ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

INVERCARGILL CITY COUNCIL AND MERIDIAN ENERGY LIMITED

NZBN: 9429037696863

Prepared by: Steve Woods

Date audit commenced: 22 June 2023

Date audit report completed: 11 August 2023

Audit report due date: 12-Aug-23

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EXECUTIVE SUMMARY

This audit of the **Invercargill City Council** (**ICC**) Unmetered Streetlights DUML database and processes was conducted at the request of **Meridian NZ 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.

Meridian reconciles this DUML load using the DST profile.

The on and off times are derived from a data logger read by AMS and are used to create a shape file. Meridian supplies AMS with the capacity information and AMS 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 the AMS agent audit. Compliance was confirmed for both parties.

I compared the database provided to the capacity information Meridian supplied to AMS for the month of May 2023 and I found a discrepancy between the kW figure in the database and that used for submission. The table below shows the differences.

ICP	Description	May 2023 Capacities	Database kW	Difference
0008801003TPFE8	ICC LIGHTS – TPC URBAN	71.78	56.33	-15.45
0008801013TP545	ICC LIGHTS - TPC RURAL	21.87	9.12	-12.75
0008801050TPB20	ICC HIGHWAY LIGHTS - TPC URBAN	43.73	43.21	-0.52
0008801051TP765	ICC HIGHWAY LIGHTS - TPC RURAL	18	16.84	-1.16
0008803002NV4BD	ICC LIGHTS - EIL INVERCARGILL	274.97	249.31	-25.66
0008803012NVE10	ICC LIGHTS - EIL INVERCARGILL	28.04	18.14	-9.90
0008803013NV255	ICC HIGHWAY LIGHTS EIL BLUFF	11.45	11.55	0.10
0088030031NVB6F	ICC HIGHWAY LIGHTS EIL INVERCARGILL	118.63	119.14	0.51
		588.47	523.63	-64.84

These ICPs switched to Meridian on 1 March 2023, therefore this difference has resulted in over submission of approx. 70,000 kWh.

As detailed in **section 3.1**, there are 15 items of load with the incorrect ballasts being applied, this will be resulting in an estimated annual over submission of 4,280 kWh per annum (based on 4271 hours per annum).

The field audit found that the database was not within the allowable +/-5% accuracy threshold. In absolute terms, total annual consumption is estimated to be 121,500 kWh lower than the DUML database indicates.

The audit found four non-compliances and makes two recommendations. The future risk rating of 30 indicates that the next audit be completed in three months. I have considered this in conjunction with Meridian's responses and recommend that the next audit be in nine months to allow sufficient time to correct the database and strengthen the database updating processes.

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	Database is not confirmed as accurate with a 95% level of confidence. In absolute terms, total annual consumption is estimated to be 121,500 kWh lower than the DUML database indicates as recorded in **section 3.**1. Incorrect ballast applied for 15 lamps resulting in an estimated over submission of 4,280 kWh per annum. kW figures used for submission differ from those in the spreadsheet, resulting in over submission of approx. 70,000 kWh between March and May 2023. Submission is based on a snapshot and does not consider the dates of changes during the month.	Weak	High	9	Identified Identified Cleared Investigating
All load recorded in database	2.5	11(2A) of Schedule 15.3	12 additional lights were found in the field of the 397 items of load sampled.	Weak	Low	3	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Database accuracy	3.1	15.2 and 15.37B(b)	Database is not confirmed as accurate with a 95% level of confidence. In absolute terms, total annual consumption is estimated to be 121,500 kWh lower than the DUML database indicates. Incorrect ballast applied for 15 lamps resulting in an estimated over submission of 4,280 kWh per annum. 11 of 16 discrepancies from the previous audit not corrected.	Weak	High	9	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Volume information accuracy	3.2	15.2 and 15.37B(c)	Database is not confirmed as accurate with a 95% level of confidence. In absolute terms, total annual consumption is estimated to be 121,500 kWh lower than the DUML database indicates as recorded in **section 3.**1. Incorrect ballast applied for 15 lamps resulting in an estimated over submission of 4,280 kWh per annum. kW figures used for submission differ from those in the spreadsheet, resulting in over submission of approx. 70,000 kWh between March and May 2023. Submission is based on a snapshot and does not consider the dates of changes during the month.	Weak	High	9	Identified Identified Cleared Investigating
Future Risk Rating						30	

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	Description	Action
GPS coordinates	2.3	Populate the GPS coordinates for the 278 items of load where this field is blank.	Identified
Database updates	3.1	Investigate the discrepancies recorded to identify why some updates are not being updated in the database.	Identified

ISSUES

Subject	Section	Description	Issue
		Nil	

1. ADMINISTRATIVE

1.1. Exemptions from Obligations to Comply with Code

Code reference

Section 11 of Electricity Industry Act 2010.

