Vector Kapuni GTP Monitoring Programme Annual Report 2017-2018

Technical Report 2018-53

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Executive summary

Vector Gas Ltd (Vector) operates a gas treatment plant (Kapuni Gas Treatment Plant, KGTP) located on Palmer Road at Kapuni, in the Kapuni catchment, South Taranaki. This report for the period July 2017 to June 2018 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess Vector's environmental and consent compliance performance during the period under review. The report also details the results of the monitoring undertaken and assesses the environmental effects of Vector's activities.

Vector holds a total of 11 resource consents, which include a total of 84 conditions setting out the requirements that they must satisfy. Vector holds one consent to allow it to take water, two consents to discharge effluent/stormwater into the Kapuni Stream, three consents to discharge to land, two land use permits, and one consent to discharge emissions into the air at this site. Two certificates of compliance are held, in relation to activities permitted under the Regional Freshwater Plan.

During the monitoring period, Vector KGTP demonstrated an overall high level of environmental performance.

The Council's monitoring programme for the year under review included three inspections, six water samples collected for physicochemical analysis and inter-laboratory comparison, a review of four biomonitoring surveys of receiving waters and two fish surveys. Also a review of monthly provided effluent data and surface water abstraction data is undertaken throughout the monitoring period.

The monitoring indicated that the effects of the discharge of stormwater and process waters into the Kapuni Stream were minimal. Inter laboratory analysis indicated fairly good agreement between both parties. Surface water abstraction was compliant for the whole monitoring period.

The review of the biological monitoring concluded that overall, the MCI scores for nearly all sites were similar to or higher than their respective means. The Kapuni Stream was generally in 'good' to 'excellent' health and the impact (if any) of the industrial activity at Kapuni was not discernible.

The findings of the fish survey concluded with the following: Overall, these electric fishing results from the Kapuni catchment do not provide any conclusive indication that the petrochemical industries are having any significant adverse effects on fish communities in the Kapuni catchment, with results being affected by sedimentation and a significant number of preceding freshes.

The regional NOx assessment indicated that 90 % of the 1-hour average results fell into Ministry's 'excellent' categories and 3 % of the results lay within Ministry's 'good' category. No results ever entered the 'action' category, i.e., no results ever exceeded the National Environmental Standard of 200µg/m^3.

There were zero unauthorised incidents recording non-compliance in respect of this consent holder during the period under review.

During the year, the Company demonstrated a high level of environmental and administrative performance with the resource consents.

For reference, in the 2017-2018 year, consent holders were found to achieve a high level of environmental performance and compliance for 76 % of the consents monitored through the Taranaki tailored monitoring programmes, while for another 20 % of the consents, a good level of environmental performance and compliance was achieved.

In terms of overall environmental and compliance performance by the consent holder over the last several years, this report shows that the consent holder's performance remains at a high level in the year under review.

This report includes recommendations for the 2018-2019 year.

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1 Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report is for the period July 2017 to June 2018 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Vector Gas Ltd (Vector). Vector operate a gas treatment plant (Kapuni Gas Treatment Plant- KGTP) which is situated on the Palmer Road, at Kapuni, in the Kapuni catchment, South Taranaki.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by Vector that relate to abstractions and discharges of water within the Kapuni catchment, and the air discharge permit held by Vector to cover emissions to air from the site.

One of the intents of the *Resource Management Act 1991* (RMA) is that environmental management should be integrated across all media, so that a consent holder's use of water, air, and land should be considered from a single comprehensive environmental perspective.

Accordingly, the Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of Vector's use of water, land and air, and is the twenty-seventh combined annual report by the Council for Vector.

1.1.2 Structure of this report

Section 1 of this report is a background section. It sets out general information about:

- consent compliance monitoring under the RMA and the Council's obligations;
- the Council's approach to monitoring sites though annual programmes;
- the resource consents held by Vector in the Kapuni catchment;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted in Vector's site/catchment.

Section 2 presents the results of monitoring during the period under review, including scientific and technical data.

Section 3 discusses the results, their interpretations, and their significance for the environment.

Section 4 presents recommendations to be implemented in the 2018-2019 monitoring year.

A glossary of common abbreviations and scientific terms, and a bibliography, are presented at the end of the report.

1.1.3 The Resource Management Act 1991 and monitoring

The RMA primarily addresses environmental 'effects' which are defined as positive or adverse, temporary or permanent, past, present or future, or cumulative. Effects may arise in relation to:

a. the neighbourhood or the wider community around an activity, and may include cultural and social-economic effects;
b. physical effects on the locality, including landscape, amenity and visual effects;
c. ecosystems, including effects on plants, animals, or habitats, whether aquatic or terrestrial;

d. natural and physical resources having special significance (for example recreational, cultural, or aesthetic); and

e. risks to the neighbourhood or environment.

In drafting and reviewing conditions on discharge permits, and in implementing monitoring programmes, the Council is recognising the comprehensive meaning of 'effects' inasmuch as is appropriate for each activity. Monitoring programmes are not only based on existing permit conditions, but also on the obligations of the RMA to assess the effects of the exercise of consents. In accordance with Section 35 of the RMA, the Council undertakes compliance monitoring for consents and rules in regional plans, and maintains an overview of the performance of resource users and consent holders. Compliance monitoring, including both activity and impact monitoring, enables the Council to continually re-evaluate its approach and that of consent holders to resource management and, ultimately, through the refinement of methods and considered responsible resource utilisation, to move closer to achieving sustainable development of the region's resources.

1.1.4 Evaluation of environmental and administrative performance

Besides discussing the various details of the performance and extent of compliance by Vector, this report also assigns them a rating for their environmental and administrative performance during the period under review.

Environmental performance is concerned with actual or likely effects on the receiving environment from the activities during the monitoring year. Administrative performance is concerned with the Vector's approach to demonstrating consent compliance in site operations and management including the timely provision of information to Council (such as contingency plans and water take data) in accordance with consent conditions.

Events that were beyond the control of the consent holder and unforeseeable (that is a defence under the provisions of the RMA can be established) may be excluded with regard to the performance rating applied. For example loss of data due to a flood destroying deployed field equipment.

The categories used by the Council for this monitoring period, and their interpretation, are as follows:

Environmental Performance

High: No or inconsequential (short-term duration, less than minor in severity) breaches of consent or regional plan parameters resulting from the activity; no adverse effects of significance noted or likely in the receiving environment. The Council did not record any verified unauthorised incidents involving significant environmental impacts and was not obliged to issue any abatement notices or infringement notices in relation to such impacts.

Good: Likely or actual adverse effects of activities on the receiving environment were negligible or minor at most. There were some such issues noted during monitoring, from self reports, or in response to unauthorised incident reports, but these items were not critical, and follow-up inspections showed they have been dealt with. These minor issues were resolved positively, co-operatively, and quickly. The Council was not obliged to issue any abatement notices or infringement notices in relation to the minor non-compliant effects; however abatement notices may have been issued to mitigate an identified potential for an environmental effect to occur.

For example:

- High suspended solid values recorded in discharge samples, however the discharge was to land or to receiving waters that were in high flow at the time;
- Strong odour beyond boundary but no residential properties or other recipient nearby.

Improvement required: Likely or actual adverse effects of activities on the receiving environment were more than minor, but not substantial. There were some issues noted during monitoring, from self reports, or in response to unauthorised incident reports. Cumulative adverse effects of a persistent minor non-compliant activity could elevate a minor issue to this level. Abatement notices and infringement notices may have been issued in respect of effects.

Poor: Likely or actual adverse effects of activities on the receiving environment were significant. There were some items noted during monitoring, from self reports, or in response to unauthorised incident reports. Cumulative adverse effects of a persistent moderate non-compliant activity could elevate an 'improvement required' issue to this level. Typically there were grounds for either a prosecution or an infringement notice in respect of effects.

Administrative performance

High: The administrative requirements of the resource consents were met, or any failure to do this had trivial consequences and were addressed promptly and co-operatively.

Good: Perhaps some administrative requirements of the resource consents were not met at a particular time, however this was addressed without repeated interventions from the Council staff. Alternatively adequate reason was provided for matters such as the no or late provision of information, interpretation of 'best practical option' for avoiding potential effects, etc.

Improvement required: Repeated interventions to meet the administrative requirements of the resource consents were made by Council staff. These matters took some time to resolve, or remained unresolved at the end of the period under review. The Council may have issued an abatement notice to attain compliance.

Poor: Material failings to meet the administrative requirements of the resource consents. Significant intervention by the Council was required. Typically there were grounds for an infringement notice.

For reference, in the 2017-2018 year, consent holders were found to achieve a high level of environmental performance and compliance for 76% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 20% of the consents, a good level of environmental performance and compliance was achieved.

1.2 Process description

The Kapuni Gas Treatment Plant (KGTP) is owned and operated by Vector. It was built between 1969-1970. The original plant was designed to process high carbon dioxide Kapuni gas to a quality suitable for use in general domestic, commercial and industrial appliances. The process involves the removal of carbon dioxide from the gas, which is then dried and chilled to remove some of the heavier hydrocarbons which could affect pipeline operation and appliance efficiency. The pipeline quality gas is then distributed via the transmission distribution network.

The first of several plant expansions occurred in 1973 with the addition of plant to process the heavier hydrocarbons into LPG (liquefied petroleum gas) and natural gas. In 1979-1980, further additions were made to process Maui gas and to recover, purify and liquefy some of the carbon dioxide from the gas. The liquid carbon dioxide is used in the beverage, food processing and refrigeration markets.

Photo 1 Vector KGTP during three train operation

In 1985, the gas treatment plant was expanded with the installation of the low temperature separation (LTS) gas conditioning plant which processed the high carbon dioxide content Kapuni gas for water and heavy hydrocarbon removal only. The conditioned gas was supplied to the region's methanol plants so that it could be blended with the much lower carbon dioxide content Maui gas for more efficient methanol production. Methanex reduced its production capacity and as a result the gas conditioning plant was mothballed in May 2005.

During 1997, the KGTP refrigeration systems were upgraded, enabling more natural gas liquids to be removed from the raw gas. Reliability and efficiencies were further improved with the completion in 1998 of a $25 million, three-year refurbishment of the plant's processes and control systems.

Vector Limited and Todd Energy are 50:50 partners in Kapuni Energy which has developed a $37 million, 25MW cogeneration plant within Vector's gas treatment plant complex at Kapuni. It provides the electricity and steam requirements of the KGTP and Fonterra's Lactose factory at Kapuni. It also exports excess electricity into the national grid.

During the 2004-2005 period, NGC completed a $7 million upgrade of the treatment plant, involving re-commissioning one of the plant's three process trains, adding a further 100 tonnes of LPG storage, and installing a reverse osmosis water treatment plant.

In April 2006 NGC changed its name to Vector Gas Ltd. NGC remains a legal entity holding previously issued consents, but consents applied for after this date were granted in the name of Vector Gas Ltd and more recently, Vector Limited.

The gas supply for the plant comes from the adjacent Kapuni Gas Production Station formerly operated by Shell Taranaki Limited now Todd Petroleum Mining Company Limited Services Ltd.

Water is drawn from the Kapuni Stream via the intake structure and raw water supply line for Hawera water treatment plant. Water discharges are from the gas treatment process, plant utilities, domestic effluent and site stormwater. Solid waste discharges are from settling basins for water treatment and waste storage. Air discharges are from the gas treatment process.

1.3 Resource consents

A summary of the consents held by Vector in relation to activities at its Kapuni gas treatment plant is given in Table 1 below and the consents are discussed in Sections 1.3.1 to 1.3.5. A copy of each of the consents can be found in Appendix I.

Table 1 Summary of resource consents held by Vector

Consent number	Purpose	Volume	Next review date	Expiry date
1123-3	Discharge cooling and wastewater to Kapuni Stream		2023	2035
1125-4	Take from Kapuni Stream	3,900 m^3/day (52/58 L/s)	2020	2035
1225-3	Discharge treated sewage and process wastes to land	13.5 m^3/day (0.97 L/s)	2023	2035
4087-2	Discharge emissions to air		2023	2029
5090-1	Structures for pipeline crossings (Motumate/Waiokura)		2023	2032
5091-1	Discharge steam pipeline construction materials		2023	2032
7043-1	Discharge stormwater/settling ponds sludges to land			2023
7281-1	Remove weir structure from Kapuni Stream			2023
7633-0**	Structures in, on, over or under Kapuni Stream		-	--
7755-1	Discharge stormwater (non-process areas) to Kapuni Stream		2023	2035
7756-0**	Discharge stormwater from LPG load-out to land		-	-
*5496-1 recently allowed to expire, activity covered under regional plan **7633-0/7756-0 are both certificates of compliance				

1.3.1 Water abstraction permit

Section 14 of the RMA stipulates that no person may take, use, dam or divert any water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or it falls within some particular categories set out in Section 14.

Vector holds water permit **1125-4** to take water from Kapuni Stream for the operation of a gas processing facility and related ancillary purposes and downstream uses. This permit was issued by the Council on 19 June 2012 under Section 87(d) of the RMA. It is due to expire on 1 June 2035.

- Condition 1 sets maximum abstraction rates under normal and emergency conditions.
- Condition 2 defines three take location alternatives.
- Condition 3 limits the duration of abstraction for emergency or other purposes.
- Condition 4 relates to best practicable option.

- Conditions 5 to 10 relate to water metering and provision of records.
- Condition 11 addresses intake screening for fish protection.
- Condition 12 requires financial contribution to Council for providing riparian planting and fencing in the Kapuni catchment.
- Condition 13 is a review condition.

The permit is attached to this report in Appendix I.

This summary of consent conditions may not reflect the full requirements of each condition. The consent conditions in full can be found in the resource consents which are appended to this report.

1.3.2 Water discharge permit

Section 15(1)(a) of the RMA stipulates that no person may discharge any contaminant into water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or by national regulations.

Vector holds water discharge permit **1123-3** to discharge process effluent and stormwater to the Kapuni Stream. This permit was issued by the Council on 18 June 2012 under Section 87(e) of the RMA. It expires on 1 June 2035.

- Condition 1 relates to best practicable option.
- Condition 2 limits the stormwater catchment area.
- Conditions 3 to 9 refer to discharge composition and effects of the discharge on the Kapuni Stream.
- Conditions 10 and 11 relate to an effluent and stormwater management plan.
- Conditions 12 and 13 relate to treatment and cleaning chemicals.
- Conditions 14 and 15 are review conditions.

Vector holds water discharge permit **7755-1** to discharge stormwater from non-process areas to the Kapuni Stream. This permit was issued by the Council on 20 June 2012 under Section 87(e) of the RMA. It expires on 1 June 2035.

- Condition 1 relates to best practicable option.
- Condition 2 limits the stormwater catchment area.
- Condition 3 refers to effects of the discharge on the Kapuni Stream.
- Condition 4 relates to a contingency plan in case of spillage or accidental discharge.
- Condition 5 requires a stormwater management plan.
- Conditions 6 and 7 deal with lapse of consent and review of conditions.

These permits are attached to this report in Appendix I.

This summary of consent conditions may not reflect the full requirements of each condition. The consent conditions in full can be found in the resource consents which are appended to this report.

1.3.3 Air discharge permit

Section 15(1)(c) of the RMA stipulates that no person may discharge any contaminant from any industrial or trade premises into air, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations.

Vector holds air discharge permit **4087-2** to cover the discharge of emissions to air from the treatment of natural gas and other related activities. This permit was issued by the Council on 7 February 1996 under Section 87(e) of the RMA. Consent conditions were varied on 27 January 1997. It is due to expire on 1 June 2029.

- Condition 1 relates to best practicable option.
- Conditions 2, 8, 9, 11, 12, 13, 14 and 15 relate to minimisation of emissions.
- Conditions 3 to 7 relate to notification and reporting.
- Conditions 10 and 16 are review conditions.
- Condition 17 relates to provision of a contingency plan.

The permit is attached to this report in Appendix I.

This summary of consent conditions may not reflect the full requirements of each condition. The consent conditions in full can be found in the resource consents which are appended to this report.

1.3.4 Discharges of wastes to land

Sections 15(1)(b) and (d) of the RMA stipulate that no person may discharge any contaminant onto land if it may then enter water, or from any industrial or trade premises onto land under any circumstances, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations.

Vector holds discharge permit **1225-3** to discharge from an aerated sewage treatment plant onto and into land. This permit was issued by the Council on 20 June 2012 under Section 87(e) of the RMA. It is due to expire on 1 June 2035.

- Condition 1 relates to best practicable option.
- Condition 2 prohibits direct discharge to surface water.
- Condition 3 addresses maximum daily discharge volume and minimum disposal area.
- Condition 4 is a review condition.

Vector holds discharge permit **5091-1** to cover the discharge of minor amounts of earth material and associated stormwater onto land and into various streams associated with constructions for steam and electricity supply to the Kapuni lactose plant. This permit was issued by the Council on 27 January 1997 under Section 87(e) of the RMA. It is due to expire in June 2032.

- Condition 1 relates to the discharge and its effects.
- Condition 2 relates to notification.
- Condition 3 is a review condition.

Vector holds discharge permit **7043-1** to cover the discharge of sludge from stormwater and filter backwash ponds onto land. This consent was issued by the Council under Section 87(a) of the RMA on 29 January 2007. It is due to expire on 1 June 2023.

Consent 7043-1 was varied on 12 August 2009 to allow the inclusion of sludge from the northern settling pond, and again on 25 January 2010 to allow the inclusion of some liquid from the ponds.

- Condition 1 relates to best practicable option.
- Conditions 2 and 5 require exercise of consent in accordance with documentation supplied.
- Condition 3 relates to sludge source, and condition 6 controls discharge location.
- Condition 4 allows discharge of liquids at times when the Kapuni Stream flow is low.
- Condition 7 relates to records.
- Condition 8 addresses soil relocation.
- Condition 9 addresses effects on surface water.
- Conditions 10 and 11 relate to guidelines for industrial sites and notification of the District Council.
- Condition 12 is a review condition.

Theses permits are attached to this report in Appendix I.

This summary of consent conditions may not reflect the full requirements of each condition. The consent conditions in full can be found in the resource consents which are appended to this report.

1.3.5 Land use permits

Section 13(1)(a) of the RMA stipulates that no person may use, erect, reconstruct, place, alter, extend, remove, or demolish any structure or part of any structure in, on under, or over the bed of any lake or river, unless the activity is expressly allowed for by a resource consent, or a rule in a Regional Plan and in any relevant proposed regional plan.

Vector holds land use consent **5090-1** related to pipeline and various structures over the beds of various streams in connection with pipelines to the Kapuni lactose plant. This consent was issued by the Council under Section 87(a) of the RMA on 16 August 1996. It is due to expire on 1 June 2032.

- Conditions 1 and 2 relate to notification and provision of information to the Council.
- Conditions 3 and 4 relate to maintenance.
- Condition 5 relates to fish passage and condition 6 related to reinstatement.
- Conditions 7 and 8 are review conditions.

