

ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT



For

MASTERTON DISTRICT COUNCIL AND
MERCURY NZ LIMITED
NZBN: 9429037705305

Prepared by: Steve Woods

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Date audit report completed: 18 February 2022

Audit report due date: 1 March 2022

TABLE OF CONTENTS

Executive summary	3
Audit summary	4
Non-compliances	4
Recommendations	6
Issues 6	
1. Administrative	7
1.1. Exemptions from Obligations to Comply with Code	7
1.2. Structure of Organisation	8
1.3. Persons involved in this audit.....	9
1.4. Hardware and Software	9
1.5. Breaches or Breach Allegations.....	9
1.6. ICP Data	9
1.7. Authorisation Received	10
1.8. Scope of Audit	10
1.9. Summary of previous audit	11
1.10. Distributed unmetered load audits (Clause 16A.26 and 17.295F).....	13
2. DUML database requirements.....	14
2.1. Deriving submission information (Clause 11(1) of Schedule 15.3)	14
2.2. ICP identifier and items of load (Clause 11(2)(a) and (aa) of Schedule 15.3)	16
2.3. Location of each item of load (Clause 11(2)(b) of Schedule 15.3)	17
2.4. Description and capacity of load (Clause 11(2)(c) and (d) of Schedule 15.3)	17
2.5. All load recorded in database (Clause 11(2A) of Schedule 15.3)	18
2.6. Tracking of load changes (Clause 11(3) of Schedule 15.3)	20
2.7. Audit trail (Clause 11(4) of Schedule 15.3).....	20
3. Accuracy of DUML database	21
3.1. Database accuracy (Clause 15.2 and 15.37B(b))	21
3.2. Volume information accuracy (Clause 15.2 and 15.37B(c))	25
Conclusion	28
Participant response	29

EXECUTIVE SUMMARY

This audit of the **Masterton District Council (MDC)** DUML database and processes was conducted at the request of **Mercury NZ Limited (Mercury)** in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1. The scope of the audit encompasses the collection, security and accuracy of the data, including the preparation of submission information.

A RAMM database is held by MDC. Alf Downs completes repairs, maintenance, upgrades, new installations, and removals and updates the database using Pocket RAMM. Lights in new subdivisions are installed by the developer's electrician and are entered into the database by MDC.

Mercury reconciles this DUML load using the HHR profile in accordance with exemption 233. MDC provides a monthly report from the database to Mercury, which is used to determine wattages. On hours are derived using data logger information.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	88.4	Wattage from survey is lower than the database wattage by 11.6%
R _L	80.8	With a 95% level of confidence, it can be concluded that the error could be between -19.2% and -1.2%
R _H	98.8	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 1 February 2019. The table below shows that Scenario B (detailed below) applies. The conclusion from Scenario B is that the database has poor accuracy demonstrated with statistical significance. The true wattage (installed in the field) could be between 19.2% lower and 1.2% lower than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

- In absolute terms the installed capacity is estimated to be 12 kW lower than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 1.0 kW lower and 19 kW lower than the database.
- In absolute terms, total annual consumption is estimated to be 49,600 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 5,000 kWh lower and 81,800 kWh p.a. lower than the database indicates.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed the code requirement to calculate the correct monthly load must:

- take into account when each item of load was physically installed or removed, and
- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

Mercury completes revision submissions where corrections are required and confirmed that no corrections have occurred since the last audit.

Five non-compliances were identified, and no recommendations were raised. The future risk rating of 16 indicates that the next audit be completed in six months. I have considered this in conjunction with the responses from Mercury and MDC and I agree with this recommendation.

The matters raised are detailed below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Deriving submission information	2.1	11(1) of Schedule 15.3	<p>The field audit concluded that in absolute terms, total annual consumption is estimated to be 49,600 kWh lower than the DUML database indicates.</p> <p>Under submission of 4,000 kWh per annum assuming wattage of 30 watts and annual burn hours of 4,271.</p> <p>Under submission of 6,700 kWh per annum. This was also discussed in the previous audit, where the light model was recorded as "Itron Zero OC6 STA" and it was stated the wattage should be 51. The description has been updated to "Itron Zero OC6 STA 3.1 100-3M" but not the wattage which for this model should be 60.</p> <p>Vesting dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in the database at the time that the change occurs.</p>	Moderate	Medium	4	Identified
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	<p>37 items of load have a blank light model field.</p> <p>33 items of load have zero in the wattage field.</p>	Moderate	Low	2	Identified
All load recorded in database	2.5	11(2A) of Schedule 15.3	1 additional light found in the field.	Moderate	Low	2	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Database accuracy	3.1	15.2 and 15.37B (b)	<p>The field audit concluded that in absolute terms, total annual consumption is estimated to be 49,600 kWh lower than the DUML database indicates.</p> <p>37 items of load have a blank light model and 33 items of load have a blank wattage, resulting in under submission of approx. 4,000 kWh per annum.</p> <p>174 incorrect LED wattages resulting in under submission of approx. 6,700 kWh per annum.</p> <p>Vesting dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in the database at the time that the change occurs.</p>	Moderate	Medium	4	Identified
Volume information accuracy	3.2	15.2 and 15.37B (c)	<p>The field audit concluded that in absolute terms, total annual consumption is estimated to be 49,600 kWh lower than the DUML database indicates.</p> <p>Under submission of 4,000 kWh per annum assuming wattage of 30 watts and annual burn hours of 4,271.</p> <p>Under submission of 6,700 kWh per annum. This was also discussed in the previous audit, where the light model was recorded as "Itron Zero OC6 STA" and it was stated the wattage should be 51. The description has been updated to "Itron Zero OC6 STA 3.1 100-3M" and the correct wattage for this model is 60.</p> <p>Vesting dates are recorded as the installation date for new connections, and</p>	Moderate	Medium	4	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			change dates may not reflect the date of the change if they are not processed in the database at the time that the change occurs.				
Future Risk Rating						16	

