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|  | Market Code Schedule 23  Code Subsidiary Document No. 0207  RF Charge Calculation, Allocation and Aggregation |
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|  | Version 13.0  Date: 2019-10-24  Document Ref: CSD0207 |
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###### Change History

| **Version Number** | **Date of Issue** | **Reason For Change** | **Change Control Reference** | **Sections Affected** |
| --- | --- | --- | --- | --- |
| 1.0 | 2010-03-29 | New Release for RF Calculation | MCCP046-CC | All |
| 1.1 | 2010-10-27 | Clarification reapplication of SGES Credit | MCCP064 | Footnote to section 2.4.10 |
| 1.2 | March 2011 | Enduring Rollover Solution | MCCP053 | Equation section 2.3.19 |
| 1.3 | 2012-03-29 | Introduction of Deregistration | MCCP052, MCCP079 | Sections 2.1 and 3.1 |
| 2.0 | 2013-04-12 | Trade Effluent Changes | MCCP095 | Sections throughout CSD |
| 3.0 | 2013-05-01 | Trade Effluent Changes | Commission Letter 29/04/2013 | Sections 3.3, 3.4, Appendix |
| 4.0 | 2013-10-14 | Trade Effluent Changes | Commission Letter 11/10/2013 | Sections 3.3, 3.4, Appendix |
| 5.0 | 2014-09-21 | Typos | MCCP149 |  |
| 6.0 | 2015-03-31 | SGES Changes | MCCP161-CC | Sections 2, 3 and Appendix |
| 7.0 | 2015-09-24 | Remove Trade Effluent (TE) Vols  Remove Transitional Indicators (TI) | MCCP166  MCCP173 |  |
| 8.0 | 2017-03-16 | Vacancy Charging | MCCP204-CC  MCCP207-CC | Sections 2 and 3 |
| 9.0 | 2017-09-17 | Editorial changes | MCCP213 | Sections 2 and 3 |
| 10.0 | 2018-02-01 | Live RV Charging and Transition  February 2018 CSD Drafting | MCCP214 – CC  MCCP219 | Sections 2 and 3 |
| 11.0 | 2018-04-01 | TTRAN and PPDISC | MCCP227-CC |  |
| 12.0 | 2018-07-12 | Drafting correction of volume conversion factor | MCCP233-CC | Section 2.6 and Section 3.6 |
| 13.0 | 2019-10-24 | Error correction in formula for Sewerage Capacity Volume Charges | MCCP242 | Section 3.3.27 |

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# Purpose and Scope

## Introduction

* + 1. The purpose of this document is to provide details of how the CMA will calculate the Primary Charges for Water and Sewerage in accordance with the Scottish Water Wholesale Charges Scheme and allocate them to the appropriate Licensed Provider and to Scottish Water in respect of any SPIDs subject to a Temporary Transfer for the Tariff Year Settlement Run (RF). For the avoidance of doubt, no calculations are carried out in respect of the Non-Primary components of the Wholesale Charges.
    2. This document describes a detailed charge calculation process which forms the CMA’s interpretation of the Scottish Water Wholesale Charges Scheme (WCS) for the Financial Years 2008-09 to 2013-14 inclusive[[1]](#footnote-1). Specific assumptions in respect of how the calculation implements the Wholesale Charges Scheme are documented in the Appendix to both provide transparency and to formalise their adoption.
    3. The process will also calculate the Primary Charges for Water and Sewerage for years beyond 2013-14 provided that the form of the Charges described in the WCS do not diverge from the form of the Charges for 2008-09 to 2013-14, and that the Charges can be successfully paramaterised.
    4. The process (including the process in respect of Trade Effluent Charges) will be a complete re-calculation based upon the data submitted by the Market Participants and as it exists in the Central Systems at the time of the RF Settlement Run. The process assumes that data has been correctly submitted, and does not necessarily fully describe situations where either incomplete or inconsistent data has been submitted by Market Participants.

## Scheme of Charges

* + 1. The process details the computation, allocation and aggregation of the various components of the Primary Charges described in the WCS. The various components of the Services are shown in the following table.

|  |  |  |  |
| --- | --- | --- | --- |
| Overview of Wholesale Charges Components | | | |
| **SERVICE** | **COMPONENT** | **SUB COMPONENT** | **SERVICE ELEMENT** |
| Primary Water Charges | Water Charges | Measured Supply Point | Meter Based Charges |
| Volumetric Charges |
| Unmeasured Supply Points –  RV Based Charges | Meter Based Charges |
| Volumetric Charges |
| Unmeasured Supply Points –  Re-assessed Charges | Meter Based Charges |
| Volumetric Charges |
| Miscellaneous Charges | Field Troughs and Drinking Bowls | Farms |
| Crofts |
| Outside Taps | Farms |
| Crofts |
| Primary Sewerage Charges | Foul Sewerage | Measured Supply Point | Meter Based Charges |
| Volumetric Charges |
| Unmeasured Supply Points –  RV Based Charges | Meter Based Charges |
| Volumetric Charges |
| Unmeasured Supply Points –  Re-assessed Charges | Meter Based Charges |
| Volumetric Charges |
| Property Drainage |  |  |
| Roads Drainage |  |  |
| Trade Effluent Charges |  |  |

* + 1. The CMA shall re-compute all the components of Primary Water Charges and Primary Sewerage Charges. This calculation will take into account all relevant changes to the chargeable parameters associated with the Tariff Year Settlement, and take account of all the data submitted to the Central Systems at the time the RF Settlement Run is carried out. A detailed specification of the computation of each of the components is given below.
    2. The Tariff Year Settlement Run (RF) is the final Settlement Run for any Year. It has three key differences from the monthly Invoice Period Settlement Runs:
* The single calculation of the full Tariff Year Settlement;
* In respect of Measured Supply Points (both water and sewerage) the calculation of a single Actual Weighted Average Unit Rate (AWA) to compute the charges for all measured volumes for the Tariff Year; and
* The application of annual minimum charges for Trade Effluent.
  + 1. Details of certain transitional charging arrangements which are catered for in the WCS are provided in the appendices to CSD0205. The various arrangements including LUVA discounts, small meter premium and the phasing premium are fully taken into account in the process described below.

# Primary Water Charges

## General

* + 1. The following calculation is carried out for each Water SPID which is or has been Tradable when the Settlement Run is carried out. This includes SPIDs which are currently Tradable or Temporarily Disconnected, as well as Disconnected or Deregistered SPIDs which have been Tradable. The calculation excludes SPIDs which are Disconnected or Deregistered but were New, Partial or Rejected when they were so Disconnected or Deregistered.
    2. A Settlement Day runs from midnight to midnight.
    3. Define the RF Settlement Period by a pair of days such that the RF Settlement Period comprises Settlement Days d such that. Note that the lowest bound day is included, but the upper bound day is not. In this description, the full Settlement Year 2008-09 would be described by
    4. If the SPID has a Permanent Disconnection Date, define the SPID Disconnection Date to be the date of Permanent Disconnection. If the SPID has a Deregistration Date, define the SPID Disconnection Date to be the date of Deregistration.
    5. Define the SPID Chargeable Period as the period for which the SPID is in (potentially) charge (from the SPID Connection Date to the day before the SPID Disconnection Date (if it exists) or the last day of the tariff year (if the SPID Disconnection Date does not exist) inclusive. Here, “potentially” refers to the condition above that the SPID is or has been Tradable. This SPID Chargeable Period can equivalently be defined by a pair of days where.

and the SPID is chargeable for all days *d* where and . The lower bound day is included, but the upper bound day is not.

* + 1. If then there are no chargeable days.
    2. For the avoidance of doubt the SPID Chargeable Period includes periods of vacancies, temporary disconnections, SGES etc. Appropriate adjustments for charges for these periods are made further on in the process.
    3. For each SPID, establish the SPID Settlement Chargeable Period which is the (possibly empty) sub-period for which the SPID Chargeable Period intersects the RF Settlement Period, and is given by where
    4. If then the SPID does not have a SPID Settlement Chargeable Period for that RF Settlement Period. If there is no such SPID Settlement Chargeable Period then no charges are computed for this SPID. The remaining sections in respect of Primary Water Charges are only applicable to SPIDs for which charges will be computed.

## Measured Supply Points - Overview

* + 1. First compute the AWA for each Water SPID which is a Measured Supply Point or a Re-Assessed Supply Point, and then compute, allocate and aggregate the Meter Based Charges and the Volumetric Charges. Re-assessed charges are implemented as if they were metered charges; see section [2.7](#_bookmark26) for details.

## AWA Algorithm for Water SPID

* + 1. For each T17 Meter Chain K, establish the T17 Meter Chain “Active Period” . If the T17 Meter Chain has not been removed from the Water SPID then set
    2. For each T17 Meter Chain *K*, establish the T17 Meter Chain Chargeable which is the (possibly empty) sub-period for which the Active Period intersects the SPID Settlement Chargeable Period, and is given by where
    3. If then the T17 Meter Chain does not have a Chargeable period for that RF Settlement Period.

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| --- |
| Standard Volume Band Limits |

* + 1. Let the Allocated Tranche be *VFA,* and *V1* and *V2* be the knots described in the Scheme of Charges which define the bands for the Standard Volume Charges above the Allocated Tranche. Let *B1, B2* and *B3* be the corresponding prices. Thus:

|  |  |
| --- | --- |
| **Standard Volume Charges** | **Price** |
| Greater than zero and up to | 0 |
| Greater than and up to |  |
| Greater than and up to |  |
| Greater than |  |

|  |
| --- |
| Yearly proportion for the Allocated Tranche *VFA* |

* + 1. For each T17 Meter Chain, define the term as [[2]](#footnote-2)
    2. Define Meter Active () for a specific T17 Meter Chain K as

i.e. has the value of 1 when d is within a T17 Meter Chain Chargeable Period.

