ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

TARARUA DISTRICT COUNCIL AND GENESIS ENERGY LIMITED

Prepared by: Rebecca Elliot

Date audit commenced: 1 July 2020

Date audit report completed: 28 August 2020

Audit report due date: 1 September 2020

TABLE OF CONTENTS

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.

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. TDC are in the process tendering the maintenance work.

The database found a high level of error and I recommend that a 100% field audit if the TDC lights is undertaken to bring the database within the acceptable accuracy thresholds.

NZTA lights are recorded in the database. They do not provide information when lights are added or changed, and only work initiated by TDC is updated in the database. The NZTA RAMM database for these lights is being updated and the NZTA lights currently recorded in the TDC RAMM database are expected to be transferred to the NZTA RAMM database once the work presently underway by NZ streetlighting has been completed. This is expected in the next 2-3 months.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	83.0	Wattage from survey is lower than the database wattage by 17.0%
R_L	75.6	With a 95% level of confidence it can be concluded that the error could be between -24.4% and -10.6%
R_H	89.4	

The variability of the sample results across the strata means that the true wattage (installed in the field) could be between 24.4% and 10.6% lower than the wattage recorded in the DUML database.

- In absolute terms the installed capacity is estimated to be 14 kW lower than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 9 kW and 20kW lower than the database.
- In absolute terms, total annual consumption is estimated to be 61,000 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 38,100 kWh to 87,500 kWh p.a. lower than the database indicates.

There is a 95% level of confidence that the annual consumption is between 38,100 kWh to 87,500 kWh p.a. lower than the database indicates.

The future risk rating of 29 indicates that the next audit be completed in three months. I have considered this in conjunction with Genesis' comments, the time needed to affect change and I recommend that the next audit be undertaken in six months' time.

The matters raised are detailed in the table 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	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 61,000 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Eight items of load had a missing gear wattage, and two items of load had invalid gear wattages of zero. 55 items of load had invalid gear wattages for their lamp model description resulting in an estimated under submission of 2,208 kWh per annum. Festive lighting in Woodville and Dannevirke not recorded in the database.	Weak	High	9	Investigating
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.	Moderate	Low	2	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 61,000 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Eight items of load had a missing gear wattage, and two items of load had invalid gear wattages of zero. 28 items of load have the incorrect lamp description. 55 items of load had invalid gear wattages for their lamp model description resulting in an estimated under submission of 2,208 kWh per annum.	Weak	High	9	Investigating

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			Festive lighting in Woodville and Dannevirke not recorded in the database.				
Volume information accuracy	3.2	15.2 and 15.37B(c)	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 61,000 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Eight items of load had a missing gear wattage, and two items of load had invalid gear wattages of zero. 55 items of load had invalid gear wattages for their lamp model description resulting in an estimated under submission of 2,208 kWh per annum. Festive lighting in Woodville and Dannevirke not recorded in the database.	Weak	High	9	Investigating
Future Risk Rating						29	

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.
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	100% field audit of the TDC lights required to bring database up to acceptable accuracy level.

