ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

KĀPITI COAST DISTRICT COUNCIL AND CONTACT ENERGY LIMITED

Prepared by: Tara Gannon

Date audit commenced: 5 November 2019

Date audit report completed: 28 November 2019

Audit report due date: 1 December 2019

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EXECUTIVE SUMMARY

This audit of the **Kāpiti Coast District Council (KCDC)** 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.

A RAMM database is held by KCDC. Fault, maintenance and upgrade work is managed by KCDC and was conducted by Electra Contracting prior to July 2019, and Fulton Hogan since July 2019. Both Electra Contracting and Fulton Hogan enter database updates using Pocket RAMM.

Database accuracy has improved following the LED upgrade and cleansing of database information, and is described as follows:

Result	Percentage	Comments
The point estimate of R	98.9	Wattage from survey is lower than the database wattage by 1.1%
R_L	95.6	With a 95% level of confidence it can be concluded that the error could be between -0.1% and -4.6%
R_H	99.9	

The variability of the sample results across the strata means that the true wattage (installed in the field) could be between 0.1% and 4.6% lower than the wattage recorded in the DUML database, and compliance is recorded because the best estimate indicates that the database is accurate within ±5.0%.

- In absolute terms the installed capacity is estimated to be 2 kW higher than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 0 kW and 7 kW lower than the database.
- In absolute terms, total annual consumption is estimated to be 7,500 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 400 and 31,200 kWh p.a. lower than the database indicates.

Contact reconciles the KCDC DUML load using the HHR profile. Submissions are based on the database information, with on and off times derived from data logger information. I found a small amount of metered load is recorded against ICP 0016099024EL49F, and this was included in Contact's submission information in error.

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 eight indicates that the next audit be completed in 18 months, and I agree with this recommendation because:

- The database was found to be accurate, and good processes are in place to maintain accuracy.
- KCDC has commissioned an audit to confirm database information accuracy (including pole ownership, pole, and lamp information), pole spacing, structural integrity of poles and outreaches, and to identify any areas where additional lights should be added for safety reasons. My field audit found that database accuracy was very high for lights sampled in areas which had already undergone KCDC's audit.

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	41 metered lights were included in the submission calculation, resulting in over submission of 3,137 W or 1,145 kWh for September 2019. 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 of the change if they are not processed in RAMM at the time that the change occurs. Seven unmetered items of load do not have an ICP number recorded. One 250 W HPS lamp was confirmed to have an incorrect gear wattage, resulting in under submission of 43 kWh per annum.	Moderate	Low	2	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
ICP identifier and items of load	2.2	11(2)(a) and (aa) of Schedule 15.3	Seven unmetered items of load do not to have an ICP number recorded.	Moderate	Low	2	Identified
Database accuracy	3.1		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 of the change if they are not processed in RAMM at the time that the change occurs. Seven unmetered items of load do not have an ICP number recorded. One 250 W HPS lamp was confirmed to have an incorrect gear wattage, resulting in under submission of 43 kWh per annum.	Moderate	Low	2	Identified
Volume information accuracy	3.2	15.2 and 15.37B(c)	41 metered lights were included in the submission calculation, resulting in over submission of 3,137 W or 1,145 kWh for September 2019. 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 of the change if they are not processed in RAMM at the time that the change occurs. One 250 W HPS lamp was confirmed to have an	Moderate	Low	2	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			incorrect gear wattage, resulting in under submission of 43 kWh per annum.				
Future Risk Rating						8	

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 the correct lamp and gear wattages for PH (LED8, 0 watts), SYLV (RS, 60 watts), BETA (B70, 70 watts) and PH (MLG, 35 watts), and update the database as necessary.
Database accuracy	3.1	Confirm the correct wattages for the Roadstar LED lights and update the database as necessary.

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.

