

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

For

**WAKA KOTAHI WAIKATO
AND
GENESIS ENERGY
NZBN: 9429037706609**

Prepared by: Steve Woods

Date audit commenced: 20 November 2023

Date audit report completed: 3 January 2024

Audit report due date: 3 September 2023

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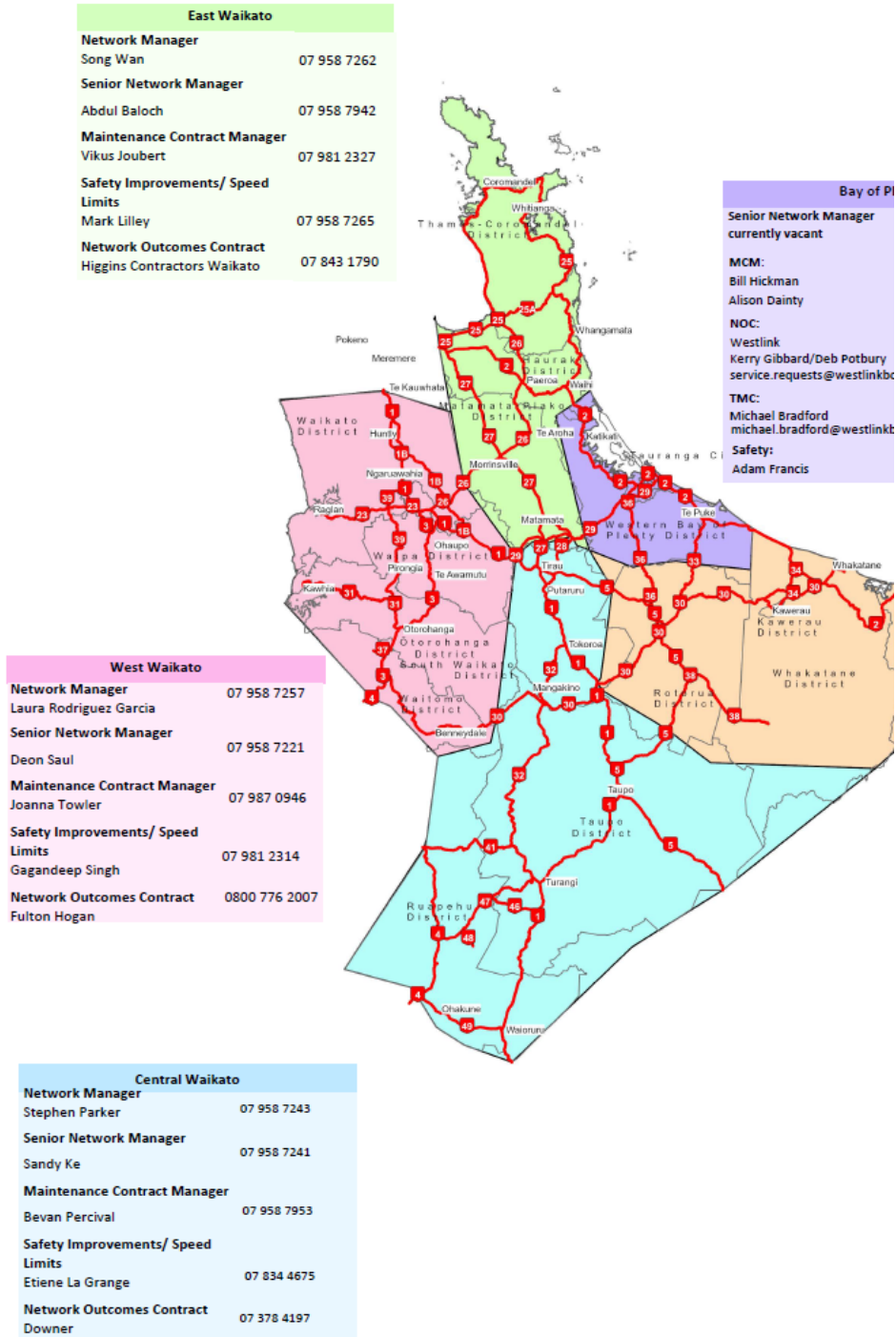
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EXECUTIVE SUMMARY

This audit of the **Waka Kotahi Waikato (NZTA)** DUML database and processes was conducted at the request of **Genesis Energy Limited (Genesis)** 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 area covered by this audit includes the green, pink and blue areas detailed in the Waka Kotahi provided map below:



The ICPs associated with this audit are detailed in **section 1.6**.

Waka Kotahi has rationalised the ICPs to ensure each NSP has one ICP. Duplicate lights have been removed and submission is based on the database. Now that the database structure is correct, there is an opportunity to improve the accuracy of the data within the database, because the field audit identified 103 errors out of 490 in the sample, which is a 21% error rate. I recommend a full audit of the database using “as built” plans and field audits where plans are not available. I’ve also recommended the database updating processes are reviewed and improved.

Genesis disputes the finding that the database is inaccurate and believes all of my field findings are incorrect, despite NZTA agreeing with the findings and correcting the database accordingly. I have therefore added an appendix showing four typical examples of database errors, where I’ve inserted photos to prove the audit findings are correct. It appears Genesis has decided not to adopt my recommendations, based on their incorrect conclusion that the database is accurate.