Vector holds land use consent **7281-1** related to removal of a weir from the Kapuni Stream. This consent was issued by the Council under Section 87(a) of the RMA on 10 April 2008. It is due to expire on 1 June 2023.

- Condition 1 requires exercise of consent in accordance with documentation supplied.
- Condition 2 relates to notification and condition 3 relates to best practicable option.
- Conditions 4, 5 and 6 relate to riverbed disturbance, control and mitigation of sediment, and removal of demolition material.
- Condition 7 stipulates dates between which works may occur and condition 8 prohibits the use of explosives.
- Conditions 9 and 10 address lapse and review of consent.

These permits are attached to this report in Appendix I.

This summary of consent conditions may not reflect the full requirements of each condition. The consent conditions in full can be found in the resource consents which are appended to this report.

1.4 Monitoring programme

1.4.1 Introduction

Section 35 of the RMA sets obligations upon the Council to gather information, monitor and conduct research on the exercise of resource consents within the Taranaki region. The Council is also required to assess the effects arising from the exercising of these consents and report upon them.

The Council may therefore make and record measurements of physical and chemical parameters, take samples for analysis, carry out surveys and inspections, conduct investigations and seek information from consent holders.

The monitoring programme for the Vector site consisted of four primary components.

1.4.2 Programme liaison and management

There is generally a significant investment of time and resources by the Council in:

- ongoing liaison with resource consent holders over consent conditions and their interpretation and application;
- in discussion over monitoring requirements;
- preparation for any consent reviews, renewals or new consent applications;
- advice on the Council's environmental management strategies and content of regional plans; and
- consultation on associated matters.

1.4.3 Site inspections

The Vector site was inspected three times during the monitoring period. Inspections were undertaken with regard to consents for the abstraction of or discharge to water, the main points of interest were plant processes with potential or actual discharges to receiving watercourses, including contaminated stormwater and process wastewaters. Air inspections focused on plant processes with associated actual and potential emission sources and characteristics, including potential odour, dust, noxious or offensive emissions. Sources of data being collected by Vector were identified and accessed, so that performance in respect of operation, internal monitoring, and supervision could be reviewed by the Council. The neighbourhood was surveyed for environmental effects.

1.4.4 Chemical sampling

Chemical sampling undertaken by the Council in this monitoring period was focused on the discharge from the facility and the effects on the receiving waters. Vector holds consent (1123-3). This allows for the discharge of cooling and waste waters to the Kapuni Stream throughout the year. The process of the discharge is controlled by the facility and checked through chemical analysis prior to the discharge occurring. The analysis of the discharge is provided to the Council in the form of a monthly annual report.

In order to ascertain the quality of the results provided by Vector, the Council conducted inter-laboratory comparison exercises which encompassed the following.

A sample of the discharge waters is collected and split between two samples. The same is performed on the preceding, upstream and the downstream (below the discharge point) sample locations.

These samples are then analysed separately, (one set is analysed at Vector, the other at the Council) and the results compared.

Table 2 Vector KGTP inter laboratory comparison analytes

Discharge sample analytes	Upstream and downstream sample analytes
Chlorine (Free)	Conductivity
Chlorine (Total)	Dissolved reactive phosphate (DRP)
Conductivity	Potassium
Dissolved reactive phosphate (DRP)	Sodium
Hydrocarbon	Ammonia and Un-ionised
Potassium	pH
Sodium	Temperature
Ammonia and Un-ionised	Turbidity
pH	Vanadium
Suspended solids	

Discharge sample analytes	Upstream and downstream sample analytes
Temperature Turbidity Vanadium Zinc	

1.4.5 Biomonitoring surveys

A biological macroinvertebrate survey was performed on four occasions during the 2017-2018 monitoring year by the third party consultant Stark Environmental. In addition, two electric fish netting surveys were also carried out. These were undertaken in the Kapuni Stream and associated tributaries at established monitoring locations. The Council reviews the reports formulated by Stark Environmental, the review is provided within this report and is also appended.

2 Results –Water

2.1 Inspections

Three inspections of the Vector site were undertaken this monitoring period by an officer of the Council. The inspections were undertaken on the 19th September 2017, 30th January 2018, and 27th June 2018.

The focus of these inspections included the following:

- Upcoming operations and current operation;
- Heat recovery steam generator operation;
- Discharge process effluent and stormwater management;
- Kapuni stream monitoring;
- Liquid transfer system;
- Dry and wet chemical storage;
- On-site sewage treatment system;
- Land treatment;
- River gauging;
- LPG load out facility; and
- Housekeeping.

Overall, the Vector plant was found to be in a very tidy condition, with staff knowledgeable about processes and compliance requirements. Further liaison with Vector was also undertaken through inter-laboratory comparison exercises. Stream gauging to establish Kapuni Stream flows is planned to be undertaken by the Council in the upcoming monitoring period, this will replace the current flo-dar stream flow monitor.

2.2 Results of abstraction and discharge monitoring

2.2.1 Surface water abstraction

Water for Vector is drawn from the Kapuni Stream about 1.4 km above the plant via the intake structure and raw water supply line for Hawera water treatment plant. South Taranaki District Council (STDC) holds land use permit 7413-1 for the structure and water permit 0146-2 to take.

Under its own water permit 1125-4, Vector must install and maintain a meter and datalogger at the point where the water enters the supply line for the Vector site. The monitoring equipment must be certified by an appropriately qualified person at least every five years.

The water permit conditions are consistent with the Resource Management (Measurement and Reporting of Water Takes) Regulations 2011, which required Vector by 10 November 2012 to keep daily records of volume taken, and thereafter supply by 31 July each year the record for the preceding 1 July to 30 June period. By stipulating a monitoring point other than the take location, the grant of consent 1125-4 constitutes an approval by Council under the Regulations.

Volumes supplied to Vector had been measured and recorded on STDC's supervisory control and data acquisition (SCADA) system since 6 January 2010. Telemetry directly to Council was connected in January 2014.

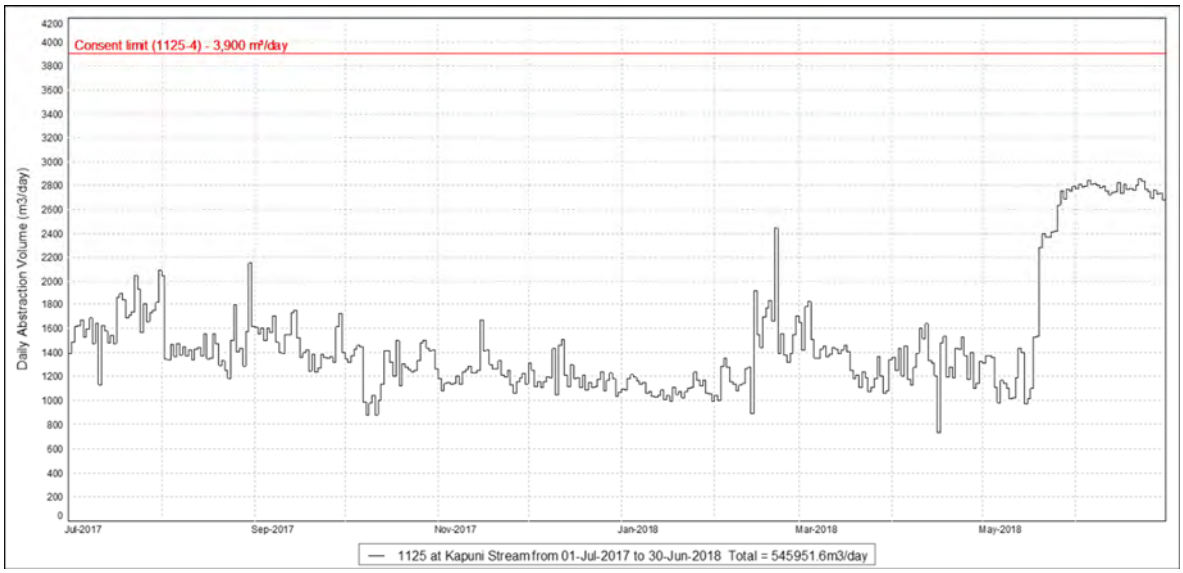

Figure 1 Daily surface water abstraction volumes (1125-4) Vector KGTP

The daily surface water abstraction record is provide in the above Figure 1. The record indicates that Vector were in compliance with their daily water abstraction rate, whereby they are allowed to abstract up to 3,900 m^3 per day. In total, Vector abstracted 545,951m^3 from the Kapuni Stream this monitoring period. This is an increase from the previous monitoring period of 47,491 m^3.

2.2.2 Provision of consent holder data

Monitoring of the discharge constituents and the Kapuni Stream is undertaken by Vector, prior to each discharge and one hour following commencement of the discharges authorised by discharge consent 1123-3.

Consent 1123-3 requires the preparation of an effluent disposal management plan. The plan includes the reporting on the exercise of the consents. Vector provided, at approximately monthly intervals, discharge data in relation to these consents for the monitoring period.

On two occasions in this monitoring period the Council carried out inter-laboratory comparisons with the Vector site laboratory. The results are discussed in the following Section 2.2.3.

The following pertains to assessment of the Vector discharge and stream monitoring data. This data was provided to the Council at monthly intervals throughout the year.

Temperature

Temperature is recorded continuously by Vector both upstream and downstream of the discharge point. In 2017-2018, the maximum temperature differential recorded was 0.9°C. This occurred on the 4 January 2018. This was within consent limits, which stipulates a maximum allowable increase of 2.0°C.

pH

Consent **1123-3** requires the pH to be within the range 6.5-9.0. Results provided by Vector detailed that compliance was achieved throughout the monitoring period. In 2017-2018, the maximum recorded pH at the downstream sampling site was 7.99 on 30 November 2017. The corresponding upstream pH was 7.98. The minimum pH recorded downstream was 6.65 on 7 June 2018. The corresponding upstream pH value was 6.54 pH.

Ammonia

Special condition 6 of consent **1123-3** limits the concentration of unionised-ammonia to not exceed 0.006 g/m^3 when measured at the downstream monitoring location on the Kapuni Stream. In any case the discharge shall not cause the concentration of un-ionised ammonia to exceed 0.025 g/m^3 in the Kapuni Stream at this point, this limit is set for the protection of aquatic species.

Results provided by Vector show that compliance was achieved throughout the monitoring period. In 2017-2018, the maximum recorded downstream un-ionised ammonia concentration was 0.01 g/m^3 on 28 August 2017.

While this was above the limit of 0.006 g/m^3 NH_3, the facility was not discharging at the time, thus no upstream sample was analysed as it was a pre-discharge sample. The corresponding post discharge sample collected on the same day, one hour after the discharge had commenced reported a value of 0.00 g/m^3 NH_3. The overall limit is set at 0.025 g/m^3 NH_3 and these results indicate compliance with this value and the consent condition.

Sodium

Special condition 7 of consent limit **1123-3** limits the sodium concentration of the Kapuni Stream to 40 g/m^3. The sodium concentration is also further limited to 22 g/m^3 in accordance with an agreement with Vector's neighbours, Ballance.

Results provided by Vector in this monitoring period indicated that compliance was achieved for this condition. During the 2017-2018 monitoring period the results indicated that the maximum recorded downstream sodium concentration was 16.50 g/m^3, this was recorded on the 29 December 2017. The corresponding upstream value was 11.60 g/m^3.

Water treatment chemicals

Special condition 12 of consent **1123-3** requires the consent holder to notify the Council of any change in water treatment chemical or increase in maximum concentration of any water treatment chemical at least one month prior to change of a water treatment programme.

In this monitoring period there was no notification of any water treatment chemical change or notification of a proposed increase in concentration of water treatment chemical.

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2.2.3 Results of receiving environment monitoring

The Council carried out compliance monitoring checks on Vector's method of wastewater discharge. This included the monitoring of the discharge and the Kapuni Stream on 26 January 2018 and 27 June 2018.

Split samples were collected by Vector and the Council from Vector's discharge point, and from the Kapuni Stream, both upstream and downstream of the discharge point. Results are presented in the following Table 3.

Table 3 2017-2018 results of the inter-laboratory comparisons

26-Jan-18	Site	U/s of discharge KPN000290		IND002008 KGTP discharge		D/s of discharge KPN000293	
	Units	TRC	KGTP	TRC	KGTP	TRC	KGTP
Chlorine Free	g/m³	-	-	<0.1	-	-	-
Chlorine Total	g/m³	-	-	<0.1	-	-	-
Conductivity	mS/m@20°C	9.3	-	29.9	-	9.9	-
Dissolved reactive phosphorous	g/m³ P	0.017	-	0.594	-	0.03	-
Total petroleum hydrocarbons	g/m³	-	-	<0.5	-	-	-
Potassium	g/m³	3.4	3.6	30.8	35	4.2	4.6
Sodium	g/m³	7.7	9.5	34.3	38	8.7	10.4
Ammonia	g/m³ N	0.052	0	0.065	0.2945	0.045	0.0179
pH	pH	7.9	7.61	7.1	7.4	7.8	7.69
Suspended solids	g/m³	-	-	28	-	-	-
Turbidity	NTU	0.96	-	7.9	-	1.2	-
Vanadium	g/m³	<0.001	0.01	0.42	1.27	0.011	0.04
Zinc	g/m³	-	-	0.171	-	-	-
Temperature	°C	20.6	20.2	26.6	26.6	20.9	20.4
Un-ionised ammonia	g/m³	0.002	<0.001	<0.001	0.0058	0.00142	<0.001
27-Jun-18	Site	U/s of discharge KPN000290		IND002008 KGTP discharge		D/s of discharge KPN000293	
	Units	TRC	KGTP	TRC	KGTP	TRC	KGTP
Chlorine Free	g/m³	-	-	-	-	-	-
Chlorine Total	g/m³	-	-	-	-	-	-
Conductivity	mS/m@20°C	11.7	-	26.9	-	12.2	-
Dissolved reactive phosphorous	g/m³ P	0.014	-	0.5	-	0.018	-
Total petroleum hydrocarbons	g/m³	-	-	<4	-	-	-
Potassium	g/m³	3.6	3.8	21	22	4.1	4.3
Sodium	g/m³	8.9	9.5	31	32	9.6	10
Ammonia	g/m³ N	0.03	0.0179	0.177	0	0.0106	0.0268
pH	pH	7.3	7.05	6.8	7.2	7.3	7.04
Suspended solids	g/m³	-	-	14	-	-	-
Turbidity	NTU	1.56	-	6.8	-	1.78	-
Vanadium	g/m³	0.0014	0.01	0.37	0.77	0.0106	0.02
Zinc	g/m³	-	-	0.058	-	-	-
Temperature	°C	7.1	6.4	14.8	14.1	7.1	6.5
Un-ionised ammonia	g/m³	<0.01	<0.001	<0.01	<0.001	<0.01	<0.001

The results of the two inter-laboratory comparisons undertaken in this monitoring period are provided in the above Table 3. The results indicated the following:

- All results were within consent limits.
- Temperature comparisons indicated fairly good agreement between laboratories across both exercises undertaken this monitoring period. However, the June 2018 temperature comparison indicated a variation of 0.7°C, with the KGTP samples found to be under estimating the temperature. Regular calibrations of temperatures probes should be undertaken moving forward.
- Potassium comparisons indicated good agreement between the laboratories, the largest variation observed was found to be 4.2 g/m^3 K, on the discharge sample undertaken 26 January 2018.
- Sodium comparisons, in similarity to the potassium readings, indicated good agreement, the largest variation was again found in the January 2018 discharge comparison, with a variation of 3.7 g/m^3 Na.
- Ammonia comparisons indicated a slight variation between results. On one occasion TRC found the discharge to be 0.065 g/m^3 (Jan 2018) while the Vector sample indicated value of 0.294 g/m^3 which indicated variation of 0.230 g/m^3. While there is a slight variation between results, the values are of low concentrations, thus accuracy at trace concentrations is inherently difficult to gain an accurate agreement.
- pH variations were found to be relatively minor, with the largest variation being 0.4 pH units recorded in the discharge sample in June 2018.
- Vanadium, in similarity to the previous monitoring period, the vanadium results indicated slight variations. The reason for this variation was due to the method of analysis undertaken by Vector. They require a swift result as they are required to discharge almost daily. Vector infers vanadium concentration based on the ratio between vanadium and potassium in the Benfield solution (this is the source of vanadium in the KGTP effluent). As potassium concentrations may increase from other sources in the process effluent, it results in an over-estimate of the true vanadium in the effluent. Vector treats the effluent vanadium value as true which allows for a margin of error with respect to the discharge concentration. The Council employs the longer and more accurate method of analysis (vanadium specific Gallic acid) to quantify the true actual value.
- Un-ionised ammonia concentrations were all below, or close to, the limit of detection..
- Total and free chlorine monitoring of the discharge was undertaken on one occasion this period, and the associated analysis indicated values below the limit of the detection. The Council is currently reviewing the method undertaken for its total and free chlorine analysis, post the closure of its onsite laboratory, thus in the June 2018 monitoring round it was not undertaken.

2.2.4 Bio-monitoring

Four bio-monitoring surveys and two fish netting surveys were undertaken this monitoring period by the consultant, Stark Environmental, on behalf of Vector. A review of the reports was performed by an officer of the Council, the review is appended to this report. A brief synopsis of the survey review is provided below with associated dates of surveys is provided in the following Table 4, the sample locations are also provided in Figure 2.

Table 4 Biomonitoring surveys undertaken on the Kapuni Stream catchment 2017-2018

Survey dates	Report number	Taxa	Number of sites	
			Kapuni Stream	Tributaries
23/08/17	2017-06	Macroinvertebrate	7	2
4/10/17	2017-07	Fish	9	2
4/10/17	2017-08	Macroinvertebrate	9	2
17/01/18	2018-01	Macroinvertebrate	7	2
24/04/18	2018-04	Fish	7	
24/04/18	2018-05	Macroinvertebrate	7	2

Macroinvertebrate survey results

During all four surveys, the Kapuni Stream and its tributary sites generally had scores indicating 'excellent' macroinvertebrate health for mainstem sites and 'fair' health for the two tributary sites. For the August 2017 survey, the majority of mainstem sites had new maximum MCI values while site 5 had a typical result and site 13 recorded a new minimum, but was only the fifth sample taken. In the October 2017 survey two more sites had new maximums while site 13 recorded a new maximum. Scores for the January and April surveys were also high. Most surveys recorded the expected trend of decreasing score in a downstream direction, with a significant decrease recorded between site 7 and the Kokiri Rd site on only one occasion (during the January survey.