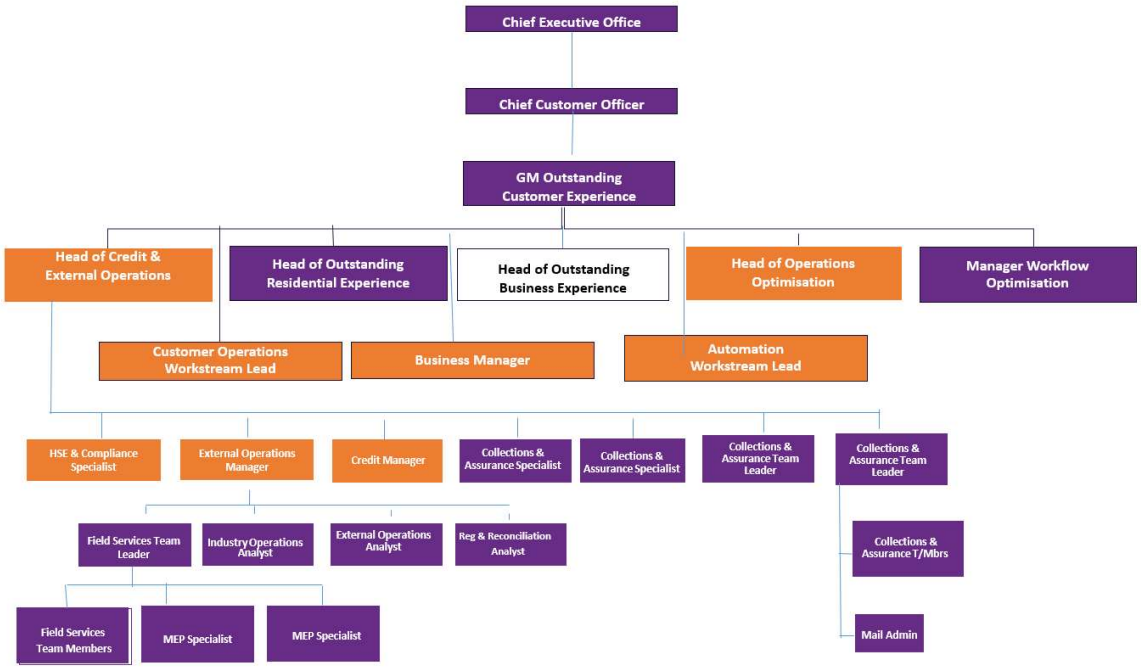
Audit commentary

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:

Tara Gannon

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Fraser Miller	Network Operations Engineer	Kāpiti Coast District Council
Glen O'Conner	Access and Transport Manager	Kāpiti Coast District Council
Neil Williams	Roading Network Performance Team Leader	Kāpiti Coast District Council
Ting Ge	Team Leader Roading Asset Management and Safety	Kāpiti Coast District Council
Allie Jones	External Operations	Contact Energy

1.4. Hardware and Software

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

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

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

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)
0016099024EL49F	KCDC STREETLIGHTS	PRM0331	HHR	4724	166,125.8

1.7. Authorisation Received

All information was provided directly by Contact or KCDC.

