ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

For

NZTA NELSON AREA AND TRUSTPOWER LIMITED

Prepared by: Rebecca Elliot

Date audit commenced: 27 July 2021

Date audit report completed: 25 August 2021

Audit report due date: 1 September 2021

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EXECUTIVE SUMMARY

This audit of the **NZTA Nelson Unmetered Streetlights** 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 thinkproject New Zealand Limited (formerly RAMM NZ Ltd). The field work is carried out by Tasman Journeys and the asset data capture is conducted by WSP Ltd (formerly Opus Consulting) directly into RAMM. A monthly report is expected to be provided to Trustpower by WSP.

Trustpower reconciles this DUML load using the UML profile. The on and off times are derived from data logger information. Trustpower request a database extract each month. A monthly report is provided if there have been changes made to the database. If no changes have been made, then the existing data set is used.

A full field audit was undertaken which found a number of variances resulting in the database being 94.6% of the recorded wattage. This is not within the +/-5% accuracy threshold therefore the database is not considered accurate. No updates to the database have been received by Trustpower since this ICP commenced trading as no changes have been made to the database. I recommend in **section 3.1**, that the change management process is reviewed to ensure updates made in the field are updated in the database and sent to Trustpower in a timely manner.

This audit found four non-compliances and two recommendations are made. The future risk rating of nine indicates that the next audit be completed in 12 months. I have considered this in conjunction with Trustpower's comments and agree with this recommendation.

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	Variance in light volumes reported to Trustpower vs what is recorded in the database is likely to be resulting in an estimated 1,760 kWh per annum of over submission. Database is not confirmed as accurate within the +/-5% threshold. Resulting in an estimated over submission of 4,425 kWh per annum (based on 4,271 annually).	Moderate	Low	2	Investigating
All load recorded in database	2.5	11(2A) of Schedule 15.3	One additional light found in the field.	Moderate	Low	2	Investigating
Database accuracy	3.1	15.2 and 15.37B(b)	Database is not confirmed as accurate within the +/-5% threshold. Resulting in an estimated over submission of 4,425 kWh per annum (based on 4,271 annually). Ten lights with the incorrect light description. The correct wattage is recorded so this has no impact on reconciliation. One light with the incorrect ballast recorded. The impact on submission is negligible.	Weak	Low	3	Investigating

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)	Variance in light volumes reported to Trustpower vs what is recorded in the database is likely to be resulting in an estimated 1,760 kWh per annum of over submission. Database is not confirmed as accurate within the +/-5% threshold. Resulting in an estimated over submission of 4,425 kWh per annum (based on 4,271 annually).	Moderate	Low	2	Investigating
Future Risk Rating						9	

Future risk rating	0	1-4	5-8	9-15	16-18	19+
Indicative audit frequency	36 months	24 months	18 months	12 months	6 months	3 months

RECOMMENDATIONS

Subject	Section	Recommendation
Location of each item of load	2.3	Record GPS co-ordinates for the 14 items of load on Queen Elizabeth Drive.
Database accuracy	3.1	Review the change management process to ensure that updates made in the field are updated in the database in a timely manner.

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

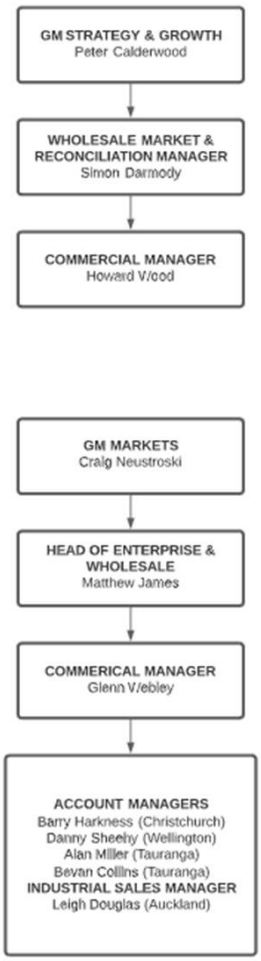
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

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

Auditors:

Name	Company	Role
Rebecca Elliot	Veritek Limited	Lead Auditor
Claire Stanley	Veritek Limited	Supporting Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Robbie Diederen	Reconciliation Analyst	Trustpower
Phil Hamblin	Senior Network Manager Nelson/Tasman	NZTA

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.

