ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

PORIRUA CITY COUNCIL
AND MERIDIAN ENERGY LIMITED

Prepared by: Bernie Cross

Date audit commenced: 7 December 2022

Date audit report completed: 13 January 2023

Audit report due date: 31 January 2023

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EXECUTIVE SUMMARY

This audit of the **Porirua City Council (PCC)** DUML database and processes was conducted at the request of **Meridian Energy Limited (Meridian)**, in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

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

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

A RAMM database is managed by PCC in relation to this load. The database is remotely hosted by thinkproject New Zealand Ltd.

Field work and new light installations are carried out by Fulton Hogan, who update the database using Pocket RAMM. Park lights are maintained in the RAMM database by the parks team.

PCC have now added 208 of the 440 parks and property lights discussed in the last audit. The remaining 232 items of load are still to be added or confirmed as being added to the database but the Light Owner has been assigned to Porirua City Council and not PCC Parks. I used the average wattage of the Parks and Property lights that are in RAMM (59 watts) and estimate that there is under submission of 58,460 kWh per annum.

This audit found the accuracy of the database has declined during this audit period reflecting the resource challenges PCC has had around the day to day management of this database. Exceptions identified from the previous audit have not been addressed and the outstanding population of the PCC Parks lights into the RAMM database remains. PCC have been actively recruiting for an analyst that will be responsible for the management of the database and this position has recently been filled.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	120.0	Wattage from survey is higher than the database wattage by 20%
R_L	107.7	With a 95% level of confidence, it can be concluded that the error could be between +7.7% and +52.7%
R_H	152.7	

In absolute terms, total annual consumption is estimated to be 192,300 kWh higher than the DUML database indicates. This is a decline from the 92,800 kWh of over submission reported in the last audit.

The audit found seven non-compliances, three recommendations and one issue were made.

The future risk rating of 34 indicates that the next audit be completed in three months. This is a decline from the last audit's risk rating of 23. I recommend that the next audit date is six months to enable Porirua City Council's new analyst resource to get up to speed with, and begin to resolve, the database accuracy issues.

The matters raised are detailed in the table 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 resulting in an estimated under submission of 192,300 kWh p.a. Eight items of load are not readily locatable. 20 items of load without an ICP being assigned and therefore the load associated with these lights is not being included in the monthly capacities report to EMS resulting in an annual under submission of approximately 2,075 kWh. Three lights recorded in the database as zero watts capacity were confirmed during the field audit as being 20W LED lights, resulting in an estimated under submission of 256 kWh. One item of load with the incorrect ballast applied resulting in an estimated under submission of 8.542 kWh. Some Italo 35.5W lamps are incorrectly recorded in the database as 36W. Some Italo 19.5W lamps are incorrectly recorded in the database as 20W. Livening dates not recorded for new connections. Under submission of 58,460 kWh due to inaccurate park lighting records in RAMM. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Weak	High	9	Identified
ICP identifier	2.2	11(2)(a) and (aa) of	20 items of load without an ICP being assigned and therefore the load associated with these lights is not being included in the	Moderate	Low	2	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
and items of load		Schedule 15.3	monthly capacities report to EMS resulting in an annual under submission of approximately 2,075 kWh. Seven items of load are incorrectly assigned to GWRC and should be associated with ICP 0001256873UNFA3 resulting in an annual under submission of approximately 1,249 kWh. ICP assignment is not correct for all items of load resulting in incorrect allocation of submission volumes to the respective NSP.				
Location of each item of load	2.3	11(2)(b) of Schedule 15.3	Eight items of load do not have sufficient location information to enable them to be readily locatable.	Moderate	Low	2	Identified
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	Three lights recorded in the database as zero watts capacity were confirmed during the field audit as being 20W LED lights, resulting in an estimated under submission of 256 kWh.	Strong	Low	1	Identified
All load recorded in database	2.5	11(2A) of Schedule 15.3	64 additional lamps (15%) in the field were not recorded in the database from a sample of 431 items of load.	Moderate	Low	2	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 192,300 kWh p.a. Eight items of load are not readily locatable. 20 items of load without an ICP being assigned and therefore the load associated with these lights is not being included in the monthly capacities report to EMS resulting in an annual under submission of approximately 2,075 kWh. Seven items of load are incorrectly assigned to GWRC but should be associated with the ICP 0001256873UNFA3 resulting in an	Weak	High	9	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			annual under submission of approximately 1,249 kWh. ICP assignment is not correct for all items of load resulting in incorrect allocation of submission volumes to the respective NSP. Three lights recorded in the database as zero watts capacity were confirmed during the field audit as being 20W LED lights, resulting in an estimated under submission of 256 kWh. Some Italo 35.5W lamps are incorrectly recorded in the database as 36W. Some Italo 19.5W lamps are incorrectly recorded in the database as 20W. One item of load with the incorrect ballast applied resulting in an estimated under submission of 8.542 kWh. Livening dates not recorded for new connections. Under submission of 58,460 kWh due to missing park lighting records in RAMM. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.				
Volume information accuracy	3.2	15.2 and 15.37B(c)	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 192,300 kWh p.a. Eight items of load are not readily locatable. 20 items of load without an ICP being assigned and therefore the load associated with these lights is not being included in the monthly capacities report to EMS resulting in an annual under submission of approximately 2,075 kWh. Three lights recorded in the database as zero watts capacity	Weak	High	9	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			were confirmed during the field audit as being 20W LED lights, resulting in an estimated under submission of 256 kWh. One item of load with the incorrect ballast applied resulting in an estimated under submission of 8.542 kWh. Livening dates not recorded for new connections. Under submission of 58,460 kWh due to missing park lighting records in RAMM.				
					Future Risk Rating		**34**