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

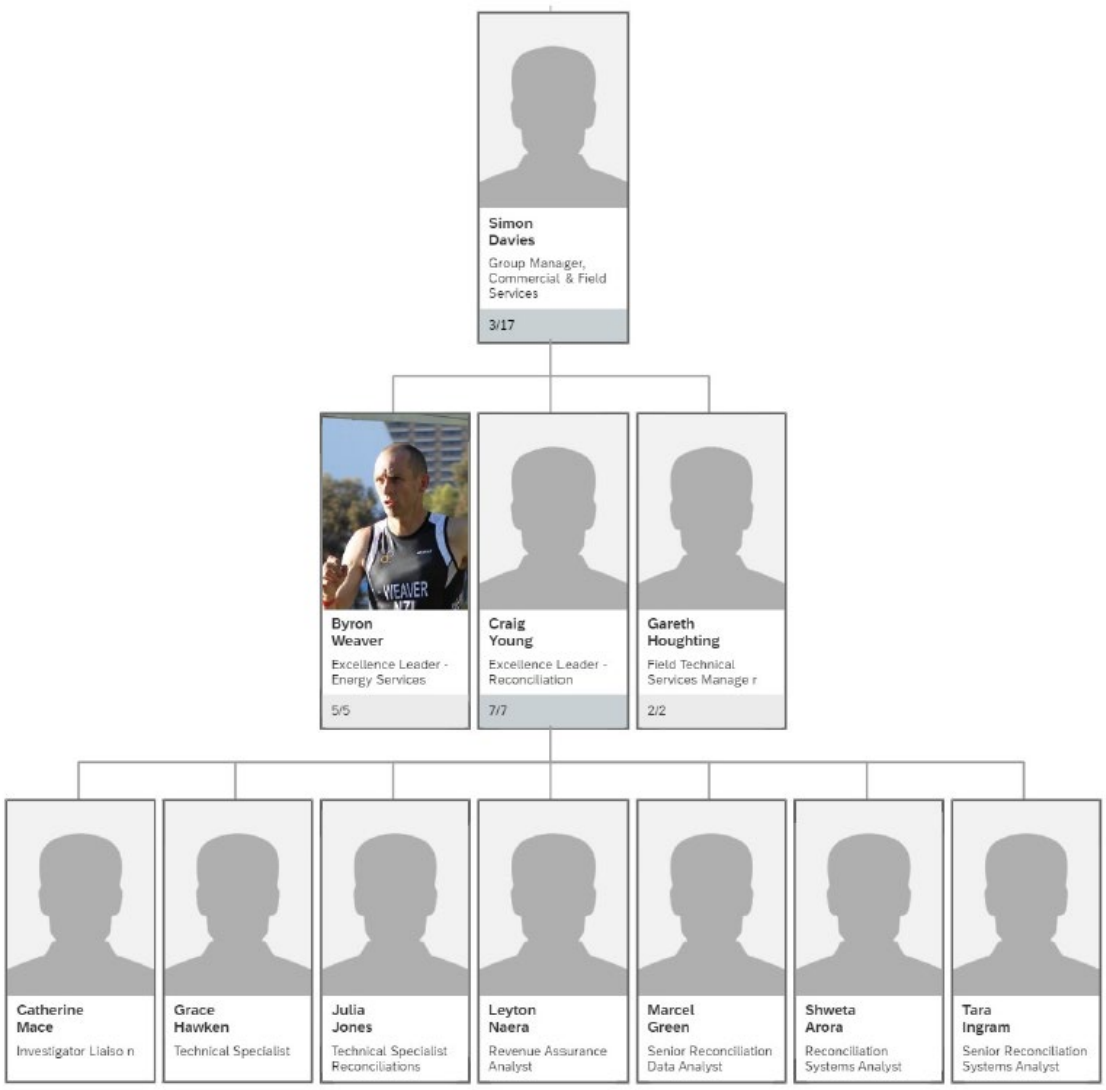
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

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:

Rebecca Elliot

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Jamie Hughes	Urban Supervisor	Tararua Alliance
Nicky Campbell	Asset Information Technician	Tararua Alliance
Peter van der Wel	Asset Engineer	Tararua Alliance
Wilson Duff	Project Supervisor	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.

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

1.5. Breaches or Breach Allegations

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

1.6. ICP Data

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0009100000CADDC	Dannevirke Street Lighting - Dannevirke Borough	DVK0111	CST	777	32,993
0009101000CAC7C	Street Lighting - Rural Streetlighting	DVK0111	CST	81	2,444
0009102000CAE9C	Street Lighting - Woodville Borough	WDV0111	CST	278	19,514
1000554957PC423	TDC Master stlight - cnr Mangamaire & Tutaekara Road	MGM0331	RPS	444	29,039
Total				**1,580**	**83,990**

As reported in the last audit, 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 repeat the last audit's recommendation 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 emailed Meridian and advised the simplest resolution is to switch the site to Genesis. Genesis will work through how to onboard the site and add to the current account.	Investigating

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.