* + 1. Then for each Settlement Day *d* in the SPID Settlement Chargeable Period define SPID SWWater Meter Active () as

and the Vacancy Adjusted SPID SWWater Meter Active () as

where

Where Cid is the Consumption Indicator and is set to True only for a day, d, within a Meter Advance Period with MAV > 0, for days on or after 2017-04-01.

* + 1. Compute the Total SWWater Meter Active Days () as
    2. Then define the Yearly Proportion as

where is the total number of days within the Settlement Period (ie 365 days or 366 days as appropriate for an RF Settlement).

* + 1. Then the Proportional Volume Limits *PV1* and *PV2* are given by

|  |
| --- |
| Allocated Tranche |

* + 1. For each meter in a T17 Meter Chain *K* for each Settlement Day *d* in the T17 Meter Chain Chargeable Period establish the Water Chargeable Meter Size. Note the Wholesale Charges Scheme refers to the “Tariff Meter Size” rather than the “Chargeable Meter Size”.

For each day define the Meter Free Allocation () as

* + 1. The Proportional Free Allocation is given by

|  |
| --- |
| Capacity Volume Charges |

* + 1. The Wholesale Charges Scheme defines meter related charges in respect of a limited number of meter sizes, and for each non-zero Chargeable Meter Size provides a mapping from the Chargeable Meter Size to an entry in the corresponding table of meter sizes.
    2. The Central Systems holds a related table comprising Lower Meter Size (), Upper Meter Size () and the Capacity Volume Threshold () for , where

and is the number of entries in the table.

* + 1. Thus each Water Chargeable Meter Size falls uniquely within a single band , and each such band () maps to a unique Capacity Volume Threshold
    2. The Meter Capacity Volume Threshold () is then given by the table of Capacity Volume Thresholds

where () is the band corresponding to

* + 1. The Proportional Capacity Volume Threshold () applicable for the SPID for the year is given by

|  |
| --- |
| Volumetric Charges |

* + 1. For each T17 Meter Chain which has a Chargeable Period in the Settlement Year, for each Settlement Day d in the T17 Meter Chain Chargeable Period, establish whether the day is within a Meter Pre-Advance Period, a Meter Advance Period (MAP) or a Meter Post-Advance Period. (see definitions in section [A.3).](#_bookmark63) [[3]](#footnote-3)
    2. For each Settlement Day *d* within a Meter Advance Period, the Meter Advance Volume () is given by where
    3. Compute the Meter Advance Chargeable Days as

where

* + 1. For each day *d* within the Meter Advance Period compute the Unadjusted Actual Daily Volume as

And the Actual Daily Volume as

* + 1. For days within a Meter Post-Advance Period compute the Unadjusted Estimated Daily Volume as
    2. The Estimated Daily Volume is calculated as
    3. For days within a Meter Pre-Advance Period compute the Unadjusted Estimated Daily Volume as
    4. To establish the for a meter *K* for the Settlement Day *d* first establish the Water Chargeable Meter Size
    5. The Central Systems have a table Industry Level Estimates, comprising a series of monotonically increasing Meter Size and Industry Level Estimates , for where is the number of entries in the table. (***Note*** This is potentially a different from the one in [2.3.13)](#_bookmark11) Then the Tabular Meter Size () in respect of the Industry Level Estimate for the T17 Meter Chain *K* for the Settlement Day *d* is

And the Industry Level Estimate for the T17 Meter Chain *K* for the Settlement Day *d* is then given by the table of Industry Level Estimates as

* + 1. Not used.
    2. For all *K*, *d* compute the Daily Volume
    3. For each meter *K*, and Settlement Day *d,* the Derived Daily Volume is calculated as

where the sum is over all meters *L* which are sub-meters of meter *K*. The derivation of the appropriate terms for the sub-meters is the same as for the meter *K*.

***Note*** The above equation describes the subtraction of sub-meter volumes from a main meter volume to establish the Derived Daily Volume. It has not yet been possible to verify that interaction of (i) the subtraction of the meter volumes, and (ii) the shifting of volumes described above in respect of vacancy works precisely in the order specified by the equation. The intention is to document the Central Systems behaviour rather than to propose any changes to the Central Systems behaviour.

* + 1. The Actual Yearly Volume () for the Water SPID is then

|  |
| --- |
| Volumes for the LUVA Charges |

* + 1. For each Settlement Day *d* in the SPID Settlement Chargeable Period define LUVA Chargeable () as

* + 1. Compute the Total LUVA Days () as
    2. The LUVA Proportion is defined as
    3. The Proportional LUVA Volume limits are given by

where is the lower limit for the LUVA Adjustment as defined in the Wholesale Charges Scheme.

* + 1. Define the LUVA Annual Volume () (which is similar to the sum above as defined in paragraph [2.3.30)](#_bookmark15) except that the condition that the SPID has the LUVA flag set for each Settlement Day must be applied.

|  |
| --- |
| Phasing Premium |

* + 1. For each Settlement Day *d* in the SPID Settlement Chargeable Period, for each T17 Meter Chain *K* define Premium Chargeable () as

where is the lower limit of the band () corresponding to identified in Section [2.3.13](#_bookmark11) .

* + 1. Define the Uncapped Premium Annual Volume as
    2. Define the Total Premium Days as
    3. Define the Proportional Premium Volume Limit as

|  |
| --- |
| Charges – the Standard Volume Charges |

* + 1. The Wholesale Charges Scheme defines charges for a volume *V* which is allocated across different charge bands (based upon a whole year’s usage) in accordance with paragraph [2.3.4](#_bookmark6)
    2. The Proportional Free Allocation is and the Proportional Volume Limits are have already been defined. The Actual Yearly Volume is. Then allocate the into the different charge bands for the Allocated Tranche , and Charge Bands 1, 2 and 3 () as
    3. The Standard Volume Charge () is defined as

|  |
| --- |
| Charges – Capacity Volume Charges |

* + 1. If the Capacity Volume Price as defined in the Scheme of Charges is , then the Capacity Volume Charge is

|  |
| --- |
| Charges – LUVA Adjustment |

* + 1. Allocate the LUVA Annual Volume () into volumes over the various charge bands to establish the LUVA adjustment.
    2. If the LUVA adjustments are [[4]](#footnote-4) then the LUVA Adjustment Charge () is

|  |
| --- |
| Charges – Phasing Premium |

* + 1. The Proportional Phasing Premium Free Allocation () is

and the Premium Volume () on which the charge is payable is therefore

* + 1. If the Premium Phasing for the Year is then the Phasing Premium Charge is given by

|  |
| --- |
| AWA |

* + 1. The Annual Weighted Average () for the SPID is then given by:

## Measured Supply Points – Charges

* + 1. Define the Discounts for the SPID for each day *d* in the SPID Chargeable Period, i.e. Water Schedule 3 (), Schedule 29e () and whether the SPID is eligible for Scottish Government Exemption Scheme ().

|  |
| --- |
| Meter Based Charges |

* + 1. Carry out the following calculations for each SPID which has a SPID Settlement Chargeable Period for the RF Settlement Period.
    2. Carry out the following calculations for each T17 Meter Chain which has a Chargeable Period for that RF Settlement Period:
    3. In accordance with [2.3.13](#_bookmark11) the Wholesale Charges Scheme defines meter related charges in respect of a limited number of meter sizes, and for each non-zero Chargeable Meter Size provides a mapping from the Chargeable Meter Size to an entry in the corresponding table of meter sizes.
    4. The Central Systems holds a related table comprising Lower Meter Size (), Upper Meter Size () and the Water Meter Annual Non-Volumetric Charges () for , where

and is the number of entries in the table.

* + 1. Thus each Water Chargeable Meter Size falls uniquely within a single band , and each such band () maps to a unique Water Meter Annual Non-Volumetric Charges
    2. The Unadjusted Water Meter Based Charge () is then given by the table of Water Meter Annual Non-Volumetric Charges as

For days prior to 2017-04-01 and

For days on or after 2017-04-01

where () is the band corresponding to

and where

* + 1. The Unadjusted Discounted Water Meter Based Charge () is then given
    2. Not Used.
    3. The Water Meter Based Charge [[5]](#footnote-6) is

where is the SGES Water refund applicable for the Financial Year *Y*, PCEd is the percentage of the exemption applicable on that day, and where is the number of Service Element Reports for the SPID.

* + 1. For each Settlement Day *d* for a Water SPID there are:
* two Service Element Reports for each T17 Meter Chain which is chargeable on that day;
* two Service Element Reports for each Unmeasurable Service Element which is chargeable on that day; and
* a Service Element Report for each Miscellaneous Charge which is chargeable on that day. The Miscellaneous charges are:
  + - * + Field Troughs and Drinking Bowls; and
        + Outside Taps.
    1. The CMA will allocate the Meter Based Charge to Licensed Provider for which the SPID was registered in respect of each Settlement Day. It will then aggregate Volumes and Charges, and report them in accordance with CSD0201.

|  |
| --- |
| Volumetric Charges |

* + 1. The Unadjusted Daily Metered Cost () is

For days prior to 2017-04-01 and

For days on or after 2017-04-01

* + 1. Not Used.
    2. The Daily Metered Cost [[6]](#footnote-7) is

where is the SGES Water refund applicable for the Financial Year *Y,* PCEd is the percentage of the exemption applicable on that da*y*, and where is the number of Service Element Reports for the SPID.

* + 1. The CMA will allocate the Meter Based Charge to the Licensed Provider for which the SPID was registered in respect of each Settlement Day. It will then aggregate Volumes and Charges, and report them in accordance with CSD0201.

## Unmeasured Supply Points – Overview

* + 1. The following Water SPIDs are subject to Unmeasured Charging:
* RV Based Charging
  + - * + Water SPIDs which have been declared unmeasurable
* Re-assessed Charging
  + - * + Water SPIDs which have been agreed are subject to Re-Assessed Charging

## RV Based Charges

|  |
| --- |
| RV Non-Volumetric Charges |

* + 1. Define the discounts for the SPID for each day *d* in the SPID Chargeable Period, i.e. Water Schedule 3 (), Schedule 29e () and whether the SPID is eligible for the Scottish Government Exemption Scheme ().
    2. The SPID Settlement Chargeable Period has already been defined as the period time given by the days
    3. The relevant SPID RV Unmeasurable Period is defined as the period of time for which

the Water SPID has been declared unmeasurable

and is likewise given by a pair of days .

