

ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT



For

CHRISTCHURCH CITY COUNCIL
UNMETERED TRAFFIC LIGHTS
AND CONTACT ENERGY LIMITED
NZBN:9429038549977

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Date audit report completed: 16 April 2024

Audit report due date: 18 April 2024

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EXECUTIVE SUMMARY

This audit of the **Christchurch City Council's Christchurch Transport Operation Centre (CTOC)** Unmetered Traffic Light 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.

Traffic light data is maintained in RTOAD (Real Time Operations Asset Database) by CTOC. RTOAD records the quantity of each equipment type, including vehicle lanterns of various types and wattages, pedestrian lanterns of various types and wattages, illuminated signs, speed zone signs and traffic safety cameras at each intersection. The wattage for each item is multiplied by the estimated number of hours on per day, power level, and kW per hour to give a daily kWh value.

The load is submitted as NHH using the UML profile for ICPs 0007102602RN872 and 007102603RN437. The profile for ICP 0000298513MPF38 and ICP 0007102604RN9FD is RPS UML which are recorded as having both metered and unmetered load associated with them in the registry. Non-compliance is recorded for an unknown amount of over submission as there could be duplication of the metered and unmetered load. Non-compliance is also recorded as DUML ICPs can only be associated with unmetered load. I have recommended that Contact work with the CTOC, MEPs and distributor to determine which items of load are metered and unmetered and establish new ICPs as required.

The field audit found that the database is not confirmed as accurate within +/-5%. In absolute terms, total annual consumption is estimated to be 94,000 kWh higher than the DUML database indicates. There were an additional 111 items of load found in the field from a sample of 1,978. CTOC confirmed that changes made in the field due to maintenance, replacements and additions have not been recorded in the database during the audit period.

Five non-compliances were identified, and this audit makes one recommendation. The future risk rating of 36 indicates that the next audit be completed in three months. I have considered this in conjunction with Contact's comments and recommend that the next audit be in 12 months to allow time for the necessary changes in management of the database to be implemented.

The matters raised are detailed below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Deriving submission information	2.1	11(1) of Schedule 15.3	<p>Two DUML ICPs with metered load associated.</p> <p>Over submission occurring as both metered and unmetered load are being submitted for the same items of load. The quantity is unable to be determined as the items of load being measured by the meter are unknown.</p> <p>The field audit found that the database is not confirmed as accurate within +/-5%. In absolute terms, total annual consumption is estimated to be 94,000 kWh higher than the DUML database indicates. Changes made in the field during the audit period have not been updated in the database.</p> <p>Daily kWh information for cameras was not included in the daily calculations for 269 sites.</p> <p>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.</p>	Weak	High	9	Investigating
All load recorded in database	2.5	11(2A) of Schedule 15.3	111 additional items of load found in the field of 1,978 items of load sampled.	Weak	Medium	6	Identified
Audit trail	2.7	11(4) of Schedule 15.3	No audit trail of changes made in the access database.	Weak	Low	3	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Database accuracy	3.1	15.2 and 15.37B(b)	<p>The field audit found that the database is not confirmed as accurate within +/-5%. In absolute terms, total annual consumption is estimated to be 94,000 kWh higher than the DUML database indicates. Changes made in the field during the audit period have not been updated in the database.</p> <p>Daily kWh information for cameras was not included in the daily calculations for 269 sites.</p>	Weak	High	9	Identified
Volume information accuracy	3.2	15.2 and 15.37B(c)	<p>Two DUML ICPs with metered load associated.</p> <p>Over submission occurring as both metered and unmetered load are being submitted for the same items of load. The quantity is unable to be determined as the items of load being measured by the meter are unknown.</p> <p>The field audit found that the database is not confirmed as accurate within +/-5%. In absolute terms, total annual consumption is estimated to be 94,000 kWh higher than the DUML database indicates. Changes made in the field during the audit period have not been updated in the database.</p> <p>Daily kWh information for cameras was not included in the daily calculations for 269 sites.</p> <p>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.</p>	Weak	High	9	Investigating
Future Risk Rating						36	

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
Deriving submission information	2.1	Work with the CTOC, MEPs and distributor to determine which items of load are metered and unmetered on ICPs 0000298513MPF38 and 0007102604RN9FD and establish new ICPs as required.