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	Description
ICP identifier and items of load	2.2	Improve accuracy of ICP assignment to each item of load	Meridian to work with Wellington Electricity to clearly define the boundaries between lights supplied by TKR0331 and PNI0331 NSPs and ensure the database then correctly reflect these boundaries.
All load recorded in database	2.5	Review additional lights to determine if these belong to another ICP	Meridian to work with PCC to investigate the additional lights identified in the field audit and confirm whether these relate to another metered or unmetered ICP.
Description and capacity of load	3.1	Improve ability to accurately identify all light types, attributes, and input wattages.	Improve the level of detail captured as part of the lamp model description to ensure the input wattages can accurately be determined and ensure all light specification sheets are held centrally and easily available for reference for all lights within the PCC database.

ISSUES

Subject	Section	Description	Issue
ICP identifier and items of load	2.2	Mechanism to ensure identified private streetlights from DUML audits are accounted in the market settlement process.	Where private lights are identified as part of a DUML audit, the process to ensure these lights are investigated by the distributor as potential standard unmetered or shared unmetered is not well understood including the ownership or responsibility for following up with the distributor.

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

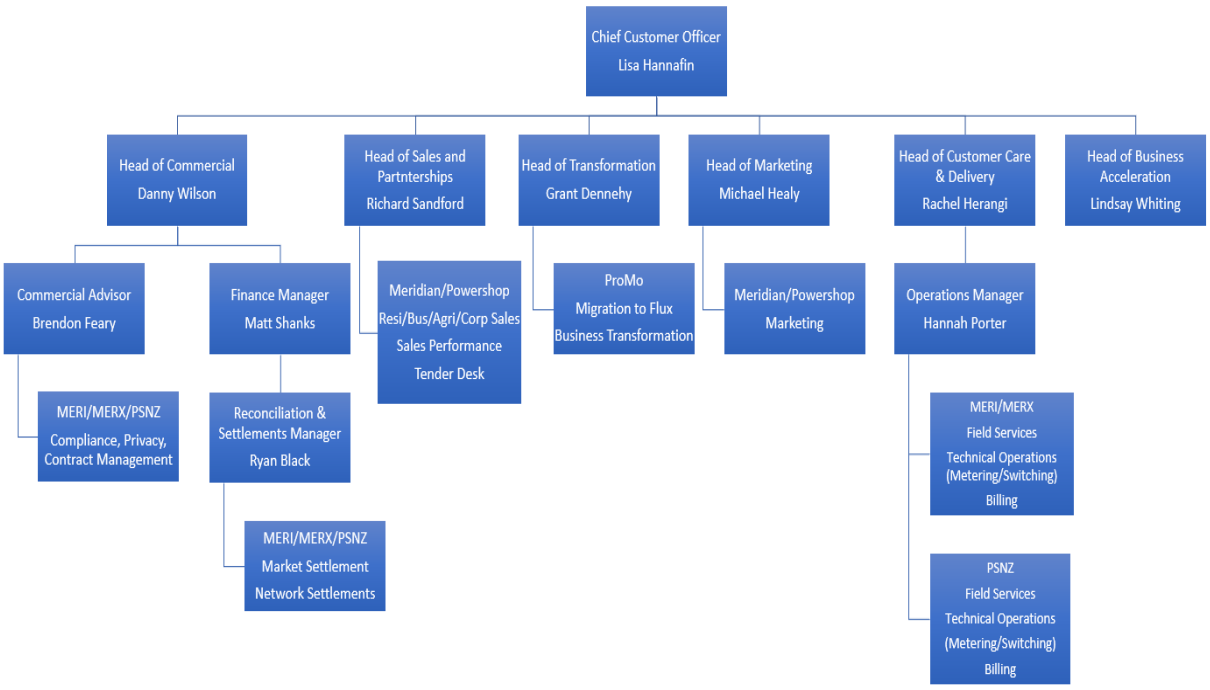
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

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 organisational structure.



1.3. Persons involved in this audit

Auditor:

Bernie Cross

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Amy Cooper	Compliance Officer	Meridian
Melanie Matthews	Quality and Compliance Advisor	Meridian
Shivam Patel	Operations Engineer Assistant - Transport	Porirua City Council

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.

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

Systems used by the trader and their agent 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	Registry profile	Number of items of load	Database wattage May 2022 (watts)
0000023024WE5D5	PCC Property – TKR0331	DST	9	1,341
0001255308UN5C4	MASTER ICP PCC Streetlight – TKR0331	DST	3,953	159,540
0001256873UNFA3	MASTER ICP PCC Streetlight – PNI0331	DST	1,391	52,521
0000161078CKA46	MASTER ICP PCC PARKS # PNI0331	DST	141	6,180
0000161079CK603	PCC PARKS #TKR0331 TOTAL ASSETS	DST	67	4,181
Total			**5,561**	**223,763**

1.7. Authorisation Received

All information was provided directly by Meridian or PCC.

1.8. Scope of Audit

This audit of the PCC 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.

