ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

WAIPA DISTRICT COUNCIL AND GENESIS ENERGY

Prepared by: Rebecca Elliot

Date audit commenced: 22 March 2018

Date audit report completed: 23 May 2018

Audit report due date: 01-Jun-18

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EXECUTIVE SUMMARY

This audit of the Waipa District Council Unmetered Streetlights (**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, which became effective on 1 June 2017.

The database is remotely hosted by RAMM Software Ltd and is managed by Waipa DC. Waipa Network conducts the installation fieldwork and maintenance. They provide information on all work carried out back to Waipa DC and this is then loaded into RAMM. Waipa DC provides reporting to Genesis on a monthly basis.

The field audit found a high level of accuracy with only one additional item of load found and the database accuracy tool returned a 100% accuracy rate.

The database contains a small number of ballast discrepancies and some variance was found between the monthly wattage report and the RAMM database extract. These are discussed in the report.

The audit found four non-compliance issues and makes two recommendations. The future risk rating of 11 indicates that the next audit be completed in 12 months, and I agree with this recommendation. 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	Inaccurate data from the monthly report used to calculate submission resulting in an estimated annual over submission of 12,599.45 kWh. Analysis of the ballasts applied indicate a minor under submission of 1,960.39 kWh.	Moderate	Medium	4	Investigating
All load recorded in database	2.5	11(2A) of Schedule 15.3	One additional item of load found in the field.	Strong	Low	1	Investigating
Database accuracy	3.1	15.2 and 15.37B(b)	Analysis of the ballasts applied indicate a minor under submission of 1,960.39 kWh.	Moderate	Low	2	Investigating
Volume information accuracy	3.2	15.2 and 15.37B(c)	Inaccurate data from the monthly report used to calculate submission resulting in an estimated annual over submission of 12,599.45 kWh. Analysis of the ballasts applied indicate a minor under submission of 1,960.39 kWh.	Moderate	Medium	4	Investigating
Future Risk Rating						11	

Future risk rating	1-3	4-6	7-8	9-17	18-26	27+
Indicative audit frequency	36 months	24 months	18 months	12 months	6 months	3 months

RECOMMENDATIONS

Subject	Section	Description	Action
Tracking of load change	2.6	Review process to ensure lights are not included in monthly reporting to Genesis until they are energised.	Investigating
Database accuracy	3.1	Review LED light descriptions to include make, model & milliamp figure.	Identified

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

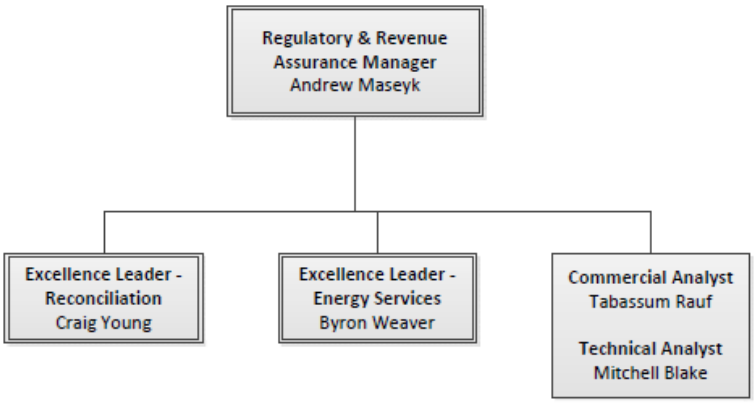
Section 11 of the Electricity Industry Act provides for the Electricity Authority to exempt any participant from compliance with all or any of the clauses.

Audit commentary

Genesis confirms that 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

Other personnel assisting in this audit were:

Name	Title	Company
Craig Young	Excellence Leader- Reconciliation	Genesis Energy
Cedric Crow	Road Maintenance Team Leader	Waipa District Council
Grace Hawken	Technical Specialist - Reconciliation Team	Genesis Energy

1.4. Hardware and Software

Section 1.8 Section 1.2 shows that 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.

Database back-up is 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)
0000400319WA4CA	Waipa DC TMU0111 S/L	TMU0111	NST	2,074	80,292
0000806500WA13E	Waipa DC CBG0111 S/L.	CBG0111	NST	2,162	126,050
0000041292WEDF7	Waipa District Council - Tamahere	HAM0331	NST	48	3,720
0000041294WEC78	Oaklands Drive	OAK0111	NST	50	3,308

1.7. Authorisation Received

All information was provided directly by Genesis or WDC.

