ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

TARARUA DISTRICT COUNCIL
AND GENESIS ENERGY LIMITED

Prepared by: Tara Gannon

Date audit commenced: 1 November 2019

Date audit report completed: 3 December 2019

Audit report due date: 1 December 2019

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EXECUTIVE SUMMARY

This audit of the **Tararua District Council (TDC)** DUML database and processes was conducted at the request of **Genesis Energy Limited (Genesis)** 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.

The TDC ICPs switched from Contact to Genesis effective from 01/10/19.

Streetlight load is determined by wattages held within TDC's RAMM database, which is managed by Tararua Alliance and TDC. New connection, fault, maintenance, and upgrade work is completed by Scanpower and Powerco. Previously maintenance work was also completed by C & J Contractors. Since TDC's LED upgrade was completed in June 2018 there have been few changes to the database. Scanpower and Powerco have been asked to provide information when changes are made, and this is used to update RAMM.

NZTA lights are recorded in the database. NZTA does not provide information when lights are added or changed, and only work initiated by TDC is updated in the database. TDC has offered to assist by checking the NZTA lights and updating the database, but this has been declined while NZTA and NZ Streetlighting work to identify the NZTA lights and establish processes. TDC intends to investigate separating the NZTA lights to new ICPs, so that they can eventually be transferred to NZTA.

TDC is undergoing a tender process to determine a new contractor, who will be engaged to complete a lux survey and check pole spacing and condition. Once appointed, this contractor will complete their field inspections, and update any incomplete or inaccurate data using Pocket RAMM.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	97.2	Wattage from survey is lower than the database wattage by 2.8%
R_L	89.7	With a 95% level of confidence it can be concluded that the error could be between -10.3% and 6.8%
R_H	106.8	

The variability of the sample results across the strata means that the true wattage (installed in the field) could be between 10.3% lower and 7.0% higher than the wattage recorded in the DUML database, and the best available estimate is not precise enough to conclude 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 9 kW lower and 6 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 9,900 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 36,600 kWh p.a. lower and 24,100 kWh p.a. higher than the database indicates.

Genesis reconciles the DUML load for 0009100000CADDC, 0009101000CAC7C and 0009102000CAE9C using the CST profile and 1000554957PC423 using the RPS profile. Wattages are derived from a

database extract provided by TDC each month. On and off times are derived from data logger information for 0009100000CADDC, 0009101000CAC7C and 0009102000CAE9C, and Astronomical Society night hours for 1000554957PC423.

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 Genesis completes revision submissions where corrections are required. Genesis is working to develop event based calculations, which will enable accurate volume calculations where lamps change part way through a month.

The future risk rating of 12 indicates that the next audit be completed in 12 months. I agree with this recommendation, as it will allow time for Genesis and TDC to work together to resolve the issues.

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 as recorded in **section 3.1**. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in RAMM at the time that the change occurs. Eight items of load had a missing gear wattage, and two items of load had invalid gear wattages of zero. 89 items of load had invalid gear wattages for their lamp model description. Light ID 2642 (betacom 27w led) was incorrectly recorded with ICP 0009100000CADDC, and was corrected to 0009102000CAE9C during the audit.	Weak	Low	3	Identified
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	Eight items of load have a missing gear wattage, and a further two items of load have invalid gear wattages of zero.	Weak	Low	3	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	The database is not confirmed as accurate with a 95% level of confidence as recorded in **section 3.1**. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in RAMM at the time that the change occurs. Eight items of load had a missing gear wattage, and two items of load had invalid gear wattages of zero.	Weak	Low	3	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			89 items of load had invalid gear wattages for their lamp model description. Light ID 2642 (betacom 27w led) was incorrectly recorded with ICP 0009100000CADDC, and was corrected to 0009102000CAE9C during the audit.				
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**. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in RAMM at the time that the change occurs. Eight items of load had a missing gear wattage, and two items of load had invalid gear wattages of zero. 89 items of load had invalid gear wattages for their lamp model description. Light ID 2642 (betacom 27w led) was incorrectly recorded with ICP 0009100000CADDC, and was corrected to 0009102000CAE9C during the audit.	Weak	Low	3	Identified
Future Risk Rating						12	

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
ICP data	1.6	ICP 7012020000CH14D is invalidly treated as standard unmetered load. Either: 1. Create a separate ICP for each point of connection, and then settle each ICP as standard unmetered load; or 2. Switch the ICP to GENE and settle the load as DUML.

Subject	Section	Recommendation
All load recorded in the database	2.5	Check under the verandah lights in Pahiatua, and add them to the database if they are unmetered.
Database Accuracy	3.1	Confirm the correct lamp and gear wattages for the unknown lights on Ward, Barraud and Jones streets.

