ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

HASTINGS DISTRICT COUNCIL AND GENESIS ENERGY

Prepared by: Steve Woods

Date audit commenced: 11 August 2022

Date audit report completed: 31 August 2022

Audit report due date: 01-Sep-22

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EXECUTIVE SUMMARY

This audit of the by **Hastings District Council (HDC)**, 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 database is remotely hosted by thinkproject New Zealand Ltd. The database population, field work and asset data capture are conducted by Pope Electrical. Database management is undertaken by Beca.

HDC has implemented a CMS system. This will interface with RAMM. 60% of the lights on and off times are controlled by the CMS. The on and off times are pre-programmed based on sunset and sunrise times. This is likely to vary slightly from the Unison controlled ripple relays which is what Genesis are currently calculating the burn hours from. Dimming is planned for the future. Genesis is working with HDC to progress a profile before dimming is deployed.

The database accuracy has improved since the last audit but is not yet within the +/-5% allowable threshold therefore this non-compliance is still present. Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	101.3	Wattage from survey is higher than the database wattage by 1.3%
R_L	99.6	With a 95% level of confidence, it can be concluded that the error could be between -0.4% and +9.9%
R_H	109.9	

In absolute terms, total annual consumption is estimated to be 24,900 kWh higher than the DUML database indicates.

A small number of errors were identified by the database analysis. These discrepancies are as follows:

- two items of load with the incorrect ballast applied resulting in an estimated under submission of 22.2 kWh, and
- seven additional lamps in the field were not recorded in the database.

The audit found four non-compliances and one recommendation is made. The future risk rating of 14 indicates that the next audit be completed in 12 months. I have considered this in conjunction with Genesis' comments and recommend the next audit is completed in 12 months.

The matters raised are detailed in the tables 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 assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 24,900 kWh per annum. Incorrect ballasts applied resulting in an estimated very minor over submission of 22.2 kWh per annum. Inaccurate on and off times as the logger times will vary slightly from the CMS on and off times. The current monthly report is provided as a snapshot and is non-compliant. The report contains a lamp install date, but this is not used to re-calculate historic submissions.	Moderate	Medium	4	Investigating
All load recorded in the database	2.5	11(2A) of Schedule 15.3	Seven additional lights identified in the field count.	Moderate	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 assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 24,900 kWh per annum. Incorrect ballasts applied resulting in an estimated very minor over submission of 22.2 kWh per annum. The current monthly report is provided as a snapshot and is non-compliant. The report contains a lamp install date, but this is not used to re-calculate historic submissions.	Moderate	Medium	4	Investigating
Volume information accuracy	3.2	15.2 and 15.37B(c)	Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 24,900 kWh per annum. Incorrect ballasts applied resulting in an estimated very minor over submission of 22.2 kWh per annum. Inaccurate on and off times as the logger times will vary slightly from the CMS on and off times. The current monthly report is provided as a snapshot and is non-compliant. The report contains a lamp install date, but this is not used to re-calculate historic submissions.	Moderate	Medium	4	Investigating
					Future Risk Rating	**14**	

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
GPS coordinates not populated for new lights	2.3	Recommend that HDC investigates the cause of the decline in GPS coordinate population for new lights within the RAMM database.