NZTA confirmed that the database back-up is in accordance with standard industry procedures. 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	Profile	Number of items of load	Database wattage (watts)
0000202024CT59F	NZTA SH6 Streetlights	STK0331	UML	112	19,013

1.7. Authorisation Received

All information was provided directly by Trustpower and NZTA.

1.8. Scope of Audit

This audit of the **NZTA Nelson Unmetered Streetlights** 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.

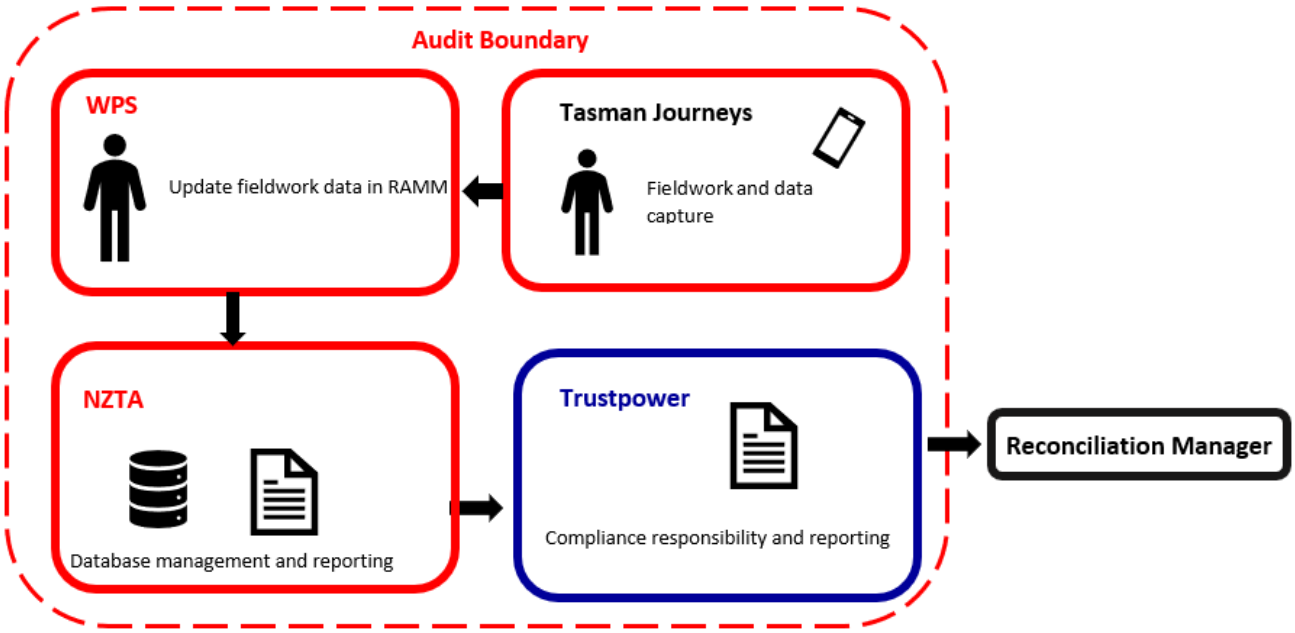
The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

The database is remotely hosted by 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.

The asset data capture and database population are conducted by WSP. The maintenance field work is carried out by Tasman Journeys.

New project work is carried out by Tasman Journeys who pass the information to WSP to load directly into RAMM once the work is complete.

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.



1.9. Summary of previous audit

The previous audit was undertaken by Rebecca Elliot of Veritek Limited in November 2020. The summary table below shows the statuses of the non-compliances and recommendations raised in the previous audit. Further comment is made in the relevant sections of this report

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
DUML audit	1.10	11(1) of Schedule 15.3	Audit not completed within three months of the new DUML load.	Cleared
All load recorded in database	2.5	11(2A) of Schedule 15.3	One additional light found in the field.	Still existing

Table of Recommendations

Subject	Section	Recommendation	Status
Location of each item of load	2.3	Record GPS co-ordinates for the 14 items of load on Queen Elizabeth Drive.	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

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.