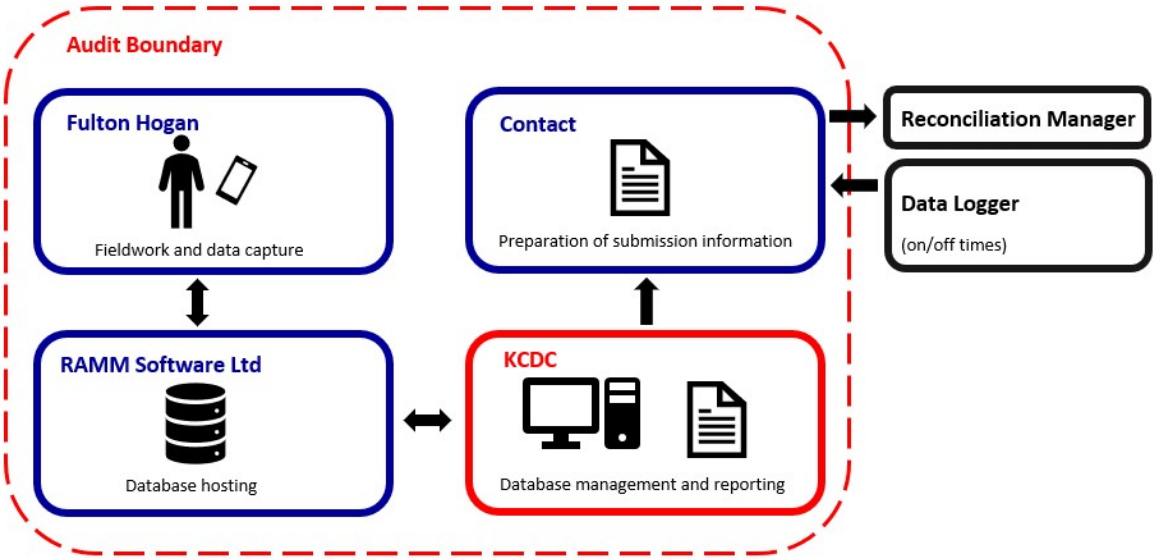
1.8. Scope of Audit

This audit of the KCDC 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.

A RAMM database is held by KCDC. Fault, maintenance and upgrade work is managed by KCDC and was conducted by Electra Contracting prior to July 2019, and Fulton Hogan since July 2019. Both Electra Contracting and Fulton Hogan enter database updates using Pocket RAMM.

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 287 items of load on 7 November 2019.

1.9. Summary of previous audit

The previous audit of this database was undertaken by Tara Gannon of Veritek Limited in April 2018. 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	The database used to prepare submissions contains some inaccurate information.	Still existing
ICP identifier	2.2	11(2)(a) of Schedule 15.3	20 items of load do not have an ICP recorded.	Still existing
Description of Load Type	2.4	11(2)(c) & (d) of Schedule 15.3	31 missing gear wattages, and three missing lamp wattages.	Cleared

Subject	Section	Clause	Non-compliance	Status
All load recorded in database	2.5	11(2A) of Schedule 15.3	For the sample of 257 lamps checked: two lamps were not recorded in the database; and two extra lamps were recorded in the database.	Cleared
Database accuracy	3.1	15.2	31 missing gear wattages, and three missing lamp wattages. 38 gear wattages did not match the expected values. For the sample of 257 lamps checked: two lamps were not recorded in the database; two extra lamps were recorded in the database; and nine lamps had incorrect lamp and wattage information recorded.	Still existing
Volume information accuracy	3.2	15.2	The database used to prepare submissions contains some inaccurate information.	Still existing

Subject	Section	Description	Recommendation	Status
Description of load type	2.4	Review of model and lamp make model information recorded in RAMM to ensure it is correct and consistent.	Review model information where data in the model and lamp make model fields is inconsistent and update the database as necessary.	Improvements implemented
Database accuracy	3.1	Continue to confirm correct lamp owners and which lamps are metered and update the database as required.	Continue to cleanse the database, and transfer lights that KCDC is not responsible for to the correct owner.	Improvements 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**.

- Submissions are based on the database information. The field survey found that the database is likely to be accurate within ±5.0% as recorded in **section 3.1**.
- On and off times derived from data logger information.

I reviewed the submission information for September 2019 and found the calculation methodology was correct. The wattage was based on the total wattage for ICP 0016099024EL49F from the database, and on hours were based on data logger information. The database extract included 41 metered lights against 0016099024EL49F which should have been excluded from the total wattage, but are consistently included because the total wattage for the ICP is applied. Inclusion of the metered lights resulted in over submission of 3,137 W or 1,145 kWh for September 2019.

Sources of inaccuracy are as follows:

Issue	Estimated volume information impact (annual kWh)
One 250 W HPS was recorded with a gear wattage of 18 instead of 28	Under submission of 43 kWh per annum
Seven items of load do not have an ICP number recorded	Potential under submission of 2,960 kWh annum

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 this practice is non-compliant. When a wattage is changed in the database due to a physical change or a correction, only the record present at the time the report is run is recorded, not the historical information showing dates of changes. Contact completes revision submissions where corrections are required, and have not yet updated their processes to be consistent with the Authority's memo.

The RAMM database records an installation date, which typically records the original installation date for the light. There is no separate livening date.

