

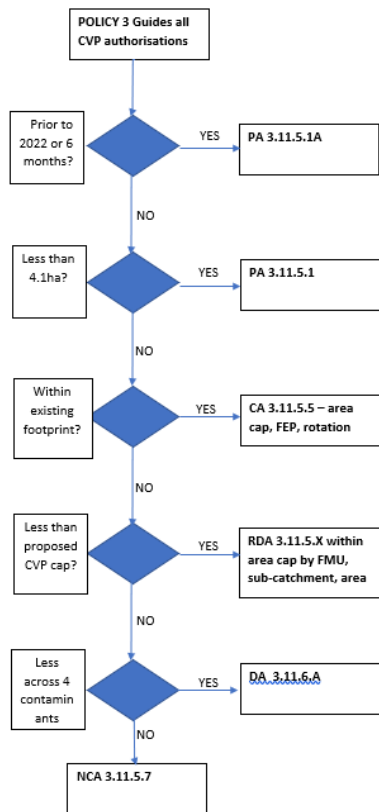
Horticulture New Zealand

YOUR GROWTH INDUSTRY



Overview - Helen Atkins

Flowchart – PCI Commercial Vegetable Production Provisions



Importance of vegetables - Michelle Sands

- ❑ National policy direction
- ❑ National food system

Regulatory Context

- ❑ HortNZ approach is consistent with proposed Essential Freshwater Review:
 - ❑ Controlled, because proposed NES provides a land area control across the FMU
 - ❑ RDA, because, the proposed NES an option for vegetable growing to expand at Best Management practice
 - ❑ Audited FEP and multiple contaminants, is proposed by the NES
 - ❑ NRP approach, the proposed NES does not include CVP within options reliant on Overseer modelling
 - ❑ Te mana o Te Wai, because it provides for healthier people and healthier freshwater.

- ❑ HortNZ approach is consistent with proposed NPS highly productive soils
 - ❑ RDA, provides for a capped area of CVP expansion and crop rotation on highly productive soils, to provide for food production

- ❑ HortNZ approach consistent with Climate Change Response Act
 - ❑ Audited FEP approach to manage fertiliser use for GHG and water quality
 - ❑ Discretionary and non-complying pathway provides a pathway for famers to diversify some land away from animal agriculture.

- ❑ HortNZ approach based on experience of short-coming in other regions
 - ❑ Horizons and Canterbury, neither proposed PC2 nor PC7 resolve the poor CVP provisions in those operative plans.

Main growing regions by volume for the 10 key vegetables (2014)



Note, only showing main growing areas.

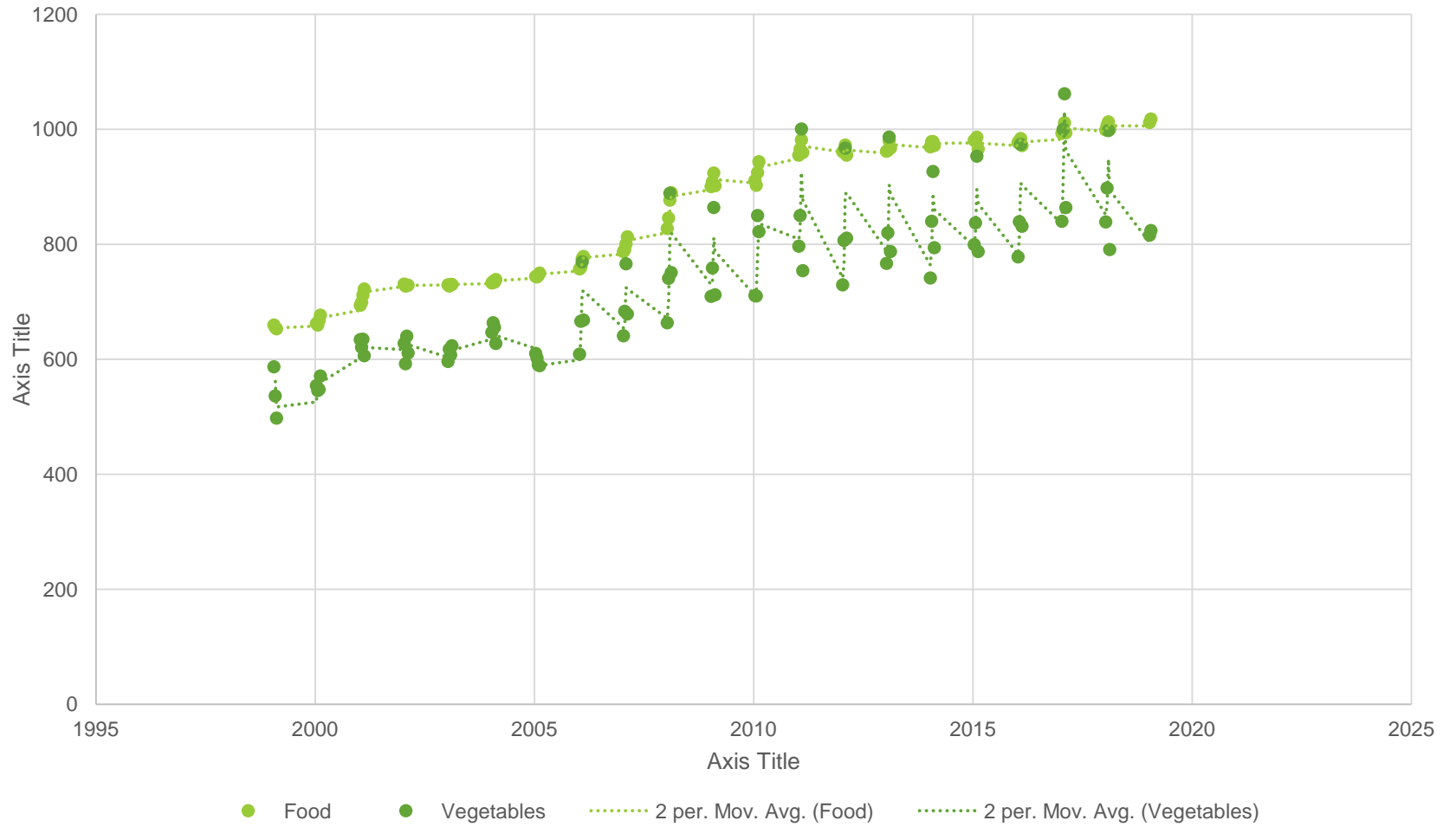
*Percentages of Southland figures represents planted hectares for these vegetables