The two main findings of the audit are as follows:

1. The database accuracy is 93.6%, resulting in over submission of 235,300 kWh per annum.
2. ICP 1000613268PCC4A is still at the ready status and has been since March 2023. Submission is not occurring, therefore under submission has occurred by 12,000 kWh per month since March 2023.

The audit found four non-compliances and makes three recommendations. The future risk rating of 19 indicates that the next audit be completed in three months. I have considered this in conjunction with the fact that Genesis does not accept the audit findings and therefore does not intend to make the required improvements to the data and associated processes, and I recommend the next audit is conducted in three months in accordance with the future risk rating table.

The matters raised are detailed below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Distributed unmetered load audits	1.10	16A.26 and 17.295F	Audit not conducted within the required timeframe.	Strong	Low	1	Cleared
Deriving submission information	2.1	11(1) of Schedule 15.3	<p>Submission is not occurring for ICP 1000613268PCC4A, therefore under submission has occurred by 12,000 kWh per month since March 2023.</p> <p>Data loggers used across more than one network resulting in the incorrect burn hours being applied.</p> <p>Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 235,300 kWh per annum.</p> <p>One invalid light type.</p> <p>Four items of load with the incorrect ballast applied.</p>	Moderate	High	6	Investigating
Database accuracy	3.1	15.2 and 15.37B(b)	<p>Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 235,300 kWh per annum.</p> <p>One invalid light type.</p> <p>Four items of load with the incorrect ballast applied.</p>	Moderate	High	6	Disputed
Volume information accuracy	3.2	15.2 and 15.37B(c)	Submission is not occurring for ICP 1000613268PCC4A, therefore under submission has occurred	Moderate	High	6	Investigating

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			<p>by 12,000 kWh per month since March 2023.</p> <p>Data loggers used across more than one network resulting in the incorrect burn hours being applied.</p> <p>Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 235,300 kWh per annum.</p> <p>One invalid light type.</p> <p>Four items of load with the incorrect ballast applied.</p>				
Future Risk Rating						19	

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

RECOMMENDATIONS

Subject	Section	Description
Database Accuracy	3.1	Conduct a full audit of the database using “as built” plans and field audits to improve accuracy.
		Review quality control processes to ensure database updates are accurate.
		Genesis to liaise with relevant networks for Waka Kotahi new connections.

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

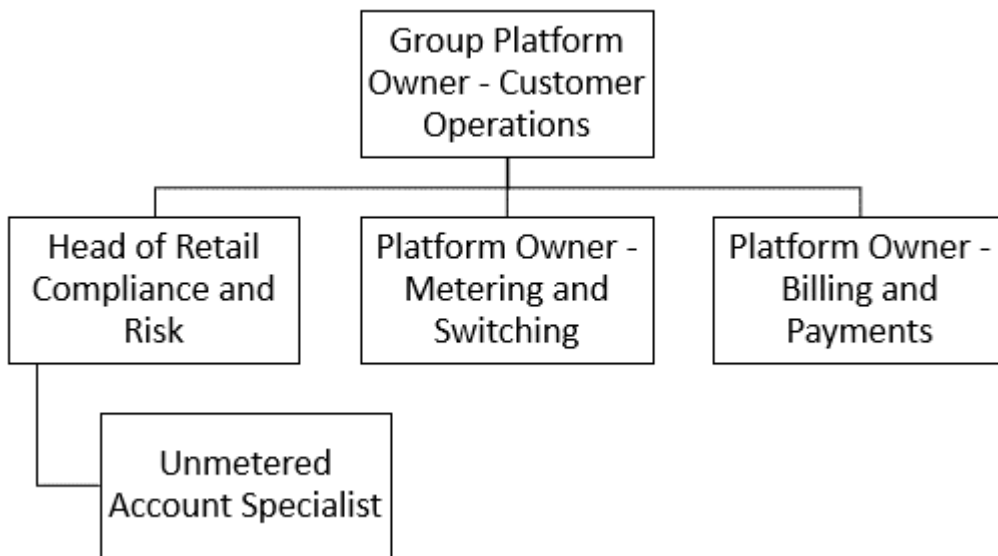
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

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

1.2. Structure of Organisation

Genesis provided the relevant organisational structure:



1.3. Persons involved in this audit

Auditors:

Name	Company	Title
Steve Woods	Veritek Limited	Lead Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Alysha Majury	Unmetered Account Specialist	Genesis Energy
Kara Atkinson	Director	NZ Streetlighting

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 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

The Genesis Waka Kotahi Waikato DUML database contains the following unmetered ICPs.

ICP Number	NSP	Profile	Number of items of load	Database wattage (watts)	Comment
0000011095WE94E	HAM0331	NST	907	168,998	
0000022579WE623	HLY0331	NST	314	51,629	
0000036247WE323	TWH0331	NST	852	165,184	
0000036463HR791	ROT0111	NST	16	3,568	
0000053741WE2D1	HAM0111	NST	17	2,783	
0000381313TUB52	WRK0331	NST	12	2,074	
0000400344WA399	TMU0111	NST	341	53,942	
0000557929UNE2C	HIN0331	NST	259	38,541	
0000806950WA53A	CBG0111	NST	188	30,249	
0000890166TU7C3	WRK0331	NST	23	3,776	
0001111171WM17A	ONG0331	CST	19	2,792	
0001111173WM1FF	NPK0331	CST	22	3,831	
0001111175WM070	OKN0111	CST	54	9,158	
0001425637UN339	KPU0661	NST	502	84,169	
0001425638UNCE7	WKO0331	NST	366	54,545	
0008806768WM373	HTI0331	NST	318	49,398	
0008809657WMB31	TKU0331	CST	2	336	
0088051901WM4EB	TKU0331	CST	58	9,744	
1000522354PCD90	PAO1101	UNM	170	26,529	UNM profile, should be NST

