ELECTRICITY INDUSTRY PARTICIPATION CODE

DISTRIBUTED UNMETERED LOAD AUDIT REPORT

For

NZTA KAITOKE AND MERIDIAN ENERGY LIMITED

Prepared by: Tara Gannon

Date audit commenced: 6 October 2020

Date audit report completed: 21 October 2020

Audit report due date: 1 June 2018

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EXECUTIVE SUMMARY

This audit of the **NZTA Kaitoke DUML database** and processes was conducted at the request of **Meridian Energy Limited (Meridian)**, in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied. The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

The scope of the audit encompasses the collection, security, and accuracy of the data, including the preparation of submission information.

A RAMM database is held by **NZTA** who is Meridian's customer. **Fulton Hogan** maintain the RAMM database on behalf of NZTA, and completed a field verification and updated their records in May 2020.

Fulton Hogan complete all maintenance and removal work, and update the database at the time work is completed using Pocket RAMM. New connections are rare, and none have been completed since approximately 2008-2009.

Meridian reconciles this DUML load using the DST profile.

- Wattages were derived from historic load provided by Wellington Electricity up to July 2020. From August 2020, wattages were derived from RAMM database extracts provided by NZTA on request.
- On and off times are derived from a data logger read by EMS and are used to create a shape file.

Meridian supplies EMS with the capacity information, and EMS calculates the kWh figures for the ICPs and includes them in the relevant AV080 file. This process was audited during Meridian's reconciliation participant audit and EMS' agent audit.

All 41 lights recorded in the database were surveyed in the field, and I found that the field wattage was 98.9% of the database wattage, indicating that the installed capacity is 1.1% lower than the database. The 250W SON connected to pole ID 15517 had been replaced with an L149 LED, and the database was updated following the field survey. The database is considered to be accurate because the error is less than ±5.0%.

Four non-compliances were identified, and no recommendations were raised. The future risk rating of four indicates that the next audit be completed in 24 months. Taking into consideration the low impact of the non-compliances and that one point relates to the audit not being completed on time, I recommend the next audit should be completed in a minimum of 36 months.

The matters raised are detailed below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Distributed unmetered load audits	1.10	17.295F	The audit was not completed by the due date.	Strong	Low	1	Identified
Deriving submission information	2.1	11(1) of Schedule 15.3	Submission was based on historic information from Wellington Electricity up to July 2020. The database extract provided does not track changes at a daily basis and is provided as a snapshot. Change dates are recorded as 11/05/20 for all lamps. Future change dates are expected to be recorded accurately using Pocket RAMM at the time the change occurs.	Strong	Low	1	Identified
Database accuracy	3.1	Clause 15.2 and 15.37B(b)	Change dates are recorded as 11/05/20 for all lamps. Future change dates are expected to be recorded accurately using Pocket RAMM at the time the change occurs.	Strong	Low	1	Identified
Volume information accuracy	3.2	Clause 15.2 and 15.37B(c)	Submission was based on historic information from Wellington Electricity up to July 2020. The database extract provided does not track changes at a daily basis and is provided as a snapshot. Change dates are recorded as 11/05/20 for all lamps. Future change dates are expected to be recorded accurately using Pocket RAMM at the time the change occurs.	Strong	Low	1	Identified
Future Risk Rating						4	

Future risk rating	0	1 to 4	5 to 8	9 to 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