Future risk rating	0	1-4	5-8	9-15	16-18	19+
Indicative audit frequency	36 months	24 months	18 months	12 months	6 months	3 months

RECOMMENDATIONS

Subject	Section	Recommendation
		Nil

ISSUES

Subject	Section	Description	Issue
		Nil	

1. ADMINISTRATIVE

1.1. Exemptions from Obligations to Comply with Code

Code reference

Section 11 of Electricity Industry Act 2010.

Code related audit information

Section 11 of the Electricity Industry Act provides for the Electricity Authority to exempt any participant from compliance with all or any of the clauses.

Audit observation

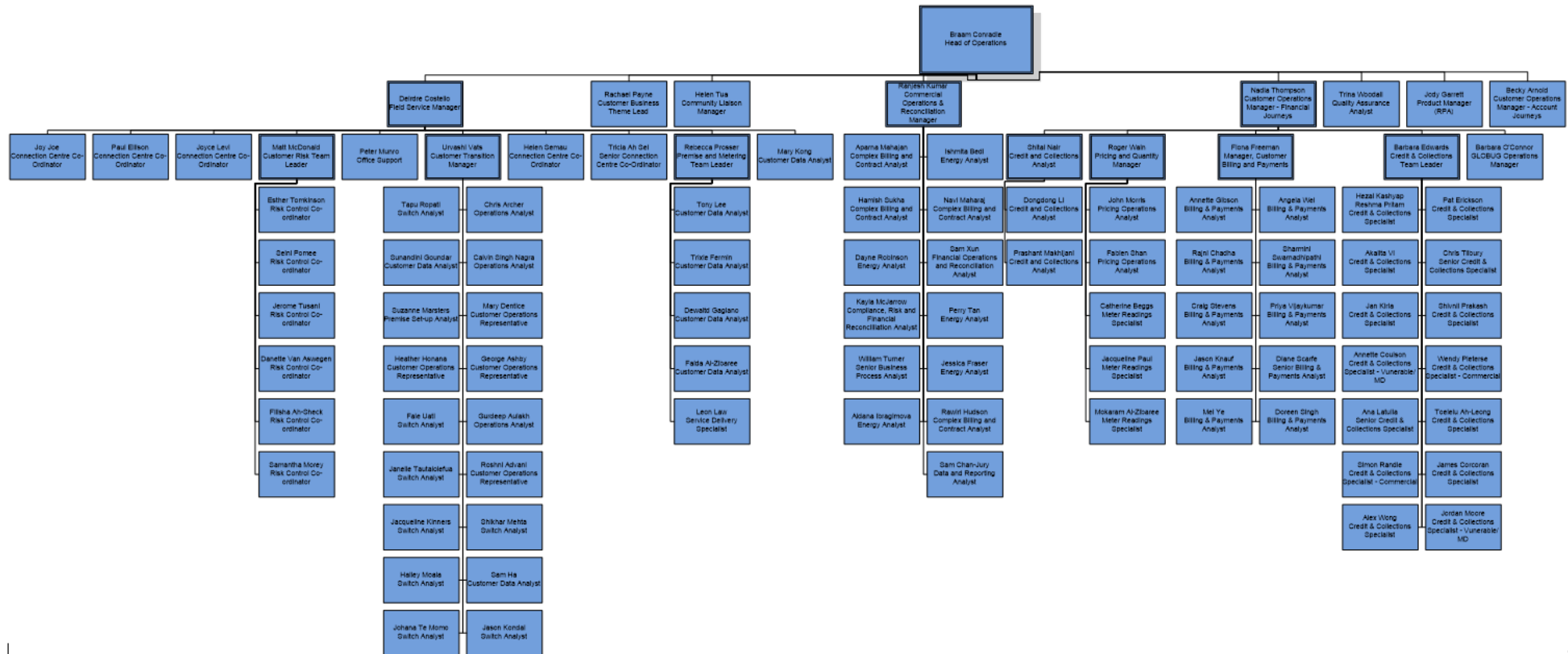
Current code exemptions were reviewed on the Electricity Authority website.

Audit commentary

Mercury has been granted exemption No. 233. This allows them to provide half-hour (“HHR”) submission information instead of non-half-hour (“NHH”) submission information for distributed unmetered load (“DUML”). This exemption expires on 31 October 2023.