Domestic consumption vs net availability of the 10 key vegetables

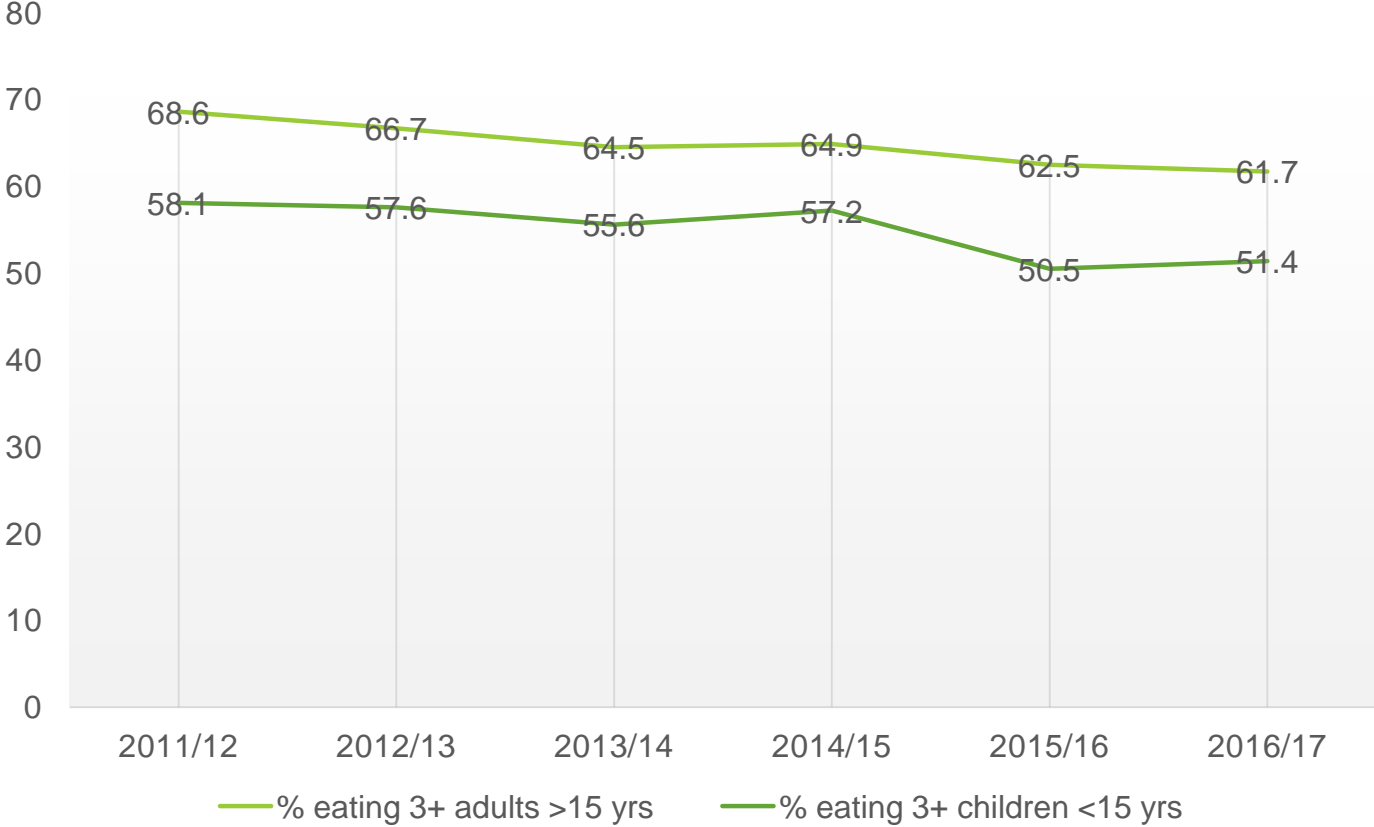
If we apply our 2016 food availability estimate, we won't be able to feed our current and growing population.



CPI - Food Versus Vegetables



% people eating 3+ vegetables



Cost of vegetables and health price

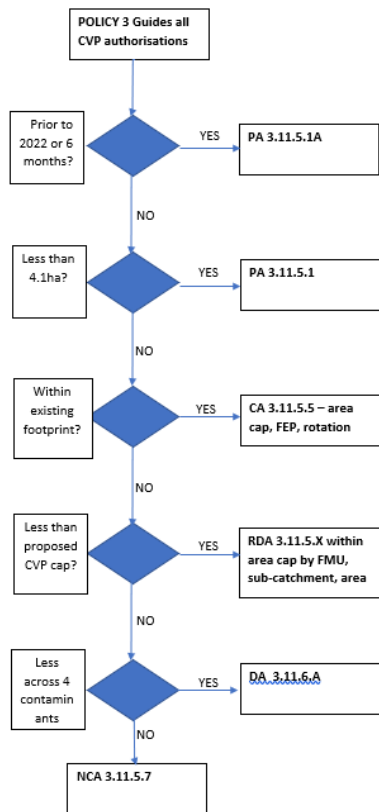
- ❑ Healthier food has been the first essential that low income families compromise on in times of hardship (Cheer, Kearns, & Murphy, 2002)
- ❑ A 20% subsidy on fruit and vegetables showed the potential to result in 560 (95% uncertainty interval, 400 to 700) deaths prevented or postponed in New Zealand (Ni Mhurchu, et al., 2015).
- ❑ Stuart Ford Estimates that the proposed offsetting policy would require an increase in vegetable price of 16 %– 50% to maintain grower margin, a more realistic outcome, is reduced vegetable production.
- ❑ 1 in 5 children living in food insecurity, these children are the most deprived and eat the least fruit and vegetables.

Health price of eating insufficient vegetables.

- ❑ 1550 deaths attributable to low fruit and vegetable consumption (MoH 2013)
- ❑ 800 cardiovascular deaths were caused by low vegetable intake in New Zealand in 2017 (IHME, 2017).
- ❑ This equates to approximately 12,000 disability-adjusted life years lost due to inadequate vegetable consumption.

