

**ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT**

For

**RUAPEHU DISTRICT COUNCIL
AND MERIDIAN ENERGY LIMITED
NZBN:9429037696863**

Prepared by: Rebecca Elliot

Date audit commenced: 10 September 2021

Date audit report completed: 2 December 2021

Audit report due date: 01 December 2021

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EXECUTIVE SUMMARY

This audit of the **Ruapehu District Council (RDC)** 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.

The Ruapehu DC DUML database switched to Meridian on 1 January 2021. Meridian reconciles this DUML load using the DST profile. The 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 figure for each ICP and includes this in the relevant AV080 file. I compared the RDC database provided to the capacity information Meridian supplied to EMS for the month of October 2021 and I confirm it matches.

A RAMM database is managed by **Alf Downs Streetlighting Limited (Alf Downs)** on behalf of RDC. The field work, asset data capture and database population is conducted by Alf Downs. Alf Downs staff update the database from the field using Pocket RAMM.

The field audit was delayed due to COVID 19 travel restrictions which has caused this audit to be completed late.

The database accuracy is confirmed to be with the +/-5% threshold.

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 audit found six non-compliances and makes three recommendations. All of the non-compliances relate to a small number of ICPs. The discrepancies found have been passed to Alf Downs to correct. The future risk rating of 11 indicates that the next audit be completed in 12 months. I have considered this along with Meridian's comments, that the field audit found the database is within the accuracy threshold and I recommend that the next audit be in 18 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
Deriving submission information	2.1	11(1) of Schedule 15.3	<p>A small number of festive lights are not recorded in the RAMM database resulting in a small amount of under submission.</p> <p>16 items of load with no ICP or wattage recorded resulting in an estimated minor under submission of 656 kWh per annum.</p> <p>28 lights with the incorrect wattage recorded resulting in an estimated over submission of 282 kWh per annum.</p> <p>158 lights with the incorrect ballast wattage recorded resulting in an estimated under submission of 1,145.27 kWh per annum.</p> <p>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.</p> <p>The liveness date of new streetlights is not captured in the database.</p>	Moderate	Low	2	Investigating
ICP Identifier	2.2	11(2)(a) and (aa) of Schedule 15.3	16 items of load with no ICP or wattage recorded resulting in an estimated minor under submission of 656 kWh per annum.	Moderate	Low	2	Investigating
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	16 items of load with no ICP or wattage recorded resulting in an estimated minor under submission of 656 kWh per annum.	Moderate	Low	2	Investigating
All load recorded in the database	2.5	11(2A) of Schedule 15.3	Two additional items of load identified in the field from a sample of 237 lights examined.	Strong	Low	1	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	16 items of load with no ICP or wattage recorded resulting in an estimated minor under	Moderate	Low	2	Investigating

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			<p>submission of 656 kWh per annum.</p> <p>28 lights with the incorrect wattage recorded resulting in an estimated over submission of 282 kWh per annum.</p> <p>158 lights with the incorrect ballast wattage recorded resulting in an estimated under submission of 1,145.27 kWh per annum.</p> <p>A small number of festive lights are not recorded in the RAMM database resulting in a small amount of under submission.</p>				
Volume information accuracy	3.2	15.2 and 15.37B(c)	<p>A small number of festive lights are not recorded in the RAMM database resulting in a small amount of under submission.</p> <p>16 items of load with no ICP or wattage recorded resulting in an estimated minor under submission of 656 kWh per annum.</p> <p>28 lights with the incorrect wattage recorded resulting in an estimated over submission of 282 kWh per annum.</p> <p>158 lights with the incorrect ballast wattage recorded resulting in an estimated under submission of 1,145.27 kWh per annum.</p> <p>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.</p> <p>The livening date of new streetlights is not captured in the database.</p>	Moderate	Low	2	Investigating
Future Risk Rating						11	
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
Confirm light wattages	3.1	Confirm the correct wattages for the two models detailed above and adjust RAMM if necessary.
New streetlight connections	3.1	Review the new streetlight new connection process with RDC, Alf Downs, the Lines Company to ensure that the livening date for new streetlights is captured in RAMM.
Decorative lights on Hakiaha Street, Taumaranui	3.1	Liaise with RDC to get the festive lights recorded in the database.

ISSUES

Subject	Section	Description	Issue
		Nil	

1. ADMINISTRATIVE

1.1. Exemptions from Obligations to Comply with Code

Code reference

Section 11 of Electricity Industry Act 2010.

