ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

For

SOUTHLAND DISTRICT COUNCIL AND GENESIS ENERGY

NZBN: 9429037706609

Prepared by: Steve Woods

Date audit commenced: 17 November 2021

Date audit report completed: 24 February 2022

Audit report due date: 1 March 2022

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This audit of the **Southland District Council (SDC)** 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.

This audit includes all streetlights for SDC load as recorded in RAMM.

The RAMM database is managed by SDC and is remotely hosted by thinkproject New Zealand Limited. The field work is carried out by NES. Pocket RAMM is used in the field to issue work and record changes in the field into RAMM.

The field audit was undertaken of a statistical sample of 241 items of load in SDC the area on January the 25th 2022. This found that the database is within the allowable +/-5% accuracy.

The total volume submitted to the Reconciliation Manager is based on a monthly database report derived from RAMM, and the "burn time" which is sourced from data loggers. The methodology is compliant.

I checked the submission calculation provided by Genesis for November 2021 and it matches the database.

The audit found two minor non-compliances and makes no recommendations. The future risk rating of three indicates that the next audit be completed in 24 months. I have considered this in conjunction with Genesis's responses and recommend that the next audit be in 24 months.

The matters raised are detailed below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
All load recorded in database	2.5	11(2A) of Schedule 15.3	Three additional lights found in the field audit sample.	Moderate	Low	2	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	One lamp with no ballast applied resulting in very minor under submission.	Strong	Low	1	Identified
Future Risk Rating						3	

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	Recommendation
		Nil	

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

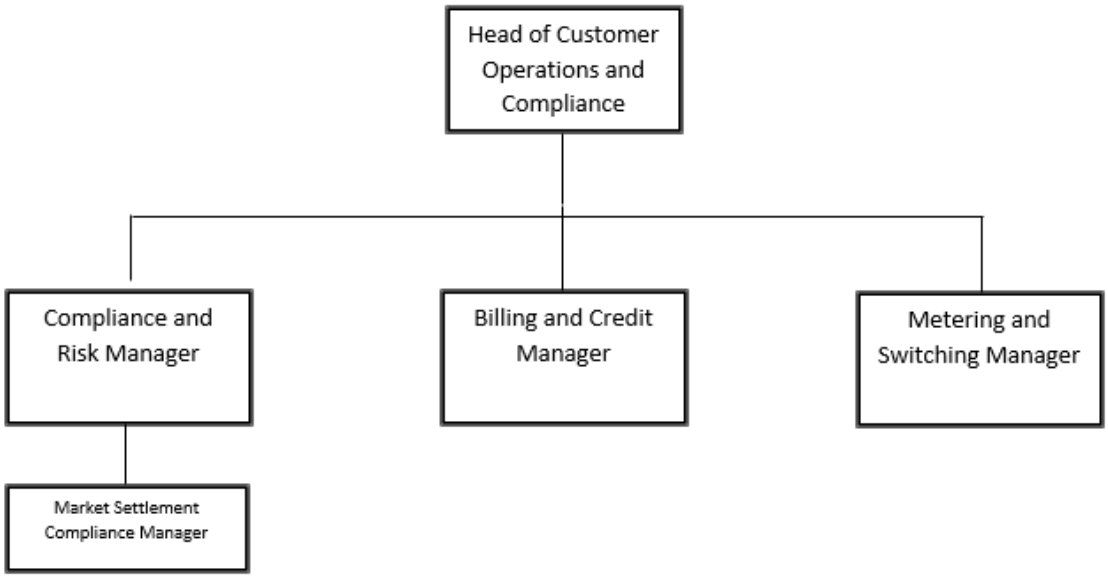
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

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

1.2. Structure of Organisation

Genesis provided a copy of their organisational structure:



1.3. Persons involved in this audit

Auditor:

Name	Company	Role
Steve Woods	Veritek Limited	Lead Auditor
Claire Stanley	Veritek Limited	Supporting Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Michael Duggan	Roading Asset Analyst Engineer	Southland District Council
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 NES.

