ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

For

WHANGAREI DISTRICT COUNCIL AND GENESIS ENERGY

Prepared by: Rebecca Elliot

Date audit commenced: 30 August 2019

Date audit report completed: 17 September 2019

Audit report due date: 01 October 2019

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EXECUTIVE SUMMARY

This audit of the Whanagrei District Council (**WDC**) 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.

This audit found five non-compliances and makes no recommendations.

Genesis has, from July 2019, started reconciling the load using the WDC RAMM streetlight database. In previous audits Genesis were using a database managed by Northpower. Field work is carried out by Currie Electrical and the database is updated using RAMM Contractor. Whilst the RAMM database was found to have a similar level of accuracy to that of the Northpower database. WDC are actively working to improve this, and field changes are tracked in RAMM in a more timely manner than they were in the Northpower database.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	96.7%	Wattage from survey is higher than the database wattage by 1.6%
R_L	91.0%	With a 95% level of confidence it can be concluded that the error could be between -9% and +9%
R_H	109%	

The inaccuracy is statistically significant at the 95% level. The sample results across the strata means that the true wattage (installed in the field) could be between 9% lower and 9% higher than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

In absolute terms the installed capacity is estimated to be 11.0 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 30 kW lower to 30 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 47,200 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 128,800 kWh p.a. lower to 128,600 kWh p.a. higher than the database indicates.

There are 58 items of load with no wattage recorded in the database. Assuming a wattage of 51 watts for each of these lamps, this will result in under submission of 12,633.62 kWh.

422 items of load have the incorrect wattage applied in the DUML database which would result in over submission of 12,244.96 kWh per annum. This is an improvement from the estimated annual over submission of 88,009.514 when the Northpower data was being used.

There was a discrepancy between the submission volume and the database for one of the two ICPs resulting in an estimated annual over submission of 60,802 kWh.

The future risk rating of 31 indicates that the next audit be completed in three months. I have considered this in conjunction with Genesis' comments and recommend that the next audit be in nine months to allow time for Genesis to work with WDC to address the inaccuracies identified in this audit. The matters raised are detailed below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Deriving submission information	2.1	11(1) of Schedule 15.3	A discrepancy between the submission volume and the database resulting in an estimated annual over submission of 60,802 kWh. 422 items of load have the incorrect wattage applied in the DUML database which would result in over submission of 12,244.96 kWh per annum if used for submission. 58 items of load with no wattage recorded in the database resulting in under submission of 12,633.62 kWh per annum. Database is not confirmed as accurate with a 95% level of confidence as recorded in section 3.1. The data used for submission does not track changes at a daily basis and is provided as a snapshot.	Moderate	High	6	Identified
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	58 items of load with no lamp wattage recorded.	Moderate	Low	2	Identified
All load recorded in database	2.5	11(2A) and (d) of Schedule 15.3	7 additional items of load found in the field sample.	Weak	Low	2	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Database accuracy	3.1	15.2 and 15.37B(b)	Database is not confirmed as accurate with a 95% level of confidence. 422 items of load have the incorrect wattage applied in the DUML database which would result in over submission of 12,244.96 kWh per annum if used for submission. 58 items of load with no wattage recorded in the database resulting in under submission of 12,633.62 kWh per annum.	Weak	High	9	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Volume information accuracy	3.2	15.2 and 15.37B(c)	A discrepancy between the submission volume and the database resulting in an estimated annual over submission of 60,802 kWh. 422 items of load have the incorrect ballast applied in the DUML database which would result in over submission of 12,244.96 kWh per annum if used for submission. 58 items of load with no wattage recorded in the database resulting in under submission of 12,633.62 kWh per annum. Database is not confirmed as accurate with a 95% level of confidence as recorded in section 3.1. The data used for submission does not track changes at a daily basis and is provided as a snapshot.	Weak	High	9	
Future Risk Rating						28	

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	Description	Recommendation
		Nil	

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

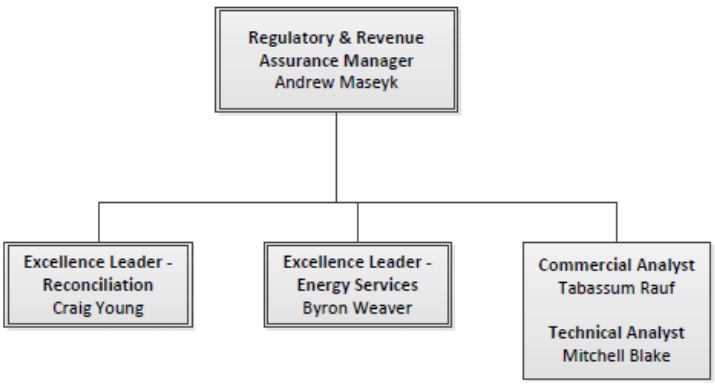
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