Code related audit information

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

Audit observation

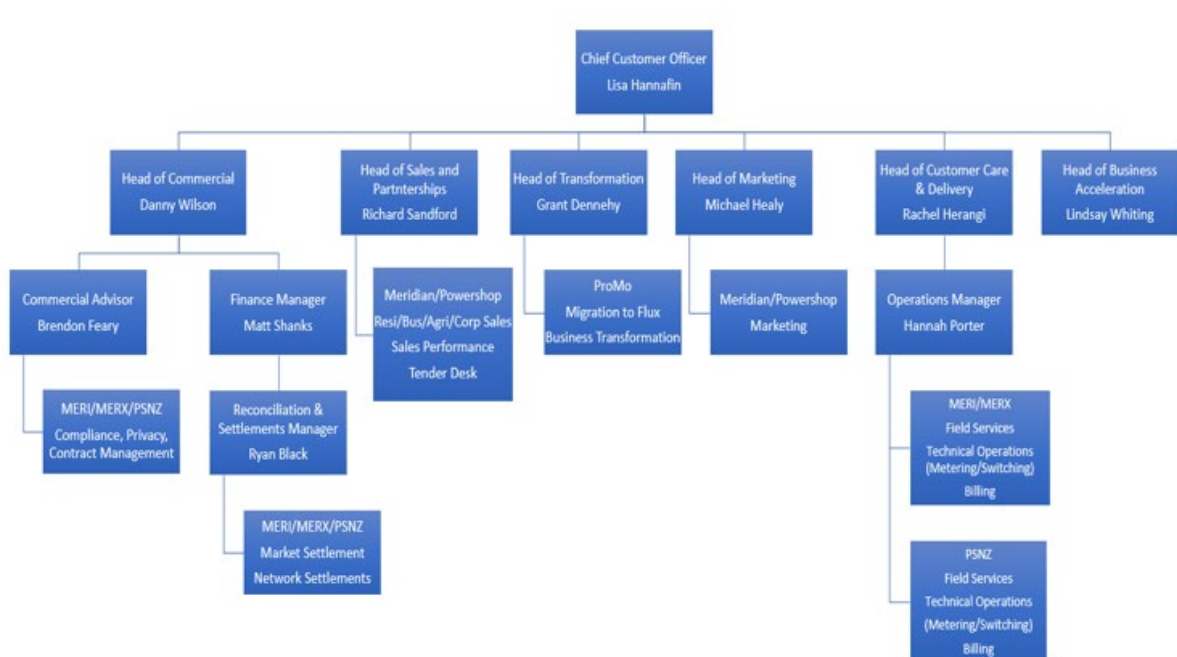
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

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

1.2. Structure of Organisation

Meridian provided a copy of their organisation 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
Aaron Reade	Director	Alf Downs Limited
Andrea Nichol	Team Leader - Land Transport	Ruapehu DC
Chris Hayvice	Project Manager	Ruapehu DC
Amy Cooper	Compliance Officer	Meridian Energy
Desiree Rogers	Corporate Account Manager	Meridian Energy
Melanie Matthews	Quality and Compliance Advisor	Meridian Energy
Simons Briggs	Corporate Account Manager	Meridian Energy

1.4. Hardware and Software

The SQL database used for the management of DUML is remotely hosted by thinkproject New Zealand Limited (formerly RAMM NZ Ltd). The database is commonly known as “RAMM” which stands for “Road Assessment and Maintenance Management”. The specific module used for DUML is called RAMM Contractor.

thinkproject New Zealand 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 Energy and EMS’ systems used in the process are discussed in their reconciliation audit report.

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)
0001111171WM17A	STREETLIGHTS TRANSIT URBAN TAUMARUNUI	ONG0331	STL	139	21,415
0001111172WMDBA	STREETLIGHTS RUAPEHU DISTRICT COUNCIL NATIONAL PARK	NPK0331	STL	73	6,179
0001111173WM1FF	STREETLIGHTS TRANSIT URBAN NATIONAL PARK	NPK0331	STL	26	4,503
0001111174WMC35	STREETLIGHTS RUAPEHU DISTRICT COUNCIL OHAKUNE	OKN0111	STL	355	32,016
0001111175WM070	STREETLIGHTS TRANSIT URBAN OHAKUNE	OKN0111	STL	37	6,783
0008807442WME14	STREETLIGHTS RUAPEHU DISTRICT COUNCIL TAUMARUNUI	ONG0331	STL	942	85,401
Private				21	1,570
(blank)	No wattage or ICP recorded			19	?
Total				1,631	157,867

Private lights

21 private lights are recorded in the database but excluded from submission.

- 16 lights are owned by DoC and situated near Chateau Tongariro. These lights have been confirmed to belong to the Whakapapa Village DoC DUML database and are being reconciled against ICP 0088055801WMB6F.
- Two lights are located at The Lines Company's depot. Alf Downs could not confirm whether these lights were metered through the Lines Company's installation or are connected to the streetlight circuits.
- Two lights are metered through the Top 10 Holiday Park's installation and are not part of the DUML load.
- One light is inside the grounds of the National Park School.

There are 19 lights that have no ICP, or wattage recorded against them. Three of these are yet to be electrically connected. The remaining 16 are new lights that have yet to be included in the monthly report being supplied to Meridian. This is recorded as non-compliance in **sections 2.1, 2.2, 2.4, 3.1 and 3.2.**

1.7. Authorisation Received

All information was provided directly by Meridian, RDC or Alf Downs.