Linear trends in MCI values at the sites are also reported, by plotting MCI and taxa richness versus time using the LOWESS (Locally Weighted Scatterplot Smoothing) method (used with Tension = 0.4). The statistical significance of the trends was assessed using Mann-Kendall tests in STATISTICA 8. The Benjamini-Hochberg false discovery rate (FDR) was also used, to control the overall Type-I error rate in time series analyses. All sites, apart from site 13 that did not have sufficient data collected for trend analysis, exhibited a statistically significant positive trend in all surveys, with such significantly positive trends being strong enough to avoid elimination by the FDR. The last 5-10 years show a levelling off or decrease in scores but as this effects the control site (site 9), it appears to be due to factors unrelated to activities associated with Ballance Kapuni.

Some additional analysis was done, where recorded MCI scores were compared with that predicted using relationships developed between MCI scores and altitude for ringplain streams. There were three predicted values provided, the first based on a relationship developed using all generic ringplain data, the second using Kapuni Stream data collected since 1981 only and the third using Kapuni Stream data collected since 2000. The latter predicts the highest MCI scores, and this is the relationship against which the reported results were compared. Observed results were generally higher than expected results for the August survey and close to expected results for the other surveys.

For the four surveys taxa numbers were variable between sites and surveys. The survey on 23 August 2017 recorded low taxa numbers but this was due to high preceding flows. No sites had taxa richnesses that were indicative of preceding water quality that was toxic to macroinvertebrates. Long term trends in taxa richness are also evident at some sites in the Kapuni Stream. This trending, undertaken for the July and October 2014

surveys, showed a statistically significant (P<0.05) negative trend in taxa richness at all sites except for site 3. After the October 2014 survey, the need for this trending was reconsidered. As the relationship between taxon richness and stream health is not linear, as both highly polluted and pristine waters can produce low taxa richness, it was decided to discontinue the trending of taxon richness.

Overall, the MCI scores for nearly all sites were similar to or higher than their respective means. The Kapuni Stream was generally in 'good' to 'excellent' health and the impact (if any) of the industrial activity at Kapuni was not discernible.

Figure 2 Bio-monitoring sites in the Kapuni catchment

Fish survey (electric fishing)

All sites were surveyed for fish using the single pass electric fishing technique. A total of 22 animals, comprising four taxa, were caught at 11 sites during the October 2017 survey. During the April 2018 survey, 13 animals comprising three taxa were caught. Both survey results were within the range (8-221) of total numbers and variety (2-8 taxa) recorded in previous years, with the autumn survey having lower numbers and taxa recorded than the spring survey, in keeping with what was found in the previous monitoring year.

In October 2017, redfin bullies were the most abundant taxa comprising 50% of the total number of animals recorded. Eels are normally the dominant fish recorded from the Kapuni Stream.

In April 2018, redfin bully were again the most abundant taxa comprising 53% of the total number of animals recorded. The poor results were likely caused by fine sand deposition and significant freshes.

It has been noted in previous reports that fine sand had been a dominant feature on the streambed, due in part to the erosion on the mountain. This has continued in both reports reviewed and it is likely to have reduced the suitability of habitat for some taxa, such as koura. It is thought that this reduction in available habitat is also responsible for a reduction in the numbers of brown trout recorded per site. The catch per unit effort has dropped from a high of 4.27 brown trout per site in 1982 – 1983 to less than 0.5 from late 2008 to mid-2012. An improvement was recorded in the October 2015 survey. However, none were recorded during the April 2016 survey, only three for the November 2016 survey and none for the June 2017 survey and this trend has continued. It was suggested that trout records may increase in the near future, as Fish and Game are now more actively stocking this river than has happened in the recent past, but so far trout numbers do not appear to be improving.

One additional point worth noting is the fact that the v-notch weir at the Vector site has been removed. The weir's removal will have improved fish passage in this reach of the Kapuni Stream, and this may result in improved fish communities. Furthermore, New Zealand Railways Corporation has undertaken works to improve fish passage at the railway bridge, which also may lead to improved fish communities.

Overall, these electric fishing results from the Kapuni catchment do not provide any conclusive indication that the petrochemical industries are having any significant adverse effects on fish communities in the Kapuni catchment with results being affected by sedimentation and significant number of preceding freshes.

2.3 Air

2.3.1 Inspections

There were no noted issues pertaining to dust or odour during the three inspections undertaken this period. No complaints were received from the public with respect to potential odour generation from this facility in the 2017-2018 monitoring period.

2.3.2 Provision of consent holder data

Special condition 4 of Vector's air discharge permit (4087) states:

That the consent holder shall provide to the General Manager, Taranaki Regional Council, by 1 June 1999 and every three years thereafter a written report:

a. *reviewing any technological advances in the reduction or mitigation of discharges to air from the site, and the costs and benefits of these advantages; and*

b. *detailing an inventory of the discharges to air from the site of such contaminants as the General manager may from time to time specify following consultation with the consent holder; and*

c. *detailing any measures that have been taken by the consent holder to improve the energy efficiency of the site's activities and processes; and*

d. *addressing any other issue relevant to the minimisation or mitigation of discharges of contaminants to air from the site that the General Manager, Taranaki Regional Council, considers should be included.*

Such reports have been provided in 1999, 2002, 2005, 2009, 2011 and 2014. The latest report was received on the 13 September 2017 and accepted by the Council. The next report is due for submission in 2020.

To fulfil the requirements of special condition 4, Vector provided information pertaining to the following:

1. a summary of annual emissions of carbon dioxide (CO_2) from the gas treatment plant for the period 2004-2016;

2. a summary of plant process and operational enhancements as measured by steam use efficiency;
3. a summary of metal deposition monitoring 2008-2016; and
4. significant flaring from the facility in the period 2014-2017.

Carbon dioxide emissions

Annual CO_2 emissions in calendar years since 2009 are shown in Figure 3. The amounts released to atmosphere from the Benfield process and from fuel combustion are distinguished. The reductions in 2013 and 2016 are a reflection of reduced quantities of gas processed by the plant compared to previous years.

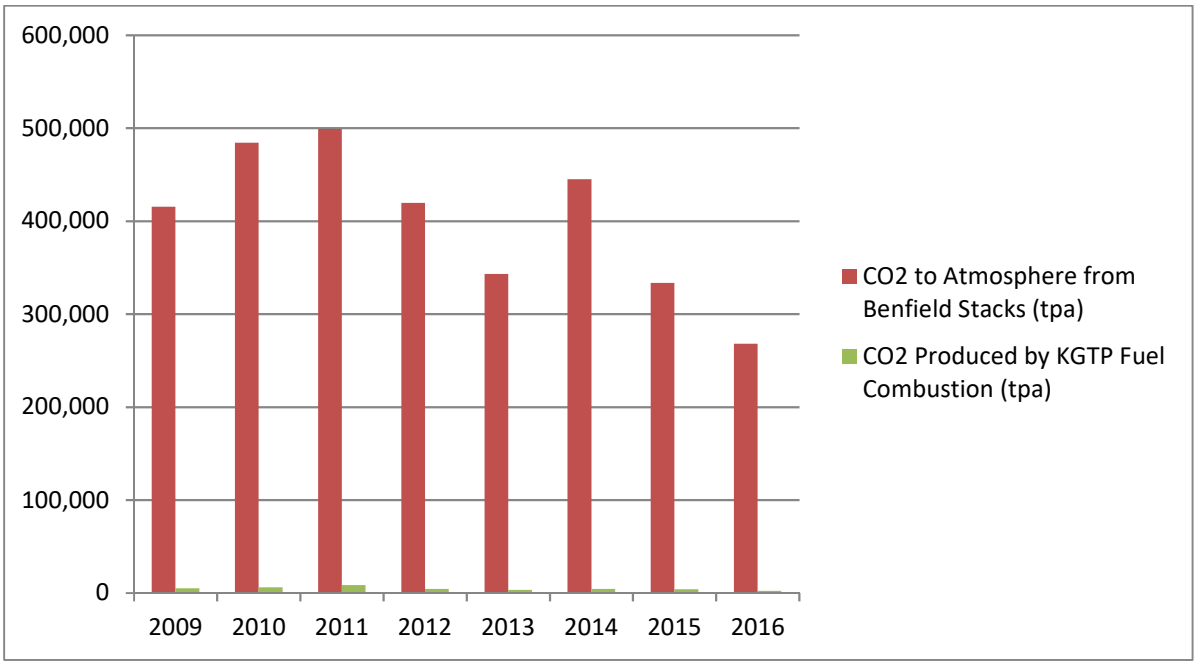

Figure 3 Annual CO_2 emissions from Vector KGTP in tonnes per annum (tpa)

Processing and operational enhancements

The efficiency of steam use in the Benfield CO_2 removal plant is a key performance indicator (KPI) for the operation of the gas treatment plant in relation to fuel use. Annual steam use per CO_2 loading since 2000-2001 is depicted in Figure 4. Vector reports that the continual improvement in steam use efficiency from 2009 onwards is not due to any particular process improvement, but rather a continued focus on consistently running the plant at higher efficiency targets from year to year, and that further improvements are likely to be small as maximum efficiency is approached.

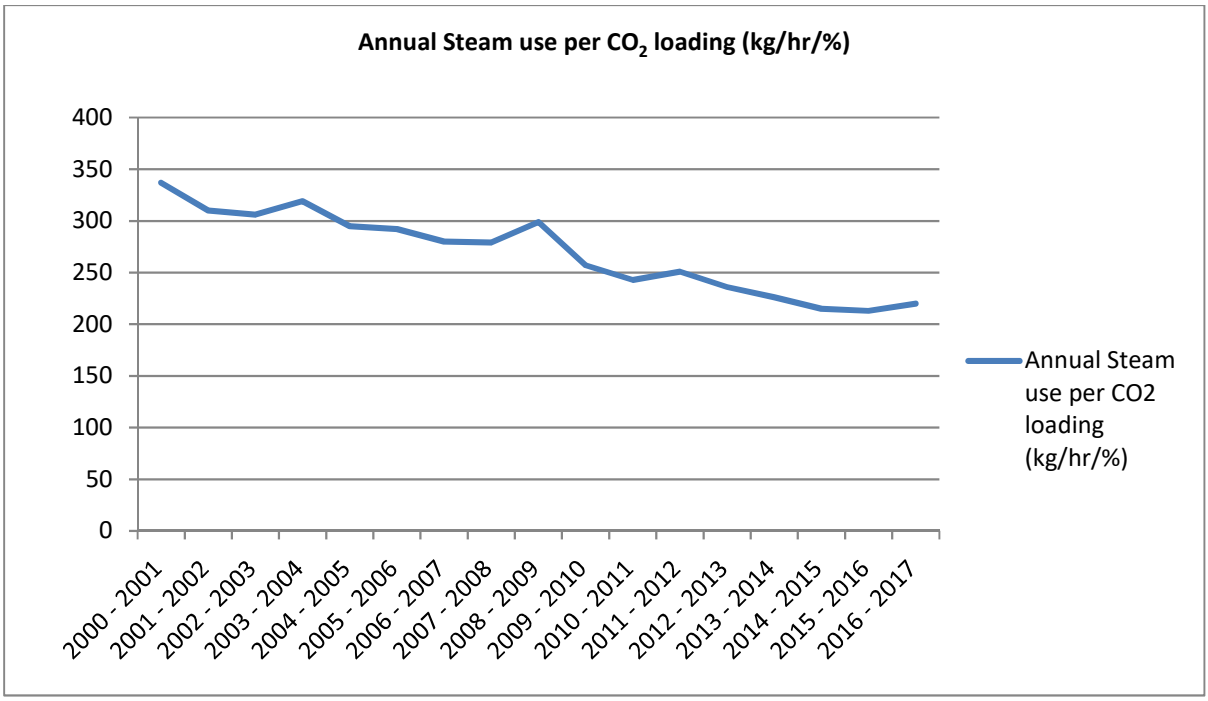

Figure 4 Annual steam use per CO_2 loading Vector KGTP

Metal deposition

Monitoring of metal deposition, for potassium, vanadium and zinc, is conducted annually at three sites around KGTP by deployment of air deposition gauges. The locations of the sites are immediately east and south of the processing area, that is, downwind and crosswind relative to the prevailing westerly wind, and beside Palmer Road to the southwest. There are no guidelines or standards for metals deposition. The data gathered since 2008 is appended (Appendix III). The data has also been tabulated in the following Figure 5, 6 and 7. While there is considerable variation in some of the samples, the data do not show any significant change in metal deposition rates over time.

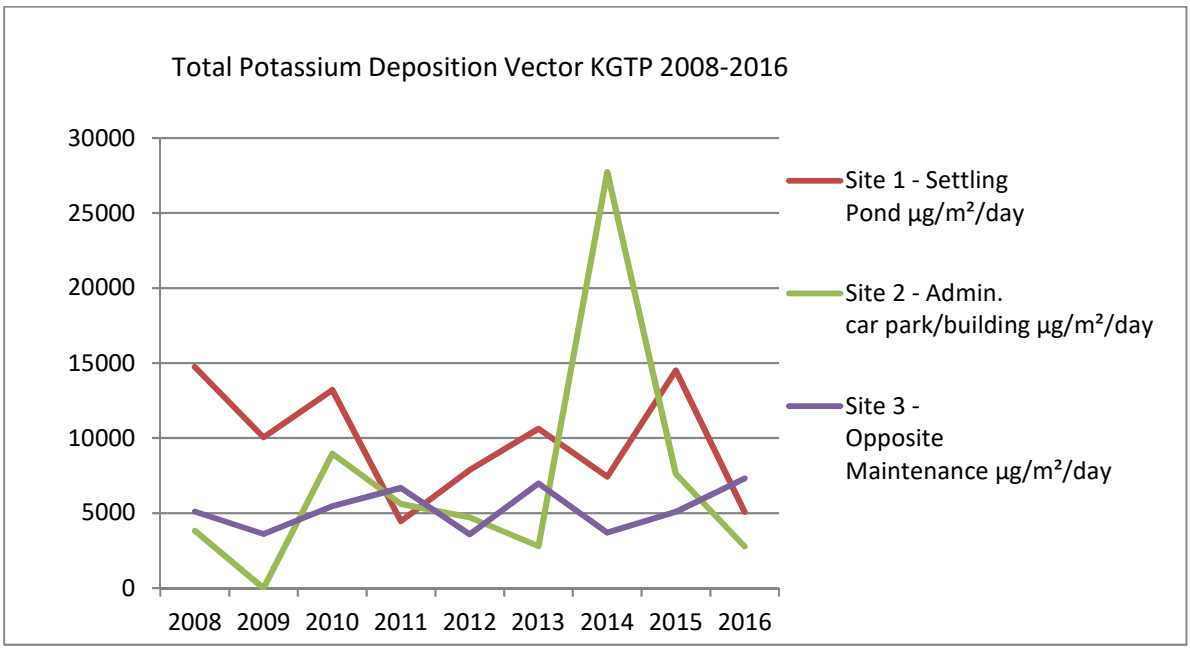

Figure 5 Total potassium deposition monitoring 2008-2016

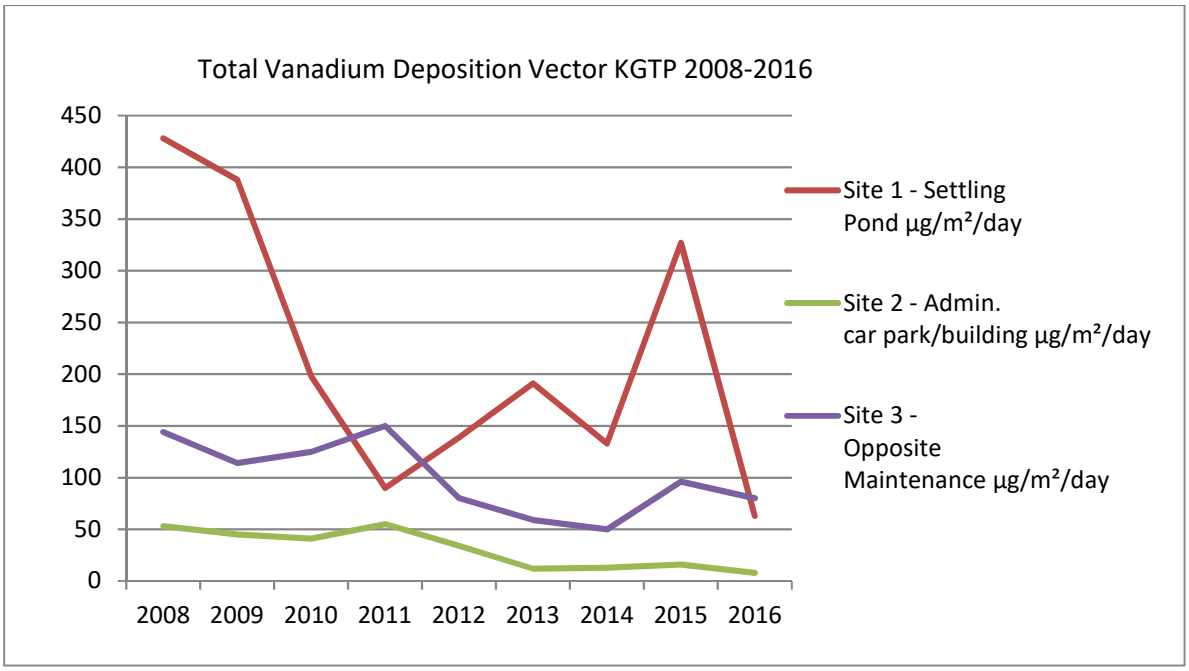

Figure 6 Total vanadium deposition Vector 2008-2016

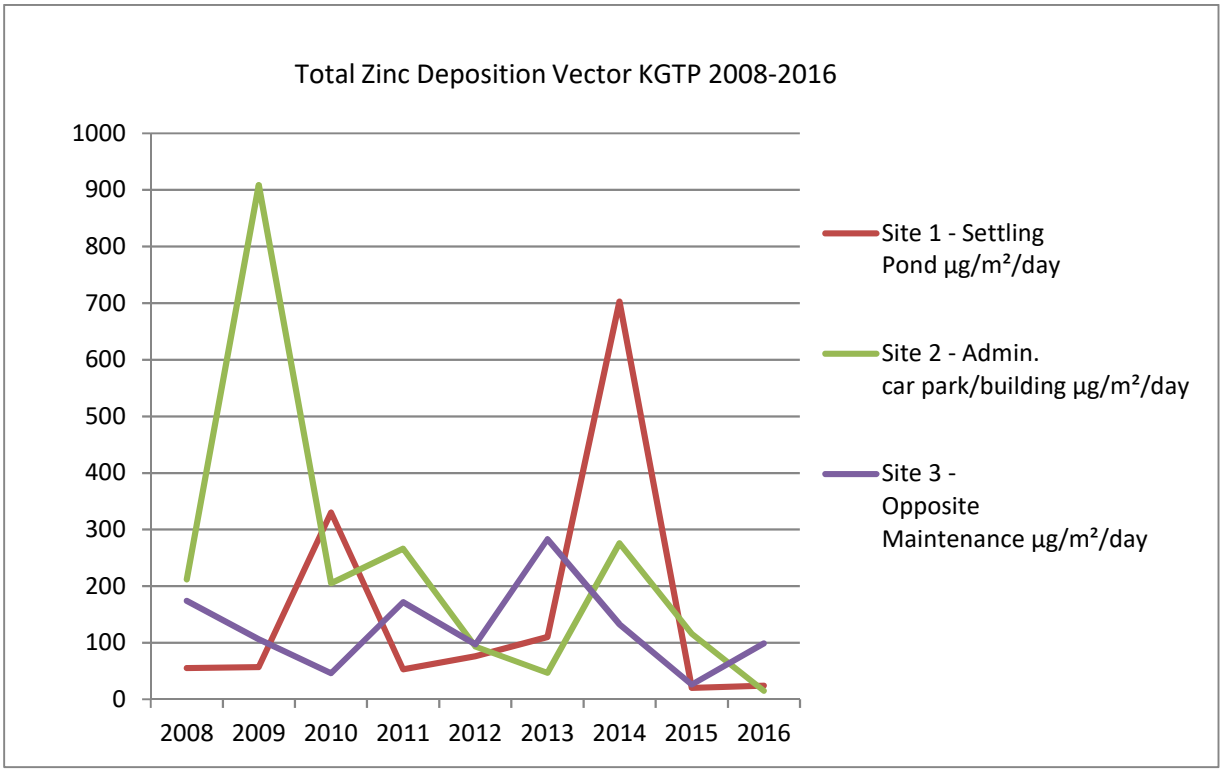

Figure 7 Total zinc deposition Vector 2008-2016

Flaring

Flaring occurs solely as a safety measure. Vector states that any flaring is a financial loss; hence there is a strong drive to minimise any flaring activity. The largest flaring episodes occur during the emergency shutdown (ESD) tests, which have been carried out annually since 1997, normally in February.

