# ELECTRICITY INDUSTRY PARTICIPATION CODE
# DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

# HAMILTON CITY COUNCIL AND GENESIS ENERGY

Prepared by: Rebecca Elliot

Date audit commenced: 19 March 2018

Date audit report completed: 23 May 2018

Audit report due date: 01-Jun-18

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## EXECUTIVE SUMMARY

This audit of the Hamilton City Council Unmetered Streetlights (**HCC**) 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, which became effective on 1 June 2017.

The database is remotely hosted by RAMM Software Ltd and is managed by Infrastructure Alliance, on behalf of HCC, HCC being Genesis's customer. Infrastructure Alliance is a joint venture between HCC and Downer which provides infrastructure management across all of HCC assets. They provide reporting to Genesis on a monthly basis.

HCC commenced an LED rollout in December 2017 replacing all of the streetlighting. Two further projects will replace all of the under verandah and decorative lighting with LEDs within the next 12 months. The database inaccuracy found in this audit is largely due to the LED rollout where the database is in the process of being updated but wasn't at the time it was counted. The rollout will also address the historic volume of incorrect ballasts being applied.

The audit found five non-compliance issues and makes one recommendation. The future risk rating of 23 indicates that the next audit be completed in six months, and I agree with this recommendation as the bulk of the current LED roll out will have been completed and the accuracy of the updated database can be assessed. 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 | The database accuracy is assessed to be 95.3% indicating an estimated over submission of 376,600 kWh per annum.<br>Analysis of the ballasts applied indicate an under submission of 96,802.64 kWh. | Moderate | High | 6 | Investigating |
| All load recorded in the database | 2.5 | 11(2A) of Schedule 15.3 | Items of load are missing from the database. | Moderate | Low | 2 | Investigating |
| Tracking of load change | 2.6 | 11(3) of Schedule 15.3 | Christmas lights not recorded in RAMM. | Weak | Low | 3 | Investigating |
| Database accuracy | 3.1 | 15.2 and 15.37B(b) | The database accuracy is assessed to be 95.3% indicating an estimated over submission of 376,600 kWh per annum.<br>Analysis of the ballasts applied indicate an under submission of 96,802.64 kWh. | Moderate | High | 6 | Investigating |
| Volume information accuracy | 3.2 | 15.2 and 15.37B(c) | The database accuracy is assessed to be 95.3% indicating an estimated over submission of 376,600 kWh per annum.<br>Analysis of the ballasts applied indicate an under submission of 96,802.64 kWh. | Moderate | High | 6 | Investigating |
| Future Risk Rating | | | | | | 23 | |

| **Future risk rating** | 1-3 | 4-6 | 7-8 | 9-17 | 18-26 | 27+ |
|---|---|---|---|---|---|---|
| **Indicative audit frequency** | 36 months | 24 months | 18 months | 12 months | 6 months | 3 months |

## RECOMMENDATIONS

| Subject | Section | Description | Action |
|---|---|---|---|
| Tracking of load change | 2.6 | Review electrical connection process to ensure new items of load are recorded in RAMM for the correct electrical connection date. | Investigating |

## 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

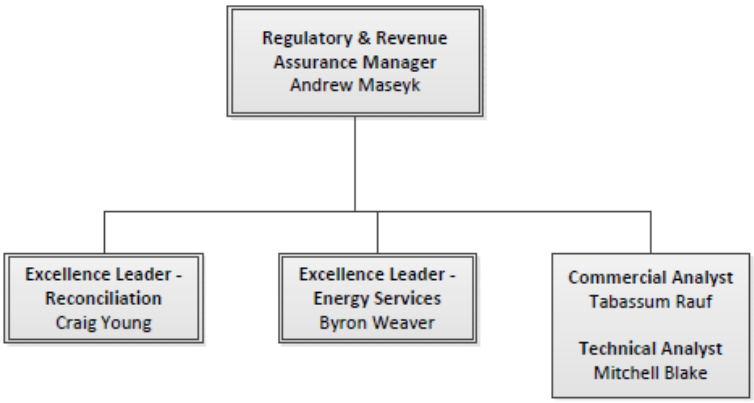
Section 11 of the Electricity Industry Act provides for the Electricity Authority to exempt any participant from compliance with all or any of the clauses.

