ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

STRATFORD DISTRICT COUNCIL AND GENESIS ENERGY LIMITED NZBN: 9429037706609

Prepared by: Rebecca Elliot

Date audit commenced: 13 May 2022

Date audit report completed: 27 May 2022

Audit report due date: 2 July 2022

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EXECUTIVE SUMMARY

This audit of the **Stratford District Council (SDC)** 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 database is remotely hosted by thinkproject New Zealand Ltd . The field work and asset data capture are conducted by NPE Tech who are responsible for fault, maintenance, and upgrade work for streetlights, and maintain the database.

A monthly report from the database was being provided to Genesis by SDC up until January 2022, I recommend that they ensure that monthly wattage reports are sent as any changes made since January will not be reflected in submission.

The NZTA lights on ICP 0080012045PC49C and 0089352001PC37D recorded in the SDC RAMM database were expected to be transferred to the NZTA database and these ICPs decommissioned as the load associated is now being reconciled by NZTA. Genesis is the trader for both customers and I recommend that they liaise with their customers to resolve this issue. A handful of items of load continue to be reconciled against these ICPs as detailed below:

ICP	Submitted kWh Value	Expected kWh Value	No. of fittings
0080012045PC49C	233	0	4
0089352001PC37D	247	0	13
Total	480	0	17

This will result in an estimated over submission by Genesis of approximately 480 kWh per month and a total of 5,280 kWh, for the period from June 2021 (when the NZTA lights were to be removed from reconciliation) to April 2022.

The field audit was undertaken of a statistical sample of 127 items of load on 19 May 2022. The field audit confirmed that the database accuracy is within the allowable +/-5% threshold.

The audit found six non-compliances, makes three new recommendations, and repeats one recommendation. The future risk rating of 19 indicates that the next audit be completed in three months. I have considered this in conjunction with Genesis's comments and recommend that the next audit be in six months.

The matters raised are detailed below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Deriving submission information	2.1	11(1) of Schedule 15.3	No database extracts have been received since January 2022 resulting in an estimated very minor under submission of 59.65 kWh for ICP 0089352004PCE32 for the month of May 2022. Estimated over submission of 5,280 kWh for the NZTA lights that are being reconciled in both the SDC and NZTA RAMM database. Ten unmetered decorative lights are not recorded in RAMM. This may result in estimated under submission of 170W or 726 kWh p.a. Eight unmetered Christmas lights are not recorded in RAMM. This may result in estimated under submission of 120W or 50.4 kWh p.a. 85 items of load do not have an ICP number recorded resulting in a potential estimated under submission of 24.431 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. 21 lamps have incorrect total wattages, resulting in an estimated under submission of 8,551 kWh per annum.	Moderate	Medium	4	Identified
ICP identifier and items of load	2.2	11(2)(a) and (aa) of Schedule 15.3	85 items of load do not have an ICP number recorded resulting in an estimated under submission of 24,431 kWh per annum.	Moderate	Medium	4	Investigating
Description and	2.4	11(2)(c) and (d) of	Two lamps have an unknown lamp model, and a missing	Strong	Low	1	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
capacity of load		Schedule 15.3	lamp wattage, one has missing gear wattage.				
All load recorded in database	2.5	11(2A) of Schedule 15.3	Two additional lights found in the field from the sample of 127 lights checked. Ten unmetered decorative lights are not recorded in RAMM. This may result in estimated under submission of 170W or 726 kWh p.a. Eight unmetered Christmas lights are not recorded in RAMM. This may result in estimated under submission of 120W or 50.4 kWh p.a.	Moderate	Low	2	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	21 lamps have incorrect total wattages, resulting in an estimated under submission of 8,551 kWh per annum. Eight unmetered Christmas lights are not recorded in RAMM. This may result in estimated under submission of 120W or 50.4 kWh p.a. Ten unmetered decorative lights are not recorded in RAMM. This may result in estimated under submission of 170W or 726 kWh p.a. 85 items of load do not have an ICP number recorded resulting in a potential estimated under submission of 24.431 kWh per annum.	Moderate	Medium	4	Identified
Volume information accuracy	3.2	15.2 and 15.37B(c)	No database extracts have been received since January 2022 resulting in an estimated very minor under submission of 59.65 kWh for ICP 0089352004PCE32 for the month of May 2022. Estimated over submission of 5,280 kWh for the NZTA lights that are being reconciled in both the SDC and NZTA RAMM database.	Moderate	Medium	4	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			Ten unmetered decorative lights are not recorded in RAMM. This may result in estimated under submission of 170W or 726 kWh p.a. Eight unmetered Christmas lights are not recorded in RAMM. This may result in estimated under submission of 120W or 50.4 kWh p.a. 85 items of load do not have an ICP number recorded resulting in a potential estimated under submission of 24.431 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. 21 lamps have incorrect total wattages, resulting in an estimated under submission of 8,551 kWh per annum.				
Future Risk Rating						19	

