ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

HUTT CITY COUNCIL AND CONTACT ENERGY LIMITED

Prepared by: Rebecca Elliot

Date audit commenced: 22 May 2020

Date audit report completed: 25 June 2020

Audit report due date: 1 July 2020

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This audit of the **Hutt City Council (HCC)** DUML database and processes was conducted at the request of **Contact Energy Limited (Contact)** 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.

Streetlight information is recorded in an ARC GIS database managed by HCC. New connection, fault and maintenance work is largely completed by Fulton Hogan, who update the ARC GIS database based on paperwork returned from the field to the Fulton Hogan office. HCC also use Commercial Signals for the more complicated work, and to confirm new streetlight connections match to the as-builts. Updates to the database are provided in the same way for both contractors. HCC provide a monthly report to Contact from ARC GIS.

There is a separate RAMM database which HCC are hoping to update with the data from the ARC GIS, so that ARC GIS is maintained but the RAMM database will be used to provide submission information.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	91.3	Wattage from survey is lower than the database wattage by 8.7%
R_L	86.5	With a 95% level of confidence it can be concluded that the error could be between -5.5% and -13.5%
R_H	94.5	

The variability of the sample results across the strata means that the true wattage (installed in the field) could be between 5.5% and 13.5% 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 98 kW lower than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 62 kW to 150 kW lower than the database.
- In absolute terms, total annual consumption is estimated to be 420,100 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 63,900 to 652,100 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.

The current monthly report is provided as a snapshot and is non-compliant, and Contact completes revision submissions where corrections are required. Contact has not yet updated their processes to be consistent with the Authority's memo.

The future risk rating of 35 indicates that the next audit be completed in three months. HCC has had some personnel changes and the COVID 19 pandemic has impacted their ability to make changes. I have taken this into consideration along with the comments returned and recommend that the next audit be in six months time.

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	The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 420,100 kWh as recorded in **section 3.1**. LED make and model details are not recorded in the database. Lamp wattage is recorded outside of the database. Ten items of load with no lamp type resulting in an estimated annual under submission of 4,429 kWh. 46 items of load have inaccurate wattages recorded resulting in an estimated annual under submission of 1,666 kWh. Seven items of load do not have ICP numbers recorded in the database. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are not recorded for new connections and change dates may not reflect the date the change is made.	Weak	Low	9	Identified
ICP identifier and items of load	2.2	11(2)(a) and (aa) of Schedule 15.3	Seven unmetered items of load do not have an ICP number assigned.	Moderate	Low	2	Identified
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	LED make and model details are not recorded in the database. Lamp wattage is recorded outside of the database.	Weak	Medium	6	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			Ten items of load with no lamp description recorded.				
Database accuracy	3.1	15.2 and 15.37B(b)	The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 420,100 kWh. LED make and model details are not recorded in the database. Lamp wattage is recorded outside of the database. Ten items of load with no lamp type resulting in an estimated annual under submission of 4,429 kWh. 46 items of load have inaccurate wattages recorded resulting in an estimated annual under submission of 1,666 kWh. Seven items of load do not have ICP numbers recorded in the database. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are not recorded for new connections and change dates may not reflect the date the change is made.	Weak	High	9	Identified
Volume information accuracy	3.2	15.2 and 15.37B(c)	The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 420,100 kWh as recorded in **section 3.1**. LED make and model details are not recorded in the database.	Weak	High	9	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			Lamp wattage is recorded outside of the database. Ten items of load with no lamp type resulting in an estimated annual under submission of 4,429 kWh. 46 items of load have inaccurate wattages recorded resulting in an estimated annual under submission of 1,666 kWh. Seven items of load do not have ICP numbers recorded in the database. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are not recorded for new connections and change dates may not reflect the date the change is made.				
Future Risk Rating						35	

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
Database accuracy	3.1	Confirm and record correct wattages for Christmas lights.
		Liaise with HCC and Wellington Electricity to confirm correct owner of private lights
		Liaise with HCC and Property Plus to create separate ICPs for these items of load.

