ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

ASHBURTON DISTRICT COUNCIL AND MERIDIAN ENERGY LIMITED

Prepared by: Tara Gannon

Date audit commenced: 28 February 2020

Date audit report completed: 22 June 2020

Audit report due date: 1 June 2020

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EXECUTIVE SUMMARY

This audit of the **Ashburton District Council (ADC)** 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.

A RAMM database is held by ADC, who is Meridian's customer. **Electricity Ashburton (EA Networks)** are responsible for new connections, fault, maintenance, and upgrade work, and maintain the database.

Meridian reconciles the DUML load for ADC ICPs 0000010559EAD7C, 0000025163EA218, 0000025164EAFD2 and 0000030218EA553 as NHH using the DST profile. Wattages are derived from an extract provided by ADC each month. 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 audit was largely conducted in accordance with the audit guidelines for DUML audits version 1.1. A field audit was not undertaken due to the restrictions imposed by the Covid-19 lockdown. To determine database accuracy, I compared the February 2020 database extract to the February 2019 database extract used to conduct the previous audit to identify any changes to lamp and gear details. I checked a sample of those changes, and rechecked discrepancies identified in the 2019 audit.

I conclude that the database is likely to be accurate within ±5%, based on:

1. The level of accuracy found in the 2019 audit, and the accuracy of corrections made following the audit. The corrections reduced the difference between the expected and actual data for the affected streets to 0 W or 0 kWh p.a. Assuming all data found to be accurate at the time of the 2019 audit remained accurate, the corrections could improve the accuracy percentage to 100.0%.
2. That corrections have been processed to include Methven Festival lights, which were found to be missing during the last audit.
3. The accuracy of database changes made during the audit period, which were correctly processed for 24/29 lights. The database was 2.5% higher than the expected values with a difference of 24 W or 102.5 kWh p.a. Wattage corrections have already been processed for two of the five lamps, reducing the difference to 22 W or 93.9 kWh p.a.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed the code requirement to calculate the correct monthly load must:

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

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

The future risk rating of ten 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	Three lights were assigned to ICP 0000000000EAZZZ, which is used to track lights with unknown owners and is not settled. Three lights (light IDs 10727, 10729 and 10734) had missing gear wattages, and were corrected by the time the audit was complete. The errors could have resulted under reporting of 55 kWh p.a. Incorrect wattages were recorded for 11 connected lights and were corrected during the audit. The errors could have resulted under reporting of 154 kWh p.a. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Moderate	Low	2	Identified
ICP identifier and items of load	2.2	11(2)(a) and (aa) of Schedule 15.3	Three lights (light IDs 7962, 7901 and 7902) were assigned to ICP 0000000000EAZZZ, which is used to track lights with unknown owners and is not settled.	Moderate	Low	2	Identified
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	Three lights (light IDs 10727, 10729 and 10734) had missing gear wattages, and were corrected by the time the audit was complete.	Strong	Low	1	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	Three lights were assigned to ICP 0000000000EAZZZ, which is used to track lights with unknown owners and is not settled. Three lights (light IDs 10727, 10729 and 10734) had missing gear wattages, and were corrected by the time the audit was complete. The errors could have resulted under reporting of 55 kWh p.a. Incorrect wattages were recorded for 11 connected lights and were corrected during the audit. The errors could have resulted under reporting of 154 kWh p.a.	Moderate	Low	2	Identified
Volume information accuracy	3.2	15.2 and 15.37B(c)	Three lights were assigned to ICP 0000000000EAZZZ, which is used to track lights with unknown owners and is not settled.	Moderate	Low	2	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			Three lights (light IDs 10727, 10729 and 10734) had missing gear wattages, and were corrected by the time the audit was complete. The errors could have resulted under reporting of 55 kWh p.a. Incorrect wattages were recorded for 11 connected lights and were corrected during the audit. The errors could have resulted under reporting of 154 kWh p.a. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.				
Future Risk Rating						9	

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	Recommendation
Database accuracy	3.1	I recommend that the total wattage for MH 60W should be checked and updated in the database if necessary.

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.