* + 1. Then the SPID RV Unmeasurable Chargeable Period which is the (possibly empty) sub-period for which the RV Unmeasurable Period intersects the SPID Settlement Chargeable Period, and is given by where
    2. If then the SPID does not have an RV Unmeasurable Period for that RF Settlement Period.
    3. For each Settlement Day *d* in the SPID RV Unmeasurable Chargeable Period define the Rateable Value , the Live Rateable Value LRVd and the RV Transition Flag RVTFd

Where

* + 1. For days prior to 2017-04-01, in accordance with the Wholesale Scheme of Charges define the Water Chargeable Meter Size () which corresponds to, and each corresponds to a unique Water Meter Annual Non-Volumetric Charge (). For days on or after 2017-04-01 and prior to 2018-04-01, in accordance with the Wholesale Scheme of Charges, for days when the SPID is not vacant, define the Water Chargeable Meter Size () which corresponds to, and each corresponds to a unique Water Meter Annual Non-Volumetric Charge (). For days on or after 2018-04-01, in accordance with the Wholesale Scheme of Charges, for days when the SPID is not vacant, define LRVWCMSd, corresponding to LRVd to create either an LRVWMANVCi or a WMANCi and define RVWCMSd, corresponding to RVd to create an RVWMANVCi. For days when the SPID is vacant (on or after 2017-04-01), WCMSd, RVWCMSd and LRVWCMSd shall be 20mm.
    2. The Unadjusted Water Meter Based Charge () is given by the table of Water Meter Annual Non-Volumetric Charges as

for days prior to 2017-04-01 and

for days on or after 2017-04-01 and prior to 2018-04-01.

where

and

and

for days on or after 2018-04-01, where RVF is a transition factor established in accordance with the Wholesale Scheme of Charges.

* + 1. The Unadjusted Discounted Water Meter Based Charge () is then given by
    2. Not Used.
    3. The Water Meter Based Charge [[7]](#footnote-8) is

Where, as above, is the SGES Water refund applicable for the Financial Year *Y*, PCEd is the percentage of the exemption applicable on that day, and is the number of Service Element Reports for the SPID.

* + 1. The CMA will allocate the Meter Based Charge to Licensed Provider for which the SPID was registered in respect of each Settlement Day. It will then aggregate Volumes and Charges, and report them in accordance with CSD0201.

|  |
| --- |
| RV Volumetric Charges |

* + 1. For each Settlement Day *d* in the SPID RV Unmeasurable Chargeable Period define the Rateable Value , the Live Rateable Value LRVd and the RV Transition Flag RVTFd.
    2. The equivalent Actual Yearly Volume given by

for days prior to 2018-04-01.

The equivalent RV based Actual Yearly Volume RVAYVd given by

And the equivalent LRV based Actual Yearly Volume LRVAYVd given by

for days on or after 2018-04-01, where RVF is a transition factor, established in accordance with the Wholesale Scheme of Charges

and the equivalent Derived Daily Volume is given by

for days prior to 2018-04-01.

The equivalent RV based Daily Derived Volume RVDDVd is given by

for days on or after 2018-04-01 and

the equivalent LRV based Daily Derived Volume LRVDDVd is given by

for days on or after 2018-04-01.

* + 1. The same calculation used to derive AWA in section [2.3](#_bookmark8) can be used to derive an Equivalent AWA for each day of the RV Unmeasurable Chargeable Period, based upon an equivalent whole year calculation and using the equivalent Actual Yearly Volume and the meter size for days prior to 2018-04-01. For days on or after 2018-04-01, an equivalent RVAWA, LRVAWA and RLRVAWA should be calculated, where the same calculation used to derive AWA in section 2.3 can be used to derive the RVAWAd, the LRVAWAd and the LRVAWAd, based upon an equivalent whole year calculation, using;
* For the RVAWAd. The equivalent RV Actual Yearly Volume RVAYVd and meter size RVWCMSd and specific volumetric prices; RVB1, RVB2, RVB3 and RVCVP.
* For the LRVAWA. The equivalent LRV Actual Yearly Volume LRVAYVd and meter size LRVWCMSd for the LRVAWA and specific volumetric prices; LRVB1, LRVB2, LRVB3 and LRVCVP.
* For the RLRVAWA. The equivalent LRV Actual Yearly Volume LRVAYVd and meter size LRVWCMSd for the LRVAWA and volumetric prices as used for metered Supply Points; B1, B2, B3 and CVP.
  + 1. The Unadjusted Daily Metered Cost () is given by

for days prior to 2017-04-01.

For days on or after 2017-04-01 and prior to 2018-04-01.

where

and

and

for days on or after 2018-04-01.

* + 1. Not Used.
    2. The Daily Metered Cost [[8]](#footnote-9) is

Where, as above, is the SGES Water refund applicable for the Financial Year *Y*, PCEd is the percentage of the exemption applicable on that day and is the number of Service Element Reports for the SPID.

* + 1. The CMA will allocate the Meter Based Charge to the Licensed Provider for which the SPID was registered in respect of each Settlement Day. It will then aggregate Volumes and Charges, and report them in accordance with CSD0201.

## Re-Assessed Charges

* + 1. Re-assessed Charges were introduced on 1st April 2009. However, it should be noted that the methods within the Central Systems for calculating Re-Assessed Charges do not carry out any verification that the data only applies for periods of time on or after the date of introduction of Re-Assessed Charges.
    2. Re-Assessed Charges are implemented by the use of Pseudo Meters. CSD0104 describes the installation, removal and maintenance of Pseudo Meters.
    3. Subject to the one minor exception noted in the following paragraph, the CMA computes charges for Pseudo Meters as for all other T17 Meter Chains in accordance with sections [2.3](#_bookmark8) and [2.4](#_bookmark17) For example, where a SPID has a Pseudo Meter installed for part of a year and a physical meter for part of the year, the CMA will compute a single AWA which is applicable to both the Pseudo Meter volume and the physical meter volume.
    4. When a Pseudo Meter is installed, Scottish Water is obliged under CSD0104 to provide an opening meter read of 0, and a YVE. While the Pseudo Meter is installed, the CMA will reject any other meter reads which are submitted. The CMA will therefore compute the Derived Daily Volume using the value of YVE submitted by Scottish Water. When a Pseudo Meter is removed, Scottish Water must provide a final closing meter read of 0. However, the CMA does not store the closing meter within the meter reads table. Thus, following the removal of the Pseudo Meter, and the CMA will continue to compute the Derived Daily Volumes during a T17 Meter Chain Chargeable Period using the value of YVE submitted, rather than using the opening and closing meter reads of 0 (which would otherwise provide a zero volume).

## Miscellaneous Charges

* + 1. This section applies to the following Miscellaneous Charges:
* Field Troughs and Drinking Bowls; and
* Outside Taps.
  + 1. Define the Discounts for the SPID for each day d in the SPID Chargeable Period i.e. Water Schedule 3 (), Schedule 29e () and whether the SPID is eligible for Scottish Government Exemption Scheme ().
    2. The SPID Settlement Chargeable Period has already been defined as the period time given by the days. As above define the relevant Chargeable Period for each of the Miscellaneous Charges.
    3. For each miscellaneous charge define and for each Settlement Day *d* in the relevant Chargeable period define
* the number of Troughs and Drinking Bowls (); and
* the number of Outside Taps ().
  + 1. Also for each Settlement Day *d* define

and

* + 1. Let the following prices be defined as per the Wholesale Charges Scheme:

|  |  |
| --- | --- |
| Annual Price Farm Troughs and Drinking Bowls |  |
| Annual Price Croft Troughs and Drinking Bowls |  |
| Annual Price Farm Outside Tap |  |
| Annual Price Croft Outside Tap |  |

* + 1. Calculate the Unadjusted Troughs and Drinking Bowls Charge and the Unadjusted Outside Taps Charge as

for days prior to 2017-04-01 and

for days on or after 2017-04-01.

* + 1. The Unadjusted Discounted Troughs and Drinking Bowls Charge and the Unadjusted Discounted Outside Taps Charge are given by
    2. The Troughs and Drinking Bowls Charge and the Outside Taps Charge are given by [[9]](#footnote-10)

Where, as above, is the SGES Water refund applicable for the Financial Year *Y*, PCEd is the percentage of the exemption applicable on that day, and is the number of Service Element Reports for the SPID.

* + 1. The CMA will allocate the Miscellaneous Charges to the Licensed Provider for which the SPID was registered in respect of each Settlement Day. It will then aggregate the volumes and charges, and report them in accordance with CSD0201.

# Primary Sewerage Charges

## General

* + 1. The following calculation is carried out for each Sewerage SPID which is or has been Tradable when the Settlement Run is carried out. This includes SPIDs which are currently Tradable or Temporarily Disconnected, as well as Disconnected or Deregistered SPIDs which have been Tradable. The calculation excludes SPIDs which are Disconnected or Deregistered but were New, Partial or Rejected when they were so Disconnected or Deregistered.
    2. A Settlement Day runs from midnight to midnight.
    3. Define the RF Settlement Period by a pair of days such that the RF Settlement Period comprises Settlement Days d such that. Note that the lowest bound day is included, but the upper bound day is not. In this description, the full Settlement Year of 2008-09 would be described by
    4. If the SPID has a Permanent Disconnection Date, define the SPID Disconnection Date to be the date of Permanent Disconnection. If the SPID has a Deregistration Date, define the SPID Disconnection Date to be the date of Deregistration.
    5. Define the SPID Chargeable Period as the period for which the SPID is in (potentially) charge (from the SPID Connection Date to the day before the SPID Disconnection Date (if it exists) or the last day of the tariff year (if the SPID Disconnection Date does not exist) inclusive. Here, ”potentially” refers to the condition above that the SPID is or has been Tradable. This SPID Chargeable Period can equivalently be defined by a pair of days

where

and the SPID is chargeable for all days *d* where and . The lower bound day is included, but the upper bound day is not.

