**E-PRTR Website**

Performance Test Procedure

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# Introduction

## Scope and Purpose

The EPER (European Pollutant Emission Register) website has been operational since February 2004, and it has been serviced by Atkins under Service Contract No 070307/2007/474320/MAR/C4 since September 2007. The European Pollutant Release and Transfer Register (E-PRTR) is the successor to EPER. The key differences between the EPER and E-PRTR are the extension of the number of pollutants (from 50 to 91), the inclusion of waste transfers, releases to land and releases from diffuse sources and the more frequent reporting (from triennially to annually). These will have implications on the future size, structure and performance of the database, the data access and the final user interface.

The reporting under E-PRTR for the reporting year 2007 is due by 30th June 2009 and will be published by the Commission on the internet by 30th September 2009. The second reporting (2008 data) is due in March 2010 and will be published the latest 1st April 2010. The new website will be launched by 30th September 2009. It will include the EPER dataset (2001 and 2004) and E-PRTR data for 2007.

This Performance Test Procedure has the overall purpose to verify that all pages of the E-PRTR Website perform at an acceptable level.

## Abbreviations

WAPT Web Application Performance Testing

## Document References

|  |  |
| --- | --- |
| [1] | Development of the European PRTR website: Technical Specification (Version 2g) |

## System Overview

The system tested is the running E-PRTR Review Website deployment. The system is accessible on EEA’s web server and the test is carried out on client computers located at Atkins Danmark.

# System Test Environment

This chapter identifies the test infrastructure, configuration management and the test participants.

## WAPT

WAPT is a third party application that allows for testing the performance of a web application. This is done by simulating a number of virtual users, each performing the steps previously recorded by the tester. Depending on the test setup, these virtual users will repeat their test steps with a certain interval. WAPT includes several options that allows for customizing the performance test. These options include number of virtual users, speed of virtual users and the simulated user connection speed.

Once a performance test has been run, WAPT will generate a report containing detailed information about the result. This includes response time for each test step divided into customizable sections, bandwidth usage, colored performance graphs and an error log per virtual user.

The WAPT version used for testing the application is “WAPT Pro 1.0”.

## Load Agents

When performing a test that simulates many virtual users, the computer running the test would risk either running out of memory or perhaps not having enough computing power. By using Load Agents, the memory and processing load is evenly distributed among the registered Load Agents. This eliminates test uncertainties caused by the client computer being stressed. Apart from this, the Load Agents also enable IP Spoofing. This is beneficial in cases where the web server uses the client IP address to enable load balancing. If 10 users share the same IP address, they would be treated as the same user by the web server. By spoofing the IP address, the server would see them as 10 individual users, thus creating a more realistic test environment.

## Test Infrastructure

The test infrastructure is setup as shown below. At EEA 3 servers run the website:

* The web server “E-PRTR Portal server” that hosts the actual web pages.
* The map server “ArcGIS Server“, which generates the maps displayed on the pages.
* The database server “SQL server” that serves as data storage.

At Atkins ordinary client machines without special configuration are used as Test Clients.



## Configuration Management

The functionality test is based on the following configurations.

### Software configuration

|  |  |
| --- | --- |
| Website deployment date |  |
| Website URL |  |
| Website Software Version (SVN) |  |
| Deployment code base (.Net) |  |
| Deployment code base (.Net) |  |

### Data Configuration

|  |  |
| --- | --- |
| Data Import date |  |

### Tool Configuration

|  |  |
| --- | --- |
| Web browser |  |

## Test Participants

The members of the test team are:

* XX, Atkins Danmark A/S
* YY, Atkins Danmark A/S
* ZZ, Atkins Danmark A/S

# Performance Test Procedure

## Running a Test

To execute a performance test select and open one of the following scenarios. Once opened, simply press the “Run” button. All test scenarios are placed in “\\Root\Test\Performance\WAPT\”.

Please refer to the WAPT documentation for instructions on customizing test parameters and output.

|  |  |
| --- | --- |
| Test Area | Scenario Name |
| Facility Level | FacilityLevel\_Subsheet\_01.wps |
| Industrial Activity | IndustrialActivity\_Subsheet\_01.wps |
| Pollutant Releases | PollutantReleases\_Subsheet\_01.wps |
| Pollutant Transfers | PollutantTransfers\_Subsheet\_01.wps |
| Waste Transfers | WasteTransfers\_Subsheet\_01.wps |

## Response Time Requirements

**Common Parameters**

|  |  |
| --- | --- |
| Parameter | Value |
| User Count | 0 – 10 |
| Run Time | 20 Minutes |
|  |  |

**Requirement Table**

|  |  |
| --- | --- |
| Test Area | Response Time Requirement |
| Facility Level | 8 seconds |
| Industrial Activity | 8 seconds |
| Pollutant Releases | 8 seconds |
| Pollutant Transfers | 8 seconds |
| Waste Transfers | 8 seconds |

## Test Procedure

The test procedure for the performance tests will be described in the sections below. The first section includes the general settings that are used for each individual test. The following sections include the details for each individual test. This includes the specific search parameters selected on the web site.

### General

The performance tests will start at 0 users and then ramp up to a maximum of 10 consecutive users. Each minute one additional user will be added to the test, giving a useful overview of how the system responds to the increase in user load. Once all 10 users are active, the test will run for an additional 10 minutes revealing any stability issues. It should be noted that the virtual users, unlike real users, have little or no delay in clicking buttons and selecting menus. A normal user would spend a couple of seconds after clicking a button or selecting a menu item to consider what to click next. The virtual users immediately navigate the menu structure, and only wait for a single second between performing new search operations. While this may not be entirely realistic, it is necessary in order to determine whether or not the system will perform adequately in a worst case scenario. This means that the response times listed in the log in most cases will be significantly higher than would be expected had it been real users.