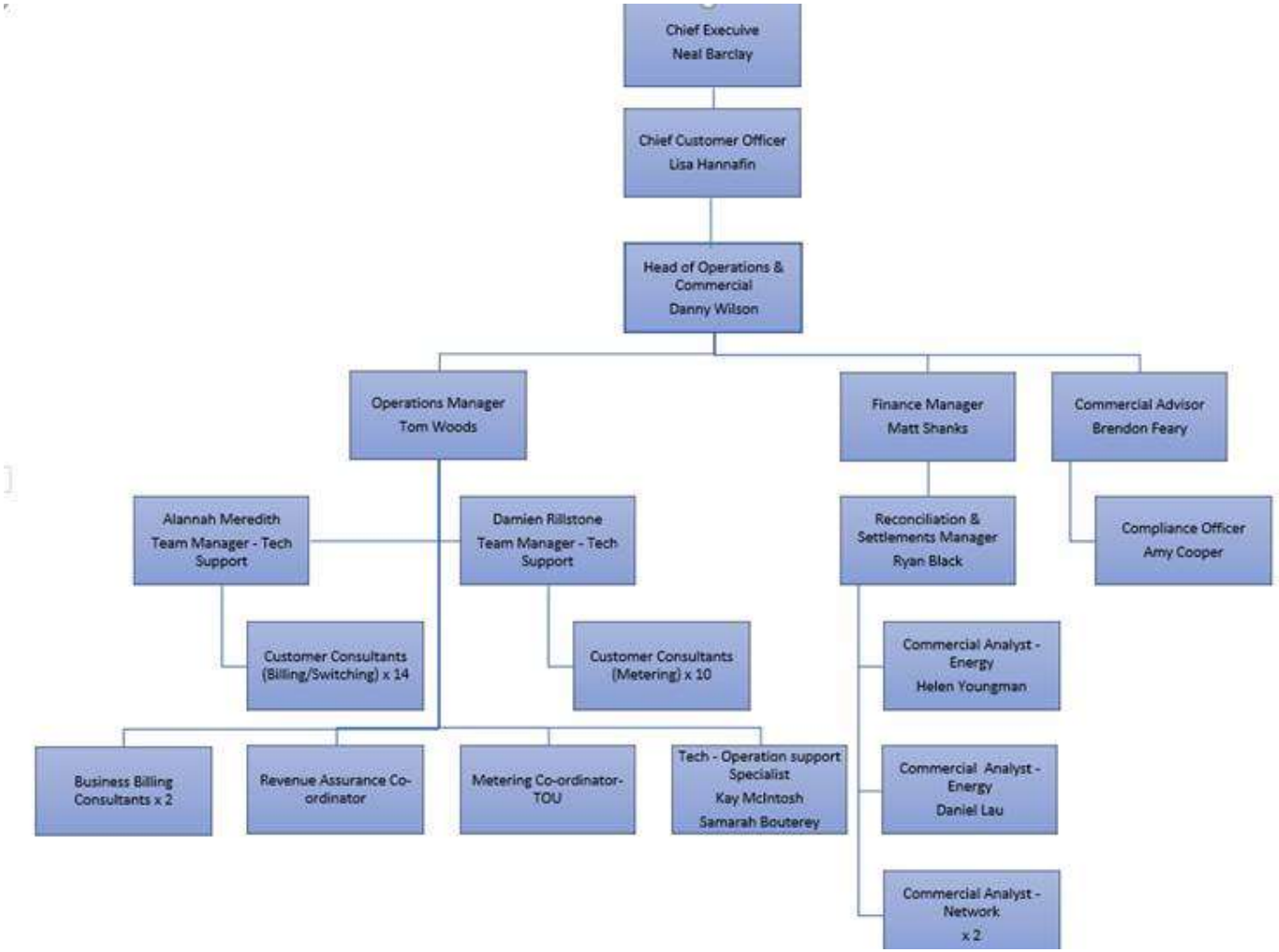
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

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

1.2. Structure of Organisation

Meridian Energy provided a copy of their organisational structure.



1.3. Persons involved in this audit

Auditor:

Tara Gannon

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Colin Tubb	Capital Journeys	Fulton Hogan
Amy Cooper	Compliance Officer	Meridian Energy Limited

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.

RAMM Software Limited backs up the database and assists with disaster recovery as part of their hosting service. Nightly backups are performed. As a minimum daily backups are retained for the previous five working days, weekly backups are retained for the previous four weeks, and monthly backups are retained for the previous six months.

Meridian and EMS' systems used in the process are discussed in their reconciliation participant and agent audit reports respectively.