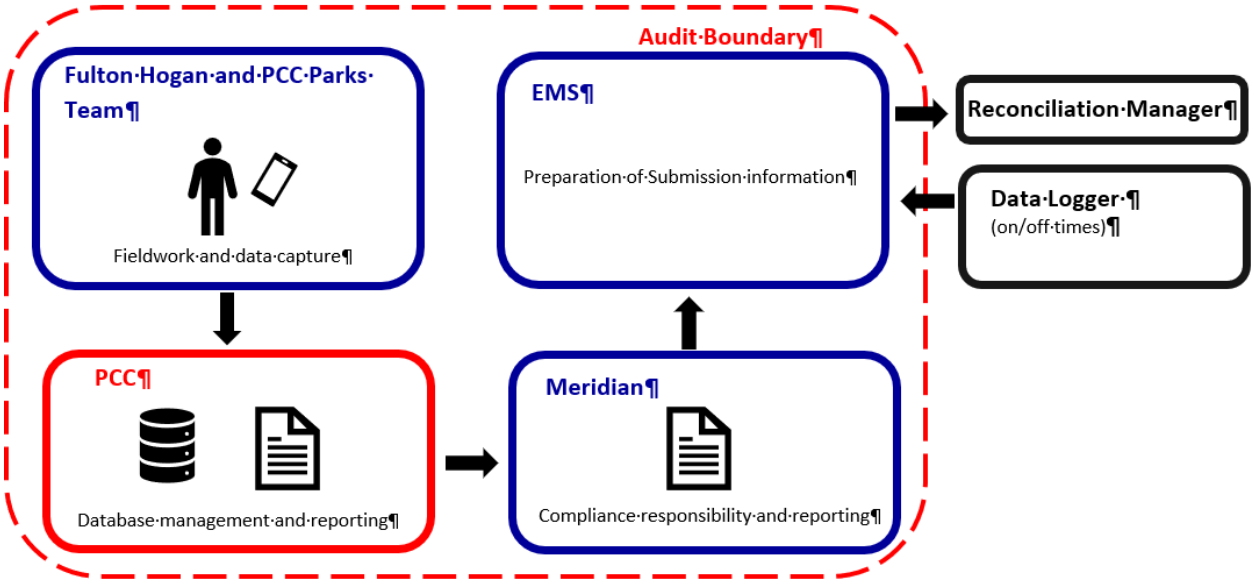
The scope of the audit encompasses the collection, security and accuracy of the data, including the preparation of submission information.

A RAMM database is managed by PCC in relation to this load. The database is remotely hosted by thinkproject New Zealand Limited.

Field work and new light installations are carried out by Fulton Hogan. Pocket RAMM is used to update the database.

Park lights are maintained in the RAMM database by the parks team.

The diagram below shows the audit boundary for clarity.



The field audit was undertaken of a statistical sample of 431 items of load on 5 January 2023.

1.9. Summary of previous audit

The previous audit was completed in July 2022 by Steve Woods of Veritek Limited. Five non-compliances were identified, and one recommendation was made. The current statuses of the findings are detailed below.

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 resulting in an estimated under submission of 92,800 kWh p.a. Eight items of load are not readily locatable. One item of load with the incorrect ballast applied resulting in an estimated under submission of 8.542 kWh. Livening dates not recorded for new connections. Under submission of 61,963 kWh due to inaccurate park lighting records in RAMM. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Still existing
Location of each item of load	2.3	11(2)(b) of Schedule 15.3	Eight items of load do not have sufficient location information to enable them to be readily locatable.	Still existing
All load recorded in database	2.5	11(2A) of Schedule 15.3	Thirteen additional lamps in the field were not recorded in the database from a sample of 366 items of load.	Still existing
Database accuracy	3.1	15.2 and 15.37B(b)	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 92,800 kWh p.a. Eight items of load are not readily locatable. One item of load with the incorrect ballast applied resulting in an estimated under submission of 8.542 kWh. Livening dates not recorded for new connections. Under submission of 61,963 kWh due to inaccurate park lighting records in RAMM. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot	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 resulting in an estimated under submission of 92,800 kWh p.a. One item of load with the incorrect ballast applied resulting in an estimated under submission of 8.542 kWh. Under submission of 61,963 kWh due to inaccurate park lighting records in RAMM. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates not recorded for new connections.	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

The audit was completed 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. 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 the EMS agent audit.

The capacities supplied to EMS for Nov 2022 were checked and confirmed to be the same as the database.

The field audit found that the database accuracy was not confirmed as accurate with a 95% level of confidence resulting in an estimated annual under submission of 192,300 kWh. This is detailed in **section 3.1**.

Some database inaccuracies were found as detailed in **section 3.1** and summarised below:

Description	Items of load	Estimated annual kWh impact
Incorrect ballasts applied	1	+8.542
Some 19.5W lights recorded as 20W	Unknown	Unknown
Some 35.5W lights recorded as 36W	Unknown	Unknown
Incorrect capacity (zero watts) applied	3	+256
ICP not assigned to all items of load	20	+2,075
Inaccurate parks lighting information in RAMM	232	+58,460

The location information is incomplete for eight items of load therefore these are unable to be confirmed as requiring inclusion in the calculation of connected load. This is recorded as non-compliance below and in **section 2.3**

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. The database contains a "light install date" and a "lamp install date" field but these are not used to re-calculate historic submissions. 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.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Jul-22 To: 30-Nov-22	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 192,300 kWh p.a. Eight items of load are not readily locatable. 20 items of load without an ICP being assigned and therefore the load associated with these lights is not being included in the monthly capacities report to EMS resulting in an annual under submission of approximately 2,075 kWh. Three lights recorded in the database as zero watts capacity were confirmed during the field audit as being 20W LED lights, resulting in an estimated under submission of 256 kWh. One item of load with the incorrect ballast applied resulting in an estimated under submission of 8.542 kWh. Some Italo 35.5W lamps are incorrectly recorded in the database as 36W. Some Italo 19.5W lamps are incorrectly recorded in the database as 20W. Livening dates not recorded for new connections. Under submission of 58,460 kWh due to inaccurate park lighting records in RAMM. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Potential impact: High Actual impact: High Audit history: Multiple times Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated as weak due to: • poor database accuracy found in the field audit, • exceptions identified in the previous audit remain unresolved, and • the recent field activity of light installations and changes does not appear to have been reflected in the database since the last audit. The audit risk rating is high based on kWh variances.