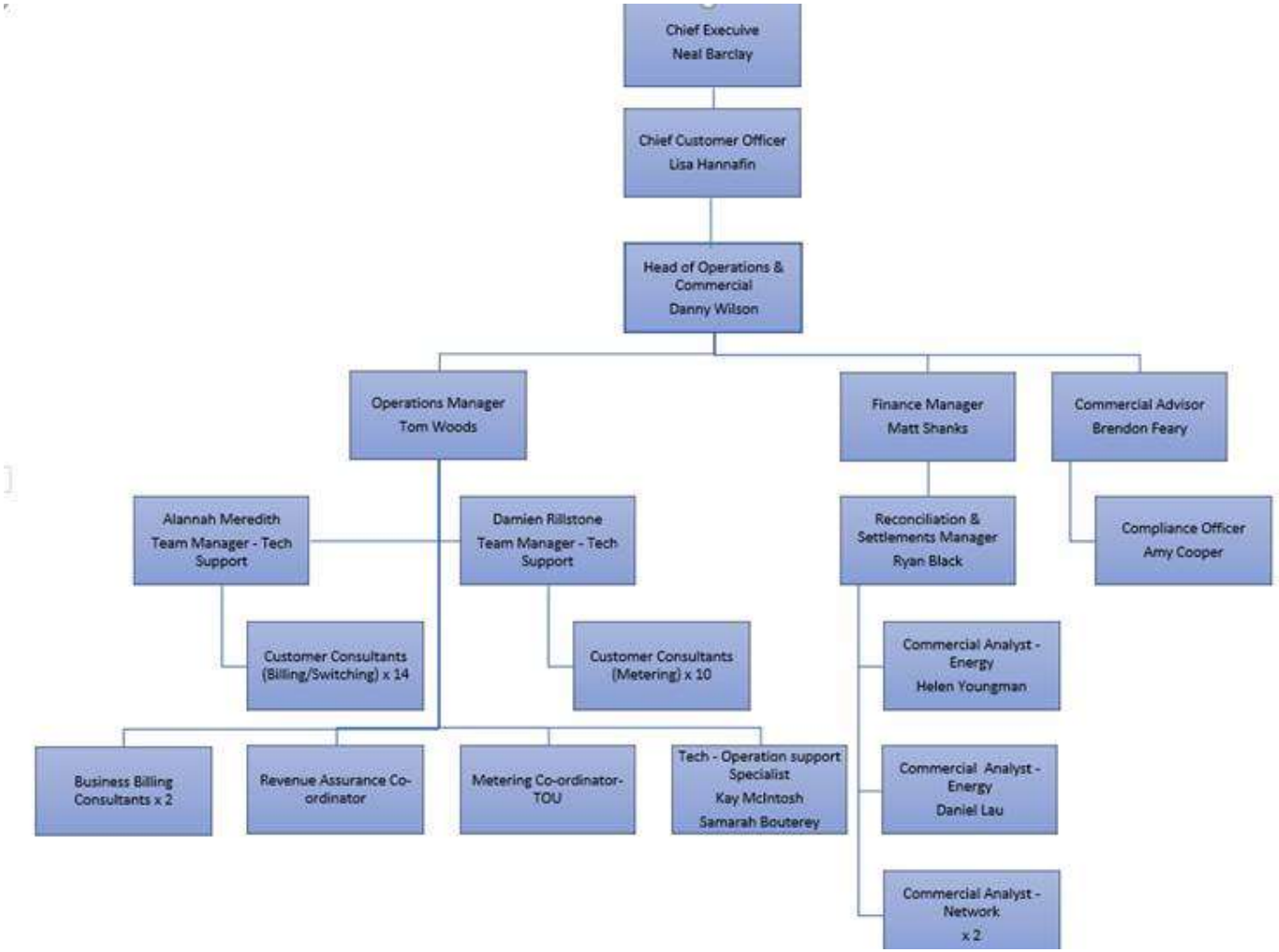
Audit observation

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



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
Deborah Barron	Asset Management Officer – Transportation	Ashburton District Council
Daniel Lau	Energy Data Analyst	Meridian Energy Limited
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.

Access to the database is secure by way of password protection.

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	NSP	Profile	Number of items of load	Database wattage (watts)
0000010559EAD7C	280 East St, Ashburton	ASB0661	DST	34	6,313
0000025163EA218	ADC Streetlights, Ashburton	ASB0661	DST	3,038	142,495
0000025164EAFD2	Open Spaces - Parks and Amenities, Ashburton	ASB0661	DST	88	7,430
0000030218EA553	Open Spaces - Methven Town Centre, Methven	ASB0661	DST	27	961
0000000000EAXXX	To track lights which are not livened	-	-	19	640
0000000000EAZZZ	To track lights with unknown owners	-	-	3	363
Total				3,651	228,982

The database also includes:

- metered lights connected to ICPs 0000017831EA1F0 and 0000024967EA2BF,
- a small number of lights connected to 0000029898EAE52 and 0000030904EAFEE, which are validly treated as standard unmetered load,
- 0000000000EAXXX which is used to track lights which are installed but not live, and
- 0000000000EAZZZ which is used to track lights with unknown owners and is discussed further in **section 2.2**.

The metered and standard unmetered load ICPs are outside the scope of this audit.

1.7. Authorisation Received

All information was provided directly by Meridian or ADC.