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

The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

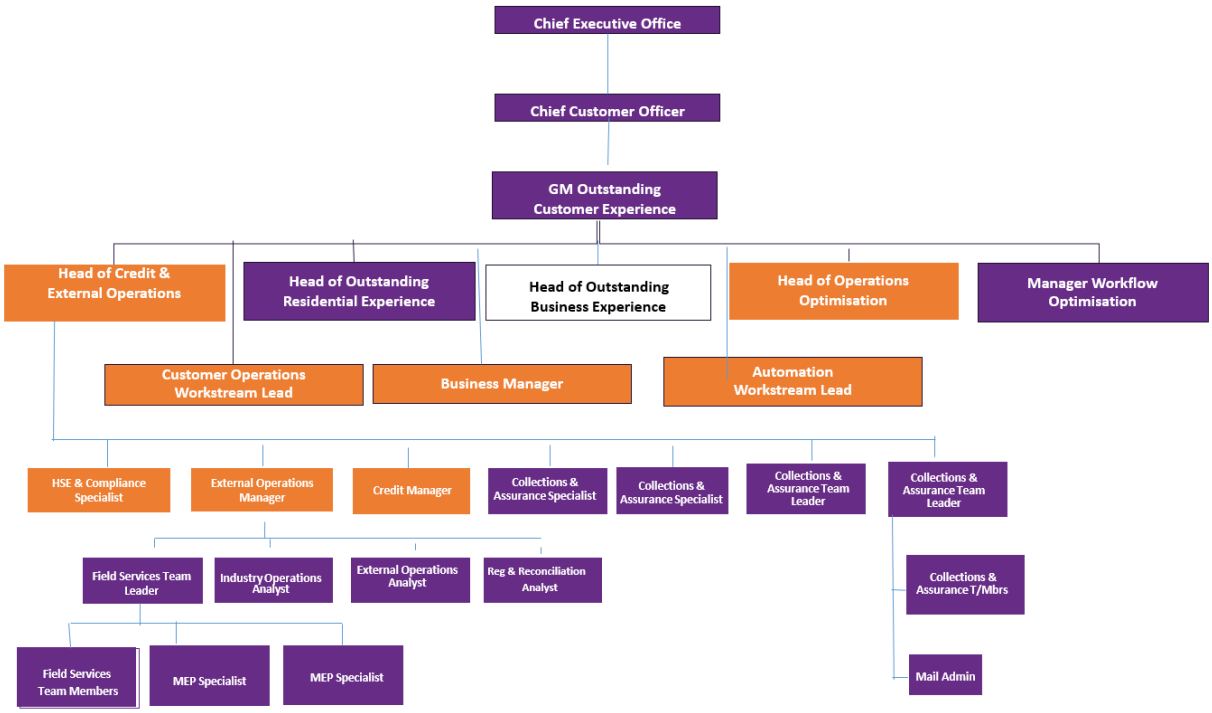
Audit commentary

There is one exemption in place relevant to the scope of this audit:

Exemption No. 177: Exemption to clause 8(g) of schedule 15.3 of the Electricity Industry Participation Code 2010 ("Code") in respect of providing half-hour ("HHR") submission information instead of non half-hour ("NHH") submission information for distributed unmetered load ("DUML"). This exemption expires at the close of 31 October 2023.

1.2. Structure of Organisation

Contact Energy provided a copy of their organisational structure.



1.3. Persons involved in this audit

Auditor:

Rebecca Elliot

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Damon Simmons	Traffic Asset Manager	Hutt City Council
Threesa Malki	Traffic Engineer	Hutt City Council
Nigel Parkin	Contracts Officer Contracts Division - City Infrastructure	Hutt City Council
Aaron Wall	Operations Team Leader	Contact Energy

1.4. Hardware and Software

HCC's ARC GIS is used to record streetlight information. n. HCC are considering moving the reconciliation to their RAMM database. This is discussed further in the report.

Both databases are backed up as part of HCC's network back-ups, and access to both databases is secure by way of password protection

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)
0001255305UNA9F	SL LH	MLG0111	HHR	2,672	263,847
0001256863UN50E	SHP17 HUTT ROAD	MLG0331	HHR	4,923	435,701
0001256864UN8C4	SHP1 HUTT ROAD	GFD0331	HHR	5,030	494,331.7
0001256868UNBDA	MASTER STL ICP HCC HAY0111	HAY0111	HHR	1,593	114,089
Total				**14,218**	**1,263,118**

1.7. Authorisation Received

All information was provided directly by Contact or HCC.