2.3.3 Monitoring of nitrogen oxides (NOx) levels in Taranaki near the NOx emitting sites, year 2017-2018

Introduction

From 2014 onwards, the Council has implemented a coordinated region-wide monitoring programme to measure NOx, not only at individual compliance monitoring sites near industries that emit NOx, but simultaneously at urban sites (the Council regional state of the environment programme) to determine exposure levels for the general population. The programme involves deploying all measuring devices on the same day, with retrieval three weeks later. This approach will assist the Council to further evaluate the effects of local and regional emission sources and ambient air quality in the region.

2.3.3.1 National environmental standards and guidelines

In 2004, national environmental standards (NES) for ambient (outdoor) air quality were introduced in New Zealand to provide a guaranteed level of protection for the health of New Zealanders. The national standard for nitrogen dioxide (NO2) is set out below.

In any 1-hour period, the average concentration of nitrogen dioxide in the air should not be more than 200 µg/m^3.

Before the introduction of the national environmental standards, air quality was measured against the national air quality guidelines. The national guidelines were developed in 1994 and revised in 2002 following a comprehensive review of international and national research and remain relevant. The national guideline for nitrogen dioxide (NO2) is set out below.

In any 24-hour period, the average concentration of nitrogen dioxide in the air should not be more than 100 µg/m^3.

Nitrogen dioxide limits are also set in the special conditions of resource consents issued by the Council. The consents limits are the same as those imposed under the NES and MfE's guideline.

2.3.3.2 Results

The location of the NOx monitoring sites are shown in Figure 8 and the details of the NOx results are presented in Table 5 and Figure 9.

Table 5 Actual (laboratory) and recalculated ambient NOx results, NES and MfE guidelines

	Survey at	Site code	NOx(µg/m³) Lab. results		NOx 1/hr (µg/m³) Theoretical max.		NOx 24/hr (µg/m³) Theoretical max.	
Petrochemical	McKee PS	AIR007901		3.8		13.4		7.1
		AIR007902		2.8		9.9		5.2
	Turangi PS	AIR007822		3.8		13.4		7.1
		AIR007824		3.1		11.0		5.8
	Kaimiro PS	AIR007817		2.2		7.8		4.1
		AIR007818		2.0		7.1		3.7
	Sidewinder PS	AIR007831		1.8		6.4		3.4
		AIR007832		1.8		6.4		3.4
	Maui PS	AIR008201		1.8		6.4		3.4
		AIR008214		2.7		9.5		5.0
	Kupe PS	AIR007827		2.6		9.1		4.9
		AIR007830		2.1		7.4		3.9
	Kapuni PS	AIR003410		3.6		12.7		6.7
		AIR003411		4.0		14.1		7.5
	Cheal PS	AIR007841		2.8		9.9		5.2
		AIR007842		3.7		13.8		6.9
	Waihapa PS	AIR007815		2.4		8.5		4.5
		AIR007816		4.9		17.3		9.2
	Ballance AUP	AIR003401		2.7		9.5		5.0
		AIR003404		2.6		9.2		7.9
	Pohokura PS	AIR003101		1.9		6.7		3.6
		AIR003103		1.4		4.9		2.6
	Rimu PS	AIR012501		2.3		8.1		4.3
		AIR012502		1.8		6.4		3.4
Dairy factory	Fonterra	AIR002410		9.0		31.8		16.8
		AIR002711		9.8		34.6		18.3
		AIR002412		2.0		7.1		3.3
		AIR002413		2.2		7.8		4.1
SEM	NPGHS	AIR000012(SW)		6.1		21.6		11.4
		AIR000012(NE)		5.5		19.4		10.3
National Environmental Standard (NES) and MfE guideline						**200 (NES)**		**100 (MfE)**

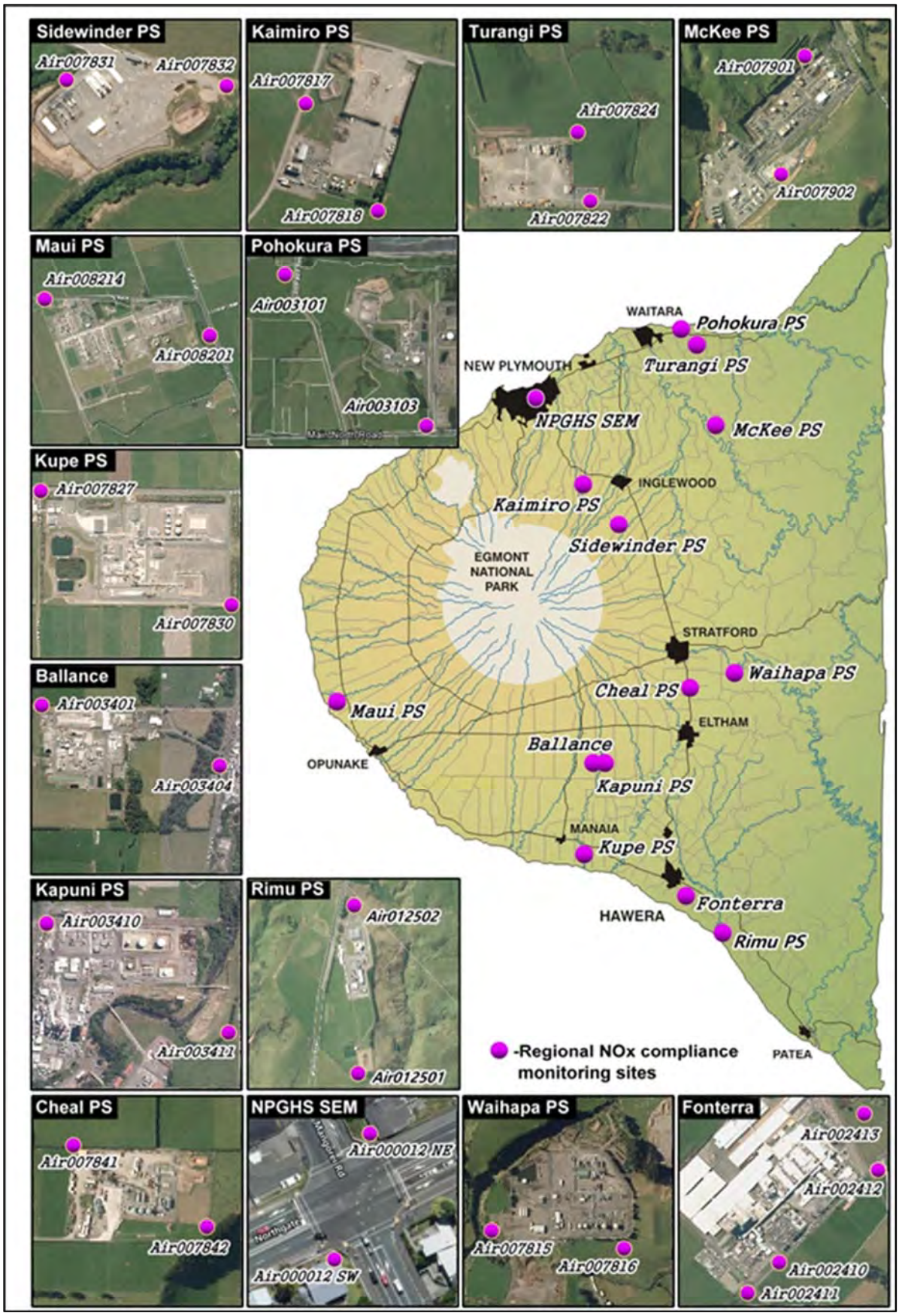

Figure 8 NOx monitoring sites in Taranaki region 2017-2018

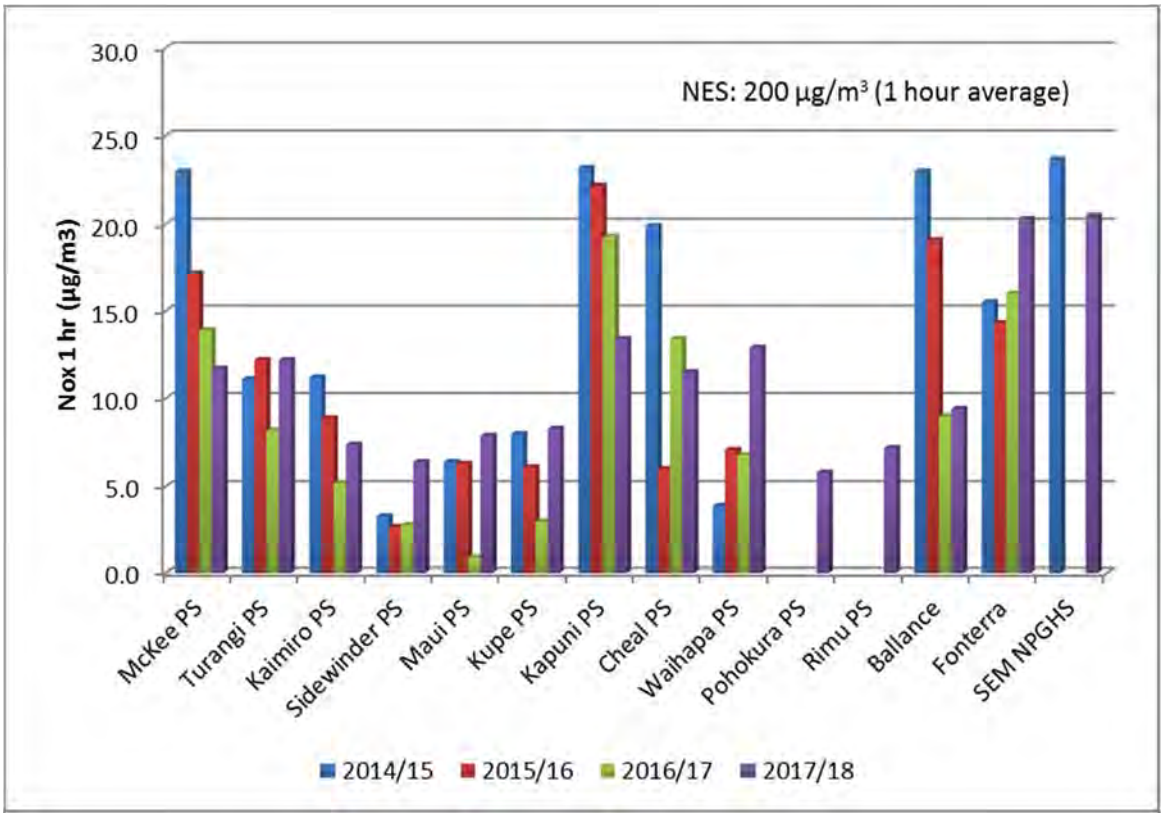

Figure 9 Average NOx levels at 14 surveyed locations throughout the region (2017-2018)

2.3.3.3 Discussion

The calculated 1-hour and 24-hour theoretical maximum concentrations (using a power law exponent of 0.2) ranged from 5.0 µg/m³ to 34.6 µg/m³, and from 2.6 µg/m³ to 18.3 µg/m³ respectively (Table 1). The highest results in 2017-2018 monitoring year were obtained from the NOx emitting sites at five different locations:

1. In the Kapuni heavy industrial area around the Kapuni production station.
2. Around the Fonterra's Whareroa co-generation plant.
3. From the sites at McKee production station.
4. Around the Waihapa production station.
5. And in New Plymouth's urban area near a busy traffic intersection.

All values were well within the National Environmental Standards, Ministry for the Environment Ambient Air Quality Guidelines and the respective resource consents limits. This continues the pattern found in previous years.

2.3.3.4 Ministry for the Environment environmental performance indicator

Ministry for the Environment uses an environmental performance indicator to categorise air quality. These categories are set out in Table 6 and further details of the entire NOx results are set out in Table 7.

Table 6 Environmental Performance Indicator air quality categories

Measured value	Less than 10% of NES	10-33% of NES	33-66% of NES	66-100% of NES	More than 100% of NES
Category	excellent	good	acceptable	alert	action

Table 7 Categorisation of results (2017-2018 monitoring year)

National Environmental Standard for NO2 = 200 µg/m3- 1 hour average.		
Category	**Measured values**	
Excellent	<10% of the NES, (0-20µg/m^3)	**27** (90%)
Good	10-33% of the NES, (20-66µg/m^3)	**3** (10 %)
Acceptable	33-66% of the NES, (66-132 µg/m^3)	**0** (0%)
Alert	66-100% of the NES, (132-200 µg/m^3)	**0** (0%)
Total number of samples		**30** (100%)

2.3.3.5 Conclusion

The monitoring showed that across all sites monitored, 90% of the 1-hour average results fell into Ministry's 'excellent' categories and 10% of the results lay within Ministry's 'good' category. No results ever entered the 'acceptable' or 'alert' categories, i.e., no results ever exceeded the National Environmental Standard of 200µg/m^3.

These results, and all regional monitoring to date, have shown that Taranaki has very clean air, and on a regional basis there are no significant pressures upon the quality of the air resource.

2.4 Investigations, interventions, and incidents

The monitoring programme for the year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with Vector. During the year matters may arise which require additional activity by the Council, for example provision of advice and information, or investigation of potential or actual causes of non-compliance or failure to maintain good practices. A pro-active approach that in the first instance avoids issues occurring is favoured.

The Council operates and maintains a register of all complaints or reported and discovered excursions from acceptable limits and practices, including non-compliance with consents, which may damage the environment. The incident register includes events where Vector has itself notified the Council. The register contains details of any investigation and corrective action taken.

Complaints may be alleged to be associated with a particular site. If there is potentially an issue of legal liability, the Council must be able to prove by investigation that the identified company is indeed the source of the incident (or that the allegation cannot be proven).

In the 2017-2018 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with Vector's conditions in resource consents or provisions in Regional Plans.

3 Discussion

3.1 Discussion of site performance

Site performance by Vector KGTP in the 2017-2018 monitoring period had been compliant across all consent related requirements. Water abstraction was undertaken and no exceedance was reported with respect to maximum daily extractable volumes. Though Vector drew more water than the previous monitoring period, in total they only utilised 38% of the total annual allowance.

Discharge monitoring of effluent and stormwater was undertaken by Vector and reported monthly to the Council. Inter-laboratory sample analysis were also undertaken on two occasions this monitoring period and the results indicated fairly good agreement across most parameters. Some variation was observed, however gaining accuracy at low concentrations does present its own difficulties and considering the low concentrations of target parameters the variations do not indicate a cause for concern. However, continued calibration of key instruments is encouraged.

Communication between Vector and the Council is regular and open in the form of monthly reports, inspections and monitoring requirements. During the monitoring year a piece of upstream in-situ monitoring equipment was taken out by the Kapuni Stream during high flows. Vector communicated this promptly to the Council, identifying that data would not be available for a period of time while a replacement was sought.

Recently, a request for a change to the contingency discharge of stormwater and process waters procedure was authorised. The change was to allow specific parameter monitoring prior to the discharge, which enabled the site operators greater flexibility.

Inspections of the site had indicated the site appears to be well managed with housekeeping prevalent across all areas. This included chemical storage areas, catch basins and discharge locations.

Kapuni Stream flow monitoring is an area which is planned to undergo some further developments in the upcoming monitoring period. Currently a proposal for an upgrade to the flow monitoring capabilities is under consideration by Vector management and it is envisaged to come to fruition in the 2018-2019 monitoring period.

Contingency plans were also updated and supplied to the Council for comment this monitoring period.

3.2 Environmental effects of exercise of consents

Minimal environmental effects were noted during the period under review. A review of Vector's independent biological monitoring, on the Kapuni Stream catchment, was undertaken by one of the Council's biologists. The review indicated that overall, the MCI scores for nearly all sites were similar to or higher than their respective means. The Kapuni Stream was generally in 'good' to 'excellent' health and the impact (if any) of the industrial activity at Kapuni was not discernible.

The findings of the fish survey concluded with the following: Overall, these electric fishing results from the Kapuni catchment do not provide any conclusive indication that the petrochemical industries are having any significant adverse effects on fish communities in the Kapuni catchment, with results being affected by sedimentation and a significant number of preceding freshes.

Discharge monitoring indicated compliance with consent defined parameters and no significant adverse effects were noted.

In terms of emissions to the air, in the upcoming monitoring period diffuse monitoring of oxides of nitrogen and benzene, toluene, ethylbenzene and xylenes (BTEX) will be undertaken around the site periphery, as part of a regional study. The results of which will be discussed in the upcoming monitoring period.

Results of the 2017-2018 regional NOx study were also presented in this report. The associated analysis indicated the following:

- These results, and all regional monitoring to date, have shown that Taranaki has very clean air, and on a regional basis there are no significant pressures upon the quality of the air resource.