Actions taken to resolve the issue	Completion date	Remedial action status
Meridian has advised PCC of the inaccuracies identified. There had been several staff changes at the council that have impacted progress on remedial work to the RAMM database. A new resource was assigned in November to start looking after the database and working on the corrections required. Meridian will be arranging a meeting with PCC and Veritek for early February to discuss the audit findings and recommendations.	30/06/2023 15/02/2023	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Meridian will continue to work with PCC on resolving the inaccuracies and ongoing issues that have been identified. We have also strongly recommended a full field audit be completed to fully resolve all existing inaccuracies.	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

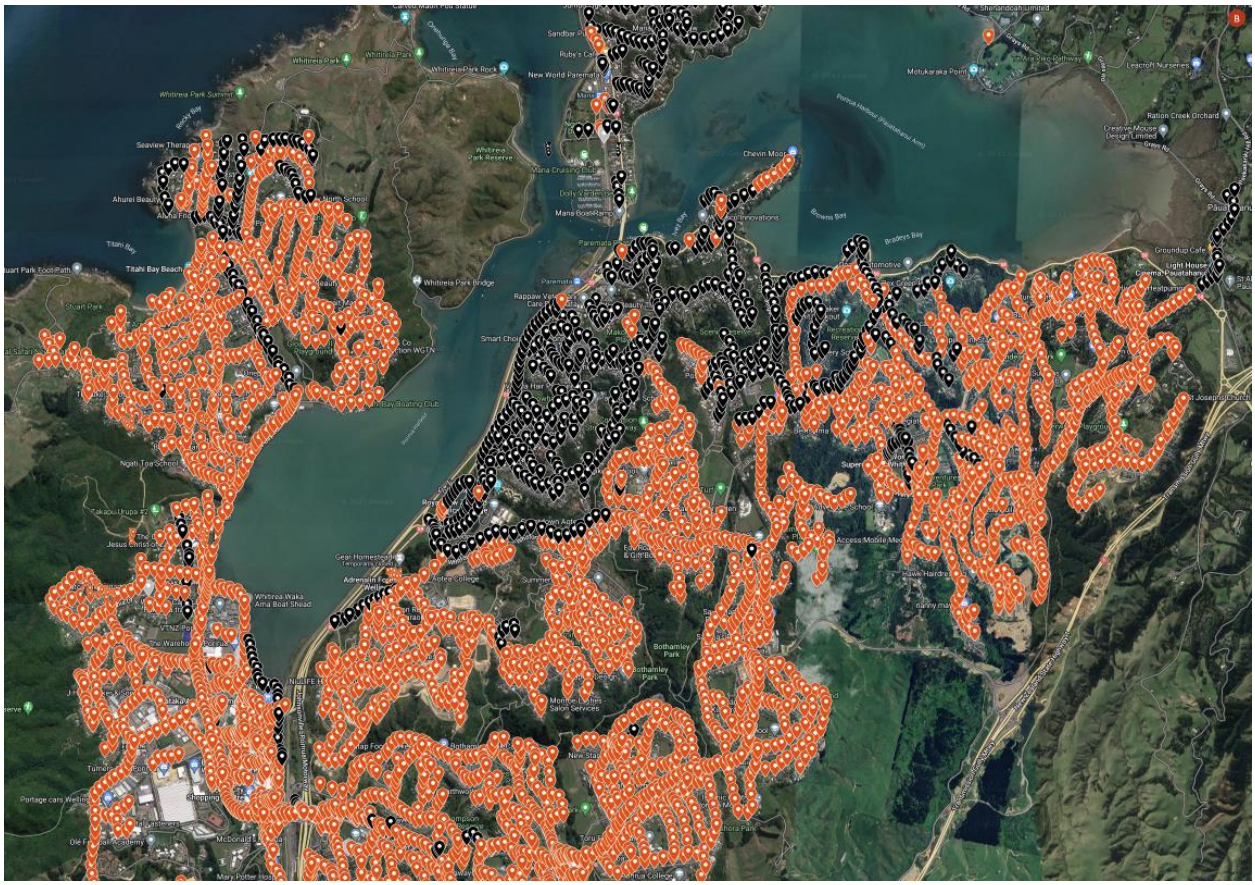
The database was checked to confirm an ICP was recorded against each item of load.

Audit commentary

The database currently has 20 items of load without an ICP being assigned and therefore the load associated with these lights is not being included in the monthly capacities report to EMS resulting in an annual under submission of approximately 3,327 kWh.

There are also 15 items of load relating to Paremata Crescent that are currently assigned to Greater Wellington Regional Council associated with the Metlink carparking. However, seven items of load are not part of the carparking lighting and should be associated with ICP 0001256873UNFA3 resulting in an annual under submission of approximately 1,249 kWh.

All items of load were plotted to ensure the correct network supply point (NSP) was allocated through the ICP assignment. In the map below the red plots are for NSP TKR0331 and the black plots are for PNI0331.



The map shows that the ICP/NSP assignment to the lights is not consistently applied resulting in some load being incorrectly assigned to ICPs and the associated NSP for reconciliation purposes. I recommend that Meridian works with Wellington Electricity to clearly define the boundaries between lights supplied by TKR0331 and PNI0331 NSPs.