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	Trader	NSP	Profile	Number of items of load	Database wattage (watts)
1001102040UN199	MASTER ICP NZTA STREETLIGHT UHT0331	Meridian	UHT0331	DST	41	11,398
Total					41	11,398

1.7. Authorisation Received

All information was provided directly by Fulton Hogan and Meridian.

1.8. Scope of Audit

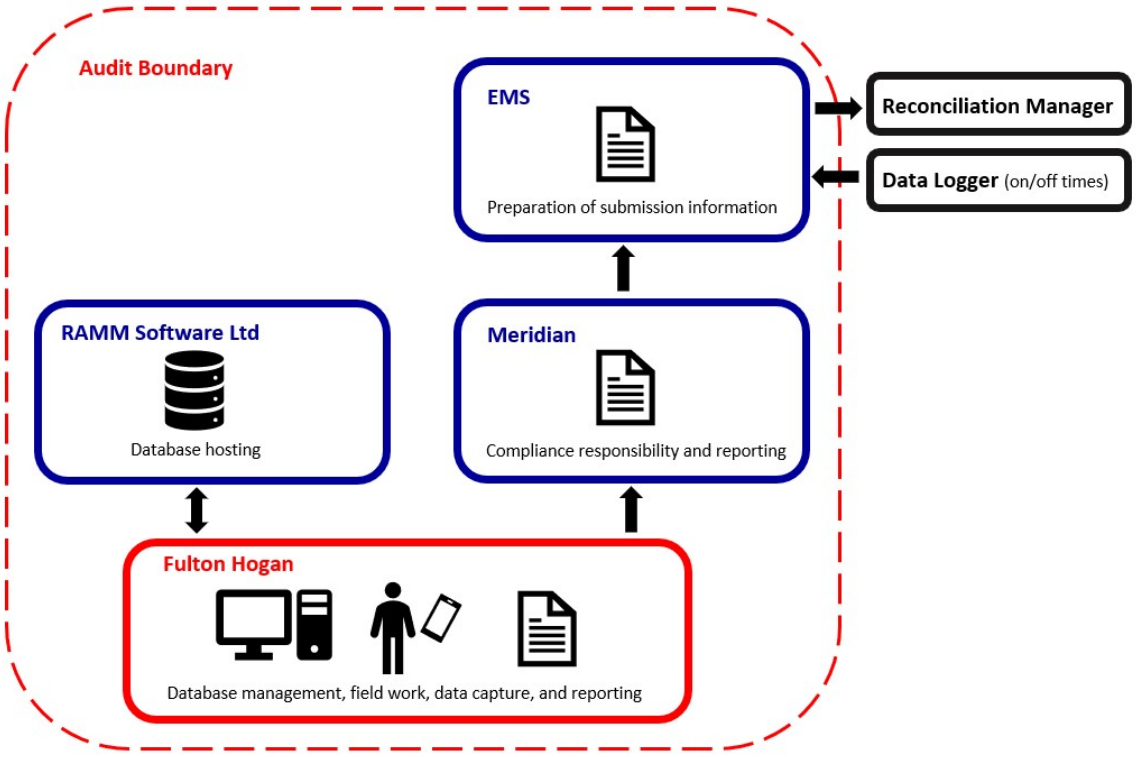
This audit of the NZTA Kaitoke DUML database and processes was conducted at the request of Meridian, in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied. The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

A RAMM database is held by NZTA who is Meridian's customer. Fulton Hogan maintain the RAMM database on behalf of NZTA, and completed a field verification and updated their records in May 2020.

Fulton Hogan complete all maintenance and removal work, and update the database at the time work is completed using Pocket RAMM. New connections are rare, and none have been completed since approximately 2008-2009.

Meridian reconciles this DUML load using the DST profile. Wattages were derived from historic load provided by Wellington Electricity up to July 2020, and database information provided by NZTA from August 2020 onwards. On and off times are derived from a data logger read by EMS and are used to create a shape file. Meridian supplies EMS with the capacity information, and EMS calculates the kWh figures for the ICPs and includes them in the relevant AV080 file. This process was audited during Meridian's reconciliation participant audit and EMS' agent audit.