Future risk rating	0	1-4	5-8	9-15	16-18	19+
Indicative audit frequency	36 months	24 months	18 months	12 months	6 months	3 months

RECOMMENDATIONS

Subject	Section	Recommendation
Deriving submission information	2.1	Ensure monthly reports are being received from SDC.
		Genesis work with NZTA and SDC to resolve the recording of NZTA lights in the SDC database.
Database Accuracy	2.2	Investigate and determine where the lights are connected to determine if they should be included in the DUML audit.
Christmas and decorative lights	2.5	Add the Christmas and decorative lights to RAMM. Communicate on and off dates for Christmas lights to Genesis.

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

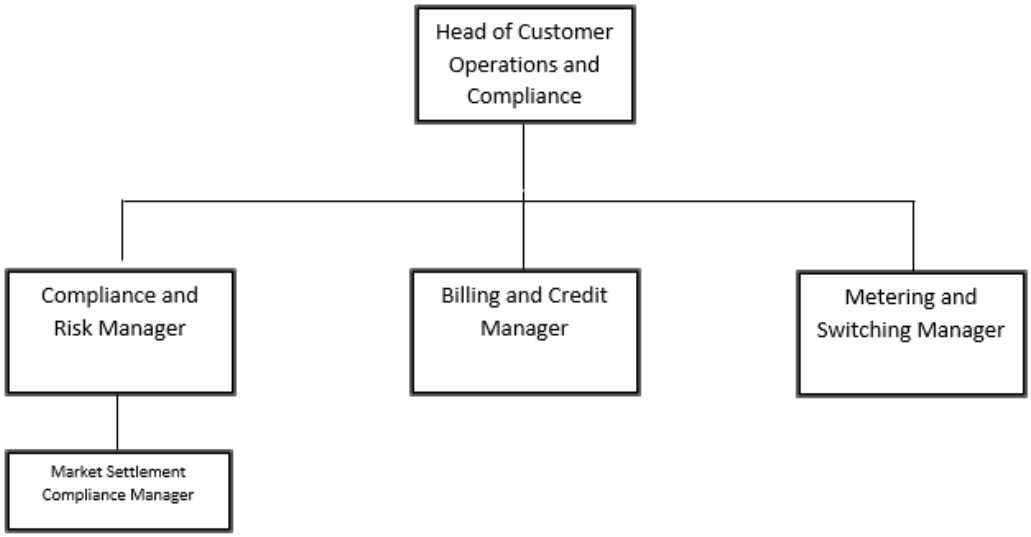
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

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

Auditors:

Name	Company	Role
Rebecca Elliot	Veritek Limited	Lead Auditor
Claire Stanley	Veritek Limited	Supporting Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Steve Bowden	Roading Asset Manager	Stratford District Council
Julia Jones	DUML Data & Stakeholder Lead - Market Settlement Compliance	Genesis

1.4. Hardware and Software

The SQL database used for the management of DUML is remotely hosted by thinkproject New Zealand Limited (formerly RAMM NZ 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. thinkproject New Zealand Limited backs up the database and assists with disaster recovery as part of their hosting service.