Consistency with Regional Policy – Chris Keenan

Flowchart – PCI Commercial Vegetable Production Provisions



- ❑ Vision and Strategy
- ❑ Regional Policy Statement
- ❑ CVP provisions

Vision and Strategy (EIC paragraph 62 – 66)

- ❑ Proposed approach does not seek to confound the primary purpose of the V&S
- ❑ It does mean the Waikato community will need to make some allowance for CVP if this provisioning service is to be maintained and enhanced
 - ❑ Objective a) The restoration and protection of the health and wellbeing of the Waikato River is still being achieved under the proposed policy and methods.
 - ❑ Objectives b&c) The relationship of Waikato-Tainui with the Waikato River is supported. CVP is a historically important activity for W-T. It is part of tikanga and kawa.
 - ❑ Objectives d & e) The relief sought by HortNZ is targeted on preserving functional use of historically important soils for wider community wellbeing.
 - ❑ Objectives f,g,h) Science demonstrates that at particular locations and within particular limits as described in the HortNZ relief, the proposal is suitably precautionary; will not result in significant cumulative effects and does not require further degradation.

Regional Policy Statement (EIC paragraph 60 – 61)

- ❑ Proposed approach fits within the Objectives and Policies of the RPS.
- ❑ CVP is an ecosystem service as defined in the RPS. It is also a mitigation against climate change if land use change is well managed.
- ❑ The RPS also seeks to preserve the life supporting capacity of the soil resource in particular “High Class Soils”
 - ❑ RPS Obj. 3.6: Climate change adaptation: The objective is to manage land use activities in a way that avoids adverse effects from climate change.
 - ❑ Policy 4.1 notes the need to recognise multiple values such as “ecosystem services”. Ecosystem services are defined to include “provisioning services such as food and water”
 - ❑ RPS Obj. 3.8 Ecosystem services. “The range of ecosystem services associated with natural resources are recognised and maintained or enhanced to enable their ongoing contribution to regional wellbeing”.
 - ❑ Policy 4.4 in relation to regionally significant industry and primary production.
 - ❑ Policy 8.1 in relation to identifying values for freshwater bodies and developing approaches to management of freshwater.
- ❑ RPS Obj. 3.26. Maintain or enhance the life supporting capacity of the soil resource.
 - ❑ Policy 14.1; Policy 14.2 High class soils

Critical elements for CVP (Paragraph 21-31)

- ❑ Allow for the concept of an Enterprise; operating across identified land parcels in one or multiple subcatchments.
- ❑ Allow the consideration of the activity at the FMU level as opposed to the OR approach for CVP (within a subcatchment).
- ❑ Reserving limited capacity for new CVP. This capacity should be targeted at a certain area LUC Classes of soil and only in certain subcatchments.
- ❑ Allowing the use of a proxy Nitrogen estimate in recognition of the flaws in existing tools utilised for accounting.
- ❑ Providing a tiered consenting pathway that limits cumulative effects; directs the location and quanta of any new CVP and controls discharges through the adoption of the farm plan.
- ❑ Providing methods that ensure reductions can be achieved and reported through the implementation of robust FEP's that focus on farm management actions being undertaken within particular timeframes

Existing CVP (Paragraph 71)

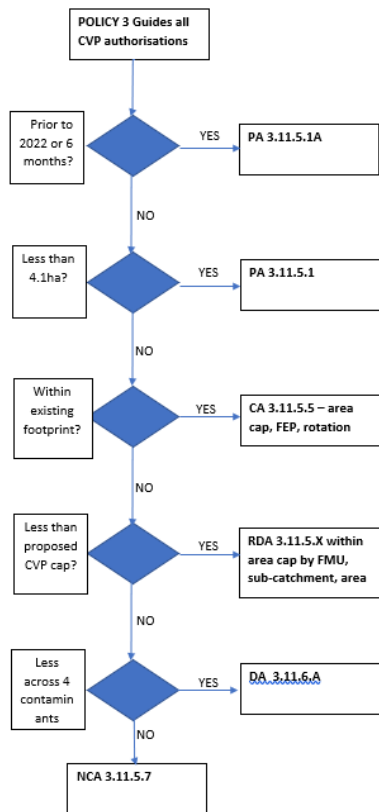
- ❑ Allow for certain activities as permitted.
- ❑ Adopt the approach of permitting the discharge if a land use consent for the Enterprise is obtained or if the PA conditions are met.
- ❑ Account for nitrogen discharges using an approved method – including using the NIWA modelling that relied on Overseer modelling of 3 representative CVP proxy systems
- ❑ Utilise the FEP Schedule (altered to incorporate the minimum standards as proposed) to control discharges and ensure mitigations are adopted;
- ❑ Grower to notify Council of movements etc. to ensure compliance. Mitigations adopted at new location to be part of amended FEP.

New CVP (paragraph 72 – 77)

- Allow for certain activities as permitted.
- Adopt the approach of permitting the discharge if an RDA land use consent for the Enterprise is obtained or the PA conditions are met.
- The RDA would allow for an assessment that new activity fits within the reserved allowance for the location proposed.
- Account for nitrogen discharges using an approved method, including proxy rotations.
- Utilise the FEP Schedule (altered to incorporate the minimum standards as proposed) to control discharges and ensure mitigations are adopted;
- Grower to notify Council of movements etc. to ensure compliance. Mitigations adopted at new location to be part of amended FEP.
- Allow new CVP with offsetting as a discretionary activity.
- Default to 3.11.5.7 for any other application.

Farm Systems and Economic Effects – Stuart Ford

Flowchart – PCI Commercial Vegetable Production Provisions



- ❑ Farm Systems - types of rotations and extent
- ❑ NRP
- ❑ Economics of CVP and discretionary pathway

CVP Farm systems

❑ **Market garden** (5% total area)

❑ Broccoli > Mustard > Lettuce > Cabbage > Mustard > Spinach > Cauliflower > Cabbage > Mustard.

❑ **Intensive vegetables** - leafy greens (45% total area)

❑ Squash > Broccoli > Oats and Rye > Lettuce (summer) > Mustard > Onions > Oats and Rye > Potato (Winter).

❑ **Extensive vegetable** – root crops (55% total area)

❑ Potato (summer) > Onions > Carrots > Squash > Oats and Rye > Barley (grain) > Oats and Rye

Results used by Dr Doole, NIWA, Jacobs and HortNZ in the PC1 process.
Changed with subsequent versions of Overseer. (+30%)

Nitrogen Reference Point

Schedule B

Option a

- Calculate a farm level NRP using Overseer or other method approved by CE.
- APSIM models of representative CVP farms (proxy rotations) would be an acceptable method to satisfy Schedule B a)

Option b

- Use the NIWA modelling assumed NRP for CVP, to satisfy Schedule B b)

Nitrogen Reference Point

- Not required for **Controlled and RDA** pathway– because any changes are relative to baseline land use area and rotation intensity, measured by audited FEP with GFP.
- Required for the **Discretionary** pathway, so the “existing” farm can be compared with the “new” farm.
- Required for the **Non-complying** pathway, so the “existing” farm, subcatchment and FMU load, can be compared to the “new” farm, subcatchment and FMU load.

