



## WP4 Urban Sharing Platform - Requirements

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D01	23/06/2017	Jason Warwick	Revised with detailed City requirements from WP3

## Executive summary

This document captures the requirements of the Sharing Cities project which will be used as input to architect, design and build the Urban Sharing Platform (USP).

This deliverable contains the consolidated description of London, Lisbon and Milan technical requirements, enhanced by feedback from Citizen Engagement WP or other WPs.

Where possible the USP requirements will align with the Requirement's Specification for the European Innovation Partnership for Smart Cities & Communities (EIP\_SCC) Integrated infrastructure Action Cluster – Urban Platform.

## Updates

The requirements for Sharing Cities evolve throughout the project especially those which related the cities and WP3. The WP4 Requirements deliverables have been designed as living documents to reflect this and as such have regular updates during the project.

These updates are primarily to support the connect of devices and sensors needed specified by WP3 to deliver their measures such as environmental sensors, EV charging stations and building heating controls. WP4 captures the technical details of this equipment including Device, Data and API to enable their connection to the USP.

It has become clear that the General Data Protection Regulation (GDPR) will need to be considered by Sharing Cities and create some requirements. We already record information about data in this document but as the Privacy Impact Assessments (PIA'S) take place during 2017 this may lead to updated specific GDPR requirements in the next update of this document.

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## **1 Introduction & Overview**

### **1.1 References and Supporting Documentation**

The following references and supporting documentation described below are appropriate for this requirements document.

#### **1.1.1 Business/ Functional Document References**

- H2020-SCC-2015 SHAR-LLM Proposal

#### **1.1.2 Technical Document References**

- SCC EIP Requirements Specification for Urban Platforms

## 2 Urban Sharing Platform Context

### 2.1 Overview

In the Sharing Cities bid from May 2015 the following was the proposal in relation to the requirements gathering for WP4. While much of what was proposed will be adopted some changes may be made where necessary as the project evolves over its 5 year lifecycle. There are significant dependencies for USP requirements definition on WP3 Place and WP2 People. It is expected that the WP3 USP requirements will be identified first and the WP2 requirements later as the People activity is planning to deliver the relevant tasks in 2017.

#### 2.1.1 Sharing Cities Bid Extract

***City Requirements Gathering*** (Coord. UrbanDNA) Project Schedule: Month 1 to 6 - This task takes a co-ordinated approach to gather, validate and then consolidate the requirements of London, Lisbon and Milan based on the use cases for the proposed work packages. From this a baseline range of functional and non-functional requirements will be identified and prioritised per their impact and benefit with priority given to requirements common between the cities.

This task includes these activities:

- i. Capture and consolidation of main common, cross-city technical requirements for the USP linked to key interventions.
- ii. Capture and refinement of local, city-scale technical requirements for the USP linked to key interventions.
- iii. Capture what data the project will generate or utilise to support the Data Management Plan (DMP, see Task T3.4).
- iv. Consolidation and refinement of technical requirements related to, e.g., compliance to standards, national or international regulations.
- v. Specification of the set of requirements to be addressed and fulfilled by the USP.
- vi. Involvement of cities, citizens and relevant stakeholders in the definition of use cases linked to the People WP.

### 2.2 SCC EIP Requirements for Urban Platforms

The SCC EIP Requirements, which are currently in draft form, have been utilised where relevant. In turn the requirements defined by Sharing Cities will be fed back to the EIP to enhance their dataset.

### 2.3 Relationship with other key Work Packages

Most of the requirements for the USP are provided by other work packages, primarily WP3 & WP2 with a little from WP5. This is because the USP largely exists to enable functions of the services which these work packages deliver including SEMS, Humble Lamppost and mobility. Therefore, a dependency exists on those work packages to provide information in a timely manner.

To manage the identification and gathering of requirements between key stakeholders; city's, citizens and work packages, the definition of Use Cases has been a valuable tool.

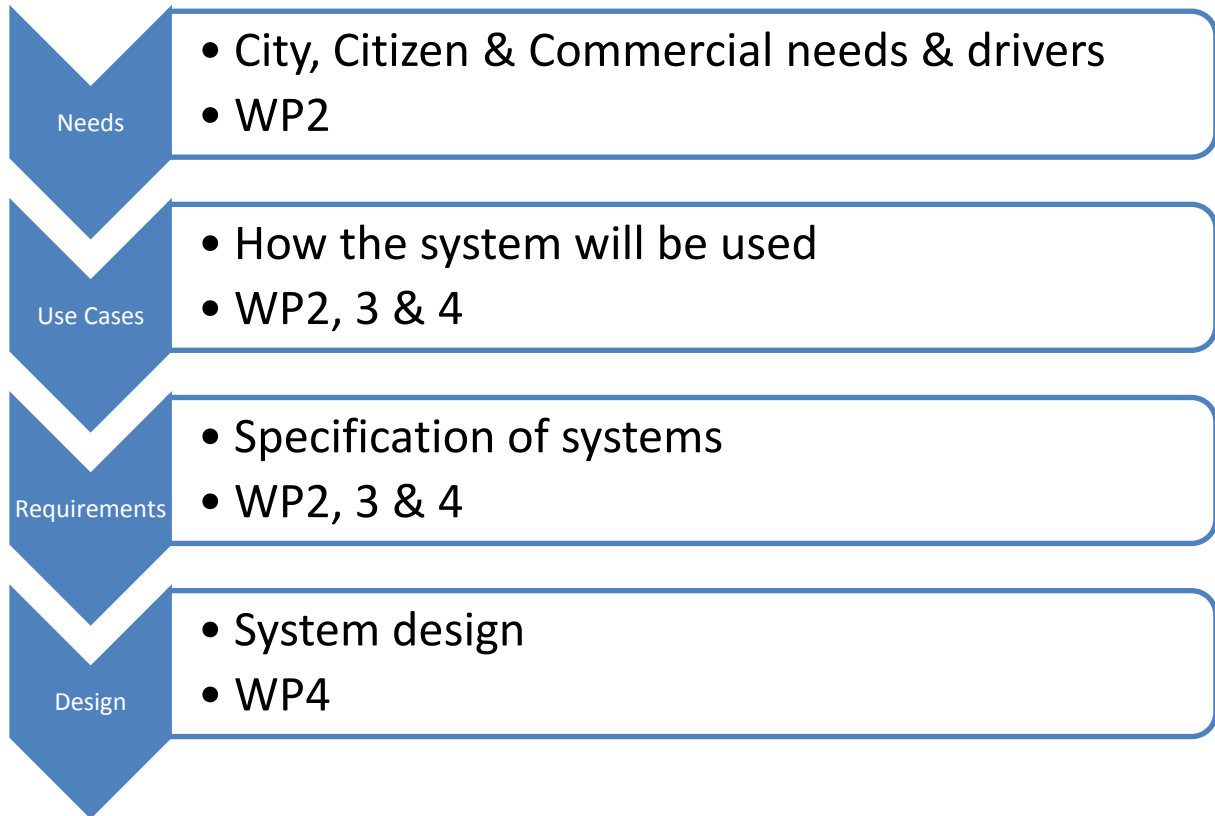
A use case is a written description of how users will perform tasks on a system. It outlines, from a user's point of view, a system's behaviour as it responds to a request. Each use case is represented as a sequence of simple steps, beginning with a user's goal and ending when that goal is fulfilled.