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.

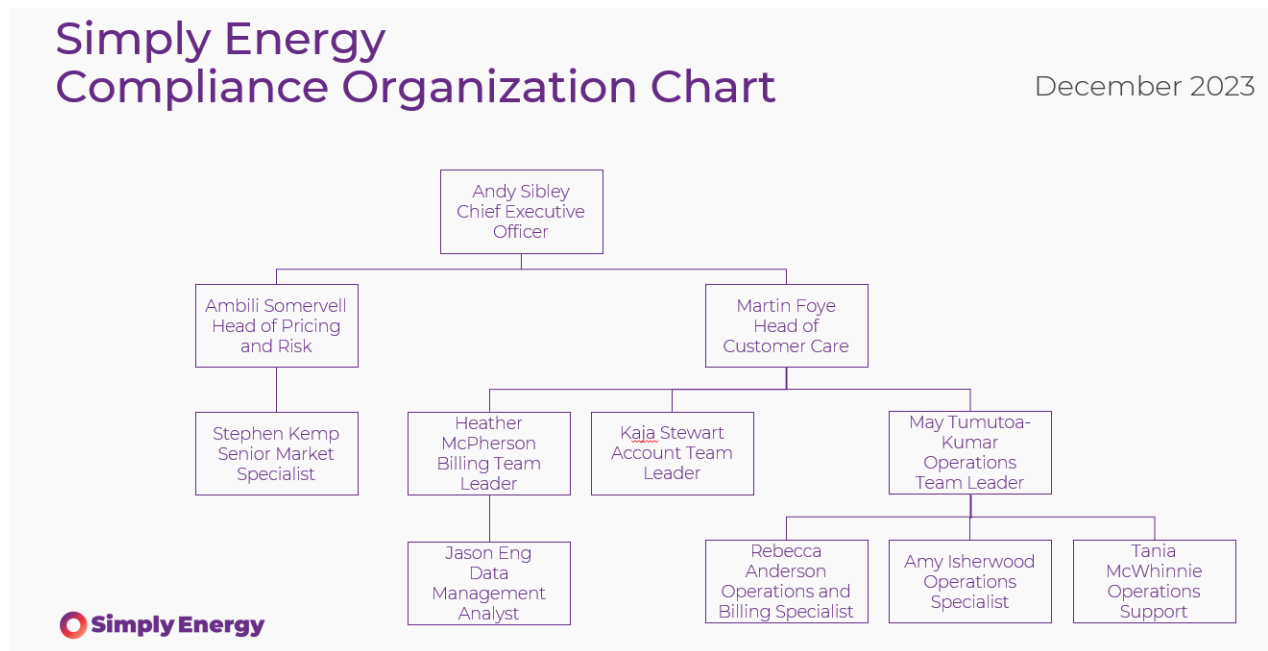
Audit observation

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

Audit commentary

There are no exemptions in place relevant to the scope of this audit.

1.2. Structure of Organisation



1.3. Persons involved in this audit

Auditors:

Name	Company	Role
Brett Piskulic	Provera	Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Vanessa Nuttall	Real Time Operations Engineer	Christchurch Transport Operation Centre – Christchurch City Council
Stephen Kemp	Senior Market Specialist	Simply Energy
Dallas Tui	White Label Account Specialist	Simply Energy

1.4. Hardware and Software

Traffic light data is maintained in RTOAD Access database by CTOC. Backup and restoration procedures are in accordance with normal industry protocols.

