

ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT



For

SOUTH WAIRARAPA DISTRICT COUNCIL
AND MERCURY ENERGY LIMITED

NZBN: 9429037705305

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Audit report due date: 1 October 2023

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EXECUTIVE SUMMARY

This audit of the **South Wairarapa District Council (SWDC)** DUMML database and processes was conducted at the request of **Mercury Energy 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 DUMML audits version 1.1.

The RAMM database is owned by **SWDC**. **Power Services Wairarapa (PSW)** complete all fieldwork for the SWDC streetlights, with assistance from **Fulton Hogan** as required. Additions, removals, and changes to lights are updated using Pocket RAMM by PSW and Fulton Hogan.

Mercury reconciles this DUMML load using the HHR profile. Mercury were granted exemption No. 233, which allowed them to provide half-hour (“HHR”) submission information instead of non-half-hour (“NHH”) submission information for distributed unmetered load (“DUMML”). Clause 8(g) of Schedule 15.3 of the Code, which the exemption related to was removed from the Code in 2018, therefore the exemption is no longer valid. Mercury is planning to apply for a new profile which will allow them to continue to submit the DUMML load as HHR.

Wattages are derived from an extract provided each month by SWDC, which includes the daily kW load. On and off times are derived from a data logger.

A field audit was conducted of a statistical sample of 157 items of load which found that database accuracy was not within the $\pm 5\%$ threshold. In absolute terms, total annual consumption is estimated to be 7,700 kWh lower than the DUMML database indicates.

The review of the entire database found that 39 (4.6%) of the 833 lights recorded in the database have missing light model and wattage information, and 38 have missing gear model and wattage information. Some transposed GPS coordinates and incorrect street addresses were also identified.

The SWDC Roading Manager intends to investigate and update these discrepancies, and review processes to prevent recurrence of the accuracy issues found in this audit.

This audit identified five non-compliances, and one recommendation was made. The future risk rating of 14 indicates that the next audit be completed in 12 months. I have considered this in conjunction with Mercury’s comments and believe that a 12 month audit period is reasonable and allows sufficient time for improvement to be demonstrated.

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 database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 7,700 kWh.</p> <p>Pole ID 1879 has a 50W mercury vapour light installed with the gear wattage recorded as zero when 9W is expected resulting in estimated under submission of 9W or 38 kWh p.a.</p> <p>38 lights have a missing gear model and gear wattage. Assuming that the lights are LEDs there will be no wattage difference.</p> <p>39 lights have a missing light model and light wattage. Assuming that the lights are 28W Vizulo Mini Martin lights (the most common light type) the estimated under submission is 1,092W or 4,664 kWh p.a.</p>	Weak	Low	3	Identified
Description and capacity of load	2.4	11(2)(c) (d) of Schedule 15.3	<p>Pole ID 1879 has a 50W mercury vapour light installed with the gear wattage recorded as zero when 9W is expected resulting in estimated under submission of 9W or 38 kWh p.a.</p> <p>38 lights have a missing gear model and gear wattage. Assuming that the lights are LEDs there will be no wattage difference.</p> <p>39 lights have a missing light model and light wattage. Assuming that the lights are 28W Vizulo Mini Martin lights (the most common light type) the estimated under submission is 1,092W or 4,664 kWh p.a.</p>	Weak	Low	3	Identified
All load recorded in database	2.5	11(2A) of Schedule 15.3	Four additional lights found in the field of the sample of 157 items of load (2.5% error rate).	Moderate	Low	2	Identified
Database accuracy	3.1	15.2 and 15.37B (b)	<p>The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 7,700 kWh.</p> <p>Pole ID 1879 has a 50W mercury vapour light installed with the gear wattage recorded as zero when 9W is expected resulting in estimated under submission of 9W or 38 kWh p.a.</p>	Weak	Low	3	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			<p>38 lights have a missing gear model and gear wattage. Assuming that the lights are LEDs there will be no wattage difference.</p> <p>39 lights have a missing light model and light wattage. Assuming that the lights are 28W Vizulo Mini Martin lights (the most common light type) the estimated under submission is 1,092W or 4,664 kWh p.a.</p> <p>33 items of load have transposed GPS coordinates.</p> <p>Five items of load on Tuscan Lane have incorrect street names recorded.</p>				
Volume information accuracy	3.2	15.2 and 15.37B (c)	<p>The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 7,700 kWh.</p> <p>Pole ID 1879 has a 50W mercury vapour light installed with the gear wattage recorded as zero when 9W is expected resulting in estimated under submission of 9W or 38 kWh p.a.</p> <p>38 lights have a missing gear model and gear wattage. Assuming that the lights are LEDs there will be no wattage difference.</p> <p>39 lights have a missing light model and light wattage. Assuming that the lights are 28W Vizulo Mini Martin lights (the most common light type) the estimated under submission is 1,092W or 4,664 kWh p.a.</p>	Weak	Low	3	Identified
Future Risk Rating						14	

