# ELECTRICITY INDUSTRY PARTICIPATION CODE
# DISTRIBUTED UNMETERED LOAD AUDIT REPORT

For

## QUEENSTOWN LAKES DISTRICT COUNCIL AND GENESIS ENERGY

## NZBN: 9429037706609

Prepared by: Rebecca Elliot

Date audit commenced: 30 November 2021

Date audit report completed: 24 February 2022

Audit report due date: 01-Mar-22

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## EXECUTIVE SUMMARY

This audit of the **Queenstown Lakes District Council (QLDC)** streetlight 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 database is remotely hosted by thinkproject New Zealand Limited. QLDC provide a monthly report to Genesis of this database. Wattages are derived from a RAMM database extract. On and off times are derived from a data logger.

QLDC's contractor for streetlight installation and maintenance is McKay Electrical.

Examination of submission for November 2021, identified a kW variance between the database extract provided for the audit and the kW value used by Genesis for submission. This could be resulting in an estimated over submission of 33,228 kWh per annum and I recommend this is investigated.

The field audit was undertaken of a statistical sample of 316 items of load in Invercargill on the 26th and 27th January 2022. This found that the database is not within the allowable +/-5% accuracy threshold and over submission is likely to be occurring as a result:

- in absolute terms the installed capacity is estimated to be 4 kW higher than the database indicates,
- there is a 95% level of confidence that the installed capacity is between 4 kW lower to 22 kW higher than the database,
- in absolute terms, total annual consumption is estimated to be 18,600 kWh higher than the DUML database indicates, and
- there is a 95% level of confidence that the annual consumption is between 16,800 kWh lower to 94,800 kWh higher p.a. higher than the database indicates.

The audit found four non-compliances, makes one new recommendation and repeats one recommendation. The future risk rating of 18 indicates that the next audit be completed in six months I have considered this in conjunction with Genesis's responses and recommend that the next audit be in six months from the audit due date.

The late submission of the audit report is not recorded as a non-compliance as the draft audit report was provided prior to the due date and the delay has been due to the responses being late in being received.

The matters raised are detailed below:

## AUDIT SUMMARY

### NON-COMPLIANCES

| Subject | Section | Clause | Non-Compliance | Controls | Audit Risk Rating | Breach Risk Rating | Remedial Action |
|---|---|---|---|---|---|---|---|
| Deriving submission information | 2.1 | 11(1) of Schedule 15.3 | Variance between database extract and volume submitted for ICP 0000027637CE36B of 2,769 kWh for the month of November 2021. Estimated annual impact on submission of 33,228 kWh over submission.<br><br>Database is not confirmed as accurate with a 95% level of confidence. In absolute terms, total annual consumption is estimated to be 18,600 kWh higher than the DUML database indicates as recorded in **section 3.**1 | Moderate | High | 6 | Identified |
| All load recorded in database | 2.5 | 11(2A) and (d) of Schedule 15.3 | Six additional items of load found in the field of 316 items of load sampled. | Moderate | Low | 2 | Identified |

| Subject | Section | Clause | Non-Compliance | Controls | Audit Risk Rating | Breach Risk Rating | Remedial Action |
|---|---|---|---|---|---|---|---|
| Database accuracy | 3.1 | 15.2 and 15.37B(b) | Variance between database extract and volume submitted for ICP 0000027637CE36B of 2,769 kWh for the month of November 2021. Estimated annual impact on submission of 33,228 kWh over submission.<br><br>Database is not confirmed as accurate with a 95% level of confidence. In absolute terms, total annual consumption is estimated to be 18,600 kWh higher than the DUML database indicates. | Moderate | High | 6 | Identified |
| Volume information accuracy | 3.2 | 15.2 and 15.37B(c) | Database is not confirmed as accurate with a 95% level of confidence. In absolute terms, total annual consumption is estimated to be 18,600 kWh higher than the DUML database indicates as recorded in **section 3.**1 | Moderate | Medium | 4 | Identified |
| Future Risk Rating | | | | | | 18 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **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 |
|---|---|---|
| Deriving submission information | 2.1 | Genesis to investigate the discrepancy identified for ICP 0000027637CE36B. The kW value for November 2021 is 2769 kW higher than the database value indicates. |
| Tracking of load change | 3.1 | Genesis to liaise with QLDC, Aurora and PowerNet to review the electrical connection of streetlights. |