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)
0089352004PCE32	STRATFORD DISTRICT DRAWING 9807	SFD0331	NST	730	19,097
0080012045PC49C	CARRIAGEWAY LIGHTING	SFD0331	NST	179	24,213
0089352001PC37D	UNDER VERANDA LIGHTS	SFD0331	NST	186	9,284
TOTAL				**1,111**	**52,751**

The NZTA lights on ICP 0080012045PC49C and 0089352001PC37D recorded in the SDC RAMM database were expected to be transferred to the NZTA database and these ICPs decommissioned as the load associated is now being reconciled by NZTA. Genesis is the trader for both customers and I recommend in **section 2.1**, that they liaise with their customers to resolve this issue.

NPE Tech undertake maintenance work on the NZTA lights, and this is updated in RAMM and included in the monthly trader report. The NZTA lights are being reconciled from the NZTA database and also the SDC database.

1.7. Authorisation Received

All information was provided directly by Genesis or SDC.

1.8. Scope of Audit

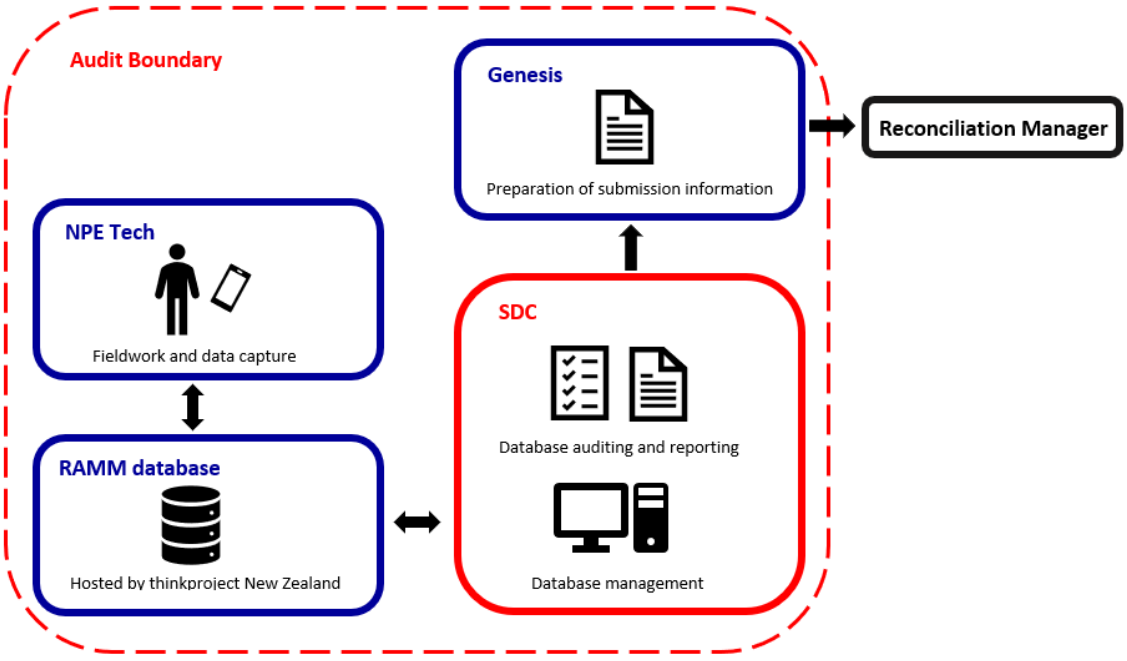
This audit of the SDC DUML database and processes was conducted at the request of Genesis in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

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

A RAMM database is held by SDC, who is Genesis' customer. NPE Tech are responsible for fault, maintenance, and upgrade work for streetlights, and maintain the database.

A monthly report from the database was being provided to Genesis by SDC up until January 2022. Genesis is still using the report dated January 202 to calculate submissions. Genesis reconciles the DUML load as NHH using the NST profile. Submission on and off times are derived from data logger information.

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



The field audit was undertaken of a statistical sample of 127 items of load on 19 May 2022.

1.9. Summary of previous audit

The previous audit of this database was undertaken by Rebecca Elliot of Veritek Limited in September 2021. The summary table below shows the statuses of the non-compliances raised in the previous audit. Further comment is made in the relevant sections of this report.