### Audit commentary

Genesis confirms that 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:

**Rebecca Elliot**

**Veritek Limited**

**Electricity Authority Approved Auditor**

Other personnel assisting in this audit were:

| Name | Title | Company |
|---|---|---|
| Craig Young | Excellence Leader - Reconciliation | Genesis Energy |
| Grace Hawken | Technical Specialist - Reconciliations Team | Genesis Energy |
| Gerald Wen | Asset Information Manager | Infrastructure Alliance |
| Malinda Kopi | Asset Engineer | Infrastructure Alliance |
| Paul Griffiths | Project Manager | Infrastructure Alliance |
| Shaun Peterson | Operations Manager | Infrastructure Alliance |
| Sione Tu-akoi | Data Operator | Infrastructure Alliance |

## 1.4. Hardware and Software

**Section 1.8** records that Roading Asset and Maintenance Management database, commonly known as RAMM continues to be used the management of DUML. This is remotely hosted by RAMM Software Ltd. The specific module used for DUML is called "SLIMM" which stands for "Streetlighting Inventory Maintenance Management".

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

## 1.5. Breaches or Breach Allegations

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

## 1.6. ICP Data

| ICP Number | Description | NSP | Profile | Number of items of load | Database wattage (watts) |
|---|---|---|---|---|---|
| 0000011087WE366 | HCC Streetlights, Hamilton | HAM0331 | NST | 16,397 | 1,790,542 |
| 0000025004WED40 | HCC Under Veranda Streetlights, Hamilton | HAM0331 | NST | 1,094 | 86,047 |

## 1.7. Authorisation Received

All information was provided directly by Genesis or Infrastructure Alliance.

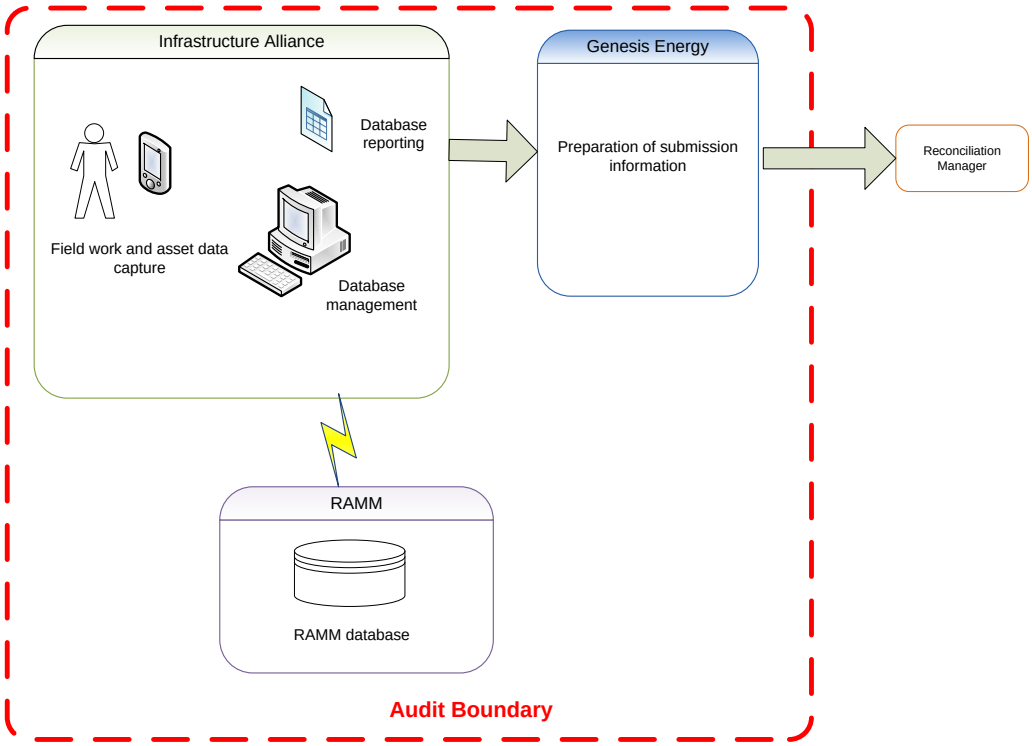
## 1.8. Scope of Audit

This audit of the Hamilton City Council Unmetered Streetlights (**HCC**) 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, which became effective on 1 June 2017.

