

VERITEK

Electricity Industry Participation Code Audit Report

For

Genesis Energy Limited



**Horowhenua District Council
Distributed Unmetered Load**

Prepared by Tara Gannon – Veritek Ltd

Date of Audit: 22/12/2017

Date Audit Report Complete: 26/03/2018

Executive Summary

This audit of the Horowhenua 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 audit was conducted in accordance with the audit guidelines for DUML audits version 1.1, which became effective on 1 June 2017.

Streetlight load is determined by wattages held within HDC's RAMM database. Alf Downs Street Lighting Limited (Alf Downs) provides monthly reports from RAMM to Genesis, including private and NZTA lighting. The volume associated with private and NZTA lighting is excluded from the calculation of submission information. Festive lighting is included in the database with the connection dates.

The database contains some inaccurate information. This primarily relates to wattage differences; the field audit found that lamp and gear model information was highly accurate. The audit process included a field audit of 203 items of load, which found 85.73% accuracy. Almost all differences related to timing of LED upgrades, and result in over reporting of approximately 10,150 kWh per annum.

HDC applies profiled wattages for LED 20 lights, to account for dimming. This, combined with an error in the lamp wattage for one other lamp, has resulted in 129 lamps with differences in lamp wattages. It is estimated that the wattage differences could result in under reporting of around 20,000 kWh per annum.

The future risk rating of eight indicates that the next audit should be completed in 18 months. The matters raised are detailed below:

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Description of Load Type	2.1	11(1) of Schedule 15.3	The database used to prepare submissions contains some inaccurate information.	Moderate	Low	2	Identified

Subject	Section	Clause	Non-compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
All load recorded in database	2.5	11(2A) of Schedule 15.3	For the sample of 203 lamps checked, two lamps were not recorded in the database. Six lamps situated at Muhunoa West Road, Ohau are located in tunnels and the burn hours differ from other lamps connected to the ICP.	Moderate	Low	2	Identified
Database accuracy	3.1	15.2	HDC applies unapproved profiles to adjust specified lamp wattages to account for different dimming. 129 recorded lamp wattages differ from expected values. 50 wattage differences and two lamp count differences were found for the sample of 203 lamps checked. Six lamps situated at Muhunoa West Road, Ohau are located in tunnels and the burn hours differ from other lamps connected to the ICP.	Moderate	Low	2	Identified
Volume information accuracy	3.2	15.2	The database used to prepare submissions contains some inaccurate information.	Moderate	Low	2	Identified
Future risk rating						8	
Indicative audit frequency						18 months	

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

Table of Recommendations

Subject	Section	Recommendation	Description
	Nil		

Persons Involved in This Audit:

Auditor:

Tara Gannon
Veritek Limited
Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Brent Tucker	Roading Officer	Horowhenua District Council
Phil Harris	Street Lighting Contract Administration	Alf Downs Streetlighting Limited
Shweta Arora	Reconciliation Systems Analyst	Genesis Energy

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1. Administrative

1.1 Exemptions from Obligations to Comply With Code (Section 11 of Electricity Industry Act 2010)

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.

Review of current exemptions on the Electricity Authority's website confirmed that there are no exemptions in place relevant to the scope of this audit.

1.2 Supplier List

HDC, Alf Downs, and RAMM Software Limited are considered agents under this clause. Genesis clearly understands that the use of agents does not release them from their compliance obligations.

Genesis' contract is with HDC, and there is no direct contractual relationship between Genesis and Alf Downs, or Genesis and RAMM Software Limited. The indirect contractual relationship does not appear to affect Genesis' ability to ensure compliance is achieved.

HDC has contracts with

- **Alf Downs** for fieldwork and asset data capture
- **RAMM Software Limited** for database hosting; and
- **Manawatu District Council** for shared asset management services, including management of HDC streetlights.

This is not seen as an issue, as the processes for updating the database are robust and have appropriate validation controls in place. This is discussed further in **section 2.6**.

1.3 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".

Alf Downs confirmed that the database back-up is in accordance with standard industry procedures. The database is password protected. Compliance is confirmed.