It should also be noted, that while the test environment is not public, a lot of people still have access to it. This includes other testers, developers, project leaders and managers. This means that any result could be affected by one or more people accessing the system while a performance test is running.

Every test will perform the search with all filters enabled. This guarantees that the most resource intense search is performed, and further guarantees that any search performed with alternative parameters will result in lower response times than indicated in this performance test report.

### Overhead

Regardless of the complexity of the search, there will always be an overhead caused by latency and browser data which may or may not be related to the E-PRTR website. Related browser data could be user controls, texts and styling information. Unrelated browser data could be regional data, third-party browser plug-ins as well as local browser/proxy communication.

### Performance Test Results

The “Average Response Time” is a calculated value based on the complete results table located in Appendix A. This is done by calculating the average value of all values involving 10 users. Enter the value below.

The results are based on build: **4483\***

|  |  |
| --- | --- |
| Test Name | Average Response Time |
| Facility Level | 3,54 seconds |
| Facility Level – Facilities | 4,46 seconds |
| Facility Level – Confidentiality | 2,62 seconds |
| Industrial Activity | 1,50 seconds |
| Industrial Activity – Pollutant Releases | 1,96 seconds  Sec |
| Industrial Activity – Pollutant Transfers | 1,39 seconds |
| Industrial Activity – Waste Transfers | 1,39 seconds |
| Industrial Activity – Confidentiality | 1,25 seconds |
| Pollutant Releases | 5,68 seconds |
| Pollutant Releases – Summary | 1,35 seconds |
| Pollutant Releases – Activities | 2,67 seconds |
| Pollutant Releases – Areas | 3,70 seconds |
| Pollutant Releases – Area Comparison | 2,49 seconds |
| Pollutant Releases – Facilities | 11,0 seconds |
| Pollutant Releases – Confidentiality | 12,9 seconds |
| Pollutant Transfers | 0,92 seconds |
| Pollutant Transfers – Summary | 0,23 seconds |
| Pollutant Transfers – Activities | 0,47 seconds |
| Pollutant Transfers – Areas | 0,35 seconds |
| Pollutant Transfers – Area Comparison | 0,31 seconds |
| Pollutant Transfers – Facilities | 2,12 seconds |
| Pollutant Transfers – Confidentiality | 2,10 seconds |
| Waste Transfers | 1,78 seconds |
| Waste Transfers – Summary | 1,14 seconds |
| Waste Transfers – Activities | 0,79 seconds |
| Waste Transfers – Areas | 1,14 seconds |
| Waste Transfers – Area Comparison | 0,95 seconds |
| Waste Transfers – Facilities | 3,11 seconds |
| Waste Transfers – Hazardous Transboundary | 3,55 seconds |

\* Pollutant Releases results are based on build 4357 including logon and not including load balancing. This will have an effect on the results, and they are expected to be fairly lower once deployed to the public website.

### Facility Level

|  |  |  |
| --- | --- | --- |
| Name | Facility Level | |
| Build # | 4483 | |
| Description | Performance test of the Facility Level search. All filters enabled. All sub-sheets selected. | |
| Preconditions | 10 virtual users accessing the system simultaneously. | |
| Results | Facility Level – Average | 3,54 seconds |
|  | Facility Level – Facilities | 4,46 seconds |
|  | Facility Level – Confidentiality | 2,62 seconds |
| Data Transfer Amount | KB Transmitted / sec / user | 116 |
| Pass / Fail | Pass | |
| Signature |  | |

Verify that performing the above search with 10 consecutive users takes no longer than 8 seconds on average.

### Industrial Activity

|  |  |  |
| --- | --- | --- |
| Name |  | |
| Build # | 4483 | |
| Description | Performance test of the Industrial Activity search. All filters enabled. All sub-sheets selected. | |
| Preconditions | None | |
| Results | Industrial Activity – Average | 1,50 seconds |
|  | Industrial Activity – Pollutant Releases | 1,96 seconds |
|  | Industrial Activity – Pollutant Transfers | 1,39 seconds |
|  | Industrial Activity – Waste Transfers | 1,39 seconds |
|  | Industrial Activity – Confidentiality | 1,25 seconds |
| Data Transfer Amount | KB Transmitted / sec / user | 143 |
| Pass / Fail | Pass | |
| Signature |  | |

Pollutant Releases

|  |  |  |
| --- | --- | --- |
| Name |  | |
| Build # | 4357 | |
| Description | Performance test of the Pollutant Releases search. All filters enabled. Greenhouse gases selected as Pollutant Group. All sub-sheets selected. | |
| Preconditions | None | |
| Results | Pollutant Releases – Average | 5,68 seconds |
|  | Pollutant Releases – Summary | 1,35 seconds |
|  | Pollutant Releases – Activities | 2,67 seconds |
|  | Pollutant Releases – Areas | 3,70 seconds |
|  | Pollutant Releases – Area Comparison | 2,49 seconds |
|  | Pollutant Releases – Facilities | 11,0 seconds |
|  | Pollutant Releases – Confidentiality | 12,9 seconds |
| Data Transfer Amount | KB Transmitted / sec / user | 85 |
| Pass / Fail | Pass | |
| Signature |  | |

### Pollutant Transfers

|  |  |  |
| --- | --- | --- |
| Name |  | |
| Build # | 4483 | |
| Description | Performance test of the Pollutant Transfers search. All filters enabled. Heavy metals selected as Pollutant Group. All sub-sheets selected. | |
| Preconditions | None | |
| Results | Pollutant Transfers – Average | 0,92 seconds |
|  | Pollutant Transfers – Summary | 0,23 seconds |
|  | Pollutant Transfers – Activities | 0,47 seconds |
|  | Pollutant Transfers – Areas | 0,35 seconds |
|  | Pollutant Transfers – Area Comparison | 0,31 seconds |
|  | Pollutant Transfers – Facilities | 2,12 seconds |
|  | Pollutant Transfers – Confidentiality | 2,10 seconds |
| Data Transfer Amount | KB Transmitted / sec / user | 114 |
| Pass / Fail | Pass | |
| Signature |  | |