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



The field audit was undertaken of all 41 items of load on 6 October 2020.

1.9. Summary of previous audit

This is the first audit of the NZTA Kaitoke DUML database completed under the current audit regime.

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

Meridian have requested Veritek to undertake this streetlight audit.

Audit commentary

The first audit under the new regime was due to be completed by 01/06/2018, but was delayed until October 2020. The audit was attempted prior to the due date, but was not completed because a database copy could not be obtained.

The audit was completed as soon as possible once the RAMM database was available, validated, and being applied for submission prior to completing the audit.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 1.10 With: Clause 17.295F From: 01-Jun-18 To: 21-Oct-20	The audit was not completed by the due date. 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 because the audit was attempted on time, but could not be completed because a copy of the RAMM database was unavailable. The impact is low, the database has now been received and the audit has been completed.

Actions taken to resolve the issue	Completion date	Remedial action status
The audit was completed as soon as the lights associated with the ICP could be confirmed and a database containing them was identified.	Oct 2020	Identified

Preventative actions taken to ensure no further issues will occur	Completion date	

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

Meridian reconciles this DUML load using the DST profile.

- Wattages were derived from historic load provided by Wellington Electricity up to July 2020. From August 2020, wattages were derived from RAMM database extracts provided by NZTA on request. NZTA completed a field verification and updated their records before Meridian began using their data. All lights recorded in the database were surveyed in the field, and I found that the field wattage was 98.9% of the database wattage, indicating that the installed capacity is 1.1% lower than the database. The database is considered to be accurate because the error is less than ±5.0%.
- On and off times are derived from a data logger read by EMS and are used to create a shape file.

Meridian supplies EMS with the capacity information, and EMS calculates the kWh figures for the ICPs and includes them in the relevant AV080 file. This process was audited during Meridian's reconciliation participant audit and EMS' agent audit.

I checked the data provided to EMS for April to July 2020 and confirmed that it matched the historic kW provided by Wellington Electricity. I checked the date provided to EMS for August 2020 and confirmed that it matched the RAMM database extract provided by NZTA.

The historic data from Wellington Electricity applied for April to July 2020 is 1.76 kW lower than the current RAMM extract. The exact amount of under or over submission due to using the historic kW values is difficult to quantify, because it is unknown how long the current lights have been installed.

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 report is provided as a snapshot and is non-compliant, and Meridian completes revision submissions where corrections are required. Meridian has not updated their processes to be consistent with the Authority's memo.

A field verification completed by Fulton Hogan in May 2020, and the database records were updated. All database records have a last update date of 11/05/2020. Fulton Hogan complete all maintenance and removal work, and maintain the database at the time work is completed using Pocket RAMM. Future changes are expected to be recorded with the date that the change occurred.

No other sources of database inaccuracy were identified.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Apr-20 To: 06-Oct-20	Submission was based on historic information from Wellington Electricity up to July 2020. The database extract provided does not track changes at a daily basis and is provided as a snapshot. Change dates are recorded as 11/05/20 for all lamps. Future change dates are expected to be recorded accurately using Pocket RAMM at the time the change occurs. Potential impact: Low Actual impact: Low Audit history: None Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are rated as strong, because the RAMM database is now used for submission and future change dates are expected to be recorded correctly. The impact of historical use of the Wellington Electricity database information is estimated to be low - approximately 1.76 kW or 7,516 kWh per annum. It is not possible to accurately determine the historic differences. Changes to the NZTA Kaitoke lights are rare, and the incorrect change dates and snapshot reports are expected to have a low impact on submission volumes.

Actions taken to resolve the issue	Completion date	Remedial action status
We are revising submissions based on database information back to May 2020 when the database content was verified. The database will be used to calculate future submissions taking onto account any changes recorded during the month.	Nov 2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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 relate to one ICP, which is recorded against each item of load in the database.