Managing Nitrogen – Controlled

- ❑ A representative rotation, limits the concentration discharged from the enterprise at the baseline
- ❑ Capping the land area across the sub-catchment and FMU, limits the contaminant load from the enterprise at baseline for controlled

Managing Nitrogen – RDA

- ❑ The capped area (allowing for 10% growth) assumes intensive vegetable rotation for all new
 - ❑ a conservative assumption, because about half of CVP rotations are extensive, which has a slightly lower leaching rate than intensive.
 - ❑ Only a very few CVP rotations are market gardens.
- ❑ Capping the land area across the sub-catchment and FMU, limits the contaminant load from the enterprise

Managing Nitrogen – Discretionary

- ❑ Offsetting for all contaminants, to be equivalent to the previous land use load
- ❑ *E. Coli* and sediment and phosphorus discussed in Andrew Barber
- ❑ Economics of offsetting nitrogen for CVP

Managing Nitrogen – Discretionary

- ❑ Economics of offsetting nitrogen for CVP
 - ❑ De-intensifying the productive system.
 - ❑ An enterprise off set whereby additional productive land is purchased and it is converted to low leaching land use.
 - ❑ An on farm offset whereby an existing land uses high leaching activity is replaced with CVP production.

Managing Nitrogen – Discretionary

Table 2: The cost of maintaining the current CVP gross margin in various offset scenarios.

	Deintensification	Enterprise	On farm
Additional area required per ha of CVP area.	1.74	1.05	-
Additional cost to maintain existing gross margin.	9,115	6,280	5,653*
Change in average crop revenue to maintain the existing gross margin.	50%	30%	16%

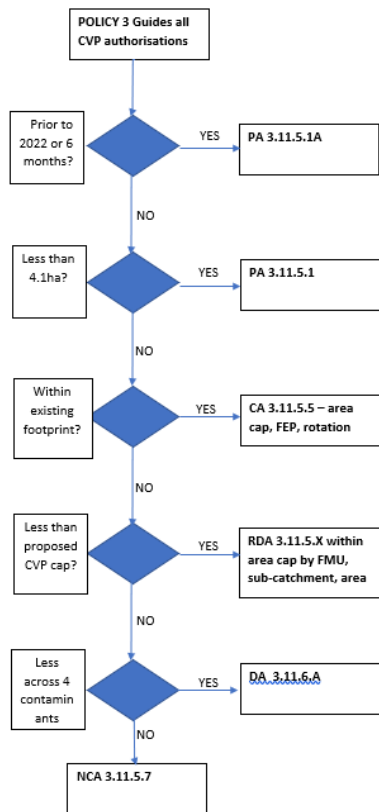
* includes the existing lease cost of \$2,000 per ha

Managing Nitrogen – Non-complying

- ❑ Non-complying pathway
 - ❑ For subcatchments not provided for by the RDA
 - ❑ When the offsetting at farm scale is uneconomic under discretionary
- ❑ Require decision support tool – integrated water quality and hydrological model to assess whether landuse change and proposed mitigations can meet objectives in the plan – links to table 3.11.1
- ❑ May be achieved through a subcatchment collective

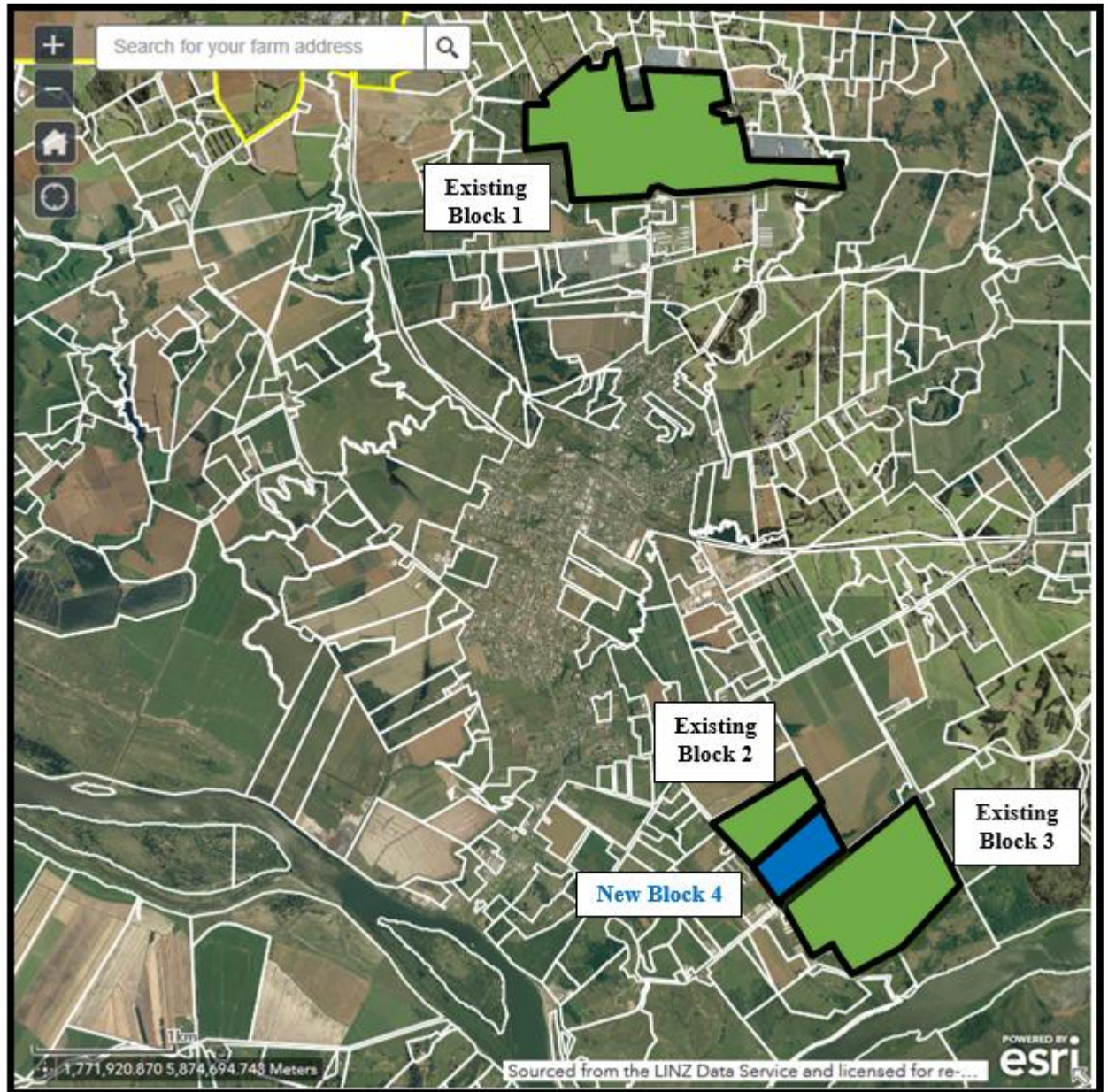
Managing Farm Level Effects— Andrew Barber