1.2. Structure of Organisation

Mercury provided their current organisational structure:



1.3. Persons involved in this audit

Auditor:

Steve Woods

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Twinkle Poulose	Urban Roading Engineer	Masterton District Council
Kayla McJarrow	Compliance, Risk & Financial Reconciliation Analyst	Mercury Energy

1.4. Hardware and Software

The SQL database used for the management of DUML is remotely hosted by Thinkproject NZ Ltd. The database is commonly known as “RAMM” which stands for “Roading Asset and Maintenance Management”. The specific module used for DUML is called RAMM Contractor.

Thinkproject NZ Ltd backs up the database and assists with disaster recovery as part of their hosting service. Nightly backups are performed. As a minimum, daily backups are retained for the previous five working days, weekly backups are retained for the previous four weeks, and monthly backups are retained for the previous six months.

Access to the database is secure by way of password protection.

Systems used by the trader to calculate submissions are assessed as part of their reconciliation participant audits.

1.5. Breaches or Breach Allegations

There are no breach allegations relevant to the scope of this audit.

1.6. ICP Data

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0020901000WR99A	MSTN DISTRICT COUNCIL (RURAL)	MST0331	HHR	100	3758
0020902000WRB7A	MASTERTON DISTRICT COUNCIL	MST0331	HHR	2,335	96,166
Solar	Pole control is photocell, solar powered			1	0
Total				2,435	99,924

The item of load with solar recorded as the ICP number is compliant because it is solar powered and is not part of the distributed unmetered load.

1.7. Authorisation Received

All information was provided directly by Mercury or MDC.

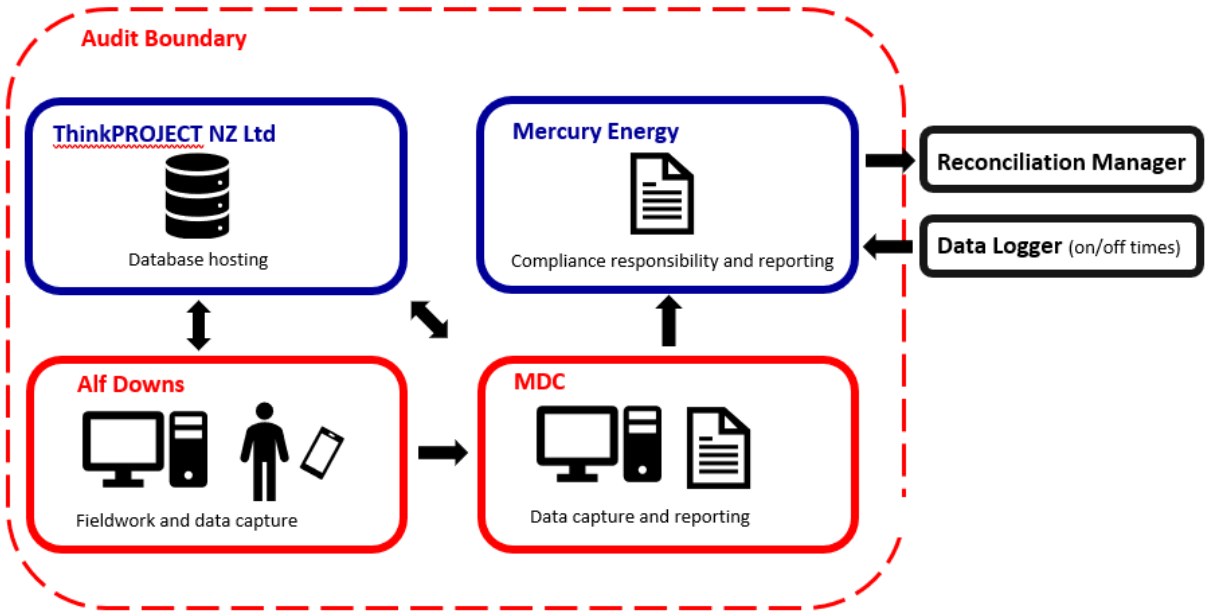
1.8. Scope of Audit

This audit of the MDC DUML database and processes was conducted at the request of Mercury in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied. The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

A RAMM database is held by MDC. Alf Downs completes repairs, maintenance, upgrades, new installations, and removals, and updates the database from the field using Pocket RAMM. Lights in new subdivisions are installed by the developer’s electrician and are entered into the database by MDC.

Mercury reconciles this DUML load using the HHR profile in accordance with exemption 233. MDC provides a monthly report from the database to Mercury, which is used to determine wattages. On hours are derived using data logger information.

The scope of the audit encompasses the collection, security and accuracy of the data, including the preparation of submission information based on the database reporting. The diagram below shows the audit boundaries for clarity.



The field audit was undertaken of a statistical sample of 293 items of load on 17 January 2022.

1.9. Summary of previous audit

The previous audit of this database was undertaken by Tara Gannon of Veritek Limited in February 2020. The summary table below shows the statuses of the non-compliances raised in the previous audit. Further comment is made in the relevant sections of this report.