Change dates are automatically generated by RAMM when records change, but cannot be selected by the user. Where a change is entered using Pocket RAMM at the time of the change, this date will reflect the date on which the change occurred. If a correction or change is processed at a later date, the change date may be incorrect.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Sep-19 To: 30-Sep-19	41 metered lights were included in the submission calculation, resulting in over submission of 3,137 W or 1,145 kWh for September 2019. 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 of the change if they are not processed in RAMM at the time that the change occurs. Seven unmetered items of load do not have an ICP number recorded. One 250 W HPS lamp was confirmed to have an incorrect gear wattage, resulting in under submission of 43 kWh per annum. 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 submission are moderate. The methodology is correct, but one of the inputs was incorrect and a small number of metered lights were included. The database update processes will ensure that in most cases the change date reflects the date that the change is made. The impact is low based on the kWh variances identified. The differences resulting from using a monthly snapshot instead of daily data are not expected to be significant based on the volume of changes and new connections occurring.

Actions taken to resolve the issue	Completion date	Remedial action status
KCDC are completing a full database audit and will have this completed in this financial year – this should clear any issues relating to incorrect lights, ICPs, Ballast and Wattage Contact will work with KCDC to ensure that a time stamp is added to their database Contact will work with KCDC to ensure they are recording correct dates	01/07/2020	Identified

Preventative actions taken to ensure no further issues will occur	Completion date	
Contact will complete quarterly database checks and keeping in touch with KCDC to ensure they are keeping their database up to date	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 unmetered items of load do not to have an ICP number recorded in the database:

Pole ID	Light ID	House Address	Light Owner	Lamp Make Model
7302	67193	113 POPLAR AVE	Local Authority	PH (LED5, 56 watts)
7316	67207	90 POPLAR AVE	Local Authority	BETA (27W, 27 watts)
7304	67195	POPLAR AVENUE RAB 1	NZTA	ST2 (122, 122 watts)
7305	67196	POPLAR AVENUE RAB 1	NZTA	ST2 (122, 122 watts)
7306	67197	POPLAR AVENUE RAB 1	NZTA	ST2 (122, 122 watts)
7308	67199	POPLAR AVENUE RAB 2	NZTA	ST2 (122, 122 watts)
7309	67200	POPLAR AVENUE RAB 2	NZTA	ST2 (122, 122 watts)

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.2 With: Clause 11(2)(a) and (aa) of Schedule 15.3 From: 01-Sep-19 To: 30-Sep-19	Seven unmetered items of load do not have an ICP number recorded. 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 are rated as moderate as a small number of items of load had missing ICP numbers, and the ICP is normally populated. The impact is low based on potential under submission of 693 W or 2,960 kWh annum (based on 4,271 burn hours).

Actions taken to resolve the issue	Completion date	Remedial action status
KCDC are completing a full database audit and will have this completed in this financial year – this should clear any issues relating to incorrect lights and ICP's	01/07/2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Contact will complete quarterly database checks and keeping in touch with KCDC to ensure they are keeping their database up to date	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

The database contains fields for light ID, pole ID, road name, house address, location number, and pole number. All items of load have a light ID and pole ID recorded, and this can be used to map the location of each light using RAMM.

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 fields for lamp make and model, lamp wattage and gear wattage. All items of load have a lamp make and model, lamp wattage, and gear wattage populated. No lamp or gear wattages were invalidly recorded as zero.

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

Audit outcome

Compliant

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 287 items of load on 5 November 2019. The sample was selected from four strata, as follows:

1. Otaki
2. Paekakariki and Raumati
3. Paraparaumu; and
4. Waikanae.

Audit commentary

The field audit discrepancies are detailed in the table below:

Street	Database count	Field count	Light count difference	Wattage recorded incorrectly	Comments
Otaki					
Arthur St	1	1	-	1	1 x L79 LED light was recorded as a 56W LED light.
Kainga Flats Rd	2	2	-	2	2 x L27 LED lights were recorded as 56W LED lights.
Norfolk Cres	9	9	-	1	1 x L23 LED light outside 63 Norfolk Cres was recorded as a L27 LED light.
Waikanae					
Winara Ave	32	31	-1		The L27 LED light outside 75 Winara Ave was duplicated in the database. The duplicate entry was corrected during the audit.
Grand Total	**287**	**286**	**-1**	**4**	

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. Wattage differences found during the field audit are recorded as non-compliance 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 RAMM 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.