Recommendation	Description	Audited party comment	Remedial action
Improve accuracy of ICP assignment to each item of load.	Meridian to work with Wellington Electricity to clearly define the boundaries between lights supplied by TKR0331 and PNI0331 NSPs and ensure the database then correctly reflect these boundaries.	Meridian has advised PCC of the recommendation. There had been several staff changes at the council that have impacted progress on remedial work to the RAMM database. A new resource was assigned in November to start looking after the database and working on the corrections required. Meridian will be arranging a meeting with PCC and Veritek for early February to discuss the audit findings and recommendations.	Identified

The database contains 207 private lights which are not recorded against an ICP, it has been confirmed that these are not the responsibility of Porirua CC. They are recorded in the database for completeness so that if a fault is logged for a private light the caller can be advised that the end user needs to arrange

the repair. It is expected that private lights will be metered through the customer's installation, or the network should create standard or shared unmetered load as appropriate. These lights have been provided on multiple occasions to Wellington Electricity to check that these are being reconciled as either standard unmetered load or shared unmetered load against the relevant ICPs. No progress has been made in ensuring these private lights are being accounted for in the market settlement process. These private lights are contributing approximately 61,000 kWh of UFE annually and I have repeated the lack of progress in ensuring these lights are included in the market settlement process as an industry issue.

Issue	Section	Clause	Description
Mechanism to ensure identified private streetlights from DUML audits are accounted in the market settlement process.	2.2	Clause 11(3)(e) Part 11	Where private lights are identified as part of a DUML audit, the process to ensure these lights are investigated by the distributor as potential standard unmetered or shared unmetered is not well understood including the ownership or responsibility for following up with the distributor.

All lights which are the responsibility of the Porirua CC have an ICP recorded.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.2 With: Clause 11(2)(a) and (aa) of Schedule 15.3 From: 01-Jul-22 To: 30-Nov-22	20 items of load without an ICP being assigned and therefore the load associated with these lights is not being included in the monthly capacities report to EMS resulting in an annual under submission of approximately 2,075 kWh. Seven items of load are incorrectly assigned to GWRC but should be associated with ICP 0001256873UNFA3 resulting in an annual under submission of approximately 1,249 kWh. ICP assignment is not correct for all items of load resulting in incorrect allocation of submission volumes to the respective NSP. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate as most lights are assigned an ICP on entry to the database. The impact is rated as low as the volume impacted is small.

Actions taken to resolve the issue	Completion date	Remedial action status
Meridian has advised PCC of the inaccuracies identified. There had been several staff changes at the council that have impacted progress on remedial work to the RAMM database. A new resource was assigned in November to start looking after the database and working on the corrections required. Meridian will be arranging a meeting with PCC and Veritek for early February to discuss the audit findings and recommendations.	30/06/2023 15/02/2023	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Meridian will continue to work with PCC on resolving the inaccuracies and ongoing issues that have been identified. We have also strongly recommended a full field audit be completed to fully resolve all existing inaccuracies.	Ongoing	

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 databases were checked to confirm the location is recorded for all items of load.

Audit commentary

The database contains fields for the street address and also GPS coordinates.

Eight items of load do not have GPS coordinates or sufficient other information to enable them to be located such as the house number, road, suburb or pole number. These eight items of load were added to the database, with pole and lamp install dates of 3 December 2021. These were the same records as identified in the last two audits.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.3 With: Clause 11(2)(b) of Schedule 15.3 From: 01-Jul-22 To: 30-Nov-22	Eight items of load do not have sufficient location information to enable them to be readily locatable. Potential impact: Low Actual impact: Low Audit history: Multiple times Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate as while no new lights have been added without sufficient location information being provided, there has been no progress to resolve the exceptions identified from previous audits. The impact is rated as low as there are only eight items of load that are not readily locatable.

Actions taken to resolve the issue	Completion date	Remedial action status
Meridian has advised PCC of the inaccuracies identified. There had been several staff changes at the council that have impacted progress on remedial work to the RAMM database. A new resource was assigned in November to start looking after the database and working on the corrections required. Meridian will be arranging a meeting with PCC and Veritek for early February to discuss the audit findings and recommendations	30/06/2023 15/02/2023	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Meridian will continue to work with PCC on resolving the inaccuracies and ongoing issues that have been identified. We have also strongly recommended a full field audit be completed to fully resolve all existing inaccuracies.	Ongoing	

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 it contained a field for lamp type and wattage capacity and included any ballast or gear wattage and that each item of load had a value recorded in these fields.

Audit commentary

The database contains fields for lamp make and model. There are three fields which record lamp wattage, gear wattage and total wattage. The fields were populated for all items of load.

Five items of load had zero watts populated in the database. Two lights appear to be duplicates as there are other lights with the same location detail present and these other lights have non zero wattages. Three lights were confirmed as part of the field audit as being 20W LED lights resulting in an estimated under submission of 256 kWh.

The accuracy of lamp descriptions, wattages and ballasts is recorded 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: 01-Jul-22 To: 30-Nov-22	Three lights recorded in the database as zero watts capacity were confirmed during the field audit as being 20W LED lights, resulting in an estimated under submission of 256 kWh. 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 recorded as strong as most lights are assigned an appropriate capacity on entry to the database. The impact is rated as low as the volume impacted is small.