A copy of the traffic light asset information is also maintained within RAMM. RAMM is periodically reconciled for RTOAD to ensure that it holds all traffic light information.

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

1.5. Breaches or Breach Allegations

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

1.6. ICP Data

The following ICPs are relevant to the scope of this audit. The database expresses the wattage as kWh per day.

ICP Number	Description	NSP	Profile	Number of sites	Database kWh per day
0007102602RN872	Ref Orion_Bromley 66kV GXP Traffic Lights	BRY0661	UML	62	404.85
0007102603RN437	Ref Orion_Islington 33kV GXP Traffic Lights	ISL0331	UML	16	144.95
0007102604RN9FD	Ref Orion_Islington 66kV GXP Traffic Lights	ISL0661	RPS UML	280	2,093.59
0000298513MPF38	TRAFFIC LIGHTS OFF RAMP	KAI0111	RPS UML	1	0
Total				359	2,643.39

1.7. Authorisation Received

All information was provided directly by Contact or the CTOC.

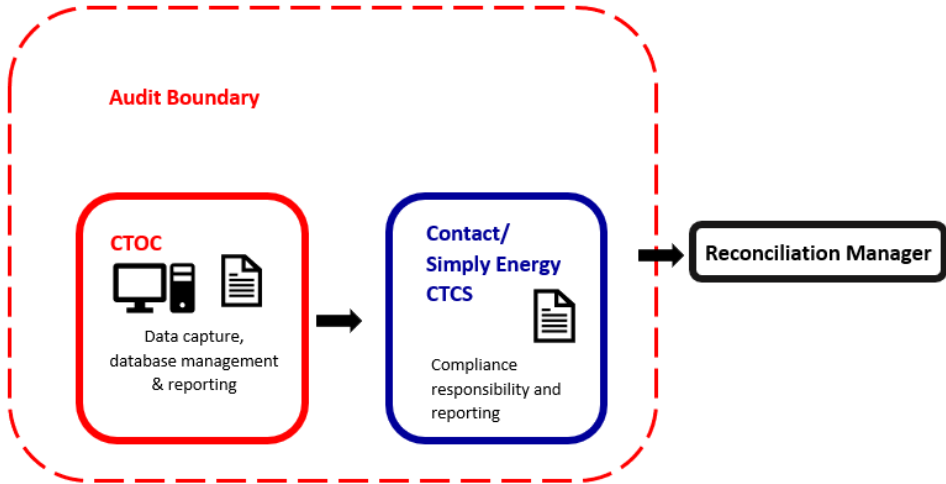
1.8. Scope of Audit

This audit of the CTOC 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.

Traffic light data is maintained in RTOAD (Real Time Operations Asset Database) database by CTOC. RTOAD records the quantity of each equipment type, including vehicle lanterns of various types and wattages, pedestrian lanterns of various types and wattages, illuminated signs, speed zone signs and traffic safety cameras at each intersection. The wattage for each item is multiplied by the estimated number of hours on per day, power level, and kW per hour to give a daily kWh value. The hours and power level are based on historic metering information, from when a sample of lights were metered to determine these values.

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 78 sites with a total of 1,978 items of load on 25 and 26 March 2024.

1.9. Summary of previous audit

The previous audit was completed by Steve Woods of Veritek Limited, completed in March 2023. The table below records the findings.

Table of Non-compliance

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	Two DUML ICPs with metered load associated. Over submission occurring as both metered and unmetered load are being submitted for the same items of load. The quantity is unable to be determined as the items of load being measured by the meter are unknown. Daily kWh information for PedCams was not included in the daily calculations for 74 sites, and one set of traffic lights, resulting in under submission of an estimated 4,260 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Still existing
Description and Capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	One item of load does not have any equipment type associated to the site name, to indicate the vehicle lantern type and wattage.	Cleared
All load recorded in database	2.5	11(2A) of Schedule 15.3	Two additional items of load found in the field of 100 items of load sampled.	Still existing