3.3 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Tables 8-18

Table 8 Summary of performance for consent 1125-4

Purpose: *To take water from the Kapuni Stream in association with the operation of a gas processing facility*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Limits to volume of water abstracted	Volume measurement by Vector and review of records by Council	Yes
2. Defines three take locations	Inspection by Council	Yes
3. Limit take duration at alternative locations	Not required by Vector this period	N/A
4. Adopt best practicable option to prevent or minimise adverse effects	Inspection and review of Vector records	Yes
5. Installation and maintenance of water meter and data logger	Inspection by Council. Telemetry to Council via STDC system established January 2014	Yes
6. Certification of water measuring equipment	Provision of certificate. Certification testing carried out 30 October 2014	Yes
7. Notification of equipment failure	Liaison with the consent holder.	Yes, notification received with respect to the upstream pH meter swept away during high flow. Staff gauge in river still requires replacing. Further developments in terms of Kapuni flow monitoring currently under consideration with Vector management.
8. Metering equipment accessible to Council	Inspection	Yes
9. Details of take recording	Records in format required	Yes
10. Notification of details of emergency takes	Not required during period under review	N/A
11. Fish screen	Check screen, and intake design	Yes
12. Financial contributions for riparian planting and fencing in Kapuni catchment	Payments received, no further obligation	N/A

Purpose: *To take water from the Kapuni Stream in association with the operation of a gas processing facility*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
13. Option for Council to review consent conditions	Option next available June 2017, recommendation attached in section 3.6	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**
Overall assessment of administration performance in respect of this consent		**High**

Table 9 Summary of performance for consent 1123-3

Purpose: *To discharge process effluent and stormwater to the Kapuni Stream*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option to prevent or minimise adverse effects	Inspection and liaison with consent holder	Yes
2. Limit on stormwater catchment area	Inspection	Yes
3. Monitor temperature from discharge and keep within limits	Company records and measurement, with review and checking by Council,	Yes
4. Monitor pH levels and keep within range	Company records and sampling, with review and checking by Council. Variation identified in previous monitoring period in relation to Kapuni Stream pH monitoring, now rectified	Yes
5. Discharge cannot produce visible effects on the surface of Kapuni Stream	Inspection	Yes
6. Concentration of un-ionised ammonia in Kapuni Stream not to exceed limits	Company records and sampling, with review and checking by Council	Yes
7. Concentration of sodium in Kapuni Stream not to exceed limits	Company records and sampling, with review and checking by Council	Yes
8. Concentration of vanadium in Kapuni Stream not to exceed limit	Company records and sampling, with review and checking by Council	Yes
9. Discharge not to contain free available chlorine	Company records and sampling, with review and checking by Council	Yes
10. Submission of effluent disposal management plan to Council	Provision of plan as required	Yes
11. Effluent disposal management plan to be followed	Company records, inspection and sampling	Yes

Purpose: *To discharge process effluent and stormwater to the Kapuni Stream*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
12. Provision of programmes of water treatment and notification of any changes	Inspection and provision of information. Chemical changes notified. Also discharge conductivity monitoring implemented for contingency discharge by Vector	Yes
13. Review of programmes of chemical cleaning treatment and notification of any changes	Inspection and provision of information	Yes
14. Optional review provision re water treatment or chemical cleaning programmes	No review required this period	N/A
15. Option for Council to review consent conditions	Option next available June 2023, recommendation attached in section 3.6	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**
Overall assessment of administration performance in respect of this consent		**High**

Table 10 Summary of performance for consent 1225-3

Purpose: *To discharge domestic sewage, tri-ethylene glycol, methanol and some water treatment chemicals (i.e. phosphate corrosion inhibitor) from an aerated sewage treatment plant onto and into land*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option to prevent or minimise adverse effects	Inspection and liaison with consent holder	Yes
2. No direct discharge to surface water	Inspection	Yes
3. Discharge limit	Data provided by consent holder	Yes
4. Option for Council to review consent conditions	Option next available June 2017, recommendation attached in section 3.6	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**
Overall assessment of administration performance in respect of this consent		**High**

Table 11 Summary of performance for consent 5091-1

Purpose: *To discharge minor amounts of earth material and associated stormwater onto land and into various streams between and including the Motumate Stream and an unnamed tributary of the Waiokura Stream associated with the construction of two above ground pipelines, an electrical ring main and associated structures for steam and electricity supply purposes*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Every practicable measure to prevent contamination of watercourses and to minimise streambed disturbance	No works undertaken during monitoring period	N/A
2. Notification of construction or maintenance work	No maintenance undertaken during monitoring period	N/A
3. Option for Council to review conditions of consent	Option next available June 2023	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**N/A**
Overall assessment of administration performance in respect of this consent		**N/A**

Table 12 Summary of performance for consent 5496-1

Purpose: *To discharge up to 8 cubic metres/day of ingress water from a stream pipeline onto land in the vicinity of unnamed tributaries of the Kapuni, Waiokura and Motumate Streams*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Discharge to be in accordance to submission	Inspection	N/A
2. No contaminants to enter surface water body	Inspection	N/A
3. No adverse effects will occur to groundwater	Inspection and sampling	N/A
4. Option for Council to review conditions of consent	Consent expires in June 2017	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**Expired, activity covered by regional plan**
Overall assessment of administration performance in respect of this consent		

Table 13 Summary of performance for consent 7043-1

Purpose: *To discharge sludge, and some liquid, from two stormwater retention ponds, a filter backwash pond and a settlement pond onto and into land*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option to minimise adverse effect	Inspection and company records	Yes
2. Exercise to be in accordance to submission	Inspection	Yes
3. Specific sludge sources	Inspection	Yes
4. Liquids may be discharged as alternative when stream in low flow	Action not required during period under review	N/A
5. Disposal area specified	Inspection	Yes
6. Minimum distance to and no discharge to surface water	Inspection	Yes
7. Keeping of records	Not requested in period under review	Yes
8. Relocation of soil to approval of Council	Inspection, no soil moved	N/A
9. No adverse effects on any water body	Inspection and biomonitoring	Yes
10. Compliance with soil and groundwater guidelines	Sampling and provision of records	Not assessed this period
11. Advice to District Council on land use	Company records	Yes
12. Option for Council to review conditions of consent	Expiry 2023	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**
Overall assessment of administration performance in respect of this consent		**High**

Table 14 Summary of performance for consent 4087-2

Purpose: *To discharge emissions into the air from the treatment of natural gas, cogeneration, other on-site activities and other related and ancillary activities*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option to prevent or minimise adverse effects	Inspection and records	Yes

Purpose: *To discharge emissions into the air from the treatment of natural gas, cogeneration, other on-site activities and other related and ancillary activities*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
2. Emissions maintained to a minimum	Inspection, company records and sampling	Yes
3. Approval for alterations affecting discharge to be gained from Council	Notifications	Yes
4. Three yearly written report to Council	Report received 13 September 2017, next one due 2020	Yes
5. Written report reviewing technological advances	Report provided to Council 1 June 1996	Yes
6. Written report evaluating risk to human health	Report provided to Council 1 June 1996	Yes
7. Annual report on gross emission of carbon dioxide	Change to RMA- no longer required. CO_2 emission data provided in triennial report	N/A
8. Control of discharges to air of carbon monoxide	Company records of monitoring undertaken in 2004 and 2008 indicated compliance with this condition	Yes
9. Control of discharges to air of nitrogen dioxide	Company records of monitoring undertaken in 2004 and 2008 indicated compliance with this condition	Yes
10. Option for Council to review conditions re excess of carbon monoxide or nitrogen dioxide limits	Not exercised	N/A
11. Concentration of benzene not to exceed limits	Not assessed this period as LTS not in operation at present. Other BTEX sources removed	N/A
12. Control all other discharges as to not exceed limits	Company records and sampling	Yes
13. Discharge of odour	Inspections did not find offensive or objectionable odour	Yes
14. Depressurisation to avoid dense black smoke	Inspection and company records	Yes

Purpose: *To discharge emissions into the air from the treatment of natural gas, cogeneration, other on-site activities and other related and ancillary activities*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
15. No adverse ecological effect on eco-systems	Inspection and biomonitoring	Yes
16. Notice to review consent conditions	Option next available June 2017, recommendation attached in section 3.6	N/A
17. Site contingency plan	Provided	Yes
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**
Overall assessment of administration performance in respect of this consent		**High**

Table 15 Summary of performance for consent 5090-1

Purpose: *To erect, place, use and maintain two above ground pipelines, an electrical ring main and associated structures over beds of various streams between and including the Motumate Stream and an unnamed tributary of the Waiokura Stream for steam and electricity supply purposes*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Structures constructed and maintained according to submission	Inspection	Yes
2. Notification of initial construction and maintenance work	No maintenance undertaken during monitoring period	N/A
3. Option for Council to review conditions of consent	Option next available June 2017, recommendation attached in section 3.6	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**
Overall assessment of administration performance in respect of this consent		**High**

Table 16 Summary of performance for consent 7281-1

Purpose: *To remove a weir structure in the Kapuni Stream and undertake works for river bank protection purposes*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Consent to be exercised in accordance with documentation submitted	Weir has previously been removed	N/A

Purpose: *To remove a weir structure in the Kapuni Stream and undertake works for river bank protection purposes*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
2. Notification prior to commencement and upon completion of works	Notification given 10 April 2008	Yes
3. Adoption of best practicable option to minimise adverse environmental effects	Weir has previously been removed	N/A
4. Minimisation of bed disturbance	Weir has previously been removed	N/A
5. Reasonable steps to minimise sediment effects	Weir has previously been removed	N/A
6. Removal of materials from streambed	Weir has previously been removed	N/A
7. Works prohibited between 10 May and 1 November, without permission	Weir has previously been removed	N/A
8. Use of explosives prohibited	Weir has previously been removed	N/A
9. Lapse of consent if not exercised	Consent was exercised	N/A
10. Option for Council to review conditions of consent	Option next available June 2017, recommendation attached in section 3.6	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**N/A**
Overall assessment of administration performance in respect of this consent		**N/A**

Table 17 Summary of performance for consent 7755-1

Purpose: *To discharge stormwater from site areas of a natural gas treatment plant where no industrial processes occur (e.g. landscaped areas and roads) into the Kapuni Stream*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option to prevent or minimise adverse effects	Inspection and liaison with consent holder	Yes
2. Limit on stormwater catchment area	Inspection	Yes
3. Controls on effect of discharge in receiving water	Inspection and biological monitoring by Council	Yes
4. Discharge cannot produce visible effects on the surface of Kapuni Stream	Inspection	Yes
5. Maintenance of contingency plan	Receipt and review of plan	Yes

Purpose: *To discharge stormwater from site areas of a natural gas treatment plant where no industrial processes occur (e.g. landscaped areas and roads) into the Kapuni Stream*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
6. Maintenance of stormwater management plan	Receipt and review of plan	Yes
7. Provision for lapse of consent	NA	N/A
8. Option for Council to review consent conditions	Option next available June 2023	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**
Overall assessment of administration performance in respect of this consent		**High**

Table 18 Evaluation of environmental performance over time

Year	Consent no	High	Good	Improvement req	Poor
2008-2009	1225-3	1			
	1123-2	1			
	1124-2	1			
	5126-1	1			
	5496-1	1			
	7043-1	1			
	4087-1	1			
	5007-1	1			
	5008-1	1			
	5090-1	1			
2010-2012	1125-3	1			
	1123-2	1			
	1124-2	1			
	1125-2	1			
	5126-1	1			
	5496-1	1			
	7043-1	1			
	4087-2	1			
	5007-1	1			
	5008-1	1			
	5090-1	1			
2012-2014	1125-3		1		
	1123-2	1			

Year	Consent no	High	Good	Improvement req	Poor
	1125-2	1			
	5496-1	1			
	7043-1	1			
	4087-2	1			
	5090-1	1			
	7755-1	1			
2015-2016	1125-4	1			
	1123-3	1			
	1225-3	1			
	5496-1	1			
	7043-1	1			
	4087-2	1			
	5090-1	1			
	7755-1	1			
2016-2017	1125-4	1			
	1123-3	1			
	1225-3	1			
	5496-1	Expired			
	7043-1	1			
	4087-2	1			
	5090-1	1			
	7255-1	1			
Totals		43	1	0	0

During the year, the Company demonstrated a high level of environmental and high level of administrative performance with the resource consents as defined in Section 1.1.4.

3.4 Recommendations from the 2016-2017 Annual Report

In the 2016-2017 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at Vector KGTP in the 2017-2018 year continue at the same level as in 2016-2017.
2. THAT should there be issues with environmental or administrative performance in 2017-2018, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the option for a review of resource consents 1123-3, 1125-4, 1225-3, 4087-2, 5090-1, 5091-1, 7043-1, 7281-1 and 7755-1 in June 2017, as set out in conditions of the consents, not be exercised, on the grounds that the current conditions are considered to be adequate.

All recommendations undertaken.

3.5 Alterations to monitoring programmes for 2018-2019

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council has taken into account:

- the extent of information already made available through monitoring or other means to date;
- its relevance under the RMA;
- the Council's obligations to monitor consented activities and their effects under the RMA;
- the record of administrative and environmental performances of the consent holder; and
- reporting to the regional community.

The Council also takes into account the scope of assessments required at the time of renewal of permits, and the need to maintain a sound understanding of industrial processes within Taranaki exercising resource consents.

It is proposed that for 2018-2019 monitoring period that the monitoring of consented activities at Vector KGTP continue at the same level as 2017-2018.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site in question. The Council reserves the right to subsequently adjust the programme from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2018-2019.

4 Recommendations

1. THAT in the first instance, monitoring of consented activities at Vector KGTP in the 2018-2019 year continue at the same level as in 2017-2018.
2. THAT should there be issues with environmental or administrative performance in 2017-2018, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Glossary of common terms and abbreviations

The following abbreviations and terms may be used within this report:

Al*	Aluminium.
As*	Arsenic.
Biomonitoring	Assessing the health of the environment using aquatic organisms.
BOD	Biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate.
BODF	Biochemical oxygen demand of a filtered sample.
Bund	A wall around a tank to contain its contents in the case of a leak.
CBOD	Carbonaceous biochemical oxygen demand. A measure of the presence of degradable organic matter, excluding the biological conversion of ammonia to nitrate.
cfu	Colony forming units. A measure of the concentration of bacteria usually expressed as per 100 millilitre sample.
COD	Chemical oxygen demand. A measure of the oxygen required to oxidise all matter in a sample by chemical reaction.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 20°C and expressed in mS/m.
Cu*	Copper.
Cumec	A volumetric measure of flow- 1 cubic metre per second (1 m^3s^{-1}).
DO	Dissolved oxygen.
DRP	Dissolved reactive phosphorus.
Fresh	Elevated flow in a stream, such as after heavy rainfall.
$g/m^2/day$	grams/$metre^2$/day.
g/m^3	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
Incident register	The Incident Register contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.
L/s	Litres per second.
m^2	Square Metres.

MCI	Macroinvertebrate community index; a numerical indication of the state of biological life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats.
mS/m	Millisiemens per metre.
Mixing zone	The zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point.
NH_4	Ammonium, normally expressed in terms of the mass of nitrogen (N).
NH_3	Unionised ammonia, normally expressed in terms of the mass of nitrogen (N).
NO_3	Nitrate, normally expressed in terms of the mass of nitrogen (N).
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
O&G	Oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons).
Pb*	Lead.
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
PM_{10}, $PM_{2.5}$, $PM_{1.0}$	Relatively fine airborne particles (less than 10 or 2.5 or 1.0 micrometre diameter, respectively).
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	*Resource Management Act 1991* and including all subsequent amendments.
SS	Suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.
UI	Unauthorised Incident.
Zn*	Zinc.

*an abbreviation for a metal or other analyte may be followed by the letters 'As', to denote the amount of metal recoverable in acidic conditions. This is taken as indicating the total amount of metal that might be solubilised under extreme environmental conditions. The abbreviation may alternatively be followed by the letter 'D', denoting the amount of the metal present in dissolved form rather than in particulate or solid form.

For further information on analytical methods, contact a Science Services Manager.

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Appendix I

Resource consents held by Vector KGTP

(For a copy of the signed resource consent
please contact the TRC Consents department)

Consent number	Purpose	Volume	Next review date	Expiry date
1123-3	Discharge cooling and wastewater to Kapuni Stream		2023	2035
1125-4	Take from Kapuni Stream	3,900 m^3/day (52/58 L/s)	2020	2035
1225-3	Discharge treated sewage and process wastes to land	13.5 m^3/day (0.97 L/s)	2023	2035
4087-2	Discharge emissions to air		2023	2029
5090-1	Structures for pipeline crossings (Motumate/Waiokura)		2023	2032
5091-1	Discharge steam pipeline construction materials		2023	2032
7043-1	Discharge stormwater/settling ponds sludges to land			2023
7281-1	Remove weir structure from Kapuni Stream			2023
7633-0	Structures in, on, over or under Kapuni Stream		-	--
7755-1	Discharge stormwater (non-process areas) to Kapuni Stream		2023	2035
7756-0	Discharge stormwater from LPG load-out to land		-	-
*5496-1 recently allowed to expire, activity covered under regional plan				

Discharge Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Vector Limited P O Box 593 HAWERA 4640
Decision Date:	18 June 2012
Commencement Date:	18 June 2012

Conditions of Consent

Consent Granted:	To discharge process effluent and stormwater to the Kapuni Stream at or about (NZTM) 1700945E-5629537N
Expiry Date:	1 June 2035
Review Date(s):	June 2017, June 2023, June 2029
Site Location:	Kapuni Gas Treatment Plant, 298 Palmer Road, Kapuni
Legal Description:	Pt Lot 1 DP 5227 Blk XVI Kaupokonui SD (Discharge source & site)
Catchment:	Kapuni

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General condition

a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.

2. The discharge of stormwater shall be from a catchment area not exceeding 3.37 ha.

3. The discharge shall not raise the temperature of the Kapuni Stream by greater than 2 degrees Celsius, when measured 50 metres downstream of the discharge point and all practicable steps shall be taken by the consent holder to minimise the temperature rise in the Kapuni Stream. Further, the consent holder shall continuously monitor the temperature of the wastewater, and receiving water upstream and downstream of the discharge point.

4. The discharge shall not cause the pH of the Kapuni Stream to be outside the range 6.5 to 9.0 when measured 50 metres downstream of the discharge point. Further, the consent holder shall continuously monitor the pH of the wastewater, and receiving water upstream and downstream of the discharge point.

5. After allowing for reasonable mixing, within a mixing zone extending 50 metres downstream of the discharge point, the discharge shall not produce any visible oil or hydrocarbon films, scums or foams on the surface of the Kapuni Stream.

6. The discharge shall not cause the concentration of un-ionised ammonia in the Kapuni Stream to exceed 0.006 grams per cubic metre when measured 50 metres downstream of the discharge point, unless agreement is given by the holder of consent 0598-3. In any case, the discharge shall not cause the concentration of un-ionised ammonia in the Kapuni Stream to exceed 0.025 grams per cubic metre.

7. The discharge shall not cause the concentration of sodium in the Kapuni Stream to exceed 15 grams per cubic metre when measured 50 metres downstream of the discharge point, unless agreement is given by the holder of consent 0598-3. In any case, the discharge shall not cause the concentration of sodium in the Kapuni Stream to exceed 40 grams per cubic metre.