The database is remotely hosted by RAMM Software Ltd and is managed by Infrastructure Alliance, on behalf of HCC, HCC being Genesis's customer. Infrastructure Alliance is a joint venture between HCC and Downer which provides infrastructure management across all of HCC assets. They provide reporting to Genesis on a monthly basis.

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 the current arrangements for clarity.




The field audit was undertaken of a statistical sample of 515 items of load on 19th March 2018.

## 1.9. Summary of previous audit

Genesis provided a copy of the last audit report undertaken by Rebecca Elliot of Veritek Limited in March 2017 which was undertaken for Genesis as part of their 2017 reconciliation participant audit. This audit wasn't submitted due to the audit regime change that occurred on June 1st ,2017. For completeness I have included the findings for reference below:

## Table of Non-Compliance

| Subject | Section | Clause | Non-compliance | Status |
|---|---|---|---|---|
| Deriving Submission Information | 2.1 | 11(1) of schedule 15.3 | Inaccurate submission due to inaccurate lighting descriptions and lamp combinations, incorrect ballasts being applied and inaccuracies found in the field audit. | Still existing |
| ICP Identified | 2.2.1 | 11(2)(a) of schedule 15.3 | 1,341 items of load with the incorrect ICP identifier allocated to them. | Cleared refer **section 2.2** |
| Description of Load Type | 2.2.3 | 11(2)(c) of schedule 15.3 | A large number of items of load with light description and lamp mismatches. | Still existing but diminishing as LED roll out replaces these lights<br>refer **section 2.4** |

## Table of Recommendations

| Subject | Section | Clause | Recommendation for Improvement | Status |
|---|---|---|---|---|
| Tracking of Load Change | 2.3 | 11(3) of schedule 15.3 | Review notification processes from field to council are reviewed. | Still existing<br>refer **section 2.6** |

### 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 confirms that the requirement to conduct an audit has been met for this database within the required timeframe. Compliance is confirmed

## 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**

Genesis reconciles this DUML load using the NST profile. The total volume submitted to the Reconciliation Manager is based on a monthly database report from RAMM and the "burn time" which is sourced from a data logger installed on the WEL network. I checked the accuracy of the submission information by multiplying the total kW from the database by the total "on" time from the data logger file and the figures matched

There is some inaccurate data within the database used to calculate submissions. This is recorded as non-compliance and discussed in **section 3.1** and **3.2**.

**Audit outcome**

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 2.1<br>With: Clause 11(1) of Schedule 15.3<br><br>From: entire audit period | The database accuracy is assessed to be 95.3% indicating an estimated over submission of 376,600 kWh per annum.<br>Analysis of the ballasts applied indicate an under submission of 96,802.64 kWh.<br>Potential impact: High<br>Actual impact: High<br>Audit history: Twice<br>Controls: Moderate<br>Breach risk rating: 6 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **High** | The controls are rated as moderate, because they are sufficient to ensure that lamp information is correctly recorded most of the time.<br>The impact is assessed to be high, based on the kWh differences described above. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| Genesis has previously met with HCC. We Genesis is currently getting HCC to review this audit with IA | 12/2018 | Investigating |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| Genesis liaises with IA (infrastructure Alliance) in regards to the issues that still exist. Still unable to date get a Ramm extraction due to its size. | 12/2018 | |

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

### Code reference

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

### Code related audit information

*The DUML database must contain:*

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

### Audit observation

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

### Audit commentary

An ICP is recorded for each item of load.

### 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 the nearest street address, pole numbers and Global Positioning System (GPS) coordinates for each item of load and users in the office and field can view these locations on a mapping system.

**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 and that each item of load had a value recorded in these fields.

**Audit commentary**

The database contains two records for wattage, firstly the lamp wattage and secondly the gear wattage, which represents ballast losses. The gear wattage is recorded in the database which meets the requirements of this clause. I found no blank records. The accuracy of the description and wattages recorded 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 270 items of load on 5th February 2018.