An example of a use case is to determine if EV Charger parking place is available. In this example, there is a requirement for the parking sensors supplied by WP3 to be connected to the USP which will gather the occupancy data and both provide real-time status of EV Charger Parking availability and reporting on historic usage patterns. Furthermore, there is much more detailed set of technical requirements which flow from this about the dataset such as volume, frequency and format.

In the following Diagram 1 – Use Case Value Chain, illustrates the relationship between City Stakeholders needs, Use Case, Requirements and USP (System Design).

#### **Diagram 1 – Use Case Value Chain**





## 2.4 The Wider City Context

This section outlines why requirements are vital to capture and design to the cities needs.

### 2.4.1 WHY – Use cases for the USP

Use cases for the USP describe why it is needed. The ‘why’ has three components:

- Why a city platform is needed
- Why the people of a city, represented by WP2 need the USP
- Why the infrastructure of a city represented by WP3 need the USP

### 2.4.2 WHAT – The USP Reference Architecture

The USP Reference Architecture describes the functions that will be developed for the USP. Although the RA has many components Sharing Cities is focusing on 3 main groups of functions:

- **API:** API & Data Sharing Layer      Move and share applications & services between cities
- **DATA:** Data Storage & Analytics      Standardised storage and processing of data
- **DEVICE:** Device Sharing Layer      Logical connection of any device to platform in any city

### 2.4.3 HOW – The USP Solution Design

Through the plan for the USP, each city is creating a solution design for the embodiment of the USP in their city. The solution design, in particular, needs to consider the requirements of the city in order to ensure the built solution meets the needs of the city.

## 2.5 Design and Implementation Constraints

### 2.5.1 Design Constraints

- Lack of standards agreement for metadata representation.
- City data found in existing data catalogues may require special consideration concerning the type of formats and datasets that must be stored within the platform.
- Requirements mismatch due to increased number of stakeholders involved in the design

### 2.5.2 Implementation Constraints

- Evaluation and testing of software options is expected to occur prior to selection and implementation of a production urban platform.
- Budget costs are unknown until evaluation of software options is completed.

### 2.5.3 Assumptions

Table 1 - USP Assumptions below outlines the assumptions relevant to the definition of USP requirements

Table 1. Assumptions

#	ASSUMPTION
1	The providers of city data and services will be responsible to maintain their resources in the platform.
2	All city data must meet the minimum metadata requirements and use the standards adopted by the platform.
3	The platform shall consider open Source as an optional commercial model, with open standards as a principle
4	The system design and architecture should minimize fragmentation of city data in the urban platform.
5	To the extent possible, automation should be used for the extraction of descriptive and technical metadata.
6	The platform must be designed in a way it accommodates additional functionality at later stage at a fair and transparent cost.
7	The platform must be a modular based architecture which relies on stable and well-defined open interfaces to ensure interoperability between the platform, services and the applications provided by service providers.
8	The platform will offer open and well-documented API's and clear service descriptions and contracts that is offered for reuse by another party to foster open innovation in the city, which means that developers and interested individuals openly utilize the resources provided.
9	Adopt open and published European and International standards where possible.
10	The platform must be flexible enough to accommodate different local, National and International data protection, licensing and commercialization regulations.
11	Platform providers will monitor emerging technologies in order to maintain and improve the architecture.
12	Platform providers will monitor emerging information standards, including metadata standards and data interface standards.
13	Platform providers will monitor new commercial models for city data exploitation

### 3 USP Requirements

The functional requirements of the USP have been grouped into two areas: Internal & external.

Internal requirements are those needed to support the basic functions of the USP and are broadly independent of the needs of the other work packages.

External requirements reflect the needs of the other WP's mainly WP3 & WP2.

WP2 – what data is output from the USP, its content, structure and format

WP3 – What data is input or captured by the USP and related specifications for devices to be connected.

#### 3.1 USP Requirements

This Section Outlines the set of requirements to be addressed and fulfilled by the USP.

##### 3.1.1 Generic

Id	Description	Type
G-001	The platform must be provided as a service	Generic
G-002	The platform must be multi-tenant	Generic
G-003	The platform must be reliable	Generic
G-004	The platform must provide open interfaces to ensure interoperability with applications, devices and enablers	Generic
G-005	The platform must have load balance mechanism	Generic
G-006	The platform must support multiple IP-based communication channels to interact with devices and applications	Generic
G-007	The platform must provide the capability for applications to communicate with devices regarding the communication technology	Generic
G-008	The platform must be auditable	Generic

### 3.1.2 Business

Id	Description	Type
B-001	The platform must support the register of publishers	Business
B-002	The platform must store publishers related information	Business
B-003	The platform must support managing terms of agreement with publishers	Business
B-004	The platform must support the commercialization of services	Business
B-005	The platform must support the commercialization of data	Business
B-006	The platform must provide service providers mechanism to specify business models associated to services they are providing	Business
B-007	The platform must provide service providers mechanism to specify business models associated to data they are providing	Business
B-008	The platform must provide mechanisms for users to subscribe open services	Business
B-009	The platform must provide mechanisms for users to subscribe paid services	Business
B-010	The platform must provide mechanisms for users to subscribe open city data	Business
B-011	The platform must provide mechanisms for users to subscribe paid city data	Business
B-012	The platform must support accounting mechanisms	Business
B-013	The platform must support the generation of charging records	
B-014	The platform must support the generation of charging records	Business
B-015	The platform must create billing items	Business
B-016	The platform must provide capabilities for top up payments	Business
B-017	The platform must support SLA monitoring	Business