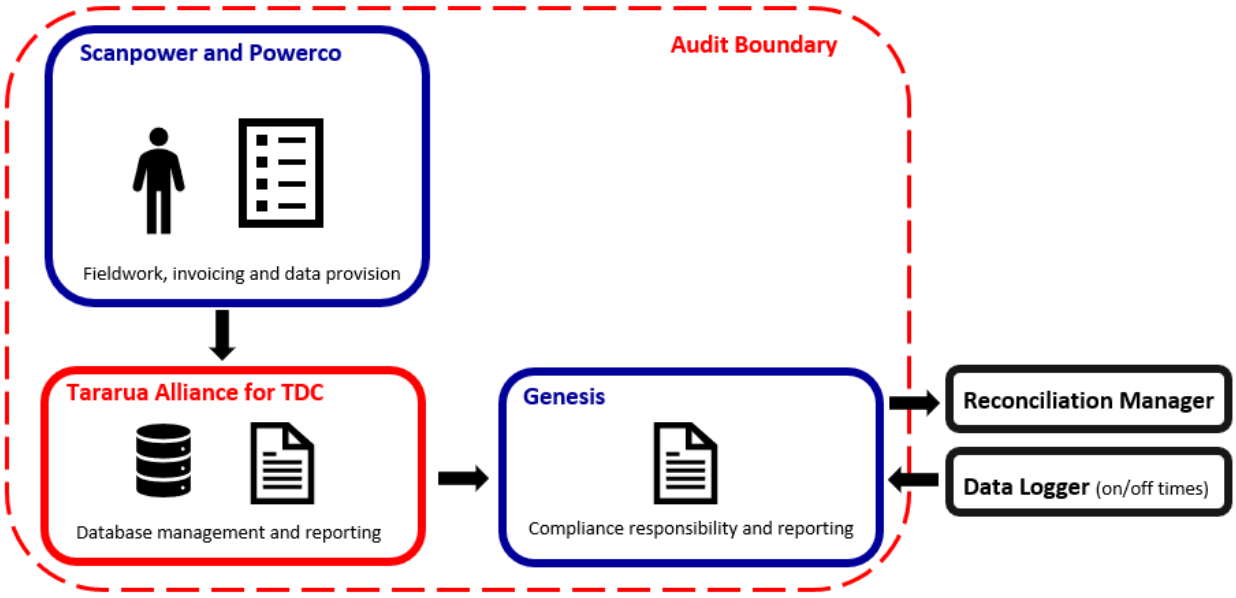
The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

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. 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. They do not provide information when lights are added or changed, and only work initiated by TDC is updated in the database. The NZTA RAMM database is being updated and the NZTA lights currently recorded in the TDC RAMM database are expected to be transferred to the NZTA database once the work presently underway by NZ streetlighting has been completed. This is expected in the next 2-3 months.

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.

TDC is still undergoing a tender process to determine a new contractor, this is expected to be awarded in November 2020. Once appointed, this contractor will complete their field inspections, and update any incomplete or inaccurate data using Pocket RAMM.



The field audit was undertaken of a statistical sample of 159 items of load on 27 August 2020.

1.9. Summary of previous audit

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

Table of Non-compliance

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	The database is not confirmed as accurate with a 95% level of confidence as recorded in **section 3.1**.	Still existing
			The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Still existing
			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.	Cleared
			Eight items of load had a missing gear wattage, and two items of load had invalid gear wattages of zero.	Still existing
			89 items of load had invalid gear wattages for their lamp model description.	Still existing
			Light ID 2642 (betacom 27w led) was incorrectly recorded with ICP 0009100000CADDC and was	Cleared

Subject	Section	Clause	Non-compliance	Status
			corrected to 0009102000CAE9C during the audit.	
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.	Still existing
Database accuracy	3.1	15.2 and 15.37B(b)	The database is not confirmed as accurate with a 95% level of confidence 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.	Still existing Still existing Cleared Still existing Still existing Cleared
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.	Still existing Still existing Cleared Still existing Still existing

Subject	Section	Clause	Non-compliance	Status
			Light ID 2642 (betacom 27w led) was incorrectly recorded with ICP 0009100000CADDC and was corrected to 0009102000CAE9C during the audit.	Cleared

Table of Recommendations

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	Still existing
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.	Still existing
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.	Cleared

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 using the CST profile. On and off times are derived from data logger information. Wattages are derived from a database extract provided by TDC each month.