1.4 List of ICPs

The following ICP is relevant to the scope of this audit:

ICP	Description	Profile	NSP	No. of items of load
0016099004EL9CA	HDC - STREETLIGHTS	CST	MHO0331	2945

1.5 Breaches or Breach Allegations

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

1.6 Distributed unmetered load audits (Clauses 16A.26 & 17.295F)

Retailers must ensure that DUML database audits are completed:

- 1. by 1 June 2018 (for DUML that existed prior to 1 June 2017)*
- 2. within three months of submission to the reconciliation manager (for new DUML)*
- 3. within the timeframe specified by the Authority for DUML that has been audited since 1 June 2017.*

Audit Observation

Genesis have requested Veritek to undertake this streetlight audit.

Audit Commentary

This audit report confirms that the requirement to conduct an audit has been met for this database within the required timeframe. Compliance is confirmed.

1.7 Separate distributed unmetered load audit (Clause 16A.8(4))

Retailers must ensure that DUML audits are reported in a separate audit report.

Audit Observation

Genesis have requested Veritek to undertake this streetlight audit.

Audit Commentary

The audit report for this DUML database is separate from other audit reports. Compliance is confirmed.

1.8 Summary of Previous Audit

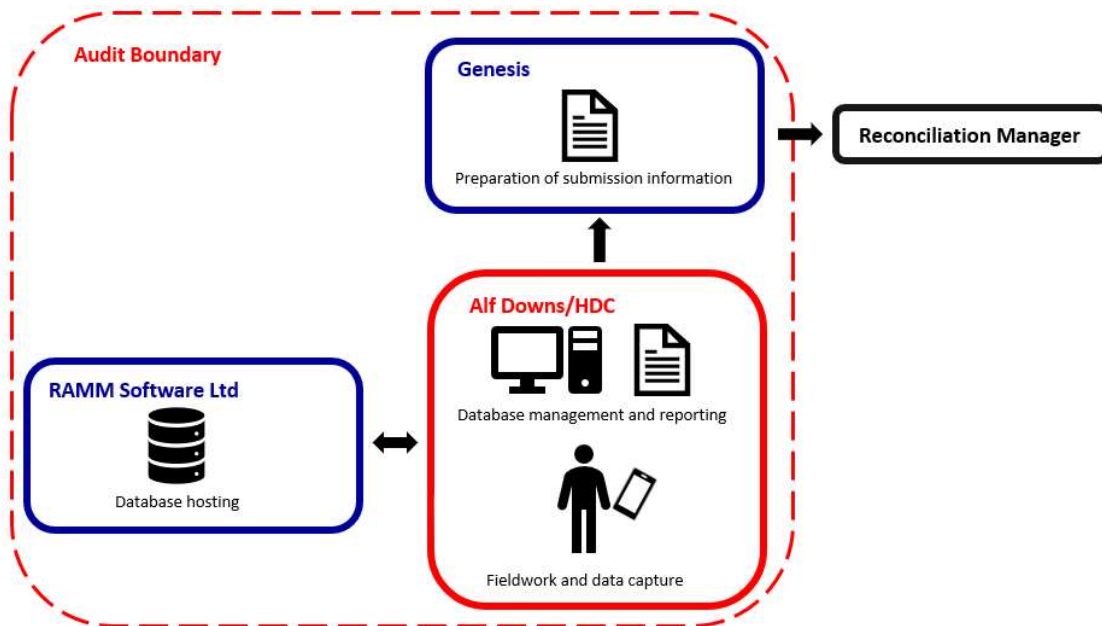
Genesis provided a copy of the report of the previous audit conducted in February 2017 by Tara Gannon of Veritek Limited. Two non-compliances were found, and no recommendations were made. The status of the non-compliances is detailed below:

Subject	Section	Clause	Non-compliance	Status
Capacity of each item of load	2.2.4	Clause 11(2)(d) of Schedule 15.3	Incorrect ballast was recorded for two lamps and was promptly investigated and corrected by Alf Downs once identified during the audit.	Cleared. All records have correct ballast recorded. Refer to section 3.1 .
Load changes	2.3	Clause 11(2)(d) of Schedule 15.3	There were two instances of delays in updating the database: <ul style="list-style-type: none"> 35 70W HP Sodium lamps in Waitare Beach had been replaced with 22W LED lamps, but were still recorded as 70W HP Sodium lamps in the database. Four lamps had no lamp or gear wattage recorded, as the information for the new lamps had not been provided by HDC. 	Cleared. The affected records have been corrected.