### 3.1.3 Functional

Id	Description	Type
F-001	The platform must support synchronous communication mode (Request & Response)	Functional
F-002	The platform must support asynchronous communication mode (Subscription & Notification)	Functional
F-003	The platform must support application registration	Functional
F-004	The platform must support device and gateway registration	Functional
F-005	The platform must store application, device and gateway registration related information	Functional
F-006	The platform must support the discovery of devices and gateways	Functional
F-007	The platform must support the discovery of applications	Functional
F-008	The platform must support policies configuration	Functional
F-009	The platform support policies enforcement	Functional
F-010	The platform must support policies monitoring	Functional
F-011	The platform must support the communication between one application with multiple devices	Functional
F-012	The platform must support the communication between one device with multiple applications	Functional
F-013	The platform must ensure the delivery of a message to an application or device	Functional
F-014	The platform shall support the acknowledgment of message delivery to an application or device	Functional
F-015	The platform must support subscription to events	Functional
F-016	The platform must support notifications when subscribed events happen	Functional
F-017	The platform must support subscription of metada-based events	Functional

F-018	The platform must support metadata verification	Functional
F-019	The platform must support metadata completion	Functional
F-020	The platform must support notifications when subscribed metadata-based events happen	Functional
F-021	The platform must store application, device and gateway subscription related information	Functional
F-022	The platform shall support communications between applications and devices using continuous connectivity	Functional
F-023	The platform shall support communications between applications and devices using non-continuous connectivity	Functional
F-024	The platform shall be capable to communicate with devices connected through gateways	Functional
F-025	The platform must support the storage of application, device and gateway data	Functional
F-026	The platform must ensure the maintenance of information while valid	Functional
F-027	The platform shall support accurate, secure and trusted time stamping	Functional
F-028	The platform must make the data available, on request or based on subscriptions, subject to access rights and permissions	Functional
F-029	The platform must ensure that data and metadata are not corrupted during exchanges	Functional
F-030	The platform must enable sharing of data among multiple applications.	Functional
F-031	The platform must enable sharing of data among multiple devices	Functional
F-032	The platform shall support information delivery to devices on behalf of applications	Functional
F-033	The platform shall support information delivery to applications on behalf of devices	Functional
F-034	The platform must guarantee the delivery of information	Functional
F-035	The platform must archives relevant information exchanged	Functional

F-036	The platform must be skilled to monitor functionality the entire repository	Functional
F-037	The platform must support interaction with exposed services	Functional
F-038	The platform shall allow the monitoring and diagnostics of applications	Functional

### 3.1.4 Device management

Id	Description	Type
DM-001	The platform shall provide the capability for provisioning of gateways and devices	Device Management
DM-002	The platform shall support management of gateways and devices	Device Management
DM-003	The platform shall support configuration of gateways and devices	Device Management
DM-004	The platform shall allow the monitoring and diagnostics of gateways devices	Device Management
DM-005	The platform shall support performance management	Device Management
DM-006	The platform shall support fault management	Device Management
DM-007	The platform shall support software update	Device Management
DM-008	The platform shall support interworking proxy between different devices	Device Management
DM-009	The platform must support authorizing devices to access local area networks	Device Management

### 3.1.5 Semantic

Id	Description	Type
SE-001	The platform must support the usage of ontologies and semantic modelling of data	Semantic
SE-002	The platform must ensure a generic structure for data representation	Semantic



SE-003	The platform shall provide capabilities to represent other sources of information rather than devices	Semantic
SE-004	The platform shall support semantic descriptions management	Semantic
SE-005	The platform shall support a common information model for different verticals	Semantic
SE-006	The platform shall support interworking proxy between different modeling languages	Semantic
SE-007	The platform shall support the discovery of devices based on semantic descriptions	Semantic
SE-008	The platform shall be skilled to perform data analytics based on semantic descriptions	Semantic

### 3.1.6 Security

Id	Description	Type
S-001	The platform shall be robust against threats to its availability	Security
S-002	The platform shall ensure privacy	Security
S-003	The platform must protect user's personal information	Security
S-004	The platform shall support mutual authentication between platform and devices and gateways	Security
S-005	The platform shall support mutual authentication between platform and applications	Security
S-006	The platform must ensure the data confidentiality	Security
S-007	The platform must ensure the data integrity	Security
S-008	The platform shall be able to securely make the provision of security credentials in devices or gateways	Security
S-009	The platform shall support countermeasures against unauthorized access to applications and devices	Security

S-010	The platform must ensure that only registered application can access the platform	Security
S-011	The platform must ensure that only registered devices can access the platform	Security
S-012	The platform must ensure a controlled access to devices	Security
S-013	The platform must ensure a controlled access to applications	Security
S-014	The platform must guarantee that only authorized applications can access the data	Security
S-015	The platform must guarantee that only authorized devices and gateways can access the data	Security
S-016	The platform must guarantee that only authorized applications can update or write new data	Security
S-017	The platform must ensure that only authorized devices and gateways can update or write new data	Security
S-018	The platform must allow interaction between applications and devices managed by different providers subject to restrictions	Security
S-019	The platform must provide access rights mechanisms associated to data and metadata access	Security
S-020	The platform must enable anonymized data access	Security
S-021	The platform must ensure the data access control in the repository based on profiles	Security

### 3.1.7 Data

Req. ID	UC. ID	Description	Priority	Domain
FREQ.1	UC1	Allow data publishers to register to submit data for publication	Must	Societal Needs, Platform
FREQ.2	UC1	Tracks data publication agreements between Data and Platform Providers	Must	Business Needs, Platform