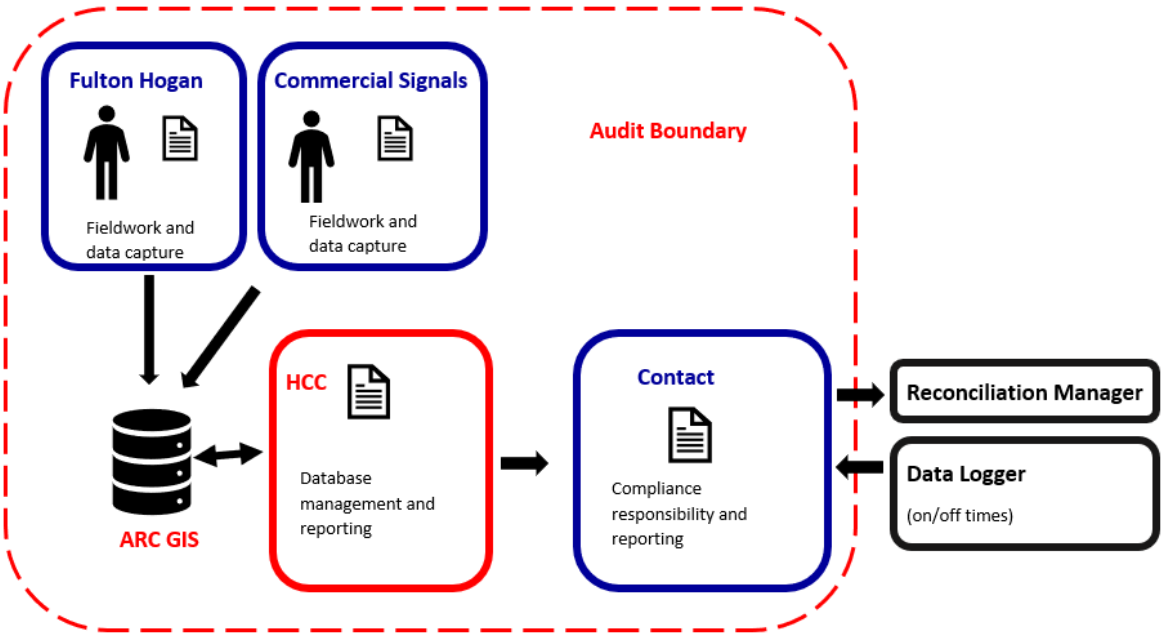
1.8. Scope of Audit

This audit of the HCC DUML database and processes was conducted at the request of Contact 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.

Streetlight information is recorded in a GIS database managed by HCC. New connection, fault and maintenance work is largely completed by Fulton Hogan, who update the ARC GIS database based on paperwork returned from the field to the Fulton Hogan office. HCC also use Commercial Signals for the more complicated work. Updates to the database are provided in the same way for both contractors. HCC provide a monthly report to Contact from ARC GIS.

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 430 items of load on 19 June 2020.

1.9. Summary of previous audit

The previous audit of this database was undertaken by Tara Gannon of Veritek Limited in December 2019. 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.

Table of Non-compliance

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	The database is not confirmed as accurate with a 95% level of confidence as recorded in **section 3.1**. 23 items of load do not have model or wattage information recorded. 14 items of load have inaccurate wattages recorded. 47 items of load do not have ICP numbers recorded in the database. Six items of load had incorrect ICP numbers recorded in the database and were corrected during the audit. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are not recorded for new connections and change dates may not reflect the date the change is made.	Still existing
ICP identifier and items of load	2.2	11(2)(a) and (aa) of Schedule 15.3	46 unmetered items of load do not have an ICP number assigned.	Still existing
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	23 items of load do not have model or wattage information recorded.	Still existing
Database accuracy	3.1	15.2 and 15.37B(b)	The database is not confirmed as accurate with a 95% level of confidence. 23 items of load do not have model or wattage information recorded. 14 items of load have inaccurate wattages recorded. 47 items of load do not have ICP numbers recorded in the database. Six items of load had incorrect ICP numbers recorded in the database and were corrected during the audit. The monthly database extract provided does not track changes at	Still existing