Subject	Section	Clause	Non-compliance	Status
Audit trail	2.7	11(4) of Schedule 15.3	No audit trail of changes made in the access database.	Still existing
Database accuracy	3.1	15.2 and 15.37B(b)	Daily kWh information for PedCams was not included in the daily calculations for 74 sites, and one set of traffic lights, resulting in under submission of an estimated 4,260 kWh per annum.	Still existing
Volume information accuracy	3.2	15.2 and 15.37B(c)	Two DUMML ICPs with metered load associated. Over submission occurring as both metered and unmetered load are being submitted for the same items of load. The quantity is unable to be determined as the items of load being measured by the meter are unknown. Daily kWh information for PedCams was not included in the daily calculations for 74 sites, and one set of traffic lights, resulting in under submission of an estimated 4,260 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Still existing

Subject	Section	Recommendation	Status
		Nil	

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 DUMML database audits are completed:

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

Audit observation

Contact have requested Provera to undertake this streetlight audit.

Audit commentary

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

Audit outcome

Compliant

2. DUML DATABASE REQUIREMENTS

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

Code reference

Clause 11(1) of Schedule 15.3

Code related audit information

The retailer must ensure the:

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

Audit observation

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

Audit commentary

Submission process and accuracy

RTOAD records the quantity of each equipment type, including vehicle lanterns of various types and wattages, pedestrian lanterns of various types and wattages, illuminated signs, speed zone signs and traffic safety cameras at each intersection. CCC provided the usage calculation formulas used. The wattage for each item is multiplied by the estimated number of hours on per day, power level, and kW per hour to give a daily kWh value.

The load is submitted as NHH using the UML profile for ICPs 0007102602RN872 and 007102603RN437. The profile for ICP 0000298513MPF38 and ICP 0007102604RN9FD is RPS UML. I checked the submission for the unmetered load for all ICPs for the month of January 2024 and confirmed that the methodology is compliant.

ICPs 0000298513MPF38 and 0007102604RN9FD are recorded as having both metered and unmetered load associated with them in the registry. It is unclear which items of load at the sites associated with these ICPs are metered or unmetered. Therefore, there is likely to be over submission occurring, but I am not able to determine the volumes associated with this. Non-compliance is recorded for an unknown amount of over submission. Non-compliance is also recorded as DUML ICPs can only be associated with unmetered load. I recommend that Contact work with the CTOC, MEPs and distributor to determine which items of load are metered and unmetered and establish new ICPs as required.

Recommendation	Description	Audited party comment	Remedial action
Regarding: Clause 11(1) of schedule 15.3	Work with the CTOC, MEPs and distributor to determine which items of load are metered and unmetered on ICPs 0000298513MPF38 and 0007102604RN9FD and establish new ICPs as required.	Simply Energy looking to have new ICPs created to resolve these issues	Investigating

On 18 June 2019, the Electricity Authority issued a memo confirming that 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 data supplied to Contact each month is based on a snapshot from RTOAD and does not achieve compliance with the requirements above.

Database accuracy

Examination of the database found:

Issue	Estimated volume information impact (annual kWh)
The field audit found that the database is not confirmed as accurate within +/-5%. In absolute terms, total annual consumption is estimated to be 94,000 kWh higher than the DUML database indicates. Changes made in the field during the audit period have not been updated in the database as recorded in section 3.1	Under submission of 94,000 kWh p.a.
Daily kWh information for cameras was not included in the daily calculations for 269 sites as recorded in section 3.1	Under submission of 10,336 kWh p.a.