Code related audit information

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

Audit observation

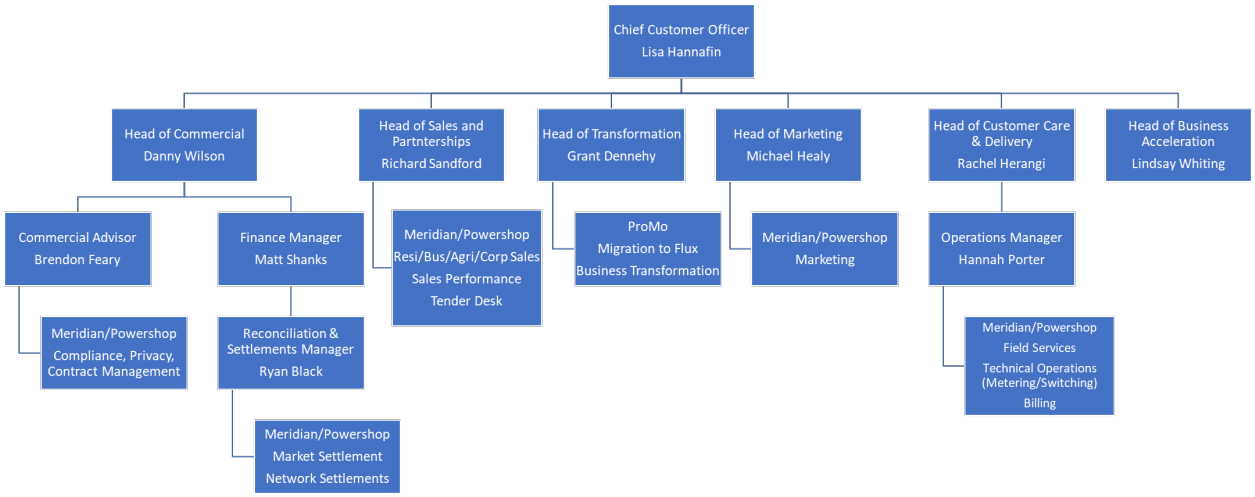
Section 11 of the Electricity Industry Act provides for the Electricity Authority to exempt any participant from compliance with all or any of the clauses.

Audit commentary

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

1.2. Structure of Organisation

Meridian provided a copy of their organisational structure:



1.3. Persons involved in this audit

Auditor:

Name	Title	Company
Steve Woods	Auditor	Veritek

Other personnel assisting in this audit were:

Name	Title	Company
Daniel Lau	Energy Data Analyst	Meridian Energy
Melanie Mathews	Quality and Compliance Advisor	Meridian Energy
Russell Pearson	Manager - Strategic Asset Planning	Invercargill CC

1.4. Hardware and Software

The SQL database used for the management of DUML is remotely hosted by thinkproject New Zealand Limited. The database is commonly known as "RAMM" which stands for "Road Assessment and Maintenance Management". The specific data used for DUML is held in the Streetlight tables. thinkproject New Zealand Limited backs up the database and assists with disaster recovery as part of their hosting service.

Pocket RAMM is used in the field by Network Electrical Servicing.

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

Systems used by the trader to calculate submissions are assessed as part of their reconciliation participant audits.