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 RAMM database. A RAMM database extract was provided in October 2019 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	Kāpiti Coast City Council Street Lights
Strata	The database contains the KCDC items of load for DUML ICPs in the Kāpiti Coast region. The processes for the management of all KCDC items of load are the same, but I decided to place the items of load into four strata: 1. Otaki 2. Paekakariki and Raumati 3. Paraparaumu; and 4. Waikanae.
Area units	I created a pivot table of the roads and I used a random number generator in a spreadsheet to select a total of 40 sub-units.
Total items of load	287 items of load were checked, which made up over 5% of the total database wattage.

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority against the RAMM database.

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 287 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	98.9	Wattage from survey is lower than the database wattage by 1.1%
R_L	95.6	

Result	Percentage	Comments
R_H	99.9	With a 95% level of confidence it can be concluded that the error could be between -0.1% and -4.6%

The variability of the sample results across the strata means that the true wattage (installed in the field) could be between 0.1% and 4.6% lower than the wattage recorded in the DUML database.

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 A (detailed below) applies. Compliance is recorded because the best estimate indicates that the database is accurate within ±5.0%.

There is a 95% level of confidence that the annual consumption is between 400 and 31,200 kWh p.a. lower than the database indicates.

In absolute terms the installed capacity is estimated to be 2 kW higher than the database indicates.

There is a 95% level of confidence that the installed capacity is between 0 kW and 7 kW lower than the database.

In absolute terms, total annual consumption is estimated to be 7,500 kWh lower than the DUML 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 %

ICP number accuracy

As recorded in **section 2.2,** seven unmetered items of load do not to have an ICP number recorded.

Light description and capacity accuracy

As discussed in **section 2.4**, all lights have a lamp and gear wattage recorded. Lamp and gear wattages were compared to the expected values.

One definite discrepancy was identified, and resulted in under submission of 10 W or 43 kWh per annum (based on 4,271 burn hours):

Lamp make model	Quantity	Database lamp wattage	Expected lamp wattage	Database gear wattage	Expected gear wattage
HPS (250, 250 watts)	1			18	28

39 potential discrepancies were identified, and specifications were requested to confirm that the correct wattage values had been recorded in the database. This information was not provided in time to be reviewed as part of this audit and therefore I cannot confirm compliance. I recommend the potential discrepancies are checked, and the database is updated as necessary.

Lamp make model	Quantity	Database lamp wattage	Expected lamp wattage	Database gear wattage	Expected gear wattage
PH (LED8, 0 watts)	1	70	20		
SYLV (RS, 60 watts)	34	60	unknown	0	unknown
BETA (B70, 70 watts)	2			13	0
BETA (HEST, 60 watts)	1			6	0
PH (MLG, 35 watts)	1			10	unknown

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	Confirm the correct lamp and gear wattages for PH (LED8, 0 watts), SYLV (RS, 60 watts), BETA (B70, 70 watts) and PH (MLG, 35 watts), and update the database as necessary.	This will be completed as part of the database audit	Identified

I found four Roadstar LEDs during the field audit where correct wattages could not be confirmed. I recommend that the wattages for these lights are checked and updated in the database if necessary:

Pole ID	Address	Comments
4580	9 NEWRY RD	Roadstar labelled 46 LED, recorded in the database as 90W (Roadstar 90)

Pole ID	Address	Comments
6846	3 NEWRY RD	Roadstar labelled 46 LED, recorded in the database as 90W (Roadstar 90)
1875	2 - 4 REALM DR	Roadstar labelled 102 LED, recorded in the database as 40W (Roadstar 40)
1876	12 - 22 REALM DR	Unlabelled Roadstar, recorded in the database as 40W (Roadstar 40)

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	Confirm the correct wattages for the Roadstar LED lights and update the database as necessary.	Contact will work with KCDC to ensure they confirm that their database parameters are accurate	Identified

Change management process findings

Fault, maintenance and upgrade work is managed by KCDC and was conducted by Electra Contracting prior to July 2019, and Fulton Hogan since July 2019. Both Electra Contracting and Fulton Hogan enter database updates using Pocket RAMM.