ICP Number	NSP	Profile	Number of items of load	Database wattage (watts)	Comment
1000608049PC05C	KIN0331	NST	146	26,770	
1000613268PCC4A	ARI1102		152	33,038	Still at Ready status. Submission not occurring
1000614310PC667	WHU0331	NST	189	29,835	
1000614311PCA22	MTR0331	CST	44	6,564	
1000614328PC38B	OKN0111	CST	2	166	
TOTAL			4,973	857,616	

All items of load are now assigned to the correct ICPs. The database has metered ICPs as well, but this audit is only concerned with unmetered ICPs. Several ICPs have been created and some have been decommissioned.

ICP 1000522354PCD90 has the UNM profile in the registry, which will be changed to NST.

ICP 1000613268PCC4A is still at the ready status but has items of load against it. Submission is not yet occurring.

1.7. Authorisation Received

All information was provided directly by Genesis and Waka Kotahi.

1.8. Scope of Audit

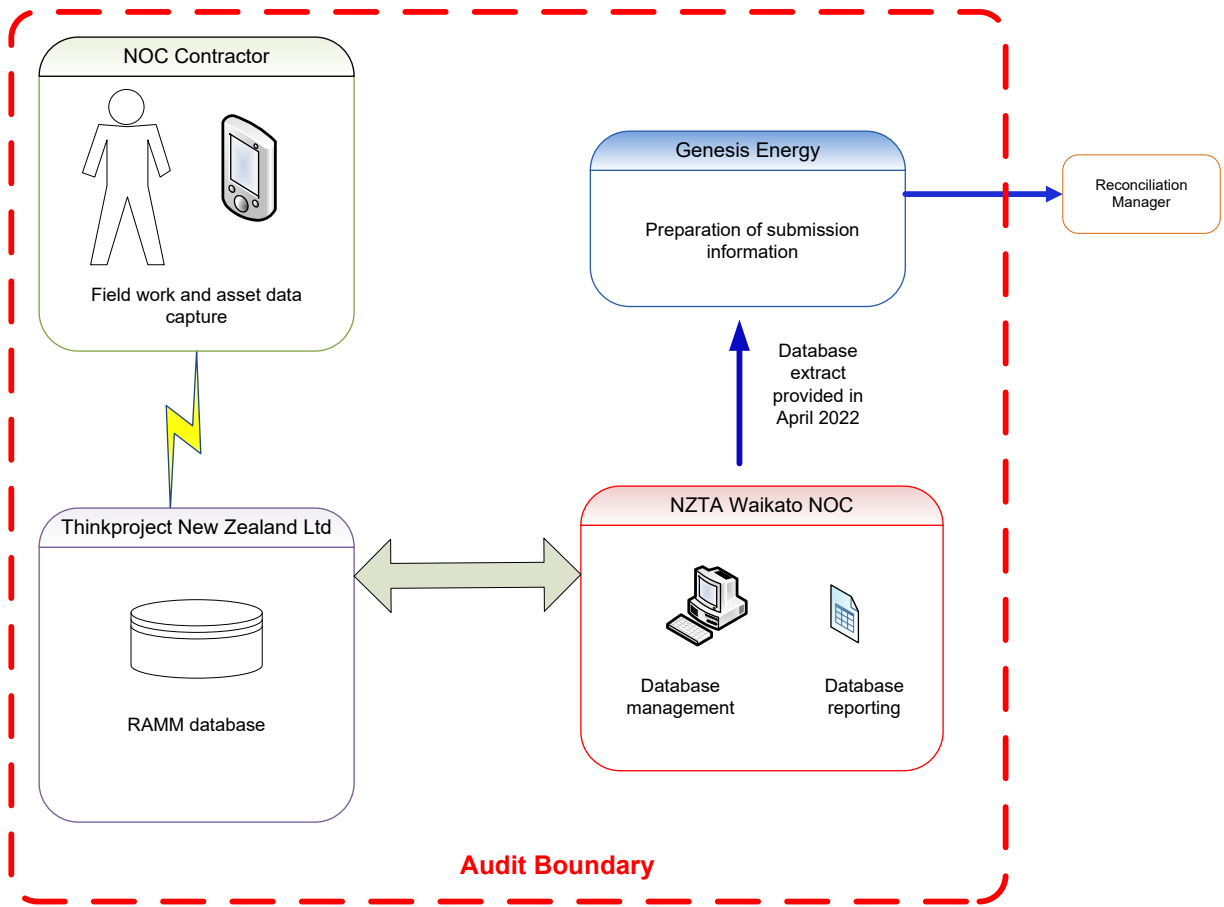
This audit of the Waka Kotahi Waikato (Waka Kotahi) DUML database and processes was conducted at the request of Genesis Energy Limited (Genesis) in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have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

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

Monthly reporting is provided to Genesis, which is used for billing and submission.

Contractors are assigned on an area basis but the processes to manage change in the database as are the same. The contractors for each area are detailed in the Waka Kotahi diagram in the Executive Summary.

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



A field audit was undertaken of a statistical sample of 490 items of load in the month of November 2023.

