ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

WESTERN BAY OF PLENTY DISTRICT COUNCIL

AND TRUSTPOWER LIMITED

Prepared by: Steve Woods

Date audit commenced: 27 October 2020

Date audit report completed: 17 November 2020

Audit report due date: 1 November 2020

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EXECUTIVE SUMMARY

This audit of the Western Bay of Plenty District Council (**WBOP DC**) DUML database and processes was conducted at the request of Trustpower Limited (**Trustpower**), in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

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

A RAMM database is managed by Westlink on behalf of WBOP DC and monthly reporting is provided to Trustpower. The field work is carried out by Horizon.

Westlink have good processes in place to manage the database accuracy. There are sometimes delays in getting the necessary information from the field for new and updated lights. The field audit found that several LED upgrades had not been updated in the database; this turned out to be a timing issue between the provision of the database and the date the field audit was undertaken. The LED issues have now been resolved. Trustpower ensures appropriate revisions occur when lights are changed with historic dates.

The audit found compliance with all clauses. I recommend the next audit is conducted in 36 months.

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
					Future Risk Rating	**0**	

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
		None	

ISSUES

Subject	Section	Description	Issue
		Nil	

1. ADMINISTRATIVE

1.1. Exemptions from Obligations to Comply with Code

Code reference

Section 11 of Electricity Industry Act 2010.

Code related audit information

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

Audit observation

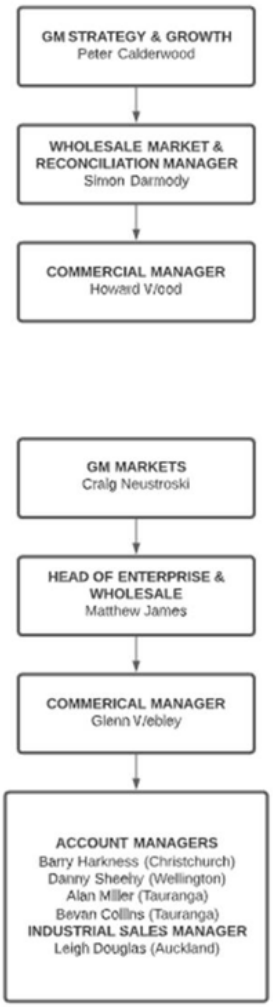
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

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

1.2. Structure of Organisation

Trustpower provided a copy of their organisational structure.



1.3. Persons involved in this audit

Auditor:

Steve Woods

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Phillip Barnes	Maintenance Manager	Westlink BOP
Robbie Diederen	Reconciliation Analyst	Trustpower

1.4. Hardware and Software

The SQL database used for the management of DUML is remotely hosted by RAMM Software Ltd. The database is commonly known as "RAMM" which stands for "Roading Asset and Maintenance Management".

Westlink confirmed that the database back-up is in accordance with standard industry procedures. Access to the database is secure by way of password protection.

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	Profile	Number of items of load	Database wattage (watts)
0001264707UN697	Mount Maunganui/Papamoa	STL	65	9,404
1000524996PC530	Welcome Bay/Ohauiti/Hairini	STL	18	1,749
1000524997PC975	Tauranga City	STL	4	417
1000524998PC6AB	North of Tauranga	STL	1,078	85,357
1000524999PCAEE	Te Puke area	STL	1,039	102,677
TOTAL			2,204	199,604