Subject	Section	Clause	Non-compliance	Status
			a daily basis and is provided as a snapshot. Livening dates are not recorded for new connections and change dates may not reflect the date the change is made.	
Volume information accuracy	3.2	15.2 and 15.37B(c)	The database is not confirmed as accurate with a 95% level of confidence as recorded in **section 3.1**. 23 items of load do not have model or wattage information recorded. 14 items of load have inaccurate wattages recorded. 47 items of load do not have ICP numbers recorded in the database. Six items of load had incorrect ICP numbers recorded in the database and were corrected during the audit. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are not recorded for new connections and change dates may not reflect the date the change is made.	Still existing

Table of Recommendations

Subject	Section	Description	Recommendation	Status
Database accuracy	3.1	Database accuracy	Confirm and record correct wattages for Christmas lights.	Not yet implemented

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

Contact 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

Contact reconciles this DUML load using the HHR profile, in accordance with exemption number 177. This exemption is discussed further in **section 1.1**.

Festive light information is provided with connection and disconnection dates, and they are included in submission data when connected.

I reviewed the submission information for March 2020 and confirmed that it was calculated correctly based on the monthly report provided to Contact multiplied by the logger hours.

Examination of the database found:

Issue	Estimated volume information impact (annual kWh)
Seven items of load do not have ICP numbers recorded in the database.	The impact of these lights are included in the ten items of load with no lamp type recorded below.
LED light descriptions do not contain lamp make and model so correct wattage cannot be verified	Unknown impact
Lamp wattages are not held in the database as required by the code.	Unknown impact
Ten items of load with no lamp type	Under submission of 4,429 kWh
46 items of load have the incorrect wattages recorded.	Under submission of 1,666 kWh per annum

The above discrepancies are discussed in **sections 2.2, 2.4** and **3.1**.

The field audit found that the database accuracy was not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 420,100 kWh.

As recorded in the last audit, a monthly snapshot is not sufficient to calculate submission from, and the code requires that to calculate the correct monthly load the monthly wattage report 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.

The current monthly report is provided as a snapshot and is non-compliant. Contact completes revision submissions where corrections are required, and have not yet updated their processes to be consistent with the Authority's memo.

As recorded in the last audit, the ARC database contains an "edited date", and "last serviced date" but there is not a field for "livening date" for newly connected lights. The "edited date" is automatically populated with the date the change occurred, and the "last serviced date" indicates when the work was completed. Where there is a delay in entering a change, the change date may be incorrect. HCC are working to move the data from ARC GIS to RAMM so that the RAMM database will be used for reconciliation.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 31-Oct-19 To: 31-May-20	The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 420,100 kWh as recorded in **section 3.1**. LED make and model details are not recorded in the database. Lamp wattage is recorded outside of the database. Ten items of load with no lamp type resulting in an estimated annual under submission of 4,429 kWh. 46 items of load have inaccurate wattages recorded resulting in an estimated annual under submission of 1,666 kWh. Seven items of load do not have ICP numbers recorded in the database. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are not recorded for new connections, and change dates may not reflect the date the change is made. Potential impact: High Actual impact: Unknown Audit history: Twice Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls over the database are rated as weak as the data quality is poor and incomplete. This is reflected by the field audit results. The audit risk rating is high based on kWh variances discussed in **section 3.1**.

Actions taken to resolve the issue	Completion date	Remedial action status
Contact is continuing to engage with HCC to ensure they update their database to maintain accuracy of model/wattage and correct ICP number Contact is continuing to work with the customer to ensure that they are setup to deliver their data for any given time, as required by the EA Contact will work with HCC to ensure that their process for New Connections reflects actual usage	Ongoing	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Contact will continue to attempt to perform quarterly checks on the database to find any possible issues to ensure these are resolved in a timely fashion	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 the correct ICP was recorded against each item of load.

Audit commentary

Seven items of load do not have an ICP number recorded against them in the database. Five of these are associated with the Haywards Hill interchange, one is in Wainuiomata and one is near the main railway depot. All have GPS co-ordinates to locate them.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.2 With: Clause 11(2)(a) and (aa) of Schedule 15.3 From: 01-Oct-19 To: 31-Oct-19	Seven unmetered items of load do not have an ICP number assigned. Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls over the database are rated as moderate. Once the data is moved to RAMM I would expect the controls to move to strong. The impact is assessed to be low due to the small number of lights involved.