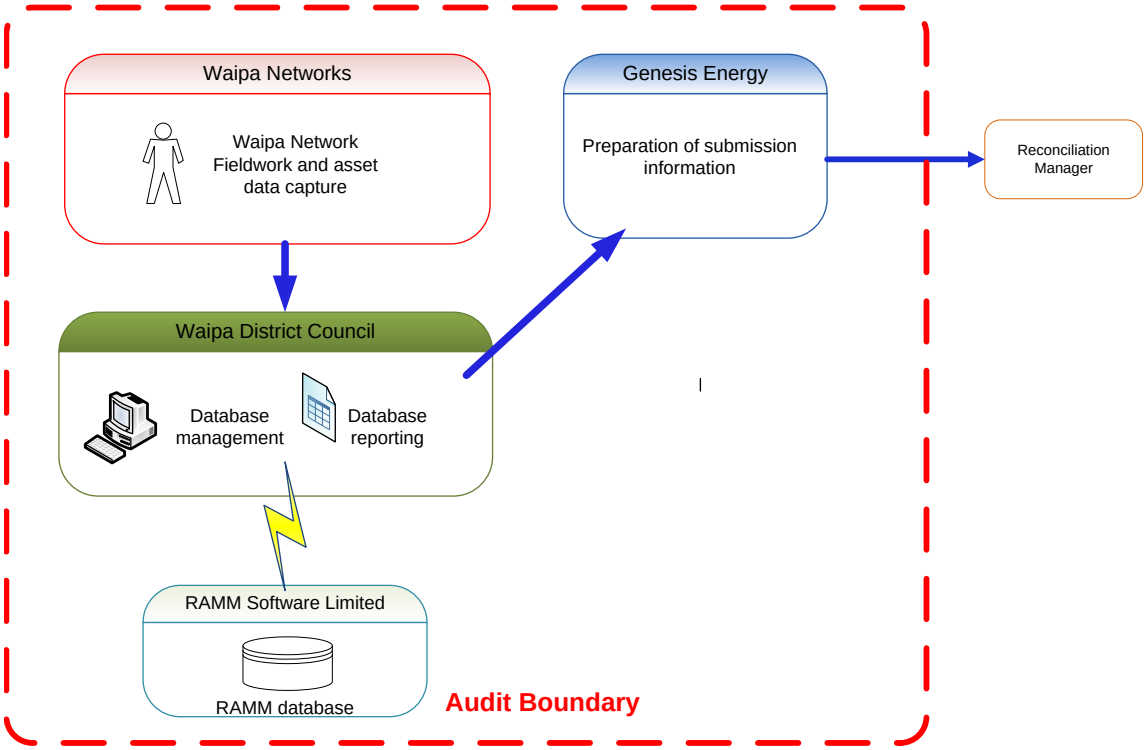
1.8. Scope of Audit

This audit of the Waipa District Council Unmetered Streetlights (**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, which became effective on 1 June 2017.

The database is remotely hosted by RAMM Software Ltd and is managed by Waipa DC. Waipa Network conducts the installation fieldwork and maintenance. They provide information on all work carried out back to Waipa DC and this is then loaded into RAMM. Waipa DC provides reporting to Genesis on a monthly basis.

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



The field audit was undertaken of a statistical sample of 307 items of load on 23rd March 2018.

1.9. Summary of previous audit

Genesis provided a copy of the last audit report undertaken by Rebecca Elliot of Veritek Limited in March 2017. This audit report was undertaken for Genesis as part of their 2017 reconciliation participant audit. This audit wasn't submitted due to the audit regime change that occurred on 1st June 2017. For completeness I have included the findings for reference below:

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of schedule 15.3	Over submission of an estimated 5,854 kWh per annum due to incorrect ballasts being applied.	Still existing
Description of load type	2.2.3	11(2)(c) of schedule 15.3	Incorrect lamp and wattage combinations.	Still existing
Capacity of items of load	2.2.4	11(2)(d) of schedule 15.3	Ballasts incorrectly applied resulting in over submission of an estimated 5,854 kWh per annum.	Still existing to a much smaller extent
Tracking of load changes	2.3	11(3) of schedule 15.3	Database inaccuracies found.	Cleared

Table of Recommendations

Subject	Section	Clause	Recommendation for Improvement	Status
Capacity of items of load	2.2.4	11(2)(d) of schedule 15.3	Adopt the Electricity Authority standard wattage table.	Still existing
Tracking of Load Change	2.3	11(3) of Schedule 15.3	Review process to ensure lights are not included in monthly reporting to Genesis until they are energised.	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 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

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.