Photos are required to be provided when work is completed. The photos and claims for work completed submitted by Fulton Hogan are checked against the database records. Any discrepancies are followed up with Fulton Hogan.

KCDC has commissioned an audit to confirm database information accuracy (including pole ownership, pole, and lamp information), pole spacing, structural integrity of poles and outreaches, and to identify any areas where additional lights should be added for safety reasons.

I walked through the new connection process.

- For subdivisions, the developer is responsible for providing a plan for streetlighting to KCDC for approval which includes approved luminaires as set out in the Kāpiti Coast District Council Standard Details and Specifications for Road Lighting Infrastructure (30 December 2018). The approved lights are then installed. As part of the section 224C process, the developer is required to arrange for a qualified person to complete a RAMM inventory including taking photos, and also provide the Electra network's approval of the connection and certification. The RAMM information is checked against the as built plans and photos, and any discrepancies are investigated. RAMM is updated from the date of livening, and field checks are carried out if deemed necessary.
- For new connections initiated by KCDC, Fulton Hogan completes the field work, and updates the database using Pocket RAMM.

The current monthly report is provided as a snapshot and this practice is non-compliant. When a wattage is changed in the database due to a physical change or a correction, only the record present at the time the report is run is recorded, not the historical information showing dates of changes.

The RAMM database records an installation date, which typically records the original installation date for the light. There is no separate livening date.

Change dates are automatically generated by RAMM when records change, but cannot be selected by the user. Where a change is entered using Pocket RAMM at the time of the change, this date will reflect the date on which the change occurred. If a correction or change is processed at a later date, the change date may be incorrect.

Outage patrols are conducted every three months, and Fulton Hogan directly update their findings into RAMM from the field.

Festive lights

KCDC confirmed that there is no festive lighting used on the Kāpiti Coast.

Private lights

120 unmetered private lights are recorded in the database and included in the extract provided to Contact Energy. KCDC does not bill private light owners for their unmetered electricity consumption. Where a private light is identified, KCDC determines the owner and whether it is metered or unmetered. If a private light is unmetered, and doesn't already have its own ICP assigned, it will be added to ICP 0016099024EL49F in the database.

NZTA lights

NZTA lights are now separately recorded against NZTA ICPs. Contact Energy confirmed that the affected ICPs are metered, or are standard unmetered load.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Sep-19 To: 30-Sep-19	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 of the change if they are not processed in RAMM at the time that the change occurs. Seven unmetered items of load do not have an ICP number recorded. One 250 W HPS lamp was confirmed to have an incorrect gear wattage, resulting in under submission of 43 kWh per annum. 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 are moderate. The database update processes will ensure that in most cases the change date reflects the date that the change is made. The impact is low based on the kWh variances identified. The differences resulting from using a monthly snapshot instead of daily data are not expected to be significant based on the volume of changes and new connections occurring.

Actions taken to resolve the issue	Completion date	Remedial action status
KCDC are completing a full database audit and will have this completed in this financial year – this should clear any issues relating to incorrect lights, ICPs, Ballast and Wattage Contact will work with KCDC to ensure that a time stamp is added to their database Contact will work with KCDC to ensure they are recording correct dates	01/07/2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Contact will complete quarterly database checks and keeping in touch with KCDC to ensure they are keeping their database up to date	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

Contact reconciles this DUML load using the HHR profile, and the correct profiles and submission types are recorded on the registry.

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

- Submissions are based on the database information. The field survey found that the database is likely to be accurate within ±5.0% as recorded in **section 3.1**.
- On and off times derived from data logger information.

I reviewed the submission information for September 2019 and found the calculation methodology was correct. The wattage was based on the total wattage for ICP 0016099024EL49F from the database, and on hours were based on data logger information. The database included 41 metered lights against 0016099024EL49F which should have been excluded from the total wattage, but are consistently included because the total wattage for the ICP is applied. Inclusion of the metered lights resulted in over submission of 3,137 W or 1,145 kWh for September 2019.