1.8. Scope of Audit

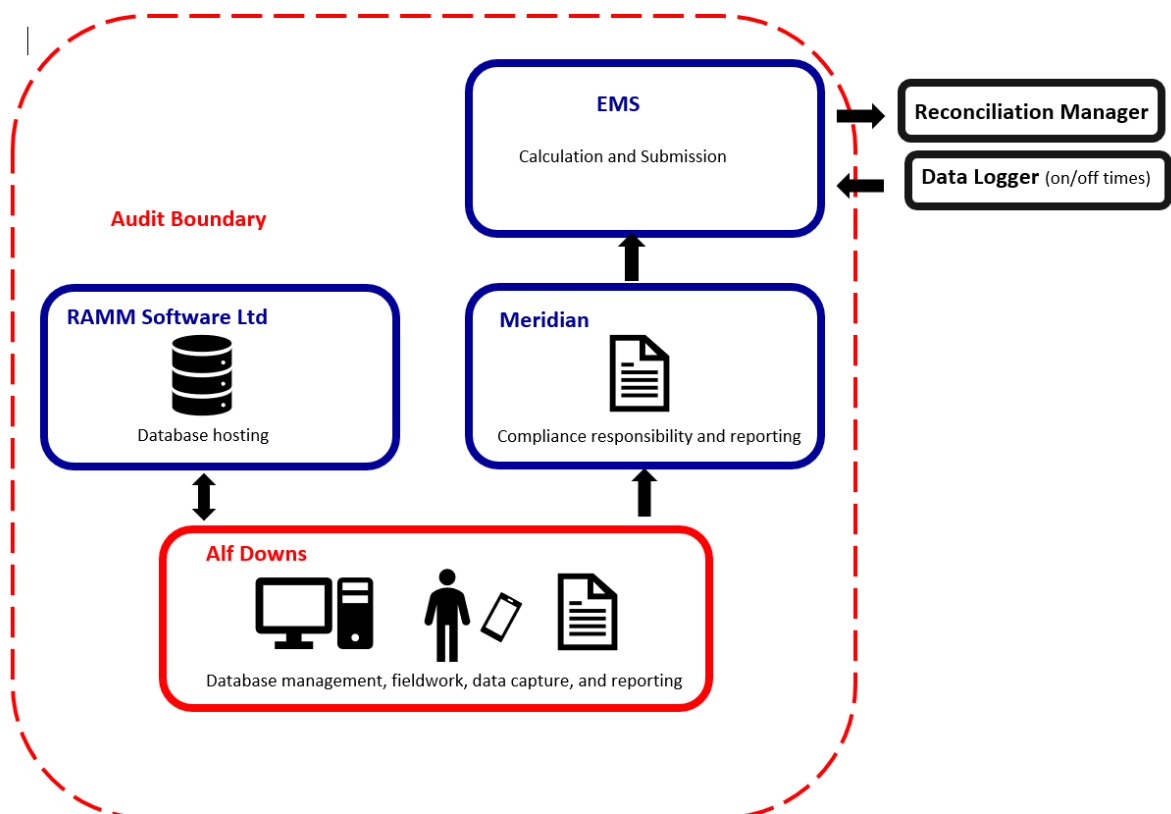
This audit of the RDC DUML database and processes was conducted at the request of Meridian in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

A RAMM database is managed by Alf Downs on behalf of RDC. The field work, asset data capture and database population is conducted by Alf Downs. Alf Downs staff update the database from the field using Pocket RAMM.

Meridian reconciles this DUML load using the DST profile. The 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 figure for each ICP and includes this in the relevant AV080 file.

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.



A field audit was undertaken of a statistical sample of 237 items of load on 22 November 2021.

1.9. Summary of previous audit

The previous audit of this database was undertaken by Tara Gannon of Veritek Limited in September 2020. Five non-compliances were identified, and five recommendations were made. The current statuses of the findings are detailed below.

Table of Non-compliance

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	<p>The database is not confirmed as accurate with a 95% level of confidence.</p> <p>The wattages supplied by Alf Downs were not applied for ICPs 0001111171WM17A, 0001111172WMDBA and 0008807442WME14 for June 2020, resulting in over submission of 135 kWh.</p> <p>Pole ID 1998 had a blank gear wattage and gear wattage description, when “no gear” and zero is expected.</p> <p>Pole ID 2117 had a blank ICP group and was updated to ICP 0008807442WME14 during the audit.</p> <p>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.</p> <p>The installation and change dates recorded in the database reflect the date of data collection, which is not always consistent with the date that the change occurred.</p>	<p>Cleared</p> <p>Non-compliance with the previous trader.</p> <p>Still existing for different items of load</p> <p>Still existing for different items of load</p> <p>Still existing</p> <p>Still existing for new connections</p>
11(2)(a) and (aa) of Schedule 15.3	2.2	11(2)(a) and (aa) of Schedule 15.3	<p>Pole ID 2117 had a blank ICP group and was updated to ICP 0008807442WME14 during the audit.</p>	<p>Still existing for different items of load</p>
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	<p>Pole ID 1998 had a blank gear wattage and gear wattage description, when “no gear” and zero is expected.</p>	<p>Still existing for different items of load</p>