1.7. Authorisation Received

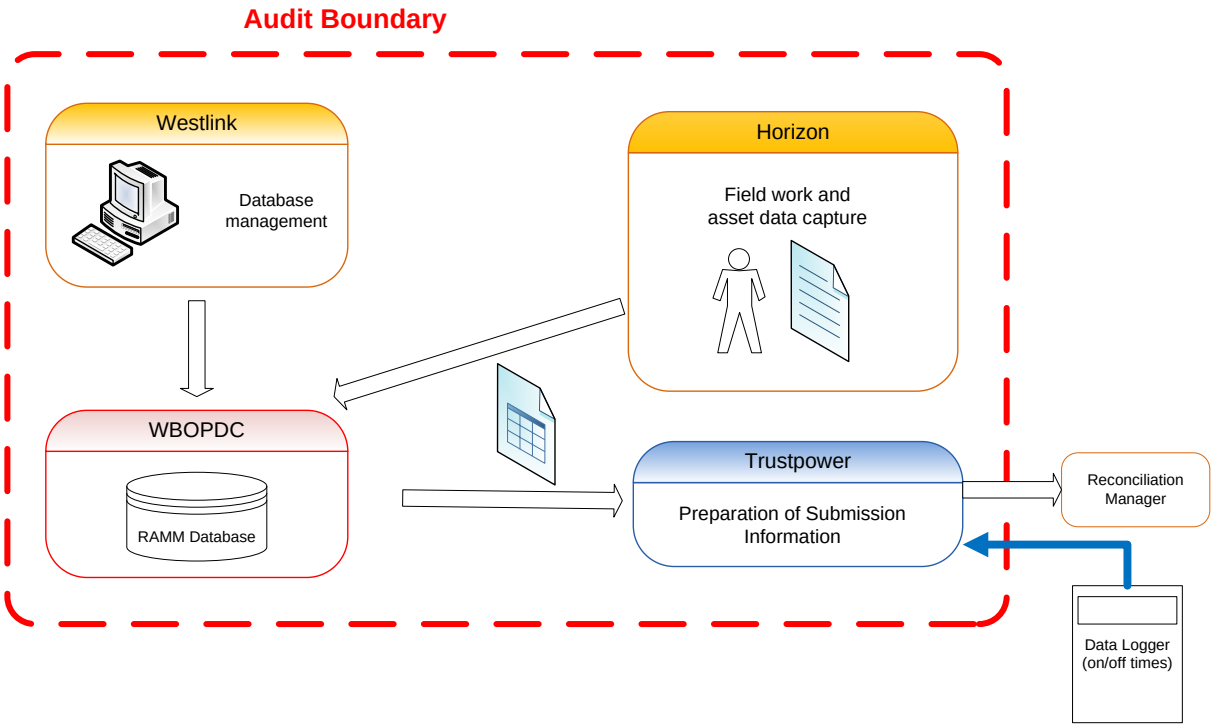
All information was provided directly by Trustpower or Westlink.

1.8. Scope of Audit

This audit of the Western Bay of Plenty District Council (**WBOPDC**) DUML database and processes was conducted at the request of Trustpower Limited (**Trustpower**), 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 database is remotely hosted by RAMM Software Ltd. The asset data capture and database population are conducted by Westlink. The field work is carried out by Horizon. 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 179 items of load.

1.9. Summary of previous audit

The previous audit was completed in November 2019 by Steve Woods of Veritek Limited. Four non-compliances were identified. Their status is shown below.

Table of Non-Compliance

Subject	Section	Clause	Non-Compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	New lights not added to the RAMM database within the month of electrical connection. 32 new lights not in the RAMM database equating to an estimated annual under submission of 4,117 kWh. In absolute terms, total annual consumption is estimated to be 12,600 kWh higher than the DUML database indicates	Cleared Cleared
All load recorded in database	2.5	11(2A) of Schedule 15.3	13 additional lights found in the field audit. 32 lights electrically connected but not recorded in the database since July 2017	Cleared
Database accuracy	3.1	15.2 and 15.37B(b)	In absolute terms, total annual consumption is estimated to be 12,600 kWh lower than the DUML database indicates. New lights not added to the RAMM database within the month of electrical connection. 32 new lights not in the RAMM database equating to an estimated annual under submission of 4,117 kWh	Cleared Cleared
Volume information accuracy	3.2	15.2 and 15.37B(c)	New lights not added to the RAMM database within the month of electrical connection. 32 new lights not in the RAMM database equating to an estimated annual under submission of 4,117 kWh. In absolute terms, total annual consumption is estimated to be 12,600 kWh higher than the DUML database indicates	Cleared Cleared

Recommendations

Subject	Section	Description	Status
		Nil	

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

Trustpower 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

Trustpower reconciles this DUML load using the STL profile. Trustpower receive monthly wattage reports. Submissions are based on the monthly wattage report, with on and off times derived from data logger information.