FREQ.3	UC1	Store terms of agreements, and use them to monitor/review/process data submissions.	Must	City Data, Platform
FREQ.4	UC1	Able to add and edit terms of agreement, based on access of level of user.	Must	Business Needs, Platform
FREQ.5	UC1	Data publications are managed and monitored	Must	City Data, Platform
FREQ.6	UC2	Allow authenticated users from across different organisations to publish city data	Must	City Data, Platform, Business Needs
FREQ.7	UC2	Provide authorization mechanisms for users and sensors to publish city data	Must	City Data, Platform
FREQ.9	UC2	Provide mechanisms for static data publication	Must	City Data, Platform, Business Needs
FREQ.10	UC2	Provide mechanisms for real-time data publication	Must	City Data, Platform, Business Needs
FREQ.11	UC2	Enable the publication of metadata	Must	City Data, Platform
FREQ.12	UC2	Maintain temporal information about the data	Must	City Data, Platform
FREQ.13	UC2	Support sensory data collection	Must	City Data, Platform
FREQ.14	UC2	Accepts content in numerous file types/formats	Must	City Data, Platform
FREQ.15	UC2	Prompts a request for resubmission to the data provider if an error of data transmission or receipt occurs	Must	City Data, Platform
FREQ.16	UC2	Enable the semantic description of connected devices	Must	City Data, Platform
FREQ.17	UC2	Gather data from authenticated and authorized devices	Must	City Data, Platform
FREQ.18	UC2	Validates automatically the successful transfer of the data	Must	City Data, Platform
FREQ.19	UC2	Performs virus checking on data	Must	City Data, Platform
FREQ.20	UC2	Verifies the validity of the submission based on submitter, expected format, data quality, and completeness	Must	City Data, Platform
FREQ.21	UC2	Platform should have built-in checks on the incoming metadata. Data not containing the minimally defined set of attributes should be returned to the publisher for metadata enhancement.	Must	City Data, Platform
FREQ.22	UC2	System should have a user-friendly method of mapping non-standard metadata elements into approved standard elements.	Should	City Data, Platform
FREQ.23	UC2	Once ingested, metadata should be stored in a single common format. This format should be one that ensures against data loss, and allows a variety of access/distribution options	Must	City Data, Platform

FREQ.24	UC2	Data in the repository shall have sufficient technical metadata to assure functionality (e.g. viewing and display) to ensure accessibility and reusability.	Must	City Data, Platform
FREQ.25	UC2	Allows publishers to display and perform manual/visual quality control assurance via a user-friendly GUI	Could	Business Needs, City Data, Platform
FREQ.26	UC2	Any errors shall prompt a request for resubmission of data	Should	Business Needs, City Data, Platform
FREQ.27	UC3	Enable data providers to manage their resources	Must	Business Needs
FREQ.28	UC3	A minimal set of identifying information/metadata concerning data publication submission must be recorded	Must	Business Needs, Platform
FREQ.29	UC3	Stores and tracks versions of data. Links /connections between versions are created and maintained	Must	City Data, Platform
FREQ.30	UC3	Give service and data providers access to anonymized data of the subscribers of their data or services	Should	Business Needs
FREQ.31	UC3	Enable data providers to maintain and repair data and metadata	Should	City Data, Platform, Business Needs
FREQ.32	UC3	Tracks data publication agreements between Data and Platform Providers	Must	Business Needs, Platform
FREQ.33	UC3	Store terms of agreements, and use them to monitor/review/process data submissions.	Must	City Data, Platform
FREQ.34	UC3	Able to add and edit terms of agreement, based on access of level of user.	Must	Business Needs, Platform
FREQ.35	UC3	Submission volumes and schedules are managed and monitored	Must	City Data, Platform

## 4 City Requirements

This section details the requirements from WP2 & WP3 which will be supported by the USP. Such requirements have been identified by the definition of Use Cases by the respective work packages.

This includes both the main common, cross-city technical requirements for the and the local, city-scale technical requirements for the USP linked to key interventions.

In this release, only the WP3 requirements are known as the WP2 People activities are still taking place. This is in line with Sharing Cities Project plan and is expected. The dependant WP2 activities overdue and will be include when they are completed. Detailed timings can be found in the Sharing Cities Project Plan.

### 4.1 WP3 Place Requirements

The city local and cross city requirements are extensive and are initially captured in a shared Excel Spreadsheet: Use Case Super Matrix and Data Capture Table which maps the WP3 Use Cases to the information needed for WP4 to identify its requirements.

There are 3 types of requirements which are captured, all of which are linked;

- Data – information about the data which the device generates or needs
- Device – provides details of the devices to be integrated with the USP
- API – information about how the data is integrated with other systems

NOTES: The tables below includes some blanks where information has yet to be determined, often as the devices have yet to be specified or procured.

#### 4.1.1 Data Requirements

ID No	City	UC ID	Data ID	Data Name	Device City	Unit	Data Generation Frequency (secs)	Data Collection Frequency (secs)	Accuracy	Spatial Definition	Is Sensitive or Personal Data
1	Lisbon	UC 3.2.2	DA_000018	Temperature	Lisbon	°C					No
2	Lisbon	UC 3.2.2	DA_000019	Solar radiation	Lisbon	W/m^2					No
3	Lisbon	UC 3.2.5	DA_000022	Electricity consumption	Lisbon	kWh	86400	86400		Local identification code	Yes
4	Lisbon	UC 3.2.5	DA_000023	Charge load level (max power or current) and charging time period	Lisbon	W (A) and hours				EV Charging Station	Yes
5	Lisbon	UC 3.2.5	DA_000024	EV Energy Charged	Lisbon	kWh	86400			EV Charging Station	Yes
6	Lisbon	UC 3.2.5	DA_000025	Charging Station Energy Charged (aggregated)	Lisbon	kWh	86400			EV Charging Station	Yes
7	Lisbon	UC 3.2.5	DA_000026	PV	Lisbon	kWh	86400				No
8	Lisbon	UC 3.2.5	DA_000027	Public lighting	Lisbon	kWh	86400				No
9	Lisbon	UC 3.3.1	DA_000030	Ebike Docking Station Status	Lisbon	FREE, CHARGING, OCCUPIED	3600	3600	0,005	Docking Station	No
10	Lisbon	UC 3.3.1	DA_000031	0	Lisbon	%	3600	3600	0,005	Ebike	No
11	Lisbon	UC 3.3.1	DA_000033	Electricity consumption	Lisbon	kWh	900	36000		EV Charging Station	
12	Lisbon	UC 3.3.1	DA_000038	Vehicle Speed	Lisbon	km/h	1	60		EV	Yes
13	Lisbon	UC 3.3.1	DA_000039	Vehicle State	Lisbon	DRIVING, CHARGING, PARKED	on change	60		EV	Yes
14	Lisbon	UC 3.3.1	DA_000052	Status-EV charging point	Lisbon	FREE, CHARGING, OCCUPIED	on change				No
15	Lisbon	UC 3.3.1	DA_000053	Emissions saved	Lisbon	kg					Don't Know
16	Lisbon	UC 3.3.2	DA_000018	Temperature	Lisbon	°C					No
17	Lisbon	UC 3.3.2	DA_000030	Ebike Docking Station Status	Lisbon	FREE, CHARGING, OCCUPIED	3600	3600	0,005	Docking Station	No