Subject	Section	Clause	Non-compliance	Status
Database accuracy	3.1	15.2 and 15.37B(b)	<p>The database is not confirmed as accurate with a 95% level of confidence.</p> <p>Pole ID 1998 had a blank gear wattage and gear wattage description, when “no gear” and zero is expected.</p> <p>Pole ID 2117 had a blank ICP group and was updated to ICP 0008807442WME14 during the audit.</p> <p>The installation and change dates recorded in the database reflect the date of data collection, which is not always consistent with the date that the change occurred.</p>	<p>Cleared</p> <p>Still existing for different items of load</p> <p>Still existing for different items of load</p> <p>Still existing for new connections</p>
Volume information accuracy	3.2	15.2 and 15.37B(c)	<p>The database is not confirmed as accurate with a 95% level of confidence.</p> <p>The wattages supplied by Alf Downs were not applied for ICPs 0001111171WM17A, 0001111172WMDBA and 0008807442WME14 for June 2020, resulting in over submission of 135 kWh.</p> <p>Pole ID 1998 had a blank gear wattage and gear wattage description, when “no gear” and zero is expected.</p> <p>Pole ID 2117 had a blank ICP group and was updated to ICP 0008807442WME14 during the audit.</p> <p>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.</p> <p>The installation and change dates recorded in the database reflect the date of data collection, which is not always consistent with the date that the change occurred.</p>	<p>Cleared</p> <p>Non-compliance with the previous trader.</p> <p>Still existing for different items of load</p> <p>Still existing for different items of load</p> <p>Still existing</p> <p>Still existing for new connections</p>

Recommendations

Section	Subject	Description	Status
2.2	Private streetlights – The Lines Company depot	Confirm whether pole IDs 539 and 1687 are metered or unmetered and update the database details accordingly.	Cleared
2.2	Private streetlights – DoC lights near Chateau Tongariro	Complete the investigation into the DoC lights at the Chateau and confirm whether they should be part of the RDC DUMML load. Work with the Whakapapa Village DoC DUMML database owner to ensure that lights in the area are recorded and assigned to the correct ICP in either the Whakapapa Village – DoC DUMML database or the RDC DUMML database.	Cleared - items of load are being reconciled in the relevant DOC DUMML database.
2.5	SH 4 (TAUMARUNUI) BRDG 100KM/H lights	Investigate the lights at this location to confirm the correct wattages and whether they are unmetered and update the database accordingly.	Cleared
3.1	Confirm light wattages	Confirm the correct wattages for the three poles with models which did not match the specifications I located, or I could not locate specifications for. Update the wattages in RAMM as necessary.	Cleared
3.1	Decorative lights on Hakiha Street, Taumaranui	Confirm whether the decorative lights on Hakiha Street, Taumaranui are ever connected. If they are, include them in the database with the correct ICP numbers and develop procedures to provide on and off dates to Trustpower for submission.	Still existing- updated findings are discussed in 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

Meridian reconciles this DUML load using the DST profile. The total volume submitted to the Reconciliation Manager is based on a monthly database report derived from RAMM and the “burn time” which is sourced from data loggers installed on the Unison and Powerco networks. Meridian supplies EMS with the capacity information and EMS calculates the kWh figure for each ICP and includes this in the relevant AV080 file. This process was audited during Meridian’s reconciliation participant audit and EMS’ agent audit.

The capacities supplied to EMS for October 2021 were checked and confirmed to be the same as the database.

The field audit found that the database was accurate to within +/-5%, compliance is confirmed.

Sources of database inaccuracy are as follows:

Issue	Estimated volume information impact (annual kWh)
16 items of load with no ICP or wattage recorded.	Under submission of 656 kWh p.a.
28 items of load with the incorrect wattage recorded	Over submission of 282 kWh p.a.
158 items of load with the incorrect ballast wattage recorded	Under submission of 1,145.27 kWh p.a.

As reported in the last audit, there are decorative lights connected to some streetlight poles on Hakiha Street, Taumarunui. The lights have been confirmed to belong to RDC but are not recorded in the database. These lights are managed by another area in the Council. I have recommended the Meridian liaise with RDC to ensure that these are managed within the database in **section 3.1**. This will be resulting in a small amount of under submission but as I have no details of the lights. I cannot calculate the kWh impact. This is recorded as non-compliance below.

There are 21 private lights recorded in the database which are excluded from submission information (of which two are metered). RDC have investigated these and have confirmed that none of these are council assets. I will be following these up with The Lines Company to confirm that these are being reconciled against the relevant ICPs.

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 DUMML load and volumes.

The current monthly report is provided as a snapshot and this practice is non-compliant. When a wattage is changed in the database due to a physical change or a correction, only the record present at the time the report is run is recorded, not the historical information showing dates of changes. Meridian has not updated their processes to be consistent with the Authority's memo.

Changes to the database are managed by Alf Downs. For maintenance work and upgrade work, RAMM is updated at the time the work is completed and the date is expected to be correct. For new connections, The Lines Company electrically connect the new streetlight circuits but this date is not provided to Alf Downs, so the actual date of livening cannot be recorded accurately and the RAMM database records light installation date, which defaults to the date which the data is collected. I recommend in **section 3.1**, that Meridian work with all parties to ensure that livening dates are captured in the database.