1.9. Summary of previous audit

The last audit report undertaken by Steve Woods of Veritek Limited in November 2022 was reviewed. The status of those audit findings is detailed below:

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	Submission values did not align for the month of October 2022 due to the registry figures being used. This will have resulted in an estimated under submission of 152,365.64 kWh.	Cleared
			Data loggers used across more than one network resulting in the incorrect burn hours being applied.	Still existing
			Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 1,456,700 kWh per annum.	Still existing
			256 items of load with zero wattage recorded potentially resulting in an estimated under submission of 183,687 kWh p.a.	Cleared
			Five 250W HPS light recorded with an incorrect wattage recorded resulting in an estimated under submission of 3,396 kWh p.a.	Cleared
			78 items of load with the incorrect ballast applied resulting in a very minor estimated under submission of 234 kWh p.a.	Still existing for a smaller number
			98 items of load missing from ICP 0001111171WM17A resulting in an estimated monthly under submission of 6,157 kWh per month since 1 September 2022.	Cleared
ICP Identifier	2.2	11(2)(a) & (aa) of Schedule 15.3	20 items of load with no ICP recorded potentially resulting in an estimated under submission of 14,350 kWh p.a.	Cleared
Location of each item of load	2.3	11(2)(b) of Schedule 15.3	544 items of load (7.7%) of the 7,016 total items of load have no GPS coordinates or location number populated and are not locatable.	Cleared
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	256 items of load with zero wattage recorded potentially resulting in an estimated under submission of 183,687 kWh p.a.	Cleared

Subject	Section	Clause	Non-compliance	Status
All load recorded in database	2.5	11(2A) of Schedule 15.3	23 additional items of load found in the field of a sample of 389 (6% error rate).	Cleared
Database accuracy	3.1	15.2 and 15.37B(b)	<p>Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 1,456,700 kWh per annum.</p> <p>256 items of load with zero wattage recorded potentially resulting in an estimated under submission of 183,687 kWh p.a.</p> <p>Five 250W HPS light recorded with an incorrect wattage recorded resulting in an estimated under submission of 3,396 kWh p.a.</p> <p>78 items of load with the incorrect ballast applied resulting in a very minor estimated under submission of 234 kWh p.a.</p> <p>98 items of load missing from ICP 0001111171WM17A resulting in an estimated monthly under submission of 6,157 kWh per month since 1 September 2022.</p>	<p>Still existing</p> <p>Cleared</p> <p>Cleared</p> <p>Still existing for a smaller number</p> <p>Cleared</p>
Volume information accuracy	3.2	15.2 and 15.37B(c)	<p>Submission values did not align for the month of October 2022 due to the registry figures being used. This will have resulted in an estimated under submission of 152,365.64 kWh.</p> <p>Data loggers used across more than one network resulting in the incorrect burn hours being applied.</p> <p>Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 1,456,700 kWh per annum.</p> <p>256 items of load with zero wattage recorded potentially resulting in an estimated under submission of 183,687 kWh p.a.</p> <p>Five 250W HPS light recorded with an incorrect wattage recorded resulting in an estimated under submission of 3,396 kWh p.a.</p> <p>78 items of load with the incorrect ballast applied resulting in a very minor estimated under submission of 234 kWh p.a.</p> <p>98 items of load missing from ICP 0001111171WM17A resulting in an estimated monthly under submission of 6,157 kWh per month since 1 September 2022.</p>	<p>Cleared</p> <p>Still existing</p> <p>Still existing</p> <p>Cleared</p> <p>Cleared</p> <p>Still existing for a smaller number</p> <p>Cleared</p>

Table of Recommendations

Subject	Section	Recommendation for Improvement	Status
ICP Identifier	2.2	Record "SOLAR" for all solar supplied items of load.	Cleared
Database Accuracy	3.1	Confirm correct light type for the ten items of load with an invalid description.	Cleared
		Review quality control processes.	Repeated
		Genesis to liaise with relevant networks for Waka Kotahi new connections.	Repeated

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

Genesis have requested Veritek to undertake this streetlight audit.

Audit commentary

This audit report was due to be finalised by September 3rd 2023, but the database was not provided until November 15th 2023 because improvements to the database were still underway.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 1.10 With: Clause 16A.26 and 17.295F From: 03-Sep-23 To: 30-Nov-23	Audit not conducted within the required timeframe. Potential impact: Medium 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 because the delay in the audit was for appropriate reasons, which were to update the database as much as possible before the audit. The audited database was more accurate in November than it would have been in September, therefore there is no impact of the delay.		
Actions taken to resolve the issue		Completion date	Remedial action status
Decision was made to wait for more accurate data that was provided on 15/11/2023		15/11/2023	Cleared
Preventative actions taken to ensure no further issues will occur		Completion date	
Decision was made to wait for more accurate data that was provided on 15/11/2023		15/11/2023	

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

Genesis reconciles this DUML load using the CST and NST profiles as indicated in **section 1.6** above. Waka Kotahi is working to bring the RAMM database up to date. Genesis have created a database to manage this DUML load until the RAMM database can be used for submission.

I reviewed the submission for the month of October 2023 and found that the values matched for all ICPs except 1000613268PCC4A, which is still at the ready status and has been since March 2023. Submission is not occurring, therefore under submission has occurred by 12,000 kWh per month since March 2023.