Audit outcome

Non-compliant

Non-compliance	Description
<p>Audit Ref: 2.1</p> <p>With: Clause 11(1) of Schedule 15.3</p> <p>From: 8 March 2022</p> <p>To: 26 March 2024</p>	<p>Two DUML ICPs with metered load associated.</p> <p>Over submission occurring as both metered and unmetered load are being submitted for the same items of load. The quantity is unable to be determined as the items of load being measured by the meter are unknown.</p> <p>The field audit found that the database is not confirmed as accurate within +/-5%. In absolute terms, total annual consumption is estimated to be 94,000 kWh higher than the DUML database indicates. Changes made in the field during the audit period have not been updated in the database.</p> <p>Daily kWh information for cameras was not included in the daily calculations for 269 sites.</p> <p>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.</p> <p>Potential impact: High</p> <p>Actual impact: High</p> <p>Audit history: Multiple times previously</p> <p>Controls: Weak</p> <p>Breach risk rating: 9</p>
Audit risk rating	Rationale for audit risk rating

High	The controls are recorded as weak due to the high number of errors found in the field audit which indicates that the database has not been updated to reflect changes in the field. The impact is assessed to be high due to the impact on submission.	
Actions taken to resolve the issue		Completion date
CCC and Simply continuing to work on these two sites to resolve		01/08/2024
Preventative actions taken to ensure no further issues will occur		Completion date
Once resolved, preventative actions will be put in place		01/08/2024
		Investigating

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

Code reference

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

Code related audit information

The DUML database must contain:

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

Audit observation

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

Audit commentary

All items of load have an ICP recorded.

Audit outcome

Compliant

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

Code reference

Clause 11(2)(b) of Schedule 15.3

Code related audit information

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

Audit observation

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

Audit commentary

All items of load have a site name recorded which includes the location and GPS coordinates are also recorded for each site. The field audit confirmed that the sites were locatable.

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 contains load types and capacities.

Audit commentary

RTOAD records the quantity of each equipment type, including vehicle lanterns of various types and wattages, pedestrian lanterns of various types and wattages, illuminated signs, speed zone signs and traffic safety cameras at each intersection. The wattage for each item is multiplied by the estimated number of hours on per day, power level, and kW per hour to give a daily kWh value. The hours and power level are based on historic metering information, from when a sample of lights were metered to determine these values.

The capacity in watts is recorded in the database as part of the daily kWh calculation and is also set out in the CTOC Traffic Signal Database Traffic Signal Power Calculation Formula document.

All items of load have site units per day recorded.

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 78 sites with a total of 1,978 items of load on 25 and 26 March 2024.

Audit commentary

The following differences were identified during the field audit:

Site	Database Count	Field Count	Count differences	Comments
Grassmere/Main North	27	37	+10	6 additional lights, 4 additional ped lights

Site	Database Count	Field Count	Count differences	Comments
Main North/Styx Mill	26	31	+5	4 additional lights, 1 additional TS Cam
Frosts/Xing	17	19	+2	2 additional ped cams
Breezes/Wainoni	37	35	-2	2 lights not found
Aldwins/Ensors/Ferry	34	33	-1	1 TS cam not found
Cashel/Fitzgerald	35	43	+8	8 additional lights
Barbadoes/Hereford	23	25	+2	2 additional signs
Carlton/Xing	15	18	+3	3 additional lights
Kilmore/Park	25	32	+7	7 additional lights found in field
Antigua/Tuam	33	39	+8, -2	6 additional lights, 2 additional ped cams found in field, 2 signs not found,
Colombo/Lichfield	30	29	+1, -2	1 additional light found in field, 2 signs not found
Bus Interchange/Lichfield	16	32	+16	11 additional lights, 2 additional ped lights, 2 additional signs, 1 additional TS cam found in field
High/Lichfield/Manchester	46	47	+3, -2	2 additional lights, 1 additional sign found in field, 2 lights not found
Lichfield/Madras	26	29	+3	3 additional lights found in field
Gloucester/Latimer/Madras	18	19	+1	1 additional sign found in field
Riccarton/Xing (Railway)	23	24	+1	1 additional sign found in field
Clarence/Riccarton/Straven	34	41	+7	7 additional lights found in field
Clarence/Dilworth	20	22	+2	2 additional lights found in field
Carmen/Xing (Masham Reserve)	20	39	+19	15 additional lights, 4 additional ped lights found in field
Buchanans/Carmen	31	35	+4	4 additional lights found in field
Strickland/Xing (Roker)	13	13	+1, -1	1 additional light found in field, 1 ped light not found
Sparks/Xing (Cycleway E Pablo)	17	19	+2	2 additional lights found in field
Hendersons/Sparks	38	44	+6	6 additional lights found in field
Augustine/Halswell/Monsaraz	57	55	-2	2 lights not found