## 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

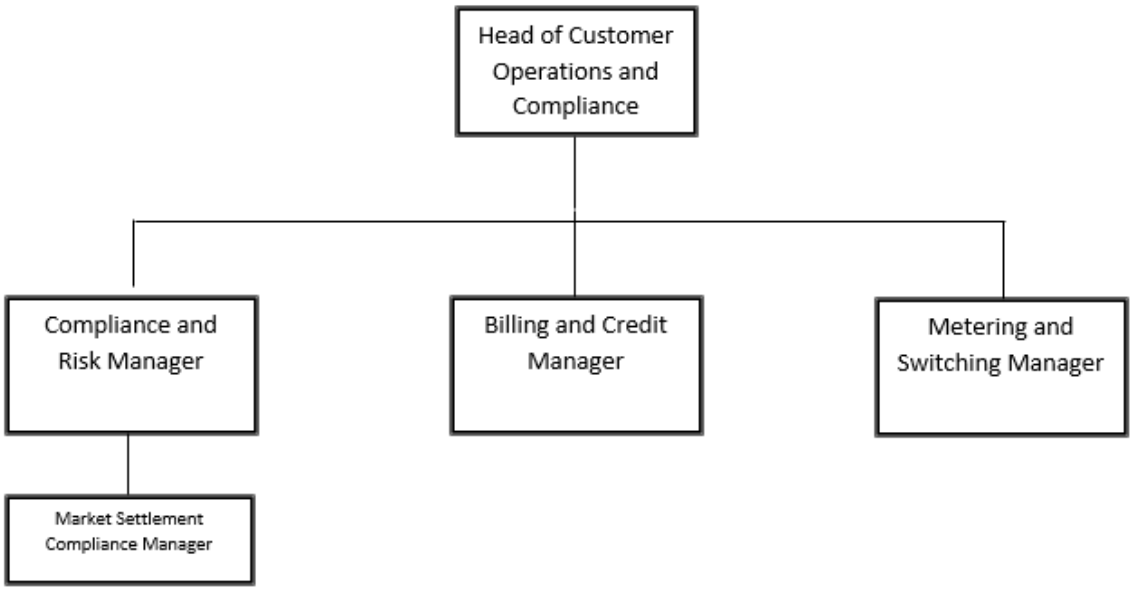
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

### 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

Auditor:

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

Other personnel assisting in this audit were:

| Name | Title | Organisation |
|---|---|---|
| Roger Hughes | Contract Data Engineer | QLDC |
| Julia Jones | Technical Specialist - Reconciliations Team | Genesis Energy |

## 1.4. Hardware and Software

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

Pocket RAMM is used in the field by McKay Electrical.

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

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

## 1.5. Breaches or Breach Allegations

There are no breach allegations relevant to the scope of this audit.

## 1.6. ICP Data

| ICP Number | Description | NSP | Number of items of load | Database wattage (watts) |
|---|---|---|---|---|
| 0000027637CE36B | Frankton | FKN0331 | 2,290 | 115,349 |
| 0000480064CEA92 | QLDC lights Lakeview subdivision | CML0331 | 2,176 | 111,3334 |
| 0000950000LN0EC | KINGSTON | FKN0331 | 761 | 42,307 |
| 0000990001LN819 | CROMWELL GXP | NLK0111 | 238 | 5,499 |
| 0008801006TP2A7 | FRANKTON GXP | NMA0331 | 58 | 1,366 |
| | | TOTAL | 5,523 | 275,855 |

## 1.7. Authorisation Received

All information was provided directly by Genesis and QLDC.