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	Audited party comment
Database address accuracy	3.1	<p>Correct the 33 items of load that have transposed GPS coordinates, with the northing value recorded in the easting field and vice versa.</p> <p>Check and update the street addresses for lights recorded on Tuscan Lane, Martinborough.</p>	We have recommended to South Wairarapa DC that they make the necessary corrections.

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 were granted exemption No. 233, which allowed them to provide half-hour (“HHR”) submission information instead of non-half-hour (“NHH”) submission information for distributed unmetered load (“DUML”). Clause 8(g) of Schedule 15.3 of the Code, which the exemption related to was removed from the Code in 2018, therefore the exemption is no longer valid.

Mercury currently submits the DUML load as HHR, which is non-compliant with Clause 8(5) of Schedule 15.3 of the Code, because the DUML load does not meet the requirements for use of the HHR profile:

For any unmetered load at an ICP for which it is responsible, regardless of the category of any metering installation at the ICP, a reconciliation participant must provide non-half-hour submission information to the reconciliation manager unless—

(a) the Authority has approved a profile for the unmetered load that allows the reconciliation participant to provide half hour submission information to the reconciliation manager for the unmetered load; and

(b) the reconciliation participant provides half hour submission information in accordance with the profile.

Mercury is planning to apply for a new profile which will allow them to continue to submit the DUML load as HHR.

1.3. Persons involved in this audit

Auditor:

Name	Title	Company
Tara Gannon	Auditor	Provera

Other personnel assisting in this audit were:

Name	Title	Company
Tim Langley	Roading Manager	South Wairarapa District Council
Hugo Martin	Account Manager	Mercury Energy
Chris Posa	Compliance Reconciliation Analyst	Mercury Energy

1.4. Hardware and Software

RAMM

The SQL database used for the management of DUML is remotely hosted by thinkproject New Zealand Limited. The database is commonly known as “RAMM” which stands for “Road Assessment and Maintenance Management”. The specific data used for DUML is held in the Streetlight tables. thinkproject New Zealand Limited backs up the database and assists with disaster recovery as part of their hosting service.

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

Mercury systems

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)
0020906000WRDFA	STREET LIGHTING	GYT0331	HHR	883	30,422

1.7. Authorisation Received

All information was provided directly by Mercury and SWDC.