### Audit commentary

The field audit findings are detailed in the table below:

| Street | Database count | Field count | Light count differences | Wattage recorded incorrectly | Comments |
|---|---|---|---|---|---|
| **Urban (as detailed by ICP)** | | | | | |
| ARTHUR PORTER ROTARY (MIDBLOCK) | 4 | 4 | | | |
| BETTINA ROAD | 6 | 6 | | | |
| CALYPSO RISE | 3 | 3 | | | |
| COLQUHOUN PLACE | 5 | 5 | | | |
| CROALL CRESCENT | 10 | 10 | | 8 | 8x LEDs found in the field recorded as 70W HPS |
| DRAKE PLACE | 3 | 3 | | | |
| GRANDVIEW ROAD | 92 | 92 | | 30 | 30x LEDs found in the field recorded as 70W HPS |
| GRANDVIEW ROAD ROTARY (NEWCASTLE) | 2 | 2 | | | |
| HILLSBOROUGH TERRACE | 13 | 13 | | | |
| JAMES STREET | 4 | 4 | | | |
| KNAPDALE MEWS | 3 | 3 | | | |
| MIERS GLADE | 8 | 8 | | | |
| MURRAY STREET | 3 | 3 | | | |
| OAKLEY AVENUE | 10 | 10 | | | |
| RIVERLEA ROAD | 44 | 44 | | 19 | 19x LEDs found in the field recorded as 70W HPS |
| RIVERPOINT GLADE | 5 | 5 | | | |
| SPRINGSIDE COURT | 2 | 2 | | | |
| TE RAPA ROAD STHBD (WAIRERE TO TE KOWHAI) | 60 | 60 | | | |
| TUDOR CRESCENT | 10 | 10 | | | |

| Street | Database count | Field count | Light count differences | Wattage recorded incorrectly | Comments |
|---|---|---|---|---|---|
| WICKHAM STREET | 4 | 4 | | | |
| **Under Verandah lighting (as detailed by ICP)** | | | | | |
| BALLOCH STREET | 3 | 3 | | | |
| CLARKIN ROAD | 1 | 2 | 1 | | 1x additional 70 HPS found in the field |
| DINSDALE ROAD | 4 | 4 | | | |
| NOBLEMAN PLACE | 1 | 1 | | | |
| POHUTUKAWA DRIVE | 2 | 2 | | | |
| **Hamilton Central** | | | | | |
| ALMA STREET ROTARY | 4 | 4 | | | |
| BRYCE LANE EXTENSION | 1 | 0 | -1 | | 1x 35W MH not found in the field |
| BRYCE STREET | 64 | 62 | -3 +1 | | 3x lights not found & 1 additional 150W HPS found. |
| HILL STREET | 6 | 6 | | 5 | 5x LEDs found in the field recorded as HPS lights |
| HOOD STREET | 36 | 39 | -5 + 8 | | 5 less fluorescent lamps found in the field and 8 additional LEDs found in the field |
| KNOX STREET | 5 | 5 | | | |
| MARAMA STREET | 5 | 5 | | 1 | 1x LED found in the field recorded as 70W HPS |
| MILL LANE | 3 | 3 | | 2 | 2x LEDs found in the field recorded as HPS lights |
| SAPPER MOORE-JONES PLACE (MARLBOROUGH PL) | 16 | 16 | | | |
| VIALOU STREET | 9 | 9 | | | |
| **New** | | | | | |
| BLACKWOOD CRESCENT | 5 | 5 | | | |
| CARLINGFORD RISE | 8 | 8 | | | |
| GLAISDALE CRESCENT | 9 | 9 | | | |

| Street | Database count | Field count | Light count differences | Wattage recorded incorrectly | Comments |
|---|---|---|---|---|---|
| HARE PUKE DRIVE | 15 | 15 | | 5 | 5x LEDs found in the field recorded as HPS lights |
| LULU AVENUE | 7 | 7 | | | |
| MAIA PLACE | 2 | 2 | | | |
| MCCORQUINDALE DRIVE | 4 | 4 | | | |
| RYEDALE ROAD | 7 | 7 | | | |
| STAN HEATHER DRIVE | 15 | 15 | | | |
| SYLVESTER ROAD | 1 | 1 | | | |
| **Grand Total** | 524 | 525 | 19 | 70 | |

I found 19 lamp count errors (over and under) in the field audit resulting in ten lamps missing from the database. As discussed in **section 2.6**, HCC commenced their LED rollout in December with approximately 150 light changes occurring daily. HCC have a dedicated resource to upload all of these changes but due to the volume occurring there is up to a three-week delay from the date the light is installed and it being updated in the database, hence the volume of lamp discrepancies found in this audit. The differences found in the field are recorded as non-compliance in **section 3.1**. The ten items of load missing from the RAMM database are recorded as non-compliance.