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

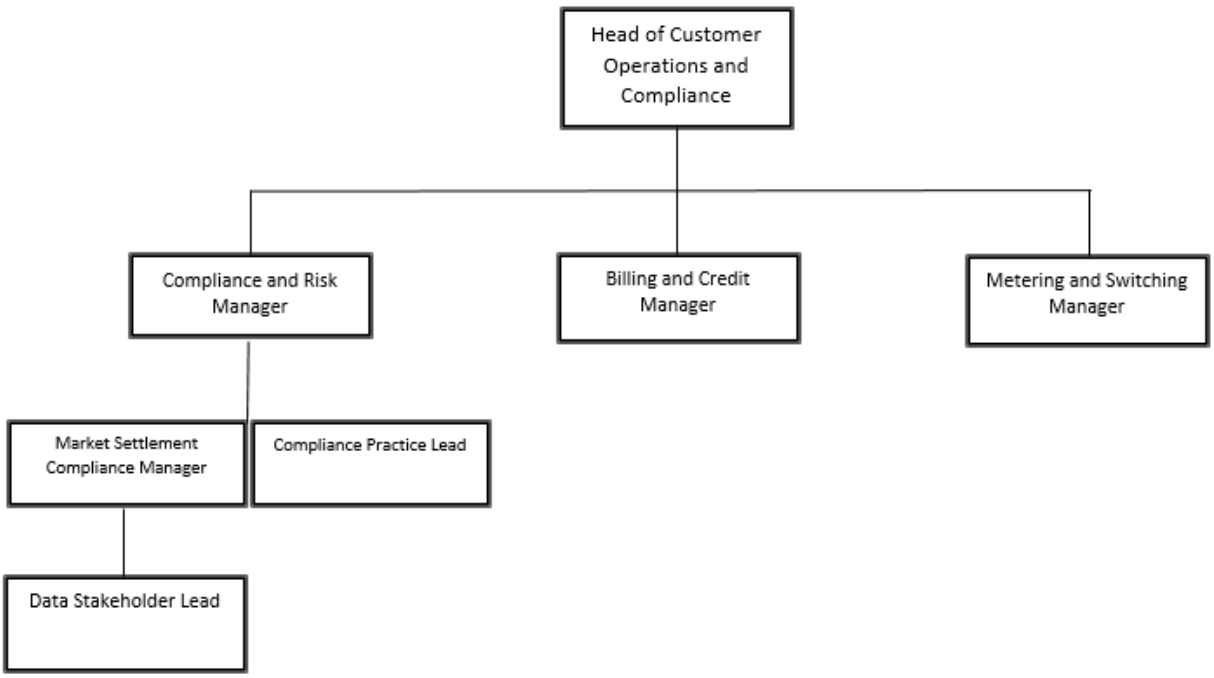
Section 11 of the Electricity Industry Act provides for the Electricity Authority to exempt any participant from compliance with all or any of the clauses.

Audit 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

Auditors:

Name	Title
Steve Woods	Lead auditor
Bernie Cross	Supporting auditor

Other personnel assisting in this audit were:

Name	Title	Company
Nirav Teli	DUML Data & Stakeholder Lead	Genesis Energy
Marius Van Niekerk	Transportation Asset Manager	Hastings DC
Hassan Salapour	RAMM support	Beca

1.4. Hardware and Software

The RAMM database used for the management of DUML is remotely hosted by thinkproject New Zealand Ltd.

HDC have deployed a CMS system called Bright City CMS from Telematics Wireless. This is used to turn 60% of the streetlights on and off. It is expected that the CMS system will be used to dim the streetlights in the future. This system is supported locally by Techlight.

HDC confirmed that the database and the Bright City CMS system are backed up is in accordance with standard industry procedures. Access to the systems 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)
0000939902HBFF4	STREETLIGHTING MASTER ICP - FHL0331	FHL0331	NST	2,663	154,724
0000939904HBE7B	STREETLIGHTS - RURAL MASTER ICP - FHL0331	FHL0331	NST	90	8,937
0000045106HB0D7	STREETLIGHTING MASTER ICP - RDF0331	RDF0331	NST	17	1,800
0000045104HB052	STREETLIGHTING MASTER ICP - WTU0331	WTU0330	NST	4,519	284,776
0000045107HBC92	STREETLIGHTS - RURAL MASTER ICP - RDF0331	RDF0331	NST	74	4,018
0000045105HBC17	STREETLIGHTS - RURAL MASTER ICP - WTU0331	WTU0331	NST	54	2,415
TOTAL				**7,417**	**456,668**

In this audit I found a slight volume difference and light count between the monthly report provided to Genesis on 1 August 2022 and that what was recorded in the database extract provided on 4th July 2022 for the purposes of this audit. A review of the database records in the monthly report extract confirmed that there were light updates performed during July which explains this difference.