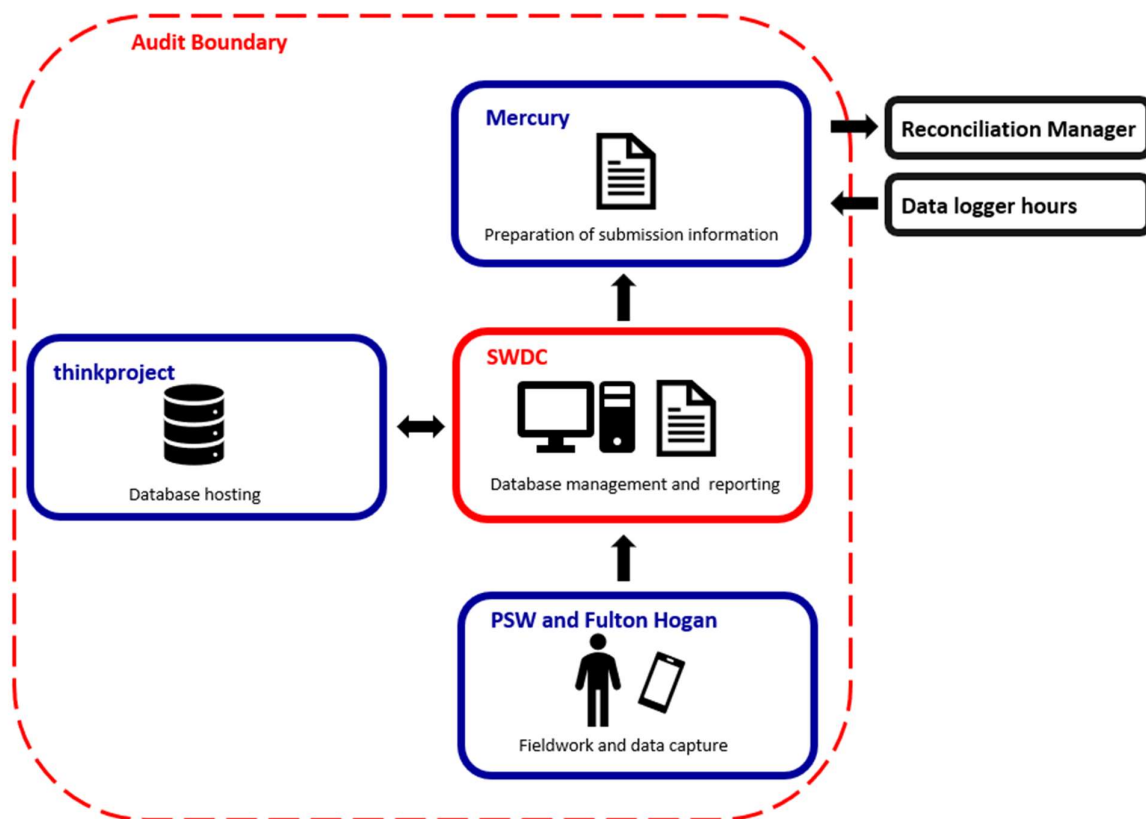
1.8. Scope of Audit

This audit of the SWDC 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.

The RAMM database is owned by SWDC. PSW complete all fieldwork for the SWDC streetlights, with assistance from Fulton Hogan as required. Additions, removals, and changes to lights are updated using Pocket RAMM by PSW and Fulton Hogan.

Mercury reconciles this DUML load using the HHR profile in accordance with exemption 233. This exemption expires on 31 October 2023, and Mercury is planning to apply for a new profile which will allow them to continue to submit the DUML load as HHR. Wattages are derived from an extract provided each month by SWDC, which includes the daily kW load. On and off times are derived from a data logger.

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 boundary for clarity.



The field audit was undertaken of a statistical sample of 157 items of load on 2 September 2023.

1.9. Summary of previous audit

The previous audit of this database was undertaken by Rebecca Elliot of Veritek Limited in May 2022. 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>The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 1,200 kWh.</p> <p>One item of load does not have wattage recorded which would result in an estimated under submission of 120 kWh per annum.</p> <p>Changes are not always recorded in the database extract from the date which they became effective.</p>	<p>Still existing.</p> <p>Still existing.</p> <p>Cleared, Pocket RAMM is now used to update the database.</p>
Description and capacity of load	2.4	11(2)(c) (d) of Schedule 15.3	Lamp make and model and wattage is not recorded for one lamp which would result in an estimated under submission of 120 kWh per annum.	Still existing. Some missing lamp model, lamp wattage, gear model and gear wattage is present.
All load recorded in database	2.5	11(2A) of Schedule 15.3	Eight additional lights found in the field (6% error rate).	Still existing.
Database accuracy	3.1	15.2 and 15.37B (b)	<p>The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 1,200 kWh.</p> <p>One lamp does not have the wattage or model recorded, resulting in an estimated under submission of 120 kWh p.a. based on 4,271 burn hours.</p> <p>Changes are not always recorded in the database extract from the date which they became effective.</p>	<p>Still existing.</p> <p>Still existing.</p> <p>Cleared, Pocket RAMM is now used to update the database.</p>
Volume information accuracy	3.2	15.2 and 15.37B (c)	<p>The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 1,200 kWh.</p> <p>One lamp does not have the wattage or model recorded resulting in an estimated under submission of 120 kWh p.a. based on 4,271 burn hours.</p> <p>Changes are not always recorded in the database extract from the date which they became effective.</p>	<p>Still existing.</p> <p>Still existing.</p> <p>Cleared, Pocket RAMM is now used to update the database.</p>