* + 1. If then there are no chargeable days.
    2. For the avoidance of doubt the SPID Chargeable Period includes periods of vacancies, temporary disconnections, SGES etc. Appropriate adjustments for charges for these periods are made further on in the algorithm
    3. For each Sewerage SPID, establish the SPID Settlement Chargeable Period which is the (possibly empty) sub-period for which the SPID Chargeable Period intersects the RF Settlement Period, and is given by where
    4. If then the Sewerage SPID does not have a SPID Settlement Chargeable Period for that RF Settlement Period. If there is no such SPID Settlement Chargeable Period then set and skip the test of the AWA Calculation of this Sewerage SPID.

## Measured Supply Points - Overview

* + 1. First compute the AWA for each Sewerage SPID which is either a Measured Supply Point or a Re-Assessed Supply Point, and then compute, allocate and aggregate the Meter Based Charges and the Volumetric Charges. Re-assessed charges are implemented as if they were metered charges, see section 3.7 for details.

## AWA Algorithm for Sewerage SPID

* + 1. Establish if there is a Related Water Supply Point (*RWSP*). If there is no such Related Water Supply Point, then set and skip the rest of the AWA Calculation for this Sewerage SPID.
    2. For each T17 Meter Chain *K* associated with the *RWSP* (a "Related T17 Meter Chain") establish the T17 Meter Chain Active Period. If the Related T17 Meter Chain has not been removed from the *RWSP* then set
    3. For each Related T17 Meter Chain *K*, define the T17 Meter Chain Chargeable Period which is the (possibly empty) sub-period for which the Active Period intersects the SPID Settlement Chargeable Period for the Sewerage SPID, and is given by

where

* + 1. If then the Related T17 Meter Chain does not have a Chargeable period for that RF Settlement Period.
    2. Establish if there are any Trade Effluent consents (DPIDs) associated with the Sewerage SPID. For each such DPID *T* [[10]](#footnote-11) associated with the Sewerage SPID establish the DPID Active Period

*T l*

*T u*

* + 1. For each DPID *T* the DPID Chargeable Period is the (possibly empty) sub-period for which the DPID Active Period intersects the SPID Settlement Chargeable Period for the Sewerage SPID, and is given by

where

* + 1. If then then the DPID does not have a Chargeable Period for that RF Settlement Period.
    2. For each Settlement Day *d* for each DPID *T* with a Chargeable Period establish the Non Domestic Allowance. For all other days d for each DPID T set.

Note there is a difference in interpretation between the usage of NDA for Settlement Runs covering periods before [[11]](#footnote-12) 1st April 2013 and those on or after 1st April 2013. For Settlement Runs covering periods before 1st April 2013 the cutover, *NDA* referred to a non-domestic allowance for the whole of the Sewerage SPID. For Settlement Runs covering periods after 1st April 2013, *NDA* refers to a non-domestic allowance only in respect of Water Meters (SWWater or PrivateWater meters) associated with the Trade Effluent DPID.

|  |
| --- |
| Sewerage Standard Volume Band Limits |

* + 1. Let the be the Sewerage Allocated Tranche, and BS1 be the price for Sewerage Standard Volumes above the Allocated Tranche as defined in the Wholesale Charges Scheme. Thus:

|  |  |
| --- | --- |
| **Sewerage Standard Volume Charges** | **Price** |
| Greater than zero and up to | 0 |
| Greater than |  |

* + 1. Define the Sewerage Meter Chargeable () for a Related T17 Meter Chain K as

where is the Return to Sewer allowance [[12]](#footnote-13) for the Related T17 Meter Chain *K* for the Settlement Day *d*.

* + 1. For each Settlement Day *d* in the SPID Settlement Chargeable Period define Total Sewerage Meter Chargeable () as

|  |
| --- |
| Sewerage Free Allocation |

* + 1. For each meter *K* for each Settlement Day *d* in the T17 Meter Chain Chargeable Period establish the Sewerage Chargeable Meter Size
    2. For each day define the Meter Sewerage Free Allocation () as
    3. The Sewerage Proportional Free Allocation is given by

|  |
| --- |
| Volume limits for the Sewerage Capacity Volume Charges |

* + 1. The Wholesale Charges Scheme defines meter related charges in respect of a limited number of meter sizes, and for each non-zero Sewerage Chargeable Meter Size provides a mapping from the Sewerage Chargeable Meter Size to an entry in the corresponding table of meter sizes. The table entries in respect of Sewerage do not necessarily correspond to the table entries in respect of water.
    2. The Central Systems holds a related table comprising Lower Meter Size (), Upper Meter Size () and the Sewerage Capacity Volume Threshold () for , where
    3. Thus each Sewerage Chargeable Meter Size falls uniquely within a single band , and each such band () maps to a unique Sewerage Capacity Volume Threshold
    4. The Meter Sewerage Capacity Volume Threshold () is then given by the table of Sewerage Capacity Volume Thresholds as

where () is the band corresponding to

* + 1. The Sewerage Proportional Capacity Volume Threshold () applicable for the Sewerage SPID for the year is given by
    2. Then derive as per the AWA Algorithm for Water in the paragraphs following [2.3.18](#_bookmark12)
    3. For Settlement Runs relating to periods before 1st April 2013, the Sewerage Derived Daily Volume for each Related T17 Meter Chain *K* for each day *d* in a Related T17 Meter Chain Chargeable Period is
    4. For Settlement Runs relating to periods after 1st April 2013 each DPID *T* may be associated with a meter *K*. This association can be described by a variable which will take the value 1 when there is an association, and take the value 0 when there is no association. Each meter-DPID association has a related meter-DPID Volume () which represents the fraction [[13]](#footnote-14) of a specific meter’s volume which is associated with a DPID. For the avoidance of doubt, if there is no association, i.e., then will also be taken to be 0.
    5. Define the term NDA Split () as

Then,

* + 1. Then for all Settlement Runs, Actual Sewerage Yearly Volume () for the Sewerage SPID is then

|  |
| --- |
| Charges – Standard Sewerage Volume Charges |

* + 1. The Wholesale Charges Scheme defines charges for a volume *V* which is allocated across different charge bands (based upon a whole year’s usage) in accordance with paragraph [3.3.9](#_bookmark32)
    2. The Sewerage Proportional Free Allocation is and the Actual Sewerage Yearly Volume is and have both previously been defined. Then calculate the Sewerage Standard Volume Charge () as

|  |
| --- |
| Charges –Sewerage Capacity Volume Charges |

* + 1. If the Sewerage Capacity Volume Price as defined in the Scheme of Charges is , then the Sewerage Capacity Volume Charge is

|  |
| --- |
| AWA |

* + 1. The Annual Weighted Average (AWA) for the Sewerage SPID is then given by:

## Measured Sewerage Supply - Charges

* + 1. The discounts for the SPID for each day d in the SPID Chargeable Period are Sewerage Schedule 3 (), Schedule 29e () and whether the SPID is eligible for Scottish Government Exemption Scheme ().
    2. Carry out the following calculations for each SPID which has a SPID Settlement Chargeable Period for the RF Settlement Period.
    3. Carry out the following calculations for each Related T17 Meter Chain which has a Chargeable Period for that RF Settlement Period:

|  |
| --- |
| Meter Based Charges |

* + 1. As per [3.3.15](#_bookmark38) the Wholesale Charges Scheme defines meter related charges in respect of a limited number of meter sizes, and for each non-zero Chargeable Meter Size provides a mapping from the Chargeable Meter Size to an entry in the corresponding table of meter sizes.
    2. The Central Systems holds a table comprising Lower Meter Size (), Upper Meter Size () and the Sewerage Meter Annual Non-Volumetric Charges () for , where

and is the number of entries in the table.

* + 1. Thus each Sewerage Chargeable Meter Size falls uniquely within a single band , and each such band () maps to a unique Sewerage Meter Annual Non-Volumetric Charged
    2. Then Unadjusted Sewerage Meter Based Charge () is then given by the table of Sewerage Meter Annual Non-Volumetric Charges as

for days prior to 2017-04-01 and

for days on or after 2017-04-01

where () is the band corresponding to

* + 1. Then the Unadjusted Discounted Sewerage Meter Based Charge () is then given
    2. Not Used.
    3. The Sewerage Meter Based Charge [[14]](#footnote-15) is

Where is the SGES Sewer refund applicable for the Financial Year *Y*, PCEd is the percentage of the exemption applicable on that day and where is the number of Service Element Reports for the SPID.

* + 1. For each Settlement Day d there are:
* two Service Element Reports for each Related T17 Meter Chain [[15]](#footnote-16) which is chargeable on that day
* two Service Element Reports for each Unmeasurable Service Element which is chargeable on that day
* a single Service Element for each DPID which is chargeable on that day
* a Service Element Report for Roads Drainage if it is chargeable on that day
* a Service Element Report for Property Drainage if it is chargeable on that day
  + 1. The CMA will allocate the Meter Based Charge to the Licensed Provider for which the SPID was registered in respect of each Settlement Day. It will then aggregate Volumes and Charges, and report them in accordance with CSD0201.

|  |
| --- |
| Sewerage Volumetric Charges |

* + 1. The Unadjusted Daily Metered Cost () is

For days prior to 2017-04-01

For days on or after 2017-04-01

* + 1. Not Used.
    2. The Daily Metered Cost [[16]](#footnote-17) is

where is the SGES Sewer refund applicable for the Financial Year *Y*, PCEd is the percentage of the exemption applicable on that day and where is the number of Service Element Reports for the SPID.