Actions taken to resolve the issue	Completion date	Remedial action status
Contact is continuing to engage with HCC to ensure that they have the correct ICP added for each item of unmetered load	Ongoing	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Contact will continue to attempt to perform quarterly checks on the database to find any possible issues to ensure these are resolved in a timely fashion	Ongoing	

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

Global Positioning System (GPS) coordinates and location IDs are recorded for all items of load and users in the office and field can view these locations on a mapping system.

The database contains the nearest property address for most items of load, but 1,369 items have no street address information recorded.

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

The database contains lamp type. This is sufficient for the older light types but there is no make and model recorded for the LED lights, so it is not possible to determine if the correct wattage is being applied. The number of wattage discrepancies found in the field audit indicate that there is a relatively high error rate, whilst this may only be 1-2 watts per light, the cumulative discrepancy is likely to be large. The overall database accuracy is discussed in **section 3.1**. This is recorded as non-compliance.

The lamp wattage and ballast table are held outside of the database and the wattages are appended to the monthly report via a lookup table. The code requires this to be part of the database. This is recorded as non-compliance. HCC are investigating using their RAMM database for reconciliation using the information from the ARC GIS database.

There are 17 items of load with no lamp type recorded. This includes the seven items of load with no ICP recorded detailed in **section 2.2.** 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: 31-Oct-19 To: 31-May-20	LED make and model details are not recorded in the database. Lamp wattage is recorded outside of the database. Ten items of load with no lamp description recorded. Potential impact: Unknown Actual impact: Medium Audit history: Twice Controls: Weak Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as weak as the database does not record the wattage, and there are no LED lamp make and models recorded. The impact is assessed to be medium as the database does not have LED make and model recorded and the field audit indicates that the data is not accurate.

Actions taken to resolve the issue	Completion date	Remedial action status
Contact is continuing to engage with HCC to ensure their data is accurate	Ongoing	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Contact will continue to attempt to perform quarterly checks on the database to find any possible issues to ensure these are resolved in a timely fashion	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 428 items of load on 19 June 2020.

Audit commentary

The field audit discrepancies are detailed in the table below:

Street	Field count	Database count	Light count difference	Wattage recorded incorrectly	Comments
Burnton Street	11	12	-1		1 x L23W missing in the field
Dyer Street	20	20	-	5	3x LED 27W were recorded in the database as LED 22W, one LED 23W was recorded in the database as 50W SON, and one LED 23W was recorded in the database as LED 27W.
Guiness Street	4	5	-1	1	1x 50W SON was missing on the street. 1x LED 23W was recorded in the database as LED 22W.
Military Road	16	16	-	7	7x LED 23W were recorded as 50W SON or LED 22W in the database. 7x 150W SON lights on Harcourt Werry Dr are labelled Military Road in the database.
Roberts Street	10	10	-	3	1x LED 27W was recorded in the database as LED 22W 1x LED 23W was recorded in the database as 50W SON 1x LED 23W was recorded in the database as LED 22W.
Elizabeth Street	15	15	-	5	4x LED 23W were recorded in the database as 50W SON 1x LED 22W was recorded in the database as 50W SON
Mulberry Street	22	22	-	7	7x LED 23W were recorded in the database as 50W SON or LED 22W
Outram Grove	10	10	-	1	1x LED 23W was recorded in the database as 50W SON
Stanhope Grove	8	8	-	1	1x LED 23W was recorded in the database as 50W SON
Terrys Place	2	2	-	2	2x LED 22W were recorded as 50W SON in the database

Street	Field count	Database count	Light count difference	Wattage recorded incorrectly	Comments
Akepiro Grove	2	2	-	1	1x 27W LED was recorded in the database as 22W LED
Clapham Grove	7	7	-	2	2x LED 16W on the walkway were recorded in the database as 50W SON
George Street	82	82	-	15	13 LED 23W were recorded in the database as 50W SON, LED 22W or LED 27 2x LED 27W were recorded in the database as LED 22W.
Hewer Crescent	30	30	-	1	2x LED 22W was recorded in the database as 50W SON.
Kamahi Street	23	23	-	2	1x LED 23W was recorded in the database as 50W SON 1x LED 23W was recorded in the database as LED 22W
Lockwood Crescent	8	8	-	2	2x LED 23W were recorded in the database as LED 27W
McManaway Grove	3	3	-	3	3x LED 23W were labelled SON 50W in the database
Purdy Street	2	2	-	1	1x LED 23W was recorded in the database as 50W SON
Scholefield Street	8	8	-	2	1x LED 23W was recorded in the database as LED 22W 1x 50W SON was recorded in the database as LED 27W
Wheatley Street	8	8	-	7	7x LED 22W were recorded as 50W SON in the database
Massey Avenue	1	1	-	6	4x LED 23W were recorded as 50W SON or LED 22W in the database. 2x LED 22W were labelled 50W SON in the database
Kim Street	3	3	-	1	1x LED 23W was recorded in the database as LED 22W
Ngaio Street	4	4	-	1	1x LED 22W was recorded as 50W SON in the database