### Waste Transfers

|  |  |  |
| --- | --- | --- |
| Name |  | |
| Build # | 4483 | |
| Description | Performance test of the Pollutant Transfers search. All filters enabled. All sub-sheets selected. | |
| Preconditions | None | |
| Results | Waste Transfers – Average | 1,78 seconds |
|  | Waste Transfers – Summary | 1,14 seconds |
|  | Waste Transfers – Activities | 0,79 seconds |
|  | Waste Transfers – Areas | 1,14 seconds |
|  | Waste Transfers – Area Comparison | 0,95 seconds |
|  | Waste Transfers – Facilities | 3,11 seconds |
|  | Waste Transfers – Hazardous Transboundary | 3,55 seconds |
| Data Transfer Amount | KB Transmitted / sec / user | 112 |
| Pass / Fail | Pass | |
| Signature |  | |

# Appendix

## Detailed Performance Test Results

### Facility Level

**Response time, sec (0 – 10 Users)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Users | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Facilities | Min | 0 | 1,67 | 1,68 | 1,62 | 1,71 | 1,7 | 1,83 | 1,68 | 1,75 | 1,88 | 1,8 | 2,17 | 1,94 | 1,65 | 1,78 | 1,84 | 1,89 | 1,7 | 1,74 | 1,72 |
|  | Avg | 0 | 1,9 | 1,89 | 2,14 | 2,32 | 2,49 | 2,61 | 2,72 | 3,04 | 3,39 | 3,9 | 3,59 | 4,17 | 4,64 | 4,15 | 4,73 | 6,12 | 4,17 | 5,0 | 4,1 |
|  | Avg90 | 0 | 2,3 | 2,02 | 2,48 | 2,81 | 3,15 | 3,01 | 3,41 | 3,82 | 5,07 | 6,82 | 4,68 | 8,02 | 8,81 | 5,95 | 9,63 | 13,8 | 8,14 | 9,86 | 6,41 |
|  | Max | 0 | 2,69 | 2,15 | 2,96 | 3,18 | 4,26 | 3,73 | 3,99 | 4,8 | 7,85 | 13,4 | 5,74 | 15,4 | 13,0 | 8,02 | 17,6 | 21,5 | 19,7 | 20,7 | 10,9 |
| Confidentiality | Min | 0 | 1,02 | 1,05 | 1,0 | 1,03 | 1,04 | 1,15 | 1,08 | 1,08 | 1,02 | 1,07 | 1,09 | 1,2 | 0,99 | 1,31 | 1,23 | 1,14 | 1,16 | 1,09 | 1,21 |
|  | Avg | 0 | 1,13 | 1,27 | 1,19 | 1,6 | 1,51 | 1,81 | 1,85 | 1,74 | 2,03 | 2,09 | 2,43 | 2,11 | 3,22 | 2,04 | 2,57 | 2,24 | 4,72 | 2,92 | 1,82 |
|  | Avg90 | 0 | 1,28 | 1,45 | 1,35 | 2,02 | 1,81 | 2,31 | 2,55 | 2,12 | 2,94 | 3,64 | 3,61 | 3,04 | 6,92 | 2,87 | 5,42 | 3,53 | 12,3 | 7,5 | 2,28 |
|  | Max | 0 | 1,37 | 1,52 | 1,54 | 2,45 | 2,04 | 2,63 | 3,63 | 2,77 | 5,11 | 10,3 | 5,86 | 5,05 | 11,6 | 5,37 | 15,0 | 9,22 | 18,6 | 17,0 | 2,96 |

**Response time, sec (20 – 100 Users)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Users | 20 Users | | | | | | | | | | 100 Users | | | | | | | | | |
| Name | Time | 0 | 1.5 | 3 | 4,5 | 6 | 7,5 | 9 | 10,5 | 12 | 13,5 | 15 | 16,5 | 18 | 19,5 | 21 | 22,5 | 24 | 25,5 | 27 | 28,5 |
| Facilities | Min | 2,36 | 1,8 | 3,74 | 3,45 | 2,9 | 2,15 | 3,05 | 2,38 | 1,93 | 2,19 | 4,75 | 39,0 | 27,9 | 39,7 | 3,67 | 30,5 | 2,72 | 5,25 | 4,7 | 2,36 |
|  | Avg | 10,6 | 5,39 | 6,6 | 7,26 | 7,91 | 11,5 | 5,86 | 5,5 | 7,72 | 9,02 | 26,8 | 55,8 | 78,6 | 65,6 | 32,5 | 91,5 | 35,4 | 46,6 | 46,8 | 26,6 |
|  | Avg90 | 15,9 | 7,41 | 8,52 | 11,7 | 12,5 | 19,5 | 8,23 | 9,25 | 13,9 | 16,3 | 39,2 | 80,2 | 121 | 89,6 | 89,9 | 120 | 78,2 | 66,9 | 70,3 | 74,2 |
|  | Max | 16,5 | 9,14 | 10,2 | 17,4 | 20,4 | 30,1 | 13,2 | 19,2 | 23,7 | 28,6 | 42,7 | 100 | 121 | 89,6 | 116 | 120 | 107 | 66,9 | 72,8 | 119 |
| Confidentiality | Min | 1,67 | 1,88 | 2,45 | 2,56 | 2,13 | 1,33 | 2,56 | 1,38 | 1,31 | 1,27 | 2,3 | 16,6 | 10,8 | 36,0 | 3,89 | 48,1 | 1,17 | 9,55 | 2,01 | 1,69 |
|  | Avg | 3,58 | 3,9 | 4,28 | 5,51 | 4,25 | 5,33 | 3,96 | 3,7 | 3,38 | 3,62 | 13,6 | 45,4 | 60,8 | 41,5 | 36,9 | 69,4 | 17,1 | 61,5 | 14,9 | 27,2 |
|  | Avg90 | 5,08 | 5,52 | 5,37 | 9,14 | 5,64 | 11,1 | 5,24 | 5,84 | 5,53 | 6,74 | 20,4 | 75,1 | 105 | 49,8 | 97,8 | 91,9 | 44,1 | 102 | 30,2 | 71,4 |
|  | Max | 8,54 | 9,05 | 6,76 | 13,9 | 8,7 | 18,9 | 10,3 | 14,8 | 16,2 | 23,4 | 29,5 | 83,3 | 105 | 49,8 | 113 | 91,9 | 94,5 | 102 | 34,4 | 121 |