As reported in the last audit, the data loggers used to calculate the burn hours are from the incorrect network are being used as the burn hours will be different between networks:

ICP Number	NSP	Logger No.	Network
0000011095WE94E	HAM0331	206558444	WEL
0000022579WE623	HLY0331	206558444	WEL
0000036247WE323	TWH0331	206558444	WEL
0000557929UNE2C	HIN0331	206558444	Powerco
0000053741WE2D1	HAM0111	206558444	WEL
0000036463HR791	ROT0111	205034818	Unison
1000608049PC05C	KIN0331	205034818	Powerco
1000613268PCC4A	ARI1102	205034818	Powerco
0000381313TUB52	WRK0331	206558603	Unison
0000890166TU7C3	WRK0331	206558603	Unison
0001425638UNCE7	WKO0331	206558603	Powerco

As discussed in **section 3.1**:

- The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 235,300 kWh per annum.

- There is one invalid light type.
- Four items of load have the incorrect ballast applied.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Dec-22 To: 30-Nov-23	Submission is not occurring for ICP 1000613268PCC4A, therefore under submission has occurred by 12,000 kWh per month since March 2023. Data loggers used across more than one network resulting in the incorrect burn hours being applied. Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 235,300 kWh per annum. One invalid light type. Four items of load with the incorrect ballast applied. Potential impact: High Actual impact: High Audit history: Multiple times previously Controls: Moderate Breach risk rating: 6		
Audit risk rating	Rationale for audit risk rating		
High	The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement. The impact is assessed to be high due to the estimated kWh impact.		
Actions taken to resolve the issue		Completion date	Remedial action status
The status for 1000613268PCC4A has been updated to Active to allow Genesis to submit on. Genesis has identified which ICP's have been impacted with incorrect loggers causing incorrect burn hours. Genesis is working with EMS and our customer to resubmit on the correct data.		30/01/2024	Investigating
Preventative actions taken to ensure no further issues will occur		Completion date	
The status for 1000613268PCC4A has been updated to Active to allow Genesis to submit on. Genesis has identified which ICP's have been impacted with incorrect loggers causing incorrect burn hours. Genesis is working with EMS and our customer to resubmit on the correct data.		30/01/2024	

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 DUMML database must contain:

- *each ICP identifier for which the retailer is responsible for the DUMML*
- *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 extract provided had an ICP recorded for all items of load apart from eight where the lights are solar powered.

The accuracy of the ICP allocation to the items of load is discussed in **section 3.1**.

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 DUMML database must contain the location of each DUMML item.

Audit observation

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

Audit commentary

The database contains fields for the road name, location number, and GPS coordinates. Two items of load have no GPS coordinates, but they do have a location number populated and are locatable.

Audit outcome

Compliant

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

Code reference

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

Code related audit information

The DUMML database must contain:

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

Audit observation

The database was checked to confirm that:

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

Audit commentary

The database contains fields for lamp make model description, lamp wattage and gear wattage.

The previous audit found that 256 items of load had zero wattage recorded. 254 of these had no or “unknown” lamp details. This matter is now resolved. All items of load have a wattage and description.

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

A field audit was undertaken of a statistical sample of 490 items of load in the month of November 2023.

Audit commentary

The table below shows a summary of findings.

Finding	Quantity
Lights missing from the database	0
Lights missing from the field	7
Incorrect wattage in database	96

There were no additional lights identified in the field. The main discrepancy is incorrect wattages, which is discussed in Section 3.1.

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 DUMML 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 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 DUMML 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 contains a compliant 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

A field audit was undertaken of 490 items of load. I assessed the accuracy of this by using the DUML Statistical Sampling Guideline. The table below shows the survey plan.

Plan Item	Comments
Area of interest	Waka Kotahi Waikato
Strata	The Waka Kotahi RAMM database covers the Waikato area. The management of the Waka Kotahi items of load are the same, but I decided to place the items of load into three similarly sized strata by network as follows: <ol style="list-style-type: none"> 1. Strata 1 – HAWK, LINE and WAIP, 2. Strata 2 – POCO, and 3. Strata 3 – WAIK.
Area units	I created a pivot table of the area units, and I used a random number generator in a spreadsheet to select a total of 32 sub-units or 10% of the database.
Total items of load	490 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 389 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	93.6%	Wattage from survey is lower than the database wattage by 6.4%
R _L	87.9%	With a 95% level of confidence, it can be concluded that the error could be between -12.1% and -1.7%
R _H	98.3%	

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 there is statistically significant evidence to support the finding that the database accuracy is outside the +/- 5% threshold.

In absolute terms the installed capacity is estimated to be 55 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 14 kW to 104 kW lower than the database.

In absolute terms, total annual consumption is estimated to be 235,300 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 61,200 kWh p.a. to 444,700 kWh pa. lower than the database indicates.

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

The field audit identified some wattages were correct in the “as built” plans for newly built roads, but incorrect in the database. Other discrepancies were due to incorrect database updates following replacements and there were also some historical errors. I recommend a full audit is conducted, where the recent “as built” plans are compared to the database, and where these plans are not available, a field audit is conducted. Whilst this is a large and costly exercise, there will be savings in energy costs, where currently Waka Kotahi is paying for 235,300 kWh per annum and there will also be audit cost savings because audits will be less frequent if the database is more accurate.