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

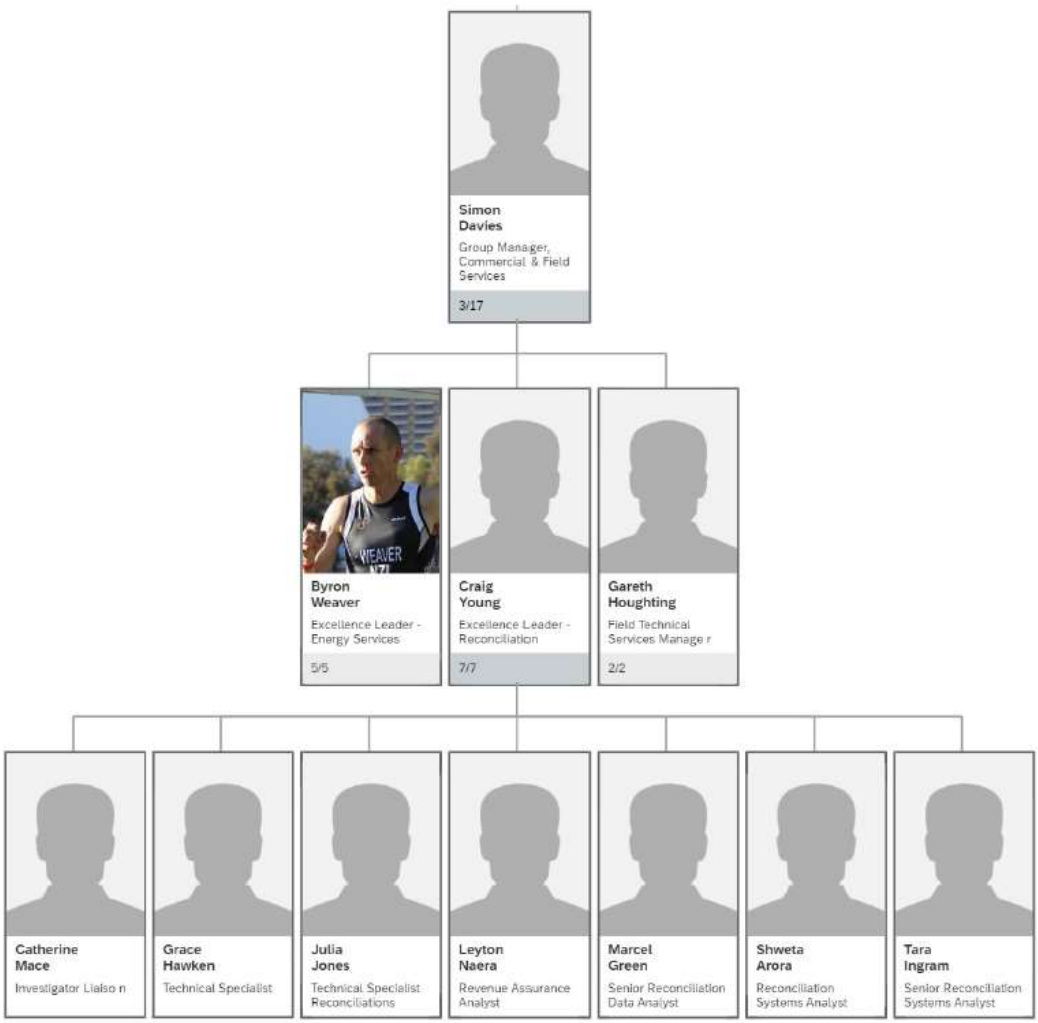
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

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

1.2. Structure of Organisation

Genesis 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
Buster Sandford	Asset Engineer	Tararua Alliance
Nicky Campbell	Asset Information Technician	Tararua Alliance
Grace Hawken	Technical Specialist - Reconciliation Team	Genesis 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)
0009100000CADDC	Dannevirke Street Lighting - Dannevirke Borough	DVK0111	CST	778	33,021
0009101000CAC7C	Street Lighting - Rural Streetlighting	DVK0111	CST	83	2,498
0009102000CAE9C	Street Lighting - Woodville Borough	WDV0111	CST	278	19,494

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
1000554957PC423	TDC Master stlight - cnr Mangamaire & Tutaekara Road	MGM0331	RPS	444	28,595
Total				**1,583**	**83,608**

ICP 7012020000CH14D is also included in the database, but is outside the scope of the audit. The ICP is supplied by Meridian and is settled as standard unmetered load. Tararua Alliance confirmed that the six lights connected do not all have the same point of connection.