#### D. 4.6 Urban Sharing Platform Requirements



ID No	City	UC ID	Data ID	Data Name	Device City	Unit	Data Generation Frequency (secs)	Data Collection Frequency (secs)	Accuracy	Spatial Definition	Is Sensitive or Personal Data
18	Lisbon	UC 3.3.2	DA_000031	0	Lisbon	%	3600	3600	0,005	Ebike	No
19	Lisbon	UC 3.3.2	DA_000053	Emissions saved	Lisbon	kg					Don't Know
20	Lisbon	UC 3.3.2	DA_000055	distance covered	Lisbon	km	7200	7200			
21	Lisbon	UC 3.3.3	DA_000030	Ebike Docking Station Status	Lisbon	FREE, CHARGING, OCCUPIED	3600	3600	0,005	Docking Station	No
22	Lisbon	UC 3.3.3	DA_000031	0	Lisbon	%	3600	3600	0,005	Ebike	No
23	Lisbon	UC 3.3.3	DA_000033	Electricity consumption	Lisbon	kWh	900	36000		EV Charging Station	
24	Lisbon	UC 3.3.3	DA_000038	Vehicle Speed	Lisbon	km/h	1	60		EV	Yes
25	Lisbon	UC 3.3.3	DA_000039	Vehicle State	Lisbon	DRIVING, CHARGING, PARKED	on change	60		EV	Yes
26	Lisbon	UC 3.3.3	DA_000040	EV Battery State of Charge	Lisbon	%	1	60	0,005	EV	No
27	Lisbon	UC 3.3.3	DA_000052	Status-EV charging point	Lisbon	FREE, CHARGING, OCCUPIED	on change				No
28	Lisbon	UC 3.3.3	DA_000053	Emissions saved	Lisbon	kg					Don't Know
29	Lisbon	UC 3.3.3	DA_000054	Tariffs	Lisbon	€/kWh	60	60			No
30	Lisbon	UC 3.3.4	DA_000037	Parking Status Sensor	Lisbon	FREE, OCCUPIED	3600	3600	0,01	Sensor	Don't Know
31	Lisbon	UC 3.3.5	DA_000037	Parking Status Sensor	Lisbon	FREE, OCCUPIED	3600	3600	0,01	Sensor	Don't Know
32	Lisbon	UC 3.3.5	DA_000038	Vehicle Speed	Lisbon	km/h	1	60		EV	Yes
33	Lisbon	UC 3.3.5	DA_000039	Vehicle State	Lisbon	DRIVING, CHARGING, PARKED	on change	60		EV	Yes
34	Lisbon	UC 3.3.5	DA_000040	EV Battery State of Charge	Lisbon	%	1	60	0,005	EV	No

## D. 4.6 Urban Sharing Platform Requirements



ID No	City	UC ID	Data ID	Data Name	Device City	Unit	Data Generation Frequency (secs)	Data Collection Frequency (secs)	Accuracy	Spatial Definition	Is Sensitive or Personal Data
35	Lisbon	UC 3.3.5	DA_000052	Status-EV charging point	Lisbon	FREE, CHARGING, OCCUPIED	on change				No
36	Lisbon	UC 3.3.6	DA_000038	Vehicle Speed	Lisbon	km/h	1	60		EV	Yes
37	Lisbon	UC 3.3.6	DA_000039	Vehicle State	Lisbon	DRIVING, CHARGING, PARKED	on change	60		EV	Yes
38	Lisbon	UC 3.3.6	DA_000040	EV Battery State of Charge	Lisbon	%	1	60	0,005	EV	No
39	Lisbon	UC 3.3.6	DA_000052	Status-EV charging point	Lisbon	FREE, CHARGING, OCCUPIED	on change				No
40	Lisbon	UC 3.4.6	DA_000065	Humidity	Lisbon	%	600	600	0,02	Lamppost	no
41	Lisbon	UC 3.4.6	DA_000066	Pressure	Lisbon	hPA	600	600		Lamppost	No
42	Lisbon	UC 3.4.6	DA_000067	Particulate Matter (PM)	Lisbon	ppm	600	600		Lamppost	No
43	Lisbon	UC 3.4.6	DA_000068	Chemicals Pollutions	Lisbon	ppm	600	600		Lamppost	No
44	Lisbon	UC 3.4.6	DA_000069	Noise	Lisbon	dB/ degree	1	1		Lamppost	no
45	London	UC 3.2.1	DA_000005	Heat Power and Energy Flow and return temperature	London	kWh	10	60	0,01	In home / HIU	Yes
46	London	UC 3.2.1	DA_000006	River Temperature	London	°C	1800	1800			No
47	London	UC 3.2.1	DA_000007	External Temperature	London	°C	1800	1800			No
48	London	UC 3.2.1	DA_000008	WSHP Import Electricity Meter	London	kWh	1800	1800			No
49	London	UC 3.2.1	DA_000009	WSHP Export Heat Meter	London	kWh	1800	1800			No
50	London	UC 3.2.1	DA_000010	Heat Network Outflow Temperature	London	°C	1	1			No



## D. 4.6 Urban Sharing Platform Requirements



ID No	City	UC ID	Data ID	Data Name	Device City	Unit	Data Generation Frequency (secs)	Data Collection Frequency (secs)	Accuracy	Spatial Definition	Is Sensitive or Personal Data
51	London	UC 3.2.1	DA_000011	Heat Network Inflow Temperature	London	°C	1	1			No
52	London	UC 3.2.1	DA_000012	Heat Network Pump(s) Consumption	London	kWh	1800	1800			No
53	London	UC 3.2.1	DA_000013	Heat Network - Current Set Points	London		60	60			No
54	London	UC 3.2.1	DA_000014	Heat Network - New Set Points	London	kWh	1800	1800			No
55	London	UC 3.2.1	DA_000015	Electricity wholesale prices	London						No
56	London	UC 3.2.1	DA_000016	Aggregated Heat Consumption	London	kWh	1800	1800			No
57	London	UC 3.2.2	DA_000017	Power and Energy consumption	London	Watts, kWh	10	10	0,05	In home metering cupboard	Yes
58	London	UC 3.2.3	DA_000020	Temperature	London	°C	60	60	0,05	In home	Yes
59	London	UC 3.2.3	DA_000021	Aggregated Heat Consumption	London	°C	1800	1800			No
60	London	UC 3.2.5	DA_000028	Temperature	London	°C	3600	3600	0,01		
61	London	UC 3.2.5	DA_000029	Tariffs	London	£/Wh					No
62	London	UC 3.3.1	DA_000034	Electricity consumption	London	kWh	60	60		EV Charging Station	
63	London	UC 3.3.1	DA_000055	distance covered	London	km	7200	7200			
64	London	UC 3.3.1	DA_000056	Ebike Docking Station Status	London	FREE, CHARGING, OCCUPIED	on change				
65	London	UC 3.3.1	DA_000057	Ebike Battery State of Charge	London	%	60	60			
66	London	UC 3.3.1	DA_000059	Status-EV charging point	London	FREE, CHARGING, OCCUPIED	on change				