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

1.2. Structure of Organisation

Genesis provided the relevant organisational structure:



1.3. Persons involved in this audit

Auditor:

Rebecca Elliot

Veritek Limited

Electricity Authority Approved Auditor

Supporting Auditor:

Brett Piskulic

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Craig Young	Excellence Leader - Reconciliation	Genesis Energy
Grace Hawken	Technical Specialist - Reconciliations Team	Genesis Energy
Mark Seakins	Roading Consultant	Whangarei District Council

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.

The database is backed-up in accordance with standard industry procedures. Access to the database is secure by way of password protection.

1.5. Breaches or Breach Allegations

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

1.6. ICP Data

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0000545284NRF73	Streetlights; Whangarei D C; BRB0331 RAMA ROAD, MARSDEN POINT, RUAKAKA 0116	BRB0331	NST	833	30,810.9
0000545289NR028	STREETLIGHTS; Whangarei D C; MPE1101 PUKEATUA ROAD, MAUNGATAPERE 0170	MPE1101	NST	4,652	303,153.8

The ballast values are included in the wattage totals.

1.7. Authorisation Received

All information was provided directly by Genesis and Whangarei District Council.

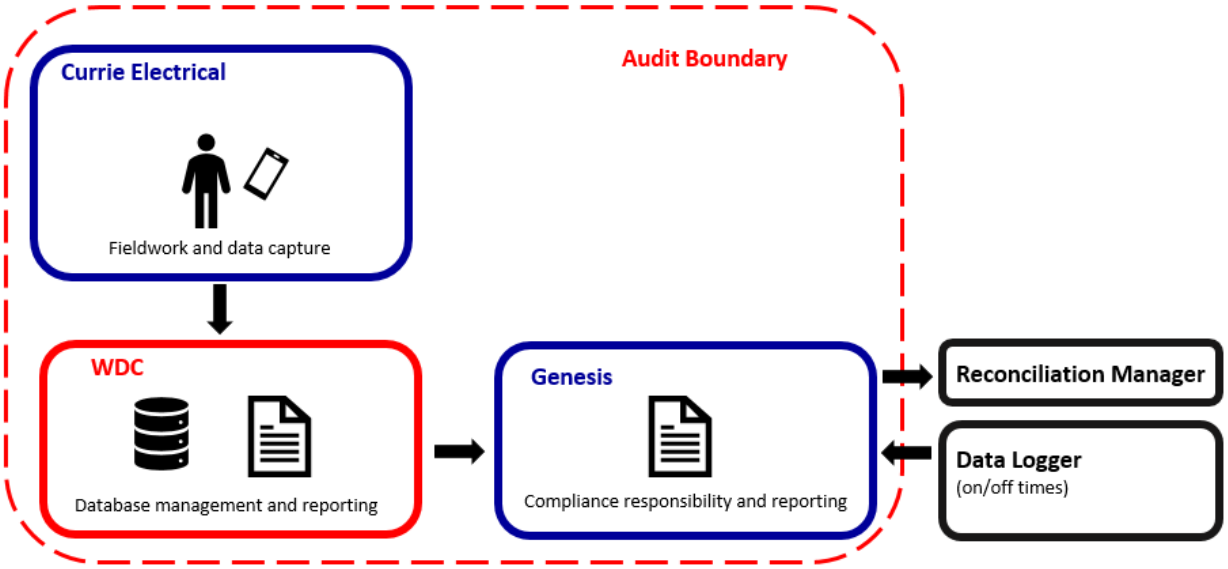
1.8. Scope of Audit

This audit of the Whanagrei District Council (**WDC**) 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.

Whangarei District Council Unmetered Streetlights are located on the Northpower network. Genesis reconciles this load using the WDC RAMM streetlight database.

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



The field audit was undertaken of a statistical sample of 291 items of load between 23rd and 29th August 2019.