Actions taken to resolve the issue	Completion date	Remedial action status
Meridian has advised PCC of the inaccuracies identified. There had been several staff changes at the council that have impacted progress on remedial work to the RAMM database. A new resource was assigned in November to start looking after the database and working on the corrections required.	30/06/2023	Identified
Meridian will be arranging a meeting with PCC and Veritek for early February to discuss the audit findings and recommendations.	15/02/2023	

Preventative actions taken to ensure no further issues will occur	Completion date	
Meridian will continue to work with PCC on resolving the inaccuracies and ongoing issues that have been identified. We have also strongly recommended a full field audit be completed to fully resolve all existing inaccuracies.	Ongoing	

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 431 items of load on 5 January 2023. The sample was selected from five strata, as follows:

- roads A-D,
- roads E-K,
- roads L-N,
- roads O-S, and
- roads T-Z.

Audit commentary

The field audit discrepancies are detailed below:

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
ARAWHATA STREET ROW	2	2	0	1	1 x 35.5W (L35.5) light recorded as 36W.
DERBY PLACE	3	3	0	2	1 x 35.5W light recorded as L36, and 1 x 28W (L28A) light recorded as 26W.
DOWNES STREET	17	18	1	0	1 additional 26W (L26) LED light found in the field.
KENEPURU DRIVE	61	77	+17, -1	4	1 x 149W light not found in the field – the GPS co-ordinates related to a light within WCC boundary. 1 x 36W recorded as 99W (L99) light, 1 x 128W (L128) light recorded as 36W, 2 x 128W (L128) lights recorded as 149W. 2 x 55W (L55),2 x 12W (Belisha Beacon lamps), 1 x 157W (L157), 4 x 128W (L128), 7 x 13W (L13), 1 x 63W (L63) additional lights found in the field.
KOPUA PLACE	3	3	0	3	3 x 20W (L20) recorded as zero W

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
LAKE LOOKOUT	7	17	10	0	Additional 1 x 98W floodlight (L98), 6 x UV (Vynco VU4 – estimated 60W) & 3 x estimated 50W LED mural spotlights found in the field.
MEPHAM PLACE	3	12	9	0	Additional 7 x 15W LED subway lights, 2 x 16W (L16) lights found in the field.
MORERE STREET	14	14	0	3	2 x 36W (L36A) light recorded as 26W light, 1 x 28W (L28A) light recorded as 26W.
NORRIE STREET	17	21	14	0	1 x estimated 80W parking kiosk, 1 x 117W (L117), 4 x 250W MH floodlights for skatepark, 8 x 50W LED spotlights found in the field.
OGILVY TERRACE	8	8	0	1	1 x 23W (L23) light recorded as 36W.
RAWHITI ROAD	30	30	0	11	11 x 19.5W (L19.5A) lights recorded as 20W.
STATE HIGHWAY NO.1	15	16	1	0	1 x estimated 5W electrical supply to prepay BBQ at Aotea Lagoon found in the field.
TAKAPUWAHIA DRIVE	14	14	0	1	1 x 35.5W (L35.5) light recorded as 36W.
TAVERN LANE	6	8	4	2	2 x 35.5W (L35.5) lights recorded as 36W. 1 x 250W MH floodlight, 3 x 250W MH floodlights for basketball court found in the field.
TE WHAKAWHITINGA-O-NGATITOA	9	11	2	5	5 x 38W (L38) lights recorded as 36W. 2 x 38W (L38) lights found in the field.
TERRACE ROAD	7	7	0	2	2 x 36W (L36) lights recorded as 26W.
TRADEWINDS RD ROW1	1	1	0	1	1 x 17W (L17) light recorded as 16W.
WALTON LEIGH AVENUE	14	20	6	1	1 x 28W (L28) light recorded as 36W. 2 x 25W LED subway lights, 4 x 10W wall mounted footpath strip lights found in the field.
WHANAKE STREET	11	11	0	1	1 x 70W HPS recorded as 36W LED.
WHITBY MALL ENTRY	2	2	0	2	2 x estimated 27W LED lights recorded as 75W LED.
Grand Total	**431**	**493**	**65 (+64-1)**	**40**	

The field audit found 64 additional lights and could not find one light listed in the database. It is possible that some of these additional lights might be metered or associated with standard UML ICPs however on-site checks and a search of the registry could not identify any likely ICPs. I recommend that Meridian works with PCC to investigate these additional lights and confirm whether these relate to another ICP.

Recommendation	Description	Audited party comment	Remedial action
Review additional lights to determine if these belong to another ICP.	Meridian to work with PCC to investigate the additional lights identified in the field audit and confirm whether these relate to another metered or unmetered ICP.	Meridian has advised PCC of the recommendation. There had been several staff changes at the council that have impacted progress on remedial work to the RAMM database. A new resource was assigned in November to start looking after the database and working on the corrections required. Meridian will be arranging a meeting with PCC and Veritek for early February to discuss the audit findings and recommendations.	Identified

This is recorded as non-compliance below.

The database accuracy has declined during the audit period across a similar sample size as detailed in the table below:

Street	May 2021	December 2021	June 2022	December 2022
Incorrect wattages	51	19	37	40
Additional lights	5	2	13	64
Missing lights	11	2	3	1

This is discussed further in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 02-Dec-21 To: 31-May-22	64 additional lamps (15%) in the field were not recorded in the database from a sample of 431 items of load. Potential impact: Low Actual impact: Low Audit history: Multiple times Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate as the recent field activity of light installations and changes does not appear to have been reflected in the database since the last audit The audit risk rating is low based on the small volume of lights affected in relation to the sample examined.