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	<p>Three items of load had missing lamp model and lamp wattage data, and one item of load had missing gear wattage information resulting in under submission of 425W or 1,815 kWh p.a. based on 4,271 burn hours.</p> <p>196 lamps have incorrect total wattages, resulting in estimated over submission of 613W or 2,618 kWh p.a. based on 4,271 burn hours.</p> <p>22 items of load connected to 0020902000WRB7A are indicated to be metered, resulting in over submission of 736W or 3,143 kWh per annum.</p> <p>Festive lights are not excluded from submission information when they are not connected, resulting in an estimated over submission of 7,398W or 3,405 kWh for the period from 01/10/19 until the lights were connected in mid-December 2019.</p> <p>Vesting dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in the database at the time that the change occurs.</p> <p>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.</p>	Still existing
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	<p>Three items of load had missing lamp model and lamp wattage data, and one item of load had missing gear wattage information.</p>	Still existing

Subject	Section	Clause	Non-compliance	Status
Database accuracy	3.1	15.2 and 15.37B (b)	<p>Three items of load had missing lamp model and lamp wattage data, and one item of load had missing gear wattage information resulting in under submission of 425W or 1,815 kWh p.a. based on 4,271 burn hours.</p> <p>196 lamps have incorrect total wattages, resulting in estimated over submission of 613W or 2,618 kWh p.a. based on 4,271 burn hours.</p> <p>22 items of load connected to 0020902000WRB7A are indicated to be metered, resulting in over submission of 736W or 3,143 kWh per annum.</p> <p>Vesting dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in the database at the time that the change occurs.</p>	Still existing
Volume information accuracy	3.2	15.2 and 15.37B (c)	<p>Three items of load had missing lamp model and lamp wattage data, and one item of load had missing gear wattage information resulting in under submission of 425W or 1,815 kWh p.a. based on 4,271 burn hours.</p> <p>196 lamps have incorrect total wattages, resulting in estimated over submission of 613W or 2,618 kWh p.a. based on 4,271 burn hours.</p> <p>22 items of load connected to 0020902000WRB7A are indicated to be metered, resulting in over submission of 736W or 3,143 kWh per annum.</p> <p>Festive lights are not excluded from submission information when they are not connected, resulting in an estimated over submission of 7,398W or 3,405 kWh for the period from 01/10/19 until the lights were</p>	Still existing

Subject	Section	Clause	Non-compliance	Status
			<p>connected in mid-December 2019.</p> <p>Vesting dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in the database at the time that the change occurs.</p> <p>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.</p>	

1.10. Distributed unmetered load audits (Clause 16A.26 and 17.295F)

Code reference

Clause 16A.26 and 17.295F

Code related audit information

Retailers must ensure that DUML database audits are completed:

- 1. by 1 June 2018 (for DUML that existed prior to 1 June 2017)*
- 2. within three months of submission to the reconciliation manager (for new DUML)*
- 3. within the timeframe specified by the Authority for DUML that has been audited since 1 June 2017.*

Audit observation

Mercury have requested Veritek to undertake this streetlight audit.

Audit commentary

This audit report confirms that the requirement to conduct an audit has been met for this database within the required timeframe.

Audit outcome

Compliant

2. DUML DATABASE REQUIREMENTS

2.1. Deriving submission information (Clause 11(1) of Schedule 15.3)

Code reference

Clause 11(1) of Schedule 15.3

Code related audit information

The retailer must ensure the:

- *DUML database is up to date*
- *methodology for deriving submission information complies with Schedule 15.5.*

Audit observation

The process for calculation of consumption was examined and the application of profiles was checked. The database was checked for accuracy.

Audit commentary

Mercury reconciles this DUML load using the HHR profile in accordance with exemption 233. Wattages are derived from an extract provided each month by MDC. On and off times are derived from a data logger.

I reviewed the submission information for November 2021 and confirmed that the calculation methodology was correct, and that wattages were based on the database extract totals and on hours were based on data logger information.

Volume inaccuracy is present as follows:

Discrepancy	Potential impact on submission
Field audit findings	The field audit concluded that in absolute terms, total annual consumption is estimated to be 49,600 kWh lower than the DUML database indicates.
Zero in the wattage field	Under submission of 4,000 kWh per annum assuming wattage of 30 watts and annual burn hours of 4,271.
Itron Zero OC6 STA 3.1 100-3M, where the spec sheet has 60 watts, and the database has 51 watts	Under submission of 6,700 kWh per annum. This was also discussed in the previous audit, where the light model was recorded as "Itron Zero OC6 STA" and it was stated the wattage should be 51. The description has been updated to "Itron Zero OC6 STA 3.1 100-3M" but not the wattage which for this model should be 60.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed the code requirement to calculate the correct monthly load must:

- take into account when each item of load was physically installed or removed; and
- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

Mercury completes revision submissions where corrections are required and has not yet updated their processes to be compliant with the Authority's memo.

The RAMM database records an installation date, which is used to record the date of livening. There is no separate livening date.

- Alf Downs records the date that the data is loaded for all new connections, changes, and removals they complete. This means that where Alf Downs has completed the new connection or change, the date is likely to be accurate.
- MDC enters the data of vesting for new connections within subdivisions, which may not reflect the date of livening.