Light ID	Road	ICP Group	
1523	052-0063	7012020000CH14D	betacom 27w led
2564	SEAVIEW RD	7012020000CH14D	betacom 27w led
2565	SEAVIEW RD	7012020000CH14D	betacom 27w led
2540	SEAVIEW RD	7012020000CH14D	betacom 27w led
2541	SEAVIEW RD	7012020000CH14D	betacom 27w led
2542	SEAVIEW RD	7012020000CH14D	betacom 27w led

Only loads below the unmetered load threshold with a single point of connection may be settled as standard unmetered load. I recommend that separate ICPs should be created for each point of connection so it can continue to be treated as standard unmetered load, or the ICPs should be treated as DUML.

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	ICP 7012020000CH14D is invalidly treated as standard unmetered load. Either: 1. Create a separate ICP for each point of connection, and then settle each ICP as standard unmetered load; or 2. Switch the ICP to GENE and settle the load as DUML.	Genesis has asked Tararua DC to request the switch of the ICP to Genesis.	Identified

1.7. Authorisation Received

All information was provided directly by Genesis or TDC.

1.8. Scope of Audit

This audit of the TDC DUML database and processes was conducted at the request of Genesis 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.

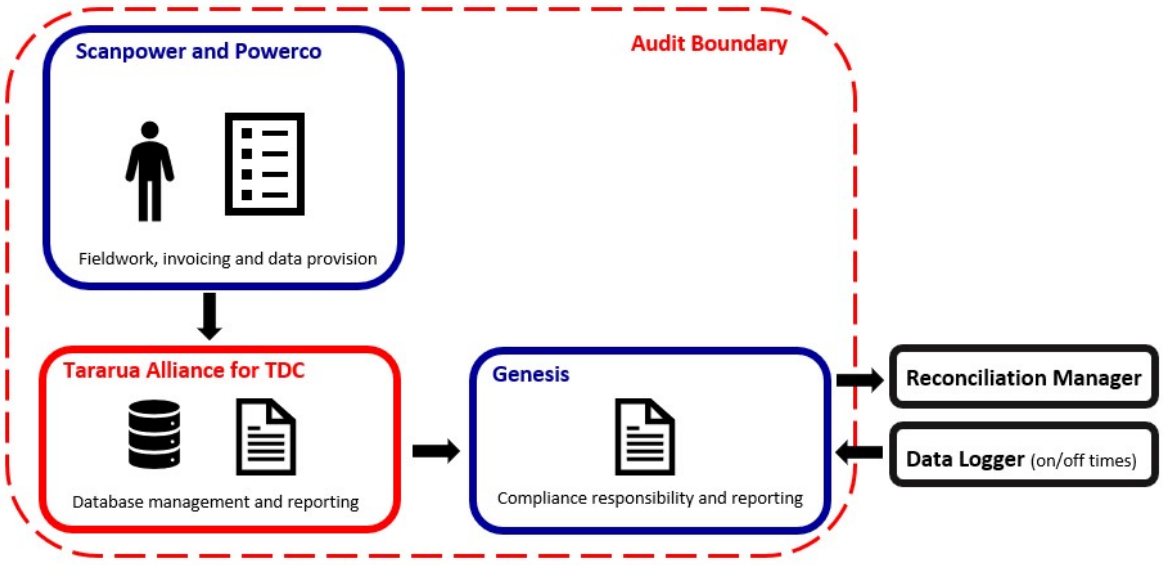
The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

The TDC ICPs switched from Contact to Genesis effective from 01/10/19.

Streetlight load is determined by wattages held within TDC's RAMM database. New connection, fault, maintenance, and upgrade work is completed by Scanpower and Powerco. Previously maintenance work was also completed by C & J Contractors. Since TDC's LED upgrade was completed in June 2018 there have been few changes to the database. Scanpower and Powerco have been asked to provide information when changes are made, and this is used to update RAMM.

NZTA lights are recorded in the database. NZTA does not provide information when lights are added or changed, and only work initiated by TDC is updated in the database. TDC has offered to assist by checking the NZTA lights and updating the database, but this has been declined while NZTA and NZ Streetlighting work to identify the NZTA lights and establish processes. TDC intends to investigate separating the NZTA lights to new ICPs, so that they can eventually be transferred to NZTA.

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



The field audit was undertaken of a statistical sample of 258 items of load on 1 November 2019.

1.9. Summary of previous audit

The previous audit of this database was undertaken by Tara Gannon of Veritek Limited in May 2018. The summary table below shows the statuses of the non-compliances and recommendations 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 is out of date.	Still existing
ICP identifier and items of load	2.2	11(2)(a) and (aa) of Schedule 15.3	ICP number is not recorded for 208 items of load.	Cleared
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	Six items of load do not have complete and accurate description and load information recorded. 168 items of load are expected to have a gear wattage recorded, but the gear wattage is blank.	Still existing, but improvements have been made
All load recorded in database	2.5	11(2A) of Schedule 15.3	Eight lamps were not recorded in the database.	Cleared
Tracking of load changes	2.6	11(3) of Schedule 15.3	Updates to the database can be delayed.	Discussed in **section 3.1**
Database accuracy	3.1	15.2 and 15.37B(b)	The database contains some incorrect and missing information.	Still existing
Volume information accuracy	3.2	15.2 and 15.37B(c)	The database used to prepare submissions is out of date.	Still existing