1.8. Scope of Audit

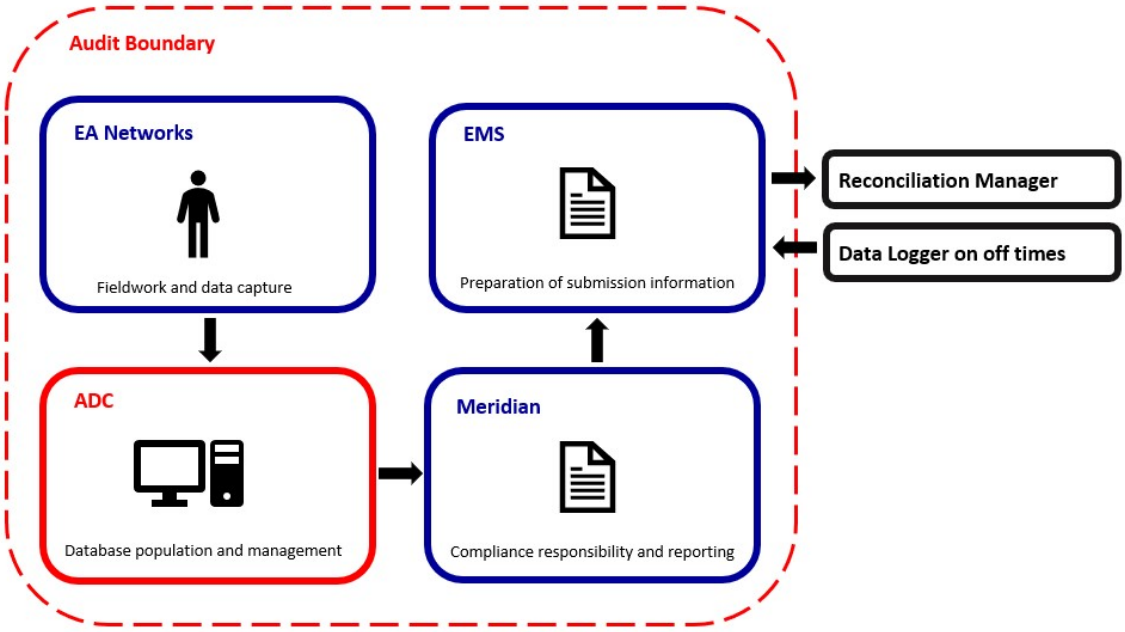
This audit of the ADC DUML database and processes was conducted at the request of Meridian in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

A RAMM database is held by ADC, who is Meridian's customer. EA Networks are responsible for new connections, fault, maintenance, and upgrade work, and maintain the database.

Meridian reconciles the DUML load for ADC ICPs 0000010559EAD7C, 0000025163EA218, 0000025164EAFD2 and 0000030218EA553 as NHH using the DST profile. Wattages are derived from an extract provided by ADC each month. 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 audit was largely conducted in accordance with the audit guidelines for DUML audits version 1.1. A field audit was not undertaken due to the restrictions imposed by the Covid-19 lockdown. To determine database accuracy I compared the February 2020 database extract to the February 2019 database extract used to conduct the previous audit to identify any changes to lamp and gear details and checked a sample of those changes, and rechecked discrepancies identified in the 2019 audit.

The following checks were conducted for a sample of lights where data had changed:

- all five lights which had a wattage change without a light ID change were checked,
- I identified all poles which had a light ID change and wattage change, indicating that a light change or upgrade had occurred, and LED upgrade records were checked against the database for ten streets where light changes had occurred between March 2019 and February 2020, and
- I identified all new poles, which indicated that a new light had been installed, and new connection "as-built" plans were checked for ten streets where new poles and lights were installed in between March 2019 and February 2020.

Field audit and data discrepancies identified during the 2019 audit were re-checked, to determine whether they had been resolved.

1.9. Summary of previous audit

The previous audit was undertaken by Tara Gannon of Veritek Limited in May 2019. The summary table below shows the statuses of the non-compliances and recommendations raised in the previous audit. Further comment is made in the relevant sections of this report.

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	The database contains some inaccurate data.	Still existing
ICP identifier and items of load	2.2	11(2)(a) and (aa) of Schedule 15.3	Four lights were assigned to an ICP which is not settled.	Still existing, in the process of being resolved
All load recorded in database	2.5	Clause 11(2A) of Schedule 15.3	Festive and decorative lights are not recorded in the database.	Cleared
Database accuracy	3.1	15.2 and 15.37B(b)	The database contains some inaccurate data.	Still existing
Volume information accuracy	3.2	15.2 and 15.37B(c)	The database contains some inaccurate data.	Still existing

Subject	Section	Description	Recommendation	Status
All load recorded in database	2.5	Festive lights	Confirm the wattages for festive and decorative lights, and update RAMM. Communicate on and off dates for festive and decorative lights to Meridian.	Implemented.
Tracking of load changes	2.6	Private lights	I recommend the details of known private lights should be passed to EA Networks to create shared unmetered load or standard unmetered load as appropriate and be removed from the monthly wattage report once this is complete.	Implemented. The lights have been investigated and are expected to be metered. See **section 3.1**.

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

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

Submission information

Meridian reconciles the DUML load for ADC ICPs 0000010559EAD7C, 0000025163EA218, 0000025164EAFD2 and 0000030218EA553 as NHH using the DST profile.

- Wattages are derived from an extract provided by ADC each month.
- 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 compared the RAMM extract provided for ADC ICPs 0000010559EAD7C, 0000025163EA218, 0000025164EAFD2 and 0000030218EA553 to the capacities provided to EMS for February 2020 and found that they matched.