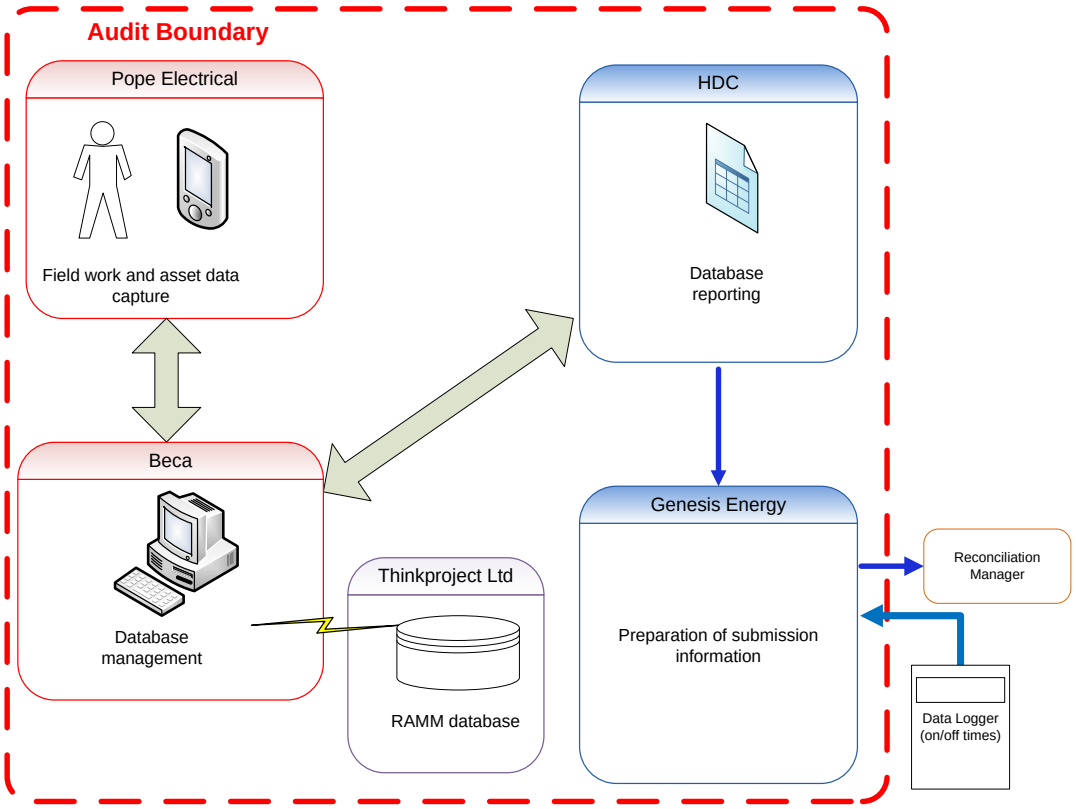
1.7. Authorisation Received

All information was provided directly by Genesis or HDC.

1.8. Scope of Audit

This audit of the HDC 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 database is remotely hosted by thinkproject New Zealand Ltd. The database population, field work and asset data capture are conducted by Pope Electrical. The database is managed by Beca Limited on behalf of HDC. 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 audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

The field audit was undertaken of 246 items of load on 11th August 2022

1.9. Summary of previous audit

I reviewed the last audit report undertaken by Rebecca Elliot of Veritek Limited in May 2021. The table below records the current status of those findings.

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	Variance in light volumes reported to Genesis vs what is recorded in the database is likely to be resulting in an estimated 99,257 kWh per annum of under submission.	Cleared
			Inaccurate on and off times as the logger times will vary slightly from the CMS on and off times.	Still existing
			In absolute terms, total annual consumption is estimated to be 21,400 kWh lower than the DUML database indicates.	Still existing
			Incorrect ballasts applied resulting in an estimated very minor over submission of 185kWh per annum.	Still existing
			The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Still existing
All load recorded in the database	2.5	11(2A) of Schedule 15.3	Four additional lights identified by the field count.	Still existing
Database accuracy	3.1	15.2 and 15.37B(b)	Variance in light volumes reported to Genesis vs what is recorded in the database is likely to be resulting in an estimated 99,257 kWh per annum of under submission.	Cleared
			Inaccurate on and off times as the logger times will vary slightly from the CMS on and off times.	Still existing
			In absolute terms, total annual consumption is estimated to be 21,400 kWh lower than the DUML database indicates.	Still existing
			Incorrect ballasts applied resulting in an estimated very minor over submission of 185kWh per annum.	Still existing
			The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Still existing

Subject	Section	Clause	Non-compliance	Status
Volume information accuracy	3.2	15.2 and 15.37B(c)	Variance in light volumes reported to Genesis vs what is recorded in the database is likely to be resulting in an estimated 99,257 kWh per annum of under submission. Inaccurate on and off times as the logger times will vary slightly from the CMS on and off times. In absolute terms, total annual consumption is estimated to be 21,400 kWh lower than the DUML database indicates. Incorrect ballasts applied resulting in an estimated very minor over submission of 185kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Cleared Still existing Still existing Still existing 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:

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 has 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 this DUML load using the NST profile.