Sources of inaccuracy are as follows:

Issue	Estimated volume information impact (annual kWh)
One 250 W HPS was recorded with a gear wattage of 18 instead of 28	Under submission of 43 kWh per annum

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 this practice is non-compliant. When a wattage is changed in the database due to a physical change or a correction, only the record present at the time the report is run is recorded, not the historical information showing dates of changes. Contact completes revision submissions where corrections are required, and have not yet updated their processes to be consistent with the Authority's memo.

The RAMM database records an installation date, which typically records the original installation date for the light. There is no separate livening date.

Change dates are automatically generated by RAMM when records change, but cannot be selected by the user. Where a change is entered using Pocket RAMM at the time of the change, this date will reflect the date on which the change occurred. If a correction or change is processed at a later date, the change date may be incorrect.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 01-Sep-19 To: 30-Sep-19	41 metered lights were included in the submission calculation, resulting in over submission of 3,137 W or 1,145 kWh for September 2019. 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 of the change if they are not processed in RAMM at the time that the change occurs. One 250 W HPS lamp was confirmed to have an incorrect gear wattage, resulting in under submission of 43 kWh per annum. 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 submission are moderate. The methodology is correct, but one of the inputs was incorrect and a small number of metered lights were included. The database update processes will ensure that in most cases the change date reflects the date that the change is made. The impact is low based on the kWh variances identified. The differences resulting from using a monthly snapshot instead of daily data are not expected to be significant based on the volume of changes and new connections occurring.

Actions taken to resolve the issue	Completion date	Remedial action status
KCDC are completing a full database audit and will have this completed in this financial year – this should clear any issues relating to incorrect lights, ICPs, Ballast and Wattage Contact will work with KCDC to ensure that a time stamp is added to their database – Contact will work on how we will address changes in the database and accurate submission Contact will work with KCDC to ensure they are recording correct dates	01/07/2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Contact will complete quarterly database checks and keeping in touch with KCDC to ensure they are keeping their database up to date	Ongoing	

CONCLUSION

A RAMM database is held by KCDC. Fault, maintenance and upgrade work is managed by KCDC and was conducted by Electra Contracting prior to July 2019, and Fulton Hogan since July 2019. Both Electra Contracting and Fulton Hogan enter database updates using Pocket RAMM.

Database accuracy has improved following the LED upgrade and cleansing of database information, and is described as follows:

Result	Percentage	Comments
The point estimate of R	98.9	Wattage from survey is lower than the database wattage by 1.1%
R_L	95.6	With a 95% level of confidence it can be concluded that the error could be between -0.1% and -4.6%
R_H	99.9	

The variability of the sample results across the strata means that the true wattage (installed in the field) could be between 0.1% and 4.6% lower than the wattage recorded in the DUML database, and compliance is recorded because the best estimate indicates that the database is accurate within ±5.0%.

- In absolute terms the installed capacity is estimated to be 2 kW higher than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 0 kW and 7 kW lower than the database.
- In absolute terms, total annual consumption is estimated to be 7,500 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 400 and 31,200 kWh p.a. lower than the database indicates.

Contact reconciles the KCDC DUML load using the HHR profile. Submissions are based on the database information, with on and off times derived from data logger information. I found a small amount of metered load is recorded against ICP 0016099024EL49F, and this was included in Contact's submission information in error.

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 eight indicates that the next audit be completed in 18 months, and I agree with this recommendation because:

- The database was found to be accurate, and good processes are in place to maintain accuracy.
- KCDC has commissioned an audit to confirm database information accuracy (including pole ownership, pole, and lamp information), pole spacing, structural integrity of poles and outreaches, and to identify any areas where additional lights should be added for safety

reasons. My field audit found that database accuracy was very high for lights sampled in areas which had already undergone KCDC's audit.

PARTICIPANT RESPONSE

Contact are really pleased with the excellent progress that KCDC have made over the past few years.

KCDC are taking their database and submission accuracy seriously and are spending a lot of time and resource to ensure it's accuracy.

We look forward to this the completed audit.

Contact will work on how we will manage database changes to suit the rules. We will the work with KCDC to ensure they can supply the information from their system to complement this process