I reviewed the submission information for May 2020 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)
Database inaccuracy indicating over submission	Estimated over submission of 61,000 kWh p.a.
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.
55 items of load had invalid gear wattages for their lamp model description.	Estimated under submission of 2,208 kWh p.a.
Festive lights not recorded in the database	Unknown but is likely to be minor.

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.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Nov-19 To: 31-Jul-20	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 61,000 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Eight items of load had a missing gear wattage, and two items of load had invalid gear wattages of zero. 55 items of load had invalid gear wattages for their lamp model description resulting in an estimated under submission of 2,208 kWh per annum. Festive lighting in Woodville and Dannevirke not recorded in the database. Potential impact: High Actual impact: High Audit history: Multiple times Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls over the database are rated as weak, because there were a relatively large number of discrepancies indicating that the data capture has a high rate of error. The audit risk rating is assessed to high due to the estimated over submission occurring due to the database inaccuracy.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has engaged with the council to initiate a review of the current information and establish a corrective process. Genesis has had confirmation that the programme of work in the Manawatu region for NZTA assets is progressing well and it would be expecting the NZTA to complete its work in the area within the time frame outlined in the audit.	03/2021	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will need to review the current processes in place to populate the asset information. Further training maybe required due to inaccurate information being populated by the contracted third parties. The council is in the tender process to recontract the maintenance programme for the current assets owned by the council, is currently underway. Genesis will be discussing the need for a 100% field audit.	03/2021	

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.

As recorded in the last audit there are eight items of load have a missing gear wattage, and a further two items of load have invalid gear wattages of zero:

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
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**

These are all NZTA lights and TDC do not have permission to update them. Reconciliation of the NZTA lights is expected to be moved to the NZTA database within the next 2-3 months. This is discussed in **section 3.1**.

The accuracy of lamp descriptions, wattage and ballast is discussed in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.4 With: Clause 11(2)(c) and (d) of Schedule 15.3 From: 01-Oct-19 To: 31-Jul-20	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: Three times Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate as TDC have robust controls for the updating of the council lights, and the NZTA lights will be moved to the NZTA RAMM in the next 2-3 months. The audit risk rating 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
TDC has already made the necessary gear wattage corrections and confirmed this in the August 2020 data set provided.	01/09/2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
NZTA to remove their assets from TDCs database within the next 2-3 months.		

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 159 items of load on 27 August 2020. 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
ALEXANDRA ST (D)	7	7	-	5	5 x L23 were recorded in the database as L27
ALLAN ST	7	7	-	1	1 x 23W LED recorded in the database as a 40W LED
ALMA ST	12	11	-1	-	1 x 40W LED not found in the field.
CLAUDIUS ST	6	6	-	6	6 x 27W LED were recorded in the database as 40W LED
LONDON ST	5	5	-	5	6 x 23W LED were recorded in the database as 27W LED
STATION ST (D)	4	2	-2		2 x LEDs not found in the field
SWINBURN ST	14	14	-	2	2 x 23W LEDs were recorded in the database as 40W LED
TENNYSON ST	11	11	-	2	2 x 23W LEDs were recorded in the database as 40W LED
BRIGHT ST	2	2		2	2 x 27W LEDs were recorded in the database as 40W LED
JONES ST	8	3	-5	-	5 x 27W LED not found in the field.
MAIN ST SOUTH (WEST ACCESS)	8	7	-1	2	1x 27W LED not found in the field 2 x27W LED were recorded in the database as 23W LED
SIMPSON ST	3	3	-	3	3 x 27W LED recorded in the database as 40W LED
STANLY ST	13	13	-	13	13 x 27W LED recorded in the database as 12 x 40W LED and 1 x 23W LED
BEVAN ST	2	2	-	1	1 x 27W LED recorded as 40W LED in the database
BOWEN ST (W)	10	10			10x 27W LED recorded as 40W LED in the database
HAMPSON ST	1	0	-1		No lights present in Hampson St

Street	Database count	Field count	Light count difference	Wattage recorded incorrectly	Comments
TAY ST	9	9	-	9	9 x 27W LED recorded in the database as 8 x 40W LED and 1 x 23W LED
Grand Total	**159**	**256**	**--10**	**51**	

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**.