Description	Recommendation	Audited party comment	Remedial action
Database accuracy	Conduct a full audit of the database using “as built” plans and field audits to improve accuracy.	Genesis will continue to work with our customer to ensure information on light wattages are correctly managed, however, robust processes are in place and Genesis and our customer believe that correct wattages are recorded against these assets that were found to be non-compliant	Not adopted

Lamp description and capacity accuracy

The previous audit found that 256 items of load had zero wattage recorded. 254 of these had no or “unknown” lamp details. This matter is now resolved. All items of load have a wattage and description.

Examination of the database found one invalid lamp type:

Lamp Description	No of items of load
180w High Pressure Sodium	1
TOTAL	1

The ballast accuracy was checked and found four incorrect ballasts applied. One 80 watt HPS has 10 watts instead of 17 watts. Three 100 watt HPS have 12 watts instead of 14 watts.

The check of LED wattages found that lamp descriptions were sufficient to confirm the correct wattage.

ICP Accuracy

There has been a rationalisation of ICP identifiers. All NSPs now have an ICP, and no discrepancies were identified.

Waka Kotahi and local Council Waka Kotahi lighting loads

The last audit reported duplicate submission was occurring as both the local council and Waka Kotahi were submitting for the same streetlights. This matter is resolved.

The previous audit recorded that the Waka Kotahi ICPs associated with the RDC database had switched to Genesis from 1 September 2022. Not all the items of load for ICP 0001111171WM17A were recorded in the Genesis database. The RDC database recorded 118 items of load, but the Genesis database had 20 items of load. This matter is now resolved, the other items of load are in the Waka Kotahi Lower North Island database.

Change management process findings

Waka Kotahi requires the NOC to maintain the RAMM database as part of their contract for maintenance carried out on the network. Contractors use pocket RAMM to track changes. Claims are submitted by the 28th of each month for all work carried out for the month prior. Install dates are being used by contractors when tracking changes in RAMM. Reporting of this activity is in development but is expected to provide Genesis with a monthly wattage report that tracks changes at a daily level.

The NOC contractor is required to have an internal quality control process to ensure that updates are accurate. The last audit field audit findings indicated that this process is not working as expected and I

recommended that this was reviewed. This is still in progress, so I have repeated the recommendation to maintain visibility.

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	Review quality control processes to ensure database updates are accurate.	NZTA are aware of the auditor's findings. Genesis relies on NZTA to accurately maintain its database. Genesis continues to work with NZTA to provide accurate data.	Unknown

As detailed in the last audit, the new connection process is managed on a project basis. Much like new Council lights, Waka Kotahi only accepts the assets at the end of project and the contractor controls the living of new lights with the relevant networks. This will be resulting in lights being on and burning before they are being reconciled. I recommend that Genesis work with the relevant networks to ensure there are robust processes in place to ensure new connections are reconciled from the time they are electrically connected.

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	Genesis to liaise with relevant networks for Waka Kotahi new connections.	Genesis relies on distributors processes when energizing a new connection as there is limited or no communication in some cases to the retailer.	Unknown

Outage patrols are undertaken on a three-monthly basis.

There are no private or festive lights connected to the Waka Kotahi load.

Audit outcome

Non-compliant

Non-compliance	Description		
<p>Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b)</p> <p>From: 01-Dec-22 To: 30-Nov-23</p>	<p>Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 235,300 kWh per annum.</p> <p>One invalid light type.</p> <p>Four items of load with the incorrect ballast applied.</p> <p>Potential impact: High Actual impact: High</p> <p>Audit history: Multiple times previously</p> <p>Controls: Moderate</p> <p>Breach risk rating: 6</p>		
Audit risk rating	Rationale for audit risk rating		
<p>High</p>	<p>The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement.</p> <p>The impact is assessed to be high due to the estimated kWh impact.</p>		
Actions taken to resolve the issue		Completion date	Remedial action status
<p>Genesis will continue to work with our customer to ensure information on light wattages are correctly managed, however, robust processes are in place and Genesis and our customer believe that correct wattages are recorded against these assets that were found to be non-compliant.</p>		<p>N/A</p>	<p>Disputed</p>
Preventative actions taken to ensure no further issues will occur		Completion date	
<p>Genesis will continue to work with our customer to ensure information on light wattages are correctly managed, however, robust processes are in place and Genesis and our customer believe that correct wattages are recorded against these assets that were found to be non-compliant.</p>		<p>N/A</p>	

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

Genesis reconciles this DUML load using the CST and NST profiles as indicated in **section 1.6** above. Waka Kotahi is working to bring the RAMM database up to date. Genesis have created a database to manage this DUML load until the RAMM database can be used for submission.

I reviewed the submission for the month of October 2023 and found that the values matched for all ICPs except 1000613268PCC4A, which is still at the ready status and has been since March 2023. Submission is not occurring, therefore under submission has occurred by 12,000 kWh per month since March 2023.

As reported in the last audit, the data loggers used to calculate the burn hours are from the incorrect network are being used as the burn hours will be different between networks:

ICP Number	NSP	Logger No.	Network
0000011095WE94E	HAM0331	206558444	WEL
0000022579WE623	HLY0331	206558444	WEL
0000036247WE323	TWH0331	206558444	WEL
0000557929UNE2C	HIN0331	206558444	Powerco
0000053741WE2D1	HAM0111	206558444	WEL
0000036463HR791	ROT0111	205034818	Unison
1000608049PC05C	KIN0331	205034818	Powerco
1000613268PCC4A	ARI1102	205034818	Powerco
0000381313TUB52	WRK0331	206558603	Unison
0000890166TU7C3	WRK0331	206558603	Unison
0001425638UNCE7	WKO0331	206558603	Powerco

As discussed in **section 3.1**:

- The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 235,300 kWh per annum.
- There is one invalid light type.
- Four items of load have the incorrect ballast applied.