Accuracy of the database information used for submission

I conclude that the database is likely to be accurate within ±5%, based on:

1. The level of accuracy found in the 2019 audit, and the accuracy of corrections made following the audit. The corrections reduced the difference between the expected and actual data for the affected streets to 0 W or 0 kWh p.a. Assuming all data found to be accurate at the time of the 2019 audit remained accurate, the corrections could improve the accuracy percentage to 100.0%.
2. That corrections have been processed to include Methven Festival lights, which were found to be missing during the last audit.
3. The accuracy of database changes made during the audit period, which were correctly processed for 24/29 lights. The database was 2.5% higher than the expected values with a difference of 24 W or 102.5 kWh p.a. Wattage corrections have already been processed for two of the five lamps, reducing the difference to 22 W or 93.9 kWh p.a.

Sources of inaccuracy are as follows:

Issue	Estimated volume information impact (annual kWh)
Three lights (light IDs 7962, 7901 and 7902) were assigned to ICP 0000000000EAZZZ, which is used to track lights with unknown owners and is not settled.	Under submission of 973 kWh p.a. for light IDs 7901 and 7902. Light ID 7962 is submitted as standard unmetered load.
Three lights (light IDs 10727, 10729 and 10734) had missing gear wattages, and were corrected by the time the audit was complete.	Under submission of 55 kWh p.a.
Incorrect wattages were recorded for 11 connected lights and were corrected during the audit.	Under submission of 154 kWh p.a.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed the code requirement to calculate the correct monthly load must:

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

The current monthly report is provided as a snapshot and 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.

The database records light installation and replacement dates. ICP 0000000000EAXXX is used to track lights which are not livened, and once the lights become live, they are moved to the correct ICP. ICP 0000000000EAXXX is correctly excluded from submission data.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 28-Feb-20 To: 28-Feb-20	Three lights are assigned to ICP 0000000000EAZZZ, which is used to track lights with unknown owners. One light is settled under another ICP, and two lights are unsettled. Three lights (light IDs 10727, 10729 and 10734) had missing gear wattages, and were corrected by the time the audit was complete. The errors could have resulted under reporting of 55 kWh p.a. Incorrect wattages were recorded for 11 connected lights and were corrected during the audit. The errors could have resulted under reporting of 154 kWh p.a. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Potential impact: Medium Actual impact: Unknown 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 they are sufficient to ensure most database information is accurate. The impact is assessed to be low. • The lights recorded under ICP 0000000000EAZZZ are in the process of being metered. Light ID 7962 is settled as standard unmetered load under ICP 0000025557EA8EB. The total load for light IDs 7901 and 7902 is 228 W or 973 kWh p.a. • The missing and incorrect wattages have been corrected. • The database accuracy assessment indicated that the impact of inaccurate data is likely to be low.

Actions taken to resolve the issue	Completion date	Remedial action status
Light IDs 7901 and 7902 recorded under ICP 0000000000EAZZZ are in the process of being metered. We understand these are not council owned lights and the customer for them is with another retailer.		Identified
Light ID 7962 is settled as standard unmetered load under ICP 0000025557EA8EB – Meridian will update UML details	31/07/2020	
The missing and incorrect wattages have been corrected.	Complete	
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Controls for maintenance of the database are considered generally robust.	Ongoing	

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 analysis found that all items of load had an ICP number recorded.

Three lights were assigned to ICP 0000000000EAZZZ, which is used to track lights with unknown owners and is not settled.

Light ID	Road Name	ICP Code	Lamp Model	Lamp and gear wattage	Comment
7962	MCMURDO STREET	PRIVATE	MV 125W	135	The unmetered load is connected to ICP 0000025557EA8EB and settled by Meridian as standard unmetered load. There are two 125W MV lights on McMurdo Street in the Tinwald Tavern carpark. Underground work is being completed at the site and as part of this process the unmetered load will become metered. Meridian is working with EA networks, and intend to update their unmetered load details so that submission is correct until the lights become metered.
7901	TINWALD DOMAIN ROAD3	PRIVATE	SON 100W	114	These lights are located at the Tinwald Domain camping ground. Investigation has been completed and these lights could be metered through the camping ground's main switchboard. EA Networks intends to arrange this with the trader. Once metered they will be removed from the RAMM data.
7902	TINWALD DOMAIN ROAD3	PRIVATE	SON 100W	114	
Total				363	

The accuracy of ICP number assignment is discussed in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.2 With: Clause 11(2)(a) and (aa) of Schedule 15.3 From: 01-Apr-19 To: 28-Feb-20	Three lights (light IDs 7962, 7901 and 7902) were assigned to ICP 0000000000EAZZZ, which is used to track lights with unknown owners and is not settled. Potential impact: Low Actual impact: Unknown Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate, because almost all lights are assigned to a settled ICP. The impact is assessed to be low: • Light ID 7962 is settled as standard unmetered load under ICP 0000025557EA8EB. • The total load for light IDs 7901 and 7902 is 228 W or 973 kWh p.a.

Actions taken to resolve the issue	Completion date	Remedial action status
Light IDs 7901 and 7902 recorded under ICP 0000000000EAZZZ are in the process of being metered. We understand these are not council owned lights and the customer for them is with another retailer. Light ID 7962 is settled as standard unmetered load under ICP 0000025557EA8EB – Meridian will update UML details and ask EASH to record the correct ICP for this light.	31/07/2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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 RAMM database contains house numbers, opposite house numbers, road names, road IDs, location numbers, and GPS coordinates.

All items of load have GPS coordinates recorded and are locatable.