8. The discharge shall not cause the total vanadium concentration of the Kapuni Stream to exceed 0.08 grams per cubic metre when measured 50 metres downstream of the discharge point.

9. The discharge shall not contain free available chlorine.

10. Prior to the exercise of this consent, the consent holder shall submit an effluent and stormwater management plan for approval by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The management plan shall detail the procedures and processes that will be followed to ensure that the conditions of this consent are met, including but not limited to:

    i) controlling the effluent and stormwater discharge rate;
    ii) measuring and recording the discharge;
    iii) measuring and recording the Kapuni Stream (chemical and biological);
    iv) calibration of monitoring equipment;
    v) co-ordination with the holder of consent 0598-3 on discharge of ammonia and sodium;
    vi) minimisation of free phosphate in the discharge, and how this can be achieved;
    vii) minimisation of the temperature increase to the receiving environment;
    viii) contingency events (including discharging in extended low flow events and the use of alternative receiving environments); and
    ix) reporting on exercise of consent.

11. The consent shall be exercised in accordance with the approved effluent and stormwater management plan required by condition 10. Within one months notice given by the Taranaki Regional Council, the consent holder shall review the management plan and resubmit the plan for approval by the Chief Executive, Taranaki Regional Council.

12. The consent holder shall forward to the Chief Executive, Taranaki Regional Council, details of any programmes of water treatment used at the Gas Treatment Plant, including raw water, boiler water and cooling water. Further, the consent holder shall notify the Chief Executive, Taranaki Regional Council, of any change in water treatment chemical, or increase in maximum concentration of any water treatment chemical, at least one month prior to change of a water treatment programme.

13. The consent holder shall forward to the Chief Executive, Taranaki Regional Council, details of any programmes of chemical cleaning used at the gas treatment plant. Further, the consent holder shall notify the Chief Executive, Taranaki Regional Council, of any change in chemical cleaning agent, or increase in concentration of any chemical cleaning agent used, where the effluent is to be disposed of to the Kapuni Stream, at least one month prior to change of a chemical cleaning programme.

14. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice within three months of notification of proposed changes in water treatment or chemical cleaning programmes under special conditions 12 and 13, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

15. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017, and/or June 2023 and/or June 2029 for the purpose of:

    a. ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time; and/or

    b. requiring any data collected in accordance with the conditions of this consent to be transmitted directly to the Council's computer system, in a format suitable for providing a 'real time' record over the internet.

Signed at Stratford on 18 June 2012

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Water Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Vector Limited P O Box 593 HAWERA 4640
Decision Date:	19 June 2012
Commencement Date:	19 June 2012

Conditions of Consent

Consent Granted:	To take water from the Kapuni Stream in association with the operation of a gas processing facility at or about (NZTM) 1701464E-5630826N
Expiry Date:	1 June 2035
Review Date(s):	June 2017, June 2020, June 2023, June 2029
Site Location:	Kapuni Gas Treatment Plant, 298 Palmer Road, Kapuni
Legal Description:	Adjacent to Lots 1 & 2 DP 10570 Blk XVI Kaupokonui SD (Site of take) Pt Lot 1 DP 5227 Blk XVI Kaupokonui SD (Site of use)
Catchment:	Kapuni

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General condition

a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

1. The volume of water taken from the Kapuni Stream shall not exceed 3,900 m^3 at a rate no greater than:

   (a) 52 litres/second under normal operating conditions; or

   (b) 58 litres/second in the event of an emergency shutdown situation, or equipment breakdown/failure; or

   (c) 58 litres/second in the event that the taking of water under 1(a) or 1(b) cannot occur.

2. Water shall be taken from the South Taranaki District Council intake structure, except at times when water is taken in accordance with special condition 1(c), when water shall be taken from the Kapuni Stream at or about the following locations:

   (a) (NZTM) 1701160E-5629699N; or
   (b) (NZTM) 1700943E-5629620N; or
   (c) (NZTM) 1700952E-5629494N.

3. The taking of water from an alternative location, as specified in special condition 1(c) of this consent, shall only be exercised for up to five days (120 hours) per calendar year, or such longer period as approved by the Chief Executive, Taranaki Regional Council for emergency or other purposes.

4. At all times the consent holder shall adopt the best practicable option as defined in the Resource Management Act 1991, to prevent or minimise any actual or likely adverse effect on the environment associated with the taking of water from the Kapuni Stream, including, but not limited to, the efficient and conservative use of water.

5. Before exercising this consent, the consent holder shall install, and thereafter maintain, a water meter and a datalogger at the point where the water enters the supply line for the Kapuni Gas Treatment Plant (i.e. (NZTM) 1701293E-5629885N). The water meter and datalogger shall be tamper-proof and shall measure and record the rate and volume of water taken to an accuracy of $\pm$ 5%. Records of the date, the time and the rate and volume of water taken at intervals not exceeding 15 minutes, shall be made available to the Chief Executive, Taranaki Regional Council at all reasonable times.

   Note: Water meters and dataloggers must be installed, and regularly maintained, in accordance with manufacturer's specifications in order to ensure that they meet the required accuracy. Even with proper maintenance water meters and dataloggers have a limited lifespan.

6. The consent holder shall provide the Chief Executive, Taranaki Regional Council with a document from a suitably qualified person certifying that water measuring and recording equipment required by the conditions of this consent ('the equipment'):

   (a) has been installed and/or maintained in accordance with the manufacturer's specifications; and/or

   (b) has been tested and shown to be operating to an accuracy of ± 5%.

   The documentation shall be provided:

   (i) within 30 days of the installation of a water meter or datalogger;

   (ii) at other times when reasonable notice is given and the Chief Executive, Taranaki Regional Council has reasonable evidence that the equipment may not be functioning as required by this consent; and

   (iii) no less frequently than once every five years.

7. If any measuring or recording equipment breaks down, or for any reason is not operational, the consent holder shall advise the Chief Executive, Taranaki Regional Council immediately. Any repairs or maintenance to this equipment must be undertaken by a suitably qualified person.

8. The water meter and datalogger shall be accessible to Taranaki Regional Council officers at all reasonable times for inspection and/or data retrieval.

9. The records of water taken shall:

   (a) be in a format that, in the opinion of the Chief Executive, Taranaki Regional Council, is suitable for auditing;

   (b) specifically record the water taken as 'zero' when no water is taken; and

   (c) for each 12-month period ending on 30 June, be provided to the Chief Executive, Taranaki Regional Council within one month after end of that period.

10. At times when water is taken from an alternative location, as specified in special condition 1(c) of this consent, the consent holder shall advise the Chief Executive, Taranaki Regional Council, within 12 hours of taking water, and within 2 days of ceasing, shall provide details of the length and time the take occurred and the volume and rate of take (cubic metres per day and litres per second).

11. The consent holder shall ensure that the intake is screened to avoid fish entering the intake or being trapped against the screen.

12. The consent holder shall make three annual payments of $16,667 (plus GST) to the Taranaki Regional Council as a financial contribution for the purpose of providing riparian planting and fencing in the Kapuni Stream catchment. These payments shall be made no later than 1 September each year from 2012 to 2014.

13. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2020 and/or June 2023 and/or June 2029 for the purposes of:

    (a) ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time; and/or

    (b) to require any data collected in accordance with the conditions of this consent to be transmitted directly to the Council's computer system, in a format suitable for providing a 'real time' record over the internet.

Signed at Stratford on 19 June 2012

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Discharge Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Vector Limited P O Box 593 HAWERA 4640
Decision Date:	20 June 2012
Commencement Date:	20 June 2012

Conditions of Consent

Consent Granted:	To discharge domestic sewage, tri-ethylene glycol, methanol and some water treatment chemicals (i.e. phosphate corrosion inhibitors) from an aerated sewage treatment plant onto and into land at or about (NZTM) 1700726E-5629194N
Expiry Date:	1 June 2035
Review Date(s):	June 2017, June 2023, June 2029
Site Location:	Kapuni Gas Treatment Plant, 298 Palmer Road, Kapuni
Legal Description:	Lot 1 DP 18183 Blk XVI Kaupokonui SD (Discharge source & site)
Catchment:	Kapuni

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General condition

a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.

2. There shall be no direct discharge of any contaminant into a surface water body.

3. The discharge shall not exceed 13.5 m^3 per day (0.97 litres per second), which shall be spread as evenly as practicable to a disposal area of not less than 1,325 m^2.

4. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2023 and/or June 2029, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 20 June 2012

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Discharge Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Vector Gas Trading Limited 101 Carlton Gore Road Newmarket Auckland 1023
Decision Date (Change):	27 January 1997
Commencement Date (Change):	27 January 1997 (Granted Date: 7 February 1996)

Conditions of Consent

Consent Granted:	To discharge emissions into the air from the treatment of natural gas, cogeneration, other on-site activities and other related and ancillary activities
Expiry Date:	1 June 2029
Review Date(s):	June 2017, June 2023
Site Location:	Kapuni Gas Treatment Plant, Palmer Road, Kapuni
Legal Description:	Pt Lot 1 DP 5527 Lot 1 DP 9987 Lot 1 DP 15254 Blk XVI Kaupokonui SD
Grid Reference (NZTM)	1700840E-5629660N

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General conditions

(a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

(b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

(c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

(i) the administration, monitoring and supervision of this consent;
(ii) charges for the carrying out of the Council's functions under section 35 in relation to this consent; and
(iii) charges authorised by regulations.

Special conditions

1) That the consent holder shall at all times adopt the best practicable option to prevent or minimise any actual or likely adverse effects on the environment arising from discharges to air from the site. `Best practicable option' shall be determined by the Chief Executive, Taranaki Regional Council, taking into account the information supplied by the consent holder under conditions 4, 5 and 6 of this consent, and following review as set out under condition 16 of this consent.

2) That the consent holder shall at all times operate, maintain, supervise, monitor and control all processes so that emissions authorised by this consent are maintained at a practicable minimum.

3) That prior to undertaking any alterations to the plant, processes or operations which may significantly change the nature or quantity of contaminants discharged to air from the site, the consent holder shall consult with the Chief Executive, Taranaki Regional Council, and shall obtain any necessary approvals under the Resource Management Act 1991.

4) That the consent holder shall provide to the Chief Executive, Taranaki Regional Council, by 1 June 1999 and every three years thereafter a written report:

(a) reviewing any technological advances in the reduction or mitigation of discharges to air from the site, and the costs and benefits of these advances; and
(b) detailing an inventory of the discharges to air from the site of such contaminants as the Chief Executive may from time to time specify following consultation with the consent holder; and
(c) detailing any measures that have been taken by the consent holder to improve the energy efficiency of the site's activities and processes; and
(d) addressing any other issue relevant to the minimisation or mitigation of discharges of contaminants to air from the site that the Chief Executive, Taranaki Regional Council, considers should be included.

5) That in addition to the requirements of condition 4, the consent holder shall provide to the Chief Executive, Taranaki Regional Council, by 1 June 1996 a written report reviewing any technological advances in the reduction or mitigation of discharges of benzene, toluene, ethyl benzene, and xylene, from the glycol towers, and discussing how these might be applicable and/or implemented at the Gas Treatment Plant, and the costs and benefits of these advances.

6) That by 1 June 1996 the consent holder shall provide to the Chief Executive, Taranaki Regional Council, a written report evaluating the risk to human health presented by the discharge to air of benzene, toluene, ethyl benzene, and xylene from the site. The report shall be to such detail as is required by the Chief Executive, Taranaki Regional Council.

7) That the consent holder shall provide to the Chief Executive, Taranaki Regional Council, on an annual basis the gross emissions of carbon dioxide from the site.

8) That the consent holder shall control all discharges to air from the site of carbon monoxide, in order that the maximum concentration of carbon monoxide measured under ambient conditions at or beyond the site boundary arising from discharges to air from the site does not exceed 30 mg/m3 (one-hour average exposure) or 10 mg/m3 (eight-hour average exposure).

9) That the consent holder shall control all discharges to air from the site of nitrogen dioxide, in order that the maximum ambient concentration of nitrogen dioxide measured under ambient conditions at or beyond the site boundary arising from discharge to air from the site does not exceed 300 µg/m3 (one-hour average exposure) or 100 µg/m3 (twenty-hour average exposure).

10) That should an off-site concentration of carbon monoxide or of nitrogen dioxide in the vicinity of the site be found to exceed a limit established in condition 8 or 9 above, then the Taranaki Regional Council may review any or all of the conditions of this consent pursuant to section 128(1)(a) of the Resource Management Act.

11) That the consent holder shall control all discharges of benzene to air from the site, in order that the maximum concentration measured under ambient conditions at or beyond the site boundary arising from discharges to air from the site, shall not exceed 16 µg/m3 (annual average of twenty-four-hour average exposure), nor 3.2 mg/m3 at any time, nor 0.32 mg/m3 (any eight-hour average exposure).

12) That the consent holder shall control all discharges to air from the site other than of carbon dioxide, carbon monoxide, nitrogen oxides and benzene, so that the maximum concentration measured under ambient conditions at or beyond the boundary of the site, arising from the exercise of this consent, does not exceed:

    (a) more than 1/30th of the relevant Occupation Threshold Value (Time Weighted Average); or
    (b) the Short Term Exposure Limit at any time (Workplace Exposure Standards and Biological Exposure Indices for New Zealand, 1992, Department of Labour).

13) That the discharges authorised by this consent shall not give rise to an odour at or beyond the boundary of the site that in the opinion of at least one officer of the Taranaki Regional Council is offensive or obnoxious or objectionable.

14) That whenever practicable depressurisation of the plant or sections of the plant shall be so controlled as to avoid dense black smoke from being discharged from any flare.

15) That the discharges authorised by this consent shall not give rise to any significant adverse ecological effect on any ecosystems, including but not limited to habitats, plants, animals, microflora and microfauna.

16) That pursuant to the provisions of section 128(1)(a) of the Resource Management Act the Council may within six months of receiving a report prepared by the consent holder subject to conditions 4, 5, or 6 of this consent or otherwise by giving notice of review during June 1999 and/or June 2005 and/or June 2011 and/or June 2017 and/or June 2023 serve notice that it intends to review any condition of this resource consent for the purposes of:

    (a) dealing with any significant adverse effect on the environment arising from the exercise of this consent; or
    (b) requiring the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge.

17) That the consent holder shall prepare a site contingency plan to the satisfaction of the Chief Executive, Taranaki Regional Council, no later than six months after the granting of this consent. The contingency plan shall be reviewed and if necessary updated to the satisfaction of the Chief Executive, Taranaki Regional Council, annually.

Transferred at Stratford on 1 September 2015

For and on behalf of
Taranaki Regional Council

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A D McLay
Director - Resource Management

Land Use Consent

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Vector Gas Trading Limited 101 Carlton Gore Road Newmarket Auckland 1023
Decision Date:	27 January 1997
Commencement Date:	27 January 1997

Conditions of Consent

Consent Granted:	To erect place use and maintain two above ground pipelines, an electrical ring main and associated structures over beds of various streams between and including the Motumate Stream and an unnamed tributary of the Waiokura Stream for steam and electricity supply purposes
Expiry Date:	1 June 2032
Review Date(s):	June 2017, June 2023
Site Location:	Palmer Road To Manaia Road, Kapuni
Legal Description:	Various
Grid Reference (NZTM)	1700840E-5629760N
Catchment:	Waiokura Motumate

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General conditions

(a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

(b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

(c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

(i) the administration, monitoring and supervision of this consent;
(ii) charges for the carrying out of the Council's functions under section 35 in relation to this consent; and
(iii) charges authorised by regulations.

Special conditions

1. That the structures licensed by this consent shall be constructed and maintained in accordance with the documentation submitted in support of application 96/322.

2. That the consent holder shall notify the Taranaki Regional Council at least 48 hours prior to, and again upon completion of initial construction works, and again 48 hours prior to and upon completion of any subsequent maintenance works which may result in disturbance of the stream beds and/or discharges to the streams.

3. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 1999 and/or June 2005 and/or June 2011 and/or June 2017 and/or June 2023 and/or June 2029, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects of the discharge on the receiving environment arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at the time.

Transferred at Stratford on 1 September 2015

For and on behalf of
Taranaki Regional Council

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A D McLay
Director - Resource Management

Discharge Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Vector Gas Trading Limited 101 Carlton Gore Road Newmarket Auckland 1023
Decision Date:	27 January 1997
Commencement Date:	27 January 1997

Conditions of Consent

Consent Granted:	To discharge minor amounts earth material and associated stormwater onto land and into various streams between and including the Motumate Stream and an unnamed tributary of the Waiokura Stream associated with the construction of two above ground pipelines,an electrical ring main and associated structures for steam and electricity supply purposes
Expiry Date:	1 June 2032
Review Date(s):	June 2017, June 2023, June 2029
Site Location:	Palmer Road To Manaia Road, Kapuni
Legal Description:	Various
Grid Reference (NZTM)	1700840E-5629760N
Catchment:	Waikoura Motumate

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General conditions

(a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

(b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

(c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

(i) the administration, monitoring and supervision of this consent;
(ii) charges for the carrying out of the Council's functions under section 35 in relation to this consent; and
(iii) charges authorised by regulations.

Special conditions

1. That during the exercise of this consent, the consent holder must observe every practicable measure to prevent the discharge or placement of silt and/or organics and/or cement products and/or any other contaminants into the watercourse, and to minimise disturbance of the stream bed.

2. That the consent holder shall notify the Taranaki Regional Council at least 48 hours prior to, and again upon completion of, any exercise of this consent.

3. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 1999 and/or June 2005 and/or June 2011 and/or June 2017 and/or June 2023 and/or June 2029, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects of the discharge on the receiving environment arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at the time.

Transferred at Stratford on 1 September 2015

For and on behalf of
Taranaki Regional Council

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A D McLay
Director - Resource Management

Discharge Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Vector Gas Trading Limited 101 Carlton Gore Road Newmarket Auckland 1023
Decision Date (Change):	25 January 2010
Commencement Date (Change):	25 January 2010 (Granted Date: 29 January 2007)

Conditions of Consent

Consent Granted:	To discharge sludge, and some liquid, from two stormwater retention ponds, a filter backwash pond and a settlement pond onto and into land
Expiry Date:	1 June 2023
Review Date(s):	June 2017
Site Location:	Kapuni Gas Treatment plant, 298 Palmer Road, Kapuni
Legal Description:	Lot 1 DP 15254 Lot 1 DP 18183 Blk XVI Kaupokonui SD
Grid Reference (NZTM)	1700973E-5629335N
Catchment:	Kapuni

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.

2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of applications 4506 and 6313. In the case of any contradiction between the documentation submitted in support of applications 4506 and 6313 and the conditions of this consent, the conditions of this consent shall prevail.