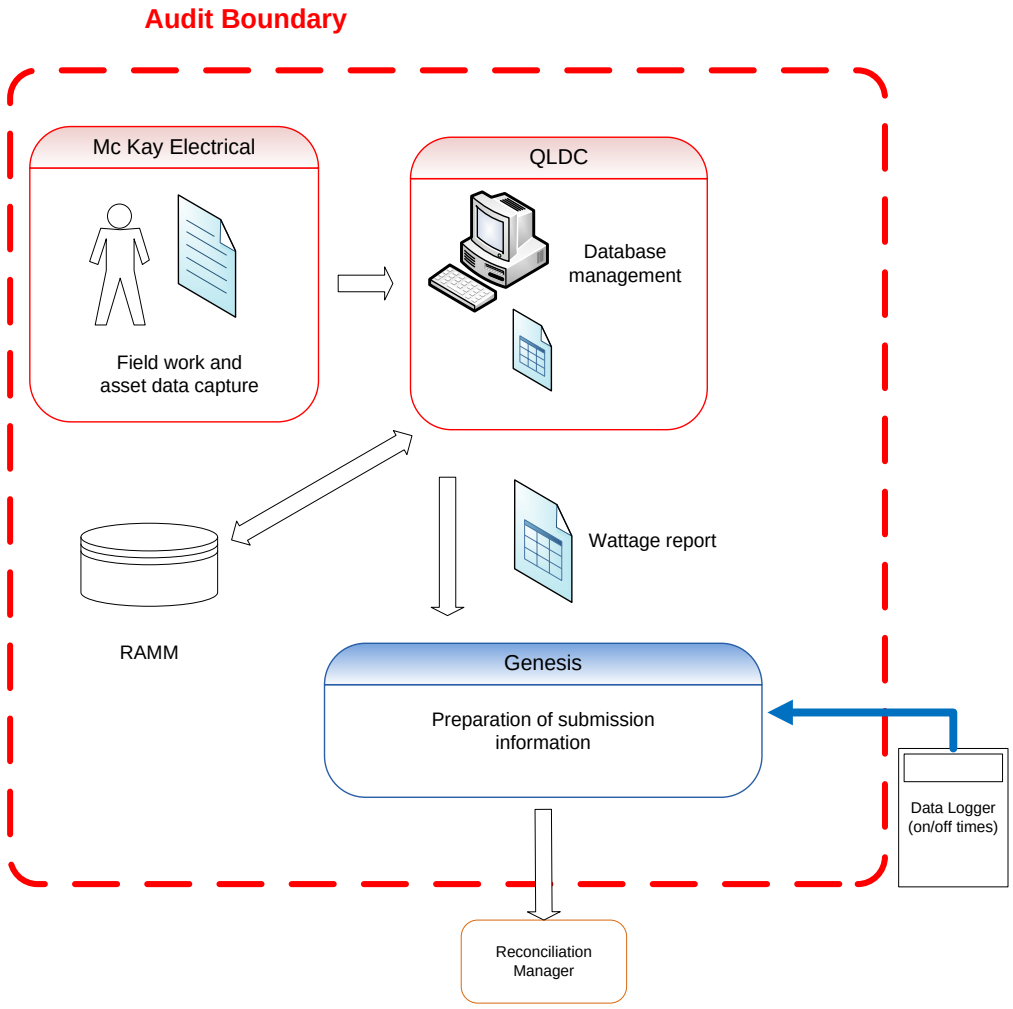
## 1.8. Scope of Audit

This audit of the **Queenstown Lakes District Council** (**QLDC**) streetlight 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.

Fault, and maintenance work is completed by McKay Electrical. Pocket RAMM is used in the field to issue work and record changes in the field into RAMM.

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




The field audit was undertaken of 316 lights using the statistical sampling methodology on the 26th and 27th January 2022.