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 each light is recorded in the make and model fields, wattages are recorded in the lamp wattage and gear wattage fields.

All items of load have a lamp model and lamp wattage populated, and no items of load have invalid zero lamp wattages.

Three items of load had missing gear wattages, which could result in under reporting of 13W or 55 kWh p.a. based on 4,271 annual burn hours. All were corrected by the time the audit was complete. No lights had invalid zero gear wattages.

Road Name	ICP	Light ID	Light Model	Database gear wattage	Expected gear wattage	Wattage difference
SINGLETREE ROAD	0000025163EA218	10727	SON 70w	-	13	13
VICTORIA STREET	0000025163EA218	10729	LED 70W	-	0	-
VICTORIA STREET	0000025163EA218	10734	LED 70W	-	0	-
Total				-	13	-

The accuracy of the recorded wattages is discussed in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.4 With: Clause 11(2)(c) and (d) of Schedule 15.3 From: 28-Feb-20 To: 28-Feb-20	Three lights (light IDs 10727, 10729 and 10734) had missing gear wattages, and were corrected by the time the audit was complete. 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 almost all items of load have model, lamp wattage and gear wattages recorded. The impact is assessed to be low. Three items of load temporarily had missing gear wattages, which could result in under reporting of 13W or 55 kWh p.a. based on 4,271 annual burn hours.

Actions taken to resolve the issue	Completion date	Remedial action status
Missing gear wattage has been corrected.	Complete	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
We consider controls are adequate to ensure wattages are recorded as only one light that had an applicable gear wattage was not recorded.		

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 was not undertaken due to the restrictions imposed by the Covid-19 lockdown. I compared the February 2020 database extract to the February 2019 database extract used to conduct the previous audit, to identify any changes to lamp and gear details. The following checks were conducted for a sample of lights where data had changed:

- all five lights which had a wattage change without a light ID change were checked,
- I identified all poles which had a light ID change and wattage change, indicating that a light change or upgrade had occurred and LED upgrade records were checked against the database for ten streets where light changes had occurred between March 2019 and February 2020, and
- I identified all new poles, which indicated that a new light had been installed, and new connection "as-built" plans were checked for ten streets where new poles and lights were installed in between March 2019 and February 2020.

Field audit and data discrepancies identified during the 2019 audit were re-checked, to determine whether they had been resolved.

Audit commentary

Database change accuracy

I reviewed a sample of database changes, and found:

Database change type	Sample size	Findings
Corrections *Light details changes without a change to pole ID or light ID*	Six lights on five streets	Five were updated to correct previously incorrect or inconsistent lamp and/or gear wattage data. The gear wattage for MH100W light 7280/pole ID 3451 was incorrectly updated from 14 to 12 and was corrected during the audit.
Light changes and upgrades *Light details and ID changes without a change to pole ID*	79 lights on ten streets	Light description and wattage information was correctly recorded for the sample checked.
New installations *New light and pole IDs*	29 lights on ten streets	Light description and wattage information was correctly recorded for 24 of the 29 lights. • Pole ID 4484/light ID 10702 was recorded as TL055 55W but should have been TL025 25W. • Pole ID 4438/light ID 10652 and Pole ID 4439/light ID 10653 were recorded as LED 36W (36W lamp + 6W gear wattage) but should have been recorded as LED 43W (43W lamp wattage). ADC advised that the wattages for these lamps were corrected during the audit. • Pole ID 4500/light ID 10718 and Pole ID 4434/light ID 10648 were recorded as LED 27W but should have been recorded as LED 29W. The total wattage recorded in the database for the sample is 956W, and the total expected wattage is 932W. The database is 2.5% higher than the expected values, a difference of 24W or 102.5 kWh per annum.

Resolution of 2019 audit discrepancies

Field audit discrepancies identified in the 2019 ADC field audit were followed up, to confirm whether they had been resolved. The discrepancies were reviewed by checking the affected lights in the database extract as at 28/02/20 and following up any remaining exceptions with ADC. All exceptions were resolved by the time that the audit was completed.

Address	2019 Db Count	2019 Field Count	2019 Count diff.	2019 Watt diff.	2020 Count diff.	2020 Watt diff.	2020 exceptions on report completion	2020 Comments
ADC								
AGNES STREET	6	6	-	6	-	-	-	6/6 wattage exceptions cleared.

Address	2019 Db Count	2019 Field Count	2019 Count diff.	2019 Watt diff.	2020 Count diff.	2020 Watt diff.	2020 exceptions on report completion	2020 Comments
CARTERS TERRACE	11	9	-2	6	-1	-	-	6/6 wattage exceptions cleared. 1/2 count exceptions cleared. Pole ID 2530 was accidentally left in the database following power undergrounding and was corrected during the audit.
CRIDLAND STREET	6	6	-	6	-	1	-	5/6 wattage exceptions cleared. Pole ID 2281 missed being updated following an upgrade and was corrected during the audit.
GRAHAM STREET	9	9	-	9	-	-	-	9/9 wattage exceptions cleared.
ISLEWORTH ROAD	4	4	-	3	-	-	-	3/3 wattage exceptions cleared.
MACKIE STREET (RAKAIA)	5	5	-	5	-	-	-	5/5 wattage exceptions cleared.
TURTON STREET	9	8	-1	-			-	1/1 count exception cleared. The additional light has been removed from the database.
Total	**166**	**163**	**3**	**35**	**-1**	**1**	-	

The 2019 Ashburton DC audit found that Methven festival lights and other festive lights were connected to the streetlight circuits when operating but were not recorded in RAMM. I checked the database and confirmed that the festive and festival lights are now included, and the light notes contain information on when they are connected.