Subject	Section	Recommendation	Status
Database Accuracy	3.1	<p>Correct the 33 items of load that have transposed GPS coordinates, with the northing value recorded in the easting field and vice versa.</p> <p>Correct the street addresses for the six items of load with the correct GPS coordinates. The street name should be updated from Vintners Lane to Dublin Street West for four lamps, and street names should be updated from Esther St to Tuscan Lane and Burgundy Drive for two lamps.</p>	<p>Not adopted, re-raised.</p> <p>Four of the exceptions relating to Vinters Lane have been resolved, because the section of Dublin St they were on has been renamed to Vinters Lane. The other two exceptions are to be checked by SWDC and update if necessary.</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 Provera 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. Mercury were granted exemption No. 233, which allowed them to provide half-hour (“HHR”) submission information instead of non-half-hour (“NHH”) submission information for distributed unmetered load (“DUML”). Clause 8(g) of Schedule 15.3 of the Code, which the exemption related to was removed from the Code in 2018, therefore the exemption is no longer valid. Mercury is planning to apply for a new profile which will allow them to continue to submit the DUML load as HHR.

Wattages are derived from an extract provided each month by SWDC, which includes the daily kW load. On and off times are derived from a data logger.

I reviewed the submission information for June 2023 and confirmed that the calculation methodology was correct, with wattages based on database extract totals per day, and on hours based on data logger information.

Volume inaccuracy is present in the database as follows, and is described in more detail in **section 3.1**:

Issue	Estimated volume information impact (annual kWh)
The database was not confirmed to be accurate within $\pm 5\%$.	Over submission of 7,700 kWh p.a.
Pole ID 1879 has a 50W mercury vapour light installed with the gear wattage recorded as zero when 9W is expected	Under submission of 9W or 38 kWh p.a.
38 lights have a missing gear model and gear wattage. Based on the lights being LEDs there will be no wattage difference.	No difference
39 lights have a missing light model and light wattage. Assuming that the lights are 28W Vizulo Mini Martin lights (the most common light type) I estimate that under submission of 28W per light will occur.	Under submission is 4,664 kWh p.a.

Audit outcome

Non-compliant

Non-compliance	Description		
<p>Audit Ref: 2.1</p> <p>With: Clause 11(1) of Schedule 15.3</p> <p>From: 07-Jul-23</p> <p>To: 12-Sep-23</p>	<p>The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 7,700 kWh.</p> <p>Pole ID 1879 has a 50W mercury vapour light installed with the gear wattage recorded as zero when 9W is expected resulting in estimated under submission of 9W or 38 kWh p.a.</p> <p>38 lights have a missing gear model and gear wattage. Assuming that the lights are LEDs there will be no wattage difference.</p> <p>39 lights have a missing light model and light wattage. Assuming that the lights are 28W Vizulo Mini Martin lights (the most common light type) the estimated under submission is 1,092W or 4,664 kWh p.a.</p> <p>Potential impact: Low</p> <p>Actual impact: Low</p> <p>Audit history: Three times</p> <p>Controls: Weak</p> <p>Breach risk rating: 3</p>		
Audit risk rating	Rationale for audit risk rating		
<p>Low</p>	<p>The controls are assessed to be weak because 39 (4.6%) of the 833 lights recorded in the database have missing light model and wattage information, and the field audit found that the database was not accurate with a 95% confidence level.</p> <p>The impact on settlement is low based on the kWh differences identified.</p>		
Actions taken to resolve the issue		Completion date	Remedial action status
<p>South Wairarapa DC are aware of the required fixes to make the database accurate.</p>		<p>Septe</p>	<p>Identified</p>
Preventative actions taken to ensure no further issues will occur		Completion date	
<p>South Wairarapa DC are aware of the importance of maintaining an accurate database.</p>		<p>Ongoing</p>	

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 DUMML database must contain:

- each ICP identifier for which the retailer is responsible for the DUMML
- 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

An ICP is recorded for all items of load.

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 DUML database must contain the location of each DUML 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 road, location, pole number, and GPS coordinates.

46 items of load do not have GPS co-ordinates recorded, however there is sufficient information recorded in the road and location fields to be able to locate these lamps.

Some items of load had correct GPS coordinates but incorrect road names recorded, and are discussed in **section 3.1**.

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 DUML 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

A description of each light is recorded in the lamp model field, and wattages are recorded in the lamp wattage and gear wattage fields.