The total volume submitted to the Reconciliation Manager is based on a monthly database report from RAMM and the "burn time" which is sourced from a data logger installed on the Powerco network. I checked the methodology used and confirm compliance.

There is some inaccurate ballast data within the database used to calculate submissions, and a variance was found between the monthly wattage figures and the RAMM database values. This is recorded as non-compliance and discussed in **section 3.1** and **3.2.**

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of schedule 15.3 From: 01-Jun-17 To: 30-Apr-18	Inaccurate data from the monthly report used to calculate submission resulting in an estimated annual over submission of 12,599.45 kWh. Analysis of the ballasts applied indicate a minor under submission of 1,960.39 kWh. Potential impact: Medium Actual impact: Medium Audit history: None Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as moderate, because they are sufficient to mitigate risk most of the time. The impact is assessed to be low, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis will advise Waipa DC of the exception found and work with them to rectify.	10/2018	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will continue to work with Waipa DC to uphold database accuracy	10/2018	

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

The RAMM database contains the relevant ICP identifiers for all items of load.

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 the nearest street address, pole numbers and Global Positioning System (GPS) coordinates for each item of load and users in the office and field can view these locations on a mapping system.

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 and that each item of load had a value recorded in these fields.

Audit commentary

The database contains two records for wattage, firstly the lamp wattage and secondly the gear wattage, which represents ballast losses. The gear wattage is recorded in the database which meets the requirements of this clause. The accuracy of the description and wattages recorded 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 a statistical sample of 307 items of load on 23 March 2018.

Audit commentary

The field audit findings are detailed in the table below:

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
0000041292WEDF7					
COLLINS RD	3	3			
RUKUHIA RD	10	10			
TE PAHU RD	2	2			
TUHIKARAMEA RD	7	7			
0000041294WEC78					
ALBA PL	3	3			
ALBA PL EXTENSION	3	3			
DAMIO PL	2	2			
DURMAST CRT	3	3			
MIRBECK AVE	10	10			
OAKLANDS DR	12	13	1		1x extra LED found in the field
OAKLANDS DR/BURR ST RAB	2	2			
0000400319WA4CA					
AVA MAE DR	12	12			
BELCHER ST	6	6			
COLLEGE ST	12	12			

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
LINDEN ST	2	2			
ROLLESTON ST	23	23			
0000806500WA13E					
ACHILLES AVE/TIRAU RD SLIP	5	5			
CHURCHILL PL	1	1			
DRAYTON PL	1	1			
SEWELL PL	2	2			
TOSLAND WAY	1	1			
WATKINS RD	7	7			
0004050724WM830	1	1			
WHATAURI RD	1	1			
New					
ALAN LIVINGSTON DR	41	41			
ALPERS RIDGE	12	12			
ASH GR	4	4			
BRENNAN PL	3	3			
HYATT CL	2	2			
JARRETT TCE	24	24			
KANIERA TCE	9	9			
PENGOVER AVE	20	20			
Under Verandah					
ANZAC ST	21	21			
EMPIRE ST	23	23			
MAHOE ST	15	15			
MARKET ST SERVICE LANE (RP94 RHS)	2	2			

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
Grand Total	**307**	**308**	**1**	**nil**	

I found one additional lamp count in the field than was recorded in the database. This is recorded as non-compliance below. The impact on database accuracy is recorded as non-compliance in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: entire audit period	One additional item of load found in the field. Potential impact: Low Actual impact: Low Audit history: None Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as strong, as they mitigate risk to an acceptable level. The impact is assessed to be low, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis will advise Waipa DC of the exception found and work with them to rectify.	10/2018	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will continue to work with Waipa DC to uphold database accuracy	10/2018	

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

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 20th September 2012, the Authority sent a memo to Retailers and auditors advising that tracking of load changes at a daily level was not required as long as 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 ensuring that changes in the field are recorded accurately in the database. 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. Waipa Networks has responsibility for all maintenance. Patrols are carried out on a rolling basis with the network being checked each month.

Waipa Network provide Waipa DC with the information via the NZTA smartphone mobile road application for both upgrades and new street light connections. Waipa DC then load this into RAMM. Waipa DC undertake audits on the work claimed to confirm the accuracy of updates.

For new subdivisions, "as builts" are provided and the details from these are loaded into RAMM. A full field audit confirming the RAMM database content accuracy is undertaken by Waipa DC prior to energisation. This can result in new subdivision lighting being added to RAMM and therefore billed as connected before they are energised. I recommend this process is reviewed to ensure only connected street lights are included in the monthly report. There were no actual examples found of this during the audit.