1.9 Scope of Audit

The database is remotely hosted by RAMM Software Ltd, and is managed by Alf Downs on behalf of HDC, who is Genesis' customer. Field work and asset data capture for faults and maintenance is also conducted by Alf Downs. Alf Downs reports to Genesis on a monthly basis. LED upgrades are managed by HDC, who update the database.

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 203 lights using the statistical sampling methodology on 22 December 2017. The field selection included four population groups:

- Festive lights
- Lights installed in 2017
- Parks lights
- All other lights.

1.10 Data Transmission (Clause 20 of Schedule 15.2)

The monthly reporting from Alf Downs to Genesis consists of an emailed spreadsheet. This file is zipped with password protection to achieve compliance with this clause.

Compliance is confirmed.

2. DUML database requirements

2.1 Deriving Submission Information (Clause 11(1) of Schedule 15.3)

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

This clause requires that the distributed unmetered load database must satisfy the requirements of schedule 15.5 regarding the methodology for deriving submission information. Genesis reconciles this DUML load using the CST profile. The calculations were checked for November 2017, and compliance is confirmed.

While Genesis are using up to date database information, there is some inaccurate data within the database, and this is recorded as non-compliance below and discussed in **sections 2.5** and **3.1**.

Non-compliance	Description		
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: entire audit period	The database used to prepare submissions contains some inaccurate information. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
Low	Controls are rated as moderate, as most lamps have the correct wattages recorded in the database. It is estimated that the wattage differences could result in under reporting of around 10,000 kWh per annum. 3607-53PB 70WHPS was promptly checked and corrected to 70W by Alf Downs.		
Actions taken to resolve the issue		Completion date	Remedial action status
Genesis are working with the database owner to maintain exceptions where identified.		10/2018	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
Awaiting database owner's response - what controls are in place to validate lamp descriptions and wattages/ballasts in order for Genesis to rectify their submission volume.		10/2018	

2.2 ICP Identifier (Clause 11(2)(a) of Schedule 15.3)

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

ICP is linked to the light owner. The analysis found that all items of load had the correct ICP recorded against them. Compliance is confirmed.

2.3 Location of Each Item of Load (Clause 11(2)(b) of Schedule 15.3)

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 Global Positioning System (GPS) coordinates for 2935 (99.66%) of the 2945 lamps.

Street address information is recorded for all lamps, except one privately owned lamp recorded in the database for completeness.

Compliance is confirmed.

2.4 Description of Load Type (Clause 11(2)(c) & (d) of Schedule 15.3)

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

The database contains a description of lamp type, a lamp wattage and a gear wattage.

Compliance is confirmed.

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

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 203 lights using the statistical sampling methodology. The field selection included four population groups:

- Festive lights
- Lights installed in 2017
- Parks lights
- All other lights.

Audit Commentary

The field audit findings are detailed in the table below.

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
Festive lighting					
MAIN STREET, FOXTON	50	50	-	-	Festive light locations differed from those provided. There was no decoration on the Lotto Shop; lights were situated on New World and Property Brokers.
Lights installed in 2017					
ANDREW STREET, FOXTON BEACH	8	10	2	-	Missing two LED lamps.
BULLER ROAD, LEVIN	1	1	-	-	
CAREX GROVE, FOXTON BEACH	2	2	-	-	
COLLINGWOOD STREET, LEVIN	6	6	-	-	
COOK STREET (FXT), FOXTON	15	15	-	-	
HOKIO BEACH ROAD (LVN), LEVIN	18	18	-	-	
HOPCROFT STREET, FOXTON BEACH	2	2	-	-	
KENT TERRACE, FOXTON BEACH	3	3	-	-	
MABEL STREET, LEVIN	7	7	-	-	
MAHOE STREET, LEVIN	4	4	-	-	
MUHUNOA WEST ROAD, OHAU	9	9	-	1	Six lamps are tunnel lights and on during the day. One tunnel light is recorded with 27W but should be 16W.
PROUSE STREET, LEVIN	5	5	-	4	Four 70W replaced with LEDs.
TIRO TIRO ROAD, LEVIN	26	26	-	26	All 70W replaced with LEDs.
WAIMARIE PARK, LEVIN	4	4	-	3	Three 70W replaced with LEDs.
Parks lights					
AVENUE NORTH ROAD, LEVIN	2	2	-	-	
HARTLEY STREET, FOXTON BEACH	20	20	-	2	Two 70W replaced with LEDs.
All other lights					
BOWEN STREET, LEVIN	7	7	-	-	
NGAIO STREET, LEVIN	2	2	-	2	Two 70W replaced with LEDs.
STRATHMORE AVENUE, LEVIN	12	12	-	12	All 70W replaced with LEDs
Total	203	203	2	50	

Two lamp count differences are recorded as non-compliance below, and the 50 wattage differences are recorded as non-compliance in **section 3.1**.