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)
0000302001HEF6B	HERITAGE ESTATE	HER0111	81	1,770
0008801031TP895	SDC LIGHTS - RURAL EDENDALE	EDN0331	49	3340
0008801021TP238	SDC LIGHTS - URBAN EDENDALE	EDN0331	269	10,565
0008801033TP810	SDC LIGHTS - RURAL GORE	GOR0331	78	4,057
0008801023TP2BD	SDC LIGHTS - URBAN GORE	GOR0331	170	10,332
0008801032TP455	SDC LIGHTS - RURAL INVERCARGILL	INV0331	122	7,349
0008801034TP5DA	SDC LIGHTS - RURAL NORTH MAKAREWA	NMA0331	272	18,456
0008801024TPF77	SDC LIGHTS - URBAN NORTH MAKAREWA	NMA0331	2251	96,976
Total			**3292**	**152,845**

As noted in the previous audit report, ICP 0008801022TPEF8 was previously included as an ICP for this DUML database. Powernet confirmed to SDC in June 2018 that the load for this ICP is connected to NSP NMA0331 and the load is to be recorded against ICP 0008801024TPF77. Powernet do not want to decommission ICP0008801022TPEF8 in case the network is reconfigured in the future. It is recorded on the registry as status "inactive - reconciled elsewhere" being reconciled to ICP 0008801024TPF77 and has remained with Meridian.

1.7. Authorisation Received

All information was provided directly by Genesis and SDC.

1.8. Scope of Audit

This audit of the SDC DUML database and processes was conducted at the request of 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.

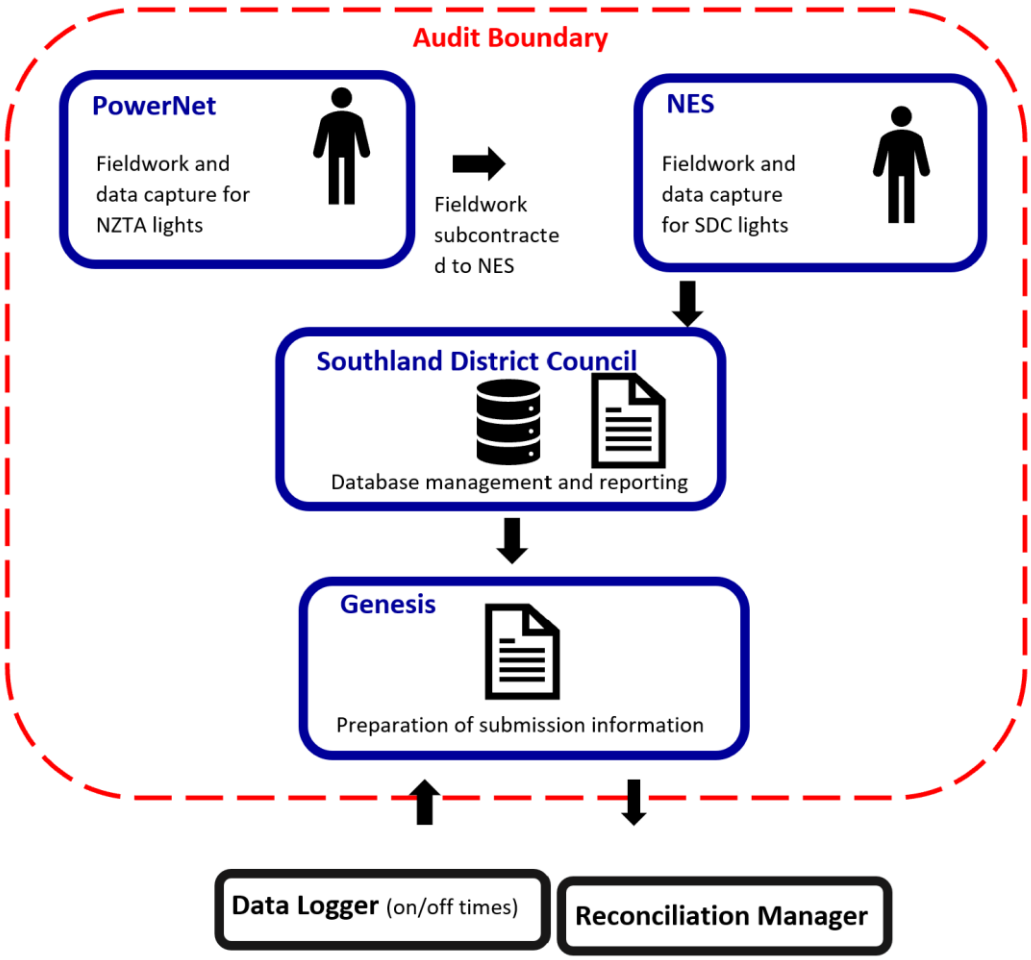
The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

This audit includes all streetlights for SDC load as recorded in RAMM.

The RAMM database is managed by SDC and is remotely hosted by thinkproject New Zealand Limited. The field work is carried out by NES. 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 database reporting. SDC have engaged NES to maintain their lights. PowerNet remain the contractor to maintain the NZTA lights. They have engaged

NES to undertake the field work so effectively it is the one contractor undertaking the field work. The diagram below shows the audit boundary for clarity.



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

The field audit was undertaken of 241 items of load on 25th January 2022.