Site	Database Count	Field Count	Count differences	Comments
Total	1,978	2,077	+111, -12	

111 additional items of load found in the field of 1,978 items of load sampled and this is recorded as non-compliance.

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

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 18 April 2023 To: 26 March 2024	111 additional items of load found in the field of 1,978 items of load sampled. Potential impact: High 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 changes in the field are not being updated in the database. The impact is assessed to be medium due to the number of additional lights found in the field and the impact on submission.		
Actions taken to resolve the issue		Completion date	Remedial action status
CCC is continuing to work on adding robust processes to ensure all additional lights added are captured		31/03/2025	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
-		-	

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

There has been no change to the process for new connections. The Christchurch City Council (CCC) capital programme team manage the process and the CTOC are responsible for programming the lights and ensuring that both RTOAD and RAMM are updated. A RAMM data sheet is completed, and the information is populated in the RTOAD database and in RAMM. CTOC is usually aware of any new lights to be commissioned and ensures that database information is updated as required. RAMM is periodically reconciled for RTOAD to ensure that it holds all traffic light information.

The ICP, GXP, and types and quantities of equipment installed are determined from the signal plan and “as built” information.

Additions, changes and decommissions are managed by CTOC, and the database has the ability to be updated from the effective date of the change. Non-compliance is recorded in **section 3.1**, as whilst the database has functionality to record changes there have been no updates related to maintenance, replacements, and additions at existing sites during the audit period.

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

CTOC RTOAD Access database has no audit trail of additions and changes to the database information.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.7 With: Clause 11(4) of Schedule 15.3 From: 8 March 2022 To: 26 March 2024	No audit trail of changes made in the access database. Potential impact: Low Actual impact: Low Audit history: Multiple times Controls: Weak Breach risk rating: 3
Audit risk rating	Rationale for audit risk rating

Low	The controls are rated as weak because audit trails do not exist. The impact is rated as low, because it does not affect submission.	
Actions taken to resolve the issue	Completion date	Remedial action status
CCC are planning to move all records to RAMM which will resolve this issue	31/03/2025	Identified
Preventative actions taken to ensure no further issues will occur	Completion date	
-	-	

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

Contacts' submissions are based on a monthly extract from the database. A database extract was provided in February 2024. A field audit was undertaken of 78 sites with a total of 1,978 items of load. The change management process and timeliness of database updates was evaluated.

Audit commentary

Field audit findings

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

Plan Item	Comments
Area of interest	CCC unmetered traffic lights
Strata	The database contains 359 sites in the CCC area. All lights in the database have the same owner, and the management process is the same. The database was divided into three strata: <ul style="list-style-type: none"> • Site names starting with A to Cl, • Site names starting with Co to Hi, and • Site names starting with Ho to Wr.
Area units	I used a random number generator to select a total of 78 sites across the two strata.
Total items of load	1,978 items of load were checked.

The calculation of daily kWh in the database was checked, by reperforming the calculation based on the CTOC Traffic Signal Database Traffic Signal Power Calculation Formula document.

Audit commentary

Database accuracy based on the field audit

A field audit was conducted of a statistical sample of 78 sites with a total of 1,978 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	109.7	Wattage from survey is higher than the database wattage by 9.7%
R _L	105.4	

R _H	117.4	With a 95% level of confidence, it can be concluded that the error could be between 5.4% and 17.4% higher than the database.
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These results were categorised in accordance with the “Distributed Unmetered Load Statistical Sampling Audit Guideline”, effective from 1 February 2019. The table below shows that Scenario B (detailed below) applies, and the best available estimate indicates that the database is not accurate within ± 5.0%.