As reported in the previous two audits, 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 has requested the inclusion/review of these lighting assets to be included/amended in the database	Investigating

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 May 2020 and I assessed the accuracy of this by using the DUML Statistical Sampling Guideline. The table below shows the survey plan.

Plan Item	Comments
Area of interest	Tararua District Council streetlights
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 2. Paihiatua 3. Woodville.
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	159 items of load were checked.

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority against the database or in the case of LED lights against the LED light specification.

The change management process and timeliness of database updates was evaluated.

Audit commentary

Field audit findings

A field audit was conducted of a statistical sample of 159 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	83.0	Wattage from survey is lower than the database wattage by 17.0%
R_L	75.6	With a 95% level of confidence it can be concluded that the error could be between -24.4% and -10.6%
R_H	89.4	

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 B (detailed below) applies, and the database has poor accuracy, demonstrated with statistical significance 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 24.4% and 10.6% lower than the wattage recorded in the DUML database.
- In absolute terms the installed capacity is estimated to be 14 kW lower than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 9 kW and 20kW lower than the database.
- In absolute terms, total annual consumption is estimated to be 61,000 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 38,100 kWh to 87,500 kWh p.a. lower than the database indicates.

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

Due to the high level of error found in the field I recommend that a 100% field audit of the TDC lights only is undertaken. I have excluded the NZTA lights as these will be being moved to the NZTA RAMM database.

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	100% field audit of the TDC lights required to bring database up to acceptable accuracy level.	Genesis will be discussing the need for the field audit to validate the lamp information within its database. Over the next 2-3 months it is likely the NZTA assets will be removed through an NZTA sponsored program of work.	Investigating

Light description and capacity accuracy

As reported in the last audit, 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.

All of the affected lights have NZTA ownership, NZTA will not give Tararua Alliance permission to correct these. As detailed in **section 2.1**, these lights are wattages from NZTA before updating their database.

Lamp and gear wattages were compared to the expected values, and I found a further 55 items of load had gear wattages that did not match the expected values and the light description was incorrect for 28 lamps. The differences are expected to result in under an estimated under submission of 517 W or 2,208 kWh p.a. based on 4,271 burn hours p.a.

Model	Gear wattage	Expected gear wattage	Count of lights	Wattage difference x light count	Comment
135W HighPressureSodium Vapour	13	36	24	183	Expected to be 135W low pressure sodium
250W HighPressureSodium Vapour	18	28	27	270	
90W High PressureSodium Vapour	14	30	4	64	Expected to be 90W low pressure sodium
Total			**55**	**517**	

43 of these lights belong to NZTA, who have not given TDC permission to change their data. This is discussed in **section 2.1**. The remaining 12 lights belong to TDC.

ICP number 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 none. Compliance is confirmed.

Change management process findings

I walked through the new connection, fault, maintenance, and upgrade work processes. This is completed by Scanpower and Powerco. They 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.

The new connections process remains unchanged from the previous audit.

- 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 four 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. They do not provide information when lights are added or changed, and only work initiated by TDC is updated in the database. The NZTA RAMM database is being updated and the NZTA lights currently recorded in the TDC RAMM database are expected to be transferred to the NZTA database once the work presently underway by NZ streetlighting has been completed. This is expected in the next 2-3 months.

TDC is still undergoing a tender process to determine a new contractor, this is expected to be awarded in November 2020. Once appointed, this contractor will complete their field inspections, and update any incomplete or inaccurate data using Pocket RAMM.

Tararua Alliance continues to complete 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. The date of installation recorded on the as built is used as the liven date.

Festive lights

Festive lighting is used in Woodville and Dannevirke. This lighting was thought to be plugged in to the shop's electricity supplies but Tararua Alliance confirmed it is connected into the streetlight circuit and therefore should be included in the database when connected. This is recorded as non-compliance.