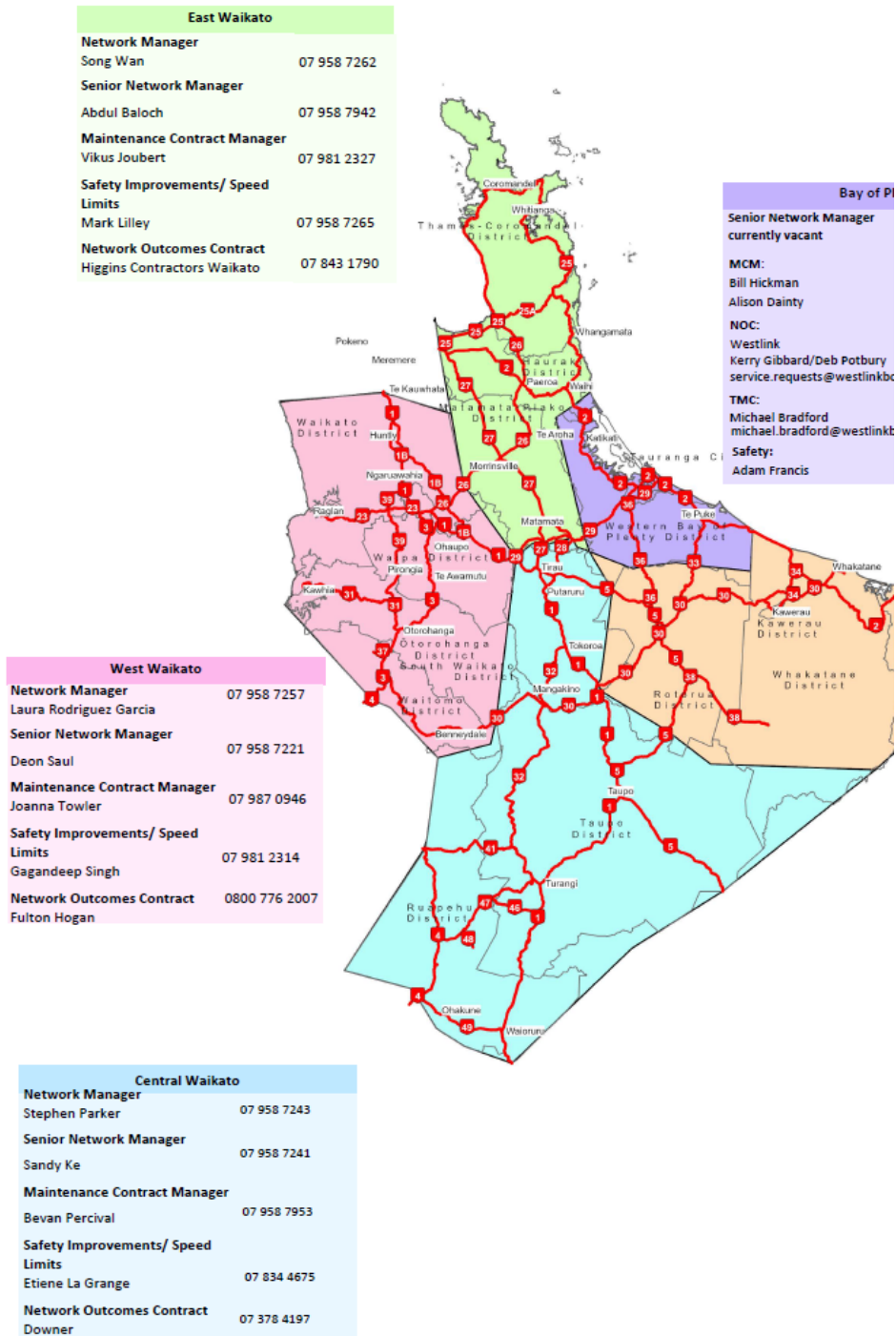
Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 01-Dec-22 To: 30-Nov-23	Submission is not occurring for ICP 1000613268PCC4A, therefore under submission has occurred by 12,000 kWh per month since March 2023. Data loggers used across more than one network resulting in the incorrect burn hours being applied. Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 235,300 kWh per annum. One invalid light type. Four items of load with the incorrect ballast applied. Potential impact: High Actual impact: High Audit history: Multiple times previously Controls: Moderate Breach risk rating: 6		
Audit risk rating	Rationale for audit risk rating		
High	The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement. The impact is assessed to be high due to the estimated kWh impact.		
Actions taken to resolve the issue		Completion date	Remedial action status
The status for 1000613268PCC4A has been updated to Active to allow Genesis to submit on. Genesis has identified which ICP's have been impacted with incorrect loggers causing incorrect burn hours. Genesis is working with EMS and our customer to resubmit on the correct data.		30/01/2024	Investigating
Preventative actions taken to ensure no further issues will occur		Completion date	
The status for 1000613268PCC4A has been updated to Active to allow Genesis to submit on. Genesis has identified which ICP's have been impacted with incorrect loggers causing incorrect burn hours. Genesis is working with EMS and our customer to resubmit on the correct data.		30/01/2024	

CONCLUSION

The area covered by this audit includes the green, pink and blue areas detailed in the Waka Kotahi provided map below:



The ICPs associated with this audit are detailed in **section 1.6**.