Audit outcome

Non-compliant

Non-compliance	Description
<p>Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3</p> <p>From: 01-Feb-20 To: 24-Jan-22</p>	<p>The field audit concluded that in absolute terms, total annual consumption is estimated to be 49,600 kWh lower than the DUMML database indicates.</p> <p>Under submission of 4,000 kWh per annum assuming wattage of 30 watts and annual burn hours of 4,271.</p> <p>Under submission of 6,700 kWh per annum. This was also discussed in the previous audit, where the light model was recorded as "Itron Zero 0C6 STA" and it was stated the wattage should be 51. The description has been updated to "Itron Zero 0C6 STA 3.1 100-3M" but not the wattage which for this model should be 60..</p> <p>Vesting dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in the database at the time that the change occurs.</p> <p>Potential impact: High Actual impact: Medium Audit history: Once</p> <p>Controls: Moderate Breach risk rating: 4</p>
Audit risk rating	Rationale for audit risk rating
<p>Medium</p>	<p>The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement.</p> <p>The impact on settlement and participants is medium; therefore, the audit risk rating is medium.</p>

Actions taken to resolve the issue	Completion date	Remedial action status
<p>Zero in the wattage field - Under submission of 4,000 kWh per annum assuming wattage of 30 watts and annual burn hours of 4,271. Masterton DC are currently conducting a full review of the DUML database. Once this is complete, we will be checking to ensure the wattages are populated for all lights.</p> <p>Incorrect wattage - Under submission of 6,700 kWh per annum. Itron Zero OC6 STA 3.1 100-3M wattage should be 60 not 51. Masterton DC are currently conducting a full review of the DUML database. Once this is complete, we will be checking to ensure the wattages for these lights have been corrected.</p>	Apr22	Identified
<p>Preventative actions taken to ensure no further issues will occur</p>	<p>Completion date</p>	
<p>Due to the decline in accuracy over the last audit period, we will be requesting Masterton DC to review their processes to identify the cause of this and address any issues appropriately to return the database to high accuracy.</p>	Ongoing	

2.2. ICP identifier and items of load (Clause 11(2)(a) and (aa) of Schedule 15.3)

Code reference

Clause 11(2)(a) and (aa) of Schedule 15.3

Code related audit information

The DUML database must contain:

- *each ICP identifier for which the retailer is responsible for the DUML*
- *the items of load associated with the ICP identifier.*

Audit observation

The database was checked to confirm an ICP was recorded against each item of load.

Audit commentary

All connected unmetered items of load have an ICP recorded against them. One item of load is powered by solar and correctly does not have an ICP number recorded in the database.

Audit outcome

Compliant

2.3. Location of each item of load (Clause 11(2)(b) of Schedule 15.3)

Code reference

Clause 11(2)(b) of Schedule 15.3

Code related audit information

The DUMML database must contain the location of each DUMML item.

Audit observation

The database was checked to confirm the location is recorded for all items of load.

Audit commentary

The database contains fields for the road name, displacement, pole ID and number, and GPS coordinates.

371 items of load do not have GPS coordinates, but they have sufficient street address, displacement and pole number information to enable them to be located.

Audit outcome

Compliant

2.4. Description and capacity of load (Clause 11(2)(c) and (d) of Schedule 15.3)

Code reference

Clause 11(2)(c) and (d) of Schedule 15.3

Code related audit information

The DUMML database must contain:

- *a description of load type for each item of load and any assumptions regarding the capacity*
- *the capacity of each item in watts.*

Audit observation

The database was checked to confirm that:

- it contained a field for light type and wattage capacity,
- wattage capacities include any ballast or gear wattage, and
- each item of load has a light type, light wattage, and gear wattage recorded.

Audit commentary

The database contains light model, light wattage, gear model and gear wattage. These fields were checked for all records, and a small number of exceptions were identified:

- 37 items of load have a blank light model field, and
- 33 items of load have zero in the wattage field.

The accuracy of the recorded wattages is discussed in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 2.4 With: Clause 11(2)(c) and (d) of Schedule 15.3 From: 01-Feb-20 To: 24-Jan-22	37 items of load have a blank light model field. 33 items of load have zero in the wattage field. Potential impact: Low Actual impact: Low Audit history: Twice Controls: Moderate Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
Low	Controls are rated as moderate, as they are sufficient to mitigate the risk most of the time and only a small number of exceptions were identified. The impact is assessed to be low. The missing information may have resulted in under submission by approx. 4,000 kWh per annum assuming wattage of 30 watts and annual burn hours of 4,271.		
Actions taken to resolve the issue		Completion date	Remedial action status
Masterton DC are currently conducting a full review of the DUML database. Once this is complete, we will be checking to ensure all relevant fields are populated for each light.		Mar 22	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
Due to the decline in accuracy over the last audit period, we will be requesting Masterton DC to review their processes to identify the cause of this and address any issues appropriately to return the database to high accuracy.		Ongoing	

2.5. All load recorded in database (Clause 11(2A) of Schedule 15.3)

Code reference

Clause 11(2A) of Schedule 15.3

Code related audit information

The retailer must ensure that each item of DUML for which it is responsible is recorded in this database.