Table of Non-compliance

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	Estimated over submission of 49,635 kWh for the NZTA lights that were being reconciled in the SDC and NZTA RAMM database. Ten unmetered decorative lights are not recorded in RAMM. This may result in estimated under submission of 1,700W or 726 kWh p.a. Eight unmetered Christmas lights are not recorded in RAMM. This may result in estimated under submission of 120 W or 50.4 kWh p.a. The database is outside of the allowable +/-5% threshold. In absolute terms, total annual consumption is estimated to be 1,500 kWh higher than the DUML database indicates. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Still exiting for some load Still existing Still existing Cleared Still existing
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	One light has an unknown lamp model, and a missing lamp wattage and gear wattage.	Still existing for different lamp
All load recorded in database	2.5	11(2A) of Schedule 15.3	Four additional lights found in the field from the sample of 154 lights checked. Ten unmetered decorative lights are not recorded in RAMM. This may result in estimated under submission of 1,700W or 726 kWh p.a. Eight unmetered Christmas lights are not recorded in RAMM.	Still existing for different lamps Still existing Still existing

Database accuracy	3.1	15.2 and 15.37B(b)	The database is outside of the allowable +/-5% threshold. In absolute terms, total annual consumption is estimated to be 1,500 kWh higher than the DUML database indicates. Ten unmetered decorative lights are not recorded in RAMM. This may result in estimated under submission of 1,700W or 726 kWh p.a. Eight unmetered Christmas lights are not recorded in RAMM. This may result in estimated under submission of 120 W or 50.4 kWh p.a.	Cleared Still existing Still existing
Volume information accuracy	3.2	15.2 and 15.37B(c)	Estimated over submission of 49,635 kWh for the NZTA lights that were being reconciled in the SDC and NZTA RAMM database. Ten unmetered decorative lights are not recorded in RAMM. This may result in estimated under submission of 1,700W or 726 kWh p.a. Eight unmetered Christmas lights are not recorded in RAMM. This may result in estimated under submission of 120 W or 50.4 kWh p.a. The database is outside of the allowable +/-5% threshold. In absolute terms, total annual consumption is estimated to be 1,500 kWh higher than the DUML database indicates. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Still exiting for some load Still existing Still existing Cleared Still existing

Table of Recommendations

Subject	Section	Description	Recommendation	**Status**
Christmas and decorative lights	2.5	Christmas and decorative lights	Add the Christmas and decorative lights to RAMM. Communicate on and off dates for Christmas lights to Genesis.	Still existing

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:

- *by 1 June 2018 (for DUML that existed prior to 1 June 2017)*
- *within three months of submission to the reconciliation manager (for new DUML)*
- *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 as NHH using the NST profile. Wattages are derived from an extract provided by SDC. The last wattage report provided to Genesis by SDC was in January 2022. I recommend below that Genesis follow this up with SDC to ensure that database extracts are received.

Recommendation	Description	Audited party comment	Remedial action
Deriving submission information	Ensure monthly reports are being received from SDC.	Genesis has been in contact with the customer to advise that we require monthly data extract.	Identified

I checked the data submission for April 2022 for ICP 0089352004PCE32 which found a very minor difference. This will be due to no data extract being received since January 2022 and will be resulting in a very minor under submission of 59.65 kWh for the month of May 2022.

The NZTA lights on ICP 0080012045PC49C and 0089352001PC37D recorded in the SDC RAMM database were expected to be transferred to the NZTA database and these ICPs decommissioned as they are now being reconciled by NZTA. Genesis is the trader for both customers and I recommend that they liaise with their customers to resolve this issue.

Recommendation	Description	Audited party comment	Remedial action
Deriving submission information	Genesis work with NZTA and SDC to resolve the recording of NZTA lights in the SDC database	Genesis is currently working with SDC and NZTA to resolve this.	Identified

A handful of items of load continue to be reconciled in the SDC database as identified below:

ICP	Submitted kWh Value	Expected kWh Value	No. of fittings
0080012045PC49C	233	0	4
0089352001PC37D	247	0	13
Total	480	0	17

This will result in an estimated over submission by Genesis of approximately 480 kWh per month and a total of 5,280 kWh, for the period from June 2021 (when the NZTA lights were to be removed from reconciliation) to April 2022.

The field audit confirmed that the database accuracy is within the +/-5% allowable threshold.