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	Number of items of load	Database wattage (watts)
0008801003TPFE8	ICC LIGHTS – TPC URBAN	INV0331	1,235	56,326
0008801013TP545	ICC LIGHTS - TPC RURAL	INV0331	102	9,120
0008801050TPB20	ICC HIGHWAY LIGHTS - TPC URBAN	INV0331	177	43,210
0008801051TP765	ICC HIGHWAY LIGHTS - TPC RURAL	INV0331	88	16,836
0008803002NV4BD	ICC LIGHTS - EIL INVERCARGILL	INV0331	4,629	249,309
0008803012NVE10	ICC LIGHTS - EIL INVERCARGILL	INV0331	434	18,139
0008803013NV255	ICC HIGHWAY LIGHTS EIL BLUFF	INV0331	69	11,554
0088030031NVB6F	ICC HIGHWAY LIGHTS EIL INVERCARGILL	INV0331	422	119,141
Total			**7,156**	**523,634**

1.7. Authorisation Received

All information was provided directly by Meridian and ICC.

1.8. Scope of Audit

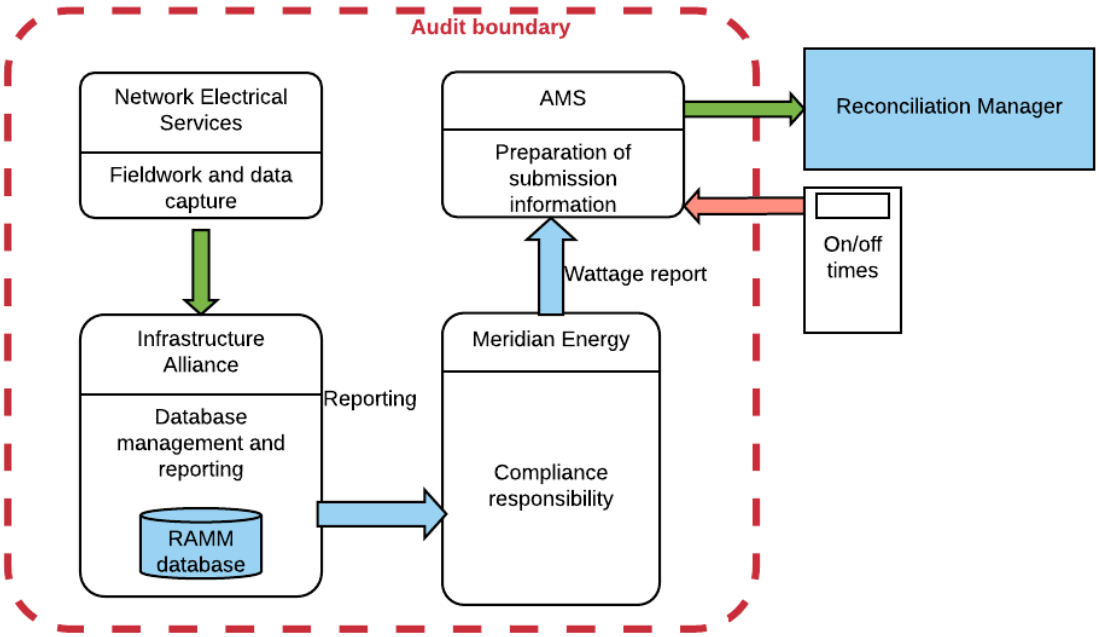
This audit of the ICC DUML database and processes was conducted at the request of Meridian, in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

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

Meridian use ICC's RAMM database for submission. ICC provide a monthly report to Meridian of this database.

New connection, fault, and maintenance work is completed by Network Electrical Servicing. Pocket RAMM is used in the field to issue work and record changes in the field into RAMM.

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



The field audit was undertaken of a statistical sample of 397 items of load on 21st June 2023.

1.9. Summary of previous audit

The previous audit was undertaken by Steve Woods of Veritek Limited in August 2022 for Mercury NZ Limited. Four non-compliances were identified, and no recommendations were made. The status of the non-compliances and recommendation are described below.

Table of Non-Compliance

Subject	Section	Clause	Non-Compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	Database is not confirmed as accurate with a 95% level of confidence. In absolute terms, total annual consumption is estimated to be 39,000 kWh higher than the DUML database indicates as recorded in **section 3.**1. Incorrect ballast applied for five lamps resulting in an estimated over submission of 1,234 kWh per annum.	Still existing but now over submission Still existing
All load recorded in database	2.5	11(2A) of Schedule 15.3	Ten additional lights were found in the field of the 390 items of load sampled.	Still existing
Database accuracy	3.1	15.2 and 15.37B(b)	Database is not confirmed as accurate with a 95% level of confidence. In absolute terms, total annual consumption is estimated to be 39,000 kWh higher than the DUML database indicates. Incorrect ballast applied for five lamps resulting in an estimated over submission of 1,234 kWh per annum.	Still existing but now over submission Still existing