Audit observation

The field audit was undertaken of a statistical sample of 293 items of load on 17 January 2022. The sample was selected from four strata, as follows:

1. Other lighting,
2. Urban A-G,
3. Urban H-P, and
4. Urban Q-Z.

Audit commentary

The field audit discrepancies are detailed in the table below.

Finding	Quantity
Incorrect wattage	61
Light in the database not in the field	1
Lights in the field not in the database	1

The field audit found one additional light in the field, which is recorded as non-compliance. Other light count and wattage differences identified during the field audit are recorded as non-compliance in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description	
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 01-Feb-20 To: 24-Jan-22	1 additional light found in the field. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2	
Audit risk rating	Rationale for audit risk rating	
Low	The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement. The impact on settlement is under submission of approx. 256 kWh per annum; therefore, the audit risk rating is low.	
Actions taken to resolve the issue		Completion date
Masterton DC are currently conducting a full review of the DUMML database. Once this is complete, we will be checking to ensure this light has been added to the database.		Apr22
Preventative actions taken to ensure no further issues will occur		Completion date
Due to the decline in accuracy over the last audit period, we will be requesting Masterton DC to review their processes to identify the cause of this and address any issues appropriately to return the database to high accuracy.		Ongoing
		Identified

2.6. Tracking of load changes (Clause 11(3) of Schedule 15.3)

Code reference

Clause 11(3) of Schedule 15.3

Code related audit information

The DUML database must track additions and removals in a manner that allows the total load (in kW) to be retrospectively derived for any given day.

Audit observation

The process for tracking of changes in the database was examined.

Audit commentary

The database functionality achieves compliance with the code.

The change management process and the compliance of the database reporting provided to Mercury is detailed in **sections 3.1** and **3.2**.

Audit outcome

Compliant

2.7. Audit trail (Clause 11(4) of Schedule 15.3)

Code reference

Clause 11(4) of Schedule 15.3

Code related audit information

The DUML database must incorporate an audit trail of all additions and changes that identify:

- *the before and after values for changes*
- *the date and time of the change or addition*
- *the person who made the addition or change to the database.*

Audit observation

The database was checked for audit trails.

Audit commentary

The database has a complete audit trail.

Audit outcome

Compliant

3. ACCURACY OF DUML DATABASE

3.1. Database accuracy (Clause 15.2 and 15.37B(b))

Code reference

Clause 15.2 and 15.37B(b)

Code related audit information

Audit must verify that the information recorded in the retailer's DUML database is complete and accurate.

Audit observation

Mercury's submissions are based on a monthly extract from the RAMM database. A database extract was provided in December 2021, and I assessed the accuracy of this by using the DUML Statistical Sampling Guideline. The table below shows the survey plan.

Plan Item	Comments
Area of interest	Masterton DC streetlights
Strata	The database contains 2,435 items of load in the MDC region. The management process is the same for all lights. I created four strata: <ol style="list-style-type: none"> 5. Other lighting, 6. Urban A-G, 7. Urban H-P, and 8. Urban Q-Z.
Area units	I created a pivot table of the roads, and I used a random number generator in a spreadsheet to select a total of 40 sub-units.
Total items of load	293 items of load were checked, making up 10% of the database.

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority against the database or in the case of LED lights against the LED light specification.

The change management process and timeliness of database updates was evaluated.

Audit commentary

Field audit findings

A field audit was conducted of a statistical sample of 293 items of load. The "database auditing tool" was used to analyse the results, which are shown in the table below.

Result	Percentage	Comments
The point estimate of R	88.4	Wattage from survey is lower than the database wattage by 11.6%
R _L	80.8	With a 95% level of confidence, it can be concluded that the error could be between -19.2% and -1.2%
R _H	98.8	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 1 February 2019. The table below shows that Scenario B (detailed below) applies. The conclusion from Scenario B is that the database has poor accuracy demonstrated

with statistical significance. The true wattage (installed in the field) could be between 19.2% lower and 1.2% lower than the wattage recorded in the DUMML database. Non-compliance is recorded because the potential error is greater than 5.0%.

- In absolute terms the installed capacity is estimated to be 12 kW lower than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 1.0 kW lower and 19 kW lower than the database.
- In absolute terms, total annual consumption is estimated to be 49,600 kWh lower than the DUMML database indicates.
- There is a 95% level of confidence that the annual consumption is between 5,000 kWh lower and 81,800 kWh p.a. lower than the database indicates.

Scenario	Description
<p>A - Good accuracy, good precision</p>	<p>This scenario applies if:</p> <p>(a) R_H is less than 1.05; and</p> <p>(b) R_L is greater than 0.95</p> <p>The conclusion from this scenario is that:</p> <p>(a) the best available estimate indicates that the database is accurate within +/- 5 %; and</p> <p>(b) this is the best outcome.</p>
<p>B - Poor accuracy, demonstrated with statistical significance</p>	<p>This scenario applies if:</p> <p>(a) the point estimate of R is less than 0.95 or greater than 1.05</p> <p>(b) as a result, either R_L is less than 0.95 or R_H is greater than 1.05.</p> <p>There is evidence to support this finding. In statistical terms, the inaccuracy is statistically significant at the 95% level</p>
<p>C - Poor precision</p>	<p>This scenario applies if:</p> <p>(a) the point estimate of R is between 0.95 and 1.05</p> <p>(b) R_L is less than 0.95 and/or R_H is greater than 1.05</p> <p>The conclusion from this scenario is that the best available estimate is not precise enough to conclude that the database is accurate within +/- 5 %</p>

Light description and capacity accuracy

The following discrepancies were identified.