Street	Field count	Database count	Light count difference	Wattage recorded incorrectly	Comments
Pollard Street	5	5	-	1	1x LED 27W was recorded in the database as 50W SON
Sun Valley Grove	3	3	-	2	2x LED 22W were recorded as 50W SON in the database
Grand Total	**428**	**430**	**-2**	**79**	

This clause relates to lights in the field that are not recorded in the database. The audit did not find any additional lights in the field. Database accuracy is discussed in **section 3.1**.

Audit outcome

Compliant

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 Contact 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, which was viewed during the audit.

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

Contact's submissions are based on a monthly extract from the database. A database extract was provided in June 2020 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	Hutt City Council Street Lights
Strata	The database contains the HCC items of load for DUML ICPs in the Hutt region. The processes for the management of all HCC items of load are the same, but I decided to place the items of load into four similar sized strata based on suburb: 1. Alicetown - Howard Point 2. Hutt Central – Moera 3. Naenae - Tirohanga 4. Wainuiomata - York Bay
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 46 sub-units.
Total items of load	430 items of load were checked, making up approximately 2% 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 430 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	91.3	Wattage from survey is lower than the database wattage by 8.7%
R_L	86.5	With a 95% level of confidence it can be concluded that the error could be between -5.5% and -13.5%
R_H	94.5	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 01/02/19 and the table below shows that Scenario B (detailed below) is the best fit.

The conclusion from Scenario B is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between 3.1% and 19.1% 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 98 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 62 kW to 153 kW lower than the database.

In absolute terms, total annual consumption is estimated to be 420,100 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 263,900 to 652,100 kWh p.a. lower than the database indicates.

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

Light description and capacity accuracy

The database contains lamp type only which is sufficient for the older light types but not for the LED lights. This is recorded as non-compliance in **section 2.4**.

The light wattages are appended to the monthly report using a look up table based on the light description recorded. This is recorded as non-compliance in **section 2.4**.

There are 17 items of load with no lamp type recorded. This includes the seven items of load with no ICP recorded detailed in **section 2.2.** Assuming a most common lamp wattage of 50W HPS in the database this is estimated to result in an annual under submission of 4,429 kWh.

Wattages for those items of load with sufficient lamp description were checked against the published standardised wattage tables produced by the Electricity Authority. The following discrepancies were identified:

Lamp Type	Count	Total wattage	Correct total wattage	Total wattage difference	Annual kWh difference (based on 4,271 hours)
58W FLUORO	11	62	72	+110	+470
36W FLUORO	35	38	46	+280	+1,196
Total	46			+390	1,666

Some signs are recorded in the database. These have two batteries drawing 50W which are charged when the streetlight circuit is connected, and these power the signs when the streetlight circuit is switched off. The wattages for these signs are correctly recorded.

ICP number accuracy

As recorded in **section 2.2**, seven items of load do not have ICP numbers recorded in the database.

Change management process findings

Streetlight information is recorded in the ARC GIS database managed by HCC. New connection, fault and maintenance work is largely completed by Fulton Hogan, who update the ARC GIS database based on paperwork returned from the field to the Fulton Hogan office. HCC also use Commercial Signals for the more complicated work. Updates to the database are provided in the same way for both contractors. HCC provide a monthly report to Contact from ARC GIS.

Data is reviewed by Contact Energy prior to billing and submission to identify missing or inconsistent information, and any discrepancies are referred to HCC.