Subject	Section	Clause	Non-Compliance	Status
Volume information accuracy	3.2	15.2 and 15.37B(c)	Database is not confirmed as accurate with a 95% level of confidence. In absolute terms, total annual consumption is estimated to be 39,000 kWh higher than the DUML database indicates. Incorrect ballast applied for five lamps resulting in an estimated over submission of 1,234 kWh per annum.	Still existing but now over submission Still existing

1.10. Distributed unmetered load audits (Clause 16A.26 and 17.295F)

Code reference

Clause 16A.26 and 17.295F

Code related audit information

Retailers must ensure that DUML database audits are completed:

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

Audit observation

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 on and off times are derived from a data logger read by AMS and are used to create a shape file. Meridian supplies AMS with the capacity information and AMS 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 the AMS agent audit. Compliance was confirmed for both parties.

I compared the database provided to the capacity information Meridian supplied to AMS for the month of May 2023 and I found a discrepancy between the kW figure in the database and that used for submission. The table below shows the differences.

ICP	Description	May 2023 Capacities	Database kW	Difference
0008801003TPFE8	ICC LIGHTS – TPC URBAN	71.78	56.33	-15.45
0008801013TP545	ICC LIGHTS - TPC RURAL	21.87	9.12	-12.75
0008801050TPB20	ICC HIGHWAY LIGHTS - TPC URBAN	43.73	43.21	-0.52
0008801051TP765	ICC HIGHWAY LIGHTS - TPC RURAL	18	16.84	-1.16
0008803002NV4BD	ICC LIGHTS - EIL INVERCARGILL	274.97	249.31	-25.66
0008803012NVE10	ICC LIGHTS - EIL INVERCARGILL	28.04	18.14	-9.90
0008803013NV255	ICC HIGHWAY LIGHTS EIL BLUFF	11.45	11.55	0.10
0088030031NVB6F	ICC HIGHWAY LIGHTS EIL INVERCARGILL	118.63	119.14	0.51
		588.47	523.63	-64.84

These ICPs switched to Meridian on 1 March 2023, therefore this difference has resulted in over submission of approx. 70,000 kWh. The issue was caused by Meridian not having a report from Invercargill CC and therefore historic information was used. Revisions have been conducted for these months, including correction for the incorrect ballasts recorded below.

As detailed in **section 3.1**, there are 15 items of load with the incorrect ballasts being applied, this will be resulting in an estimated annual over submission of 4,280 kWh per annum (based on 4271 hours per annum).

The field audit found that the database was not within the allowable +/-5% accuracy threshold. In absolute terms, total annual consumption is estimated to be 121,500 kWh lower than the DUML database indicates.

The RAMM database contains dates for light installation but the reporting to Meridian does not identify the date lights were removed or the date lights were installed, which means submission is based on a snapshot at the end of the month. This is not considered compliant.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Jul-22 To: 02-Jul-23	Database is not confirmed as accurate with a 95% level of confidence. In absolute terms, total annual consumption is estimated to be 121,500 kWh lower than the DUML database indicates as recorded in **section 3.**1. Incorrect ballast applied for 15 lamps resulting in an estimated over submission of 4,280 kWh per annum. kW figures used for submission differ from those in the spreadsheet, resulting in over submission of approx. 70,000 kWh between March and May 2023. Submission is based on a snapshot and does not consider the dates of changes during the month. Potential impact: High Actual impact: High Audit history: Multiple time previously Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	Controls are rated as weak because it does not appear that changes in the field are being recorded in the database in a timely fashion and discrepancies from the previous audit are still present. The impact is assessed to be high, based on the kWh difference being higher than 50,000 kWh per annum.

Actions taken to resolve the issue	Completion date	Remedial action status
Meridian has advised Invercargill City Council of the inaccuracies identified and has requested for corrections to be made.	10/7/23	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

Meridan will continue to follow up with Invercargill City Council to have the inaccuracies corrected. We have assessed our processes and tools to account for historic lamp installations and changes to the database at a daily level. There are checks in place comparing month to month data to identify any material changes and confirm details for these. These are accounted for in monthly submission.	12/11/23 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 an ICP was recorded against each item of load.