1.9. Summary of previous audit

The previous audit was completed in February 2020 by Rebecca Elliot of Veritek Limited. Three non-compliances were identified, and one recommendation was made. The statuses of the non-compliances and recommendations are described below.

Table of Non-compliances

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Cleared

Subject	Section	Clause	Non-compliance	Status
All load recorded in database	2.5	11(2A) of Schedule 15.3	1 additional light found in the field audit sample. NZTA Edendale bypass lights not recorded in the database but as noted in section 2.1 these are being reconciled so this has no material impact.	Still existing for different lamps Cleared
Volume information accuracy	3.2	15.2 and 15.37B(c)	The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Cleared

Table of Recommendations

Subject	Section	Clause	Recommendations	Status
Tracking of load changes	2.6	Clause 11(3) of Schedule 15.3	Investigate festive lighting and record in the database if being connected to the unmetered streetlight circuit.	Cleared

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.

Audit outcome

Compliant

2. DUML DATABASE REQUIREMENTS

2.1. Deriving submission information (Clause 11(1) of Schedule 15.3)

Code reference

Clause 11(1) of Schedule 15.3

Code related audit information

The retailer must ensure the:

- *DUML database is up to date*
- *methodology for deriving submission information complies with Schedule 15.5.*

Audit observation

The process for calculation of consumption was examined.

Audit commentary

Genesis reconciles this DUML load using the SST profile. Submissions are based on the database information, with on and off times derived from data logger information. I reviewed the submission information and confirmed the calculation for November 2021 was correct.

It was noted in the previous audit that the NZTA Edendale bypass lights were installed in the field but had not been added to RAMM, this has now been resolved and the lights are recorded in RAMM.

The database was confirmed to fall within the database accuracy threshold as detailed in **section 3.1**.

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

Audit outcome

Compliant

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

Code reference

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

Code related audit information

The DUML database must contain:

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

Audit observation

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

Audit commentary

All items of load have an ICP recorded against them.

Lights for Stewart Island are recorded in the database but are excluded from this audit, and as they are not included in submission, they do not have an ICP assigned.

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 examined to confirm the location is recorded for all items of load.

Audit commentary

Street addresses and GPS coordinates are recorded for all items of load.

32 lights on Edendale Woodlands Highway did not have GPS co-ordinates recorded in the database, SDC provided an updated extract to confirm the GPS co-ordinates were added to the database during the audit.

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 they contained a field for lamp type and wattage capacity and included any ballast or gear wattage.

Audit commentary

A lamp type, lamp type description and lamp wattage including an allowance for ballast is recorded for each item of load in the database.

The accuracy of these 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 241 items of load on 25th January 2022. The total population was divided into seven geographical strata.

Audit commentary

The field audit found a high level of accuracy. The three errors are detailed in the table below:

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
BUTE ST (WINTON)	2	2		2	1 x 150 HPS recorded in the database but 1 x 28W LED located in the field 1 x 28W LED recorded in the database but 1 x 77W LED located in the field
CHURCH ST (WINTON)	7	8	+1		1 additional 22W LED not recorded in the database but located in the field
HENRY ST (TE ANAU)	4	5	+1		1 additional 22 LED not recorded in the database but located in the field
LAWSON BURROWS CRESC (TE ANAU)	9	10	+1		1 additional 22 LED not recorded in the database but located in the field
MORTON ST (RIVERTON)	9	9		2	2 x 28W LED recorded in the database but 2 x 24W LED located in the field
QUINTIN DRIVE (TE ANAU)	20	20		1	1 x 70W HPS recorded in the database but 1 x 22W LED located in the field
WINTON WREYS BUSH HWY (SH 96 WINTON WARD)	1	1		1	1 x 150W HPS recorded in the database but 1 x 250W HPS located in the field
Total lights	**3290**	**3293**	**+3**	**6**	

Three additional lights were found in the field. This is recorded as non-compliance below.

The field audit found a high level of accuracy and the database falls within the acceptable accuracy threshold. This is discussed further in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 01-Feb-20 To: 17-Nov-21	Three additional lights found in the field. Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate because they ensure most information is accurate. The impact is assessed to be low due to three 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 discussed the audit findings with the Southland DC with the intent that council makes every effort to ensure the exceptions are rectified.	Continuous improvement	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis continues to work with the council to raise database accuracy levels.	Continuous improvement	

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

Audit observation

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

Audit commentary

The RAMM database functionality achieves compliance with the code.