Non-compliance	Description		
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: entire audit period	For the sample of 203 lamps checked, two lamps were not recorded in the database. Six lamps situated at Muhunoa West Road, Ohau are located in tunnels and the burn hours differ from other lamps connected to the ICP. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
Low	Controls are rated as moderate because most lamps were recorded accurately. The impact is low, because a small number of lamps were affected.		
Actions taken to resolve the issue		Completion date	Remedial action status
Genesis are working with the database owner to maintain exceptions where identified.		10/2018	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
Waiting for database owner's response. Will need to investigate the tunnel load details, and the issue of tracking changes with the LED deployment. 6 lamps 24hr will require their own ICP submitted under UML profile. Will work with the DC and the network to get this administered.		10/2018	

2.6 Tracking of Load Changes (Clause 11(3) of Schedule 15.3)

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

Any changes that are made during any given month take effect from the beginning of that month. The information is available which would allow for the total load in kW to be retrospectively derived for any day. On 20 September 2012, the Authority sent a memo to retailers and auditors advising that tracking of load changes at a daily level was not required if the database contained an audit trail. I have interpreted this to mean that the production of a monthly "snapshot" report is sufficient to achieve compliance.

The processes were reviewed for new lamp connections and the tracking of load changes due to faults and maintenance.

Fault and maintenance work is completed by Alf Downs. For routine faults and maintenance, the RAMM database is updated in the field using PDAs. LED upgrades are managed by HDC, who update the database.

Where major upgrades are undertaken, such as the replacement of sodium lights with LEDs, an audit is carried out on completion of the job to ensure all records are updated correctly.

Alf Downs staff are responsible for recording new connections in the database. Each new connection application to the Network includes a plan, and once the lamps are livened the database is updated and an "as built" plan is prepared. Livening is normally conducted by the developer or the Distributor and will not always be communicated to Alf Downs immediately. No issues with new connections were identified during the audit.

The database contains Christmas lighting, which is turned on in early December and off in mid January. These items of load are identified in the database as "Festive" lighting and are included in the report for every month. Genesis include these lights for submissions during the period in which they are switched on.

Alf Downs completes a monthly check for "blown" lamps and any lamps that are on during the off period. Both of these processes are used to identify any additional or removed items of load.

Compliance is confirmed.

2.7 Audit Trail (Clause 11(4) of Schedule 15.3)

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 RAMM database contains an audit trail for all changes, in addition this clause requires that an audit trail exists for all processing functions. The provision of reports from the database is considered to be secure, and an audit trail exists for the transmission of these reports.

Compliance is confirmed.

3. Accuracy of DUML database

3.1 Database Accuracy (Clause 15.2)

The Audit must verify that the information recorded in the retailer's DUML database is complete and accurate.

Audit Observation

The audit findings were used to determine if the information contained in the database is complete and accurate.

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

Audit Commentary

The database contains some inaccurate information. This primarily relates to wattage differences; the field audit found that most lamp differences related to timing of LED upgrades. 50 wattage differences and two lamp count differences were found for the sample of 203 lamps checked, they are discussed in **section 2.5**. Six lamps are situated in tunnels and on day and night.

The recorded wattage for the sample checked was 16,252. The light count and wattage differences identified in the field totalled -2319 W. Based on this the sample's accuracy was 85.73%.

The listed lamp model and gear models for each lamp was compared to the Electricity Authority's published standardised wattage table, or the manufacturer's specifications if the lamp was not included on the wattage table.

Alf Downs confirmed that HDC applies profiled wattages for LED 20 lights, based on use over a 12 month period. The code requires any non-standard profiles applied to be approved by the Electricity Authority and recorded on the reconciliation submissions. Genesis reports the load for ICP 0016099004EL9CA against profile CST, the profiles used by HDC to adjust wattages have not been approved by the Electricity Authority.