3. The consent holder shall ensure that only sludge generated in the stormwater retention ponds, filter backwash ponds and from settlement of Kapuni Stream water in the northern pond is discharged.

4. During times when the Kapuni Stream is in low flow, or when equipment failure prevents discharge to the stream, the discharge may include liquids [excluding demineralisation wastes] that normally reside in these ponds as an alternative to discharging them to the stream.

5. No disposal shall occur outside the area specified in application 4506.

6. The discharge onto and into land shall occur a minimum of 25 metres from any surface water body or property boundary. Discharge shall be onto and into land and there shall be no discharge of any contaminant to surface water.

7. The consent holder shall keep records of the following:
   a) Analysis of a representative sample of sludge each time the stormwater ponds and filter backwash pond is de-sludged, and soil quality after each discharge (analysing for arsenic, cadmium, chromium, copper, lead, nickel, mercury and zinc)
   b) Volumes of material discharged
   c) Dates and times of discharge events

   and shall provide the results to the Chief Executive, Taranaki Regional Council, on request.

8. Any relocation of soil from within the defined disposal area shall only occur if it can be shown to the satisfaction of the Chief Executive, Taranaki Regional Council that the standards, terms, and conditions of Rule 29 of the Regional Freshwater Plan for Taranaki will be complied with.

9. The discharge authorised by this consent shall not give rise to any of the following effects in any water body:

   a) the production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
   b) any conspicuous change in the colour or visual clarity;
   c) any emission of objectionable odour;
   d) the rendering of fresh water unsuitable for consumption by farm animals;
   e) any significant adverse effects on aquatic life.

10. At all times, the consent holder shall comply with the guidelines for industrial sites developed by the Australian National Environmental Protection Council (Assessment of Site Contamination) Schedule B(1): Guideline on the Investigation Levels for Soil and Groundwater (1999).

11. The consent holder shall advise the South Taranaki District Council that the disposal area is being used for disposal of contaminated silts at levels and rates expected to result in the soil of that area exceeding agricultural land use guidelines, but not exceeding industrial land use guidelines.

12. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Transferred at Stratford on 1 September 2015

For and on behalf of
Taranaki Regional Council

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A D McLay
Director - Resource Management

Land Use Consent

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Vector Gas Trading Limited 101 Carlton Gore Road Newmarket Auckland 1023
Decision Date:	10 April 2008
Commencement Date:	10 April 2008

Conditions of Consent

Consent Granted:	To remove a weir structure in the Kapuni Stream and undertake works for river bank protection purposes
Expiry Date:	1 June 2023
Review Date(s):	June 2017
Site Location:	Kapuni Gas Treatment Plant, 318 Palmer Road, Kapuni
Legal Description:	Pt Lot 1 DP 5227 Lot 1 DP 9987 Blk XVI Kaupokonui SD
Grid Reference (NZTM)	1700900E-5629580N
Catchment:	Kapuni

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. The exercise of this consent shall be undertaken substantially in accordance with the documentation submitted in support of application 4950. In the case of any contradiction between the documentation submitted in support of application 4950 and the conditions of this consent, the conditions of this consent shall prevail.

2. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to the commencement and upon completion of weir removal and again at least 48 hours prior to and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the river bed or discharges to water. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz. Notification by fax or post is acceptable if the consent holder does not have access to email.

3. The consent holder shall adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to avoid or minimise the discharge of sediments or other contaminants into water or onto the riverbed and to avoid or minimise the disturbance of the riverbed and any adverse effects on water quality.

4. The consent holder shall ensure that the area and volume of the riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.

5. The consent holder shall take all reasonable steps to:

a) minimise the amount of sediment discharged to streams;
b) minimise the amount of sediment that becomes suspended in streams; and
c) mitigate the effects of any sediment in the stream

Undertaking work in accordance with *Guidelines for Earthworks in the Taranaki Region*, by Taranaki Regional Council, will achieve compliance with this condition.

6. The consent holder shall ensure that all concrete, steel, rubble and any other materials from the demolition is removed from the streambed.

7. Any instream work shall take place only between 1 November and 10 May inclusive, except where this is waived in writing by the Chief Executive, Taranaki Regional Council.

8. The consent holder shall not use explosives in the removal of the structure.

9. This consent shall lapse five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

10. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at that time.

Transferred at Stratford on 1 September 2015

For and on behalf of
Taranaki Regional Council

_____

A D McLay
Director - Resource Management

Certificate of Compliance

Pursuant to section 139 of the Resource Management Act 1991 a certificate of compliance is hereby issued by the Taranaki Regional Council

Name of certificate holder

Vector Gas Trading Limited
101 Carlton Gore Road
Newmarket
Auckland 1023

Site location

Kapuni Gas Treatment Plant, 298 Palmer Road, Kapuni

Certification

The Taranaki Regional Council hereby certifies that as of 29 March 2010:

The placement and use of the following structures in, on, under or over the bed of the Kapuni Stream;

1. LTS pipebridge
2. LTS plant access bridge
3. Water intake structure
4. Flo-Dar and access platform
5. pH meter
6. Gabion baskets
7. Two stormwater discharge pipes
8. Stream bank protection
9. Stock bridge

can lawfully be undertaken without a resource consent.

Relevant Rules

Rule 52 of the Regional Fresh Water Plan applies to all structures listed above excluding a PVC stormwater pipe and Flo-Dar measuring system. That rule has the following conditions:

- *Structure was lawfully established and in use at the date of public notification of this Plan;*
- *Structure must not restrict the passage of fish;*
- *There shall be no significant adverse effects on aquatic life or instream habitat.*

Rule 61 of the Regional Fresh Water Plan applies to the PVC stormwater pipe and Flo-Dar measuring system. That rule has the following conditions:

- *Structures for the conveyance of stormwater shall be no greater than 150 mm in diameter;*
- *Structure shall not cause a navigational hazard;*
- *Structure does not alter the natural course of the river nor reduce channel capacity during flood flows;*
- *There shall be no significant adverse effects on aquatic life or instream habitat;*
- *Structure does not cause significant erosion, scour or deposition;*
- *Disturbance of the bed shall be the minimum necessary to carry out the required works;*
- *No contaminants shall be released to the river or lake bed from equipment being used for the activity, and no refuelling of equipment shall take place on any area of the river or lake bed;*
- *Between 1 May and 31 October there shall be no disturbance of any part of the bed covered by water;*
- *Sediment disturbance will not conspicuously change the visual clarity of water beyond a zone of reasonable mixing;*
- *All construction materials shall be removed from the bed;*
- *Water is only diverted to the extent, and for the period, necessary to carry out the works;*
- *Structure shall not restrict the passage of fish.*

Transferred at Stratford on 1 September 2015

For and on behalf of
Taranaki Regional Council

_____

A D McLay
Director-Resource Management

Discharge Permit

Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Vector Limited P O Box 593 HAWERA 4640
Decision Date:	20 June 2012
Commencement Date:	20 June 2012

Conditions of Consent

Consent Granted:	To discharge stormwater from site areas of a natural gas treatment plant where no industrial processes occur (e.g. landscaped areas and roads) into the Kapuni Stream at or about (NZTM) 1700830E-5629418N
Expiry Date:	1 June 2035
Review Date(s):	June 2017, June 2023, June 2029
Site Location:	Kapuni Gas Treatment Plant, 298 Palmer Road, Kapuni
Legal Description:	Pt Lot 1 DP 5227 Blk XVI Kaupokonui SD (Discharge source & site)
Catchment:	Kapuni

For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document

General condition

a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.

2. The stormwater discharged shall be from a catchment area not exceeding 9.39 ha.

3. After allowing for reasonable mixing, the discharge shall not, either by itself or in combination with other discharges, give rise to any or all of the following effects in the receiving water:
    a. the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
    b. any conspicuous change in the colour or visual clarity;
    c. any emission of objectionable odour;
    d. the rendering of fresh water unsuitable for consumption by farm animals; and
    e. any significant adverse effects on aquatic life.

4. The consent holder shall maintain a contingency plan (which is incorporated into the contingency plan for the entire site). The contingency plan shall be adhered to in the event of a spill or emergency and shall, to the satisfaction of the Chief Executive, Taranaki Regional Council, detail measures and procedures to be undertaken to prevent spillage or accidental discharge of contaminants not authorised by this consent and measures to avoid, remedy or mitigate the environmental effects of such a spillage or discharge.

5. The consent holder shall maintain a stormwater management plan (which is incorporated into the stormwater management plan for the entire site). This plan shall be adhered to at all times and shall, to the satisfaction of the Chief Executive, Taranaki Regional Council document how the site is to be managed in order to minimise the contaminants that become entrained in the stormwater.

6. This consent shall lapse on 30 June 2017, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

7. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2023 and/or June 2029, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 20 June 2012

For and on behalf of
Taranaki Regional Council

_____

Director-Resource Management

Certificate of Compliance

Pursuant to section 139 of the Resource Management Act 1991 a certificate of compliance is hereby issued by the Taranaki Regional Council

Name of certificate holder	Vector Gas Trading Limited 101 Carlton Gore Road Newmarket **Auckland 1023**
Site location	Kapuni Gas Treatment Plant, 298 Palmer Road, Kapuni at or about GR: 1700824E-5629246N [legal description: Lot 1 DP 15254 [Discharge source & site]]
Proposal/Activity	To discharge stormwater from an LPG storage and load-out facility onto and into land in the vicinity of the Kapuni Stream, in accordance with the proposal set out in application 6645.
Certification	The Taranaki Regional Council hereby certifies that: the discharge of stormwater from a LPG storage and load-out facility onto and into land in the vicinity of the Kapuni Stream as outlined in the documentation supplied in support of the application is a permitted activity pursuant to Rule 23 of the Regional Freshwater Plan for Taranaki [2001] at the date of receipt of the application for this certificate, provided that it complies with and continues to comply with the following conditions: • *The discharge shall not originate from any industrial or trade premise where the active area of the site is greater than 0.5 ha, unless there is an interceptor system in place that is designed and managed so that it will keep stormwater from entraining contaminants;*

- *The discharge shall not originate from any industrial or trade premise where hazardous substances are used, stored or potentially spilt unless:*
  - *(i) there is an interceptor system in place that is designed and managed so that it will keep stormwater from entraining contaminants; or*
  - *(ii) there is an interceptor system in place that is designed and managed so that it is capable of capturing contaminated stormwater and either diverting it to trade waste or containing it and/or removing or reducing the contaminants such that:*
    - *any spills can be recovered;*
    - *the discharge shall not contain any persistent or bioaccumulative substances;*
    - *the discharge shall not breach any other specified condition of this rule;*

  and a spill contingency and interceptor system maintenance plan is maintained and regularly updated for the site;
- *The discharge shall not originate from any industrial or trade premises where the movement of rock, earth or soil material is taking place, unless that movement is being undertaken in connection with site landscaping, or the installation, construction, maintenance or demolition of buildings, structures or equipment;*
- *The discharge shall not be greater than is able to be discharged from a pipe of 900 mm in diameter;*
- *The discharge shall not cause significant erosion, scour or deposition;*
- *Discharge that will, or is liable to enter surface water, shall not exceed the following:*

pH	*6.0-9.0*
oil and grease	*15 gm^{-3}*
suspended solids	*100 gm^{-3}*
BOD	*5 gm^{-3}*
unionised ammonia	*0.025 gm^{-3}*
free chlorine	*0.2 gm^{-3}*

- *The discharge shall not give rise to any of the following effects in receiving waters after reasonable mixing:*
  - *(a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;*
  - *(b) any conspicuous change in the colour or visual clarity;*
  - *(c) any emission of objectionable odour;*
  - *(d) the rendering of fresh water unsuitable for consumption by farm animals;*
  - *(e) any significant adverse effects on aquatic life.*

Any discharge which causes any of the above conditions to be breached is not permitted and may be the subject of enforcement action.

Transferred at Stratford on 1 September 2015

For and on behalf of
Taranaki Regional Council

A D McLay
Director-Resource Management

Appendix II

Biomonitoring reports

Memorandum

To Nathan Crook and Darin Sutherland, Job Managers

From Darin Sutherland, Environmental Scientist

Document 2118887

Date 10 Sep 2018

Review of Stark Environmental Reports: Kapuni macroinvertebrate biomonitoring and electric fishing in relation to Ballance Agri-Nutrients Kapuni Ltd and Vector Ltd – July 2017 – June 2018

Introduction

Four macroinvertebrate surveys and two fish surveys were scheduled for the Kapuni Catchment for the 2017-2018 monitoring period (Table 1). In this memo, the reports are reviewed which detail the macroinvertebrate and fish monitoring. Refer to the specific reports for further details.

Table 1 Overview of the monitoring programme for the Kapuni Catchment

Survey dates	Report number	Taxa	Number of sites	
			Kapuni Stream	Tributaries
23/08/17	2017-06	Macroinvertebrate	7	2
4/10/17	2017-07	Fish	9	2
4/10/17	2017-08	Macroinvertebrate	9	2
17/01/18	2018-01	Macroinvertebrate	7	2
24/04/18	2018-04	Fish	7	
24/04/18	2018-05	Macroinvertebrate	7	2

Figure 1 Biomonitoring sites in the Kapuni Catchment

Macroinvertebrate monitoring

Targets for MCI values have been set for the Kapuni main stem and gully system. For the Kapuni Stream a MCI target of 100 has been obtained from historical data and the expected mild enrichment in the mid-catchment. The gully system (site 5) previously had a MCI target of 72 using the hard bottomed score but this has been revised to a soft bottomed index score (MCI-sb) of 73 units based on the 25th percentile of historical data. Site 13 does not have enough data to set a target score based on historic data.

The soft bottom MCI is generally not used by the Taranaki Regional Council due to staff finding it to be unreliable when detecting pollution incidences. For instance, there have been examples of sites containing large amounts of sewage fungus and having very high BODs that had 'very poor' hard bottomed MCI scores but with 'fair' soft bottomed scores (e.g. MCI-hb of 40 vs MCI-sb 95). The MCI-sb was developed primarily in the Auckland Region and may not be appropriate for the Taranaki Region, further, differences seem to exist between sampling macrophytes and woody debris in scores, and its continued use may need to be reviewed.

Based on a sample size of one for a kick-net sample an error of 10.8 MCI units was used for the four reports. This error was based on comparisons between two kicknet samples but as the target value arguably does not contain any sampling error, the detectable difference should be half 10.8, 5.4 MCI units. The reports now acknowledge shortcomings when using the 10.8 detection level.

The gully site 5 is approximately 2,200 m downstream from the boundary with Ballance Kapuni and gully site 13 is approximately 2,000 m downstream of the boundary. The relatively large distance from the site boundary produces two problems. Firstly, effects of any nutrient enrichment will be less apparent the further downstream samples are collected. Weedy streams would be expected to take up significant amounts of nitrogen and therefore the ability to detect effects of nutrient enrichment from the Ballance site at the point where samples were collected is limited. Secondly, the two streams run through a dairy farm and if any degradation were detected it would be difficult to disentangle potential enrichment from the dairy farm (e.g. inappropriate irrigating of dairy shed effluent) from enrichment from Ballance Kapuni.

Based on the large distance from the site, use of the MCI-sb score, error rate, conservative target of 25th percentile, having a target for the two gully sites is in itself of little value and relevance. Macroinvertebrate sampling does still have limited value in the context that if a spill or discharge were to occur that was acutely toxic to macroinvertebrates and would effectively eliminate populations from the monitoring sites, then this would still be detectable. Stark Environment Ltd also concluded that the gully sites were of little practical use and macroinvertebrate communities at the sites were relatively insensitive to nutrient enrichment.

During all four surveys, the Kapuni Stream and its tributary sites generally had scores indicating 'excellent' macroinvertebrate health for mainstem sites and 'fair' health for the two tributary sites. For the August 2017 survey, the majority of mainstem sites had new maximum MCI values while site 5 had a typical result and site 13 recorded a new minimum, but was only the fifth sample taken. In the October 2017 survey two more sites had new maximums while site 13 recorded a new maximum. Scores for the January and April surveys were also high. Most surveys recorded the expected trend of decreasing score in a downstream direction, with a significant decrease recorded between site 7 and the Kokiri Rd site on only one occasion (during the January survey.

Linear trends in MCI values at the sites are also reported, by plotting MCI and taxa richness versus time using the LOWESS (Locally Weighted Scatterplot Smoothing) method (used with Tension = 0.4). The statistical significance of the trends was assessed using Mann-Kendall tests in STATISTICA 8. The Benjamini-Hochberg false discovery rate (FDR) was also used, to control the overall Type-I error rate in time series analyses. All sites, apart from site 13 that did not have sufficient data collected for trend analysis, exhibited a statistically significant positive trend in all surveys, with such significantly positive trends being strong enough to avoid elimination by the FDR. The last 5-10 years show a levelling off or decrease in scores but as this effects the control site (site 9), it appears to be due to factors unrelated to activities associated with Ballance Kapuni.

Some additional analysis was done, where recorded MCI scores were compared with that predicted using relationships developed between MCI scores and altitude for ringplain streams. There were three predicted values provided, the first based on a relationship developed using all generic ringplain data, the second using Kapuni Stream data collected since 1981 only and the third using Kapuni Stream data collected since 2000. The latter predicts the highest MCI scores, and this is the relationship against which the reported results were compared. Observed results were generally higher than expected results for the August survey and close to expected results for the other surveys.

For the four surveys taxa numbers were variable between sites and surveys. The survey on 23 August 2017 recorded low taxa numbers but this was due to high preceding flows. No sites had taxa richnesses that were indicative of preceding water quality that was toxic to macroinvertebrates. Long term trends in taxa richness are also evident at some sites in the Kapuni Stream. This trending, undertaken for the July and October 2014 surveys, showed a statistically significant ($P<0.05$) negative trend in taxa richness at all sites except for site 3. After the October 2014 survey, the need for this trending was reconsidered. As the relationship between taxon richness and stream health is not linear, as both highly polluted and pristine waters can produce low taxa richness, it was decided to discontinue the trending of taxon richness.

Overall, the MCI scores for nearly all sites were similar to or higher than their respective means. The Kapuni Stream was generally in 'good' to 'excellent' health and the impact (if any) of the industrial activity at Kapuni was not discernible.

Electric Fishing

The two reports that detail the monitoring of fish communities undertaken in the Kapuni Stream in 4 October 2017 (11 sites) and April 2018 (seven sites). The total area of streambed fished in the Kapuni Stream was approximately 356 m^2, while the tributaries were not fished in either survey.