### Industrial Activity

**Response time, sec (0 – 10 Users)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Users | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Pollutant Releases | Min | 0 | 0,93 | 1,33 | 0,99 | 1,13 | 1,05 | 1,05 | 1,21 | 1,18 | 1,15 | 1,24 | 1,32 | 0,04 | 1,08 | 0,91 | 1,69 | 1,01 | 0,97 | 0,9 | 0,91 |
|  | Avg | 0 | 1,82 | 1,71 | 1,5 | 1,88 | 1,34 | 1,45 | 1,83 | 1,72 | 1,85 | 2,07 | 2,5 | 1,82 | 1,92 | 1,79 | 2,95 | 1,99 | 1,54 | 1,34 | 1,67 |
|  | Avg90 | 0 | 3,49 | 2,08 | 2,33 | 2,76 | 1,51 | 1,73 | 2,58 | 2,03 | 2,41 | 2,7 | 3,65 | 2,59 | 2,58 | 2,36 | 3,74 | 2,78 | 2,11 | 1,78 | 2,62 |
|  | Max | 0 | 4,11 | 2,08 | 3,17 | 3,9 | 1,61 | 2,02 | 4,15 | 2,42 | 2,94 | 3,46 | 4,37 | 3,16 | 3,89 | 2,69 | 4,56 | 3,61 | 3,21 | 2,9 | 3,78 |
| Pollutant Transfers | Min | 0 | 0,57 | 0,8 | 0,53 | 0,66 | 0,59 | 0,66 | 0,74 | 0,67 | 0,75 | 0,94 | 0,83 | 0,06 | 0,57 | 0,56 | 1,18 | 0,56 | 0,62 | 0,53 | 0,53 |
|  | Avg | 0 | 0,94 | 1,5 | 1,01 | 1,32 | 0,85 | 1,05 | 1,37 | 1,21 | 1,35 | 1,44 | 1,71 | 1,23 | 1,38 | 1,34 | 2,28 | 1,32 | 1,15 | 0,95 | 1,14 |
|  | Avg90 | 0 | 1,57 | 2,77 | 1,74 | 2,25 | 1,07 | 1,59 | 2,17 | 1,59 | 1,84 | 1,82 | 2,54 | 1,74 | 2,01 | 2,01 | 3,01 | 1,85 | 1,55 | 1,3 | 2,08 |
|  | Max | 0 | 1,77 | 3,45 | 2,75 | 3,01 | 1,31 | 2,69 | 3,54 | 1,86 | 2,75 | 2,42 | 3,09 | 1,86 | 2,89 | 2,85 | 3,75 | 3,2 | 1,93 | 2,03 | 3,61 |
| Waste Transfers | Min | 0 | 0,83 | 0,88 | 0,85 | 0,87 | 0,92 | 0,95 | 0,89 | 1,0 | 1,0 | 1,06 | 1,05 | 0,03 | 0,82 | 0,93 | 1,26 | 0,97 | 0,84 | 0,81 | 0,82 |
|  | Avg | 0 | 1,14 | 1,75 | 1,22 | 1,16 | 1,11 | 1,35 | 1,31 | 1,31 | 1,43 | 1,45 | 1,49 | 1,24 | 1,32 | 1,33 | 1,9 | 1,33 | 1,18 | 1,19 | 1,51 |
|  | Avg90 | 0 | 1,59 | 3,48 | 1,59 | 1,56 | 1,39 | 2,04 | 1,62 | 1,57 | 1,82 | 1,9 | 1,94 | 1,65 | 1,72 | 1,76 | 2,41 | 1,61 | 1,41 | 1,49 | 2,67 |
|  | Max | 0 | 1,65 | 4,44 | 1,77 | 2,17 | 2,07 | 3,09 | 1,79 | 1,94 | 2,49 | 2,53 | 2,19 | 1,8 | 2,6 | 2,29 | 3,13 | 1,78 | 1,66 | 2,06 | 4,76 |
| Confidentiality | Min | 0 | 0,73 | 0,82 | 0,7 | 0,75 | 0,76 | 0,78 | 0,8 | 0,82 | 0,86 | 0,99 | 0,92 | 0,05 | 0,74 | 0,72 | 1,05 | 0,79 | 0,7 | 0,8 | 0,74 |
|  | Avg | 0 | 0,84 | 2,08 | 1,2 | 0,92 | 0,9 | 1,12 | 1,18 | 1,06 | 1,37 | 1,29 | 1,34 | 1,1 | 1,17 | 1,17 | 1,57 | 1,28 | 1,06 | 1,1 | 1,37 |
|  | Avg90 | 0 | 1,08 | 5,15 | 1,94 | 1,04 | 0,98 | 1,79 | 1,64 | 1,28 | 1,89 | 1,58 | 1,77 | 1,49 | 1,48 | 1,48 | 1,92 | 1,9 | 1,49 | 1,41 | 2,49 |
|  | Max | 0 | 1,12 | 6,39 | 2,57 | 1,1 | 1,04 | 2,81 | 2,62 | 1,65 | 3,25 | 2,0 | 2,06 | 1,49 | 1,8 | 1,84 | 2,15 | 3,14 | 2,52 | 2,07 | 3,64 |