Audit commentary

Trustpower reconciles this DUML load using the UML profile. The on and off times are derived from data logger information. Trustpower request a database extract each month. A monthly report is provided if there have been changes made to the database. If no changes have been made, then the existing data set is used. If changes are made, then Trustpower have requested that the date of the change is supplied so that submission can be calculated accordingly. No database updates have been received since submission commenced for this ICP and a copy of the database was not provided for this audit, therefore as there have been no updates made to the database, I used the database provided by NZTA for the previous audit. I have recommended in **section 3.1**, that the change management process is reviewed. I recalculated the submissions for June 2021 for the one ICP associated with the NZTA Nelson database using the data logger and database information. I confirmed that the calculation method was correct.

I found that there was a difference between the wattage applied by Trustpower and the database extract I received from NZTA as detailed below:

Wattage report light count	Database extract light count	Difference	kWh Value	Expected kWh value	June 2021 kWh difference
113	112	1	8,803.5	8,950.24	+146.69

This will be resulting in an estimated over submission of 1,760.26 kWh per annum. This is recorded as a non-compliance.

As detailed in **section 2.5**, a number of errors were found in the field audit. The full field audit found 89.4% accuracy of the database. This is outside of the allowable +/- 5% allowable threshold and will be resulting in an estimated over submission of 8,217 kWh per annum. This is recorded as non-compliance.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 29-Oct-20 To: 03-Aug-21	Variance in light volumes reported to Trustpower vs what is recorded in the database is likely to be resulting in an estimated 1,760 kWh per annum of over submission. Database is not confirmed as accurate within the +/-5% threshold. Resulting in an estimated over submission of 4,425 kWh per annum (based on 4,271 annually). Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	Overall controls are rated as moderate as they will mitigate risk most of the time, but there is room for errors to occur. The impact is assessed to be low, based on the potential kWh variances detailed above.

Actions taken to resolve the issue	Completion date	Remedial action status
To arrange a meeting to discuss the recommendations between all parties involved and to implement an action plan to resolve the concerns raised in this audit	31/10/2021	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
All parties to agree to implement the actions agreed to at the above meetings	31/10/2021	

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 is recorded for each item of load.

Audit commentary

All items of load have an ICP number recorded.

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 name, pole number, area and GPS coordinates which are populated for most items of load. 14 lamps do not have GPS co-ordinates populated. As detailed in the last audit, these were all on SH6 Queen Elizabeth Drive and therefore were able to be confirmed based on the pole numbers. I repeat the recommendation from the last audit:

Recommendation	Description	Audited party comment	Remedial action
Location of each item of load	Record GPS co-ordinates for the 14 items of load on Queen Elizabeth Drive.	[participant comment]	[auditor comment]

Audit outcome

Compliant

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

Code reference

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

Code related audit information

The DUML database must contain:

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

Audit observation

The database was checked to confirm that:

- it contained a field for light type and wattage capacity,
- wattage capacities include any ballast or gear wattage, and
- each item of load has a light type, light wattage, and gear wattage recorded.

Audit commentary

A description of each light is recorded in the make and model fields, wattages are recorded in the lamp wattage and gear wattage fields. All items of load have a lamp model and lamp wattage populated.

The accuracy of the lamp description, capacity and ballasts recorded is discussed in **section 3.1**.

The accuracy of the recorded wattages 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 the entire database on the 3rd August 2021.