* + 1. The CMA will allocate the Daily Metered Cost and the Volume to Licensed Provider to whom it was Registered in respect of each Settlement Day. It will aggregate these volumes and charges, and report them in accordance with CSD0201.

## Unmeasured Sewerage Supply Points - Overview

* RV Based Charging
  + - * + Water SPIDs which have been declared unmeasurable
* Re-assessed Charging
  + - * + Water SPIDs which have been agreed are subject to Re-Assessed Charging
    1. The following Sewerage SPIDs are subject to Unmeasured charging:
* RV Based Charging
  + - * + Sewerage SPIDs which have been declared unmeasurable.
* Re-assessed Charging
  + - * + Sewerage SPIDs which have been agreed are subject to Re-Assessed Charging

Information on transition charging is provided in the Appendices to CSD0205.

## RV Based Charges

|  |
| --- |
| RV Non-Volumetric Charges |

* + 1. The discounts for the SPID for each day *d* in the SPID Chargeable Period are Sewerage Schedule 3 (), Schedule 29e () and whether the SPID is eligible for the Scottish Government Exemption Scheme ().
    2. The SPID Settlement Chargeable Period has already been defined as the period time given by the days.
    3. The relevant SPID RV Unmeasurable Period is defined as the period of time for which the Sewerage SPID has been declared unmeasurable and is likewise given by a pair of days
    4. The SPID RV Unmeasurable Chargeable Period Chargeable Period is the (possibly empty) sub-period for which the RV Unmeasurable Period intersects the SPID Settlement Chargeable Period, and is given by where
    5. If then the SPID does not have an RV Unmeasurable Period for that RF Settlement Period.
    6. For each Settlement Day d in the SPID RV Unmeasurable Chargeable Period define the Rateable , the Live Rateable Value LRVd and the RV Transition Flag RVTFd.
    7. For days d, prior to 2017-04-01, in accordance with the Wholesale Scheme of Charges define the Sewerage Chargeable Meter Size () which corresponds to, and each corresponds to a unique Sewerage Meter Annual Non-Volumetric Charge . For days on or after 2017-04-01 and prior to 2018-04-01, in accordance with the Wholesale Scheme of Charges, for days when the SPID is not vacant, define the Sewerage Chargeable Meter Size () which corresponds to, and each corresponds to a unique Sewerage Meter Annual Non-Volumetric Charge (). For days on or after 2018-04-01, in accordance with the Wholesale Scheme of Charges, when the SPID is not vacant, define LRVSCMSd, corresponding to LRVd to create either an LRVSMANVCi or an SMANVCi and define RVSCMSd, corresponding to RVd to create an RVSMANVCi. For days when the SPID is vacant (on or after 2017-04-01), SCMSd, RVSCMSd and LRVSCMSd shall be 20mm.
    8. The Unadjusted Sewerage Meter Based Charge () is given by the table of Sewerage Meter Annual Non-Volumetric Charges as

for days prior to 2017-04-01 and

for days on or after 2017-04-01 and prior to 2018-04-01 and

where

and

and

for days on or after 2018-04-01.

* + 1. The Unadjusted Discounted Sewerage Meter Based Charge () is then given by
    2. Not Used.
    3. The Sewerage Meter Based Charge [[17]](#footnote-18)

where is the SGES Sewer refund applicable for the Financial Year *Y*, PCEd is the percentage of the exemption applicable on that day and where is the number of Service Element Reports for the SPID.

* + 1. The CMA will allocate the Meter Based Charge to the Licensed Provider for which the SPID was registered in respect of each Settlement Day. It will then aggregate Volumes and Charges, and report them in accordance with CSD0201.

|  |
| --- |
| RV Volumetric Charges |

* + 1. For each Settlement Day d in the SPID RV Unmeasurable Chargeable Period define the Rateable Value , the Live Rateable Value LRVd and the RV Transition Flag RVTFd.
    2. The equivalent Actual Sewerage Yearly Volume given by

for days prior to 2018-04-01.

The equivalent RV based Actual Sewerage Yearly Volume RVASYVd is given by

And the equivalent Live RV based Actual Yearly Sewerage Volume LRVASYVd is given by

for days on or after 2018-04-01, where RVF is a transition factor established in accordance with the Wholesale Scheme of Charges.

and the equivalent Sewerage Derived Daily Volume is given by

for days prior to 2018-04-01.

The equivalent RV based Sewerage Daily Derived Volume RVSDDVd is given by

for days on or after 2018-04-01 and

the equivalent Live RV based Sewerage Daily Derived Volume LRVSDDVd is given by

for days on or after 2018-04-01.

* + 1. The same calculation used to derive AWA in section [3.3.28](#_bookmark40) can be used to derive an Equivalent for each day of the RV Unmeasurable Chargeable Period, based upon an equivalent whole year calculation and using the equivalent Actual Sewerage Yearly Volume and the meter size for days prior to 2018-04-01. For days on or after 2018-04-01, an equivalent RVAWAd and LRVAWAd should be calculated, where the same calculation used to derive AWA in section 3.3 can be used to derive the RVAWAd and the LRVAWAd, based upon an equivalent whole year calculation, using;
* For the RVAWAd. The equivalent RV Actual Yearly Volume RVASYVd and meter size RVSCMSd and specific volumetric prices; RVSB1 and RVCSVP.
* For the LRVAWA. The equivalent LRV Actual Yearly Volume LRVASYVd and meter size LRVSCMSd for the LRVAWA and specific volumetric prices; LRVSB1 and LRVCSVP.
* For the RLRVAWA. The equivalent LRV Actual Yearly Volume LRVASYVd and meter size LRVSCMSd for the LRVAWA and volumetric prices as used for metered Supply Points; SB1 and CSVP.
  + 1. The Unadjusted Daily Metered Cost () =

for days prior to 2017-04-01.

For days on or after 2017-04-01 and prior to 2018-04-01.

where

and

and

for days on or after 2018-04-01.

* + 1. Not Used.
    2. The Daily Metered Cost [[18]](#footnote-19) is

where is the SGES Sewerage refund applicable for the Financial Year *Y*, PCEd is the percentage of the exemption applicable on that day and where is the number of Service Element Reports for the SPID.

* + 1. The CMA will allocate the Meter Based Charge to the Licensed Provider for which the SPID was registered in respect of each Settlement Day. It will then aggregate Volumes and Charges, and report them in accordance with CSD0201.

## Re-assessed Charges

* + 1. Re-assessed Charges were introduced on 1st April 2009. However, it should be noted that the methods within the Central Systems for calculating Re-Assessed Charges do not carry out any verification that the data only applies for periods of time on or after the date of introduction of Re-assessed Charges.
    2. Re-assessed Charges are implemented by the use of Pseudo Meters. In respect of Sewerage SPIDs, the Pseudo Meter is installed at the Related Water Supply Point. In respect of Re-assessed charges, there is always such a Related Water Supply Point as in respect of Sewerage Services only Supply Points, there will be a related Pseudo Water Services Supply Point.
    3. Subject to the one minor exception noted in the following paragraph, the CMA computes charges for Pseudo Meters as for all other T17 Meter Chains in accordance with sections [3.3](#_bookmark34) and [3.4.](#_bookmark41) For example, where the related Water SPID has a Pseudo Meter installed for part of a year and a physical meter installed for part of a year, the CMA will compute a single sewerage AWA which is applicable to the sewerage volumes relating to both the Pseudo Meter and the physical meter.
    4. When a Pseudo Meter is installed, Scottish Water is obliged under CSD0104 to provide an opening meter read of 0, and both a YVE and a RTS. While the Pseudo Meter is installed, the CMA will reject any other meter reads which are submitted. The CMA will therefore compute the Sewerage Derived Daily Volume using the value of YVE and RTS submitted by Scottish Water (or where applicable appropriate NDA values relating to Trade Effluent). When a Pseudo Meter is removed, Scottish Water must provide a final closing meter read of 0. However, the CMA does not store the closing meter within the meter reads table.
    5. Thus, following the removal of the Pseudo Meter, and the CMA will continue to compute the Sewerage Derived Daily Volumes during a T17 Meter Chain Chargeable Period using the values of YVE and RTS submitted (or where applicable NDA values), rather than using the opening and closing meter reads of 0 (which would otherwise provide a zero volume).

## Property Drainage

* + 1. This section applies to the Property Drainage charges.
    2. The Discounts for the SPID for each day *d* in the SPID Chargeable Period are Sewerage Schedule 3 (), Schedule 29e () and whether the SPID is eligible for Scottish Government Exemption Scheme ().
    3. The SPID Settlement Chargeable Period has already been defined as the period time given by the days. As above define the relevant Chargeable Period for Property Drainage.
    4. For each Settlement Day *d* in the relevant Chargeable Period define the Rateable Value the Live Rateable Value LRVd, the RV Transition Flag RVTFd and whether Property Drainage () is chargeable:
    5. As per the Wholesale Charges Scheme define the Annual Price for Property Drainage per pound Rateable value for the RVd (), for the LRVd (LRVPDP) and for the LRVd for Supply Points not in transition for the purposes of property drainage charges (PDP).
    6. Then define the Unadjusted Property Drainage Charge as

for days prior to 2017-04-01.

for days on or after 2017-04-01 and prior to 2018-04-01 and

where

and

and

for days on or after 2018-04-01, where RVF is a transition factor established in accordance with the Wholesale Scheme of Charges.

* + 1. The Unadjusted Discounted Property Drainage Charge is given by
    2. The Property Drainage Charge [[19]](#footnote-20) is given by

Where, as above, is the SGES Sewerage refund applicable for the Financial Year *Y*, PCEd is the percentage of the exemption applicable on that day and is the number of Service Element Reports for the SPID.