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: 31-Oct-19 To: 31-Jul-20	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 61,000 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Eight items of load had a missing gear wattage, and two items of load had invalid gear wattages of zero. 28 items of load have the incorrect lamp description. 55 items of load had invalid gear wattages for their lamp model description resulting in an estimated under submission of 2,208 kWh per annum. Festive lighting in Woodville and Dannevirke not recorded in the database. Potential impact: High Actual impact: High Audit history: Multiple times Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls over the database are rated as weak, because there were a relatively large number of discrepancies indicating that the data capture has a high rate of error. The audit risk rating is assessed to high due to the estimated over submission occurring due to the database inaccuracy.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has engaged with the council to initiate a review of the current information and establish a corrective process. Genesis has had confirmation that the programme of work in the Manawatu region for NZTA assets is progressing well and it would be expecting the NZTA to complete its work in the area within the time frame outlined in the audit.	03/2021	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will need to review the current processes in place to populate the asset information. Further training maybe required due to inaccurate information being populated by the contracted third parties. The council is in the tender process to recontract the maintenance programme for the current assets owned by the council, is currently underway. Genesis will be discussing the need for a 100% field audit.	03/2021	

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

Genesis reconciles the DUML using the CST profile. On and off times are derived from data logger information. Wattages are derived from a database extract provided by TDC each month.

I reviewed the submission information for May 2020 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)
Database inaccuracy indicating over submission	Estimated over submission of 61,000 kWh p.a.
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.
55 items of load had invalid gear wattages for their lamp model description.	Estimated under submission of 2,208 kWh p.a.
Festive lights not recorded in the database	Unknown but is likely to be minor.

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.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 01-Nov-19 To: 31-Jul-20	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 61,000 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Eight items of load had a missing gear wattage, and two items of load had invalid gear wattages of zero. 55 items of load had invalid gear wattages for their lamp model description resulting in an estimated under submission of 2,208 kWh per annum. Festive lighting in Woodville and Dannevirke not recorded in the database. Potential impact: High Actual impact: High Audit history: Multiple times Controls: Weak Breach risk rating: 9
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 indicating that the data capture has a high rate of error. The audit risk rating is assessed to high due to the estimated over submission occurring due to the database inaccuracy.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has engaged with the council to initiate a review of the current information and establish a corrective process. Genesis has had confirmation that the programme of work in the Manawatu region for NZTA assets is progressing well and it would be expecting the NZTA to complete its work in the area within the time frame outlined in the audit.	03/2021	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will need to review the current processes in place to populate the asset information. Further training maybe required due to inaccurate information being populated by the contracted third parties. The council is in the tender process to recontract the maintenance programme for the current assets owned by the council, is currently underway. Genesis will be discussing the need for a 100% field audit.	03/2021	

CONCLUSION

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. TDC are in the process tendering the maintenance work.

The database found a high level of error and I recommend that a 100% field audit is undertaken to bring the database within the acceptable accuracy thresholds.

NZTA lights are recorded in the database. They do not provide information when lights are added or changed, and only work initiated by TDC is updated in the database. The NZTA RAMM database is being updated and the NZTA lights currently recorded in the TDC RAMM database are expected to be transferred to the NZTA database once the work presently underway by NZ streetlighting has been completed. This is expected in the next 2-3 months.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	83.0	Wattage from survey is lower than the database wattage by 17.0%
R_L	75.6	With a 95% level of confidence it can be concluded that the error could be between -24.4% and -10.6%
R_H	89.4	

The variability of the sample results across the strata means that the true wattage (installed in the field) could be between 24.4% and 10.6% lower than the wattage recorded in the DUML database.

- In absolute terms the installed capacity is estimated to be 14 kW lower than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 9 kW and 20kW lower than the database.
- In absolute terms, total annual consumption is estimated to be 61,000 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 38,100 kWh to 87,500 kWh p.a. lower than the database indicates.

The future risk rating of 29 indicates that the next audit be completed in three months. I have considered this in conjunction with Genesis' comments, the time needed to affect change and I recommend that the next audit be undertaken in six months' time.

PARTICIPANT RESPONSE

Genesis will be working with the council to assist in making the necessary amendments, with the intent to improve accuracy levels of the asset information.