## 1.9. Summary of previous audit

The previous audit report conducted for Genesis Energy in February 2021 by Steve Woods of Veritek Limited was reviewed. Five non-compliances were recorded, and one recommendation was made. The current status of these are detailed below:

### Table of Non-compliances

| Subject | Section | Clause | Non-compliance | Status |
|---|---|---|---|---|
| Deriving submission information | 2.1 | 11(1) of Schedule 15.3 | The database is not confirmed as accurate with a 95% level of confidence with a potential under submission of approximately 12,000 kWh per annum. | Still existing |
| | | | 18 x 25W fluorescent lights should have a 7.8W ballast applied but have a 5W ballast applied resulting in a minor estimated annual under submission of 215 kWh. | Cleared |
| | | | 1 x 26W compact fluorescent lights should have a 2.6W ballast applied but has 5W ballast applied resulting in a minor estimated annual over submission of 11 kWh. | Cleared |
| | | | Under submission of 6,444 kWh for the month of December for ICPs 0000480064CEA92 and 0000027637CE36B. | Cleared |
| Description and capacity of load | 2.4 | 11(2)(a) of Schedule 15.3 | One Metal Halide lamp with no gear wattage recorded. | Cleared |
| All load recorded in database | 2.5 | 11(2A) and (d) of Schedule 15.3 | 13 additional items of load found in the field. | Still existing for different lights |
| Database accuracy | 3.1 | 15.2 and 15.37B(b) | The database is not confirmed as accurate with a 95% level of confidence with a potential under submission of approximately 12,000 kWh per annum. | Still existing |
| | | | 18 x 25W fluorescent lights should have a 7.8W ballast applied but have a 5W ballast applied resulting in a minor estimated annual under submission of 215 kWh. | Cleared |
| | | | 1 x 26W compact fluorescent lights should have a 2.6W ballast applied but has 5W ballast applied resulting in a minor estimated annual submission of 11 kWh. | Cleared |

| Subject | Section | Clause | Non-compliance | Status |
|---|---|---|---|---|
| Volume information accuracy | 3.2 | 15.2 and 15.37B(c) | The database is not confirmed as accurate with a 95% level of confidence with a potential under submission of approximately 12,000 kWh per annum. | Still existing |
| | | | 18 x 25W fluorescent lights should have a 7.8W ballast applied but have a 5W ballast applied resulting in a minor estimated annual under submission of 215 kWh. | Cleared |
| | | | 1 x 26W compact fluorescent lights should have a 2.6W ballast applied but has 5W ballast applied resulting in a minor estimated annual over submission of 11 kWh. | Cleared |
| | | | Under submission of 6,444 kWh for the month of December for ICPs 0000480064CEA92 and 0000027637CE36B. | Cleared |

**Table of Recommendations**

| Subject | Section | Recommendation | Status |
|---|---|---|---|
| Database accuracy | 3.1 | Genesis to liaise with QLDC, Aurora and PowerNet to review the electrical connection of streetlights | 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

Genesis has 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**

This clause requires that the distributed unmetered load database must satisfy the requirements of schedule 15.5 regarding the methodology for deriving submission information.

Genesis reconciles this DUML load using the SST profile. On and off times are derived from a data logger. Changes are tracked on a daily basis within the database. This is then multiplied by the logger hours to produce the kWh value.

I recalculated the submissions for November 2021 for the five ICPs associated with the QDLC database using the data logger and database information. I identified a discrepancy for ICP 0000027637CE36B::

| ICP | dB extract light count | Genesis dB extract | dB kW value | Genesis kW value | kW value difference |
|---|---|---|---|---|---|
| 0000027637CE36B | 2,290 | 2,288 | 115.349 | 125.548 | +10.199 |

This equates to an estimated over submission of 2,769 kWh for November 2021. Annualised this equates to an estimated 33,228 kWh of over submission. This is recorded as non-compliance below and I recommend this discrepancy is investigated to confirm that the submission value matches the database provided to the trader.

| Recommendation | Description | Audited party comment | Remedial action |
|---|---|---|---|
| Deriving submission information | Genesis to investigate the discrepancy identified for ICP 0000027637CE36B. The kW value for November 2021 is 2769 kW higher than the database value indicates. | Genesis will review the database for the discrepancy identified by the auditor for ICP 0000027637CE36B and will revise submission as required | Identified |

The field audit found that the database was not within the allowable +/-5% accuracy threshold. In absolute terms, total annual consumption is estimated to be 18,600 kWh higher than the DUML database indicates.