I checked the database for missing or invalid zero lamp models, lamp wattages and gear wattages and found the following exceptions:

- Pole ID 1879 has a 50W mercury vapour light installed with the gear wattage recorded as zero when 9W is expected which is expected to result in under submission of 9W or 38 kWh p.a., and
- 38 lights have a missing gear model and gear wattage; assuming that the lights are LEDs there will be no wattage difference, and
- 39 have a missing light model and light wattage; based on the gear wattage model for pole ID 1576, which is believed to be a 28W Vizulo Mini Martin and assuming that the lights are 28W Vizulo Mini Martin lights (the most common light type) the estimated under submission is 1,092W or 4,664 kWh p.a.

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: 07-Jul-23 To: 07-Jul-23	Pole ID 1879 has a 50W mercury vapour light installed with the gear wattage recorded as zero when 9W is expected resulting in estimated under submission of 9W or 38 kWh p.a. 38 lights have a missing gear model and gear wattage. Assuming that the lights are LEDs there will be no wattage difference. 39 lights have a missing light model and light wattage. Assuming that the lights are 28W Vizulo Mini Martin lights (the most common light type) the estimated under submission is 1,092W or 4,664 kWh p.a. Potential impact: Low Actual impact: Low Audit history: Once Controls: Weak Breach risk rating: 3		
Audit risk rating	Rationale for audit risk rating		
Low	The controls are assessed to be weak because 39 (4.6%) of the 833 lights recorded in the database have missing light model and wattage information. The impact on settlement is low based on the kWh differences identified.		
Actions taken to resolve the issue		Completion date	Remedial action status
South Wairarapa DC are aware of the required fixes to make the database accurate.		September 2023	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
South Wairarapa DC are aware of the importance of maintaining an accurate database.		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 157 items of load on 2 September 2023.

Audit commentary

The field audit discrepancies are detailed in the table below:

Street	Database count	Field count	Light count difference	Wattage recorded incorrectly	Comments
BIRDWOOD ST	11	11	-	4	One L27 (pole ID 1700) is recorded in the database as GL500 100W SON. One L23 (pole ID 1092) is recorded in the database as 110W SON. One unlabelled LED (pole ID 938) is recorded in the database as GL600 150W SON. One L60.5 (pole ID 1119) is recorded in the database as Itron Zero OC6 STA 55W.
COLOGNE ST	12	13	+1	-	One L28 outside number 45 was not recorded in the database.
FARLEY AVE	3	3	-	3	Pole IDs 2030, 2033 and 2034 have L27 lights connected but are recorded in the database with an unknown lamp model, gear model, lamp wattage and gear wattage.
GOVERNORS GREEN	5	3	-2	-	Light IDs 1970 and 1973 were not found on the street.
GREY ST	8	9	+1	-	One L28 opposite 16 Grey Street is not recorded in the database.
KANSAS ST (NORTHERN LEG)	2	2	-	2	Two L27s are recorded in the database as Itron Zero OC6 STA 55W (pole ID 1286) and Vizulo Mini Martin 28W (pole ID 1287).
MASSEY ST	3	3	-	1	Pole ID 1576 has an L28 connected but is recorded in the database with an unknown lamp model and wattage.

Street	Database count	Field count	Light count difference	Wattage recorded incorrectly	Comments
OXFORD ST	31	32	+1 ¹	2	Two L60.5s are recorded in the database as 150W SON (pole IDs 1370 and 1233). Two bollard lights are missing from the database between pole ID 1383 and Fairway Drive. One 50W Mercury light was recorded in the database but not located on Memorial Square (six lights had the same location (pole IDs 1874-1879) but only five were found in the square.
WAITE ST	10	10	-	2	Two L23s are recorded in the database as GL520 27W 7032 L-P Premium Drv (pole ID 1244) and GL500 100W SON (pole ID 1241)
WOOD ST	8	9	+1	-	One L27 opposite Woodlands Way was not recorded in the database.
Grand Total	157	159	+2 (+4,-2)	14	

The field audit found four more lamps in the field of the 157 items of load sampled. This is recorded as non-compliance below.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 01-Sep-23 To: 01-Sep-23	Four additional lights found in the field of the sample of 157 items of load (2.5% error rate). Potential impact: Low Actual impact: Low Audit history: Multiple times previously Controls: Moderate Breach risk rating: 2
Audit risk rating	Rationale for audit risk rating
Low	The controls are rated as moderate as the processes in place will ensure that the data is recorded correctly most of the time.