I recalculated the submissions for August 2020 using the data logger and database information. I confirmed that the calculation method and result was correct.

Previously I have recorded that new lights are not always added to the database in the month of these being electrically connected. I did not find any examples during this audit.

Previous audits have recorded that submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments or the fact that lights can be livened before they are entered into the database. Trustpower demonstrated that they are adjusting for previous periods and ensuring revisions are accurate.

In absolute terms, total annual consumption is estimated to be 6,300 kWh lower than the DUML database indicates. This is confirmed as compliant in Section 3.1 because the error is within 5%.

Audit outcome

Compliant

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

Code reference

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

Code related audit information

The DUML database must contain:

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

Audit observation

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

Audit commentary

12 items of load do not have an ICP recorded against them, but these are not WBOP lights, they are Tauranga City Council lights, which I confirmed with Tauranga City Council. Compliance is confirmed.

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 database contains fields for the street address and also GPS coordinates and all were populated.

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 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 the manufacturers rated wattage and the ballast wattage. The extract provided has fields for lamp and gear make and model and all were populated.

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 a statistical sample of 179 items of load.

Audit commentary

The field audit findings for the sample of lamps was accurate with the exception of the streets detailed in the table below:

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
AUGUSTA RISE	6	8	+2	-	2 x additional 29W LED Updated in September data
BRAMLEY DRIVE	2	2	-	2	2 x 23W LED recorded as 70W HPS Updated in September data
MCDONNELL STREET	3	3	-	3	3 x 23W LED recorded as 70W HPS Updated in October data
MYRTLE DRIVE	5	5	-	5	5 x 23W LED recorded as 70W HPS Updated in September and October
RUAMOANA PLACE	3	3	-	3	3 x 23W LED recorded as 70W HPS Updated in September
TETLEY ROAD	4	3	-1	-	1 x 70W HPS not found Updated in September

This clause relates to lights found in the field but not recorded in the database. The field audit found two additional lights in the field. These were both updated in the database in September, prior to the field audit but after the provision of the database for audit purposes. The database accuracy from the field audit is discussed in **section 3.1**.

I rechecked the new lights identified in the last audit that had not been added to the database and found three of 32 were still not recorded, but WBOP confirmed these lights are private and not the responsibility of the Council.

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
CHARLOTTE DRIVE EXTENTION	5	5	5		Now correct
NEW ROAD (Near GANE PLACE)	15	15	15		Now correct
NEW ROAD OMOK1	3	3	3		Now correct
NEW ROAD OMOK2	4	4	4		Now correct
PENELOPE PLACE	2	2	2		Now correct
PIPI LANE	0	3	3		WBOP confirmed these lights are private
TOTAL	0	3			

Audit outcome

Compliant

2.6. Tracking of load changes (Clause 11(3) of Schedule 15.3)

Code reference

Clause 11(3) of Schedule 15.3

Code related audit information

The DUML database must track additions and removals in a manner that allows the total load (in kW) to be retrospectively derived for any given day.

Audit observation

The process for tracking of changes in the database was examined.

Audit commentary

The RAMM database functionality achieves compliance with the code.

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	Western BOP DC Street Lights
Strata	The databases contain 2,090 items of load in the Western BOP DC area. The processes for the management of all WBOPDC items of load is the same. I selected the following strata: • Road name A-F • Road name G-M • Road name N-S • Road name T-Y
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 45 sub-units.
Total items of load	179 items of load were checked.

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority.

Audit commentary

Database accuracy based on the field audit

A field audit was conducted of a statistical sample of 179 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	99.3	Wattage from survey is lower than the database wattage by 0.7%
R_L	96.5	With a 95% level of confidence it can be concluded that the error could be between -3.5% and 0.0%
R_H	100	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 01/02/19 and the table below shows that Scenario A (detailed below) applies.