Subject	Section	Description	Recommendation	Status
ICP data	1.6	ICP data	Confirm whether this ICP 7012020000CH14D is standard or distributed unmetered load, and work with TDC to update the database if necessary	The load does not meet the requirements to be treated as standard unmetered load, and a further recommendation is raised
All load recorded in the database	2.5	Inclusion of under verandah lights.	Check under the verandah lights in Pahiatua and add them to the database if they are unmetered.	In progress

Subject	Section	Description	Recommendation	Status
Tracking of load changes	2.6	Maintaining NZTA lights in the database.	Work with NZTA to either hand over responsibility for maintaining a database of NZTA lights in the TDC area or establish a process to ensure that NZTA light information is maintained in the TDC database.	In progress
Tracking of load changes	2.6	Timeliness of updates.	Ensure that all database changes are processed prior to providing database reports to Contact each month.	Implemented, few database changes now occur

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

Genesis 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

Genesis reconciles the DUML load for 0009100000CADDC, 0009101000CAC7C and 0009102000CAE9C using the CST profile and 1000554957PC423 using the RPS profile.

- Wattages are derived from a database extract provided by TDC each month. The field survey found that the best available estimate of field wattage is not precise enough to conclude that the database is accurate within ±5.0% as recorded in **section 3.1**.
- On and off times are derived from data logger information for 0009100000CADDC, 0009101000CAC7C and 0009102000CAE9C, and Astronomical Society night hours for 1000554957PC423.

I reviewed the submission information for October 2019 and confirmed that it was calculated accurately based on the database and data logger information.

Sources of inaccuracy are as follows:

Issue	Estimated volume information impact (annual kWh)
Eight items of load have a missing gear wattage, and a further two items of load have invalid gear wattages of zero.	Estimated under submission of 717 kWh p.a.
89 items of load had invalid gear wattages for their lamp model description.	Estimated under submission of 3,797 kWh p.a.
Light ID 2642 (betacom 27w led) was incorrectly recorded with ICP 0009100000CADDC, and was corrected to 0009102000CAE9C during the audit.	115 kWh p.a. submitted against DVK0111 instead of WDV0111

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. Genesis is working to develop event based calculations, which will enable accurate volume calculations where lamps change part way through a month.

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

Change dates are automatically generated by RAMM when records change, but cannot be selected by the user. Changes are generally entered by TDC when the change is confirmed, and may be after the physical date of the change. For the bulk LED rollouts, a change date was not consistently provided by the contractor.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Oct-19 To: 31-Oct-19	The database is not confirmed as accurate with a 95% level of confidence as recorded in **section 3.1**. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in RAMM at the time that the change occurs. Eight items of load had a missing gear wattage, and two items of load had invalid gear wattages of zero. 89 items of load had invalid gear wattages for their lamp model description. Light ID 2642 (betacom 27w led) was incorrectly recorded with ICP 0009100000CADDC, and was corrected to 0009102000CAE9C during the audit. Potential impact: High Actual impact: Unknown Audit history: Three times Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls over the database are rated as weak, because there were a relatively large number of discrepancies identified during the field audit, particularly for Dannevirke. The impact is assessed to be low based on the kWh differences identified. The incorrect ICP number for one lamp has a minor impact, because the NSPs for the associated ICPs are in different balancing areas. 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
Genesis has only recently gained this customer as @ 01/10/2019, it is clear, the previous trader has not been proactive in dealing with Tararua DC database, which has led to a shortened review period for Genesis. Genesis will be working with Tararua DC over the next few months to cleanse the exceptions identified within the database.	01/03/2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Review the current council dataset and request the amendments to be updated asap. Genesis will continue to analyse the information provided by Tararua DC and provide them with the exceptions found to initiate the corrections.	01/03/2020	

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

All items of load have an ICP recorded against them. The accuracy of ICP identifiers was checked in **section 3.1**.

Audit outcome

Compliant

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

Code reference

Clause 11(2)(b) of Schedule 15.3

Code related audit information

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

Audit observation

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

Audit commentary

The database contains fields for the road name, location number, side, and GPS coordinates.

All items of load are locatable. 1,579 (99.75%) of the 1,583 items of load have GPS coordinates. The other four items of load have road names and location numbers which allow them to be mapped and located.

Audit outcome

Compliant

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

Code reference

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

Code related audit information

The 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 light make, light model, light wattage, gear make, gear model and gear wattage.

All items of load have a lamp model and lamp wattage recorded, and no items have invalid zero lamp wattages.