An LED upgrade project is underway with approximately one third of the roll out complete. This is expected to be completed by June 2022. A CMS will be used for new installations and retrofitted to existing LEDs. HCC intends to work with Contact Energy to ensure that use of the CMS is handled compliantly.

I walked through the new connection process. The new connections process for subdivisions has the following steps.

1. A plan is prepared by the developer and approved by HCC.
2. The installation is completed.
3. Commercial Signals confirms accuracy of installation.
4. HCC notifies Contact that livening is required using the as built information that has been checked in the field.
5. The database is updated.
6. Contact requests livening from Wellington Electricity.

This can result in some lights being included in the monthly report before they are livened. I did not come across any instances of this.

The current monthly report is provided as a snapshot and is non-compliant. The database contains an "edited date", and "last serviced date" but there is not a field for "livening date" for newly connected lights. The "edited date" is automatically populated with the date the change occurred, and the "last serviced date" indicates when the work was completed. Where there is a delay in entering a change, the change date may be incorrect. HCC are working to move the data from ARC GIS to RAMM so that the RAMM database is used for reconciliation and field work will be captured using RAMM contractor.

Outage patrols occur weekly in the CBD, and the faults process is relied upon to identify issues with other lights.

Festive lights

Festive lights are recorded in the database and reported separately with on and off dates when they are connected.

As recorded in the last audit, all 149 Christmas lights are recorded with 19 W per Christmas light, rather than the true wattage of each light. HCC advised that the average Lower Hutt CBD pole with festive lights has a 15 lamp holder harness and draws 45W. I repeat the last audit's recommendation to update the database to maintain visibility of this:

Description	Recommendation	Audited party comment	Remedial action
Database accuracy	Confirm and record correct wattages for Christmas lights.	Contact will work with HCC to ensure the accuracy of festive lighting	Identified

Private lights

There are 36 private lights recorded in the database, and each has a council DUML ICP number assigned.

HCC does not bill consumers for these lights and does not expect to be billed for them, but I confirmed these are being included in the monthly wattage report to Contact and are being reconciled. They are only included in the database for completeness, and so that HCC is aware that they are private in the event that a fault is recorded. If the council does not want to pay for these then I recommend that the correct owner and associated ICP needs to confirmed. I recommend that HCC liaise with Wellington Electricity to determine who is the light owner and correct as appropriate.

Description	Recommendation	Audited party comment	Remedial action
Database accuracy	Liaise with HCC and Wellington Electricity to confirm correct owner of private lights	Contact will engage with both HCC and Wellington Electricity to facilitate a discussion around ownership and responsibility of these private lights.	Identified

In addition to the private lights there are 46 "Properties UrbanPlus" lights that belong to an associated Council organisation. HCC does not expect to be paying for these items of load, but I have confirmed they are being included in the monthly wattage report and are being reconciled as they are recorded as belonging to the HCC DUML ICPs. I recommend that HCC liaise with Urban Plus to create separate ICPs for which these items of load can be reconciled to.

Description	Recommendation	Audited party comment	Remedial action
Database accuracy	Liaise with HCC and Property Plus to create separate ICPs for these items of load.	Contact agrees with this recommendation and to engage with HCC to initiate discussions with Urban Plus	Identified

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 31-Oct-19 To: 31-May-20	The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 420,100 kWh. LED make and model details are not recorded in the database. Lamp wattage is recorded outside of the database. Ten items of load with no lamp type resulting in an estimated annual under submission of 4,429 kWh. 46 items of load have inaccurate wattages recorded resulting in an estimated annual under submission of 1,666 kWh. Seven items of load do not have ICP numbers recorded in the database. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are not recorded for new connections and change dates may not reflect the date the change is made. Potential impact: High Actual impact: Unknown Audit history: Twice Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls over the database are rated as weak as the data quality is poor and incomplete. This is reflected by the field audit results. The audit risk rating is high based on kWh variances.

Actions taken to resolve the issue	Completion date	Remedial action status
Contact will work with HCC to update their database to ensure accuracy of model/wattage and correct ICP number. Contact will work with the customer to ensure that they are setup to deliver their data for any given time, as required by the EA Contact will work with HCC to ensure that their process for New Connections reflects actual usage	Ongoing	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Contact will continue to attempt to perform quarterly checks on the database to find any possible issues to ensure these are resolved in a timely fashion	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

Festive light information is provided with connection and disconnection dates, and they are included in submission data when connected.