I checked the submission calculation provided by Genesis and found the calculation was correct from the information provided by HDC. I checked this against the database extract provided and found a slight volume difference and light count between the monthly report provided to Genesis on 1 August 2022 and what was recorded in the database extract provided on 4th July 2022 for the purposes of this audit. A review of the database records in the monthly report extract confirmed that there were light updates performed during July which explains this difference.

Hastings DC has implemented a CMS system. This will interface with RAMM. 60% of the lights on and off times are controlled by the CMS. The on and off times are pre-programmed based on sunset and sunrise times. This is likely to vary slightly from the Unison controlled ripple relays. Dimming is planned for the future. Genesis is continuing to work with HDC to progress a profile before dimming is deployed. The inaccurate on and off times are recorded as non-compliance.

In absolute terms, total annual consumption is estimated to be 24,900 kWh higher than the DUML database indicates. This is outside the allowable +/- 5% variance threshold and is recorded as non-compliance below.

Analysis of the database found a very small number of incorrect ballasts that will be resulting in a very minor estimated of under submission of 22.2 kWh per annum.

Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments, or the fact that lights can be livened before they are entered into the database.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-May-21 To: 31-Jul-22	Inaccurate on and off times as the logger times will vary slightly from the CMS on and off times. Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 24,900 kWh per annum. Incorrect ballasts applied resulting in an estimated very minor under submission of 22.2 kWh per annum. The current monthly report is provided as a snapshot and is non-compliant. The report contains a lamp install date, but this is not used to re-calculate historic submissions. Potential impact: Medium Actual impact: Medium Audit history: Multiple times Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as moderate as processes in place to update the database are generally robust. 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 will discuss and see what options are available to improve accuracy around the on off times. Genesis will work with HDC to improve database accuracy. Genesis will review dataset and report exceptions back to HDC where exceptions are identified.	01/01/2023	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will work with HDC and report exceptions from monthly database. Genesis relies on HDC to accurately maintain its database.	01/01/2023	

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

Code reference

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

Code related audit information

The DUML database must contain:

- *each ICP identifier for which the retailer is responsible for the DUML*

- *the items of load associated with the ICP identifier.*

Audit observation

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

Audit commentary

All items of load have an ICP recorded against them.

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 street address and also GPS coordinates. There are 57 records that do not have GPS coordinates, a decline from only three recorded in the last audit. The use of GPS coordinates is a useful secondary mechanism to ensure the correct identification of a light after street address and I recommend that HDC investigates the cause of the decline in GPS coordinates population for new lights.

Recommendation	Description	Audited party comment	Remedial action
Regarding: Clause 11(2)(b) of Schedule 15.3	HDC investigates the cause of the decline in GPS coordinate population for new lights within the RAMM database.	Genesis has discussed with HDC the importance of GPS coordinates and will work with HDC to have RAMM database updated.	Identified

However, in all cases the items of load can be located by the address.

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, wattage capacity, and included any ballast or gear wattage. Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority.

Audit commentary

Fields exist in RAMM for lamp make and model. I analysed the database and found no blank records. The accuracy of the light wattage and ballasts is discussed in **section 3.1**.

Audit outcome

Compliant

2.5. All load recorded in database (Clause 11(2A) of Schedule 15.3)

Code reference

Clause 11(2A) of Schedule 15.3

Code related audit information

The retailer must ensure that each item of DUML for which it is responsible is recorded in this database.

Audit observation

The field audit was undertaken of 246 lights using the statistical sampling methodology. The population was divided into the following strata:

- roads A-D,
- roads E-K,
- roads L-O,
- roads P-S, and
- roads T-Z.

Audit commentary

The field audit findings are detailed in the table below and show some discrepancies.