1.9. Summary of previous audit

The previous audit was completed in December 2018 by Rebecca Elliot of Veritek Limited. The current status of that audit's findings is detailed below:

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
DUML Audit	1.10	17.295F of part 17	Audit not completed within the required timeframe.	Cleared
Deriving submission information	2.1	11(1) of Schedule 15.3	The database accuracy is assessed to be 93.2% indicating potential over submission of 39,600 kWh per annum. 1,806 items of load have the incorrect ballast applied in the DUML database which would result in over submission of 88,009.51 kWh per annum if used for submission. Total kW values are calculated outside of the database. Out of date kW report used to calculate submission resulting in a potential 123,597 kWh of over submission per annum.	Still existing but note that improved database is being used
All load recorded in database	2.5	11(2A) and (d) of Schedule 15.3	6 additional items of load found in the field sample.	Cleared
Database accuracy	3.1	15.2 and 15.37B(b)	The database accuracy is assessed to be 93.8% indicating potential over submission of 107,300 kWh per annum. 1806 items of permanent load have the incorrect ballast applied indicating over submission of 88,009.51 kWh per annum.	Still existing but note that improved database is being used
Volume information accuracy	3.2	15.2 and 15.37(c)	The database accuracy is assessed to be 93.2% indicating potential over submission of 39,600 kWh per annum. 1,806 items of load have the incorrect ballast applied in the DUML database which would result in over submission of 88,009.51 kWh per annum if used for submission. Total kW values are calculated outside of the database. Out of date kW report used to calculate submission resulting in a potential 123,597 kWh of over submission per annum.	Still existing but note that improved database is being used

Table of Recommendations

Subject	Section	Recommendation for Improvement	Status
Tracking of Load Changes	2.6	Work with WDC to bring the RAMM database up to date so that it can be used for reconciliation.	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.

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.

Audit commentary

Genesis reconciles this DUML load using the NST profile.

Genesis has, from July 2019, started reconciling the load using the WDC RAMM streetlight database. In previous audits Genesis were using a database managed by Northpower. The total volume submitted to the Reconciliation Manager is based on the most recently received database report provided by WDC.

I compared the submission volumes with the load recorded in the database extract provided for this audit in August against the volumes submitted by Genesis. There was a difference in the volumes with one of the ICPs as detailed in the table below:

ICP	Fittings number from July submission	Fittings number from database extract	Differences	kWh value submitted	Calculated kWh value from database	Differences kWh
0000545289NR028	4,704	4,652	52	143,905	138,826.62	+5,078.39
Total month kWh difference over submission						5,078.39

Annualised this will result in an estimated annual over submission of 60,940 kWh. The difference between the volumes is likely to be a combination of a difference in light volumes and the analysis of the light types in the field from the last audit to this indicating that LED are being rolled out.

I checked the wattage being applied in the database and found that 422 lamps had a discrepancy when compared to the standardised wattage table. The incorrect capacities would result in an estimated over submission of 12,244.96 kWh per annum (based on annual burn hours of 4,271 as is detailed in the DUML database auditing tool).

There are 58 items of load with no wattage recorded in the database. Assuming a wattage of 51 watts for each of these lamps, this will result in under submission of 12,633.62 kWh.

The field audit against the database quantities found that the database is not confirmed as accurate with a 95% level of confidence as recorded in **section 3.1**.

On 18 June 2019, the Electricity Authority issued a memo confirming that the code requirement to calculate the correct monthly load must:

- take into account when each item of load was physically installed or removed; and

- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

The current monthly report is provided as a snapshot and this practice is non-compliant. The database contains a "lamp install date" but there is not a field for "livening date" for newly connected lights. 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: 30-Nov-18 To: 19-Aug-19	A discrepancy between the submission volume and the database resulting in an estimated annual over submission of 60,940 kWh. 422 items of load have the incorrect wattage applied in the DUML database which would result in over submission of 12,244.96 kWh per annum. 58 items of load with no wattage recorded in the database resulting in under submission of 12,633.62 kWh per annum. Database is not confirmed as accurate with a 95% level of confidence as recorded in section 3.1. The data used for submission does not track changes at a daily basis and is provided as a snapshot. Potential impact: High Actual impact: High Audit history: Twice previously Controls: Moderate Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated as moderate as RAMM is now being used for submission purposes but the inaccuracies found indicate that the database is not as up to date as was expected. The impact is assessed to be high due to the estimated kWh volume variances.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has been working with WDC to have the exceptions found corrected in the dataset. The audit was conducted on Aug-2019 dataset, Genesis notes that half of these exceptions have already been updated.	31/01/2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will continue to review the WDC datasets to proactively advise of any exceptions found.		