Actions taken to resolve the issue	Completion date	Remedial action status
Meridian has advised PCC of the inaccuracies identified. There had been several staff changes at the council that have impacted progress on remedial work to the RAMM database. A new resource was assigned in November to start looking after the database and working on the corrections required. Meridian will be arranging a meeting with PCC and Veritek for early February to discuss the audit findings and recommendations.	30/06/2023 15/02/2023	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Meridian will continue to work with PCC on resolving the inaccuracies and ongoing issues that have been identified. We have also strongly recommended a full field audit be completed to fully resolve all existing inaccuracies.	Ongoing	

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

The DUML Statistical Sampling Guideline was used to determine the database accuracy. The table below shows the survey plan.

Plan Item	Comments
Area of interest	PCC streetlights in the Porirua area
Strata	The database contains 5,561 items of load in the PCC area. The processes for the management of all PCC items of load is the same. I selected the following strata: • roads A-D, • roads E-K, • roads L-N, • roads O-S, and • roads T-Z.
Area units	I created a pivot table of the roads in each database and used a random number generator in each spreadsheet to select a total of 53 sub-units.
Total items of load	431 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 431 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	120.0	Wattage from survey is higher than the database wattage by 20%
R_L	107.7	With a 95% level of confidence, it can be concluded that the error could be between +7.7% and +52.7%
R_H	152.7	

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 variability of the sample results across the strata means that the true wattage (installed in the field) could be between 7.7% and 52.7% higher than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

In absolute terms the installed capacity is estimated to be 45 kW higher than the database indicates.

There is a 95% level of confidence that the installed capacity is between 17 kW to 118 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 192,300 kWh higher than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 74,100 kWh p.a. to 55,000 kWh p.a. higher 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 RL is less than 0.95 or RH 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

I checked the ballasts being applied and found that one lamp had a discrepancy when compared to the standardised wattage table. This is detailed in the table below:

Lamp Type	Database Total Lamp Wattage	EA Standardised Total Wattage	Variance (watts)	Database Quantity	Estimated Annual kWh effect on consumption
250W MV	268	270	-2	1	+8.542
Total estimated annual effect on submission				1	+8.542 kWh

I checked LED lamp wattages against available specification sheets and found:

- that some Italo 35.5W lamps are incorrectly recorded in the database as 36W, and
- that some Italo 19.5W lamps are incorrectly recorded in the database as 20W.

This will be resulting in an over submission of volume, however due to the limited descriptions provided in the database relating to lamp model it was not possible to accurately identify all affected lights and determine the extent of the over submission.

I was unable to confirm the wattage of six models of LED lamps which amount to 2,540 lamps due to incomplete lamp model descriptions being populated or the light specifications being unable to be reviewed before the audit is due. This issue was highlighted in the last two audits and no progress has been achieved to date. I have repeated this recommendation.

Recommendation	Description	Audited party comment	Remedial action
Improve ability to accurately identify all light types, attributes and input wattages.	Improve the level of detail captured as part of the lamp model description to ensure the input wattages can accurately be determined and ensure all light specification sheets are held centrally and easily available for reference for all lights within the PCC database.	Meridian has advised PCC of the recommendation. There had been several staff changes at the council that have impacted progress on remedial work to the RAMM database. A new resource was assigned in November to start looking after the database and working on the corrections required. Meridian will be arranging a meeting with PCC and Veritek for early February to discuss the audit findings and recommendations.	Identified

Address accuracy

The location information is incomplete for eight items of load. This is recorded as non-compliance below and in **section 2.3**.

ICP number and owner accuracy

20 items of load without an ICP being assigned and therefore the load associated with these lights is not being included in the monthly capacities report to EMS resulting in an annual under submission of approximately 2,075 kWh.

There are also 15 items of load relating to Paremata Crescent that is currently assigned to Greater Wellington Regional Council associated with the Metlink carparking. However, seven items of load are not part of the carparking lighting and should be associated with ICP 0001256873UNFA3 resulting in an annual under submission of approximately 1,249 kWh.

A plot of all items of load shows that the ICP/NSP assignment to the lights is not consistently applied resulting in some load being incorrectly assigned to ICPs and the associated NSP for reconciliation purposes.

Change management process findings

The RAMM database used for submission is managed by PCC. The streetlight contractors update the database using Pocket RAMM.

The new connection process remains unchanged. The lights are recorded in RAMM when an "as built" plan is provided to Fulton Hogan.

The current monthly report is provided as a snapshot and this practice is non-compliant. The database contains a "light install date" and a "lamp install date" field but these are not used to re-calculate historic submissions. 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.

The database contains 207 private lights which are not recorded against an ICP, it has been confirmed that these are not the responsibility of Porirua CC.

Festive lighting is no longer connected.

Outage patrols are conducted at night over a 4-month cycle.