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
PURSER PLACE	4	3	-1		1 x L28 LED not found in the field.
QUEEN STREET EAST (RAIL XING - PRINCES)	22	24	+3, -1		3 x 60W(estimated) LED on Windsor urban pole found in the field. 1 x 99W LED not found in the field
MONA STREET	3	4	+1		1 x 19.5W LED found in the field.
PARKHAVEN VILLAGE	1	4	+3		1x 70W HPS GL700, 2 x 19.5W LED found in the field.

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
Grand Total			**9 (+7, -2)**	**0**	

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

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 01-May-21 To: 31-Jul-22	Seven additional lights identified in the field count. Potential impact: Low Actual impact: Low Audit history: Twice Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate as processes in place to update the database are generally robust. The impact is assessed to be low based on small number of additional lights found in the field.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has discussed auditor's findings with HDC with an intent that HDC makes every effort the exceptions are rectified.	01/10/2022	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis relies on HDC to accurately maintain its database.	01/10/2022	

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 ability of the database to track changes was assessed and the process for tracking of changes in the database was examined.

Audit commentary

The 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

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

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	Hastings District Council streetlights
Strata	The database contains items of load in the Hastings District Council area. The processes for the management of items of load are the same, but I decided to place the items of load into five strata, as follows: • roads A-D, • roads E-K, • roads L-O, • roads P-S, and • roads T-Z.
Area units	I created a pivot table of the roads in each area, and I used a random number generator in a spreadsheet to select a total of 31 sub-units.
Total items of load	246 items of load were checked.

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority or the LED specifications.

Audit commentary

Database accuracy based on the field audit

A field audit was conducted of a statistical sample of 246 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	101.3	Wattage from survey is higher than the database wattage by 1.3%
R_L	99.6	With a 95% level of confidence, it can be concluded that the error could be between -0.4% and +9.9%
R_H	109.9	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 1 February 2019 and the table below shows that Scenario B (detailed below) applies.

The conclusion from Scenario C is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between -0.4% and 9.9% 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 6 kW higher than the database indicates.

There is a 95% level of confidence that the installed capacity is between -2 kW and 45 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 24,900 kWh higher than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between -8,000 kWh to 192,500 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

The database was analysed and found only 296 non-LED lights as the LED rollout continues to near completion for HDC.

Analysis found a small handful of incorrect ballasts applied:

Light type	Database ballast	Expected ballast	Quantity	Total difference
23W Fluro Compact	zero watts	2.6W	2	5.2

This will result in a very minor under submission of 22.2 kWh per annum.

Change Management

The processes were reviewed for new lamp connections and the tracking of load changes due to faults and maintenance. All fault and maintenance work is conducted by Pope Electrical through "RAMM Contractor" and once each job is completed the database is updated via field PDA's. There is an invoice checking process conducted by HDC which helps to ensure database accuracy. Lamp outages are predominately notified to HDC by residents from which work requests are made to Pope Electrical.

Hastings DC has implemented a CMS system. This includes fault reporting so that future lighting faults will be reported by the CMS system.

When lighting in new subdivisions is connected, "as built" plans are supplied to HDC and then Pope Electrical checks the lights in the field prior to populating the database.

The current monthly report is provided as a snapshot and is non-compliant. The report contains a lamp install date, but this is not used to re-calculate historic submissions.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-May-21 To: 31-Jul-22	Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 24,900 kWh per annum. Incorrect ballasts applied resulting in an estimated very minor over submission of 22.2 kWh per annum. The current monthly report is provided as a snapshot and is non-compliant. The report contains a lamp install date, but this is not used to re-calculate historic submissions. Potential impact: Medium Actual impact: Medium Audit history: Multiple times Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as moderate as processes in place to update the database are generally robust. 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 will work with HDC to improve database accuracy. Genesis will review dataset and report exceptions back to HDC where exceptions are identified. Genesis has reviewed the auditor's findings and will advise HDC of requirement of visibility of tracking of change within their data base and recommend that install date/removal date/reason for change be included in their data extract.	01/01/2023	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will work with HDC and report exceptions from monthly database. Genesis relies on HDC to accurately maintain its database.	01/01/2023	

3.2. Volume information accuracy (Clause 15.2 and 15.37B(c))

Code reference

Clause 15.2 and 15.37B(c)

Code related audit information

The audit must verify that:

- *volume information for the DUML is being calculated accurately*
- *profiles for DUML have been correctly applied.*

Audit observation

The submission was checked for accuracy for the month the database extract was supplied. This included:

- checking the registry to confirm that the ICP has the correct profile and submission flag, and
- checking the database extract combined with the burn hours against the submitted figure to confirm accuracy.