Audit commentary

The field audit findings for the sample of lamps was accurate with the exception of the streets detailed in the table below. Some of these were present in the last audit so I have highlighted those that were present in the last audit:

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
241 HAVEN ROAD	1	1		1	201W LED recorded in the database but 213W LED found in the field.
MAITAI TO ROCKS ROAD CYCLEWAY - COLLINS STREET TO ROCKS ROAD	5	5		2	2 x 201W LED recorded in the database but 2 x 150 W LED found in the field. Note- this has increased to two lights from the one recorded in the last audit.
SH 6 QUEEN ELIZABETH II DRIVE	22	22		1	213W LED recorded in the database but 103W LED found in the field.
SH 6 HAVEN ROAD (SOUTHBOUND)	14	15	+1		1 additional L150 found in the field (double headed light, not single).
SH 6 WAKEFIELD QUAY	28	28		4	201W LED recorded in the database but 150W LED found in the field 2 x 150W HPS recorded in the database but 2 x 103W LED found in the field- note increased to 2 lights since last audit 150W HPS recorded in the database but 107W LED found in the field.
SH 6 ROCKS ROAD	20	19	-1	10	10 x 150W HPS recorded in the database but 107W LED found in the field 1 x 150W HPS recorded in the database no light found in field - pole has been crushed.
GRAND TOTAL	**112**	**112**	**2**	**18**	

The field audit found one additional light in the field; this was part of a double-headed light. This is recorded as non-compliance below. The accuracy of the database is detailed in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 29-Oct-20 To: 03-Aug-21	One additional light found in the field. Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate, because they are sufficient to ensure that lamp information is correctly recorded most of the time. The impact is assessed to be low as only one additional item of load was found in the field audit.

Actions taken to resolve the issue	Completion date	Remedial action status
To arrange a meeting to discuss the recommendations between all parties involved and to implement an action plan to resolve the concerns raised in this audit	31st October 2021	Investigating
Preventative actions taken to ensure no further issue will occur	**Completion date**	
All parties to agree to implement the actions agreed to at the above meetings	31st October 2021	

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 database tracks additions and removals as required by this clause. The "light install date" is used to identify the date lights are installed and the date lights are changed.

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 RAMM database has a complete audit trail of all additions and changes to the database information.

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 field audit was conducted of all 112 lights.

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

The full field audit found a number of errors as discussed in **section 2.5**. This resulted in a database accuracy of 94.6% which is not within the +/-5% accuracy threshold therefore the database is not deemed to be accurate. Some of these errors were identified in the last audit and it appears that the change management process is not working as expected. This process is discussed below. This will be resulting in an estimated over submission of 4,425 kWh per annum and is recorded as non-compliance.

Light description and capacity accuracy

As discussed in **section 2.4**:

All items of load have a lamp model and lamp wattage populated; one item of load had invalid zero gear wattage:

Lamp Model	Quantity	Recorded Gear Wattage	Expected Gear Wattage	Comment
HPS-T-150	1	0	18	Incorrect gear wattage recorded for one light.

This will be resulting in a very minor amount of under submission but too small to be worthy of recording the kWh impact.

Lamp models were compared to the expected model information, but ten lights had the incorrect lamp model recorded:

Lamp Model recorded	Expected Lamp Model	Quantity	Recorded Lamp Wattage	Comment
HPS-T-150	HPS-T-250	7	250	The wattage was confirmed to be correct in the field audit.
HPS-T-150	HPS-T-400	3	400	The wattage was confirmed to be correct in the field audit.

Change management process findings

Processes to track changes to the database were reviewed.

All fault and maintenance work is controlled by Tasman Journeys on behalf of NZTA, the information is passed to WSP who update RAMM directly. As noted above this process does not appear to be working as expected and I recommend that this process is reviewed.

Recommendation	Description	Audited party comment	Remedial action
Database accuracy	Review the change management process to ensure that updates made in the field are updated in the database in a timely manner.	To arrange a meeting to discuss the recommendations between all parties involved and to implement an action plan to resolve the concerns raised in this audit. These checks have to be robust going forward	Investigating

Quarterly Outage Patrols are completed by Tasman Journeys.