The lights are only included in the database extracts when connected. ADC's procedure notes list the lights and on/off dates and require the lights to be manually removed from the database extract when they are not connected. I compared Meridian's submission data for February 2020, the database extract for February 2020, and the full database extract provided during the audit, and confirmed that this process was operating as expected.

Conclusion

I assessed database accuracy based on:

1. The level of accuracy found in the 2019 audit, and the accuracy of corrections made following the audit. The corrections reduced the difference between the expected and actual data for the affected streets to 0 W or 0 kWh p.a. Assuming all data found to be accurate at the time of

the 2019 audit remained accurate, the corrections could improve the accuracy percentage to 100.0%.

2. That corrections have been processed to include Methven Festival lights, which were found to be missing during the last audit.
3. The accuracy of database changes made during the audit period, which were correctly processed for 24/29 lights. The database was 2.5% higher than the expected values with a difference of 24 W or 102.5 kWh p.a. Wattage corrections have already been processed for two of the five lamps, reducing the difference to 22 W or 93.9 kWh p.a.

Based on this analysis, I conclude that the database is likely to be accurate within ±5%.

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's submissions are based on a monthly extract from the RAMM database.

A field audit was not undertaken due to the restrictions imposed by the Covid-19 lockdown. I compared the February 2020 database extract to the February 2019 database extract used to conduct the previous audit, to identify any changes to lamp and gear details. The following checks were conducted for a sample of lights where data had changed:

- all five lights which had a wattage change without a light ID change were checked,
- I identified all poles which had a light ID change and wattage change, indicating that a light change or upgrade had occurred, and LED upgrade records were checked against the database for ten streets where light changes had occurred between March 2019 and February 2020, and
- I identified all new poles, which indicated that a new light had been installed, and new connection "as-built" plans were checked for ten streets where new poles and lights were installed in between March 2019 and February 2020.

Field audit and data discrepancies identified during the 2019 audit were re-checked, to determine whether they had been resolved.

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

Database accuracy

I assessed database accuracy based on:

1. The level of accuracy found in the 2019 audit, and the accuracy of corrections made following the audit. The corrections reduced the difference between the expected and actual data for the affected streets to 0 W or 0 kWh p.a. Assuming all data found to be accurate at the time of the 2019 audit remained accurate, the corrections could improve the accuracy percentage to 100.0%.
2. That corrections have been processed to include Methven Festival lights, which were found to be missing during the last audit.
3. The accuracy of database changes made during the audit period, which were correctly processed for 24/29 lights. The database was 2.5% higher than the expected values with a difference of 24 W or 102.5 kWh p.a. Wattage corrections have already been processed for two of the five lamps, reducing the difference to 22 W or 93.9 kWh p.a.

Based on this analysis, I conclude that the database is likely to be accurate within ±5%.

Light description and capacity accuracy

As discussed in **section 2.4**:

- all items of load have a lamp model and lamp wattage populated, and no items of load had invalid zero lamp wattages, and
- three items of load had missing gear wattages, which could result in under reporting of 13W or 55 kWh p.a. based on 4,271 annual burn hours, however all were corrected by the time the audit was complete.

No lights had invalid zero lamp or gear wattages. Lamp and gear wattages were compared to the expected values. I found that there were incorrect wattages recorded for 11 connected lights, and these were corrected during the audit. The errors could have resulted under reporting of 154 kWh p.a.

Lamp Model	Quantity	Recorded total wattage	Expected total wattage	Comment
MH 100w	1	112	114	ADC advised that the gear wattage was corrected from 12 to 14 during the audit. The expected under reporting is 2 W or 9 kWh per annum.
LED 36W	4	36	43	ADC advised that wattages for these EFL 540 R65 LEDs were corrected to 43 during the audit. Nine of the affected lamps were connected to 0000000000EAXXX, which is used to track lights which are not livened. The expected under reporting relating to the ten connected lamps is 34 W or 145 kWh per annum.
	15	42	43	
MH 60w	20	66	Unknown	I was unable to obtain specifications to confirm the correct wattage during the audit and recommend that the correct wattages are confirmed and updated if necessary.

Recommendation	Description	Audited party comment	Remedial action
Confirm total wattage for MH 60W	I recommend that the total wattage for MH 60W should be checked and updated in the database if necessary.	We will follow up with EASH to confirm total wattage for this light model.	Identified

Smartspot parking sensors are used. These have a battery (drawing a maximum of 80W) that is charged when the streetlight circuit is connected, and which power the sensors when the streetlight circuit is switched off. The wattages for these batteries are correctly recorded.

ICP number and owner accuracy

As discussed in **section 2.2**, the analysis found that all items of load had an ICP number recorded.