Flowchart – PCI Commercial Vegetable Production Provisions

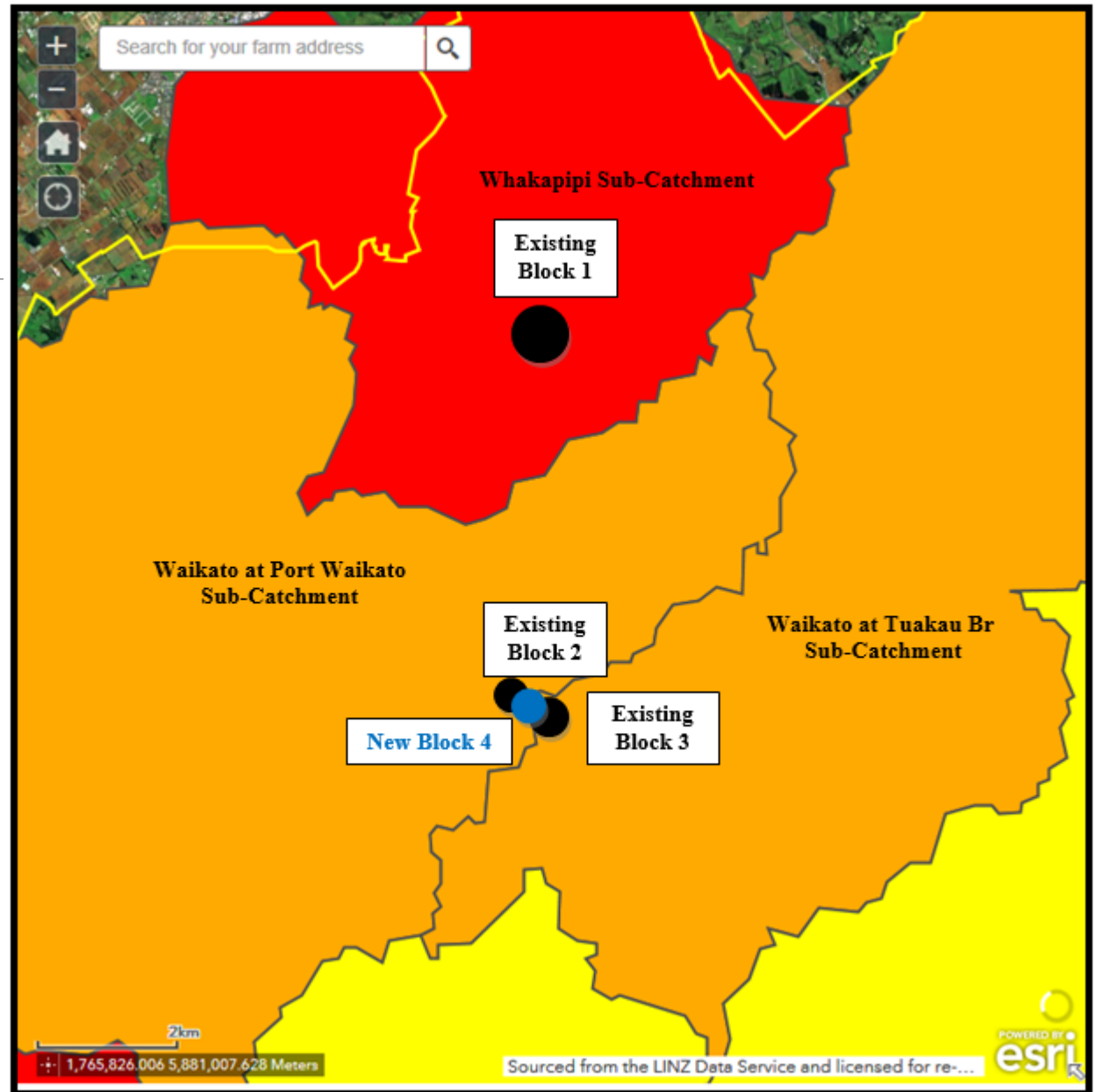


- ❑ Effectiveness of mitigations, required in FEP
- ❑ A mock consent for an existing site (3 Blocks) and another consent that added Block 4 (previously in pasture)
- ❑ A real example
- ❑ I will describe the FEP process
- ❑ Stuart Easton will comment on the water quality effects of converting Block 4 from pasture to CVP