### Pollutant Releases

**Response time, sec (0 – 10 Users)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Users | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Summary | Min | 0 | 0,28 | 0,28 | 0,25 | 0,27 | 0,27 | 0,27 | 0,28 | 0,27 | 0,28 | 0,28 | 0,29 | 0,27 | 0,27 | 0,27 | 0,01 | 0,31 | 0,31 | 0,79 | 8,28 |
|  | Avg | 0 | 0,29 | 0,3 | 0,3 | 0,3 | 0,32 | 0,33 | 0,34 | 0,34 | 0,73 | 0,69 | 0,57 | 0,47 | 0,38 | 0,36 | 0,36 | 0,83 | 0,52 | 0,79 | 8,54 |
|  | Avg90 | 0 | 0,31 | 0,33 | 0,35 | 0,36 | 0,36 | 0,38 | 0,42 | 0,43 | 2,77 | 1,69 | 1,49 | 1,29 | 0,51 | 0,47 | 0,63 | 3,37 | 0,97 | 0,79 | 8,8 |
|  | Max | 0 | 0,31 | 0,35 | 0,43 | 0,47 | 0,43 | 0,43 | 0,57 | 0,52 | 8,05 | 2,65 | 3,54 | 3,69 | 0,61 | 0,56 | 1,3 | 9,74 | 1,58 | 0,79 | 8,8 |
| Activities | Min | 0 | 0,26 | 0,25 | 0,24 | 0,23 | 0,23 | 0,24 | 0,25 | 0,24 | 0,24 | 0,26 | 0,22 | 0,24 | 0,24 | 0,24 | 0,02 | 0,25 | 0,33 | 12,5 | 6,02 |
|  | Avg | 0 | 0,31 | 0,32 | 0,27 | 0,29 | 0,33 | 0,36 | 0,36 | 0,4 | 0,45 | 1,08 | 0,47 | 0,57 | 0,34 | 0,33 | 0,35 | 0,99 | 3,77 | 12,5 | 6,25 |
|  | Avg90 | 0 | 0,37 | 0,4 | 0,3 | 0,35 | 0,41 | 0,51 | 0,48 | 0,75 | 0,75 | 3,06 | 0,87 | 1,62 | 0,42 | 0,4 | 0,53 | 3,89 | 8,47 | 12,5 | 6,48 |
|  | Max | 0 | 0,38 | 0,45 | 0,32 | 0,48 | 0,49 | 0,7 | 0,64 | 1,89 | 1,26 | 4,76 | 1,33 | 4,5 | 0,52 | 0,49 | 0,71 | 10,6 | 14,1 | 12,5 | 6,48 |
| Areas | Min | 0 | 0,8 | 0,76 | 0,76 | 0,77 | 0,79 | 0,82 | 0,8 | 0,78 | 0,8 | 0,79 | 0,81 | 0,84 | 0,81 | 0,77 | 0,02 | 0,79 | 0,93 | 5,82 | 13,2 |
|  | Avg | 0 | 0,81 | 0,81 | 0,81 | 0,92 | 0,85 | 0,97 | 0,98 | 1,05 | 1,33 | 1,45 | 1,04 | 2,28 | 0,97 | 0,97 | 0,95 | 1,67 | 1,82 | 12,6 | 13,3 |
|  | Avg90 | 0 | 0,83 | 0,84 | 0,86 | 1,13 | 0,91 | 1,15 | 1,21 | 1,64 | 2,98 | 2,59 | 1,34 | 5,12 | 1,07 | 1,21 | 1,45 | 4,55 | 3,86 | 29,0 | 13,3 |
|  | Max | 0 | 0,84 | 0,84 | 0,89 | 1,45 | 0,95 | 1,38 | 1,54 | 3,29 | 7,02 | 3,59 | 1,97 | 7,72 | 1,16 | 1,68 | 1,8 | 11,0 | 5,83 | 31,9 | 13,4 |
| Area Comparison | Min | 0 | 0,48 | 0,46 | 0,46 | 0,45 | 0,47 | 0,46 | 0,48 | 0,48 | 0,45 | 0,49 | 0,48 | 0,54 | 0,47 | 0,46 | 0,02 | 0,02 | 0,49 | 5,56 | 4,87 |
|  | Avg | 0 | 0,5 | 0,53 | 0,51 | 0,56 | 0,54 | 0,59 | 0,59 | 0,76 | 1,26 | 0,84 | 0,73 | 1,47 | 0,6 | 0,6 | 0,53 | 1,19 | 2,52 | 10,6 | 5,8 |
|  | Avg90 | 0 | 0,51 | 0,67 | 0,58 | 0,66 | 0,64 | 0,74 | 0,72 | 1,39 | 2,96 | 1,42 | 0,99 | 3,31 | 0,74 | 0,77 | 0,69 | 3,65 | 5,66 | 13,2 | 7,63 |
|  | Max | 0 | 0,51 | 0,8 | 0,67 | 0,78 | 0,75 | 1,01 | 0,86 | 2,85 | 5,54 | 1,79 | 1,3 | 5,09 | 0,88 | 1,09 | 0,69 | 9,9 | 5,92 | 13,2 | 7,63 |
| Facilities | Min | 0 | 1,47 | 1,49 | 1,51 | 1,53 | 1,55 | 1,64 | 1,55 | 1,58 | 1,81 | 1,93 | 1,62 | 1,65 | 1,63 | 1,58 | 0,02 | 0,03 | 1,79 | 13,1 | 21,0 |
|  | Avg | 0 | 1,55 | 1,61 | 1,69 | 1,77 | 1,89 | 2,1 | 2,09 | 2,38 | 3,79 | 3,8 | 3,9 | 3,61 | 5,22 | 2,34 | 4,46 | 3,69 | 6,78 | 19,7 | 56,3 |
|  | Avg90 | 0 | 1,58 | 1,75 | 1,82 | 1,98 | 2,28 | 2,72 | 2,63 | 3,82 | 7,35 | 5,38 | 8,35 | 6,71 | 13,3 | 2,86 | 11,3 | 7,66 | 17,5 | 27,6 | 75,5 |
|  | Max | 0 | 1,58 | 1,86 | 1,9 | 2,16 | 3,01 | 3,99 | 3,06 | 5,64 | 12,3 | 7,97 | 13,5 | 9,38 | 21,0 | 3,43 | 16,9 | 12,5 | 22,5 | 28,0 | 75,5 |
| Confidentiality | Min | 0 | 1,28 | 1,12 | 1,18 | 1,23 | 1,21 | 1,24 | 1,23 | 1,18 | 1,21 | 1,45 | 1,4 | 1,32 | 1,22 | 1,21 | 1,2 | 0,02 | 1,63 | 27,4 | 60,1 |
|  | Avg | 0 | 1,35 | 1,6 | 1,45 | 1,57 | 1,66 | 1,73 | 1,81 | 1,91 | 2,9 | 2,85 | 2,89 | 2,38 | 4,04 | 2,22 | 3,31 | 2,17 | 8,26 | 40,4 | 60,1 |
|  | Avg90 | 0 | 1,45 | 2,19 | 1,72 | 1,89 | 2,19 | 2,38 | 2,45 | 3,08 | 5,86 | 4,86 | 6,1 | 4,06 | 10,5 | 4,86 | 8,71 | 4,31 | 16,3 | 47,9 | 60,1 |
|  | Max | 0 | 1,46 | 2,43 | 1,82 | 2,22 | 2,62 | 3,87 | 2,96 | 5,35 | 9,48 | 8,49 | 12,4 | 7,89 | 18,7 | 13,5 | 15,9 | 7,89 | 21,2 | 47,9 | 60,1 |