## D. 4.6 Urban Sharing Platform Requirements



ID No	City	UC ID	Data ID	Data Name	Device City	Unit	Data Generation Frequency (secs)	Data Collection Frequency (secs)	Accuracy	Spatial Definition	Is Sensitive or Personal Data
67	London	UC 3.3.1	DA_000061	Vehicle Speed	London	km/h					
68	London	UC 3.3.1	DA_000062	Attitudinal data from survey	London	m					
69	London	UC 3.3.1	DA_000064	Electricity consumption	London	kWh					
70	London	UC 3.3.3	DA_000034	Electricity consumption	London	kWh	60	60		EV Charging Station	
71	London	UC 3.3.4	DA_000034	Electricity consumption	London	kWh	60	60		EV Charging Station	
72	London	UC 3.3.4	DA_000063	Parking Sensor Status	London	FREE, OCCUPIED	60	60			
73	London	UC 3.3.5	DA_000034	Electricity consumption	London	kWh	60	60		EV Charging Station	
74	London	UC 3.3.5	DA_000055	distance covered	London	km	7200	7200			
75	London	UC 3.3.5	DA_000059	Status-EV charging point	London	FREE, CHARGING, OCCUPIED	on change				
76	London	UC 3.3.5	DA_000061	Vehicle Speed	London	km/h					
77	London	UC 3.3.5	DA_000064	Electricity consumption	London	kWh					
78	London	UC 3.3.6	DA_000058	EV Battery State of Charge	London	%	60	60			
79	London	UC 3.3.6	DA_000059	Status-EV charging point	London	FREE, CHARGING, OCCUPIED	on change				
80	London	UC 3.3.6	DA_000060	Vehicle State	London	DRIVING, CHARGING, PARKED	on change				
81	London	UC 3.3.6	DA_000061	Vehicle Speed	London	km/h					
82	London	UC 3.4.6	DA_000050	NO2	London					Lamppost	Yes
83	London	UC 3.4.6	DA_000051	Particulate Matter (PM)	London					Lamppost	Yes
84	Milan	UC 3.1.1	DA_000001	Electrical energy	Milan	Wh	Continuous	900	0,01	Public building apartment	Yes

#### D. 4.6 Urban Sharing Platform Requirements



ID No	City	UC ID	Data ID	Data Name	Device City	Unit	Data Generation Frequency (secs)	Data Collection Frequency (secs)	Accuracy	Spatial Definition	Is Sensitive or Personal Data
85	Milan	UC 3.1.1	DA_000002	Thermal energy	Milan	Wh	Continuous	3600	0,05	Public building common area	No
86	Milan	UC 3.1.1	DA_000003	Thermal energy	Milan	Wh	Continuous	3600	0,01	Public building apartment	No
87	Milan	UC 3.1.1	DA_000004	Air temperature	Milan	°C	Continuous	600	0,03	Public building apartment	Yes
88	Milan	UC 3.3.2	DA_000032	Ebike Battery State of Charge	Milan	%				Ebike	
89	Milan	UC 3.3.3	DA_000035	Electricity consumption	Milan	kWh					
90	Milan	UC 3.3.3	DA_000036	Power Generated	Milan						
91	Milan	UC 3.4.6	DA_000041	Chemicals Pollutions	Milan		600	600		Lamppost	Yes
92	Milan	UC 3.4.6	DA_000042	Wind speed	Milan		600	10000		Lamppost	Yes
93	Milan	UC 3.4.6	DA_000043	Wind direction	Milan		600	10000		Lamppost	Yes
94	Milan	UC 3.4.6	DA_000044	Temperature	Milan		600	600		Lamppost	Yes
95	Milan	UC 3.4.6	DA_000045	Humidity	Milan		600	600		Lamppost	Yes
96	Milan	UC 3.4.6	DA_000046	Pressure	Milan		600	600		Lamppost	Yes
97	Milan	UC 3.4.6	DA_000047	Water level	Milan		600	600		Lamppost	Yes
98	Milan	UC 3.4.6	DA_000048	Noise	Milan		600	600		Lamppost	Yes
99	Milan	UC 3.4.6	DA_000049	Particulate Matter (PM)	Milan		600	600		Lamppost	Yes

#### 4.1.2 Device Requirements

ID No	City	Data ID	Data Name	Spatial Definition	Is Sensitive or Personal Data	Device ID	Device Name	Vendor / Provider	Product Name and Model	Is Device Position (x,y,z) / Orientation Available	Device Position Coordinates Format	Is Gateway or Application
1	Lisbon	DA_000024	EV Energy Charged	EV Charging Station	Yes	DE_000012	Ecar Charging Point	CEIIA	Charging Station	Yes	WGS84	
2	Lisbon	DA_000025	Charging Station Energy Charged (aggregated)	EV Charging Station	Yes	DE_000012	Ecar Charging Point	CEIIA	Charging Station	Yes	WGS84	
3	Lisbon	DA_000030	Ebike Docking Station Status	Docking Station	No	DE_000015	EBike docking station	Orbita	Router Thomson	Yes	WGS84	No
4	Lisbon	DA_000031	0	Ebike	No	DE_000016	EBike	Orbita	Router Thomson	Yes	WGS84	No
5	Lisbon	DA_000033	Electricity consumption	EV Charging Station		DE_000018	Ecar Charging Point	EFACEC	EV1	No		
6	Lisbon	DA_000037	Parking Sensor Status	Sensor	Don't Know	DE_000023	Parking Sensor	RPGSI	EMELY	Yes	WGS84	Yes
7	Lisbon	DA_000038	Vehicle Speed	EV	Yes	DE_000024	EV Car	CEIIA	MDC v2	Yes	WGS84	
8	Lisbon	DA_000039	Vehicle State	EV	Yes	DE_000024	EV Car	CEIIA	MDC v2	Yes	WGS84	
9	Lisbon	DA_000040	EV Battery State of Charge	EV	No	DE_000024	EV Car	CEIIA	MDC v2	Yes	WGS84	
10	Lisbon	DA_000052	Status-EV charging point		No	DE_000018	Ecar Charging Point	EFACEC	EV1	No		
11	Lisbon	DA_000053	Emissions saved		Don't Know	DE_000013	Electric Vehicle Management System	CEEIA	mobi.me			Yes
12	Lisbon	DA_000054	Tariffs		No	DE_000013	Electric Vehicle Management System	CEEIA	mobi.me			Yes
13	Lisbon	DA_000065	Humidity	Lamppost	no	DE_000034	Sound Analytics Station			no		