There are no private or festive lights associated with the NZTA lights.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 29-Oct-20 To: 03-Aug-21	Database is not confirmed as accurate within the +/-5% threshold. Resulting in an estimated over submission of 4,425 kWh per annum (based on 4,271 annually). Ten lights with the incorrect light description. The correct wattage is recorded so this has no impact on reconciliation. One light with the incorrect ballast recorded. The impact on submission is negligible. Potential impact: Low Actual impact: Low Audit history: Once Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as weak as changes made in the field are not being reflected in the database and I have recommended this process is reviewed. The impact is assessed to be low, based on the potential kWh variances detailed above.

Actions taken to resolve the issue	Completion date	Remedial action status
As there is only a small amount of lights, a site visit to all lights to check what's in the field and to update the DB	31 October 2021	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
To arrange a meeting to discuss the recommendations between all parties involved and to implement an action plan to resolve the concerns raised in this audit	31 October 2021	

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 all ICPs have 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 UML profile. The on and off times are derived from data logger information. Trustpower request a database extract each month. A monthly report is provided if there have been changes made to the database. If no changes have been made, then the existing data set is used. If changes are made, then Trustpower have requested that the date of the change is supplied so that submission can be calculated accordingly. No database updates have been received since submission commenced for this ICP and a copy of the database was not provided for this audit, therefore as there have been no updates made to the database, I used the database provided for the previous audit. I have recommended in **section 3.1**, that the change management process is reviewed. I recalculated the submissions for June 2021 for the one ICP associated with the NZTA Nelson database using the data logger and database information. I confirmed that the calculation method was correct.

I found that there was a difference between the wattage applied by Trustpower and the database extract I received from NZTA as detailed below:

Wattage report light count	Database extract light count	Difference	kWh Value	Expected kWh value	June 2021 kWh difference
113	112	1	8,803.5	8,950.24	146.69+

This will be resulting in an estimated over submission of 1,760.26 kWh per annum. This is recorded as a non-compliance.

As detailed in **section 2.5**, a number of errors were found in the field audit. The full field audit found 89.4% accuracy of the database. This is outside of the allowable +/- 5 % allowable threshold and will be resulting in an estimated over submission of 4,425 kWh per annum. This is recorded as non-compliance.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 29-Oct-20 To: 03-Aug-21	Variance in light volumes reported to Trustpower vs what is recorded in the database is likely to be resulting in an estimated 1,760 kWh per annum of over submission. Database is not confirmed as accurate within the +/-5% threshold. Resulting in an estimated over submission of 4,425 kWh per annum (based on 4,271 annually). Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	Overall controls are rated as moderate as they will mitigate risk most of the time, but there is room for errors to occur. The impact is assessed to be low, based on the potential kWh variances detailed above.

Actions taken to resolve the issue	Completion date	Remedial action status
To check wattage of each fitting against DB from a site visit	31/10/2021	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
To arrange a meeting to discuss the recommendations between all parties involved and to implement an action plan to resolve the concerns raised in this audit	31/10/2021	

CONCLUSION

Trustpower reconciles this DUML load using the UML profile. The on and off times are derived from data logger information. Trustpower request a database extract each month. A monthly report is provided if there have been changes made to the database. If no changes have been made, then the existing data set is used.

A full field audit was undertaken which found a number of variances resulting in the database being 89.4% of the recorded wattage. This is not within the +/-5% accuracy threshold therefore the database is not considered accurate. No updates to the database have been received by Trustpower since this ICP commenced trading as no changes have been made to the database. I recommend in **section 3.1**, that the change management process is reviewed to ensure updates made in the field are updated in the database and sent to Trustpower in a timely manner.

This audit found four non-compliances and two recommendations are made. The future risk rating of nine indicates that the next audit be completed in 12 months. I have considered this in conjunction with Trustpower's comments and agree with this recommendation.

PARTICIPANT RESPONSE

From when we first set up the new ICP to cover these lights, NZTA has introduced another layer (WPS) of accountability into the process. In arranging a meeting of all parties to go through the findings in this audit, we will be able to define what each party is responsible for and who will supply Trustpower with the up to date monthly report with any changes that might have occurred.

As this audit is only covering 112 lights, there should be minimal problems, thus getting systems in place should not be problematic.

When we achieve this, the small amount of lights involved will then mean this audit should become very accurate, predictable and manageable.