The monthly report is provided with changes made through the month. The database contains a "light date added" and a "lamp date changed". Genesis calculates the load from the date the light is added (vested), changed or removed. Revisions are completed where corrections are required.

### Audit outcome

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 2.1<br>With: 11(1) of Schedule 15.3<br><br><br><br>From: 22-Jan-21<br>To: 30-Nov-21 | Variance between database extract and volume submitted for ICP 0000027637CE36B of 2,769 kWh for the month of November 2021. Estimated annual impact on submission of 33,228 kWh over submission.<br>Database is not confirmed as accurate with a 95% level of confidence. In absolute terms, total annual consumption is estimated to be 18,600 kWh higher than the DUML database indicates as recorded in **section 3.**1<br>Potential impact: High<br>Actual impact: High<br>Audit history: Multiple times previously<br>Controls: Moderate<br>Breach risk rating: 6 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **High** | The controls are rated as moderate as processes to manage change capture most changes.<br>The impact is assessed to be medium, based on the database inaccuracies detailed above. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| Genesis will review the database for the discrepancy identified by the auditor for ICP 0000027637CE36B and will revise as required. | 01/01/2023 | Identified |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| Genesis will review the database and report exceptions | 01/01/2023 | |

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

### Code reference

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

### Code related audit information

*The DUML database must contain:*

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

### Audit observation

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

**Audit commentary**

All items of load have an ICP recorded against them.

**Audit outcome**

Compliant

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

**Code reference**

*Clause 11(2)(b) of Schedule 15.3*

**Code related audit information**

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

**Audit observation**

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

**Audit commentary**

The database contains fields for the street address and GPS coordinates for each item of load.

**Audit outcome**

Compliant

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

**Code reference**

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

**Code related audit information**

*The DUML database must contain:*

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

**Audit observation**

The database was checked to confirm that it contained a field for lamp type and wattage capacity and included any ballast or gear wattage.

**Audit commentary**

The extract provided has fields for lamp type, lamp model as well as lamp wattage and gear wattage, all were populated.

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

**Audit outcome**

Compliant

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

**Code reference**

*Clause 11(2A) of Schedule 15.3*

### Code related audit information

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

### Audit observation

The field audit was undertaken of a statistical sample of 316 items of load. The field audit was undertaken on 26th and 27th January 2022.

The population was divided into the following strata:

- Arrowtown,
- Queenstown,
- Wanaka, and
- Rural.

### Audit commentary

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

| Street | Database count | Field count | Light count differences | Wattage recorded incorrectly | Comments |
|---|---|---|---|---|---|
| CHURCHILL STREET | 1 | 1 | | 1 | 1 x 17W LED recorded in the database but 1 x 27W LED located in the field |
| EARL STREET | 6 | 6 | | 1 | 1 x 70W HPS recorded in the database but 1 x 29W LED located in the field |
| EDNA LANE | 4 | 4 | | 3 | 3 x 27W LED recorded in the database but 3 x 20W LED located in the field |
| GLENDA DRIVE | 34 | 33 | -1 | | 1 x 60W LED recorded in the database but not located in the field |
| GRANDVIEW ROAD | 6 | 6 | | 1 | 1 x 20W LED recorded in the database but 1 x 36W LED located in the field |
| HYLAND STREET | 5 | 5 | | 3 | 3 x 22W LED recorded in the database but 3 x 29W LED located in the field |
| KINGFISHER CRESCENT | 8 | 8 | | 6 | 2 x 23W LED recorded in the database but 2 x 27W LED located in the field<br>4 x 27W LED recorded in the database but 4 x 33W LED located in the field |
| MACKINNON TERRACE | 5 | 5 | | 1 | 1 x 22W LED recorded in the database but 1 x 24W LED located in the field |
| MALVERN ROAD | 12 | 12 | | 5 | 4 x 26W LED recorded in the database but 4 x 22W LED located in the field<br>1 x 26W LED recorded in the database but 1 x 40W LED located in the field |