Examination of the database found:

- 21 lights were found to have the incorrect ballast applied resulting in an estimated under submission of 8,551 kWh per annum.
- 85 items of load in the database that have either N/A or blank for ICP.
- Decorative lights missing from the database, as detailed below:

Issue	Estimated volume information impact (annual kWh)	Comment
Eight unmetered Christmas lights are not recorded in RAMM.	Potential under submission of 50.4 kWh p.a.	Present in the 2020 and 2021 audit.
Ten unmetered decorative lights are not recorded in RAMM.	Potential under submission of 726 kWh p.a.	Present in the 2020 and 2021 audit.
85 items of load in the database that have either N/A or blank for ICP	Potential under submission of 24,431 kWh p.a.	Identified in the 2022 audit

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.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 28-May-21 To: 13-May-22	No database extracts have been received since January 2022 resulting in an estimated very minor under submission of 59.65 kWh for ICP 0089352004PCE32 for the month of May 2022. Estimated over submission of 5,280 kWh for the NZTA lights that are being reconciled in both the SDC and NZTA RAMM database. Ten unmetered decorative lights are not recorded in RAMM. This may result in estimated under submission of 170W or 726 kWh p.a. Eight unmetered Christmas lights are not recorded in RAMM. This may result in estimated under submission of 120W or 50.4 kWh p.a. 85 items of load do not have an ICP number recorded resulting in a potential estimated under submission of 24.431 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. 21 lamps have incorrect total wattages, resulting in an estimated under submission of 8,551 kWh per annum. Potential impact: Medium Actual impact: Medium Audit history: Multiple times previously Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as moderate because they ensure most information is accurate. The impact is assessed to be medium based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has contacted SDC to advise that we require a monthly data extract and will continue to work with SDC in order to obtain this information. Genesis has discussed the audit findings with the SDC with the intent that council makes every effort to ensure the exceptions are rectified.	Continuous improvement	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis continues to work with the council to raise database accuracy levels.	Continuous improvement	

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

Code reference

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

Code related audit information

The DUML database must contain:

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

Audit observation

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

Audit commentary

The analysis found that there were 85 items in the database that have either N/A or blank for the ICP. 46 of these have lamp wattage recorded. I have assumed the most common 24W LED for the remaining lights. This will potentially be resulting in 23,431 kWh of under submission annually.

I recommend that the 85 items of load are investigated to determine where they are connected and if they should be included in the DUML audit or not.

Description	Recommendation	Audited party comment	Remedial action
Blank and N/A ICP for 85 items of load	Investigate and determine where the lights are connected to determine if they should be included in the DUML audit.	Genesis are in the process of investigating this with SDC to determine if unmetered load should be included.	Investigating

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.2 With: Clause 11(2)(a) and (aa) of Schedule 15.3 From: 28-May-21 To: 13-May-22	85 items of load do not have an ICP number recorded resulting in a potential estimated under submission of 24.431 kWh per annum. Potential impact: Medium Actual impact: Medium Audit history: None Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement. The impact is assessed to be medium based on the estimated kWh impact described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis is in the process of investigating this with SDC to determine where this unmetered load should be allocated too.	01/09/2022	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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 the road name, location number, and Global Positioning System (GPS) coordinates for most items of load, and users in the office and field can view these locations on a mapping system.

Six items of load do not have GPS co-ordinates recorded, however there is sufficient information recorded in the address field to be able to locate these lamps.

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 a lamp make model description, lamp wattage and gear wattage. Analysis of the database found a small number of errors, as follows:

Road Name	Pole ID	Lamp Make	Lamp Model	Lamp wattage	Gear Wattage
Regan St (1 West)	0198	Unknown	Unknown	Unknown	Unknown
Mercade Close	0985	Evolve LED	Unknown	Unknown	40

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.4 With: Clause 11(2)(c) and (d) of Schedule 15.3 From: 28-May-21 To: 13-May-22	Two lamps have an unknown lamp model and missing lamp wattage, one has missing gear wattage. Potential impact: Low Actual impact: Low Audit history: Twice previously Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are rated as strong, the small number of exceptions indicated that controls are sufficient to ensure that all lamps are recorded in the database most of the time. The impact is assessed to be low as was only two items of load with missing details.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has discussed the audit findings with the SDC with the intent that council makes every effort to ensure the exceptions are rectified.	Continuous improvement	Identified
Genesis continues to work with the council to raise database accuracy levels.	Continuous improvement	

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 127 lights on 19th May 2022 using the statistical sampling methodology.