In absolute terms, total annual consumption is estimated to be 94,000 kWh higher than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 52,600 kWh lower p.a. to 168,800 kWh p.a. higher than the database indicates.

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

Change management process findings

For new sites the Christchurch City Council (CCC) assets team manage the process and the CTOC are responsible for programming the lights and ensuring that both RTOAD and RAMM are updated. Maintenance, replacements, and additions are managed by the maintenance team and details of changes are expected to be recorded in both RTOAD and RAMM. As indicated by the number of discrepancies found in the field audit, changes are not being recorded in the database.

Wattage accuracy

The accuracy of the wattages recorded in the database was confirmed by reperforming the wattage calculation for each type of equipment and summing the result by site. The recalculation was according to the CTOC Traffic Signal Database Traffic Signal Power Calculation Formula document.

There were 269 sites where a total of 267 pedestrian cameras and 323 traffic safety cameras are recorded in the database but are not included in the daily kWh calculation. The cameras consume 0.048 kWh per day resulting in a difference of 28.32kWh per day. This will result in an estimated under submission of 10,336 kWh per annum, which is recorded as a non-compliance below.

The capacity in watts is recorded in the database as part of the daily kWh calculation and is also set out in the CTOC Traffic Signal Database Traffic Signal Power Calculation Formula document.

Address location accuracy

As discussed in **section 2.3**, all lights have an address recorded.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 18 February 2023 To: 26 March 2024	The field audit found that the database is not confirmed as accurate within +/-5%. In absolute terms, total annual consumption is estimated to be 94,000 kWh higher than the DUML database indicates. Changes made in the field during the audit period have not been updated in the database. Daily kWh information for cameras was not included in the daily calculations for 269 sites. Potential impact: High Actual impact: High Audit history: Multiple times previously Controls: Weak Breach risk rating: 9		
Audit risk rating	Rationale for audit risk rating		
High	The controls are recorded as weak due to the high number of errors found in the field audit which indicates that the database has not been updated to reflect changes in the field. The impact is assessed to be high due to the impact on submission.		
Actions taken to resolve the issue		Completion date	Remedial action status
CCC is continuing to work on adding robust processes to ensure all additional lights added are captured		31/03/2025	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
-		-	

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 burn hours against the submitted figure to confirm accuracy.

Audit commentary

Submission process and accuracy

RTOAD records the quantity of each equipment type, including vehicle lanterns of various types and wattages, pedestrian lanterns of various types and wattages, illuminated signs, speed zone signs and traffic safety cameras at each intersection. CCC provided the usage calculation formulas used. The wattage for each item is multiplied by the estimated number of hours on per day, power level, and kW per hour to give a daily kWh value.

The load is submitted as NHH using the UML profile for ICPs 0007102602RN872 and 007102603RN437. The profile for ICP 0000298513MPF38 and ICP 0007102604RN9FD is RPS UML. I checked the submission for the unmetered load for all ICPs for the month of January 2024 and confirmed that the methodology is compliant.

ICPs 0000298513MPF38 and 0007102604RN9FD are recorded as having both metered and unmetered load associated with them in the registry. It is unclear which items of load at the sites associated with these ICPs are metered or unmetered. Therefore, there is likely to be over submission occurring, but I am not able to determine the volumes associated with this. Non-compliance is recorded for an unknown amount of over submission. Non-compliance is also recorded as DUML ICPs can only be associated with unmetered load.

On 18 June 2019, the Electricity Authority issued a memo confirming that 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 data supplied to Contact each month is based on a snapshot from RTOAD and does not achieve compliance with the requirements above.