* + 1. The CMA will allocate the Property Drainage Charges to the Licensed Provider for which the SPID was registered in respect of each Settlement Day. It will then aggregate the volumes and charges, and report them in accordance with CSD0201.
    2. ***Note:*** There are a small number of SPIDs on Area Based Property Drainage Charges. The calculation for them is the same as above with the price per area replacing the price per pound Rateable Value, and the area replacing the Rateable Value.

## Roads Drainage

* + 1. This section applies to the Roads Drainage charges.
    2. The discounts for the SPID for each day d in the SPID Chargeable Period are Sewerage Schedule 3 (), Schedule 29e () and whether the SPID is eligible for Scottish Government Exemption Scheme ().
    3. The SPID Settlement Chargeable Period has already been defined as the period time given by the days . As above define the relevant Chargeable Period for Roads Drainage.
    4. For each Settlement Day *d* in the relevant Chargeable Period define the Rateable Value , the Live Rateable Value LRVd, the RV Transition Flag RVTF and whether Roads Drainage () is chargeable:
    5. As per the Wholesale Charges Scheme define the Annual price for Roads Drainage per pound Rateable value for the RVd (), for the LRVd (LRVRDP) and for the LRVd for Supply Points not in transition for the purposes of Roads Drainage Charges (RDP).
    6. The Unadjusted Roads Drainage Charge is

for days prior to 2017-04-01.

for days on or after 2017-04-01 and prior to 2018-04-01.

where

and

and

for days on or after 2018-04-01, where RVF is a transition factor established in accordance with the Wholesale Scheme of Charges.

* + 1. The Unadjusted Discounted Roads Drainage Charge is given by
    2. The Roads Drainage Charge [[20]](#footnote-21) is then given by

Where, as above, is the SGES Sewerage refund applicable for the Financial Year *Y*, PCEd is the percentage of the exemption applicable on that day and is the number of Service Element Reports for the SPID.

* + 1. The CMA will allocate the Roads Drainage Charges to the Licensed Provider for which the SPID was registered in respect of each Settlement Day. It will then aggregate the volumes and charges, and report them in accordance with CSD0201.

## Trade Effluent Charges

* + 1. For each Trade Effluent DPID *T* establish the DPID “Active Period”. If the DPID has been discontinued, then set
    2. For each Trade Effluent DPID *T* establish the DPID Chargeable Period which is the (possibly empty) sub-period for which the Active Period intersects the SPID Settlement Chargeable Period, and is given by where
    3. If then the DPID does not have a Chargeable Period for that RF Settlement Period.
    4. The CMA shall use the following procedure for calculating the Daily Actual Volume Discharged ()
    5. For each T17 Meter Chain K define the variable as

noting that a T17 Meter Chain K has a constant meter treatment over its entire history.

* + 1. Then define the term NDA Included in Sewerage Calculations as
    2. Then the Daily Actual Volume Discharged is

where is the Percentage Allowance [[21]](#footnote-22), and is the Fixed Allowance

* + 1. In accordance with the Wholesale Scheme of Charges define the variables Preliminary Treatment Indicator (), Biological Treatment Indicator () and Sewage Sludge Indicator () as per the following table.

|  |  |  |  |
| --- | --- | --- | --- |
| Treatment Types | | | |
|  |  |  |  |
| Sub-primary | 0 | 0 | 0 |
| Primary | 1 |  | 0 |
| Secondary | 1 | 1 | 1 |

* + 1. Then the Unadjusted Daily Availability Charge can be calculated as [[22]](#footnote-23)

for days prior to 2017-04-01 and

for days on or after 2017-04-01

and the Unadjusted Daily Operating Charge () can be calculated as

where the following parameters are derived from the Trade Effluent DPID

and the following terms are derived from the Wholesale Scheme of Charges:

𝑅𝑎 = 𝑅𝑒𝑐𝑒𝑝𝑡𝑖𝑜𝑛 𝑐ℎ𝑎𝑟𝑔𝑖𝑛𝑔 𝑐𝑜𝑚𝑝𝑜𝑛𝑒𝑛𝑡 𝑖𝑛 𝑝𝑒𝑛𝑐𝑒/𝑚3 𝑝𝑒𝑟 𝐷𝑎𝑦

𝑉𝑎 = 𝑉𝑜𝑙𝑢𝑚𝑒𝑡𝑟𝑖𝑐/𝑃𝑟𝑖𝑚𝑎𝑟𝑦 𝑐ℎ𝑎𝑟𝑔𝑖𝑛𝑔 𝑐𝑜𝑚𝑝𝑜𝑛𝑒𝑛𝑡 𝑖𝑛 𝑝𝑒𝑛𝑐𝑒/𝑚3 𝑝𝑒𝑟 𝐷𝑎𝑦

𝐵𝑎 = 𝐵𝑖𝑜𝑙𝑜𝑔𝑖𝑐𝑎𝑙 𝐶𝑎𝑝𝑎𝑐𝑖𝑡𝑦 𝑐ℎ𝑎𝑟𝑔𝑖𝑛𝑔 𝑐𝑜𝑚𝑝𝑜𝑛𝑒𝑛𝑡 𝑖𝑛 𝑝𝑒𝑛𝑐𝑒/𝑘𝑔 𝑝𝑒𝑟 𝐷𝑎𝑦

𝑆𝑎 = 𝑆𝑙𝑢𝑑𝑔𝑒 𝐶𝑎𝑝𝑎𝑐𝑖𝑡𝑦 𝑐ℎ𝑎𝑟𝑔𝑖𝑛𝑔 𝑐𝑜𝑚𝑝𝑜𝑛𝑒𝑛𝑡 𝑖𝑛 𝑝𝑒𝑛𝑐𝑒/𝑘𝑔 𝑝𝑒𝑟 𝐷𝑎𝑦

𝑅𝑜 = 𝑅𝑒𝑐𝑒𝑝𝑡𝑖𝑜𝑛 𝑐ℎ𝑎𝑟𝑔𝑖𝑛𝑔 𝑐𝑜𝑚𝑝𝑜𝑛𝑒𝑛𝑡 𝑖𝑛 𝑝𝑒𝑛𝑐𝑒/𝑚3

𝑉𝑜 = 𝑉𝑜𝑙𝑢𝑚𝑒𝑡𝑟𝑖𝑐/𝑃𝑟𝑖𝑚𝑎𝑟𝑦 𝑐ℎ𝑎𝑟𝑔𝑖𝑛𝑔 𝑐𝑜𝑚𝑝𝑜𝑛𝑒𝑛𝑡 𝑖𝑛 𝑝𝑒𝑛𝑐𝑒/𝑚3

𝐵𝑜 = 𝑆𝑒𝑐𝑜𝑛𝑑𝑎𝑟𝑦 𝑇𝑟𝑒𝑎𝑡𝑚𝑒𝑛𝑡 𝑐ℎ𝑎𝑟𝑔𝑖𝑛𝑔 𝑐𝑜𝑚𝑝𝑜𝑛𝑒𝑛𝑡 𝑖𝑛 𝑝𝑒𝑛𝑐𝑒/𝑚3

𝑆𝑜 = 𝑆𝑙𝑢𝑑𝑔𝑒 𝑇𝑟𝑒𝑎𝑡𝑚𝑒𝑛𝑡 𝑐ℎ𝑎𝑟𝑔𝑖𝑛𝑔 𝑐𝑜𝑚𝑝𝑜𝑛𝑒𝑛𝑡 𝑖𝑛 𝑝𝑒𝑛𝑐𝑒/𝑚3

0s = The standard strength of settled chemical oxygen Demand of the Foul Sewerage

Ss = The standard strength of settleable solids in the foul sewage.

* + 1. The Unadjusted Discounted Daily Availability Charge and the Unadjusted Discounted Daily Operating Charge () are given by

where is any applicable Trade Effluent Schedule 3 discount.

* + 1. The Daily Availability Charge and the Daily Operating Charge () are given by [[23]](#footnote-24)

Where, as above is the SGES Sewerage refund applicable for the Financial Year *Y*, PCEd is the percentage of the exemption applicable on that day and is the number of Service Element Reports for the SPID.

* + 1. The CMA will then calculate the Wholesale Charge payable for the Settlement Day in respect of a Discharge Point using the following formula:
    2. For the avoidance of doubt, any monthly Trade Effluent charge computed in accordance with CSD0205 is the sum of the relevant terms
    3. In respect of RF annual charges, a minimum charge (as set out in the Wholesale Charges Scheme) is payable in respect of a Discharge Point. At the end of each Year, as part of the RF Settlement Run, the CMA will calculate whether the Wholesale Charges payable in respect of a Discharge Point are less than the minimum charge.
    4. Where either
* a Sewerage Service Supply Point (with a related Discharge Point) has been vacant for part of the Year (applicable for periods prior to 2017-04-01);
* a Sewerage Services Supply Point (with related Discharge Point(s)) has been registered for a period less than a Year;
* a Sewerage Services Supply Point (with related Discharge Point(s)) qualifies for exemption under the Scottish Government Exemption Scheme; or
* a Discharge Point was commenced in the Central Systems during the Year,

the CMA will calculate the proportionate minimum charge prior to its use in comparing it to the Wholesale Charges payable in respect of the Discharge Point for that Year, using the following formula:

where:

* + 1. The CMA will then aggregate the Year Trade Effluent Charges for each Discharge point by summing the values for Days which do NOT have a SGES refund charge.
    2. The CMA will then compare the Year Trade Effluent Charge against the Discharge Point’s minimum charge and where the Year Trade Effluent Charge is less than the Discharge Point’s minimum charge (), then the CMA then will calculate any minimum charge payable by each Licensed Provider (in respect of Settlement Days for which there is not a SGES refund) as follows:

Where:

* + 1. For each Licensed Provider, the CMA will then report the minimum charge (as adjusted by the SGES refund for Settlement Days for which a refund is available.)