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 had an ICP recorded.

Audit outcome

Compliant

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

Code reference

Clause 11(2)(b) of Schedule 15.3

Code related audit information

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

Audit observation

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

Audit commentary

The database has the nearest street address for all items of load.

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 lamp type and wattage capacity and included any ballast or gear wattage.

Audit commentary

Lamp description information is contained within the lamp make model field, light make model field and two other model fields. Analysis of the database found there was no wattage recorded for 58 Italo 2 and Italo 3 model lamps.

The accuracy of lamp descriptions, wattages and ballasts is recorded 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: 07-Aug-19 To: 19-Aug-19	58 items of load with no lamp wattage recorded. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate as this information is expected to be captured as part of the updating of the RAMM database. The impact is assessed to be low as the volume of lights with no wattage is small.

Actions taken to resolve the issue	Completion date	Remedial action status
All assets have an assigned wattage value	01/09/2019	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will continue to review the WDC datasets to proactively advise of any exceptions found.	01/09/2019	

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 291 items of load between 23rd and 29th August 2019.

Audit commentary

The field audit discrepancies found are detailed in the table below.

There were seven additional lamps found in the field that were not recorded in the database and nine lamp wattage differences.

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
Whangarei Urban North					
LAKE DR	9	16	+7	-	7x 55W LEDs on a newer section of Lake Rd not in database.
Whangarei Urban South					
HINEMOA ST	3	3	-	1	1x incorrect wattage- 19.9W LED found in the field recorded as a 125W MV in the database.
LE RUEZ PL	2	2	-	1	1x incorrect wattage- 19.9W LED found in the field recorded as a 70W HPSV in the database.
TAINUI ST	3	3	-	1	1x incorrect wattage- 19.9W LED found in the field recorded as a 125W MV in the database.
Rural					
MANAIA VIEW RD	2	2	-	1	1x incorrect wattage- 23W LED found in the field recorded as a 125W MV in the database.
MARINA RD	10	10	-	2	2x incorrect wattage- 19.9W LED found in the field recorded as a 150W HPSV in the database.

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
TIKI PL	2	2	-	2	2x incorrect wattage- 19.9W LED found in the field recorded as a 70W HPSV in the database.
Amenity and toilets					
OCEAN BEACH RD	1	1	-	1	1x incorrect wattage- 19.9W LED found in the field recorded as a 70W MV in the database.
Grand Total	**291**	**298**	**+7**	**9**	

This clause relates to lights in the field that are not recorded in the database. I found an additional seven lamps in the field than were not recorded in the database. The database accuracy is discussed in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) and (d) of Schedule 15.3 From: 30-Nov-18 To: 19-Aug-19	7 additional items of load found in the field sample. Potential impact: High Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate due to the volume of additional lights found in the field. The impact is assessed to be low due to the low number of differences found in the field and total estimated kWh difference detailed in **section 3.1**.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has requested these assets to be confirmed and included in the data set.	01/12/2019	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will continue to review the WDC datasets to proactively advise of any exceptions found.		

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

RAMM contains a complete audit trail of all additions and changes with operator ID to the database information.

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

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

Plan Item	Comments
Area of interest	Whangarei District Council area
Strata	The database contains items of load in the Whangarei area. The area has two distinct sub regions of Whangarei urban and rural. The processes for the management of all WDC items of load are the same, but I decided to place the items of load into four strata: 1. Whangarei Urban South 2. Whangarei Urban North 3. Rural 4. Amenity and Toilet Blocks
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 58 sub-units.
Total items of load	291 items of load were checked.

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

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

Audit commentary

A statistical sample of 291 items of load found that the field data was 96.7% of the database data for the sample checked.

Result	Percentage	Comments
The point estimate of R	96.7%	Wattage from survey is lower than the database wattage by 1.6%
R_L	91.0%	With a 95% level of confidence it can be concluded that the error could be between -9% and +9%
R_H	109%	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 01/02/19 and the table below shows that Scenario B (detailed below) applies.

The conclusion from Scenario B is that in statistical terms, the inaccuracy is statistically significant at the 95% level. The sample results across the strata means that the true wattage (installed in the field) could be between 9% lower and 9% higher than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

In absolute terms the installed capacity is estimated to be 11.0 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 30 kW lower to 30 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 47,200 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 128,800 kWh p.a. lower to 128,600 kWh p.a. higher than the database indicates.