Block locations



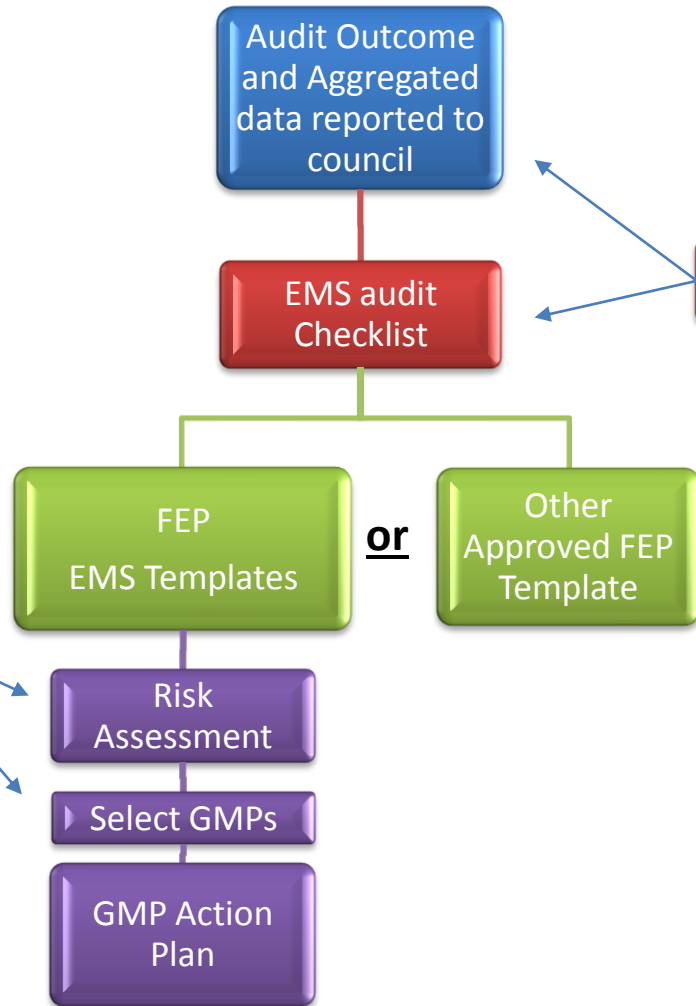
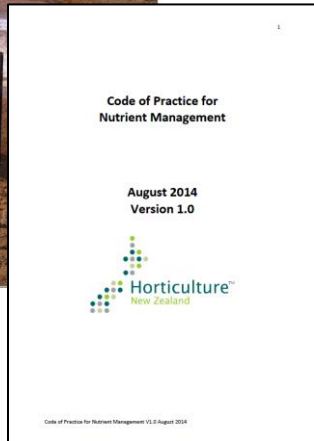
Block locations



Demonstrate operating at GMP



Codes of Practice



3rd party EMS audit



Farm level improvements across contaminants – Controlled

- ❑ The risk based FEP requires improvements in the enterprise contaminant concentrations and loads:
 - ❑ Sediment GMP removes (Block 2 evidence):
 - ❑ 95% - 99% of sediment (sediment retention pond - SRP),
 - ❑ 80% of sediment (5m vegetated buffer)
 - ❑ Potentially lower than pasture (Buffer strips > pasture > SRP)
 - ❑ Phosphorus GMP,
 - ❑ 80% - 99% reduction (equal to sediment reductions)
 - ❑ Nitrogen GMP, result in greater crop yields, and less losses
 - ❑ *E. coli* GMP, extremely low risk system

Real vegetable operation consent across 4 sub catchments, 1 new block FEP example

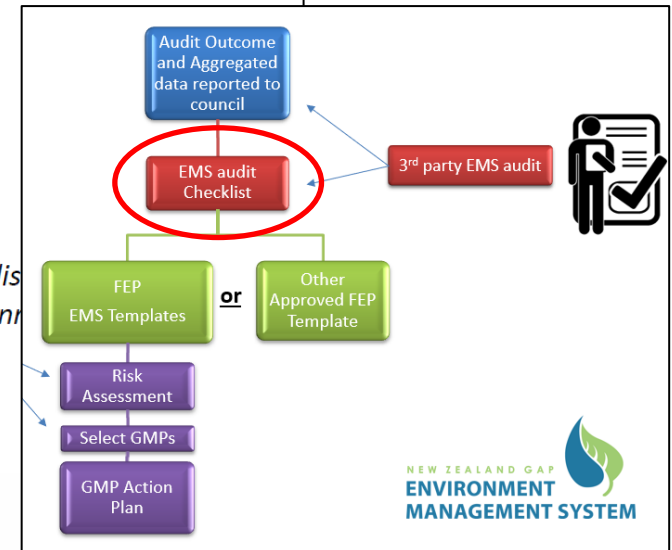
NZGAP

Environment Management System (EMS) Add-On AUDIT CHECKLIST (v1.4 August 2019)

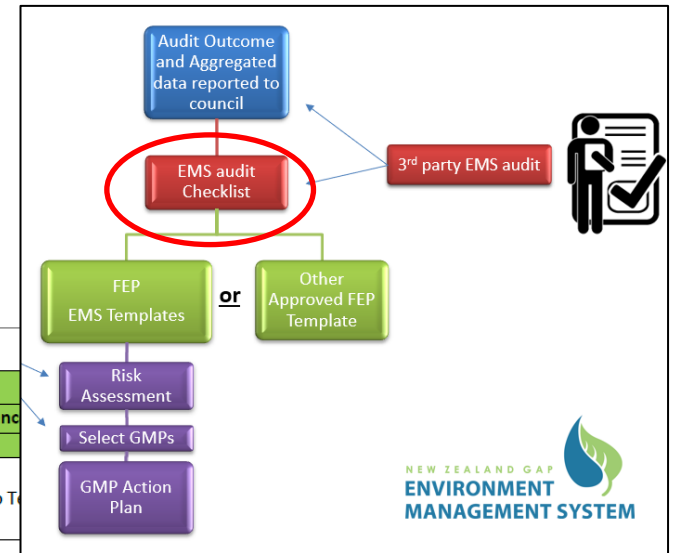
Business Details	
NZGAP Number:	xxxxx
Business Name (Legal Entity):	Operation A
Business owner (s):	Grower A
Physical address (main site):	Xyz Road, XYZ
Responsible manager:	AA
Certification Body Details	
Certification Body (tick):	AsureQuality <input checked="" type="checkbox"/> SGS <input type="checkbox"/>
Auditor Name:	
Audit date:	

Assessment Summary (complete after the assessment)	Total Number of Questions:
Total number of non-compliances:	53
Total number of initial Major "C" non-compliances:	15
Total number of initial Major "M" non-compliances:	25
Total number of initial Recommendations "R" not met:	13
Corrective actions to be completed before (date):	
Signature of Auditor:	
Signature of Responsible Manager:	