**Audit outcome**

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 2.5<br>With: Clause 11(2A) of Schedule 15.3<br><br>From: entire audit period | Items of load are missing from the database.<br>Potential impact: Low<br>Actual impact: Low<br>Audit history: None<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 are sufficient to ensure that lamp information is correctly recorded most of the time.<br>The impact is rated as low, 95.3% of lamps found were recorded in the database. Most of the variances related to wattage discrepancies, rather than lamp count differences. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| Genesis has previously met with HCC. We Genesis is currently getting HCC to review this audit with IA | 12/2018 | Investigating |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| Genesis liaises with IA (infrastructure Alliance) in regards to the issues that still exist. Still unable to date get a Ramm extraction due to its size. | 12/2018 | |

## 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

Any changes that are made during any given month take effect from the beginning of that month. The information is available which would allow for the total load in kW to be retrospectively derived for any day. On 20th September 2012, the Authority sent a memo to Retailers and auditors advising that tracking of load changes at a daily level was not required as long as the database contained an audit trail. I have interpreted this to mean that the production of a monthly "snapshot" report is sufficient to achieve compliance.

The processes were reviewed for ensuring that changes in the field are notified through to Infrastructure Alliance. All maintenance work in the field is entered directly into "Pocket RAMM". There is an annual audit process in place which checks both quality of workmanship and accuracy of asset capture. Any errors found are corrected.

HCC commenced their LED rollout for street lighting in December with approximately 150 light changes occurring daily. HCC have a dedicated resource to upload all of these changes but due to the volume occurring there is up to a three-week delay from the date of the light being installed and it being updated in the database, hence the volume of lamp discrepancies found in this audit. Under verandah lighting is scheduled to be changed to LED commencing January 2019 and the decorative lighting will be upgraded to LED following the completion of the verandah lights.

Outage patrols in those areas not yet upgraded to LED lights are conducted on a four-monthly basis with all streets driven and blown bulbs logged for replacement. The outage patrol regime for those areas with LED lighting will be less due to the more reliable nature of LED lighting. This is being determined and will at a minimum be patrolled 12 months after installation.

There are a small number of Christmas lights connected into unmetered streetlight circuits. These are not currently being tracked and this is recorded as non-compliance below. I recommend that these are tracked in RAMM.

WEL Networks liven the streetlights. Lights in new subdivisions are added to RAMM once the "as builts" are received. This can be slow in some instances and in others the lights are being added to RAMM before they are electrically connected. I recommend that the new connection process be reviewed to ensure new items of load are recorded correctly in RAMM. The HCC Operations team have a fortnightly meeting with the Council development team to discuss what work is coming through but the electrical connection date is not always known.

| Recommendation | Description | Audited party comment | Remedial action |
|---|---|---|---|
| Regarding: Clause 11(3) of Schedule 15.3 | Review electrical connection process to ensure new items of load are recorded in RAMM for the correct electrical connection date. | Genesis have discussed this in the previous audit review conversation. Genesis will re iterate and try drive process improvement. | Investigating |

**Audit outcome**

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 2.6<br>With: 11(3) of Schedule 15.3<br><br>From: 01-Jun-17<br>To: 31-May-18 | Christmas lights not recorded in RAMM.<br>Potential impact: Low<br>Actual impact: Low<br>Audit history: None<br>Controls: Weak<br>Breach risk rating: 3 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **Low** | The controls are rated as weak as the tracking of maintenance load change is effective, but Christmas lights are not recorded.<br>The impact is assessed to be low as the volume of discrepancies found in the new area assessed as part of the field audit was low. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| Genesis has previously met with HCC. We Genesis is currently getting HCC to review this audit with IA | 12/2018 | Investigating |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| Genesis liaises with IA (infrastructure Alliance) in regards to the issues that still exist. Still unable to date get a Ramm extraction due to its size. | 12/2018 | |