#### D. 4.6 Urban Sharing Platform Requirements



ID No	City	Data ID	Data Name	Spatial Definition	Is Sensitive or Personal Data	Device ID	Device Name	Vendor / Provider	Product Name and Model	Is Device Position (x,y,z) / Orientation Available	Device Position Coordinates Format	Is Gateway or Application
14	Lisbon	DA_000066	Pressure	Lamppost	No	DE_000034	Sound Analytics Station			no		
15	Lisbon	DA_000067	Particulate Matter (PM)	Lamppost	No	DE_000034	Sound Analytics Station			no		
16	Lisbon	DA_000068	Chemicals Pollutions	Lamppost	No	DE_000034	Sound Analytics Station			no		
17	Lisbon	DA_000069	Noise	Lamppost	no	DE_000034	Sound Analytics Station			no		
18	London	DA_000005	Heat and Power Flow and return temperature	In home / HIU	Yes	DE_000004	Heat Meter	TBD	Sharky 0007	No		
19	London	DA_000006	River Temperature		No	DE_000006	Heat System Control System		SCADA			
20	London	DA_000007	External Temperature		No	DE_000006	Heat System Control System		SCADA			
21	London	DA_000008	WSHP Import Electricity Meter		No	DE_000006	Heat System Control System		SCADA			
22	London	DA_000009	WSHP Export Heat Meter		No	DE_000006	Heat System Control System		SCADA			

D. 4.6 Urban Sharing Platform Requirements



ID No	City	Data ID	Data Name	Spatial Definition	Is Sensitive or Personal Data	Device ID	Device Name	Vendor / Provider	Product Name and Model	Is Device Position (x,y,z) / Orientation Available	Device Position Coordinates Format	Is Gateway or Application
23	London	DA_000010	Heat Network Outflow Temperature		No	DE_000006	Heat System Control System		SCADA			
24	London	DA_000011	Heat Network Inflow Temperature		No	DE_000006	Heat System Control System		SCADA			
25	London	DA_000012	Heat Network Pump(s) Consumption		No	DE_000006	Heat System Control System		SCADA			
26	London	DA_000013	Heat Network - Current Set Points		No	DE_000006	Heat System Control System		SCADA			
27	London	DA_000014	Heat Network - New Set Points		No	DE_000006	Heat System Control System		SCADA			
28	London	DA_000016	Aggregated Heat Consumption		No	DE_000007	Building Heating System					
29	London	DA_000017	Power and Energy consumption	In home / metering cupboard	Yes	DE_000008	CT clamps	Hildebrand Technology	Efergy CT clamp	No		No
30	London	DA_000020	Temperature	In home	Yes	DE_000008	CT clamps	Hildebrand Technology	Efergy CT clamp	No		No
31	London	DA_000021	Aggregated Heat Consumption		No	DE_000011	Building Heating System					
32	London	DA_000028	Temperature			DE_000014	Weather Forecast Web Site					

#### D. 4.6 Urban Sharing Platform Requirements



ID No	City	Data ID	Data Name	Spatial Definition	Is Sensitive or Personal Data	Device ID	Device Name	Vendor / Provider	Product Name and Model	Is Device Position (x,y,z) / Orientation Available	Device Position Coordinates Format	Is Gateway or Application
33	London	DA_000034	Electricity consumption	EV Charging Station		DE_000019	Ecar Charging Point	IER		No		
34	London	DA_000050	NO2	Lamppost	Yes	DE_000028	Environmental Sensor			Yes	BNG	
35	London	DA_000051	Particulate Matter (PM)	Lamppost	Yes	DE_000028	Environmental Sensor			Yes	BNG	
36	London	DA_000055	distance covered			DE_000030	EV Car			Yes		
37	London	DA_000056	Ebike Docking Station Status			DE_000032	e-bike doking station			Yes		
38	London	DA_000057	Ebike Battery State of Charge			DE_000033	e-bike			Yes		
39	London	DA_000058	EV Battery State of Charge			DE_000030	EV Car			Yes		
40	London	DA_000059	Status-EV charging point			DE_000019	Ecar Charging Point	IER		No		
41	London	DA_000060	Vehicle State			DE_000030	EV Car			Yes		
42	London	DA_000061	Vehicle Speed			DE_000030	EV Car			Yes		
43	London	DA_000062	Attitudinal data from survey			DE_000031	App					
44	London	DA_000063	Parking Sensor Status			DE_000029	Parking Sensor			Yes		
45	London	DA_000064	Electricity consumption			DE_000019	Ecar Charging Point	IER		No		

D. 4.6 Urban Sharing Platform Requirements



ID No	City	Data ID	Data Name	Spatial Definition	Is Sensitive or Personal Data	Device ID	Device Name	Vendor / Provider	Product Name and Model	Is Device Position (x,y,z) / Orientation Available	Device Position Coordinates Format	Is Gateway or Application
46	Milan	DA_000001	Electrical energy	Public building apartment	Yes	DE_000001	Electrical Energy Smart Meter	A2A Unareti		Yes		No
47	Milan	DA_000002	Thermal energy	Public building common area	No	DE_000002	Thermal Energy Smart Meter	MM		Yes		No
48	Milan	DA_000003	Thermal energy	Public building apartment	No	DE_000002	Thermal Energy Smart Meter	MM		Yes		No
49	Milan	DA_000004	Air temperature	Public building apartment	Yes	DE_000003	SC8 Meter Station	Future Energy	SC8 v1	Yes		No
50	Milan	DA_000032	Ebike Battery State of Charge	Ebike		DE_000017	EBike			Yes	WGS84	
51	Milan	DA_000035	Electricity consumption			DE_000020	Ecar Charging Point			No		
52	Milan	DA_000036	Power Generated			DE_000022	PV Panel					
53	Milan	DA_000041	Chemicals Pollutions	Lamppost	Yes	DE_000025	Environmental Sensor - Airspot		Airspot	Yes	WGS84	
54	Milan	DA_000042	Wind speed	Lamppost	Yes	DE_000026	Environmental Sensor - WaspMote		WaspMote	Yes	WGS84	
55	Milan	DA_000043	Wind direction	Lamppost	Yes	DE_000026	Environmental Sensor - WaspMote		WaspMote	Yes	WGS84	