Audit commentary

Genesis reconciles this DUML load using the NST profile.

As detailed in **section 2.1**, I checked the submission calculation provided by Genesis and found the calculation was correct from the information provided by HDC. I checked this against the database extract provided and found a slight volume difference and light count between the monthly report provided to Genesis on 1 August 2022 and what was recorded in the database extract provided on 4 July 2022, for the purposes of this audit. A review of the database records in the monthly report extract confirmed that there were light updates performed during July which explains this difference.

Hastings DC has implemented a CMS system. This will interface with RAMM. 60% of the lights on and off times are controlled by the CMS. The on and off times are pre-programmed based on sunset and sunrise times. This is likely to vary slightly from the Unison controlled ripple relays. Dimming is planned for the future. Genesis is working with HDC to progress a profile before dimming is deployed. The inaccurate on and off times are recorded as non-compliance.

In absolute terms, total annual consumption is estimated to be 24,900 kWh higher than the DUML database indicates. This is outside the allowable +/- 5% variance threshold and is recorded as non-compliance below.

Analysis of the database found a very small number of incorrect ballasts that will be resulting in a very minor estimated of over submission of 22.2 kWh per annum. This is a significant improvement from the findings in the last audit.

Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments, or the fact that lights can be livened before they are entered into the database.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 01-May-21 To: 31-Jul-22	Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 24,900 kWh per annum. Incorrect ballasts applied resulting in an estimated very minor over submission of 22.2 kWh per annum. Inaccurate on and off times as the logger times will vary slightly from the CMS on and off times. The current monthly report is provided as a snapshot and is non-compliant. The report contains a lamp install date, but this is not used to re-calculate historic submissions. Potential impact: Medium Actual impact: Medium Audit history: Multiple times Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as moderate as processes in place to update the database are generally robust. 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 will work with HDC to improve database accuracy. Genesis will review dataset and report exceptions back to HDC where exceptions are identified. Genesis has reviewed the auditor's findings and will advise HDC of requirement of visibility of tracking of change within their data base and recommend that install date/removal date/resson for change be included in their data extract.	01/01/2023	Investigating

Preventative actions taken to ensure no further issues will occur	Completion date	
Genesis will work with HDC and report exceptions from monthly database. Genesis relies on HDC to accurately maintain its database.	01/01/2023	

CONCLUSION

This audit of the by **Hastings District Council (HDC)**, 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 database is remotely hosted by thinkproject New Zealand Ltd. The database population, field work and asset data capture are conducted by Pope Electrical. Database management is undertaken by Beca.

Hastings DC has implemented a CMS system. This will interface with RAMM. 60% of the lights on and off times are controlled by the CMS. The on and off times are pre-programmed based on sunset and sunrise times. This is likely to vary slightly from the Unison controlled ripple relays which is what Genesis are currently calculating the burn hours from. Dimming is planned for the future. Genesis is working with HDC to progress a profile before dimming is deployed.

The database accuracy has improved since the last audit but is not yet within the +/-5% allowable threshold therefore this non-compliance is still present. Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	101.3	Wattage from survey is higher than the database wattage by 1.3%
R_L	99.6	With a 95% level of confidence, it can be concluded that the error could be between -0.4% and +9.9%
R_H	109.9	

In absolute terms, total annual consumption is estimated to be 24,900 kWh higher than the DUML database indicates

A small number of errors were identified by the database analysis. These discrepancies are as follows:

- two items of load with the incorrect ballast applied resulting in an estimated under submission of 22.2 kWh, and
- seven additional lamps in the field were not recorded in the database.

The audit found four non-compliances and one recommendation is made. The future risk rating of 14 indicates that the next audit be completed in 12 months. I have considered this in conjunction with Genesis' comments and recommend the next audit is completed in 12 months.

PARTICIPANT RESPONSE

It is Genesis intension to attend to the non-compliances raised in the audit. Genesis will work with HDC to improve data accuracy. Genesis will review dataset and report exceptions back to HDC where exceptions are identified. Genesis has discussed with HDC the importance of GPS coordinates and will work with HDC to have RAMM database updated.