Audit commentary

The field audit discrepancies are detailed in the table below:

Street	Database count	Field count	Light count difference	Wattage recorded incorrectly	Comments
MIRANDA STREET (1 NORTH)	21	21	+1 -1		1 x additional 24W LED not recorded in the database but located in the field 1 x 24W LED recorded in the database but not located in the field
SH 43 (1 REGAN STREET EAST)	37	38	+1		1 x 40W Phillips not recorded in the database but located in the field
Grand Total	**1,111**	**1,112**	**3 (-1 +2)**	**-**	

The field audit found two more lamps in the field than were recorded in the database. This is recorded as non-compliance below.

The database accuracy is discussed in **section 3.1**.

As detailed in the last two audits, Christmas and decorative lights are connected to the streetlight circuits when operating but are not recorded in RAMM. This is recorded as non-compliance in **sections 2.1**, **3.1** and **3.2**, and I repeat the previous audit recommendation to maintain visibility.

Description	Recommendation	Audited party comment	Remedial action
Christmas and decorative lights	Add the Christmas and decorative lights to RAMM. Communicate on and off dates for Christmas lights to Genesis.	Genesis has discussed the audit findings with the council with the intent that the council makes every effort to ensure that the Christmas lights are included in the RAMM data base and advise of on and off dates.	Identified

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 28-May-21 To: 13-May-22	Two additional lights found in the field from the sample of 127 lights checked. Ten unmetered decorative lights are not recorded in RAMM. This may result in estimated under submission of 170W or 726 kWh p.a. Eight unmetered Christmas lights are not recorded in RAMM. This may result in estimated under submission of 120W or 50.4 kWh p.a. Potential impact: Low Actual impact: Low Audit history: Multiple times previously Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	A control rating of moderate was selected, because the controls over the inclusion of Christmas and decorative lights are weak but will improve to strong once the lights have been added to the database. The impact is assessed to be low based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has discussed the audit findings with the council with the intent that the council makes every effort to ensure that the Christmas lights are included in the RAMM data base and advise of on and off dates.	01/09/2022	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis continues to work with the council to raise database accuracy levels.	Continuous improvement	

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.

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

RAMM records audit trail information of changes made.

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

A database extract was provided, 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	Stratford District Council streetlights including NZTA lighting
Strata	The database contains the SDC items of load DUML in the Stratford region. The processes for the management of all SDC items of load are the same, but I decided to place the items of load into three strata: 1. A-W, 2. State Hwy, and 3. State Hwy 2.
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 19 sub-units.
Total items of load	127 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 127 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	101.6	Wattage from survey is higher than the database wattage by 1.6%
R_L		See comment below *
R_H		

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 1 February 2019. The table below shows that Scenario A (detailed below) applies, and the best available estimate indicates that the database is accurate within ± 5.0%.

In absolute terms, total annual consumption is estimated to be 3,600 kWh higher than the DUML database indicates.

*The database auditing tool was not able to return a result as the margin of error was too small to tabulate as there was only a 50W variance.

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

Light description and capacity accuracy

As discussed in **section 2.4**, two items of load have no lamp make, lamp model or gear wattage information recorded.

Lamp and gear wattages were compared to the expected values. The gear wattage field records the total wattage for each item of load, including lamp and gear wattage.

I also found a small number of discrepancies when compared to the standardised wattage table. This is detailed in the table below:

Lamp Model	Database Total Lamp Wattage	EA Standardised Total Wattage	Variance	Database Quantity	Estimated Annual kWh effect on consumption
250w HPI	83	278	195	1	832.85
250w HPI	168	278	110	16	7516.96
40WLED	81	40	-41	2	-350.22
NHT150I	83	168	85	1	363.04
Unknown	0	44	44	1	187.92
				TOTAL	**8,850.54**

The incorrect capacities will be resulting in an estimated under submission of 8,551 kWh per annum (based on annual burn hours of 4,271 as is detailed in the DUML database auditing tool).