Waka Kotahi has rationalised the ICPs to ensure each NSP has one ICP. Duplicate lights have been removed and submission is based on the database. Now that the database structure is correct, there is an opportunity to improve the accuracy of the data within the database, because the field audit identified 103 errors out of 490 in the sample, which is a 21% error rate. I recommend a full audit of the database

using “as built” plans and field audits where plans are not available. I’ve also recommended the database updating processes are reviewed and improved.

The two main findings of the audit are as follows:

1. The database accuracy is 93.6%, resulting in over submission of 235,300 kWh per annum.
2. ICP 1000613268PCC4A is still at the ready status and has been since March 2023. Submission is not occurring, therefore under submission has occurred by 12,000 kWh per month since March 2023.

The audit found four non-compliances and makes three recommendations. The future risk rating of 19 indicates that the next audit be completed in three months. I have considered this in conjunction with the fact that Genesis does not accept the audit findings and therefore does not intend to make the required improvements to the data and associated processes, and I recommend the next audit is conducted in three months in accordance with the future risk rating table.

PARTICIPANT RESPONSE

Genesis has updated status for ICP 1000613268PCC4A to allow submissions.

Genesis has identified the ICP's impacted by incorrect loggers and are currently amending our past 14-month submissions. The loggers have been updated for future submissions.

Genesis will continue to work with our customer to ensure information on light wattages are correctly managed, however, robust processes are in place and Genesis and our customer believe that correct wattages are recorded against these assets that were found to be non-compliant.

APPENDIX

Example 1

Light ID	Database wattage	Field wattage	Evidence
6500	80 watt LED	42 watt LED	The image below shows a sticker on the light with L42A, confirming the field finding of 42 watts not 80 watts. NZTA's comment is: "changed to 42w per sticker."



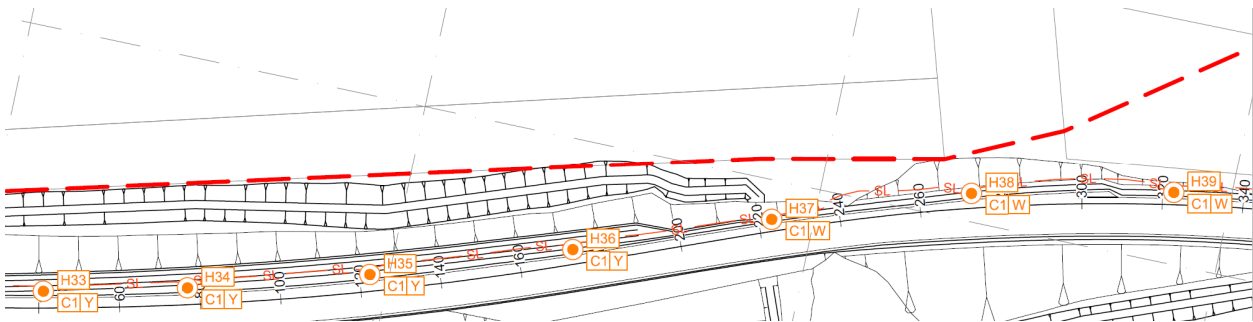
Example 2

Light ID	Database wattage	Field wattage	Evidence
6501	150 watt HPS	60.5 watt LED	The image below clearly shows this is an LED not a 150 watt HPS. I saw the sticker showing 60.5 watts. NZTA's comment is: "agree - updated to 60.5w."



Example 3

Pole No	Database wattage	Field wattage	Evidence
H33 to H39	ITALO 2 STW 4.5-8M 152W	AEC Italo 2 SV 4.5 5M 75W	<p>The first image below is from an “as built” plan supplied by NZTA, dated 03/03/2020. The top “box” shows the pole numbers of H33 to H39. Below there is a box with “C1”. C1 corresponds to the next image which is from the legend in the “as built” plan, and shows the wattage as 75 not 152.</p> <p>The field audit identified that this was a 5 module LED. In the description “5M” means 5 module. The database had it recorded as an 8 module (8M), and whilst the number of modules cannot necessarily determine wattage, it can alert to database errors. In this case NZTA confirmed the lamp type of “AEC Italo 2 SV 4.5 5M 75W”, which was further confirmed by the “as built” plan. The third and fourth images are of 5 module and 8 module lights.</p>



C1 SUPPLY AND INSTALL A GROUND PLANTED OCTAGONAL GALVANISED STEEL COLUMN WITH A 2M OUTREACH ARM (REFER TO SPECIFIC NOTES 'G' AND 'H' ON DRAWING DG-R-4301) COMPLETE WITH AN AEC ITALO 2 SV 4.5 5M 75W LED LUMINAIRE (8090 LUMENS). THE LUMINAIRE SHALL BE MOUNTED AT A HEIGHT OF 10M AND BE TILTED AT AN ANGLE OF 0° TO THE HORIZONTAL.

The field audit identified this as a 5 module LED not an 8 module LED.



The image below shows an 8 module lamp, which is clearly different to the 5 module lamp shown above.



Example 4

Pole No	Database wattage	Field wattage	Evidence
67103	ITALO 1-- Veh 146W	150 watt HPS	The image below shows this lamp is not an LED, it is a 150 watt high pressure sodium. NZTA's comment is: "changed to sodium 150w."