The conclusion from Scenario A is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between -3.5% lower and 100% accurate compared to the wattage recorded in the DUML database. Compliance is recorded because the potential error is within 5.0%.

In absolute terms the installed capacity is estimated to be 1.0 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 7 kW lower than the database to 100% accurate.

In absolute terms, total annual consumption is estimated to be 6,300 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 30,000 kWh p.a. lower than the database indicates to 100% accurate.

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 %

The database was checked against the published standardised wattage table and confirmed that ballasts applied, and lamp descriptions were correct.

NZTA Lighting

NZTA lighting is not included in this audit.

ICP accuracy

All items of load have an ICP recorded.

Location accuracy

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

Change management process findings

The process to add new streetlights was examined and it remains unchanged from the last audit. WBOP DC approves all new developments and the consent is provided once they are satisfied that the development will meet the required standards. Detailed "as builts" are required to be provided by the developer and a walk over by council staff of the development is undertaken before the 224 certificate is issued. Once this is issued the "as builts" should be sent to Westlink to upload to RAMM. This process is sometimes slow, and it can take some months before this information reaches Westlink.

When new lights are added to the database Westlink's contract does not require them to be added until the 20th of the month following them being advised. This can result in no submission for a further month from the new lights being added. No examples were identified during the audit.

Horizon carries out the field maintenance for Westlink on behalf of WBOP DC and they update RAMM directly. Westlink have robust controls in their contract with Horizon and this ensures that field maintenance is captured in a timely and accurate manner. Outage patrols are in place with the whole network being checked each month. Additional to this Westlink undertake a 20% validation of all assets they are responsible for on an annual basis.

There are no festive lights connected to the unmetered streetlight circuits and there are no private lights known of or identified as part of the field audit undertaken.

Audit outcome

Compliant

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

Trustpower reconciles this DUML load using the STL profile. Trustpower receive monthly wattage reports. Submissions are based on the monthly wattage report, with on and off times derived from data logger information.

I recalculated the submissions for August 2020 using the data logger and database information. I confirmed that the calculation method and result was correct.

Previously I have recorded that new lights are not always added to the database in the month of these being electrically connected. I did not find any examples during this audit.

Previous audits have recorded that submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments or the fact that lights can be livened before they are entered into the database. Trustpower demonstrated that they are adjusting for previous periods and ensuring revisions are accurate.

In absolute terms, total annual consumption is estimated to be 6,300 kWh lower than the DUML database indicates, which is confirmed in Section 3.1 as compliant because the error is less than 5%.

Audit outcome

Compliant

CONCLUSION

A RAMM database is managed by Westlink on behalf of WBOP DC and monthly reporting is provided to Trustpower. The field work is carried out by Horizon.

Westlink have good processes in place to manage the database accuracy. There are sometimes delays in getting the necessary information from the field for new and updated lights. The field audit found that several LED upgrades had not been updated in the database; this turned out to be a timing issue between the provision of the database and the date the field audit was undertaken. The LED issues have now been resolved. Trustpower ensures appropriate revisions occur when lights are changed with historic dates.

The audit found compliance with all clauses. I recommend the next audit is conducted in 36 months.

PARTICIPANT RESPONSE

The findings of the Auditor match our understanding of how the Customer is maintaining a robust DUML database with appropriate controls around maintenance work and processing changes in a timely manner and using correct dates. We are ensuring any changes that are backdated flow through to our submission process so that all consumption is allocated into the correct periods. Few changes are not been captured in the current month. With regard to the process of new lights being livened in new subdivisions we are proactively working with Powerco and the Council to ensure we have in place a more robust process of ensuring that the DUML database is updated at the time of livening. We disagree with an Audit rating of 14 as all field discrepancies have been shown to have been correct as to light count and wattage . It would appear that we have a timing issue between when the August Data is supplied and the work is carried out and included in the September data. We also believe that the new connection process has contributed 12 points by being allocated 4 points and counted three times across different sections of the report.