Audit Checklist
Farm Environment



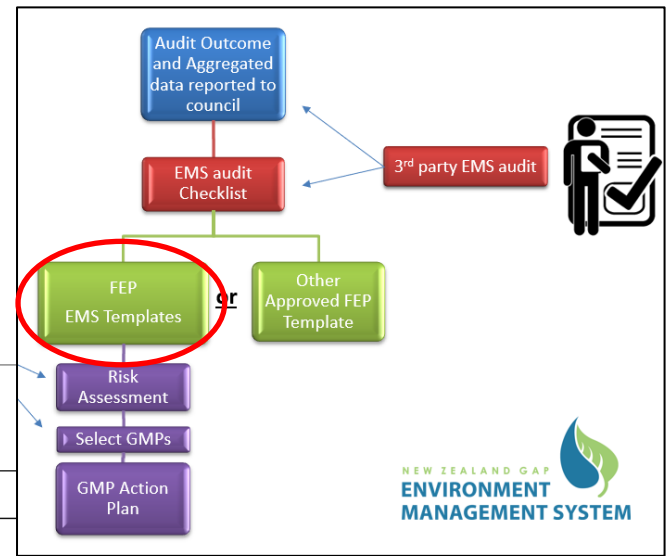
Checklist - Soil Section



6. Soil Management						
Ref	Question	Y	N	NA	Comment	Evidence
Soil quality, health, structure and fertility						
6.1	Has a soil assessment been completed to determine soil quality, health, structure and fertility (Template 6A)?	✓				Refer to T
6.2	Have techniques been used to maintain or improve soil quality, health, structure and fertility (Template 6B)?	✓				Refer to Template 6B. M
Erosion and Sediment control (cultivated, bare or erosion prone soil)						
6.3	Has the risk of soil erosion and sediment loss been assessed for the property (Template 6C) and paddocks (Template 6D – cultivated or bare soil)?	✓				Refer to Template 6D. C
6.4	Are appropriate measures implemented (or planned) and maintained to stop or control surface water entering the paddock (Template 6E)?	✓				Refer to Template 6E. M
6.5	Are appropriate measures implemented (or planned) and maintained to reduce or minimise the risk of soil erosion (Template 6F)?	✓				Refer to Template 6F. M
6.6	Are appropriate measures implemented (or planned) and maintained to reduce or minimise sediment loss (Template 6G)?	✓				Refer to Template 6G. M
6.7	Are records kept for cultivations, sowing, planting, and other relevant field operations (e.g. wheel track ripping)?	✓				Refer to field records. M
6.8	Do any newly adopted mitigations/measures meet the minimum design and operation requirements outlined in relevant industry guidance and codes of practice (e.g. sediment retention ponds)?	✓				Refer to erosion & sediment control plan. M

FEP – Template 6D

6D. SOIL: Risk of soil erosion and sediment loss – Paddock Assessment (for cultivated and bare soils)



Ref	Good Management Practices (for individual paddock or summary of all paddocks)	Complete? (Yes, Partial, No, n/a)				Date to be completed (if 'Partial' or 'No')	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence (e.g. map or description)	Level
		Y	P	N	n/a				
1	Identify site specific risks of this paddock (e.g. soil type, slope, proximity to waterways, critical source areas)	✓						Refer to maps. Refer to E&S Plan	GMP
2	Describe paddock management risks (e.g. paddock use, previous use, crop type, crop coverage, cultivation technique)	✓						Refer to maps. Refer to crop records.	GMP
3	Assess the risk of soil erosion prior to carrying out all field operations	✓						Refer to staff training manuals.	GMP
4	Identify where surface water is entering paddocks (map or description)	✓						Refer to maps.	GMP
5	Identify where surface water leaves paddocks (map or description)	✓						Refer to maps.	GMP
Baseline / Unmitigated Risk Level (i.e. without any GMPs in place):		High							
Risk Level with current practices in place (Template 6E, 6F, 6G):		Medium							
Risk level with GMP in place (Template 6E, 6F, 6G, 10):		Low							
Other identified risks:									