Audit commentary

All items of load have an ICP recorded against them.

Audit outcome

Compliant

2.3. Location of each item of load (Clause 11(2)(b) of Schedule 15.3)

Code reference

Clause 11(2)(b) of Schedule 15.3

Code related audit information

The DUML database must contain the location of each DUML item.

Audit observation

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

Audit commentary

The RAMM database contains a field for the nearest street address and there are GPS coordinates. There are a total of 278 items of load with no GPS coordinates recorded. The street address was sufficient to locate those. I recommend these coordinates are populated to assist with locating these items of load.

Description	Recommendation	Audited party comment	Remedial action
GPS coordinates	Populate the GPS coordinates for the 278 items of load where this field is blank.	Meridian has advised Invercargill City Council of the recommendation.	Identified

Audit outcome

Compliant

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

Code reference

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

Code related audit information

The DUML database must contain:

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

Audit observation

The database was checked to confirm that it contained a field for lamp type and wattage capacity and included any ballast or gear wattage and that all items of load were recorded.

Audit commentary

The extract provided has fields for lamp make, lamp model and lamp notes, which records the total wattage for the lamp including wattage and ballast, and all were populated.

The accuracy of the lamp wattages and ballasts is discussed in **section 3.1.**

Audit outcome

Compliant

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

Code reference

Clause 11(2A) of Schedule 15.3

Code related audit information

The retailer must ensure that each item of DUML for which it is responsible is recorded in this database.

Audit observation

The field audit was undertaken of 397 lights using the statistical sampling methodology. The population was divided into the following strata:

- Local Authority A-G,
- Local Authority H-P,
- Local Authority Q-Z, and
- NZTA.

Audit commentary

The field audit findings for the sample of lamps are summarised in the table below. A detailed spreadsheet was provided to Invercargill CC and Meridian.

Discrepancy	Quantity	Comments
Lights in the field not in the database	12	Six appear to be infill lighting. Two are for a pedestrian crossing. One is in Queens Park and three are road lighting.
Lights in the database not in the field	3	
Incorrect wattages	23	17 of the 23 were LED changes.

The field audit found 12 additional lights in the field of the 397 items of load sampled. 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: 01-Jul-22 To: 02-Jul-23	12 additional lights were found in the field of the 397 items of load sampled. Potential impact: Low Actual impact: Low Audit history: Multiple times previously Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are rated as weak because it does not appear that changes in the field are being recorded in the database in a timely fashion and discrepancies from the previous audit are still present. The impact is assessed as low because this clause only relates to the 12 discrepancies, not all of the database discrepancies.

Actions taken to resolve the issue	Completion date	Remedial action status
Meridian has advised Invercargill City Council of the inaccuracies identified and has requested for corrections to be made.	10/7/23	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Meridan will continue to follow up with Invercargill City Council to have the inaccuracies corrected.	12/11/23	

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

RAMM records audit trail information of changes made.

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

A database extract was provided, 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	Invercargill City Council region
Strata	The database contains items of load in the Invercargill City Council area. The processes for the management of ICC items of load are the same, but I decided to place the items of load into four strata, as follows: 1. Local Authority A-G, 2. Local Authority H-P, 3. local Authority Q-Z, and 4. NZTA.
Area units	I created a pivot table of the roads in each area, and I used a random number generator in a spreadsheet to select a total of 49 sub-units.
Total items of load	397 items of load were checked.

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

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

Audit commentary

A field audit was conducted of a statistical sample of 397 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	94.6	Wattage from survey is lower than the database wattage by 5.4%
R_L	87.8	With a 95% level of confidence, it can be concluded that the error could be between -12.2% and -0.6%.
R_H	99.4	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 1 February 2019 and the table below shows that Scenario B (detailed below) applies.

The conclusion from Scenario B is that the database has poor accuracy, demonstrated with statistical significance.

In absolute terms the installed capacity is estimated to be 28 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 3 kW lower and 64 kW lower than the database.

In absolute terms, total annual consumption is estimated to be 121,500 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 13,500 and 272,600 kWh p.a. lower than the database indicates.