Lamp wattage differences were identified for 129 (4.4%) of HDC's streetlights, as shown below:

Lamp Model	Quantity	Lamp Wattage	Expected Lamp Wattage
Cre LEDway 20LED	124	27	Expecting 35-39W at 525mA, depending on voltage
Cre LEDway 20LED Dim	4	37	Expecting 47-51W at 700mA, depending on voltage
3607-53PB 70WHPS	1	100	70
Total	129	3,596	4,598-5,110 (depending on voltage)

All gear wattages matched the expected values.

Non-compliance	Description	
Audit Ref: 3.1 With: Clause 15.2 From: entire audit period	HDC applies unapproved profiles to adjust specified lamp wattages to account for different dimming. 129 recorded lamp wattages differ from expected values. 50 wattage differences and two lamp count differences were found for the sample of 203 lamps checked. Six lamps situated at Muhunua West Road, Ohau are located in tunnels and the burn hours differ from other lamps connected to the ICP. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2	
Audit risk rating	Rationale for audit risk rating	
Low	Controls are rated as moderate, as most lamps have the correct wattages recorded in the database. It is estimated that the wattage differences could result in under reporting of around 10,000 kWh per annum. 3607-53PB 70WHPS was promptly checked and corrected to 70W by Alf Downs.	
Actions taken to resolve the issue	Completion date	Remedial action status
Genesis are working with the database owner to maintain exceptions where identified.	10/2018	Identified
Preventative actions taken to ensure no further issues will occur	Completion date	
As referred to in 2.5 Waiting for database owner's response. Will need to investigate the tunnel load details, and the issue of tracking changes with the LED deployment. 6 lamps 24hr will require their own ICP submitted under UML profile. Will work with the DC and the network to get this administered.	10/2018	

3.2 Volume Information Accuracy (Clause 15.2)

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
- checking the database extract against the submitted figure to confirm accuracy.

Audit Commentary

ICP 0016099004EL9CA has the correct profile and submission flag assigned on the registry.

For November 2017, I compared the total submission to the reconciliation manager to a manual calculation based on the database information provided. The manual calculation matched the data submitted, and compliance is confirmed.

While Genesis are using up to date database information, there is some inaccurate data within the database, and this is recorded as non-compliance below and discussed in **sections 2.5** and **3.1**.

Non-compliance	Description	
Audit Ref: 3.2 With: Clause 15.2 From: entire audit period	The database used to prepare submissions contains some inaccurate information. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2	
Audit risk rating	Rationale for audit risk rating	
Low	Controls are rated as moderate, as most lamps have the correct wattages recorded in the database. It is estimated that the wattage differences could result in under reporting of around 10,000 kWh per annum.	
Actions taken to resolve the issue	Completion date	Remedial action status
Genesis are working with the database owner to maintain exceptions where identified.	10/2018	Identified
Preventative actions taken to ensure no further issues will occur	Completion date	
As discussed in 2.5 & 3.1. Most LED upgrade information is delayed due to a field audit conducted post deployment. Genesis will discuss whether this information could be more timely enabling accuracy in initial monthly volumes.	10/2018	

4. Conclusions

Streetlight load is determined by wattages held within HDC's RAMM database. Alf Downs Street Lighting Limited (Alf Downs) provides monthly reports from RAMM to Genesis, including private and NZTA lighting. The volume associated with private and NZTA lighting is excluded from the calculation of submission information. Festive lighting is included in the database with the connection dates.

The database contains some inaccurate information. This primarily relates to wattage differences; the field audit found that lamp and gear model information was highly accurate. The audit process included a field audit of 203 items of load, which found 85.73% accuracy. Almost all differences related to timing of LED upgrades, and result in over reporting of approximately 10,150 kWh per annum.

HDC applies profiled wattages for LED 20 lights, to account for dimming. This, combined with an error in the lamp wattage for one other lamp, has resulted in 129 lamps with differences in lamp wattages. It is estimated that the wattage differences could result in under reporting of around 20,000 kWh per annum.

The future risk rating of eight indicates that the next audit should be completed in 18 months.



Tara Gannon
Veritek Limited
Electricity Authority Approved Auditor

5. Genesis Comments

Genesis have reviewed the report and their comments are contained in its body.