Database accuracy

Examination of the database found:

Issue	Estimated volume information impact (annual kWh)
The field audit found that the database is not confirmed as accurate within +/-5%. In absolute terms, total annual consumption is estimated to be 94,000 kWh higher than the DUML database indicates. Changes made in the field during the audit period have not been updated in the database as recorded in section 3.1 .	Under submission of 94,000 kWh p.a.

Issue	Estimated volume information impact (annual kWh)
Daily kWh information for cameras was not included in the daily calculations for 269 sites as recorded in section 3.1	Under submission of 10,336 kWh p.a.

Audit outcome

Non-compliant

Non-compliance	Description	
<p>Audit Ref: 3.2</p> <p>With: Clause 15.2 and 15.37B(c)</p> <p>From: 18-Mar-21</p> <p>To: 26-Mar-24</p>	<p>Two DUML ICPs with metered load associated.</p> <p>Over submission occurring as both metered and unmetered load are being submitted for the same items of load. The quantity is unable to be determined as the items of load being measured by the meter are unknown.</p> <p>The field audit found that the database is not confirmed as accurate within +/-5%. In absolute terms, total annual consumption is estimated to be 94,000 kWh higher than the DUML database indicates. Changes made in the field during the audit period have not been updated in the database.</p> <p>Daily kWh information for cameras was not included in the daily calculations for 269 sites.</p> <p>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.</p> <p>Potential impact: High</p> <p>Actual impact: High</p> <p>Audit history: Multiple times previously</p> <p>Controls: Weak</p> <p>Breach risk rating: 9</p>	
Audit risk rating	Rationale for audit risk rating	
High	<p>The controls are recorded as weak due to the high number of errors found in the field audit which indicates that the database has not been updated to reflect changes in the field.</p> <p>The impact is assessed to be high due to the impact on submission.</p>	
Actions taken to resolve the issue	Completion date	Actions taken to resolve the issue
CCC and Simply continuing to work on these two sites to resolve	01/08/2024	Investigating
Preventative actions taken to ensure no further issues will occur	Completion date	
-	-	

CONCLUSION

Traffic light data is maintained in RTOAD (Real Time Operations Asset Database) by CTOC. RTOAD records the quantity of each equipment type, including vehicle lanterns of various types and wattages, pedestrian lanterns of various types and wattages, illuminated signs, speed zone signs and traffic safety cameras at each intersection. The wattage for each item is multiplied by the estimated number of hours on per day, power level, and kW per hour to give a daily kWh value.

The load is submitted as NHH using the UML profile for ICPs 0007102602RN872 and 007102603RN437. The profile for ICP 0000298513MPF38 and ICP 0007102604RN9FD is RPS UML which are recorded as having both metered and unmetered load associated with them in the registry. Non-compliance is recorded for an unknown amount of over submission as there could be duplication of the metered and unmetered load. Non-compliance is also recorded as DUML ICPs can only be associated with unmetered load. I have recommended that Contact work with the CTOC, MEPs and distributor to determine which items of load are metered and unmetered and establish new ICPs as required.

The field audit found that the database is not confirmed as accurate within +/-5%. In absolute terms, total annual consumption is estimated to be 94,000 kWh higher than the DUML database indicates. There were an additional 111 items of load found in the field from a sample of 1,978. CTOC confirmed that changes made in the field due to maintenance, replacements and additions have not been recorded in the database during the audit period.

Five non-compliances were identified, and this audit makes one recommendation. The future risk rating of 36 indicates that the next audit be completed in three months. I have considered this in conjunction with Contact's comments and recommend that the next audit be in 12 months to allow time for the necessary changes in management of the database to be implemented.

PARTICIPANT RESPONSE

Christchurch City Council are continuing to add processes in place to ensure when the asset team adds new lights, these are captured in the database. Both CCC and Simply Energy will work together to resolve issues at 0000298513MPF38 and 0007102604RN9FD.