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

Lamp description and capacity accuracy

I checked the wattage being applied in the database and found that 422 lamps had a discrepancy when compared to the standardised wattage table. This is detailed in the table below:

Lamp Type	Database Total Lamp Wattage	EA Standardised Total Wattage	Variance	Database Quantity	Estimated Annual kWh effect on consumption
100w SON	112	114	-2	3	-25.626
100w SON	118	114	4	1	17.084
100w MH	112	114	-2	35	-298.97
100w MH	100	114	-14	1	-59.794
100w MH	113	114	-1	1	-4.271
125w MV	125	136	-11	1	-46.981
125w MV	137	136	1	3	12.813
125w MV	138	136	2	1	8.542
125w MV	143	136	7	6	179.382
125w MV	148	136	12	7	358.764
150w SON	150	168	-18	7	-538.146
150w SON	157	168	-11	2	-93.962
150w SON	160	168	-8	1	-34.168
150w SON	178	168	10	3	128.13
150w MH	186	168	18	51	3920.778
250w SON	250	278	-28	1	-119.588
250w SON	262	278	-16	1	-68.336
250w SON	268	278	-10	1	-42.71
250w MH	268	278	-10	2	-85.42
400w MH	428	438	-10	3	-128.13
70w SON	90	83	7	58	1734.026
70w SON	96	83	13	131	7273.513

Lamp Type	Database Total Lamp Wattage	EA Standardised Total Wattage	Variance	Database Quantity	Estimated Annual kWh effect on consumption
70w SON	77	83	-6	6	-153.756
70w SON	70	83	-13	2	-111.046
70w SON	101	83	18	1	76.878
70w MH	70	83	-13	1	-55.523
70w MH	77	83	-6	40	-1025.04
80w MV	93	90	3	1	12.813
80w MV	103	90	13	36	1998.828
110 SON	123	121	2	1	8.542
Tubular 100W	100	121	-21	1	-89.691
Tubular 100W	110	121	-11	1	-46.981
Tubular 100W	112	121	-9	9	-345.951
Tubular 100W	118	121	-3	2	-25.626
Tubular 400W	418	438	-20	1	-85.42
Total estimated annual effect on submission					12,244.96

The incorrect capacities would result in an estimated over submission of 12,244.96 kWh per annum (based on annual burn hours of 4,271 as is detailed in the DUML database auditing tool).

There are 58 items of load with no wattage recorded in the database. Assuming a wattage of 51 watts for each of these lamps, this will result in under submission of 12,633.62 kWh.

Address accuracy

The field audit did not identify any location discrepancies.

Change management process findings

The RAMM database used for submission is managed by WDC. The streetlight contractor Currie Electrical update the database using RAMM Contractor.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 30-Nov-18 To: 19-Aug-19	Database is not confirmed as accurate with a 95% level of confidence. 422 items of load have the incorrect wattage applied in the DUML database which would result in over submission of 12,244.96 kWh per annum. 58 items of load with no wattage recorded in the database resulting in under submission of 12,633.62 kWh per annum. Potential impact: High Actual impact: High Audit history: Twice Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated as weak due to the number of discrepancies recorded in the database. The impact is assessed to be medium due to the estimated kWh volume variances.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has been working with WDC to have the exceptions found corrected in the dataset. The audit was conducted on Aug-2019 dataset, Genesis notes that half of these exceptions have already been updated. Genesis wishes to highlight that WDC has made extensive efforts to increase the accuracy of their dataset and continues to do so. 2018 there was 88k 1806 wattage exceptions leading to the annual over submission, this audit reveals the work done and this has been reduced to 12.6k with exceptions down to 422 as @ Aug-2019	31/01/2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will continue to review the WDC datasets to proactively advise of any exceptions found.		

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 all ICPs have the correct profile and submission flag; and
- checking the database extract combined with the burn hours against the submitted figure to confirm accuracy.

Audit commentary

Genesis reconciles this DUML load using the NST profile.

The total volume submitted to the Reconciliation Manager is based on the most recently received database report provided by WDC. As detailed in **section 2.1**, the database extract did not match the volumes submitted by Genesis resulting in an over submission of 5,078.39 kWh for the month of July 2019. Annualised this will result in an estimated annual over submission of 60,940 kWh. The difference between the volumes is likely to be a combination of a difference in light volumes and the analysis of the light types in the field from the last audit to this indicating that LED are being rolled out.