¹ Most of the bollard lights at the Fairway Drive end of Oxford Street are recorded as 50W mercury, the same as the lights in memorial square. The light missing in Memorial Square and one of the additional lights near Fairway Drive offset each other.

	The impact is assessed to be low due to the small number of additional lights found in the field in relation to the overall count of the items of load.	
Actions taken to resolve the issue	Completion date	Remedial action status
South Wairarapa DC are aware of the required fixes to make the database accurate.	September 2023	Identified
Preventative actions taken to ensure no further issues will occur	Completion date	
South Wairarapa DC are aware of the importance of maintaining an accurate database.	Ongoing	

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 RAMM database functionality achieves compliance with the code.

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

RAMM records audit trail information of changes made.

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

The DUML Statistical Sampling Guideline was used to determine the database accuracy. The table below shows the survey plan.

Plan Item	Comments
Area of interest	South Wairarapa DC streetlights
Strata	The database contains 845 items of load in the South Wairarapa DC region. The management process is the same for all lights. I created two strata: <ol style="list-style-type: none"> 1. Road names A-K, and 2. Road names L-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 19 sub-units.
Total items of load	157 items of load were checked, making up 19% of the total database wattage.

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 157 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	94.0	Wattage from the survey is higher than the database wattage by 0.9%
R _L	84.7	With a 95% level of confidence, it can be concluded that the error could be between -15.3% and +1.6%
R _H	101.6	

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 is not accurate within $\pm 5\%$ and the variability of the sample results across the strata means that:

- The true wattage (installed in the field) could be between 15.3% lower and 1.6% higher than the wattage recorded in the DUML database.

- There is a 95% level of confidence that the installed capacity is between 5 kW lower and 0 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 7,700 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 19,800 kWh p.a. lower to 2,100 kWh p.a. higher than the database indicates.

Scenario	Description
A – Good accuracy, good precision	<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>
B – Poor accuracy, demonstrated with statistical significance	<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>
C – Poor precision	<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

A description of each light is recorded in the lamp model field, and wattages are recorded in the lamp wattage and gear wattage fields.

I checked the database for missing or invalid zero lamp models, lamp wattages, and gear wattages and found the following exceptions:

- Pole ID 1879 has a 50W mercury vapour light installed with the gear wattage recorded as zero when 9W is expected which is expected to result in under submission of 9W or 38 kWh p.a.,
- 38 lights have a missing gear model and gear wattage; assuming that the lights are LEDs there will be no wattage difference, and
- 39 have a missing light model and light wattage; based on the gear wattage model for pole ID 1576, which is believed to be a 28W Vizulo Mini Martin and assuming that the lights are 28W Vizulo Mini Martin lights (the most common light type) the estimated under submission is 1,092W or 4,664 kWh p.a.

All other lamp and gear wattages were checked and found to be consistent with expected values.

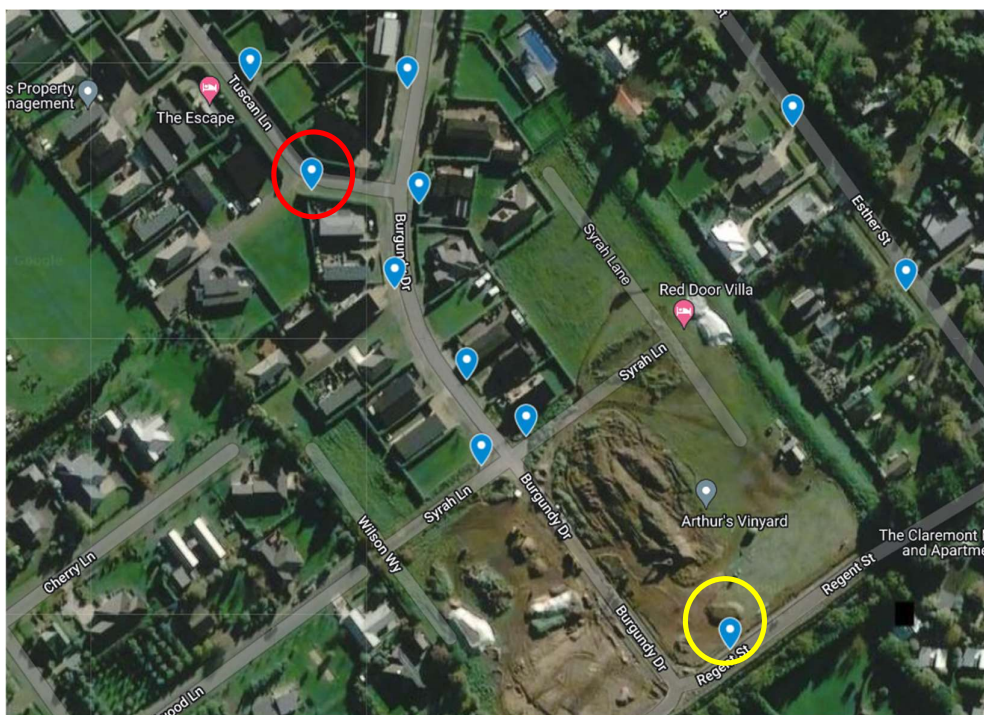
The SWDC Roading Manager intends to investigate and update these discrepancies and review processes to prevent recurrence of the accuracy issues.