## 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**

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 | Hamilton City area |
| Strata | The database contains items of load in Hamilton City Council area.<br>The area has three distinct sub groups. Urban, under verandah and central city.<br>The processes for the management of HCC items of load are the same, but I decided to place the items of load into four strata, as follows:<br>1. Urban<br>2. New<br>3. Under verandah lighting<br>4. Other Hamilton central. |
| 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 45 sub-units. |
| Total items of load | 524 items of load were checked. |

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

**Audit commentary**

The field data was 95.3% of the database data for the sample checked. The total wattage recorded in the database for the sample was 61,369 watts. The estimated total wattage found in the field for the sample checked was 57,508 watts, a difference of 3,861 watts. This will result in estimated over submission of 376,600 kWh per annum (based on annual burn hours of 4,271 as detailed in the DUML database auditing tool).

The check of wattages found:

- 46 33W LEDs recorded as 32.5W. This will result in an estimated under submission by 98.23 kWh per annum.

- 9,074 items of load were identified with an invalid light type description. I note that the 140W MH lights are currently all being changed to LED. These are detailed in the table below. This is recorded as non-compliance.

| Light Type | Volume |
|---|---|
| 140 Watts HPS | 56 |
| Unknown 250 Watts | 6 |
| 150 Watts Down Light | 165 |
| 140 Watts MH | 8,846 |
| 150 Watts Ped Flood | 1 |
| TOTAL | 9,074 |

I identified 1,197 lights that I cannot determine the correct wattage from the lights description and I recommend that the light descriptions be updated to include the make, model, milliamp figure (LED only) so that the wattage can be confirmed. The lights identified are a mix of fluorescent and LED lights. I note that the fluorescent lights are under verandah lights and these will be changed to LED in early 2019. These are set out in the table below:

| | Wattage | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Light Description | 13 | 20 | 27 | 32.5 | 34 | 35 | 43 | 45 | 57 | 70 | 90 | 100 | | 150 | 250 | |
| 30 LED | | | | | | | | | | | | | | | | |
| 30LE | | | | | | | 108 | | | | | | | | | 108 |
| 5 ft Coreline LED60S L1500 | | | | | | | | | | | | | | | | |
| L60S | | | | | | | | | 28 | | | | | | | 28 |
| 9 Watts 3IRGB-316 LED | | | | | | | | | | | | | | | | |
| UW11 | | | 3 | | | | | | | | | | | | | 3 |
| Double 4FT Fluro | | | | | | | | | | | | | | | | |
| D4FT | | | | | | | | | | 35 | | | | | | 35 |
| Double 5FT Fluro | | | | | | | | | | | | | | | | |
| D5FT | | | | | | | | | | 166 | | | | | | 166 |
| Energy Saver Fluro | | | | | | | | | | | | | | | | |
| ES | | 3 | | | | | | | | | | | | | | 3 |
| GOUGH K190 | | | | | | | | | | | | | | | | |
| K190 | | | | | | | | | | | 2 | | | | | 2 |
| Mini Stelivo 36 LED | | | | | | | | | | | | | | | | |
| 3275 | | | | | 30 | | | | | | | | | | | 30 |
| Single 4FT Fluro | | | | | | | | | | | | | | | | |
| S4FT | | | | | | | | 67 | | | | | | | | 67 |
| Single 5FT Fluro | | | | | | | | | | | | | | | | |
| S5FT | | | | | | 362 | | | | | | | | | | 362 |
| Super 4Y High Output | | | | | | | | | | | | | | | | |
| 4Y | | | | | | | | | | | | | | 258 | | 258 |
| TABLED OB 4.7-9 | | | | | | | | | | | | | | | | |
| OB47 | 11 | | | | | | | | | | | | | | | 11 |
| Type 2, 60 LED, 525mA | | | | | | | | | | | | | | | | |
| T2-6 | | | | | | | | | | | | 124 | | | | 124 |
| | | | | | | | | | | | | | | | Grand Total | 1197 |

The analysis of ballasts found 12,588 items of load with the incorrect ballast applied. 6,670 of these relate to incorrect ballasts for 70W HPS and MH lights and a further 1,292 relates to 250W HPS or MH lights. These are in the process of being changed out to LED lights as part of the LED rollout. The incorrect ballasts indicate an estimated 96,802.64 kWh under submission per annum (based on annual burn hours of 4,271 as detailed in the DUML database auditing tool).