Eight items of load have a missing gear wattage, and a further two items of load have invalid gear wattages of zero. This is an improvement from 168 items of load with blank gear wattages identified in the previous audit.

Light ID	Road	Lamp Model	Lamp Wattage	Gear wattage	Expected gear wattage
427	MAIN ST NORTH (SH2)	150W HighPressureSodium Vapour	150		18
428	MAIN ST NORTH (SH2)	150W HighPressureSodium Vapour	150		18
429	MAIN ST NORTH (SH2)	150W HighPressureSodium Vapour	150		18
430	MAIN ST NORTH (SH2)	150W HighPressureSodium Vapour	150		18
431	MAIN ST NORTH (SH2)	150W HighPressureSodium Vapour	150		18
432	MAIN ST NORTH (WEST ACCESS)	150W HighPressureSodium Vapour	150		18
433	MAIN ST NORTH (WEST ACCESS)	150W HighPressureSodium Vapour	150		18

Light ID	Road	Lamp Model	Lamp Wattage	Gear wattage	Expected gear wattage
408	MAIN ST WEST (SH2)	300W Halogen	300		0
1358	HIGH ST (SH2)	100W HighPressureSodiumVapour	100	0	14
366	MAIN ST EAST (SH2)	250W HighPressureSodium Vapour	250	0	28
Total					**168**

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.4 With: Clause 11(2)(c) and (d) of Schedule 15.3 From: 01-Oct-19 To: 31-Oct-19	Eight items of load have a missing gear wattage, and a further two items of load have invalid gear wattages of zero. Potential impact: Medium Actual impact: Low Audit history: Twice Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as weak because they are not sufficient to ensure that wattage and gear information is consistently recorded. The impact is assessed to be low at 168 W or 717 kWh p.a. based on 4,271 burn hours p.a.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has only recently gained this customer as @ 01/10/2019, it is clear, the previous trader has not been proactive in dealing with Tararua DC database, which has led to a shortened review period for Genesis. Genesis will be working with Tararua DC over the next few months to cleanse the exceptions identified within the database.	01/03/2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Review the current council dataset and request the amendments to be updated asap. Genesis will continue to analyse the information provided by Tararua DC and provide them with the exceptions found to initiate the corrections.	01/03/2020	

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 258 items of load on 1 November 2019. The sample was selected from three strata, as follows:

1. Dannevirke ICP
2. Rural and Woodville ICPs
3. TDC Master ICP

Audit commentary

The field audit discrepancies are detailed in the table below:

Street	Database count	Field count	Light count difference	Wattage recorded incorrectly	Comments
Dannevirke ICP					
ALEXANDRA ST (D)	7	7	-	5	5 x L23 were recorded in the database as L27
ALLARDICE ST	19	19	-	11	2 x 150W HPS, 9 x L23 and 8 x L27 were recorded in the database as 5 x 40W LED and 14 x L27
BARRAUD ST	19	18	-1	6	2 x 150W SON, 4 x L23, 11 x L27 and 1 x unknown were recorded in the database as 3 x 40W LED and 16 x 27W LED *The unknown light is not recorded as a discrepancy because its correct wattage could not be confirmed. A recommendation is raised in* ***section 3.1.***
CLAUDIUS ST	6	6	-	6	6 x L27 were recorded in the database as 40W LED
COLLETT ST	2	2	-	1	1 x L23 was recorded in the database as L27
CUBA ST	2	2	-	2	2 x L23 were recorded in the database as L27
DRUMMOND ST (D)	3	3	-	2	2 x L23 were recorded in the database as L27

Street	Database count	Field count	Light count difference	Wattage recorded incorrectly	Comments
EMPIRE ST	4	4	-	2	2 x L23 were recorded in the database as L27
GRANT ST (D)	7	7	-	5	5 x L23 were recorded in the database as L27
HALL ST (D)	11	11	-	3	3 x L23 were recorded in the database as L27
NEW ST	3	3	-	2	2 x L23 were recorded in the database as L27
TENNYSON ST	11	11	-	7	7 x L23 and 4 x L27 were recorded in the database as 2 x 40W LED and 9 x L27
VICTORIA AVE	8	8	-	6	8 x L27 were recorded in the database as 6 x 40W LED and 2 x L27
WARD ST	8	8	-	1	1 x L23, 1 x L27 and 6 x unknown were recorded in the database as 2 x L23, 1 x 40W LED, 2 x L27 and 3 x 23W LED. *The unknown lights are not recorded as discrepancies because their correct wattage could not be confirmed. A recommendation is raised in* ***section 3.1.***
Rural and Woodville ICPs					
NORMANBY ST	4	3	-1	-	1 x L27 located south of the Normanby St/Bowen St corner was recorded in the database but not present on the street
ROSS ST (W)	19	19	-	3	Two Cree LEDway 20 LEDs between Pollen and Amelia Streets were recorded in the database as L27
TDC Master ICP					
BRIDGE ST	13	13	-	13	12 x L27 and 1 x L86 were recorded in the database as 13 x 40W LED
JONES ST	8	8	-	6	3 x L27 (poles P23542, P16810, P16806), 2 x L86 (pole L0013 and pedestrian crossing), 1 x L23 (pedestrian crossing) and 2 x belisha beacons were recorded as 8 x L27.