I reviewed the submission information for March 2020 and confirmed that it was calculated correctly based on the monthly report provided to Contact multiplied by the logger hours.

Examination of the database found:

Issue	Estimated volume information impact (annual kWh)
Seven items of load do not have ICP numbers recorded in the database.	The impact of these lights are included in the ten items of load with no lamp type recorded below.
LED light descriptions do not contain lamp make and model so correct wattage cannot be verified	Unknown impact
Lamp wattages are not held in the database as required by the code.	Unknown impact
Ten items of load with no lamp type	Under submission of 4,429 kWh
46 items of load have the incorrect wattages recorded.	Under submission of 1,666 kWh per annum

The above discrepancies are discussed in **sections 2.2, 2.4** and **3.1**.

The field audit found that the database accuracy was not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 420,100 kWh.

As recorded in the last audit, a monthly snapshot is not sufficient to calculate submission from, and the code requires that to calculate the correct monthly load the monthly wattage report 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.

The current monthly report is provided as a snapshot and is non-compliant. Contact completes revision submissions where corrections are required and have not yet updated their processes to be consistent with the Authority's memo.

As recorded in the last audit, the ARC database contains an "edited date", and "last serviced date" but there is not a field for "livening date" for newly connected lights. The "edited date" is automatically populated with the date the change occurred, and the "last serviced date" indicates when the work was completed. Where there is a delay in entering a change, the change date may be incorrect. HCC are working to move the data from ARC GIS to RAMM so that the RAMM database is used for reconciliation.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 31-Oct-19 To: 31-May-20	The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 420,100 kWh as recorded in **section 3.1**. LED make and model details are not recorded in the database. Lamp wattage is recorded outside of the database. Ten items of load with no lamp type resulting in an estimated annual under submission of 4,429 kWh. 46 items of load have inaccurate wattages recorded resulting in an estimated annual under submission of 1,666 kWh. Seven items of load do not have ICP numbers recorded in the database. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are not recorded for new connections and change dates may not reflect the date the change is made. Potential impact: High Actual impact: Unknown Audit history: Twice Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls over the database are rated as weak as the data quality is poor and incomplete. This is reflected by the field audit results. The audit risk rating is high based on kWh variances discussed in **section 3.1**.

Actions taken to resolve the issue	Completion date	Remedial action status
Contact will continue to work with the customer to ensure that they have systems and processes to deliver their data to an acceptable level of accuracy as required by the code	Ongoing	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

CONCLUSION

The Streetlight information is recorded in an ARC GIS database managed by HCC. New connection, fault and maintenance work is largely completed by Fulton Hogan, who update the ARC GIS database based on paperwork returned from the field to the Fulton Hogan office. HCC also use Commercial Signals for the more complicated work, and to confirm new streetlight connections match to the as-builts. Updates to the database are provided in the same way for both contractors. HCC provide a monthly report to Contact from ARC GIS.

There is a separate RAMM database which HCC are hoping to update with the data from the ARC GIS, so that ARC GIS is maintained but the RAMM database will be used to provide submission information.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	91.3	Wattage from survey is lower than the database wattage by 8.7%
R_L	86.5	With a 95% level of confidence it can be concluded that the error could be between -5.5% and -13.5%
R_H	94.5	

The variability of the sample results across the strata means that the true wattage (installed in the field) could be between 5.5% and 13.5% 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 98 kW lower than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 62 kW to 150 kW lower than the database.
- In absolute terms, total annual consumption is estimated to be 420,100 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 63,900 to 652,100 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.

The current monthly report is provided as a snapshot and is non-compliant, and Contact completes revision submissions where corrections are required. Contact has not yet updated their processes to be consistent with the Authority's memo.

The future risk rating of 35 indicates that the next audit be completed in three months. HCC has had some personnel changes and the COVID 19 pandemic has impacted their ability to make changes. I have taken this into consideration along with the comments returned and recommend that the next audit be in I have taken this into consideration along with the comments returned and recommend that the next audit be in six months time.

PARTICIPANT RESPONSE

Action plan

Resume quarterly BD checks – send exception lists to get BD updated.

Arrange meeting with WE and HCC regarding private streetlights with a view to set up shared UML

Encourage full audit of all lights once LED roll out is completed.