Three private lights were assigned to ICP 0000000000EAZZZ, which is used to track lights with unknown owners and is not settled. The lights are in the process of being metered and will be removed from the RAMM data once this is complete.

The accuracy of ICP numbers was checked by comparing the ICP description, location, and light type for each item of load for consistency. I identified 14 street names where items of load were connected to more than one ICP. Each affected street was checked, and I confirmed that the ICP assignment was

correct based on the ICP's description and location information. All ICPs in the database are connected to the same NSP.

Change management process findings

EA Networks are responsible for new connections, fault, maintenance, and upgrade work, and maintain the database.

For new subdivisions, the developer liaises with EA Networks to arrange a new connection. Streetlight design is approved by ADC on EA Networks' recommendation. EA Networks completes the connection once it is approved by ADC and EA Networks, and updates RAMM. ICP 0000000000EAXXX is used to track lights which are not livened, and once the lights become live, they are moved to the correct ICP. ICP 0000000000EAXXX is correctly excluded from submission data.

The LED upgrade project was completed in May 2019. Further LED upgrades are occurring as power is undergrounded and new streetlight poles are installed.

Outage patrols are conducted on an ad hoc basis when staff are working in an area at night. Outages are also reported by residents within the ADC region and work orders are raised with EA Networks as required.

The database records light installation and replacement dates.

Private lights

As recorded above, three private lights are assigned to ICP 0000000000EAZZZ, which is used to track lights with unknown owners and is not settled by Meridian. The lights were checked as part of EA Networks' 2020 distributor audit and are in the process of being metered. Once metered they will be removed from the RAMM data.

Light ID	Road Name	ICP Code	Lamp Model	Lamp and gear wattage	Comment
7962	MCMURDO STREET	PRIVATE	MV 125W	135	The unmetered load is connected to ICP 0000025557EA8EB and settled by Meridian as standard unmetered load. There are two 125W MV lights on McMurdo Street in the Tinwald Tavern carpark. Underground work is being completed at the site and as part of this process the unmetered load will become metered. Meridian is working with EA networks, and intend to update their unmetered load details so that submission is correct until the lights become metered.
7901	TINWALD DOMAIN ROAD3	PRIVATE	SON 100W	114	These lights are located at the Tinwald Domain camping ground. Investigation has been completed and these lights could be metered through the camping ground's main switchboard. EA Networks intends to arrange this with the trader.
7902	TINWALD DOMAIN ROAD3	PRIVATE	SON 100W	114	
Total				363	

Festival and festive lights

The 2019 Ashburton DC audit found that Methven festival lights and other festive lights were connected to the streetlight circuits when operating but were not recorded in RAMM. I checked the database and confirmed that the festive and festival lights are now included, and the light notes contain information on when they are connected.

The lights are only included in the database extracts when connected. ADC's procedure notes list the lights and on/off dates and require the lights to be manually removed from the database extract when they are not connected. I compared Meridian's submission data for February 2020, the database extract for February 2020 and the full database extract provided during the audit and confirmed that this process was operating as expected.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 28-Feb-20 To: 28-Feb-20	Three lights are assigned to ICP 0000000000EAZZZ, which is used to track lights with unknown owners. One light is settled under another ICP, and two lights are unsettled. Three lights (light IDs 10727, 10729 and 10734) had missing gear wattages, and were corrected by the time the audit was complete. The errors could have resulted under reporting of 55 kWh p.a. Incorrect wattages were recorded for 11 connected lights and were corrected during the audit. The errors could have resulted under reporting of 154 kWh p.a. Potential impact: Medium Actual impact: Unknown Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate as they are sufficient to ensure most database information is accurate. The impact is assessed to be low. • The ICPs recorded under ICP 0000000000EAZZZ are in the process of being metered. Light ID 7962 is settled as standard unmetered load under ICP 0000025557EA8EB. The total load for light IDs 7901 and 7902 is 228 W or 973 kWh p.a. • Three items of load temporarily had missing gear wattages, which could result in under reporting of 13W or 55 kWh p.a. based on 4,271 annual burn hours. • The incorrect wattages have been corrected. The database accuracy assessment indicated that the impact of inaccurate data is likely to be low.

Actions taken to resolve the issue	Completion date	Remedial action status
Light IDs 7901 and 7902 recorded under ICP 0000000000EAZZZ are in the process of being metered. We understand these are not council owned lights and the customer for them is with another retailer.		Identified
Light ID 7962 is settled as standard unmetered load under ICP 0000025557EA8EB – Meridian will update UML details	31/07/2020	
The missing and incorrect wattages have been corrected.	Complete	
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Controls for maintenance of the database are considered generally robust.	Ongoing	

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

Submission information

Meridian reconciles the DUML load for ADC ICPs 0000010559EAD7C, 0000025163EA218, 0000025164EAFD2 and 0000030218EA553 as NHH using the DST profile. The correct profiles are recorded on the registry.

- Wattages are derived from an extract provided by ADC each month.
- 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 compared the RAMM extract provided for ADC ICPs 0000010559EAD7C, 0000025163EA218, 0000025164EAFD2 and 0000030218EA553 to the capacities provided to EMS for February 2020 and found that they matched.