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

All items of load have GPS coordinates, address, and carriageway information recorded.

Audit outcome

Compliant

2.4. Description and capacity of load (Clause 11(2)(c) and (d) of Schedule 15.3)

Code reference

Clause 11(2)(c) and (d) of Schedule 15.3

Code related audit information

The DUML database must contain:

- *a description of load type for each item of load and any assumptions regarding the capacity*
- *the capacity of each item in watts.*

Audit observation

The database was checked to confirm that:

- it contained a field for light type and wattage capacity,
- wattage capacities include any ballast or gear wattage, and
- each item of load has a light type, light wattage, and gear wattage recorded.

Audit commentary

A description of the load type, light wattage and gear wattage is recorded for each item of load.

All items of load in the database had consistent descriptions, lamp and gear wattages recorded. No items of load had missing description or wattage information.

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

A field audit of all items of load was undertaken on 6 October 2020.

Audit commentary

The field audit discrepancies are detailed in the table below:

Location	Database count	Field count	Light count difference	Wattage recorded incorrectly	Comments
Plateau Road intersection (opposite Plateau Road)	1	1	-	1	The 250W SON connected to pole ID 15517 had been replaced with an L149 LED. The database was updated during the audit.
Total	**1**	**1**	**-**	**1**	

Compliance is recorded in this section because all lights are recorded in the database. The wattage difference is discussed in **section 3.1.**

Audit outcome

Compliant

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 Meridian 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

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

Meridian reconciles this DUML load using the DST profile.

- Wattages were derived from historic load provided by Wellington Electricity up to July 2020. From August 2020, wattages were derived from RAMM database extracts provided by NZTA. NZTA completed a field verification and updated their records before Meridian began using their data.
- On hours are determined from data logger information.

A database extract was provided in August 2020 and I assessed the accuracy of this by using the DUML Statistical Sampling Guideline. The table below shows the survey plan.

Plan Item	Comments
Area of interest	NZTA Kaitoke streetlights
Strata	The database contains 41 items of load connected to ICP 1001102040UN199. All 41 items of load were checked.
Area units	Not applicable, all 41 items of load were checked.
Total items of load	All 41 items of load were checked.

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority against the database or in the case of LED lights against the LED light specification.

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

Audit commentary

Field audit findings

All 41 lights recorded in the database were surveyed in the field, and I found that the field wattage was 98.9% of the database wattage, indicating that the installed capacity is 1.1% lower than the database. The 250W SON connected to pole ID 15517 had been replaced with an L149 LED, and the database was updated following the field survey. The database is considered to be accurate because the error is less than ±5.0%.

Light description and capacity accuracy

As discussed in **section 2.4**, a lamp description and size (including make and model) and lamp and gear wattages are recorded in the database for all items of load. No inaccurate wattage information was identified during the database review.

Wattages were checked against the published standardised wattage table produced by the Electricity Authority and found to be correct.

Change management process findings

Fulton Hogan maintain the RAMM database on behalf of NZTA, and completed a field verification and updated their records in May 2020. All database records have a last update date of 11/05/2020.

Fulton Hogan complete all maintenance and removal work, and update the database at the time work is completed using Pocket RAMM.

New connections are rare, and none have been completed since approximately 2008-2009. When a new connection is required NZTA selects an installer through their contracting process, who works with Wellington Electricity to arrange the connection. The database would be updated by Fulton Hogan once the connection was complete.

Outage patrols are completed once per month and may also be notified by residents.

Festive and private lights

There are no private or festive lights for NZTA Kaitoke.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 11-May-20 To: 06-Oct-20	Change dates are recorded as 11/05/20 for all lamps. Future change dates are expected to be recorded accurately using Pocket RAMM at the time the change occurs. Potential impact: Low Actual impact: Low Audit history: None Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are rated as strong because the future change dates are expected to be recorded correctly. Changes to the NZTA Kaitoke lights are rare, and the incorrect change dates are expected to have a low impact on submission volumes.