### Pollutant Transfers

**Response time, sec (0 – 10 Users)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Users | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Summary | Min | 0 | 0,14 | 0,12 | 0,12 | 0,13 | 0,15 | 0,13 | 0,13 | 0,13 | 0,13 | 0,13 | 0,13 | 0,13 | 0,12 | 0,12 | 0,14 | 0,12 | 0,13 | 0,12 | 0,12 |
|  | Avg | 0 | 0,15 | 0,13 | 0,17 | 0,15 | 0,38 | 0,16 | 0,17 | 0,17 | 0,21 | 0,22 | 0,19 | 0,21 | 0,21 | 0,18 | 0,38 | 0,22 | 0,24 | 0,26 | 0,19 |
|  | Avg90 | 0 | 0,2 | 0,15 | 0,25 | 0,18 | 0,75 | 0,2 | 0,22 | 0,24 | 0,31 | 0,3 | 0,26 | 0,45 | 0,34 | 0,24 | 0,56 | 0,38 | 0,39 | 0,86 | 0,26 |
|  | Max | 0 | 0,23 | 0,16 | 0,36 | 0,23 | 0,89 | 0,24 | 0,32 | 0,47 | 0,45 | 0,36 | 0,37 | 1,34 | 0,59 | 0,31 | 0,77 | 0,57 | 0,6 | 2,89 | 0,32 |
| Activities | Min | 0 | 0,14 | 0,13 | 0,13 | 0,12 | 0,14 | 0,13 | 0,13 | 0,12 | 0,13 | 0,16 | 0,14 | 0,12 | 0,13 | 0,13 | 0,15 | 0,14 | 0,12 | 0,13 | 0,13 |
|  | Avg | 0 | 0,16 | 0,16 | 0,16 | 0,22 | 0,68 | 0,19 | 0,19 | 0,25 | 0,23 | 0,34 | 0,32 | 0,28 | 0,35 | 0,19 | 0,5 | 0,23 | 1,45 | 0,41 | 0,59 |
|  | Avg90 | 0 | 0,19 | 0,21 | 0,21 | 0,47 | 1,25 | 0,24 | 0,25 | 0,58 | 0,37 | 0,86 | 0,84 | 0,82 | 1,1 | 0,27 | 0,73 | 0,36 | 5,91 | 1,88 | 2,36 |
|  | Max | 0 | 0,2 | 0,27 | 0,28 | 0,86 | 1,25 | 0,3 | 0,33 | 1,69 | 0,56 | 2,85 | 2,2 | 2,87 | 2,77 | 0,37 | 1,06 | 0,5 | 11,1 | 7,0 | 7,63 |
| Areas | Min | 0 | 0,14 | 0,13 | 0,13 | 0,14 | 0,16 | 0,13 | 0,14 | 0,14 | 0,14 | 0,17 | 0,14 | 0,14 | 0,14 | 0,13 | 0,28 | 0,13 | 0,13 | 0,15 | 0,12 |
|  | Avg | 0 | 0,23 | 0,14 | 0,15 | 0,26 | 0,78 | 0,22 | 0,23 | 0,23 | 0,25 | 0,34 | 0,29 | 0,29 | 0,26 | 0,22 | 0,6 | 0,32 | 0,42 | 0,27 | 0,46 |
|  | Avg90 | 0 | 0,46 | 0,16 | 0,18 | 0,56 | 1,49 | 0,31 | 0,31 | 0,38 | 0,41 | 0,58 | 0,67 | 0,74 | 0,48 | 0,37 | 0,85 | 0,79 | 1,35 | 0,4 | 1,53 |
|  | Max | 0 | 0,6 | 0,16 | 0,2 | 1,01 | 1,49 | 0,47 | 0,42 | 0,68 | 0,75 | 1,22 | 2,24 | 1,93 | 0,94 | 0,78 | 1,16 | 2,51 | 4,57 | 0,57 | 4,27 |
| Area Comparison | Min | 0 | 0,12 | 0,12 | 0,12 | 0,12 | 0,13 | 0,12 | 0,12 | 0,12 | 0,12 | 0,12 | 0,13 | 0,12 | 0,11 | 0,11 | 0,13 | 0,12 | 0,1 | 0,1 | 0,12 |
|  | Avg | 0 | 0,15 | 0,13 | 0,14 | 0,22 | 0,57 | 0,17 | 0,23 | 0,18 | 0,18 | 0,24 | 0,19 | 0,28 | 0,28 | 0,23 | 0,49 | 0,22 | 0,48 | 0,26 | 0,41 |
|  | Avg90 | 0 | 0,2 | 0,14 | 0,16 | 0,46 | 1,16 | 0,21 | 0,56 | 0,27 | 0,26 | 0,43 | 0,27 | 0,85 | 0,73 | 0,68 | 1,17 | 0,32 | 2,81 | 0,79 | 1,44 |
|  | Max | 0 | 0,23 | 0,15 | 0,17 | 0,8 | 1,16 | 0,27 | 1,55 | 0,47 | 0,36 | 0,97 | 0,37 | 2,37 | 2,22 | 2,48 | 3,0 | 0,45 | 11,0 | 2,59 | 3,9 |
| Facilities | Min | 0 | 1,05 | 0,98 | 0,99 | 0,98 | 1,19 | 1,02 | 1,05 | 1,02 | 1,01 | 1,1 | 1,12 | 1,1 | 0,98 | 1,04 | 1,48 | 1,05 | 1,03 | 1,11 | 1,04 |
|  | Avg | 0 | 1,18 | 1,06 | 1,19 | 1,59 | 4,75 | 1,42 | 1,36 | 1,65 | 1,55 | 1,89 | 1,56 | 1,96 | 1,88 | 2,05 | 2,92 | 1,74 | 2,02 | 3,41 | 1,73 |
|  | Avg90 | 0 | 1,45 | 1,15 | 1,32 | 2,84 | 6,72 | 1,78 | 1,67 | 2,15 | 2,19 | 2,4 | 1,94 | 3,59 | 4,07 | 4,39 | 4,1 | 2,21 | 3,24 | 9,64 | 2,58 |
|  | Max | 0 | 1,62 | 1,18 | 1,43 | 4,88 | 6,72 | 2,06 | 2,39 | 2,53 | 3,18 | 3,65 | 2,44 | 6,26 | 10,2 | 8,45 | 6,13 | 2,68 | 5,39 | 18,8 | 3,9 |
| Confidentiality | Min | 0 | 1,05 | 1,02 | 1,05 | 1,02 | 5,27 | 1,07 | 1,08 | 1,09 | 1,05 | 1,15 | 1,21 | 1,12 | 1,09 | 1,12 | 1,06 | 1,22 | 1,14 | 1,05 | 1,11 |
|  | Avg | 0 | 1,14 | 1,18 | 1,21 | 1,37 | 6,75 | 1,39 | 1,46 | 1,82 | 1,61 | 1,87 | 1,63 | 2,17 | 1,69 | 2,07 | 2,77 | 2,11 | 2,08 | 2,51 | 1,89 |
|  | Avg90 | 0 | 1,27 | 1,3 | 1,39 | 1,74 | 8,15 | 1,63 | 1,99 | 2,92 | 2,14 | 2,41 | 1,98 | 4,48 | 2,39 | 3,5 | 3,84 | 4,05 | 2,81 | 6,07 | 2,62 |
|  | Max | 0 | 1,27 | 1,3 | 1,69 | 2,16 | 8,38 | 1,85 | 2,96 | 4,07 | 2,86 | 2,81 | 2,23 | 8,52 | 4,29 | 4,77 | 5,04 | 10,6 | 3,72 | 11,3 | 3,43 |