| Street | Database count | Field count | Light count differences | Wattage recorded incorrectly | Comments |
|---|---|---|---|---|---|
| RED DEER RISE | 3 | 3 | | 3 | 3 x 24W LED recorded in the database but 3 x 20W LED located in the field |
| RED OAKS DRIVE (SOUTH) | 22 | 28 | +6 | 2 | 1 x 60W LED recorded in the database but 1 x 102W LED located in the field<br>1 x 60W LED recorded in the database but 2 x 72W LED located in the field<br>5 x 60W LED recorded in the database but 10 x 47W LED located in the field |
| TILL STREET | 5 | 4 | -1 | | 1 x 36 LED recorded in the database but not located in the field |
| WALLACE PLACE | 2 | 1 | -1 | | 1 x 27W LED recorded in the database but not located in the field |
| WOODPECKER STREET | 6 | 6 | | 6 | 1 x 20W LED recorded in the database but 1 x 56W LED located in the field<br>5 x 20W LED recorded in the database but 5 x 36W LED located in the field |
| **Grand Total** | **5523** | **5526** | **9 (+6,-3)** | **32** | |

The field audit found six additional lamps in the field. This is recorded as non-compliance below.

The accuracy of the database is discussed in **section 3.1**.

**Audit outcome**

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 2.5<br>With: Clause 11(2A) and (d) of Schedule 15.3<br><br>From: 22-Jan-21<br>To: 30-Nov-21 | Six additional items of load found in the field of 316 items of load sampled.<br>Potential impact: Low<br>Actual impact: Low<br>Audit history: Multiple times previously<br>Controls: Moderate<br>Breach risk rating: 2 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **Low** | The controls are rated as moderate because they ensure most information is accurate.<br>The impact is assessed to be low due to the small number of additional lights found in the field in relation to the overall count of the items of load. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| Genesis has reviewed the auditors finding and have advised Queenstown Lake DC of the discrepancy with the intent that QLDC makes every effort to ensure the exceptions are rectified. | 01/10/2022 | Identified |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| Queenstown Lake DC has been notified of the asset discrepancies. Genesis relies on Queenstown Lake DC to accurately maintain its database. | 01/10/2022 | |

## 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 RAMM database was checked for audit trails.

### Audit commentary

RAMM 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**

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 | Queenstown Lakes District Council Area |
| Strata | The database contains items of load in Queenstown Lakes District Area.<br>The processes for the management of all QLDC items of load are the same, the population was across four strata:<br>• Arrowtown,<br>• Queenstown,<br>• Wanaka, and<br>• rural. |
| Area units | I created a pivot table of the roads in each area and I used a random number generator in a spreadsheet to select a total of 50 sub-units. |
| Total items of load | 316 items of load were checked. |

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

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

**Audit commentary**

**Field audit findings**

A field audit was conducted of a statistical sample of 316 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 | 101.6 | Wattage from survey is higher than the database wattage by 1.6% |
| $R_L$ | 98.6 | With a 95% level of confidence, it can be concluded that the error could be between -1.4% and +8% |
| $R_H$ | 108.0 | |

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 C (detailed below) applies.

The conclusion from Scenario C is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between -1.4% lower to 8% higher than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

In absolute terms the installed capacity is estimated to be 4 kW higher than the database indicates.