Street	Database count	Field count	Light count difference	Wattage recorded incorrectly	Comments
					The belisha beacons are not recorded as discrepancies because their correct wattage could not be confirmed. A recommendation is raised in ***section 3.1.***
MAIN ST NORTH (SH2)	5	5	-	1	One unlabelled LED likely to be L86 is recorded in the database as 150W HPS.
STANLY ST	13	13	-	13	13 x L27 were recorded in the database as 12 x 40W LED and 1 x 23W LED
VICTORIA ST	7	7	-	7	7 x L27 were recorded in the database as 40W LED
Grand Total	**258**	**256**	**-2**	**102**	

All lights checked during the field survey were present in the database. Wattage differences and lights which were not located during the field survey are recorded as non-compliance in **section 3.1**.

The previous audit found that Tararua Alliance believed some under verandah lights in Pahiatua were unmetered but not recorded in the database, and a recommendation was raised to check the lights and update the database as necessary. Tararua Alliance has been unable to arrange for an electrician to check these lights due to safety concerns as the buildings affected do not meet the current building standards or have a valid CoC. At this stage, Tararua Alliance believes at least some of the lights are metered through the buildings' electricity meters, and some may be unmetered. Checks will be completed once the building issues have been resolved, and I repeat the recommendation to maintain visibility.

Description	Recommendation	Audited party comment	Remedial action
All load recorded in the database	Check under the verandah lights in Pahiatua, and add them to the database if they are unmetered.	Genesis will liaise with Tararua DC as to how this field audit is tracking.	Identified

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 Genesis 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

Genesis' 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	Tararua District Council street lights
Strata	The database contains the TDC items of load for DUML ICPs in the Tararua region. The processes for the management of all TDC items of load are the same, but I decided to place the items of load into three strata: 1. Dannevirke ICP 2. Rural and Woodville ICPs 3. TDC Master ICP
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 31 sub-units.
Total items of load	258 items of load were checked, making up 10% of the database.

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority against the 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 258 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	97.2	Wattage from survey is lower than the database wattage by 2.8%
R_L	89.7	With a 95% level of confidence it can be concluded that the error could be between -10.3% and 6.8%
R_H	106.8	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 01/02/19. The table below shows that Scenario C (detailed below) applies, and the best available estimate is not precise enough to conclude that the database is accurate within ±5.0%.

- The variability of the sample results across the strata means that the true wattage (installed in the field) could be between 10.3% lower and 7.0% higher than the wattage recorded in the DUML database.
- 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 9 kW lower and 6 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 9,900 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 36,600 kWh p.a. lower and 24,100 kWh p.a. higher 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 %

The light type and wattage was unable to be confirmed during the field audit for seven lights recorded on Ward and Barraud St, and two belisha beacons on Jones St. 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.

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	Confirm the correct lamp and gear wattages for the unknown lights on Ward, Barraud and Jones streets.	Genesis will work with the Council to verify these assets specifications.	Identified

Light description and capacity accuracy

Eight items of load have a missing gear wattage, and a further two items of load have invalid gear wattages of zero as discussed in **section 2.4**. The missing and zero gear wattages are expected to result in under submission of 168 W or 717 kWh p.a. based on 4,271 burn hours p.a.

Lamp and gear wattages were compared to the expected values, and I found a further 89 items of load had gear wattages that did not match the expected values. The differences are expected to result in under submission of 889 W or 3,797 kWh p.a. based on 4,271 burn hours p.a.

All of the affected lights have NZTA ownership, and Tararua Alliance is awaiting confirmation of the correct wattages from NZTA before updating their database.

Model	Gear wattage	Expected gear wattage	Count of lights	Wattage difference x count	Comment
135W HighPressureSodium Vapour	13	36	21	183	Expected to be 135W low pressure sodium
	14	36	2	44	
	18	36	1	18	
150W HighPressureSodium Vapour	14	18	5	20	
250W HighPressureSodium Vapour	18	28	56	560	
90W High PressureSodium Vapour	14	30	4	64	Expected to be 90W low pressure sodium
Total			**89**	**889**	

ICP number and owner accuracy

As discussed in **section 2.2**, all items of load had ICP numbers recorded against them. I checked the database for roads where lights were connected to more than one ICP, and found Bevan St in Woodville had one light (ID 2642 betacom 27w led) connected to 0009100000CADDC (Dannevirke Street Lighting - Dannevirke Borough) in error. The ICP was corrected to 0009102000CAE9C (Street Lighting - Woodville Borough) during the audit.