Table 2 Results of fish survey in the Kapuni Stream conducted on 4 October 2017

Site	Brown trout	Redfin bully	Koaro	Torrentfish	Eels	Koura	Total number of species
O			1				1
P					1		1
E					1		1
9		2					2
11		1					1
12		3					3
10	1						1
6		1			1		2
7		1					1
8/K	2	2			1	1	6
N		1			3		4
Total	3	11			7	1	

Table 3 Results of fish survey in the Kapuni Stream conducted on 24 April 2018

Site	Brown trout	Redfin bully	Koaro	Torrentfish	Eels	Koura	Total number of species
O	NA	NA	NA	NA	NA	NA	NA
P	NA	NA	NA	NA	NA	NA	NA
E	NA	NA	NA	NA	NA	NA	NA
9		1			1		2
11							
12		3			1		4
10							
6					1		1
7		2					2
8/K		1			3		4
N	NA	NA	NA	NA	NA	NA	NA
Total	0	7	0	0	6	0	

All sites were surveyed for fish using the single pass electric fishing technique. The results of these surveys are given in Table 2 and Table 3.

A total of 22 animals, comprising four taxa, were caught at 11 sites during the October 2017 survey. During the April 2018 survey, 13 animals comprising three taxa were caught. Both survey results were within the range (8-221) of total numbers and variety (2-8 taxa) recorded in previous years, with the autumn survey having lower numbers and taxa recorded than the spring survey, in keeping with what was found in the previous monitoring year.

In October 2017, redfin bullies were the most abundant taxa comprising 50% of the total number of animals recorded. Eels are normally the dominant fish recorded from the Kapuni Stream.

In April 2018, redfin bully were again the most abundant taxa comprising 53% of the total number of animals recorded. The poor results were likely caused by fine sand deposition and significant freshes.

It has been noted in previous reports that fine sand has been a dominant feature on the streambed, due in part to the erosion on the mountain. This has continued in both reports reviewed and it is likely to have reduced the suitability of habitat for some taxa, such as koura. It is thought that this reduction in available habitat is also responsible for a reduction in the numbers of brown trout recorded per site. The catch per unit effort has dropped from a high of 4.27 brown trout per site in 1982 – 1983 to less than 0.5 from late 2008 to mid 2012. An improvement was recorded in the October 2015 survey. However none were recorded during the April 2016 survey, only three for the November 2016 survey and none for the June 2017 survey and this trend has continued. It was suggested that trout records may increase in the near future as Fish and Game is now more actively stocking this river than has happened in the recent past but so far trout numbers to not appear to be improving.

One additional point worth noting is the fact that the v-notch weir at the Vector site has been removed. The weir's removal will have improved fish passage in this reach of the Kapuni Stream, and this may result in

improved fish communities. Furthermore, New Zealand Railways Corporation has undertaken works to improve fish passage at the railway bridge, which also may lead to improved fish communities.

Overall, these electric fishing results from the Kapuni catchment do not provide any conclusive indication that the petrochemical industries are having any significant adverse effects on fish communities in the Kapuni catchment with results being affected by sedimentation and significant number of preceding freshes.

Appendix III

Regional NOx study report 2017-2018

To	Fiza Hafiz, Scientific Officer – State of the Environment
	Job Managers - Callum MacKenzie, Thomas McElroy, Darin Sutherland
From	Brian Cheyne, Scientific Officer – Air Quality
Document	2089257
Date	20 July 2018

Monitoring of nitrogen oxides (NOx) levels in Taranaki near the NOx emitting sites, year 2017-2018

From 2014 onwards, the Taranaki Regional Council (TRC) has implemented a coordinated region-wide monitoring programme to measure NOx, not only at individual compliance monitoring sites near industries that emit NOx, but simultaneously at urban sites (the Council regional state of the environment programme) to determine exposure levels for the general population. The programme involves deploying all measuring devices on the same day, with retrieval three weeks later. This approach will assist the Council to further evaluate the effects of local and regional emission sources and ambient air quality in the region.

Nitrogen oxides

Nitrogen oxides (NOx), a mixture of nitrous oxide (N_2O), nitric oxide (NO) and nitrogen dioxide (NO_2), are produced from natural sources, motor vehicles and other fuel combustion processes. Indoor domestic appliances (gas stoves, gas or wood heaters) can also be significant sources of nitrogen oxides, particularly in areas that are poorly ventilated. NO and NO_2 are of interest because of potential effects on human health.

Nitric oxide is colourless and odourless and is oxidised in the atmosphere to form nitrogen dioxide. Nitrogen dioxide is an odorous, brown, acidic, highly corrosive gas that can affect our health and environment. Nitrogen oxides are critical components of photochemical smog – nitrogen dioxide produces the brown colour of the smog.

Environmental and health effects of nitrogen oxides

Nitrogen dioxide is harmful to vegetation, can fade and discolour fabrics, reduce visibility, and react with surfaces and furnishings. Vegetation exposure to high levels of nitrogen dioxide can be identified by damage to foliage, decreased growth or reduced crop yield.

Nitric oxide does not significantly affect human health. On the other hand, elevated levels of nitrogen dioxide cause damage to the mechanisms that protect the human respiratory tract and can increase a person's susceptibility to, and the severity of, respiratory infections and asthma. Long-term exposure to high levels of nitrogen dioxide can cause chronic lung disease. It may also affect sensory perception, for example, by reducing a person's ability to smell an odour.

National environmental standards and guidelines

In 2004, national environmental standards (NES) for ambient (outdoor) air quality were introduced in New Zealand to provide a guaranteed level of protection for the health of New Zealanders. The national standard for nitrogen dioxide (NO_2) is set out below.

In any 1-hour period, the average concentration of nitrogen dioxide in the air should not be more than 200 µg/m³.

Before the introduction of the national environmental standards, air quality was measured against the national air quality guidelines. The national guidelines were developed in 1994 and revised in 2002 following a comprehensive review of international and national research and remain relevant. The national guideline for nitrogen dioxide (NO_2) is set out below.

In any 24-hour period, the average concentration of nitrogen dioxide in the air should not be more than 100 µg/m³.

Nitrogen dioxide limits are also set in the special conditions of resource consents issued by the Council. The consents limits are the same as those imposed under the NES and MfE's guideline.

Measurement of nitrogen oxides

The Taranaki Regional Council has been monitoring nitrogen oxides (NOx) in the Taranaki region since 1993 using passive absorption discs. Research to date indicates that this is an accurate method for measuring average exposure, with benefits of simplicity of use and relatively low cost. To date more than 720 samplers of nitrogen oxides have been collected in Taranaki region. Discs are sent to EUROFINS ELS Ltd. Lower Hutt for analysis. Passive absorption discs are placed at the nominated sites. The gases diffuse into the discs and any target gases (nitrogen dioxide or others) are captured.

In the 2017-18 year, passive absorption discs were placed on one occasion at 30 sites, staked about two metres off the ground for a period of 21 days, for the purpose of compliance monitoring.

Conversion of exposure result to standardised exposure time period

From the average concentration measured, it is possible to calculate a theoretical maximum daily or one hour concentrations that may have occurred during the exposure period. Council data on NOx is gathered over a time period other than exactly 24 hours or one hour. There are mathematical equations used by air quality scientists to predict the maximum concentrations over varying time periods. These are somewhat empirical, in that they take little account of local topography, micro-climates, diurnal variation, etc. Nevertheless, they are applied conservatively and have some recognition of validity.

One formula in general use is of the form:

$$C(t_2) = C(t_1) \times \left(\frac{t_1}{t_2}\right)^p$$

where C(t) = the average concentration during the time interval t, and p = a factor lying between 0.17 and 0.20. When converting from longer time periods to shorter time periods, using p = 0.20 gives the most conservative estimate (i.e. the highest calculated result for time period t_2 given a measured concentration for time period t_1). Using the 'worst case' factor of p = 0.20, the monitoring data captured by the Council has been converted to equivalent 'maximum' 1-hour and 'maximum'24-hour exposure levels.

Results

The location of the NOx monitoring sites are shown in Figure 1 and the details of the NOx results are presented in Table 1 and Figure 2.

Table 1 Actual (laboratory) and recalculated ambient NOx results, NES and MfE guideline.

	Survey at	Site code	NOx(µg/m3) Lab. results		NOx 1/hr (µg/m3) Theoretical max.		NOx 24/hr (µg/m3) Theoretical max.	
Petrochemical	McKee PS	AIR007901		3.8		13.4		7.1
		AIR007902		2.8		9.9		5.2
	Turangi PS	AIR007822		3.8		13.4		7.1
		AIR007824		3.1		11.0		5.8
	Kaimiro PS	AIR007817		2.2		7.8		4.1
		AIR007818		2.0		7.1		3.7
	Sidewinder PS	AIR007831		1.8		6.4		3.4
		AIR007832		1.8		6.4		3.4
	Maui PS	AIR008201		1.8		6.4		3.4
		AIR008214		2.7		9.5		5.0
	Kupe PS	AIR007827		2.6		9.1		4.9
		AIR007830		2.1		7.4		3.9
	Kapuni PS	AIR003410		3.6		12.7		6.7
		AIR003411		4.0		14.1		7.5
	Cheal PS	AIR007841		2.8		9.9		5.2
		AIR007842		3.7		13.8		6.9
	Waihapa PS	AIR007815		2.4		8.5		4.5
		AIR007816		4.9		17.3		9.2
	Ballance AUP	AIR003401		2.7		9.5		5.0
		AIR003404		2.6		9.2		7.9
	Pohokura PS	AIR003101		1.9		6.7		3.6
		AIR003103		1.4		4.9		2.6
	Rimu PS	AIR012501		2.3		8.1		4.3
		AIR012502		1.8		6.4		3.4
Dairy factory	Fonterra	AIR002410		9.0		31.8		16.8
		AIR002711		9.8		34.6		18.3
		AIR002412		2.0		7.1		3.3
		AIR002413		2.2		7.8		4.1
SEM	NPGHS	AIR000012(SW)		6.1		21.6		11.4
		AIR000012(NE)		5.5		19.4		10.3
National Environmental Standard (NES) and MfE guideline						**200 (NES)**		**100 (MfE)**

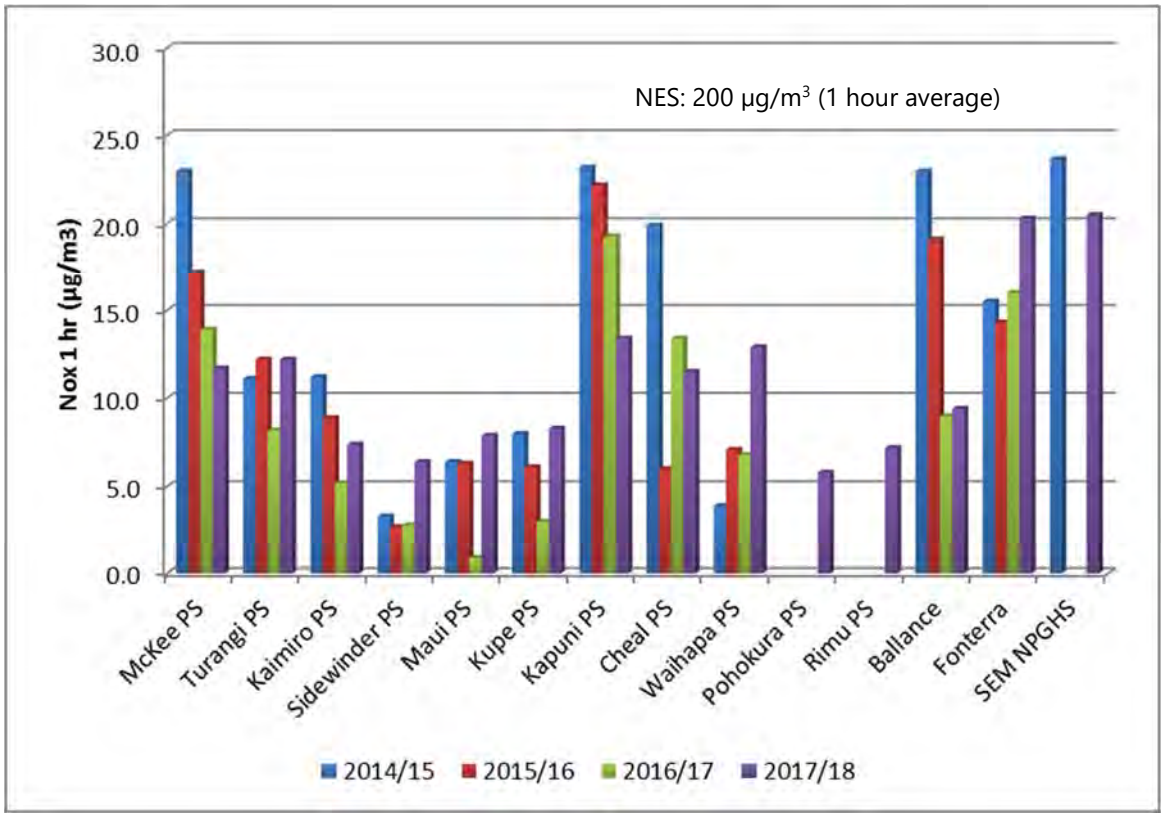

Figure 2 Average NOx levels at 14 surveyed locations throughout the region (year 2017-2018).

Discussion

The calculated 1-hour and 24-hour theoretical maximum concentrations (using a power law exponent of 0.2) ranged from 5.0µg/m³ to 34.6 µg/m³, and from 2.6 µg/m³ to 18.3 µg/m³ respectively (Table 1). The highest results in 2017-18 monitoring year were obtained from the NOx emitting sites at five different locations:

1. In the Kapuni heavy industrial area around the STOS production station.
2. Around the Fonterra's Whareroa co-generation plant.
3. From the sites at McKee production station.
4. Around the Waihapa production station.
5. And In New Plymouth's urban area near a busy traffic intersection.

All values were well within the National Environmental Standards, Ministry for the Environment Ambient Air Quality Guidelines and the respective resource consents limits. This continues the pattern found in previous years.

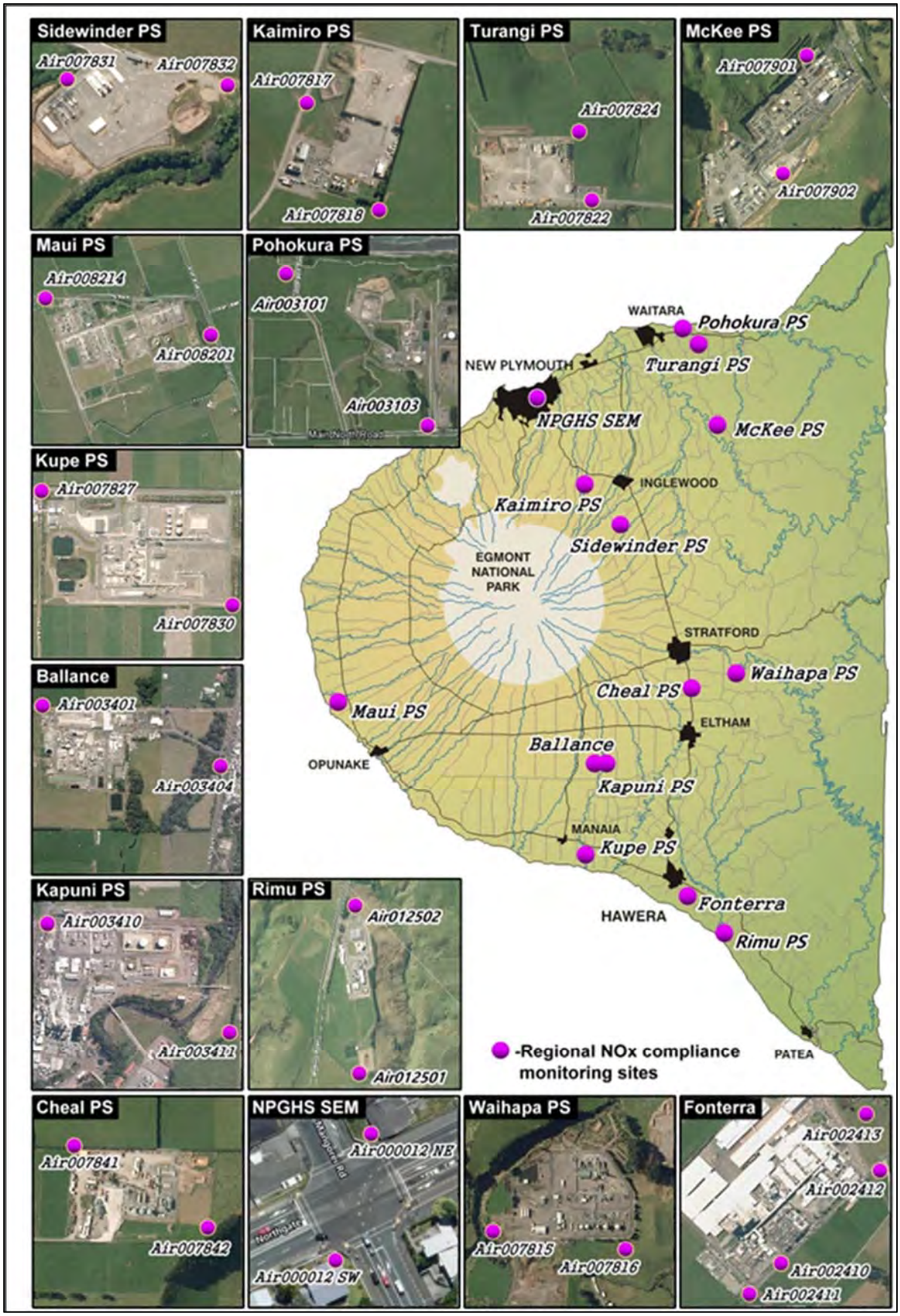

Figure 1 NOx monitoring sites in Taranaki Region, 2017-2018

Ministry for the Environment environmental performance indicator

Ministry for the Environment uses an environmental performance indicator to categorise air quality. These categories are set out in Table 2 and further details of the entire NOx results are set out in Table 3.

Table 2 Environmental Performance Indicator air quality categories

Measured value	Less than 10% of NES	10-33% of NES	33-66% of NES	66-100% of NES	More than 100% of NES
Category	excellent	good	acceptable	alert	action

Table 3 Categorisation of results (2017-2018 monitoring year)

National Environmental Standard for NO2 = 200 µg/m3- 1 hour average.		
Category	**Measured values**	
Excellent	<10% of the NES, (0-20µg/m^3)	**27** (90%)
Good	10-33% of the NES, (20-66µg/m^3)	**3** (10 %)
Acceptable	33-66% of the NES, (66-132 µg/m^3)	**0** (0%)
Alert	66-100% of the NES, (132-200 µg/m^3)	**0** (0%)
Total number of samples		**30** (100%)

Conclusion

The monitoring showed that 90% of the 1-hour average results fell into Ministry's 'excellent' categories and 3% of the results lay within Ministry's 'good' category. No results ever entered the 'acceptable' or 'alert' categories, i.e., no results ever exceeded the National Environmental Standard of 200µg/m^3.

These results, and all regional monitoring to date, have shown that Taranaki has very clean air, and on a regional basis there are no significant pressures upon the quality of the air resource.