### Audit outcome

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 3.1<br>With: Clause 15.2 and 15.37B(b)<br><br>From: entire audit period | The database accuracy is assessed to be 95.3% indicating an estimated over submission of 376,600 kWh per annum.<br>Analysis of the ballasts applied indicate an under submission of 96,802.64 kWh.<br>Potential impact: High<br>Actual impact: High<br>Audit history: None<br>Controls: Moderate<br>Breach risk rating: 6 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **High** | The controls are rated as moderate, because the inaccuracies are being addressed through the LED roll out and therefore accuracy will increase.<br>The impact is assessed to be high, based on the kWh differences described above. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| Genesis has previously met with HCC. We Genesis is currently getting HCC to review this audit with IA | 12/2018 | Investigating |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| Genesis liaises with IA (infrastructure Alliance) in regards to the issues that still exist. Still unable to date get a Ramm extraction due to its size. | 12/2018 | |

## 3.2. Volume information accuracy (Clause 15.2 and 15.37B(c))

### Code reference

*Clause 15.2 and 15.37B(c)*

### Code related audit information

*The audit must verify that:*

- *volume information for the DUML is being calculated accurately*
- *profiles for DUML have been correctly applied.*

### Audit observation

The submission was checked for accuracy for the month the database extract was supplied. This included:

- checking the registry to confirm that the ICP has the correct profile and submission flag
- 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 NST profile.

The total volume submitted to the Reconciliation Manager is based on a monthly database report from RAMM and the "burn time" which is sourced from a data logger installed on the WEL network. I checked the accuracy of the submission information for the month of December, 2017 by multiplying the total kW from the database by the total "on" time from the data logger file and the figures matched

There is some inaccurate data within the database used to calculate submissions. The analysis of ballasts found the incorrect ballasts being applied indicate an estimated 96,802.64 kWh under submission per annum but as noted in **section 3.1**, these are in the process of being changed out to LED lights as part of the LED rollout.

The DUML database auditing tool provided a result indicating the field data was 95.3% of the database data. This will result in estimated over submission of 376,600 kWh per annum (based on annual burn hours of 4,271 as detailed in the DUML database auditing tool).

**Audit outcome**

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 3.2<br>With: Clause 15.2 and 15.37B(c)<br><br>From: entire audit period | The database accuracy is assessed to be 95.3% indicating an estimated over submission of 376,600 kWh per annum.<br>Analysis of the ballasts applied indicate an under submission of 96,802.64 kWh.<br>Potential impact: High<br>Actual impact: High<br>Audit history: None<br>Controls: Moderate<br>Breach risk rating: 6 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **High** | The controls are rated as moderate, because they are sufficient to ensure that lamp information is correctly recorded most of the time.<br>The impact is assessed to be high, based on the kWh differences described above. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| Genesis has previously met with HCC. We Genesis is currently getting HCC to review this audit with IA | 12/2018 | Investigating |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| Genesis liaises with IA (infrastructure Alliance) in regards to the issues that still exist. Still unable to date get a Ramm extraction due to its size. | 12/2018 | |

## CONCLUSION

The database is remotely hosted by RAMM Software Ltd and is managed by Infrastructure Alliance, on behalf of HCC, HCC being Genesis's customer. Infrastructure Alliance is a joint venture between HCC and Downer to provide infrastructure management across all of HCC assets. Downer who is a contractor to HCC, conducts the installation fieldwork and maintenance and asset data capture. Infrastructure Alliance provides reporting to Genesis on a monthly basis.

HCC commenced an LED rollout in December 2017 replacing all of the streetlighting. Two further projects will replace all of the under verandah and decorative lighting with LEDs within the next 12 months. The database inaccuracy found in this audit is largely due to the LED rollout where the database is in the process of being updated but wasn't at the time it was counted. The rollout will also address the historic volume of incorrect ballasts being applied.

The audit found five non-compliance issues and makes one recommendation. The future risk rating of 23 indicates that the next audit be completed in six months, and I agree with this recommendation as the bulk of the current LED roll out will have been completed and the accuracy of the updated database can be assessed.

PARTICIPANT RESPONSE

Genesis will continue to work with HCC and Infrastructure Alliance to better gain accuracy in their database.