I checked the wattage being applied in the database and found that 422 lamps had a discrepancy when compared to the standardised wattage table. The incorrect capacities would result in an estimated over submission of 12,244.96 kWh per annum (based on annual burn hours of 4,271 as is detailed in the DUML database auditing tool).

There are 58 items of load with no wattage recorded in the database. Assuming a wattage of 51 watts for each of these lamps, this will result in under submission of 12,633.62 kWh.

The field audit against the database quantities found that the database is not confirmed as accurate with a 95% level of confidence. This is detailed in **section 3.1**.

On 18 June 2019, the Electricity Authority issued a memo confirming that the code requirement to calculate the correct monthly load must:

- take into account when each item of load was physically installed or removed; and
- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

The current data used is a snapshot and this practice is non-compliant.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 30-Nov-18 To: 19-Aug-19	A discrepancy between the submission volume and the database resulting in an estimated annual over submission of 60,940 kWh. 422 items of load have the incorrect ballast applied in the DUML database which would result in over submission of 12,244.96 kWh per annum. 58 items of load with no wattage recorded in the database resulting in under submission of 12,633.62 kWh per annum. Database is not confirmed as accurate with a 95% level of confidence as recorded in **section 3.1**. The data used for submission does not track changes at a daily basis and is provided as a snapshot. Potential impact: High Actual impact: High Audit history: Twice previously Controls: Moderate Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated as moderate as RAMM is now being used for submission purposes but the inaccuracies found indicate that the database is not as up to date as expected. The impact is assessed to be high due to the estimated kWh volume variances.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has been working with WDC to have the exceptions found corrected in the dataset. The audit was conducted on Aug-2019 dataset, Genesis notes that half of these exceptions have already been updated. Genesis wishes to highlight that WDC has made extensive efforts to increase the accuracy of their dataset and continues to do so. 2018 there was 88k 1806 wattage exceptions leading to the annual over submission, this audit reveals the work done and this has been reduced to 12.6k with exceptions down to 422 as @ Aug-2019	31/01/2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will continue to review the WDC datasets to proactively advise of any exceptions found.		

CONCLUSION

This audit found five non-compliances and makes no recommendations.

Genesis has, from July 2019, started reconciling the load using the WDC RAMM streetlight database. In previous audits Genesis were using a database managed by Northpower. Field work is carried out by Currie Electrical and the database is updated using RAMM Contractor. Whilst the RAMM database was found to have a similar level of accuracy to that of the Northpower database. WDC are actively working to improve this, and field changes are tracked in RAMM in a more timely manner than they were in the Northpower database.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	96.7%	Wattage from survey is higher than the database wattage by 1.6%
R_L	91.0%	With a 95% level of confidence it can be concluded that the error could be between -9% and +9%
R_H	109%	

The inaccuracy is statistically significant at the 95% level. The sample results across the strata means that the true wattage (installed in the field) could be between 9% lower and 9% higher than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

In absolute terms the installed capacity is estimated to be 11.0 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 30 kW lower to 30 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 47,200 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 128,800 kWh p.a. lower to 128,600 kWh p.a. higher than the database indicates.

There are 58 items of load with no wattage recorded in the database. Assuming a wattage of 51 watts for each of these lamps, this will result in under submission of 12,633.62 kWh.

422 items of load have the incorrect wattage applied in the DUML database which would result in over submission of 12,244.96 kWh per annum. This is an improvement from the estimated annual over submission of 88,009.514 when the Northpower data was being used.

There was a discrepancy between the submission volume and the database for one of the two ICPs resulting in an estimated annual over submission of 60,802 kWh.

The future risk rating of 31 indicates that the next audit be completed in three months. I have considered this in conjunction with Genesis' comments and recommend that the next audit be in nine months to allow time for Genesis to work with WDC to address the inaccuracies identified in this audit.

PARTICIPANT RESPONSE

Genesis has reviewed the audit provided. Genesis acknowledges that the dataset is still being reviewed by trader and owner for improvements.

Genesis made the change from the incorrectly supplied data from the distributor to the RAMM data that would be provided by WDC in July 2019. Extensive work was done after Genesis initiated the communication between the council and distributor which saw an increase in data quality being provided also by the distributor.

The wattage/ballast & description exceptions in the WDC RAMM dataset have reduced from the reported 1806 (distributor based) in 2018 to 422 in Aug 2019. Genesis has identified 216 as in the September 2019 data set provided and has advised WDC of these.

Genesis would be seeking a 9-12-month review period for the WDC RAMM database.