There is a 95% level of confidence that the installed capacity is between 4 kW lower to 22 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 18,600 kWh higher than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 16,800 kWh lower to 94,800 kWh higher p.a. higher than the database indicates.

| **Scenario** | **Description** |
|---|---|
| A - **Good accuracy, good precision** | This scenario applies if:<br>(a) $R_H$ is less than 1.05; and<br>(b) $R_L$ is greater than 0.95<br>The conclusion from this scenario is that:<br>(a) the best available estimate indicates that the database is accurate within +/- 5 %; and<br>(b) this is the best outcome. |
| B - **Poor accuracy, demonstrated with statistical significance** | This scenario applies if:<br>(a) the point estimate of R is less than 0.95 or greater than 1.05<br>(b) as a result, either $R_L$ is less than 0.95 or $R_H$ is greater than 1.05.<br>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:<br>(a) the point estimate of R is between 0.95 and 1.05<br>(b) $R_L$ is less than 0.95 and/or $R_H$ is greater than 1.05<br>The conclusion from this scenario is that the best available estimate is not precise enough to conclude that the database is accurate within +/- 5 % |

**Lamp description and capacity accuracy**

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

In the last report there were 98 items of load with a fluorescent wattage that was not represented on the Electricity Authority's standard wattage table, these have all been replaced except for the 18W Compact Fluorescent lamps that have had the ballast updated to 1.8W.

**Change Management**

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

Fault, and maintenance work is completed by McKay Electrical. Pocket RAMM is used in the field to issue work and record changes in the field into RAMM.

Any new streetlight connections on the PowerNet sections of the network are notified to QLDC. This gives QLDC notification of new assets being connected. These assets are not added to the RAMM database until the 224C notification has been received. This is often after electrical connection has occurred. In addition to this, notification from other parts of council can be slow to be provided, causing the database to be updated late.

As reported in the previous audits, no notifications are received for new connections on the Aurora network. I have repeated the previous audit's recommendation that Genesis liaise with QLDC, Aurora and PowerNet to review the electrical connection of streetlight circuits.

| Recommendation | Description | Audited party comment | Remedial action |
|---|---|---|---|
| Tracking of load change | Genesis to liaise with QLDC, Aurora and PowerNet to review the electrical connection of streetlights. | Genesis will discuss with QLDC to have temporary ICP created for new connections until it has been vested to the council. | Identified |

QLDC had expected McKay Electrical to have completed the full field audit, this has been delayed by COVID 19. The audit is still in progress, and the McKay contractors are using Pocket RAMM to collect details and update RAMM.

McKay Electrical undertake the outage and condition patrols.

The QLDC LED rollout is largely complete except for some of the V category and decorative lights. Where a lamp requires replacing an LED lamp will be installed, this is expected to happen over the next three years.

There are eight private lights identified in the QLDC database. These are marked as private in the database and have the correct ICP associated.

**Audit outcome**

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 3.1<br>With: Clause 15.2 and 15.37B(b)<br><br>From: 22-Jan-21<br>To: 30-Nov-21 | Database is not confirmed as accurate with a 95% level of confidence. In absolute terms, total annual consumption is estimated to be 18,600 kWh higher than the DUML database indicates.<br>Potential impact: Medium<br>Actual impact: Medium<br>Audit history: Multiple times previously<br>Controls: Moderate<br>Breach risk rating: 4 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **Medium** | The controls are rated as moderate as processes to manage change capture most changes.<br>The impact is assessed to be medium, based on the database inaccuracies detailed above. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| Genesis has reviewed the auditors finding and have advised QLDC of the discrepancy with the intent that QLDC makes every effort to ensure the exceptions are rectified. | 01/11/2022 | Identified |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| Genesis continues to work with the council to gain accuracy levels within their database. | 01/11/2022 | |

## 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

This clause requires that the distributed unmetered load database must satisfy the requirements of schedule 15.5 regarding the methodology for deriving submission information.

Genesis reconciles this DUML load using the SST profile. On and off times are derived from a data logger. Changes are tracked on a daily basis within the database. This is then multiplied by the logger hours to produce the kWh value.