Change management process findings

New connection, fault, maintenance, and upgrade work is completed by Scanpower and Powerco. Previously maintenance work was also completed by C & J Contractors. Since TDC's LED upgrade was completed in June 2018 there have been few changes to the database. Scanpower and Powerco have been asked to provide information when changes are made, and this is used to update RAMM. Invoices are checked against the RAMM data to ensure that all required changes are captured.

I walked through the new connections process.

- When a new subdivision is created an application is sent to TDC and planning approval is provided, then the streetlights are installed and connected by either Scanpower or Powerco. Tararua Alliance monitors construction and once a code of compliance and "as built" plans are provided the lights are vested in Council and added to the RAMM database. There have been no new subdivisions in the past three years.
- New connections for network extensions are initiated by TDC, and the new connection is completed by Scanpower or Powerco. TDC updates RAMM when the light is connected. Where possible TDC requests new flag lights to be solar.

NZTA lights are recorded in the database. NZTA does not provide information when lights are added or changed, and only work initiated by TDC is updated in the database. TDC has offered to assist by checking the NZTA lights and updating the database, but this has been declined while NZTA and NZ Streetlighting work to identify the NZTA lights and establish processes. TDC intends to investigate separating the NZTA lights to new ICPs, so that they can eventually be transferred to NZTA.

TDC is undergoing a tender process to determine a new contractor, who will be engaged to complete a lux survey and check pole spacing and condition. Once appointed, this contractor will complete their field inspections, and update any incomplete or inaccurate data using Pocket RAMM.

Tararua Alliance completes regular streetlight checks:

- in the towns, lights are checked for outages as part of the daily road sweeping process;
- each summer, lenses are cleaned, the lights are inspected; and
- each winter, lights are checked to confirm they are working.

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. Genesis is working to develop event based calculations, which will enable accurate volume calculations where lamps change part way through a month.

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

Change dates are automatically generated by RAMM when records change, but cannot be selected by the user. Changes are generally entered by TDC when the change is confirmed, and may be after the physical date of the change. For the bulk LED rollouts, a change date was not consistently provided by the contractor.

Festive lights

Festive lighting is used in Woodville and Dannevirke but Tararua Alliance advised it is connected to shops' electricity supplies not the streetlight circuits. This lighting is not included in the database.

Private lights

Tararua Alliance is not aware of any private unmetered lights.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Oct-19 To: 31-Oct-19	The database is not confirmed as accurate with a 95% level of confidence as recorded in **section 3.1**. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in RAMM at the time that the change occurs. Eight items of load had a missing gear wattage, and two items of load had invalid gear wattages of zero. 89 items of load had invalid gear wattages for their lamp model description. Light ID 2642 (betacom 27w led) was incorrectly recorded with ICP 0009100000CADDC, and was corrected to 0009102000CAE9C during the audit. Potential impact: High Actual impact: Unknown Audit history: Three times Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls over the database are rated as weak, because there were a relatively large number of discrepancies identified during the field audit, particularly for Dannevirke. The impact is assessed to be low based on the kWh differences identified. The incorrect ICP number for one lamp has a minor impact, because the NSPs for the associated ICPs are in different balancing areas. 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
Genesis has only recently gained this customer as @ 01/10/2019, it is clear, the previous trader has not been proactive in maintaining the asset information within Tararua DC's database. Genesis will be working with Tararua DC over the next few months to cleanse the exceptions identified within the database with the intent to meet the duml guidelines.	01/03/2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Review the current council dataset and request the amendments to be updated asap. Genesis will continue to analyse the information provided by Tararua DC and provide them with the exceptions found to initiate the corrections.	01/03/2020	

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

The ICPs switched to Genesis effective from 01/10/19. Genesis reconciles this DUML load using the CST profile for 0009102000CAE9C, 0009100000CADDC and 0009101000CAC7C, and RPS profile for 1000554957PC423. The correct profiles and submission types are recorded on the registry.

- Wattages are derived from a database extract provided by TDC each month. The field survey found that the best available estimate of field wattage is not precise enough to conclude that the database is accurate within ±5.0% as recorded in **section 3.1**.
- On and off times are derived from data logger information for 0009100000CADDC, 0009101000CAC7C and 0009102000CAE9C, and Astronomical Society night hours for 1000554957PC423.

I reviewed the submission information for October 2019, and confirmed that it was calculated accurately based on the database and data logger information.