Accuracy of the database information used for submission

I conclude that the database is likely to be accurate within ±5%, based on:

1. The level of accuracy found in the 2019 audit, and the accuracy of corrections made following the audit. The corrections reduced the difference between the expected and actual data for the affected streets to 0 W or 0 kWh p.a. Assuming all data found to be accurate at the time of the 2019 audit remained accurate, the corrections could improve the accuracy percentage to 100.0%.
2. That corrections have been processed to include Methven Festival lights, which were found to be missing during the last audit.
3. The accuracy of database changes made during the audit period, which were correctly processed for 24/29 lights. The database was 2.5% higher than the expected values with a difference of 24 W or 102.5 kWh p.a. Wattage corrections have already been processed for two of the five lamps, reducing the difference to 22 W or 93.9 kWh p.a.

Sources of inaccuracy are as follows:

Issue	Estimated volume information impact (annual kWh)
Three lights (light IDs 7962, 7901 and 7902) were assigned to ICP 0000000000EAZZZ, which is used to track lights with unknown owners and is not settled.	Under submission of 973 kWh p.a. for light IDs 7901 and 7902. Light ID 7962 is submitted as standard unmetered load.
Three lights (light IDs 10727, 10729 and 10734) had missing gear wattages, and were corrected by the time the audit was complete.	Under submission of 55 kWh p.a.
Incorrect wattages were recorded for 11 connected lights and were corrected during the audit.	Under submission of 154 kWh p.a.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed the code requirement to calculate the correct monthly load must:

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

The current monthly report is provided as a snapshot and 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.

The database records light installation and replacement dates. ICP 0000000000EAXXX is used to track lights which are not livened, and once the lights become live, they are moved to the correct ICP. ICP 0000000000EAXXX is correctly excluded from submission data.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 28-Feb-20 To: 28-Feb-20	Three lights are assigned to ICP 0000000000EAZZZ, which is used to track lights with unknown owners. One light is settled under another ICP, and two lights are unsettled. Three lights (light IDs 10727, 10729 and 10734) had missing gear wattages, and were corrected by the time the audit was complete. The errors could have resulted under reporting of 55 kWh p.a. Incorrect wattages were recorded for 11 connected lights and were corrected during the audit. The errors could have resulted under reporting of 154 kWh p.a. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Potential impact: Medium Actual impact: Unknown 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 they are sufficient to ensure most database information is accurate. The impact is assessed to be low: • The ICPs recorded under ICP 0000000000EAZZZ are in the process of being metered. Light ID 7962 is settled as standard unmetered load under ICP 0000025557EA8EB. The total load for light IDs 7901 and 7902 is 228 W or 973 kWh p.a. • The missing and incorrect wattages have been corrected. • The database accuracy assessment indicated that the impact of inaccurate data is likely to be low.

Actions taken to resolve the issue	Completion date	Remedial action status
Light IDs 7901 and 7902 recorded under ICP 0000000000EAZZZ are in the process of being metered. We understand these are not council owned lights and the customer for them is with another retailer.		Identified
Light ID 7962 is settled as standard unmetered load under ICP 0000025557EA8EB – Meridian will update UML details	31/07/2020	
The missing and incorrect wattages have been corrected.	Complete	
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Controls for maintenance of the database are considered generally robust.	Ongoing	

CONCLUSION

A RAMM database is held by ADC, who is Meridian's customer. **Electricity Ashburton (EA Networks)** are responsible for new connections, fault, maintenance, and upgrade work, and maintain the database.

Meridian reconciles the DUML load for ADC ICPs 0000010559EAD7C, 0000025163EA218, 0000025164EAFD2 and 0000030218EA553 as NHH using the DST profile. Wattages are derived from an extract provided by ADC each month. 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 audit was largely conducted in accordance with the audit guidelines for DUML audits version 1.1. A field audit was not undertaken due to the restrictions imposed by the Covid-19 lockdown. To determine database accuracy, I compared the February 2020 database extract to the February 2019 database extract used to conduct the previous audit to identify any changes to lamp and gear details. I checked a sample of those changes, and rechecked discrepancies identified in the 2019 audit.

I conclude that the database is likely to be accurate within ±5%, based on:

1. The level of accuracy found in the 2019 audit, and the accuracy of corrections made following the audit. The corrections reduced the difference between the expected and actual data for the affected streets to 0 W or 0 kWh p.a. Assuming all data found to be accurate at the time of the 2019 audit remained accurate, the corrections could improve the accuracy percentage to 100.0%.
2. That corrections have been processed to include Methven Festival lights, which were found to be missing during the last audit.
3. The accuracy of database changes made during the audit period, which were correctly processed for 24/29 lights. The database was 2.5% higher than the expected values with a difference of 24 W or 102.5 kWh p.a. Wattage corrections have already been processed for two of the five lamps, reducing the difference to 22 W or 93.9 kWh p.a.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed the code requirement to calculate the correct monthly load must:

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

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

The future risk rating of ten indicates that the next audit be completed in 12 months, and I agree with this recommendation.

PARTICIPANT RESPONSE

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