Audit outcome

Non-compliant

Non-compliance	Description		
<p>Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3</p> <p>From: 17-Aug-20 To: 30-Nov-21</p>	<p>A small number of festive lights are not recorded in the RAMM database resulting in a small amount of under submission.</p> <p>16 items of load with no ICP or wattage recorded resulting in an estimated minor under submission of 656 kWh per annum.</p> <p>28 lights with the incorrect wattage recorded resulting in an estimated over submission of 282 kWh per annum.</p> <p>158 lights with the incorrect ballast wattage recorded resulting in an estimated under submission of 1,145.27 kWh per annum.</p> <p>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.</p> <p>The livening date of new streetlights is not captured in the database.</p> <p>Potential impact: Low Actual impact: Low Audit history: Once previously Controls: Moderate Breach risk rating: 2</p>		
Audit risk rating	Rationale for audit risk rating		
<p>Low</p>	<p>The controls over the database are rated as moderate. Processes in place to manage changes are generally robust but there is room for improvement in relation to the recording of new streetlights.</p> <p>The audit risk rating is low based on the volume differences identified.</p>		
Actions taken to resolve the issue		Completion date	Remedial action status
<p>Wattage discrepancies identified have been provided to Alf Downs for correction in the database.</p> <p>RDC have been asked to confirm connection status for the 16 lights with no ICP recorded and the decorative lights that are not recorded – relevant details will be added to the database for any lights that are connected and operational.</p> <p>We are considering the impact provision and use of database changes at a daily level will have on our processes and tools.</p> <p>We will review the streetlight new connection process with the Lines Company to ensure that the livening date for new streetlights is communicated to Alf Downs and captured in RAMM.</p>		28 Feb 2021	Investigating
		31 March 2021	
		30 June 2021	
		30 June 2021	
Preventative actions taken to ensure no further issues will occur		Completion date	
No comments provided			

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

Code reference

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

Code related audit information

The DUML database must contain:

- *each ICP identifier for which the retailer is responsible for the DUML*
- *the items of load associated with the ICP identifier.*

Audit observation

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

Audit commentary

The ICP number is recorded in the ICP group field in the database. A check of the database found 19 items of load with no ICP, or wattage recorded against them. 16 of these have been electrically connected and three are still to be livened. Alf Downs are correcting this in the database. This will have resulted in an estimated minor under submission of 656 kWh per annum (based on an estimated wattage of 14W and 4,271 burn hours from the DUML audit tool). This is recorded as non-compliance below and in **sections 2.1, 2.4, 3.1 and 3.2.**

Examination of the database found 21 private lights which are recorded in the database with “private” as the ICP group. RDC have investigated these and confirm that none of these are RDC assets. These will be raised with The Lines Company to confirm that the load is associated with an ICP.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 2.2 With: Clause 11(2)(a) and (aa) of Schedule 15.3 From: 17-Aug-20 To: 30-Nov-21	16 items of load with no ICP or wattage recorded resulting in an estimated minor under submission of 656 kWh per annum. Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
Low	The controls are rated as moderate. Processes in place to manage changes are generally robust but there is room for improvement in relation to the recording of new streetlights. The audit risk rating is low based on the volume differences identified.		
Actions taken to resolve the issue		Completion date	Remedial action status
RDC have been asked to confirm connection status for the 16 lights with no ICP recorded – relevant details will be added to the database for any lights that are connected and operational.		31 March 2021	Investigating
Preventative actions taken to ensure no further issues will occur		Completion date	
No comments provided			

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 DUMML database must contain the location of each DUMML item.

Audit observation

The database was checked to confirm the location is recorded for all items of load.

Audit commentary

The database contains fields for road name, displacement, GPS coordinates, and pole numbers.

All items of load are locatable and have GPS coordinates and road names recorded. No inaccurate locations were identified during the audit.

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 DUMML 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 lamp model field, and wattages are recorded in the lamp wattage and gear wattage fields.

A check of the database found 19 items of load with no ICP, or wattage recorded against them. 16 of these have been electrically connected and three are still to be livened. Alf Downs are correcting this in the database. This will have resulted in an estimated minor under submission of 656 kWh per annum (based on an estimated wattage of 14W and 4,271 burn hours from the DUMML audit tool). This is recorded as non-compliance below and in **sections 2.1, 2.2, 3.1 and 3.2**.

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: 17-Aug-20 To: 30-Nov-21	16 items of load with no ICP or wattage recorded resulting in an estimated minor under submission of 656 kWh per annum. Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
Low	The controls are rated as moderate. Processes in place to manage changes are generally robust but there is room for improvement in relation to the recording of new streetlights. The audit risk rating is low based on the volume differences identified.		
Actions taken to resolve the issue		Completion date	Remedial action status
RDC have been asked to confirm connection status for the 16 lights with no ICP recorded – relevant details will be added to the database for any lights that are connected and operational.		31 March 2021	Investigating
Preventative actions taken to ensure no further issues will occur		Completion date	
No comments provided			

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 237 items of load on 22 November 2021. The sample was selected from four strata, as follows:

1. Ruapehu DC street names A –L,
2. Ruapehu DC street names M-R,
3. Ruapehu DC street names S – Z, and
4. NZTA and other.