Discrepancy	Quantity	Potential impact on submission
Blank light model	37	0
Zero in the wattage field	33	Under submission of 4,000 kWh per annum assuming wattage of 30 watts and annual burn hours of 4,271.
Itron Zero OC6 STA 3.1 100-3M, where the spec sheet has 60 watts, and the database has 51 watts	174	Under submission of 6,700 kWh per annum. This was also discussed in the previous audit, where the light model was recorded as "Itron Zero OC6 STA" and it was stated the wattage should be 51. The description has been updated to "Itron Zero OC6 STA 3.1 100-3M" but not the wattage which for this model should be 60.

ICP number accuracy

Compliance is recorded for ICP number accuracy.

Change management process findings

A RAMM database is held by MDC. Alf Downs completes repairs, maintenance, upgrades, new installations, and removals and updates the database using Pocket RAMM. Change dates are automatically generated by RAMM when records change but cannot be selected by the user. Changes are normally entered using Pocket RAMM on the date of the change.

Lights in new subdivisions are installed by the developer's electrician and are entered into the database by MDC. The lights are entered once the subdivision is "vested" in council. The RAMM database records an installation date, which is used to record the date the light is vested in council once this occurs. There is no separate livening date. The street lighting team liaise closely with the planning team to ensure new connections are identified promptly, and developers are advised to provide connection information as soon as possible.

Regular outage patrols have not been completed since July 2019. MDC relies on the public to advise of lights which need to be maintained.

An LED upgrade project is underway. The lights are compatible with a CMS, but MDC does not intend to use a CMS for light management or dimming. Most MDC lights have been upgraded with the exception of some:

- subdivisions with decorative lights where MDC is determining suitable replacements,
- CBD under verandah lights, and
- CBD lights in areas where MDC is planning roading upgrades, and lighting will be considered as part of the wider upgrade process.

Festive lights

Some festive lights are installed and are switched on from early December and off from mid-January. Alf Downs manages the connection and disconnection process and provides this information in the database extract.

Festive lights are recorded against the ICP which they are attached to and must be deducted from the total wattage for the ICP when they are not connected, rather than being added to the total wattage when they are connected. These lights are correctly excluded for the months they are not connected.

Private lights

MDC has taken ownership of all private lights in their database. There were historically a small number of private lights on right of ways. I found two lights which had privately owned poles in the database, and load was recorded and submitted as required.

Audit outcome

Non-compliant

Non-compliance	Description		
<p>Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b)</p> <p>From: 01-Feb-20 To: 24-Jan-22</p>	<p>The field audit concluded that in absolute terms, total annual consumption is estimated to be 49,600 kWh lower than the DUML database indicates.</p> <p>37 items of load have a blank light model and 33 items of load have a blank wattage, resulting in under submission of approx. 4,000 kWh per annum.</p> <p>174 incorrect LED wattages resulting in under submission of approx. 6,700 kWh per annum.</p> <p>Vesting dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in the database at the time that the change occurs.</p> <p>Potential impact: Medium Actual impact: Medium Audit history: Twice Controls: Moderate Breach risk rating: 4</p>		
Audit risk rating	Rationale for audit risk rating		
<p>Medium</p>	<p>The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement.</p> <p>The impact on settlement and participants is medium; therefore, the audit risk rating is medium.</p>		
Actions taken to resolve the issue		Completion date	Remedial action status

<p>37 items of load have a blank light model and 33 items of load have a blank wattage, resulting in under submission of approx. 4,000 kWh per annum. Masterton DC are currently conducting a full review of the DUMML database. Once this is complete, we will be checking to ensure the wattages are populated for all lights.</p> <p>174 incorrect LED wattages resulting in under submission of approx. 6,700 kWh per annum. Masterton DC are currently conducting a full review of the DUMML database. Once this is complete, we will be checking to ensure the wattages for these lights have been corrected.</p>	Apr22	Identified
<p>Preventative actions taken to ensure no further issues will occur</p>	<p>Completion date</p>	
<p>Due to the decline in accuracy over the last audit period, we will be requesting Masterton DC to review their processes to identify the cause of this and address any issues appropriately to return the database to high accuracy.</p>	Ongoing	

3.2. Volume information accuracy (Clause 15.2 and 15.37B(c))

Code reference

Clause 15.2 and 15.37B(c)

Code related audit information

The audit must verify that:

- *volume information for the DUMML is being calculated accurately*
- *profiles for DUMML have been correctly applied.*

Audit observation

The submission was checked for accuracy for the month the database extract was supplied. This included:

- checking the registry to confirm that the ICP has the correct profile and submission flag, and
- checking the database extract combined with the on hours against the submitted figure to confirm accuracy.