Scenario	Description
A - **Good accuracy, good precision**	This scenario applies if: (a) R_H is less than 1.05; and (b) R_L is greater than 0.95 The conclusion from this scenario is that: (a) the best available estimate indicates that the database is accurate within +/- 5 %; and (b) this is the best outcome.
B - **Poor accuracy, demonstrated with statistical significance**	This scenario applies if: (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. There is evidence to support this finding. In statistical terms, the inaccuracy is statistically significant at the 95% level
C - **Poor precision**	This scenario applies if: (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 The conclusion from this scenario is that the best available estimate is not precise enough to conclude that the database is accurate within +/- 5 %

Lamp description and capacity accuracy

The database was checked against the published standardised wattage table, and manufacturer's specifications where available.

LED light specifications were provided in the previous audit by ICC to confirm the correct wattage and ballast is recorded in the database.

The following lights were found to have the incorrect ballast applied:

Lamp model	Expected ballast	Ballast recorded	Count	Difference
Phillips 19w LED	0	64	4	256
EWO F3-29W	0	109	2	218
Philip 70W Eliptical HPS	13	20	1	20
Philip 70W Eliptical HPS	13	98	2	196
OTEK Ignis 1 PMPE 77w	0	6	2	12
OTEK Ignis 2 PMPE 97w	0	26	1	26
Floodlight BVP151 LED150W	0	128	2	256
Floodlight BVP151 LED150W	0	18	1	18
		Totals	**15**	**1,002**

The incorrect ballasts being applied will be resulting in an estimated annual over submission of 4,280 kWh per annum (based on 4271 hours per annum).

Change management process findings

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

The field contractor is Network Electrical Servicing, and they are responsible for the Network maintenance. Network Electrical Servicing are issued a Service Request for reactive work and complete a regular maintenance programme. Pocket RAMM is used in the field to issue work and record changes in the field into RAMM. ICC complete random audits of fieldwork to check for completeness and accuracy of information, and invoices are checked. Any additional or incorrect information identified is manually updated in RAMM. Most of the discrepancies relate to LED upgrades, which were not updated in the database. The process design appears robust, but I recommend Invercargill CC investigates the discrepancies recorded to identify process improvements.

Description	Recommendation	Audited party comment	Remedial action
Database updates	Investigate the discrepancies recorded to identify why some updates are not being updated in the database.	Meridian has advised Invercargill City Council of the recommendation.	Identified

New subdivisions require a proposed plan to be provided and an “as built” plan once the development is complete. New streetlights are only electrically connected once they have been vested. When the lights are vested to the council they are added to the database.

I checked the 16 discrepancies identified in the last audit and only five have been updated in the database.

Festive lighting has been added to the RAMM database and these items are included in the monthly report to Meridian when electrically connected.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Jul-22 To: 02-Jul-23	Database is not confirmed as accurate with a 95% level of confidence. In absolute terms, total annual consumption is estimated to be 121,500 kWh lower than the DUML database indicates. Incorrect ballast applied for 15 lamps resulting in an estimated over submission of 4,280 kWh per annum. 11 of 16 discrepancies from the previous audit not corrected. Potential impact: High Actual impact: High Audit history: Multiple times previously Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	Controls are rated as weak because it does not appear that changes in the field are being recorded in the database in a timely fashion and discrepancies from the previous audit are still present. The impact is assessed to be high, based on the kWh difference being higher than 50,000 kWh per annum.

Actions taken to resolve the issue	Completion date	Remedial action status
Meridian has advised Invercargill City Council of the inaccuracies identified and has requested for corrections to be made.	10/7/23	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Meridan will continue to follow up with Invercargill City Council to have the inaccuracies corrected.	12/11/23	

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 burn hours against the submitted figure to confirm accuracy.

Audit commentary

Meridian reconciles this DUML load using the DST profile.

The on and off times are derived from a data logger read by AMS and are used to create a shape file. Meridian supplies AMS with the capacity information and AMS 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 the AMS agent audit. Compliance was confirmed for both parties.

I compared the database provided to the capacity information Meridian supplied to AMS for the month of May 2023 and I found a discrepancy between the kW figure in the database and that used for submission. The table below shows the differences.