ICP Accuracy

As detailed in **section 2.2**, there were 85 items in the database that have either N/A or blank for the ICP. This is potentially resulting in an estimated annual under submission of 24,431 kWh assuming the most common light type.

Change management process findings

Fault, maintenance and upgrade work is completed by NPE Tech.

NPE Tech updates the database from the field using PDAs, or from the office based on paper field records. Where the changes are entered from the field using PDAs, the change date will reflect the date that the change occurred. When changes are entered in the office the user enters an asset change date which reflects the date that the work was carried out. NPE Tech are responsible for validating any work completed in RAMM.

For all new connections, an "as built" is required to be submitted to council before connection can occur. The roading team approves any proposed streetlights, and the developer is responsible for installation and advising SDC once the work is complete. These are added to RAMM by SDC.

SDC's LED road lighting upgrade project is now mostly complete. There are a small number of HPS lights that will be upgraded next year.

Outage patrols are completed by NPE Tech every three months. Outages are also reported by residents within the SDC region and work orders are raised with NPE Tech as required.

Christmas lights

As recorded in the previous two audits, Christmas lights are connected to the streetlight circuits when operating but are not recorded in RAMM. SDC confirmed that there are four 15W Christmas tree lights and four 15W Christmas bell lights, which are typically connected for six weeks from the first of December until the second week of January. SDC confirmed the correct wattages with the supplier during the audit.

These lights are still to be added to the database against the associated poles and to maintain visibility of this in **section 2.5.** I have repeated the last audit's recommendation to communicate on and off dates to Genesis.

Based on total Christmas light wattage of 120W connected for six summer weeks per annum (approximately 420 burn hours), omission of the lights from the database may lead to potential under submission of 50.4 kWh p.a.

Decorative lights

As recorded in the last audit, ten poles in the town centre have Inari 200 17W decorative lights installed. These lights operate year-round and are connected to the streetlight circuits but are not recorded in RAMM. SDC confirmed the correct wattages with the supplier during the audit.

SDC have advised they will add the lights to the database against the associated poles and I have repeated the last audit's recommendation in **section 2.5**, to maintain visibility of this.

Exclusion of the decorative lights from RAMM may result in under reporting of 170W or 726 kWh p.a. based on 4,271 annual burn hours.

Private lights

There are no private lights recorded in the database, and SDC confirmed that they are not aware of any private streetlights in the SDC region.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 28-May-21 To: 13-May-22	21 lamps have incorrect total wattages, resulting in an estimated under submission of 8,551 kWh per annum. Eight unmetered Christmas lights are not recorded in RAMM. This may result in estimated under submission of 120W or 50.4 kWh p.a. Ten unmetered decorative lights are not recorded in RAMM. This may result in estimated under submission of 170W or 726 kWh p.a. 85 items of load do not have an ICP number recorded resulting in a potential estimated under submission of 24.431 kWh per annum. Potential impact: Medium Actual impact: Medium Audit history: Multiple times previously Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	A control rating of moderate was selected, because the controls over the inclusion of Christmas and decorative lights are weak but will improve to strong once the lights have been added to the database. The impact is assessed to be medium based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has discussed the audit findings with the council with the intent that the council makes every effort to ensure that the Christmas lights are included in the RAMM data base and advise of on and off dates.	01/09/2022	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis continues to work with the council to raise database accuracy levels.	Continuous improvement	

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 load as NHH using the NST profile. Wattages are derived from an extract provided by SDC. The last wattage report provided to Genesis by SDC was in January 2022. I recommend in **section 3.1**, that Genesis follow this up with SDC to ensure that database extracts are received.

I checked the data submission for April 2022 for ICP 0089352004PCE32 which found a very minor difference which will be due to no data extract being received since January 2022. This will be resulting in a very minor under submission of 59.65 kWh for the month of May 2022. s

The NZTA lights on ICP 0080012045PC49C and 0089352001PC37D recorded in the SDC RAMM database were expected to be transferred to the NZTA database and these ICPs decommissioned as they are now being reconciled by NZTA. Genesis is the trader for both customers and I recommend in **section 2.1**, that they liaise with their customers to resolve this issue. A handful of items of load continue to be reconciled as identified below:

ICP	Submitted kWh Value	Expected kWh Value	No. of fittings
0080012045PC49C	233	0	4
0089352001PC37D	247	0	13
Total	480	0	17

This will result in an estimated over submission by Genesis of approximately 480 kWh per month and a total of 5,280 kWh, for the period from June 2021 (when the NZTA lights were to be removed from reconciliation) to April 2022.