# Appendix

## Matters arising from the Wholesale Charges Scheme

* + 1. The following assumptions have been made in the implementing the various Whole- sale Scheme of Charges. This Appendix is provided to clarify and formalise the adoption of the various assumptions.
    2. ***20mm Phasing Premium*** This charge is applied for all years for SPIDs which have meters which are charged as 20mm meters (or smaller), but excluding meters with a chargeable size of 0mm.
    3. ***0mm Meters*** Standard volume charges are applied to volumes associated with meters which have been set a chargeable size of 0mm. However, there is no Free Allocation or Capacity Volume associated with such meters, nor are any meter based charges applied.
    4. ***TDISC*** Following clarification from the Commission, all non-volumetric charges are applied during periods of Temporary Disconnection, including meter based charges, roads drainage, property drainage and charges for miscellaneous services.
    5. ***SGES*** For SPIDs which are flagged as exempt under the Scottish Government Exemption Scheme, a payment is made from Scottish Water to the Licensed Provider and a specified percentage of all other charges from the Licensed Provider to Scottish Water are waived.
    6. ***RTS*** For meters with a return to sewer allowance of 0%, all associated Foul Sewerage Meter based annual charges are zero in accordance with the Wholesale Scheme of Charges.
    7. ***Re-assessed Charges*** The Central Systems have the functionality in respect of the Re-assessed Charges which were introduced in 2009-10. There is no functionality which prevents data being submitted for a SPID which charge a SPID in 2008-09 with this method. It is a requirement on Market Participants not to submit data that would utilise this method in 2008-09.
    8. ***Property Drainage*** The Central Systems have a charging method in respect of Property Drainage Charges whereby a few properties which have the Area Property are charged on an area basis. There are no methods for updating the relevant areas for these properties. However, the charges while being correctly calculated are labelled by the system as being ”the Property Drainage RV” as opposed to the Area Based Property Drainage charges.
    9. ***Metered Volumes*** The CSDs have built in specific methods for establishing metered volumes for Measured Supply Points. In particular, it has built in rules in respect of Industry Level Estimates and YVE allowances. The CSDs also describe how meter volumes are interpolated, extrapolated and adjusted for vacancy.
    10. ***Multiple Discounts*** Where both a Schedule 29e discount and a Schedule 3 discount are submitted in respect of a SPID, these discounts are added. No check is carried out that the discounts add to less than 100%. At present, there is no facility in the Central Systems to apply a Schedule 29e discount to Trade Effluent Charges.
    11. ***Proportionality*** The Wholesale Charges Scheme defines charges for a volume *V* which is allocated across different charge bands (based upon a whole year’s usage). The relevant charges bands are proportioned taking account of (i) the length of time a Supply Point (i) is as a Measured Supply Point and (ii) has the LUVA adjustments applied. Similarly, the Phasing Premium is proportioned taking account of the length of time the SPIDs has meter(s) to which the Phasing Premium applies.
    12. ***AWA*** The whole year AWA calculation is applied to Measured Supply Points and to Supply Points on Reassessed Charges. It is not applied for Unmeasured Supply Points where charges are based upon RV.
    13. ***Application of LUVA Adjustment and Phasing Premium*** The LUVA Adjustment and the Phasing Premium in the AWA calculations for the year. Other discounts including Schedule 3, Schedule 29e and SGES are applied per Settlement day.
    14. ***LUVA Adjustment*** According to the Scheme of Charges the LUVA Adjustment applies Large User Volume Agreements (LUVA) as in 2006/07. The Central Systems applies the adjustment to SPIDs in accordance with the way the LUVA flag is set for the period or sub-period of the Settlement Run.
    15. ***Negative Volumes*** If a series of meter reads is not all monotonically increasing (taking account where applicable of the rollover algorithm) it is possible for the Central Systems to compute negative volumes for a SPID. If the total volume of water or sewerage supplied over the course of a year is negative, then the relevant AWA and the volumetric charges will be zero. However, where the total volume supplied to a SPID to be positive, but negative volumes occur either in respect of a single meter for the full year, or for the SPID for part of the year then the charges in respect of that single meter or that part of the year will be negative.
    16. ***TE Minimum Charges*** Minimum Charges for Trade Effluent are applied per DPID rather than per SPID. They are pro-rated for the length of time a DPID is active over the course of the year. In respect of a single SPID with multiple DPIDs, a greater than minimum charge on one DPID does not offset charges on another DPID which does not reach the minimum.
    17. ***TE Minimum Charges*** Where there are multiple LPs which share a DPID which needs to have minimum charges applied then the allocation of minimum charges is pro-rata on a daily basis, irrespective of volumetric charges occurred by each LP. See CSD0206 for details.
    18. ***Percentages and Fractions*** A number of variables in this CSD which represent fractions are expressed as percentages within the Wholesale Scheme of Charges. The equations in this CSD use them as fractions rather than as percentage. Thus the CSD has equations with the terms such as rather than terms with explicit percentages such as.

## Variables

* + 1. This section provides details of all the variables used in this CSD0207.

|  |  |
| --- | --- |
| Actual Daily Volume |  |
| Actual Sewerage Yearly Volume |  |
| Actual Yearly Volume |  |
| Allocated Tranche |  |
| Annual Price Croft Outside Tap |  |
| Annual Price Croft Troughs and Drinking Bowls |  |
| Annual Price Farm Outside Tap |  |
| Annual Price Farm Troughs and Drinking Bowls |  |
| Annual Price Property Drainage |  |
| Annual Price Roads Drainage |  |
| Annual Volumes (per charge band) |  |
| Annual Weighted Average |  |
| Availability Charge |  |
| Biological Capacity charging component in pence/kg per Day |  |
| Biological Treatment Indicator |  |
| Capacity Volume Charge |  |
| Capacity Volume Price |  |
| Capacity Volume Threshold |  |
| Chargeable Daily Volume of the Trade Effluent in *m*3 |  |
| Connected |  |
| Consumption Indicator | CId |
| Croft |  |
| Daily Actual Volume Discharged |  |
| Daily Availability Charge |  |
| Daily Metered Cost |  |
| Daily Operating Charge |  |
| Daily Trade Effluent Charge |  |
| Daily Volume |  |
| Days |  |
| Days in Year |  |
| Days in Year within DPID Chargeable Period DPID neither vacant nor in SGES |  |
| DPID |  |
| Derived Daily Volume |  |
| DPID Active Period |  |
| DPID Chargeable Period |  |
| DPID Minimum Charge (and LP’s share |  |
| Equivalent AWA |  |
| Equivalent Actual Sewerage Yearly Volume |  |
| Equivalent Actual Yearly Volume |  |
| Estimated Daily Volume |  |
| Farm |  |
| Fixed Allowance |  |
| Fixed strength (settled Chemical Oxygen Demand) of the Trade Effluent |  |
| Fixed strength (settleable solids) of the Trade Effluent |  |
| Industry Level Estimates |  |
| Live Rateable Value | LRVd |
| Lower Meter Size |  |
| LUVA Adjustment |  |
| LUVA Annual Volume |  |
| LUVA Annual Volume(per charge band) |  |
| LUVA Charge Bands |  |
| LUVA Chargeable |  |
| LUVA Phasing |  |
| LUVA Proportion |  |
| LUVA Volume Limits |  |
| Meter Active |  |
| Meter Advance Chargeable Days |  |
| Meter Advance Period |  |
| Meter Advance Volume |  |
| Meter DPID Association |  |
| Meter DPID Volume |  |
| Meter Capacity Volume Threshold |  |
| Meter Free Allocation |  |
| Meter Readings |  |
| Meter Sewerage Capacity Volume Threshold |  |
| Meter Sewerage Free Allocation |  |
| Meter Size |  |
| NDA Included |  |
| NDA Split |  |
| Non Domestic Allowance |  |
| Number of Days DPID registered to an LP and neither vacant nor SGES |  |
| Number of table items |  |
| Outside Taps |  |
| Outside Taps Charge |  |
| Percentage Allowance |  |
| Percentage Exemption for the day | PCEd |
| Phasing Premium for the Year |  |
| Phasing Premium Charge |  |
| Preliminary Treatment Indicator |  |
| Premium Chargeable |  |
| Premium Phasing |  |
| Premium Volume |  |
| Private |  |
| Property Drainage |  |
| Property Drainage Charge |  |
| Proportional Capacity Volume Threshold |  |
| Proportional Free Allocation |  |
| Proportional LUVA Volume limits |  |
| Proportional Phasing Premium Free Allocation |  |
| Proportional Premium Volume Limit |  |
| Proportional Volume Limits |  |
| Return to Sewerage |  |
| Roads Drainage |  |
| Roads Drainage Charge |  |
| Rateable Value Factor | RVF |
| Rateable Value |  |
| Reception charging component in pence/*m*3 |  |
| Reception charging component in pence/*m*3 per Day |  |
| RV Unmeasurable Period |  |
| RV Unmeasurable Chargeable Period |  |
| Schedule 29e Discount |  |
| Seasonal Factor |  |
| Settlement Day |  |
| Secondary Treatment charging component in pence/*m*3 |  |
| Service Element Reports |  |
| Sewage Sludge Indicator |  |
| Sewerage Allocated Tranche |  |
| Sewerage Capacity Volume Charge |  |
| Sewerage Capacity Volume Price |  |
| Sewerage Capacity Volume Thresholds |  |
| Sewerage Chargeable Meter Size |  |
| Sewerage Derived Daily Volume |  |
| Sewerage Meter Chargeable |  |
| Sewerage Meter Annual Non-Volumetric Charge |  |
| Sewerage Meter Based Charge |  |
| Sewerage Proportional Capacity Volume Threshold |  |
| Sewerage Proportional Free Allocation |  |
| Sewerage Schedule 3 |  |
| Sewerage Standard Volume Charge |  |
| Sewerage Standard Volume Price |  |
| Sludge Treatment charging component in pence/*m*3 |  |
| Sludge Capacity charging component in pence/kg per Day |  |
| SPID Chargeable Period |  |
| SPID Settlement Chargeable Period |  |
| SPID SWWater Meter Active |  |
| SPID Water Meter Chargeable |  |
| Sewerage Schedule 3 Discount |  |
| SGES Refund Applicable |  |
| SGES Water Refund |  |
| SGES Sewerage Refund |  |
| Standard strength of Settled Chemical Oxygen Demand of the foul sewage |  |
| Standard strength of settleable solids in the foul sewage |  |
| Standard Volume Charge |  |
| Trade Effluent Meter |  |
| Trade Effluent Schedule 3 |  |
| Trade Effluent Yearly Estimate Volume |  |
| T17 Meter Chain |  |
| T17 Meter Chain “Active Period” |  |
| T17 Meter Chain Chargeable Period |  |
| Tabular Meter Size |  |
| Temporarily Disconnected |  |
| Total LUVA Days |  |
| Total Premium Days |  |
| Total Sewerage Meter Chargeable |  |
| Total SWWater Meter Active Days |  |
| Troughs and Drinking Bowls |  |
| Troughs and Drinking Bowls Charge |  |
| Unadjusted Daily Availability Charge |  |
| Unadjusted Daily Operating Charge |  |
| Unadjusted Actual Daily Volume |  |
| Unadjusted Daily Metered Cost |  |
| Unadjusted Discounted Daily Availability Charge |  |
| Unadjusted Discounted Daily Operating Charge |  |
| Unadjusted Discounted Outside Taps Charge |  |
| Unadjusted Discounted Property Drainage Charge |  |
| Unadjusted Discounted Roads Drainage Charge |  |
| Unadjusted Discounted Troughs and Drinking Bowls Charge |  |
| Unadjusted Discounted Sewerage Meter Based Charge |  |
| Unadjusted Discounted Water Meter Based Charge |  |
| Unadjusted Estimated Daily Volume |  |
| Unadjusted Outside Taps Charge |  |
| Unadjusted Property Drainage Charge |  |
| Unadjusted Roads Drainage Charge |  |
| Unadjusted Sewerage Meter Based Charge |  |
| Unadjusted Troughs and Drinking Bowls Charge |  |
| Unadjusted Water Meter Based Charge |  |
| Uncapped Premium Annual Volume |  |
| Upper Meter Size |  |
| Vacancy Adjusted SPID SWWater Meter Active |  |
| Vacant |  |
| Volumetric/Primary charging component in pence/*m*3 |  |
| Volumetric/Primary charging component in pence/*m*3 per Day |  |
| Water Chargeable Meter Size |  |
| Water Schedule 3 Discount |  |
| Water knots |  |
| Water Meter Annual Non-Volumetric Charge |  |
| Water Meter Based Charge |  |
| Water Standard Volume Prices |  |
| Yearly Proportion |  |
| Year |  |
| YVE |  |