ICP	Description	May 2023 Capacities	Database kW	Difference
0008801003TPFE8	ICC LIGHTS – TPC URBAN	71.78	56.33	-15.45
0008801013TP545	ICC LIGHTS - TPC RURAL	21.87	9.12	-12.75
0008801050TPB20	ICC HIGHWAY LIGHTS - TPC URBAN	43.73	43.21	-0.52
0008801051TP765	ICC HIGHWAY LIGHTS - TPC RURAL	18	16.84	-1.16
0008803002NV4BD	ICC LIGHTS - EIL INVERCARGILL	274.97	249.31	-25.66
0008803012NVE10	ICC LIGHTS - EIL INVERCARGILL	28.04	18.14	-9.90
0008803013NV255	ICC HIGHWAY LIGHTS EIL BLUFF	11.45	11.55	0.10
0088030031NVB6F	ICC HIGHWAY LIGHTS EIL INVERCARGILL	118.63	119.14	0.51
		588.47	523.63	-64.84

These ICPs switched to Meridian on 1 March 2023, therefore this difference has resulted in over submission of approx. 70,000 kWh. The issue was caused by Meridian not having a report from Invercargill CC and therefore historic information was used. Revisions have been conducted for these months, including correction for the incorrect ballasts recorded below.

As detailed in **section 3.1**, there are 15 items of load with the incorrect ballasts being applied, this will be resulting in an estimated annual over submission of 4,280 kWh per annum (based on 4271 hours per annum).

The field audit found that the database was not within the allowable +/-5% accuracy threshold. In absolute terms, total annual consumption is estimated to be 121,500 kWh lower than the DUML database indicates.

The RAMM database contains dates for light installation but the reporting to Meridian does not identify the date lights were removed or the date lights were installed, which means submission is based on a snapshot at the end of the month. This is not considered compliant.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 01-Jul-22 To: 02-Jul-23	Database is not confirmed as accurate with a 95% level of confidence. In absolute terms, total annual consumption is estimated to be 121,500 kWh lower than the DUML database indicates as recorded in **section 3.**1. Incorrect ballast applied for 15 lamps resulting in an estimated over submission of 4,280 kWh per annum. kW figures used for submission differ from those in the spreadsheet, resulting in over submission of approx. 70,000 kWh between March and May 2023. Submission is based on a snapshot and does not consider the dates of changes during the month. Potential impact: High Actual impact: High Audit history: Multiple time previously Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	Controls are rated as weak because it does not appear that changes in the field are being recorded in the database in a timely fashion and discrepancies from the previous audit are still present. The impact is assessed to be high, based on the kWh difference being higher than 50,000 kWh per annum.

Actions taken to resolve the issue	Completion date	Remedial action status
Meridian has advised Invercargill City Council of the inaccuracies identified and has requested for corrections to be made.	10/7/23	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Meridan will continue to follow up with Invercargill City Council to have the inaccuracies corrected.	12/11/23	
We have assessed our processes and tools to account for historic lamp installations and changes to the database at a daily level. There are checks in place comparing month to month data to identify any material changes and confirm details for these. These are accounted for in monthly submission.	Ongoing	

CONCLUSION

Meridian reconciles this DUML load using the DST profile.

The on and off times are derived from a data logger read by AMS and are used to create a shape file. Meridian supplies AMS with the capacity information and AMS 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 the AMS agent audit. Compliance was confirmed for both parties.

I compared the database provided to the capacity information Meridian supplied to AMS for the month of May 2023 and I found a discrepancy between the kW figure in the database and that used for submission. The table below shows the differences.

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These ICPs switched to Meridian on 1 March 2023, therefore this difference has resulted in over submission of approx. 70,000 kWh.

As detailed in **section 3.1**, there are 15 items of load with the incorrect ballasts being applied, this will be resulting in an estimated annual over submission of 4,280 kWh per annum (based on 4271 hours per annum).

The field audit found that the database was not within the allowable +/-5% accuracy threshold. In absolute terms, total annual consumption is estimated to be 121,500 kWh lower than the DUML database indicates.

The audit found four non-compliances and makes two recommendations. The future risk rating of 30 indicates that the next audit be completed in three months. I have considered this in conjunction with Meridian's responses and recommend that the next audit be in nine months to allow sufficient time to correct the database and strengthen the database updating processes.

PARTICIPANT RESPONSE