Sources of inaccuracy are as follows:

Issue	Estimated volume information impact (annual kWh)
Eight items of load have a missing gear wattage, and a further two items of load have invalid gear wattages of zero.	Estimated under submission of 717 kWh p.a.
89 items of load had invalid gear wattages for their lamp model description.	Estimated under submission of 3,797 kWh p.a.
Light ID 2642 (betacom 27w led) was incorrectly recorded with ICP 0009100000CADDC, and was corrected to 0009102000CAE9C during the audit.	115 kWh p.a. submitted against DVK0111 instead of WDV0111

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. Genesis is working to develop event based calculations, which will enable accurate volume calculations where lamps change part way through a month.

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

Change dates are automatically generated by RAMM when records change, but cannot be selected by the user. Changes are generally entered by TDC when the change is confirmed, and may be after the physical date of the change. For the bulk LED rollouts, a change date was not consistently provided by the contractor.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 01-Oct-19 To: 31-Oct-19	The database is not confirmed as accurate with a 95% level of confidence as recorded in **section 3.1**. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in RAMM at the time that the change occurs. Eight items of load had a missing gear wattage, and two items of load had invalid gear wattages of zero. 89 items of load had invalid gear wattages for their lamp model description. Light ID 2642 (betacom 27w led) was incorrectly recorded with ICP 0009100000CADDC, and was corrected to 0009102000CAE9C during the audit. Potential impact: High Actual impact: Unknown Audit history: Three times Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls over the database are rated as weak, because there were a relatively large number of discrepancies identified during the field audit, particularly for Dannevirke. The impact is assessed to be low based on the kWh differences identified. The incorrect ICP number for one lamp has a minor impact, because the NSPs for the associated ICPs are in different balancing areas. 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
Genesis has only recently gained this customer as @ 01/10/2019, it is clear, the previous trader has not been proactive in maintaining the asset information within Tararua DC's database. Genesis will be working with Tararua DC over the next few months to cleanse the exceptions identified within the database with the intent to meet the duml guidelines.	01/03/2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Review the current council dataset and request the amendments to be updated asap. Genesis will continue to analyse the information provided by Tararua DC and provide them with the exceptions found to initiate the corrections.	01/03/2020	

CONCLUSION

The TDC ICPs switched from Contact to Genesis effective from 01/10/19.

Streetlight load is determined by wattages held within TDC's RAMM database, which is managed by Tararua Alliance and TDC. New connection, fault, maintenance, and upgrade work is completed by Scanpower and Powerco. Previously maintenance work was also completed by C & J Contractors. Since TDC's LED upgrade was completed in June 2018 there have been few changes to the database. Scanpower and Powerco have been asked to provide information when changes are made, and this is used to update RAMM.

NZTA lights are recorded in the database. NZTA does not provide information when lights are added or changed, and only work initiated by TDC is updated in the database. TDC has offered to assist by checking the NZTA lights and updating the database, but this has been declined while NZTA and NZ Streetlighting work to identify the NZTA lights and establish processes. TDC intends to investigate separating the NZTA lights to new ICPs, so that they can eventually be transferred to NZTA.

TDC is undergoing a tender process to determine a new contractor, who will be engaged to complete a lux survey and check pole spacing and condition. Once appointed, this contractor will complete their field inspections, and update any incomplete or inaccurate data using Pocket RAMM.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	97.2	Wattage from survey is lower than the database wattage by 2.8%
R_L	89.7	With a 95% level of confidence it can be concluded that the error could be between -10.3% and 6.8%
R_H	106.8	

The variability of the sample results across the strata means that the true wattage (installed in the field) could be between 10.3% lower and 7.0% higher than the wattage recorded in the DUML database, and the best available estimate is not precise enough to conclude 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 9 kW lower and 6 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 9,900 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 36,600 kWh p.a. lower and 24,100 kWh p.a. higher than the database indicates.

Genesis reconciles the DUML load for 0009100000CADDC, 0009101000CAC7C and 0009102000CAE9C using the CST profile and 1000554957PC423 using the RPS profile. Wattages are derived from a database extract provided by TDC each month. On and off times are derived from data logger information for 0009100000CADDC, 0009101000CAC7C and 0009102000CAE9C, and Astronomical Society night hours for 1000554957PC423.

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 Genesis completes revision submissions where corrections are required. Genesis is working to develop event based calculations, which will enable accurate volume calculations where lamps change part way through a month.

The future risk rating of 12 indicates that the next audit be completed in 12 months. I agree with this recommendation, as it will allow time for Genesis and TDC to work together to resolve the issues.

PARTICIPANT RESPONSE

Genesis has only just gained the contract for this council in October 2019. Genesis has already been in contact with Tararua District Council and Scan Power who maintain the asset information. Scan Power provide a summary of information which Genesis has requested a complete asset extraction verifying asset properties.

Genesis and Scan Power have had discussions around the NZTA, however these are NZTA Manawatu Assets. Genesis has requested scan power to continue providing the NZTA asset information as Genesis would require NZTA Manawatu to except any ICP's that may be required to separate the NZTA assets from Council assets.