Actions taken to resolve the issue	Completion date	Remedial action status
The issue of historic change dates not being recorded is not able to be resolved as this information is not known. We are revising submissions based on database information back to May 2020 when the database content was verified.	Nov 2020	Identified

Preventative actions taken to ensure no further issues will occur	Completion date	

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

Code reference

Clause 15.2 and 15.37B(c)

Code related audit information

The audit must verify that:

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

Audit observation

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

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

Audit commentary

Meridian reconciles this DUML load using the DST profile, and the correct profile is recorded on the registry.

- Wattages were derived from historic load provided by Wellington Electricity up to July 2020. From August 2020, wattages were derived from RAMM database extracts provided by NZTA on request. NZTA completed a field verification and updated their records before Meridian began using their data. All lights recorded in the database were surveyed in the field, and I found that the field wattage was 98.9% of the database wattage, indicating that the installed capacity is 1.1% lower than the database. The database is considered to be accurate because the error is less than ±5.0%.
- On and off times are derived from a data logger read by EMS and are used to create a shape file.

Meridian supplies EMS with the capacity information, and EMS calculates the kWh figures for the ICPs and includes them in the relevant AV080 file. This process was audited during Meridian's reconciliation participant audit and EMS' agent audit.

I checked the data provided to EMS for April to July 2020 and confirmed that it matched the historic kW provided by Wellington Electricity. I checked the data provided to EMS for August 2020 and confirmed that it matched the RAMM database extract provided by NZTA.

The historic data from Wellington Electricity applied for April to July 2020 is 1.76 kW lower than the current RAMM extract. The exact amount of under or over submission due to using the historic kW values is difficult to quantify, because it is unknown how long the current lights have been installed.

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 report is provided as a snapshot and is non-compliant, and Meridian completes revision submissions where corrections are required. Meridian has not updated their processes to be consistent with the Authority's memo.

A field verification completed by Fulton Hogan in May 2020, and the database records were updated. All database records have a last update date of 11/05/2020. Fulton Hogan complete all maintenance and removal work, and maintain the database at the time work is completed using Pocket RAMM. Future changes are expected to be recorded with the date that the change occurred.

No other sources of database inaccuracy were identified.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 01-Apr-20 To: 06-Oct-20	Submission was based on historic information from Wellington Electricity up to July 2020. The database extract provided does not track changes at a daily basis and is provided as a snapshot. Change dates are recorded as 11/05/20 for all lamps. Future change dates are expected to be recorded accurately using Pocket RAMM at the time the change occurs. Potential impact: Low Actual impact: Low Audit history: None Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are rated as strong, because the RAMM database is now used for submission and future change dates are expected to be recorded correctly. The impact of historical use of the Wellington Electricity database information is estimated to be low - approximately 1.76 kW or 7,516 kWh per annum. It is not possible to accurately determine the historic differences. Changes to the NZTA Kaitoke lights are rare, and the incorrect change dates and snapshot reports are expected to have a low impact on submission volumes.

Actions taken to resolve the issue	Completion date	Remedial action status
We are revising submissions based on database information back to May 2020 when the database content was verified. The database will be used to calculate future submissions taking onto account any changes recorded during the month.	Nov 2020	Identified

Preventative actions taken to ensure no further issues will occur	Completion date	

CONCLUSION

A RAMM database is held by NZTA who is Meridian's customer. Fulton Hogan maintain the RAMM database on behalf of NZTA, and completed a field verification and updated their records in May 2020.

Fulton Hogan complete all maintenance and removal work, and update the database at the time work is completed using Pocket RAMM. New connections are rare, and none have been completed since approximately 2008-2009.

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Four non-compliances were identified, and no recommendations were raised. The future risk rating of four indicates that the next audit be completed in 24 months. Taking into consideration the low impact of the non-compliances and that one point relates to the audit not being completed on time, I recommend the next audit should be completed in a minimum of 36 months.

PARTICIPANT RESPONSE

Meridian has reviewed this report and their comments are contained within its body.