As detailed in **section 2.1**, I recalculated the submissions for November 2021 for the five ICPs associated with the QDLC database using the data logger and database information. I identified a discrepancy for ICP 0000027637CE36B, the kW value for November 2021 is 10.199 kW higher than the database value indicates. This equates to an estimated over submission of 2,769 kWh for November 2021. Annualised this equates to an estimated 33,228 kWh of over submission. This is recorded as non-compliance below and I recommend in **section 2.1**, that this discrepancy is investigated to confirm that the submission value matches the database provided to the trader.

The field audit found that the database was not within the allowable +/-5% accuracy threshold. In absolute terms, total annual consumption is estimated to be 18,600 kWh lower than the DUML database indicates.

The monthly report is provided with changes made through the month. The database contains a "light date added" and a "lamp date changed". Genesis calculates the load from the date the light is added (vested), changed or removed. Revisions are completed where corrections are required.

### Audit outcome

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 3.2<br>With: Clause 15.2 and 15.37B(c)<br><br>From: 22-Jan-21<br>To: 30-Nov-21 | Variance between database extract and volume submitted for ICP 0000027637CE36B of 2,769 kWh for the month of November 2021. Estimated annual impact on submission of 33,228 kWh over submission.<br>Database is not confirmed as accurate with a 95% level of confidence. In absolute terms, total annual consumption is estimated to be 18,600 kWh lower than the DUML database indicates as recorded in **section 3.**1<br>Potential impact: High<br>Actual impact: High<br>Audit history: Multiple times previously<br>Controls: Moderate<br>Breach risk rating: 6 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **High** | The controls are rated as moderate as processes to manage change capture most changes.<br>The impact is assessed to be medium, based on the database inaccuracies detailed above. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| Genesis will review the database for the discrepancy identified by the auditor for ICP 0000027637CE36B and will revise as required.<br>Genesis has reviewed the auditors finding and have advised QLDC of the discrepancy with the intent that QLDC makes every effort to ensure the exceptions are rectified. | 01/01/2023 | Identified |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| Genesis will review the database and report exceptions QLDC has been notified of the asset discrepancies. Genesis relies on QLDC to accurately maintain its database. | 01/01/2023 | |

## CONCLUSION

The database is remotely hosted by thinkproject New Zealand Limited. QLDC provide a monthly report to Genesis of this database. Wattages are derived from a RAMM database extract. On and off times are derived from a data logger.

QLDC's contractor for streetlight installation and maintenance is McKay Electrical.

Examination of submission for November 2021, identified a kW variance between the database extract provided for the audit and the kW value used by Genesis for submission. This could be resulting in an estimated over submission of 33,228 kWh per annum and I recommend this is investigated.

The field audit was undertaken of a statistical sample of 316 items of load in Invercargill on the 26th and 27th January 2022. This found that the database is not within the allowable +/-5% accuracy threshold and over submission is likely to be occurring as a result:

- in absolute terms the installed capacity is estimated to be 4 kW higher than the database indicates,
- there is a 95% level of confidence that the installed capacity is between 4 kW lower to 22 kW higher than the database,
- in absolute terms, total annual consumption is estimated to be 18,600 kWh higher than the DUML database indicates, and
- there is a 95% level of confidence that the annual consumption is between 16,800 kWh lower to 94,800 kWh higher p.a. higher than the database indicates.

The audit found four non-compliances, makes one new recommendation and repeats one recommendation. The future risk rating of 18 indicates that the next audit be completed in six months I have considered this in conjunction with Genesis's responses and recommend that the next audit be in six months from the audit due date.

The late submission of the audit report is not recorded as a non-compliance as the draft audit report was provided prior to the due date and the delay has been due to the responses being late in being received.

PARTICIPANT RESPONSE

Genesis will review the database for the discrepancy identified by the auditor for ICP 0000027637CE36B and will revise as required. Genesis will review the database and report exceptions with the intent that QLDC makes every effort to ensure the exceptions are rectified. Genesis will work with the council to improve data accuracy.