D. 4.6 Urban Sharing Platform Requirements



ID No	City	Data ID	Data Name	Spatial Definition	Is Sensitive or Personal Data	Device ID	Device Name	Vendor Provider	Product Name and Model	Is Device Position (x,y,z) / Orientation Available	Device Position Coordinates Format	Is Gateway or Application
56	Milan	DA_000044	Temperature	Lamppost	Yes	DE_000025	Environmental Sensor - Airspot		Airspot	Yes	WGS84	
57	Milan	DA_000045	Humidity	Lamppost	Yes	DE_000025	Environmental Sensor - Airspot		Airspot	Yes	WGS84	
58	Milan	DA_000046	Pressure	Lamppost	Yes	DE_000025	Environmental Sensor - Airspot		Airspot	Yes	WGS84	
59	Milan	DA_000047	Water level	Lamppost	Yes	DE_000027	Environmental Sensor - Flood		Flood Monitoring	Yes	WGS84	
60	Milan	DA_000048	Noise	Lamppost	Yes	DE_000025	Environmental Sensor - Airspot		Airspot	Yes	WGS84	
61	Milan	DA_000049	Particulate Matter (PM)	Lamppost	Yes	DE_000025	Environmental Sensor - Airspot		Airspot	Yes	WGS84	

4.1.3 API Requirements

ID No	City	Device ID	Device Name	Vendor Provider	Product Name and Model	Is Gateway or Application	API ID	API Name	API Type	Data Format	Metadata or Schema	Network Connectivity	Connection Protocol
1	Lisbon	DE_000012	Ecar Charging Point	CEIIA	Charging Station		AP_000006	Electric Vehicle Management	REST	JSON	Custom	GPRS/3G	HTTPS

#### D. 4.6 Urban Sharing Platform Requirements



ID No	City	Device ID	Device Name	Vendor Provider	Product Name and Model	Is Gateway or Application	API ID	API Name	API Type	Data Format	Metadata or Schema	Network Connectivity	Connection Protocol
								System REST API					
2	Lisbon	DE_000013	Electric Vehicle Management System	CEEIA	mobi.me	Yes	AP_000006	Electric Vehicle Management System REST API	REST	JSON	Custom	GPRS/3G	HTTPS
3	Lisbon	DE_000015	EBike docking station	Orbita	Router Thomson	No	AP_000008	Ebike Docking Station API	REST	JSON	Custom	GPRS/3G	Custom
4	Lisbon	DE_000018	Ecar Charging Point	EFACEC	EV1		AP_000009	Mobility Management Platform API	REST	JSON	Custom	GPRS/3G	HTTPs
5	Lisbon	DE_000021	Mobility Management Platform	CEIIA	mobi.me		AP_000009	Mobility Management Platform API	REST	JSON	Custom	GPRS/3G	HTTPs
6	Lisbon	DE_000024	EV Car	CEIIA	MDC v2		AP_000009	Mobility Management Platform API	REST	JSON	Custom	GPRS/3G	HTTPs
7	London	DE_000004	Heat Meter	TBD	Sharky 0007		AP_000004	DR Energy Hero App REST API	REST	JSON	Custom	WAN	HTTPS
8	London	DE_000005	DR Energy Hero App	Hildebrand Technology	Energy Hive	Yes	AP_000004	DR Energy Hero App REST API	REST	JSON	Custom	WAN	HTTPS
9	London	DE_000006	Heat System Control System		SCADA		AP_000005	[TBC SCADA Protocol]		[TBC SCADA Protocol]			TCP/IP
10	London	DE_000008	CT clamps	Hildebrand Technology	Efergy clamp	CT No	AP_000004	DR Energy Hero App REST API	REST	JSON	Custom	WAN	HTTPS

#### D. 4.6 Urban Sharing Platform Requirements



ID No	City	Device ID	Device Name	Vendor / Provider	Product Name and Model	Is Gateway or Application	API ID	API Name	API Type	Data Format	Metadata or Schema	Network Connectivity	Connection Protocol
11	London	DE_000009	Temperature sensor	Hildebrand Technology	Light temperature and motion sensor	No	AP_000004	DR Energy Hero App REST API	REST	JSON	Custom	WAN	HTTPS
12	London	DE_000010	Heat Network Control System [TBC SCADA]			Yes	AP_000005	[TBC SCADA Protocol]		[TBC SCADA Protocol]			TCP/IP
13	London	DE_000014	Weather Forecast Web Site				AP_000007	Weather Forecast Website API	REST				HTTP
14	Milan	DE_000001	Electrical Energy Smart Meter	A2A Unareti		No	AP_000001	SFTP Transfer	SFTP	CSV plain text		Internet	SFTP
15	Milan	DE_000002	Thermal Energy Smart Meter	MM		No	AP_000001	SFTP Transfer	SFTP	CSV plain text		Internet	SFTP
16	Milan	DE_000003	SC8 Station Meter	Future Energy	SC8 v1	No	AP_000002	SC8 Station Radio Interface		Don't Know		Radio	Custom
17	Milan	DE_000025	Environmental Sensor - Airspot		Airspot		AP_000010	Airspot API	MQTT	JSON	Custom	LoRa	MQTT
18	Milan	DE_000026	Environmental Sensor - WaspMote		WaspMote		AP_000011	WaspMote API	REST	CSV plain text	Custom	GPRS/LAN	HTTP
19	Milan	DE_000027	Environmental Sensor - Flood		Flood Monitoring		AP_000012	Flood Sensor API	MQTT	JSON	Custom	LoRa	MQTT

## 4.2 WP2 People Requirements

The people requirements from WP2 have been delayed and will be included in the next update of this document. WP2 requirements will be for data which is provided by the USP and how to interface with that data, for example via standard API's. It is likely that much of these data requirements are identical to those of WP3 (Place) and are already detailed in the tables above. Therefore no further action would be needed and this section could be minimal.