral and organic fertilisers, pesticides, de-icing products) • Minimising waste generation • Enhancing biodiversity 2. maintain the vehicles fleet and the machinery fleet according to the manufacturers recommendations 3. evaluate the deployment of the plan and operational procedures, by tracking the evolution of indicators[1] and the implementation of the measures and procedures in real practice 4. implement the necessary actions to correct deviations from the plan, and if possible prevent them in the future. **Verification:** The tenderer must provide a copy of the said written procedures.	

Environmental management systems certified against EU Eco-management and Audit Scheme (EMAS) or ISO 14001 will be deemed to comply, if they cover the environmental objectives listed in the technical specification and its scope includes the services that constitute the subject matter of the call for tender. The tenderer must provide the environmental policy showing the commitment to achieve these objectives, together with the certificate issued by the certification body where the scope is disclosed. *Note: the contracting authority may points at award stage to those tenders offering significant improvements in their environmental management measures.*	
Explanatory notes: [1]*The indicators to monitor the environmental issues are recommended to be based on the functional unit 'm^2 of maintained area' (e.g. litres of water consumed per m^2, litres of consumable per m^2). The minimum monitoring frequency recommended is once per season (four per year) during representative weeks. A representative week means a week where the level of activity is approximately the average of each season* *In case of biodiversity, the selection of indicators that enable the monitoring of this environmental aspect may be difficult. The ideal indicator would be objective-based, for example, an objective may be increasing the population of passerines, and the indicator would be the evolution of number of these birds. This needs to be estimated by capturing samples, and may be too costly. In that case, it is recommended to set indicators for the actions carried out to accomplish the objective: number of occupied nest boxes, increment of tree density and patch connectivity, etc.*	
Core criteria	**Comprehensive criteria**
Contract performance clause	
CPC2. Environmental management measures *(Same for core and comprehensive)* The contractor must document and report, over the contract duration: - the results of the monitoring of indicators - the maintenance activities and - the results of the evaluation and the correction and prevention actions, where applicable, according to the written procedures provided for the verification of the TS1 Environmental management measures These reports must be made available to the contracting authority for verification purposes. The contracting authority may set rules for penalties for non-compliance and bonuses for exceeding the objectives set by the procedures to optimise the environmental issues.	

Consequences

The incorporation of this criterion would encourage contractors providing public space maintenance service to implement the basis of, or have, a

third party certified environmental management system, leading to improvements in environmental performance in a systematic way.

Consultation questions
○ Do you agree with the environmental issues proposed to be monitored? ○ Which functional unit should be used to monitor the environmental issues? Would it be per area of maintained space a correct magnitude? ○ Have similar criteria been set in previous tenders and, if so, what were the verification procedures?

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