The field audit confirmed that the database accuracy is within the +/-5% allowable threshold.

Examination of the database found:

- 21 lights were found to have the incorrect ballast applied resulting in an estimated under submission of 8,551 kWh per annum.
- 85 items of load in the database that have either N/A or blank for ICP.
- Decorative lights missing from the database, as detailed below:

Issue	Estimated volume information impact (annual kWh)	Comment
Eight unmetered Christmas lights are not recorded in RAMM.	Potential under submission of 50.4 kWh p.a.	Present in the 2020 and 2021 audit.
Ten unmetered decorative lights are not recorded in RAMM.	Potential under submission of 726 kWh p.a.	Present in the 2020 and 2021 audit.
85 items of load in the database that have either N/A or blank for ICP	Potential under submission of 24,431 kWh p.a.	Identified in the 2022 audit

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.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 28-May-21 To: 13-May-22	No database extracts have been received since January 2022 resulting in an estimated very minor under submission of 59.65 kWh for ICP 0089352004PCE32 for the month of May 2022. Estimated over submission of 5,280 kWh for the NZTA lights that are being reconciled in both the SDC and NZTA RAMM database. Ten unmetered decorative lights are not recorded in RAMM. This may result in estimated under submission of 170W or 726 kWh p.a. Eight unmetered Christmas lights are not recorded in RAMM. This may result in estimated under submission of 120W or 50.4 kWh p.a. 85 items of load do not have an ICP number recorded resulting in a potential estimated under submission of 24.431 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. 21 lamps have incorrect total wattages, resulting in an estimated under submission of 8,551 kWh per annum. Potential impact: Medium Actual impact: Medium Audit history: Multiple times previously Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as moderate because they ensure most information is accurate. The impact is assessed to be medium based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has contacted SDC to advise that we require a monthly data extract and will continue to work with SDC in order to obtain this information. Genesis has discussed the audit findings with the SDC with the intent that council makes every effort to ensure the exceptions are rectified.	Continuous improvement	Identified
Genesis continues to work with the council to raise database accuracy levels.	Continuous improvement	

CONCLUSION

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

The database is remotely hosted by thinkproject New Zealand Ltd . The field work and asset data capture are conducted by NPE Tech who are responsible for fault, maintenance, and upgrade work for streetlights, and maintain the database.

A monthly report from the database was being provided to Genesis by SDC up until January 2022, I recommend that they ensure that monthly wattage reports are sent as any changes made since January will not be reflected in submission.

The NZTA lights on ICP 0080012045PC49C and 0089352001PC37D recorded in the SDC RAMM database were expected to be transferred to the NZTA database and these ICPs decommissioned as they are now being reconciled by NZTA. Genesis is the trader for both customers and I recommend that they liaise with their customers to resolve this issue. A handful of items of load continue to be reconciled against these ICPs as detailed below:

ICP	Submitted kWh Value	Expected kWh Value	No. of fittings
0080012045PC49C	233	0	4
0089352001PC37D	247	0	13
Total	480	0	17

This will result in an estimated over submission by Genesis of approximately 480 kWh per month and a total of 5,280 kWh, for the period from June 2021 (when the NZTA lights were to be removed from reconciliation) to April 2022.

The field audit was undertaken of a statistical sample of 127 items of load on 19 May 2022. The field audit confirmed that the database accuracy is within the allowable +/-5% threshold.

The audit found six non-compliances, makes three new recommendations, and repeats one recommendation. The future risk rating of 19 indicates that the next audit be completed in three months. I have considered this in conjunction with Genesis's comments and recommend that the next audit be in six months.

PARTICIPANT RESPONSE

Genesis has contacted SDC to advise that we require a monthly data extract and will continue to work with SDC in order to obtain this information.

Genesis has discussed the audit findings with the SDC with the intent that council makes every effort to ensure the exceptions are rectified.