Recommendation	Description	Audited party comment	Remedial action
Regarding: Clause 11(3) of Schedule 15.3	Review process to ensure lights are not included in monthly reporting to Genesis until they are energised.	[participant comments]	[auditor comment]

No festive lighting is connected to the street light circuit in the Waipa DC district.

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 RAMM database has a complete audit trail of all additions and changes 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	Te Awamutu and surrounds
Strata	The database contains items of load in Waipa District Council area. The processes for the management of WDC items of load are the same, but I decided to place the items of load into six strata, as follows: 1. Tamahere (ICP 0000041292WEDF7) 2. WEL embedded network (ICP 0000041294WEC78) 3. TMU0111 (ICP 0000400319WA4CA) 4. CBG0111 (ICP 0000806500WA13E) 5. New 6. Under verandah.
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 34 sub-units.
Total items of load	307 items of load were checked.

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

Audit commentary

The field data found one light variance. This was run through the DUML database tool recorded that the database was 100% for the sample checked, therefore the difference of one light was not significant and compliance is confirmed.

The check of wattages found all were correct with the small number of discrepancies detailed below:

- 134 items of load were identified with an invalid light type description This is recorded as non-compliance. These are detailed in the table below:

Light Type	Volume
70W Mercury Vapour	2
60W Metal Halide	92
80W Metal Halide	5
90W Metal Halide	23
200W Metal Halide	8
Other 60W	1
70W Sodium Low Pressure	3
TOTAL	134

- There are 463 items of load with the incorrect ballast applied. This is resulting in an estimated a minor under submission of 1,960.39 kWh per annum (based on annual burn hours of 4,271 as detailed in the DUML database auditing tool).

Whilst there were no apparent LED lamp wattage errors, I recommend that the LED light descriptions be updated to include the make, model, milliamp figure so that the wattage can be confirmed.

Recommendation	Description	Audited party comment	Remedial action
Regarding: Clause 11(3) of Schedule 15.3	Review LED light descriptions to include make, model & milliamp figure.	Genesis will request these descriptions be reviewed.	Identified

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Jun-17 To: 30-Apr-18	Analysis of the ballasts applied indicate a minor under submission of 1,960.39 kWh. 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, because they are sufficient to ensure that changes to the database are correctly recorded most of the time. The impact is assessed to be low, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis will advise Waipa DC of the exception found and work with them to rectify.	10/2018	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will continue to work with Waipa DC to uphold database accuracy	10/2018	

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
- 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 a monthly database report from RAMM and the "burn time" which is sourced from a data logger installed on the Powerco network. I checked the kW values and found some variances between the values in the database and the monthly wattage report:

ICP Number	Database extract fittings	Feb report wattage	Light count difference	Database kW value	Feb report kW value	kW difference
0000400319WA4CA	2074	1798	276	80.292	74.618	5.674
0000806500WA13E	2162	2159	3	126.05	134.471	-8.421
0000041292WEDF7	48	48	0	3.72	3.793	-0.073
0000041294WEC78	50	50	0	3.308	3.438	-0.13
Total kW difference						-2.95

This equates to an estimated 12,599.45 kWh over submission per annum (based on annual burn hours of 4,271 as detailed in the DUML database auditing tool). This is recorded as non-compliance.

There is some inaccurate ballast data within the database used to calculate submissions. This is recorded as non-compliance and discussed in **section 2.1** and **3.1**

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: entire audit period	Inaccurate data from the monthly report used to calculate submission resulting in an estimated annual over submission of 12,599.45 kWh. Analysis of the ballasts applied indicate a minor under submission of 1,960.39 kWh. Potential impact: Medium Actual impact: Medium Audit history: None Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as moderate, because they are sufficient to mitigate risk most of the time. The impact is assessed to be low, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis will advise Waipa DC of the exception found and work with them to rectify.	10/2018	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will continue to work with Waipa DC to uphold database accuracy	10/2018	

CONCLUSION

The field audit found a high level of accuracy with only one additional item of load found and the database accuracy tool returned a 100% accuracy rate.

The database contains a small number of ballast discrepancies and some variance was found between the monthly wattage report and the RAMM database extract. These are discussed in the report.

The audit found four non-compliance issues and makes two recommendations. The future risk rating of 11 indicates that the next audit be completed in 12 months, and I agree with this recommendation.

PARTICIPANT RESPONSE

Genesis have been working with Waipa, Waipa have made good in roads to maintaining the data within their database. Genesis will share this audits outcomes with them with the intent to remedy.