Audit outcome

Compliant

2.7. Audit trail (Clause 11(4) of Schedule 15.3)

Code reference

Clause 11(4) of Schedule 15.3

Code related audit information

The DUML database must incorporate an audit trail of all additions and changes that identify:

- *the before and after values for changes*
- *the date and time of the change or addition*
- *the person who made the addition or change to the database.*

Audit observation

The database was checked for audit trails.

Audit commentary

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

A database extract was provided, and 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	Southland District Council area
Strata	The database contains items of load for the Southland District Council. The processes for the management of SDC of load are the same, but I decided to place the items of load into seven geographical strata of a similar size as follows: 1. Five Rivers/Waikaia, 2. Riverton, 3. Te Anau, 4. Totoes/Waihopi, 5. Wallace/Wallacetown, 6. Winton, and 7. Te Tipua/Tuatapere
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 61 sub-units.
Total items of load	241 items of load recorded in the database were selected.

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

The process to manage changes made in the field being updated in the database was examined.

Audit commentary

Database accuracy based on the field audit

A field audit was conducted of a statistical sample of 241 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 0.1%
R_L	99.4	With a 95% level of confidence, it can be concluded that the error could be between -0.6% and + 4.3%.
R_H	104.3	

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 A (detailed below) applies.

The conclusion from Scenario A is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between -0.6% lower and 4.3% higher than the wattage recorded in the DUML database. Compliance is recorded because the potential error is less than 5.0%.

In absolute terms the installed capacity is estimated to be the 2 kWh higher as the database indicates.

There is a 95% level of confidence that the installed capacity is between 1 kW lower and 7 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 10,300 kWh higher than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 4,100 kWh p.a. lower and 27,800 kWh p.a. higher 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 %

Lamp description and capacity accuracy

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

One HPS light was found to have the incorrect ballast applied:

Lamp model	Expected ballast	Ballast recorded	Count	Difference
High Pressure Sodium 70 W	13	0	1	+13
Totals			1	+13

The incorrect ballasts being applied will be resulting in an estimated very minor annual under submission of 56 kWh per annum.

Change Management

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

New connection, fault, and maintenance work is completed by NES. Pocket RAMM is used in the field to issue work and record changes from the field into RAMM.

NZTA have engaged PowerNet to maintain their lights. PowerNet have engaged NES as a subcontractor to undertake this work. They in turn advise SDC of any changes and these are updated into RAMM.

There are outage patrols in place for the NZTA lights, carried out six monthly by NES. There is not outage patrol for the SDC lights as these are now LED and the failure rate is very low. Any failures are expected to be notified to the SDC via calls from the public.

SDC advised that there have been no new connections recently for SDC lights. If a new connection is required a request will be issued to PowerNet.

It has been confirmed that the Christmas lights are installed on the unmetered circuits. The festive lighting has been added to the RAMM database and these items are included when electrically connected in the monthly report to Genesis.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Feb-20 To: 17-Nov-21	Incorrect ballast applied for one lamp resulting in an estimated very minor over submission of 56 kWh per annum. Potential impact: Low Actual impact: Low Audit history: Three times previously Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as strong because field audit indicated the controls are robust. The impact is assessed to be low due to the kWh impact.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has discussed the audit findings with the Southland DC with the intent that council makes every effort to ensure the exceptions are rectified.	Continuous improvement	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis continues to work with the council to raise database accuracy levels.	Continuous improvement	

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 SST profile. Submissions are based on the database information, with on and off times derived from data logger information. I reviewed the submission information and confirmed the calculation for November 2021 was correct.

It was noted in the previous audit that the NZTA Edendale bypass lights were installed in the field but had not been added to RAMM, this has now been resolved and the lights are recorded in RAMM.

The database was confirmed to fall within the database accuracy threshold as detailed in **section 3.1**.

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

Audit outcome

Compliant

CONCLUSION

The RAMM database is managed by Southland DC and is remotely hosted by thinkproject New Zealand Limited. The field work is carried out by NES. Pocket RAMM is used in the field to issue work and record changes in the field into RAMM.

The field audit was undertaken of a statistical sample of 241 items of load in SDC the area on January the 25th 2022. This found that the database is within the allowable +/-5% accuracy.

The total volume submitted to the Reconciliation Manager is based on a monthly database report derived from RAMM, and the "burn time" which is sourced from data loggers. The methodology is compliant.

I checked the submission calculation provided by Genesis for November 2021 and it matches the database.

The audit found two minor non-compliances and makes no recommendations. The future risk rating of three indicates that the next audit be completed in 24 months. I have considered this in conjunction with Genesis's responses and recommend that the next audit be in 24 months.

PARTICIPANT RESPONSE

Genesis has discussed the audit findings with the Southland DC with the intent that council makes every effort to ensure the exceptions are rectified.

Genesis continues to work with the council to raise database accuracy levels.