Address location accuracy

33 items of load had transposed GPS coordinates, with the northing value recorded in the easting field and vice versa. These items of load were also recorded as non-compliance in the previous audit.

The previous audit recorded that six items of load had the correct GPS coordinates, but incorrectly recorded street address. Four of the exceptions relating to Vinters Lane have been resolved, because the section of Dublin St they were on has been renamed to Vinters Lane. The other two exceptions are to be checked by SWDC and updated if necessary.

Road	Location	Pole ID	Expected road name
ESTHER ST	16	1911 (circled in yellow)	Burgundy Dr
ESTHER ST	264	1988 (circled in red)	Tuscan Lane



The three lights at the northern end of Tuscan Lane are recorded with a road name of Jellicoe St.

I repeat the previous audit recommendation to resolve these issues:

Recommendation	Description	Audited party comment	Remedial action
Database address accuracy	<p>Correct the 33 items of load that have transposed GPS coordinates, with the northing value recorded in the easting field and vice versa.</p> <p>Check and update the street addresses for lights recorded on Tuscan Lane, Martinborough.</p>	We have recommended to South Wairarapa DC that they make the necessary corrections.	Identified

Change management process findings

PSW complete all fieldwork for the SWDC streetlights, with assistance from Fulton Hogan as required. Additions, removals, and changes to lights are updated using Pocket RAMM by PSW and Fulton Hogan.

For new connections, lights are loaded into RAMM once they are vested in council. SWDC has requested that developers do not connect lights until this process is complete. SWDC monitors new subdivisions and keeps in close contact with Powerco to ensure that they are quickly made aware when the lights are connected.

The field audit findings have shown that not all changes to streetlights are being recorded in RAMM promptly. The SWDC Roading Manager is meeting with the planning team to determine the reasons for this, and what can be done to address it, and will investigate and resolve the discrepancies identified during this audit.

Fulton Hogan and PSW have a maintenance contract with SWDC and complete outage patrols in one town per month, so each town is patrolled every four months. Any outages identified during patrols are passed to PSW, who complete the repairs, and this information is captured in the field using pocket RAMM.

LED upgrade

SWDC's LED upgrade project is mostly complete. There are a few non-LED lights remaining, and these will be upgraded when required through the maintenance process or when budgets allow as part of the process of becoming a dark sky region.

There are no plans to use dimming or a central management system.

Festive and private lights

There are no festive or private lights in use in the SWDC region.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 07-Jul-23 To: 12-Sep-23	The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 7,700 kWh. Pole ID 1879 has a 50W mercury vapour light installed with the gear wattage recorded as zero when 9W is expected resulting in estimated under submission of 9W or 38 kWh p.a. 38 lights have a missing gear model and gear wattage. Assuming that the lights are LEDs there will be no wattage difference. 39 lights have a missing light model and light wattage. Assuming that the lights are 28W Vizulo Mini Martin lights (the most common light type) the estimated under submission is 1,092W or 4,664 kWh p.a. 33 items of load have transposed GPS coordinates. Five items of load on Tuscan Lane have incorrect street names recorded. Potential impact: Low Actual impact: Low Audit history: Multiple times Controls: Weak Breach risk rating: 3