Audit commentary

Mercury reconciles this DUMML load using the HHR profile in accordance with exemption 233. Wattages are derived from an extract provided each month by MDC. On and off times are derived from a data logger.

I reviewed the submission information for November 2021 and confirmed that the calculation methodology was correct, and that wattages were based on the database extract totals and on hours were based on data logger information.

Volume inaccuracy is present as follows:

Discrepancy	Potential impact on submission
Field audit findings	The field audit concluded that in absolute terms, total annual consumption is estimated to be 49,600 kWh lower than the DUML database indicates.
Zero in the wattage field	Under submission of 4,000 kWh per annum assuming wattage of 30 watts and annual burn hours of 4,271.
Itron Zero OC6 STA 3.1 100-3M, where the spec sheet has 60 watts, and the database has 51 watts	Under submission of 6,700 kWh per annum. This was also discussed in the previous audit, where the light model was recorded as "Itron Zero OC6 STA" and it was stated the wattage should be 51. The description has been updated to "Itron Zero OC6 STA 3.1 100-3M" but not the wattage which for this model should be 60.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed the code requirement to calculate the correct monthly load must:

- take into account when each item of load was physically installed or removed, and
- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

Mercury completes revision submissions where corrections are required and has not yet updated their processes to be compliant with the Authority's memo.

The RAMM database records an installation date, which is used to record the date of livening. There is no separate livening date.

- Alf Downs records the date that the data is loaded for all new connections, changes, and removals they complete. This means that where Alf Downs has completed the new connection or change, the date is likely to be accurate.
- MDC enters the data of vesting for new connections within subdivisions, which may not reflect the date of livening.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c)	<p>The field audit concluded that in absolute terms, total annual consumption is estimated to be 49,600 kWh lower than the DUML database indicates.</p> <p>Under submission of 4,000 kWh per annum assuming wattage of 30 watts and annual burn hours of 4,271.</p> <p>Under submission of 6,700 kWh per annum. This was also discussed in the previous audit, where the light model was recorded as "Itron Zero OC6 STA" and it was stated the wattage should be 51. The description has been updated to "Itron Zero OC6 STA 3.1 100-3M" but not the wattage which for this model should be 60.</p> <p>Vesting dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in the database at the time that the change occurs.</p> <p>Potential impact: High</p>

From: 01-Feb-20 To: 24-Jan-22	Actual impact: Medium Audit history: Once Controls: Moderate Breach risk rating: 4	
Audit risk rating	Rationale for audit risk rating	
Medium	The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement. The impact on settlement and participants is medium; therefore, the audit risk rating is medium.	
Actions taken to resolve the issue	Completion date	Remedial action status
Zero in the wattage field - Under submission of 4,000 kWh per annum assuming wattage of 30 watts and annual burn hours of 4,271. Masterton DC are currently conducting a full review of the DUMML database. Once this is complete, we will be checking to ensure the wattages are populated for all lights. Incorrect wattage - Under submission of 6,700 kWh per annum. Itron Zero 0C6 STA 3.1 100-3M wattage should be 60 not 51. Masterton DC are currently conducting a full review of the DUMML database. Once this is complete, we will be checking to ensure the wattages for these lights have been corrected.	Apr22	Identified
Preventative actions taken to ensure no further issues will occur	Completion date	
Due to the decline in accuracy over the last audit period, we will be requesting Masterton DC to review their processes to identify the cause of this and address any issues appropriately to return the database to high accuracy.	Ongoing	

CONCLUSION

A RAMM database is held by MDC. Alf Downs completes repairs, maintenance, upgrades, new installations, and removals and updates the database using Pocket RAMM. Lights in new subdivisions are installed by the developer's electrician and are entered into the database by MDC.

Mercury reconciles this DUML load using the HHR profile in accordance with exemption 233. MDC provides a monthly report from the database to Mercury, which is used to determine wattages. On hours are derived using data logger information.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	88.4	Wattage from survey is lower than the database wattage by 11.6%
R _L	80.8	With a 95% level of confidence, it can be concluded that the error could be between -19.2% and -1.2%
R _H	98.8	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 1 February 2019. The table below shows that Scenario B (detailed below) applies. The conclusion from Scenario B is that the database has poor accuracy demonstrated with statistical significance. The true wattage (installed in the field) could be between 19.2% lower and 1.2% lower than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

- In absolute terms the installed capacity is estimated to be 12 kW lower than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 1.0 kW lower and 19 kW lower than the database.
- In absolute terms, total annual consumption is estimated to be 49,600 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 5,000 kWh lower and 81,800 kWh p.a. lower than the database indicates.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed the code requirement to calculate the correct monthly load must:

- take into account when each item of load was physically installed or removed, and
- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

Mercury completes revision submissions where corrections are required and confirmed that no corrections have occurred since the last audit.

Five non-compliances were identified, and no recommendations were raised. The future risk rating of 16 indicates that the next audit be completed in six months. I have considered this in conjunction with the responses from Mercury and MDC and I agree with this recommendation.

PARTICIPANT RESPONSE