Audit commentary

The field audit discrepancies are detailed in the table below:

Street	Database count	Field count	Light count difference	Wattage recorded incorrectly	Comments
SH 49 (Clyde St)	32	33	+2 -1	-	1x additional 70W HPS and 1x 150W MH found in the field. 1x 150WMH not found in the field.
SH 49 (RANGATAUA ROAD)	8	8	-	1	1x 70W HPS found in the field recorded in the database as 150W HPS.
Grand total	237	238	3(+2-1)	1	

Two additional lights were found in the field. This is recorded as non-compliance below. The accuracy of the database is discussed in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 17-Aug-20 To: 30-Nov-21	Two additional items of load identified in the field from a sample of 237 lights examined. 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 the change process is managed well and the database accuracy was confirmed to be within the +/-5% threshold. The audit risk rating is low as the overall database accuracy is confirmed to be compliant.		
Actions taken to resolve the issue		Completion date	Remedial action status
Field audit discrepancies identified have been provided to Alf Downs for correction in the database.		28 Feb 2021	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
No comments provided			

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.

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 RAMM database extract was provided in October 2021, 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	Ruapehu District Council streetlights
Strata	<p>The database contains the RDC items of load for the DUML ICPs in the Ruapehu region.</p> <p>The processes for the management of all RDC items of load are the same, but I decided to place the items of load into five strata:</p> <ol style="list-style-type: none"> 1. Ruapehu DC street names A – L, 2. Ruapehu DC street names M – R, 3. Ruapehu DC street names S – Z, and 4. NZTA and other.
Area units	I created a pivot table of the roads, and I used a random number generator in a spreadsheet to select a total of 51 sub-units.
Total items of load	237 items of load making up 16% of the total 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

A field audit was conducted of a statistical sample of 237 items of load. The "database auditing tool" was used to analyse the results, which are shown in the table below.

Result	Percentage	Comments
The point estimate of R	100.1	Wattage from survey is higher than the database wattage by 0.1%.
R _L	99.3	With a 95% level of confidence, it can be concluded that the error could be between -0.7% and +1.3%.
R _H	101.3	

The variability of the sample results across the strata means that the true wattage (installed in the field) could be -0.7% to +1.3% lower than the wattage recorded in the DUML database.

These results were categorised in accordance with the “Distributed Unmetered Load Statistical Sampling Audit Guideline”, effective from 1 February 2019. The table below shows that Scenario A (detailed below) applies, and the database is confirmed to be accurate to within the +/-5% threshold.

In absolute terms the installed capacity is estimated to be the same as the database indicates.

There is a 95% level of confidence that the installed capacity is between 1 kW lower to 2 kW higher than the database.

In absolute terms, total annual consumption is estimated to be the same as the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 4,500 kWh p.a. lower and 9,000 kWh p.a. higher lower than the database indicates.

Scenario	Description
<p>A - Good accuracy, good precision</p>	<p>This scenario applies if:</p> <ul style="list-style-type: none"> (a) R_H is less than 1.05; and (b) R_L is greater than 0.95 <p>The conclusion from this scenario is that:</p> <ul style="list-style-type: none"> (a) the best available estimate indicates that the database is accurate within +/- 5 %; and (b) this is the best outcome.
<p>B - Poor accuracy, demonstrated with statistical significance</p>	<p>This scenario applies if:</p> <ul style="list-style-type: none"> (a) the point estimate of R is less than 0.95 or greater than 1.05 (b) as a result, either R_L is less than 0.95 or R_H is greater than 1.05. <p>There is evidence to support this finding. In statistical terms, the inaccuracy is statistically significant at the 95% level</p>
<p>C - Poor precision</p>	<p>This scenario applies if:</p> <ul style="list-style-type: none"> (a) the point estimate of R is between 0.95 and 1.05 (b) R_L is less than 0.95 and/or R_H is greater than 1.05 <p>The conclusion from this scenario is that the best available estimate is not precise enough to conclude that the database is accurate within +/- 5 %</p>

Light description and capacity accuracy

As discussed in **section 2.4**, 19 items of load have no ICP, or wattage recorded against them. 16 of these have been electrically connected and three are still to be livened. Alf Downs are correcting this in the database. This will have resulted in an estimated minor under submission of 656 kWh per annum (based on an estimated wattage of 14W and 4,271 burn hours from the DUML audit tool). This is recorded as non-compliance below and in **sections 2.1, 2.2, 2.4** and **3.2**.

Examination of the database found the wattage was recorded correctly except for:

Lamp Model	Recorded wattage	Correct wattage	Quantity	Wattage difference
20 LED Module	27	20	23	-161
A2 525mA 30 LED	33	30	3	-15
LED144PCS	23	144	2	242
TOTAL			28	66

This will be resulting in an estimated over submission of 282 kWh per annum. The effect is small as the overs and under values balance each other out in this instance. These are being corrected by Alf Downs.