### Waste Transfers

**Response time, sec (0 – 10 Users)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Users | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Summary | Min | 0 | 1,12 | 0,8 | 0,78 | 0,79 | 0,78 | 0,83 | 0,81 | 0,79 | 0,82 | 0,77 | 0,8 | 0,81 | 0,83 | 0,78 | 0,86 | 0,92 | 0,92 | 1,03 | 0,81 |
|  | Avg | 0 | 1,15 | 0,93 | 1,03 | 1,02 | 0,87 | 0,99 | 0,95 | 0,94 | 0,95 | 0,92 | 1,01 | 1,06 | 1,07 | 0,96 | 0,94 | 1,34 | 1,26 | 1,39 | 1,44 |
|  | Avg90 | 0 | 1,19 | 1,08 | 1,69 | 1,6 | 0,93 | 1,1 | 1,1 | 1,06 | 1,07 | 1,03 | 1,15 | 1,28 | 1,24 | 1,12 | 1,01 | 2,15 | 1,89 | 2,15 | 2,56 |
|  | Max | 0 | 1,19 | 1,11 | 2,48 | 2,72 | 0,97 | 1,18 | 1,23 | 1,18 | 1,17 | 1,08 | 1,21 | 1,39 | 1,38 | 1,4 | 1,09 | 3,48 | 3,33 | 3,64 | 3,54 |
| Activities | Min | 0 | 0,39 | 0,24 | 0,22 | 0,24 | 0,21 | 0,29 | 0,21 | 0,21 | 0,22 | 0,23 | 0,25 | 0,3 | 0,28 | 0,23 | 0,29 | 0,36 | 0,36 | 0,55 | 0,25 |
|  | Avg | 0 | 0,43 | 0,33 | 0,51 | 0,37 | 0,35 | 0,61 | 0,39 | 0,34 | 0,67 | 0,45 | 0,6 | 0,59 | 0,67 | 1,07 | 0,42 | 1,16 | 1,01 | 1,3 | 0,58 |
|  | Avg90 | 0 | 0,46 | 0,42 | 1,19 | 0,49 | 0,62 | 1,45 | 0,57 | 0,44 | 1,76 | 0,64 | 1,12 | 0,9 | 0,99 | 2,46 | 0,52 | 3,05 | 2,98 | 2,9 | 0,93 |
|  | Max | 0 | 0,46 | 0,43 | 2,12 | 0,54 | 1,2 | 3,4 | 0,85 | 0,51 | 3,94 | 0,87 | 2,61 | 1,18 | 1,16 | 3,48 | 0,65 | 5,83 | 7,7 | 4,94 | 1,2 |
| Areas | Min | 0 | 0,34 | 0,28 | 0,31 | 0,29 | 0,29 | 0,3 | 0,31 | 0,29 | 0,31 | 0,43 | 0,44 | 0,45 | 0,49 | 0,45 | 0,41 | 0,53 | 0,38 | 0,93 | 0,35 |
|  | Avg | 0 | 0,38 | 0,42 | 0,6 | 0,44 | 0,5 | 0,67 | 0,54 | 0,52 | 0,6 | 0,7 | 0,84 | 0,92 | 1,09 | 0,96 | 0,7 | 1,32 | 1,58 | 1,78 | 1,46 |
|  | Avg90 | 0 | 0,43 | 0,6 | 1,03 | 0,58 | 0,75 | 0,95 | 0,78 | 0,73 | 0,88 | 0,94 | 1,21 | 1,6 | 1,61 | 2,14 | 0,89 | 2,27 | 3,64 | 3,05 | 3,08 |
|  | Max | 0 | 0,43 | 0,72 | 1,51 | 0,8 | 1,19 | 1,4 | 1,13 | 1,2 | 1,34 | 1,07 | 1,77 | 1,97 | 2,01 | 4,6 | 1,05 | 4,67 | 8,32 | 5,31 | 4,28 |