## Meter Advance Periods

* + 1. The terms “Meter Pre-Advance Periods”, “Meter Advance Periods”, and “Meter Post-Advance Periods” are all formally defined in the Market Code, Schedule 1. The following diagrams are provided as an aid to the correct interpretation of each of these terms. In the event of a conflict between any of these terms and the diagrams below, the definition in the Market Code shall prevail.



Figure 1: A Single Meter which is Active in Central Systems (from cutover). No reads. Whole period is a “Meter Pre-Advance Period” Volumes estimated from either: *YVE* if submitted, else Industry Level Estimates (*ILE*).

***Note*** *– as per definition; changes to meter Water or Chargeable Sewerage Size would force multiple Meter Pre-Advance Periods in all the examples.*

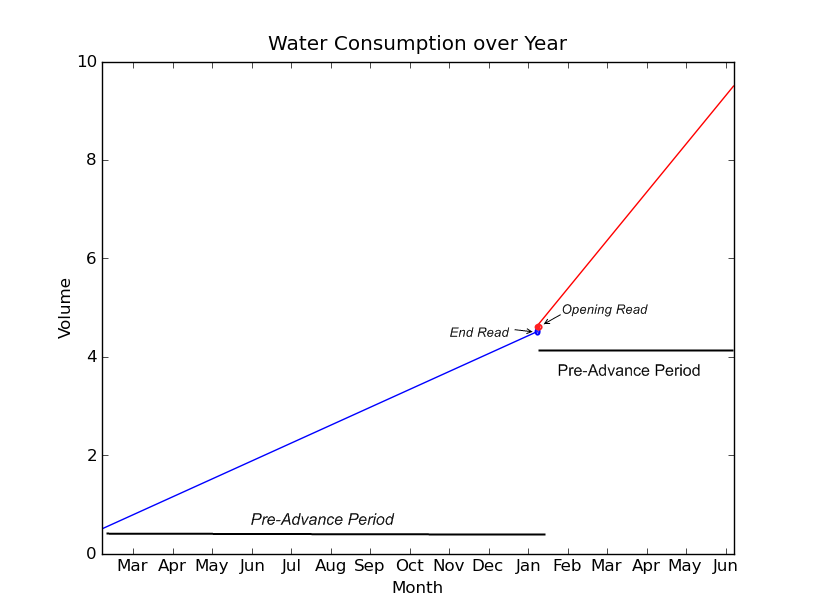


Figure 2: A T17 Meter Chain which is Active in the Central Systems (from cutover). Two Meter Pre-Advance Periods First meter has a single “End” Read. Volumes estimated from appropriate YVE or ILE. Second meter has a single “Opening” Read. Volumes estimated from appropriate YVE or ILE. ***Note 1***- YVE is set separately for each meter. ***Note 2*** - a change in meter size for either meter would force a new Meter Pre-Advance Period

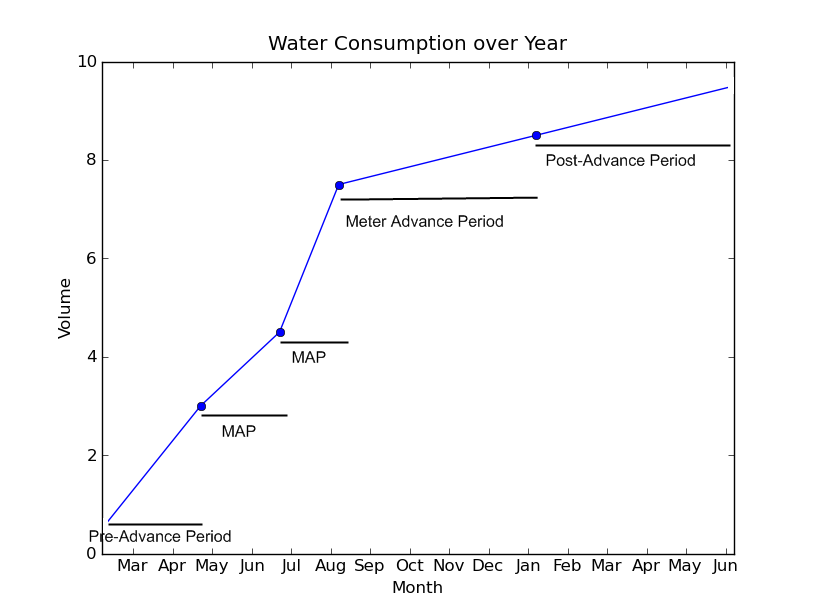


Figure 3: A single meter which is Active in the Central Systems (from cutover) with several reads. The diagram shows (i) A Meter Pre-Advance Period; (ii) Several Meter Advance Periods; and (iii) A Meter Post Advance Period

1. As of the time of writing [↑](#footnote-ref-1)
2. This is also applicable pre-MCCP095, as all existing meters were set to Meter Treatment SWWater [↑](#footnote-ref-2)
3. Note - the terms “Meter Pre-Advance Period”, “Meter Advance Period” and “Meter Post-Advance Period” are all formally defined in the Market Code, Schedule 1. However, non-definitive diagrams describing each of these periods are provided in the Appendix A.3 [↑](#footnote-ref-3)
4. Expressed as percentages in Central Systems, but used here as fractions [↑](#footnote-ref-4)
5. There are rare circumstances where the allocation of the SGES refund in the Central Systems is not uniformly distributed across the various Service Element Reports as in this equation. This is as a result of the practical implementation of the algorithms described in this CSD, which are based upon calculating charges for chunks of time where the charging parameters are otherwise constant. However, even in such cases, the total of the SGES distributed across the various Service Elements will still be correct [↑](#footnote-ref-6)
6. Compare the footnote at section 2.4.10 [↑](#footnote-ref-7)
7. Compare the footnote at section 2.4.10 [↑](#footnote-ref-8)
8. Compare the footnote at section 2.4.10 [↑](#footnote-ref-9)
9. Compare the footnote at section 2.4.10 [↑](#footnote-ref-10)
10. The subscript T indicates it’s a DPID [↑](#footnote-ref-11)
11. See Appendix A re cutover between the methods [↑](#footnote-ref-12)
12. Expressed as a percentage in Central Systems, but used here and elsewhere as a fraction [↑](#footnote-ref-13)
13. Expressed as a percentage in Central Systems but used here as a fraction [↑](#footnote-ref-14)
14. Compare the footnote at section 2.4.10 [↑](#footnote-ref-15)
15. When the RTS is zero there may be less than two Service Elements per Related T17 Meter Chain. In particular, there will be no service element for Meter Based Charges [↑](#footnote-ref-16)
16. Compare the footnote at section 2.4.10 [↑](#footnote-ref-17)
17. Compare the footnote at section 2.4.10 [↑](#footnote-ref-18)
18. Compare the footnote at section 2.4.10 [↑](#footnote-ref-19)
19. Compare the footnote at section 2.4.10 [↑](#footnote-ref-20)
20. Compare the footnote at section 2.4.10 [↑](#footnote-ref-21)
21. Expressed as a percentage in Central Systems, but used here as a fraction [↑](#footnote-ref-22)
22. for the avoidance of doubt, this equation will apply unchanged before and after 1st April 2013 [↑](#footnote-ref-23)
23. Compare the footnote at section 2.4.10 [↑](#footnote-ref-24)