I was unable to confirm the correct wattage has been applied to the two light types below and recommend that these are confirmed to be recorded correctly:

Lamp Model	Recorded wattage	Quantity
I-tron Zero OC6 STA 4.100-3M	60	18
TC01 P 32L NW 5144 FG	51	4
TOTAL		22

Description	Recommendation	Audited party comment	Remedial action
Confirm light wattages	Confirm the correct wattages for the two models detailed above and adjust RAMM if necessary.	Alf Downs have been requested to confirm details as recommended.	Investigating

Gear wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority. All were confirmed to be correct except for:

Lamp Model	Recorded ballast	Correct ballast	Quantity	Wattage difference
20W ES Compact Florescent	0	Est 2.6	2	5.2
28watt 2d Fluorescent	0	Est 7.8	7	54.95
125watt MV	0	11	1	11
36w Twin Fluorescent	18	20	141	282
80W Mercury Vapour	0	10	2	20
A2 525mA 30 LED	21	0	5	-105
TOTAL			158	268.15

This will be resulting in an estimated under submission of 1,145.27 kWh per annum. These are being corrected by Alf Downs.

ICP number and owner accuracy

As recorded in **section 2.2**, all items of load have an ICP number recorded except for 19 items of load with no ICP, or wattage recorded against them. 16 of these have been electrically connected and three are still to be livened. Alf Downs are correcting this in the database. This will have resulted in an estimated minor under submission of 656 kWh per annum (based on an estimated wattage of 14W and 4,271 burn hours from the DUML audit tool). This is recorded as non-compliance below and in **sections 2.1, 2.2, 2.4** and **3.2**.

Two items of load were recorded against an invalid ICP. These were examined and determined that these are private lights associated with the old RSA site in Ohakune. These are not council assets and the ICP number is being updated to "private".

Change management process findings

The RAMM database is managed by Alf Downs on behalf of RDC. The field work, asset data capture and database population is conducted by Alf Downs. Staff update the database from the field using Pocket RAMM.

I walked through the new connection process. New subdivisions are rare. All new connections require an application for service to The Lines Company. Once approved the work is carried out in the field. The Lines Company electrically connect the new streetlight circuits but this date is not provided to Alf Downs, so the actual date of livening cannot be recorded accurately and the RAMM database records light installation date, which defaults to the date which the data is collected. I recommend, that Meridian work with all parties to ensure that livening dates are captured in the database.

Recommendation	Description	Audited party comment	Remedial action
New streetlight connections	Review the new streetlight new connection process with RDC, Alf Downs, the Lines Company to ensure that the livening date for new streetlights is captured in RAMM.	We will review the streetlight new connection process with the Lines Company to ensure that the livening date for new streetlights is communicated to Alf Downs and captured in RAMM.	Investigating

Monthly “outage patrols” are conducted by Alf Downs and the process is used to identify any incorrect wattage and location issues that may exist.

Festive lights

There are decorative lights connected to some streetlight poles on Hakiha Street, Taumaranui. The lights are not recorded in the database. These lights are managed by another area in the Council. This is recorded as non-compliance below and I have recommended the Meridian liaise with RDC to ensure that these are managed within the database.

Description	Recommendation	Audited party comment	Remedial action
Decorative lights on Hakiha Street, Taumaranui	Liaise with RDC to get the festive lights recorded in the database.	RDC have been asked to confirm connection status for the decorative lights that are not recorded – relevant details will be added to the database for any lights that are connected and operational.	Investigating

Private lights

There are 21 private lights recorded in the database which are excluded from submission information (of which two are metered). RDC have investigated these and have confirmed that none of these are council assets. I will be following these up with The Lines Company to confirm that these are being reconciled against the relevant ICPs.

Audit outcome

Non-compliant

Non-compliance	Description		
<p>Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b)</p> <p>From: 17-Aug-20 To: 30-Nov-21</p>	<p>16 items of load with no ICP or wattage recorded resulting in an estimated minor under submission of 656 kWh per annum.</p> <p>28 lights with the incorrect wattage recorded resulting in an estimated over submission of 282 kWh per annum.</p> <p>158 lights with the incorrect ballast wattage recorded resulting in an estimated under submission of 1,145.27 kWh per annum.</p> <p>A small number of festive lights are not recorded in the RAMM database resulting in a small amount of under submission.</p> <p>Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2</p>		
Audit risk rating	Rationale for audit risk rating		
<p>Low</p>	<p>The controls over the database are rated as moderate. Most of the field audit accuracy issues related to one light location, and a small number of database accuracy issues were identified.</p> <p>The audit risk rating is low based on the volume differences identified.</p>		
Actions taken to resolve the issue		Completion date	Remedial action status
<p>Wattage discrepancies identified have been provided to Alf Downs for correction in the database.</p> <p>RDC have been asked to confirm connection status for the 16 lights with no ICP recorded and the decorative lights that are not recorded – relevant details will be added to the database for any lights that are connected and operational.</p> <p>We are considering the impact provision and use of database changes at a daily level will have on our processes and tools.</p> <p>We will review the streetlight new connection process with the Lines Company to ensure that the livening date for new streetlights is communicated to Alf Downs and captured in RAMM.</p>		28 Feb 2021	Investigating
		31 March 2021	
		30 June 2021	
		30 June 2021	
Preventative actions taken to ensure no further issues will occur		Completion date	
No comments provided			

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. The total volume submitted to the Reconciliation Manager is based on a monthly database report derived from RAMM and the “burn time” which is sourced from data loggers installed on the Unison and Powerco networks. Meridian supplies EMS with the capacity information and EMS calculates the kWh figure for each ICP and includes this in the relevant AV080 file. This process was audited during Meridian’s reconciliation participant audit and EMS’ agent audit.