Parks Lighting

During a previous audit in 2020, PCC provided the results of a full field survey of Parks and Property lights. This audit found that there were 440 lights. 208 are now within the RAMM database and assigned to PCC Parks. The remaining 232 items of load are still to be added or confirmed as being added to the database but the Light Owner has been assigned to Porirua City Council and not PCC Parks. I used the average wattage of the Parks and Property lights that are in RAMM (59 watts) and estimate that there is under submission of 58,460 kWh per annum.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Jul-22 To: 30-Nov-22	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 192,300 kWh p.a. Eight items of load are not readily locatable. 20 items of load without an ICP being assigned and therefore the load associated with these lights is not being included in the monthly capacities report to EMS resulting in an annual under submission of approximately 2,075 kWh. Seven items of load are incorrectly assigned to GWRC but should be associated with the ICP 0001256873UNFA3 resulting in an annual under submission of approximately 1,249 kWh. ICP assignment is not correct for all items of load resulting in incorrect allocation of submission volumes to the respective NSP. Three lights recorded in the database as zero watts capacity were confirmed during the field audit as being 20W LED lights, resulting in an estimated under submission of 256 kWh. Some Italo 35.5W lamps are incorrectly recorded in the database as 36W. Some Italo 19.5W lamps are incorrectly recorded in the database as 20W. One item of load with the incorrect ballast applied resulting in an estimated under submission of 8.542 kWh. Livening dates not recorded for new connections. Under submission of 58,460 kWh due to missing park lighting records in RAMM. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Potential impact: High Actual impact: High Audit history: Multiple times Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated as weak due to: • poor database accuracy found in the field audit, • exceptions identified in the previous audit remain unresolved, and • the recent field activity of light installations and changes does not appear to have been reflected in the database since the last audit. The audit risk rating is high based on kWh variances.

Actions taken to resolve the issue	Completion date	Remedial action status
Meridian has advised PCC of the inaccuracies identified. There had been several staff changes at the council that have impacted progress on remedial work to the RAMM database. A new resource was assigned in November to start looking after the database and working on the corrections required. Meridian will be arranging a meeting with PCC and Veritek for early February to discuss the audit findings and recommendations.	30/06/2023 15/02/2023	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Meridian will continue to work with PCC on resolving the inaccuracies and ongoing issues that have been identified. We have also strongly recommended a full field audit be completed to fully resolve all existing inaccuracies.	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

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. 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 the EMS agent audit.

The field audit found that the database accuracy was not confirmed as accurate with a 95% level of confidence resulting in an estimated annual under submission of 192,300 kWh. This is detailed in **section 3.1**.

The location information is incomplete for eight items of load therefore these are unable to be confirmed as requiring inclusion in the calculation of connected load. This is recorded as non-compliance below and in **section 2.3**.

Some database inaccuracies were found as detailed in **section 3.1** and summarised below:

Description	Items of load	Estimated annual kWh impact
Incorrect ballasts applied	1	+8.542
Incorrect capacity (zero watts) applied	3	+256
ICP not assigned to all items of load	20	+2,075
Inaccurate parks lighting information in RAMM	232	+58,460

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. The database contains a "light install date" and a "lamp install date" field but these are not used to re-calculate historic submissions. 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.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 01-Jul-22 To: 30-Nov-22	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 192,300 kWh p.a. Eight items of load are not readily locatable. 20 items of load without an ICP being assigned and therefore the load associated with these lights is not being included in the monthly capacities report to EMS resulting in an annual under submission of approximately 2,075 kWh. Three lights recorded in the database as zero watts capacity were confirmed during the field audit as being 20W LED lights, resulting in an estimated under submission of 256 kWh. One item of load with the incorrect ballast applied resulting in an estimated under submission of 8.542 kWh. Livening dates not recorded for new connections. Under submission of 58,460 kWh due to missing park lighting records in RAMM. Potential impact: High Actual impact: High Audit history: Multiple times Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated as weak due to: • poor database accuracy found in the field audit, • exceptions identified in the previous audit remain unresolved, and • the recent field activity of light installations and changes does not appear to have been reflected in the database since the last audit. The audit risk rating is high based on kWh variances.

Actions taken to resolve the issue	Completion date	Remedial action status
Meridian has advised PCC of the inaccuracies identified. There had been several staff changes at the council that have impacted progress on remedial work to the RAMM database. A new resource was assigned in November to start looking after the database and working on the corrections required.	30/06/2023	Identified
Meridian will be arranging a meeting with PCC and Veritek for early February to discuss the audit findings and recommendations.	15/02/2023	
Preventative actions taken to ensure no further issues will occur	**Completion date**	

Meridian will continue to work with PCC on resolving the inaccuracies and ongoing issues that have been identified. We have also strongly recommended a full field audit be completed to fully resolve all existing inaccuracies.	Ongoing	

CONCLUSION

A RAMM database is managed by PCC in relation to this load. The database is remotely hosted by thinkproject New Zealand Ltd.

Field work and new light installations are carried out by Fulton Hogan, who update the database using Pocket RAMM. Field work and new light installations are carried out by Fulton Hogan, who update the database using Pocket RAMM. Park lights are maintained in the RAMM database by the parks team.

This audit found the accuracy of the database has not improved overall during this audit period reflecting the resource challenges PCC has had around management of this database. PCC have been actively recruiting for an analyst that will be responsible for the management of the database and this position has recently been filled.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	120.0	Wattage from survey is higher than the database wattage by 20%
R_L	107.7	With a 95% level of confidence, it can be concluded that the error could be between +7.7% and +52.7%
R_H	152.7	

In absolute terms, total annual consumption is estimated to be 192,300 kWh higher than the DUML database indicates. This is a decline from the 92,800 kWh of over submission reported in the last audit.

PCC have now added 208 of the 440 parks and property lights discussed in the last audit. The remaining 232 items of load are still to be added or confirmed as being added to the database, but the Light Owner has been assigned to Porirua City Council and not PCC Parks. I used the average wattage of the Parks and Property lights that are in RAMM (59 watts) and estimate that there is under submission of 58,460 kWh per annum.

The audit found seven non-compliances, three recommendations and one issue were made.

The future risk rating of 34 indicates that the next audit be completed in three months. This is a decline from the last audit's risk rating of 23. I recommend that the next audit date is six months to enable Porirua City Council's new analyst resource to get up to speed with, and begin to resolve, the database accuracy issues.

PARTICIPANT RESPONSE