| Area Comparison | Min | 0 | 0,33 | 0,34 | 0,27 | 0,28 | 0,25 | 0,32 | 0,31 | 0,33 | 0,33 | 0,26 | 0,41 | 0,32 | 0,4 | 0,36 | 0,32 | 0,55 | 0,32 | 0,53 | 0,3 |
|  | Avg | 0 | 0,33 | 0,41 | 0,79 | 0,53 | 0,42 | 0,56 | 0,46 | 0,44 | 0,55 | 0,53 | 0,83 | 0,74 | 0,92 | 0,9 | 0,59 | 1,09 | 1,14 | 1,42 | 1,29 |
|  | Avg90 | 0 | 0,33 | 0,48 | 2,1 | 1,28 | 0,55 | 0,75 | 0,6 | 0,57 | 0,75 | 0,74 | 1,54 | 1,36 | 1,39 | 1,78 | 0,74 | 1,63 | 2,34 | 2,13 | 2,63 |
|  | Max | 0 | 0,33 | 0,5 | 3,84 | 2,73 | 0,64 | 1,03 | 0,71 | 0,75 | 0,92 | 0,98 | 3,32 | 1,86 | 1,66 | 3,09 | 0,84 | 2,68 | 5,26 | 3,2 | 4,42 |
| Facilities | Min | 0 | 1,96 | 1,23 | 1,28 | 1,35 | 1,24 | 1,37 | 1,39 | 1,21 | 1,44 | 1,37 | 1,66 | 1,5 | 1,66 | 1,38 | 1,45 | 2,24 | 1,35 | 2,88 | 1,35 |
|  | Avg | 0 | 1,96 | 1,95 | 2,25 | 1,94 | 1,59 | 2,05 | 2,2 | 1,82 | 2,23 | 2,34 | 2,82 | 3,04 | 2,95 | 2,61 | 2,1 | 3,53 | 3,82 | 4,15 | 3,72 |
|  | Avg90 | 0 | 1,96 | 2,98 | 4,23 | 3,06 | 1,99 | 2,83 | 3,12 | 2,22 | 3,2 | 2,97 | 4,25 | 4,93 | 3,91 | 4,74 | 2,54 | 4,75 | 6,77 | 6,37 | 7,03 |
|  | Max | 0 | 1,96 | 3,53 | 6,78 | 5,0 | 2,75 | 4,47 | 4,51 | 2,47 | 4,92 | 3,17 | 7,4 | 5,93 | 4,59 | 9,89 | 2,82 | 6,17 | 12,0 | 11,0 | 10,7 |
| Hazardous Transboundary | Min | 0 | 1,55 | 1,65 | 1,72 | 1,68 | 1,61 | 1,9 | 1,79 | 1,78 | 1,78 | 1,83 | 1,93 | 1,96 | 1,9 | 1,88 | 1,96 | 2,78 | 1,68 | 3,17 | 1,77 |
|  | Avg | 0 | 1,55 | 1,97 | 2,28 | 1,99 | 2,09 | 2,43 | 2,62 | 2,3 | 2,64 | 2,62 | 3,58 | 3,92 | 3,34 | 2,91 | 2,49 | 4,26 | 3,89 | 4,52 | 3,95 |
|  | Avg90 | 0 | 1,55 | 2,45 | 2,99 | 2,22 | 2,63 | 3,03 | 3,31 | 2,67 | 3,25 | 3,17 | 4,98 | 5,59 | 4,22 | 4,58 | 2,78 | 6,57 | 6,27 | 6,35 | 6,55 |
|  | Max | 0 | 1,55 | 2,88 | 3,64 | 2,36 | 3,51 | 3,61 | 4,34 | 2,93 | 3,72 | 3,61 | 7,13 | 6,11 | 4,52 | 8,75 | 3,24 | 11,8 | 10,7 | 10,7 | 8,48 |