The capacities supplied to EMS for October 2021 were checked and confirmed to be the same as the database.

The field audit found that the database was accurate to within +/-5%, compliance is confirmed.

Sources of database inaccuracy are as follows:

Issue	Estimated volume information impact (annual kWh)
16 items of load with no ICP or wattage recorded.	Under submission of 656 kWh p.a.
28 items of load with the incorrect wattage recorded	Over submission of 282 kWh p.a.
158 items of load with the incorrect ballast wattage recorded	Under submission of 1,145.27 kWh p.a.

As reported in the last audit, there are decorative lights connected to some streetlight poles on Hakiha Street, Taumaranui. The lights have been confirmed to belong to RDC but are not recorded in the database. These lights are managed by another area in the Council. I have recommended the Meridian liaise with RDC to ensure that these are managed within the database in **section 3.1**. This will be resulting in a small amount of under submission but as I have no details of the lights. I cannot calculate the kWh impact. This is recorded as non-compliance below.

There are 21 private lights recorded in the database which are excluded from submission information (of which two are metered). RDC have investigated these and have confirmed that none of these are council assets. I will be following these up with The Lines Company to confirm that these are being reconciled against the relevant ICPs.

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 monthly report is provided as a snapshot and this practice is non-compliant. When a wattage is changed in the database due to a physical change or a correction, only the record present at the time the report is run is recorded, not the historical information showing dates of changes. Meridian has not updated their processes to be consistent with the Authority's memo.

Changes to the database are managed by Alf Downs. For maintenance work and upgrade work, RAMM is updated at the time the work is completed and the date is expected to be correct. For new connections, The Lines Company electrically connect the new streetlight circuits but this date is not provided to Alf Downs, so the actual date of livening cannot be recorded accurately and the RAMM database records light installation date, which defaults to the date which the data is collected. I recommend in **section 3.1**, that Meridian work with all parties to ensure that livening dates are captured in the database.

Audit outcome

Non-compliant

Non-compliance	Description		
<p>Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c)</p> <p>From: 17-Aug-20 To: 30-Nov-21</p>	<p>A small number of festive lights are not recorded in the RAMM database resulting in a small amount of under submission.</p> <p>16 items of load with no ICP or wattage recorded resulting in an estimated minor under submission of 656 kWh per annum.</p> <p>28 lights with the incorrect wattage recorded resulting in an estimated over submission of 282 kWh per annum.</p> <p>158 lights with the incorrect ballast wattage recorded resulting in an estimated under submission of 1,145.27 kWh per annum.</p> <p>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.</p> <p>The livening date of new streetlights is not captured in the database.</p> <p>Potential impact: Low Actual impact: Low Audit history: Once previously Controls: Moderate Breach risk rating: 2</p>		
Audit risk rating	Rationale for audit risk rating		
<p>Low</p>	<p>The controls over the database are rated as moderate. Processes in place to manage changes are generally robust but there is room for improvement in relation to the recording of new streetlights.</p> <p>The audit risk rating is low based on the volume differences identified.</p>		
Actions taken to resolve the issue		Completion date	Remedial action status
<p>Wattage discrepancies identified have been provided to Alf Downs for correction in the database.</p> <p>RDC have been asked to confirm connection status for the 16 lights with no ICP recorded and the decorative lights that are not recorded – relevant details will be added to the database for any lights that are connected and operational.</p> <p>We are considering the impact provision and use of database changes at a daily level will have on our processes and tools.</p> <p>We will review the streetlight new connection process with the Lines Company to ensure that the livening date for new streetlights is communicated to Alf Downs and captured in RAMM.</p>		28 Feb 2021	Investigating
		31 March 2021	
		30 June 2021	
		30 June 2021	
Preventative actions taken to ensure no further issues will occur		Completion date	
No comments provided			

CONCLUSION

The Ruapehu DC DUML database switched to Meridian on 1 January 2021. Meridian reconciles this DUML load using the DST profile. The 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 figure for each ICP and includes this in the relevant AV080 file. I compared the RDC database provided to the capacity information Meridian supplied to EMS for the month of October 2021 and I confirm it matches.

A RAMM database is managed by **Alf Downs Streetlighting Limited (Alf Downs)** on behalf of RDC. The field work, asset data capture and database population is conducted by Alf Downs. Alf Downs staff update the database from the field using Pocket RAMM.

The database accuracy is confirmed to be with the +/-5% threshold.

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 audit found six non-compliances and makes three recommendations. All of the non-compliances relate to a small number of ICPs. The discrepancies found have been passed to Alf Downs to correct. The future risk rating of 11 indicates that the next audit be completed in 12 months. I have considered this along with Meridian's comments, that the field audit found the database is within the accuracy threshold and I recommend that the next audit be in 18 months.

PARTICIPANT RESPONSE

The field audit for this DUML was delayed from the planned date due to COVID restrictions in the region which has delayed report completion.