Audit risk rating	Rationale for audit risk rating		
Low	<p>The controls are assessed to be weak because 39 (4.6%) of the 833 lights recorded in the database have missing light model and wattage information, and the field audit found that the database was not accurate with a 95% confidence level.</p> <p>The impact on settlement is low based on the kWh differences identified.</p>		
Actions taken to resolve the issue		Completion date	Remedial action status
South Wairarapa DC are aware of the required fixes to make the database accurate.		September 2023	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
South Wairarapa DC are aware of the importance of maintaining an accurate database.		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 DUML is being calculated accurately
- profiles for DUML 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 DUML load using the HHR profile in accordance with exemption 233. The correct profile and submission type is recorded on the registry. Mercury were granted exemption No. 233, which allowed them to provide half-hour (“HHR”) submission information instead of non-half-hour (“NHH”) submission information for distributed unmetered load (“DUML”). Clause 8(g) of Schedule 15.3 of the Code, which the exemption related to was removed from the Code in 2018, therefore the exemption is no longer valid. Mercury is planning to apply for a new profile which will allow them to continue to submit the DUML load as HHR.

Wattages are derived from an extract provided each month by SWDC, which includes the daily kW load. On and off times are derived from a data logger.

I reviewed the submission information for June 2023 and confirmed that the calculation methodology was correct, with wattages based on database extract totals per day, and on hours based on data logger information.

Volume inaccuracy is present in the database as follows, and is described in more detail in **section 3.1**:

Issue	Estimated volume information impact (annual kWh)
The database was not confirmed to be accurate within $\pm 5\%$.	Over submission of 7,700 kWh p.a.
Pole ID 1879 has a 50W mercury vapour light installed with the gear wattage recorded as zero when 9W is expected,	Under submission of 9W or 38 kWh p.a.
38 lights have a missing gear model and gear wattage. Based on the lights being LEDs there will be no wattage difference.	No difference
39 lights have a missing light model and light wattage. Assuming that the lights are 28W Vizulo Mini Martin lights (the most common light type) I estimate that under submission of 28W per light will occur.	Under submission is 4,664 kWh p.a.

Audit outcome

Non-compliant

Non-compliance	Description	
<p>Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c)</p> <p>From: 07-Jul-23 To: 12-Sep-23</p>	<p>The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 7,700 kWh.</p> <p>Pole ID 1879 has a 50W mercury vapour light installed with the gear wattage recorded as zero when 9W is expected resulting in estimated under submission of 9W or 38 kWh p.a.</p> <p>38 lights have a missing gear model and gear wattage. Assuming that the lights are LEDs there will be no wattage difference.</p> <p>39 lights have a missing light model and light wattage. Assuming that the lights are 28W Vizulo Mini Martin lights (the most common light type) the estimated under submission is 1,092W or 4,664 kWh p.a.</p> <p>Potential impact: Low Actual impact: Low Audit history: Three times Controls: Weak Breach risk rating: 3</p>	
Audit risk rating	Rationale for audit risk rating	
Low	<p>The controls are assessed to be weak because 39 (4.6%) of the 833 lights recorded in the database have missing light model and wattage information, and the field audit found that the database was not accurate with a 95% confidence level.</p> <p>The impact on settlement is low based on the kWh differences identified.</p>	
Actions taken to resolve the issue	Completion date	Remedial action status
South Wairarapa DC are aware of the required fixes to make the database accurate.	September 2023	Identified

Preventative actions taken to ensure no further issues will occur	Completion date	
South Wairarapa DC are aware of the importance of maintaining an accurate database.	Ongoing	

CONCLUSION

A field audit was conducted of a statistical sample of 157 items of load which found that database accuracy was not within the $\pm 5\%$ threshold. In absolute terms, total annual consumption is estimated to be 7,700 kWh lower than the DUMML database indicates.

The review of the entire database found that 39 (4.6%) of the 833 lights recorded in the database have missing light model and wattage information, and 38 have missing gear model and wattage information. Some transposed GPS coordinates and incorrect street addresses were also identified.

The SWDC Roading Manager intends to investigate and update these discrepancies, and review processes to prevent recurrence of the accuracy issues found in this audit.

This audit identified five non-compliances, and one recommendation was made. The future risk rating of 14 indicates that the next audit be completed in 12 months. I have considered this in conjunction with Mercury's comments and believe that a 12 month audit period is reasonable and allows sufficient time for improvement to be demonstrated.

Participant response

Mercury have reviewed this report and their comments are contained within its body.