FEP - Maps

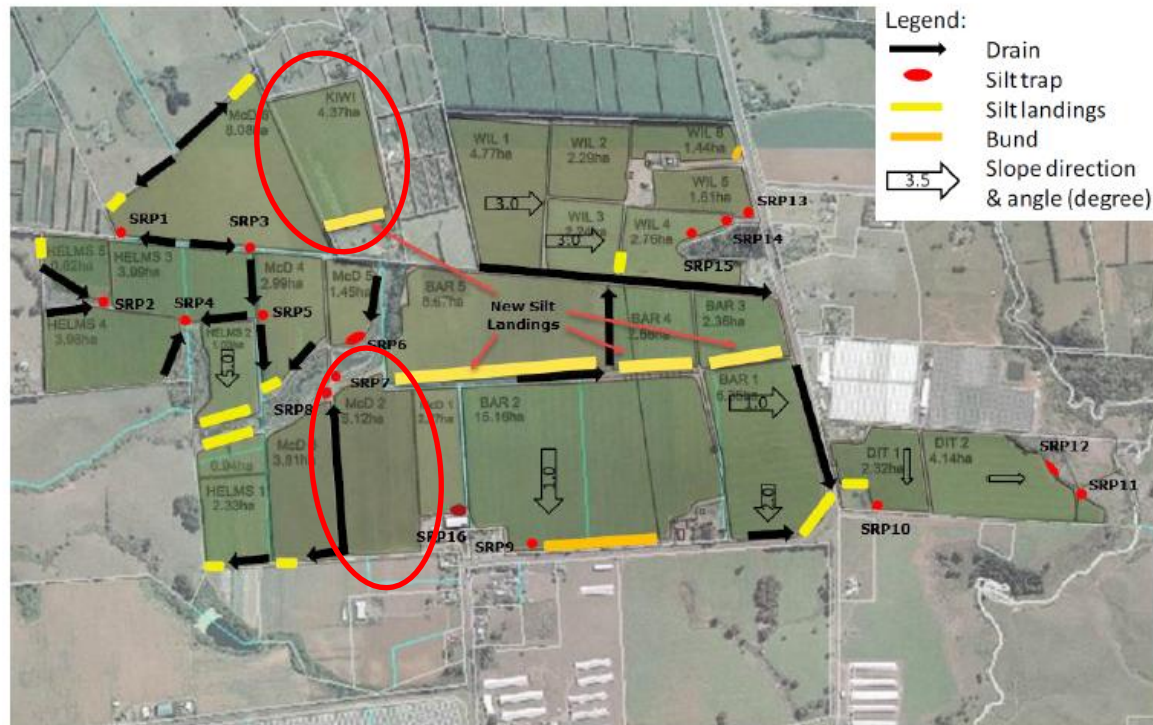


Figure 4. Site map with legend following implementation of action plan

Paddock risk assessment

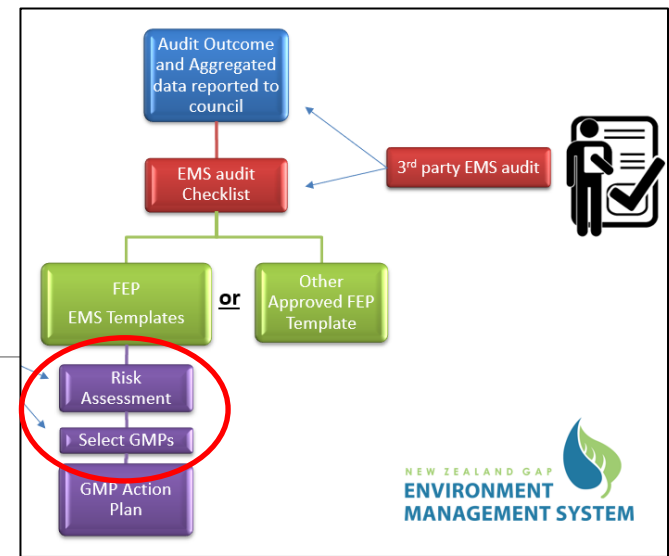


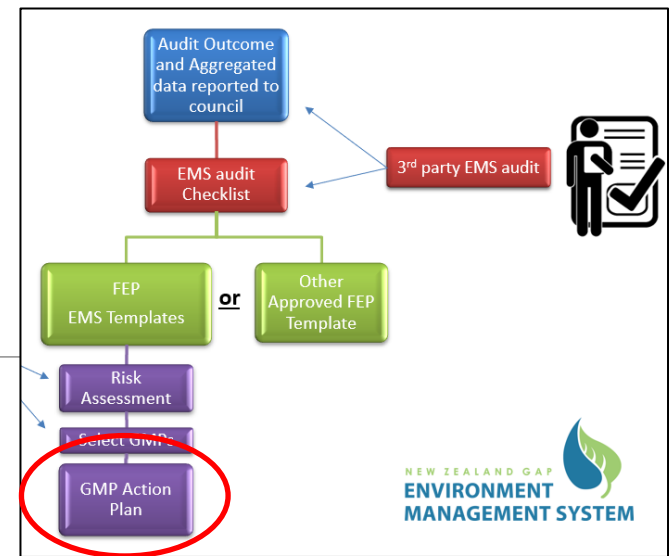
Table A2. Erosion estimates for Home Block 1 site

	Unmitigated erosion (t/ha/yr)	Level of sediment loss with <u>current</u> practice (t/ha/yr)*				Level of sediment loss with <u>enhanced</u> practice (t/ha/yr)	
		Total erosion (t/ha/yr)	<u>Suspended</u> sediment reduction (%)	Priority ranking	Risk assessment	Total erosion (t/ha/yr)	<u>Suspended</u> sediment reduction (%)
KIWI	65	65.0	0%	1	High	12.2	20%
McD1	65	65.0	0%	2	High	0.5	83%
McD2	70	3.2	83%	15	Medium	3.2	83%

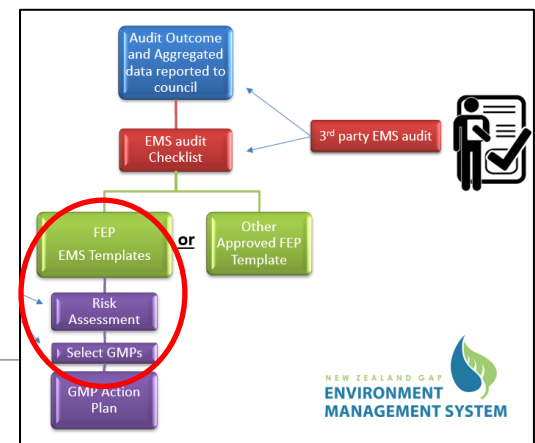
Action Plan

8 Action Plan

1. Upgrade all existing and new snorkels to comply with Table 6.
2. Ensure all drains running alongside paddocks are stabilised, with bunds installed as required to ensure overland flow from the paddocks does not enter the clean drain.
3. Ensure that there is at least a 1-2m setback from all clean drains to prevent soil entering from cropping activities.
4. Progressively grass all drains by April 2020.
5. Ensure all Silt Landings/Buffer Strips are maintained, with careful attention being paid to preventing ponding and channelisation. Construct 4 new Silt Landings in the locations specified in figure 4 with these factors taken under consideration.
6. Dig out all existing SRPs at the earliest opportunities and ensure all emergency spillways are level and stabilised. Stabilise all spillways with geotextile cloth.
7. Construct new SRPs/modify existing SRPs to the dimensions specified in Table 5 and in the locations specified in Figure 4. Stabilise all spillways with geotextile cloth.



Nutrients – higher level



7B. NUTRIENTS: Assessing the risk of nutrient Loss

Ref	Contributing factor	Assessing extent of risk	Level of risk (Low, Med, High)
1	Soil moisture	Applications of N when soils that are saturated - high risk. Applications when soils are not saturated – lower risk <i>Note:</i> It is important to assess the soil moisture status before an application to ensure that the potential for leaching is minimised. Use of foliar applications can reduce the risk	Low
2	Irrigation	Use of irrigation – high risk <i>Note:</i> Risk can be reduced by ensuring that irrigation is used to maintain soil moisture at target levels and applications of N timed accordingly.	Medium
3	Soil type	Light soils – High risk. Medium soils – Medium risk. Heavy soils – Low risk. If available use S-map Soil Report – contaminant management classification	Low
4	Paddock history	Quantities of N applied <u>not</u> based on fertiliser recommendations or assessment of crop residues – high risk. Applications take into account fertiliser recommendations and crop residues to ensure that appropriate levels of N are applied - lower risk	Medium

7C. NUTRIENTS: Implement measures to improve nutrient uptake and minimise nutrient loss

Ref	Good/Best Management Practices	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence provided (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
Pre-planting									
1	Plan fertiliser inputs for the crop	✓						Refer to fertiliser records.	GMP
2	Take into account any organic manures used	✓						Refer to fertiliser records soil test results.	GMP
3	Take into account any animals in the rotation				✓		No animals in rotation.		GMP
4	Manage applications of nutrients taking into account rainfall, field capacity and soil saturation levels	✓					Qualified agronomists are used.		GMP
5	Obtain advise from a nutrient advisor or agronomist	✓					Qualified agronomists are used		BMP

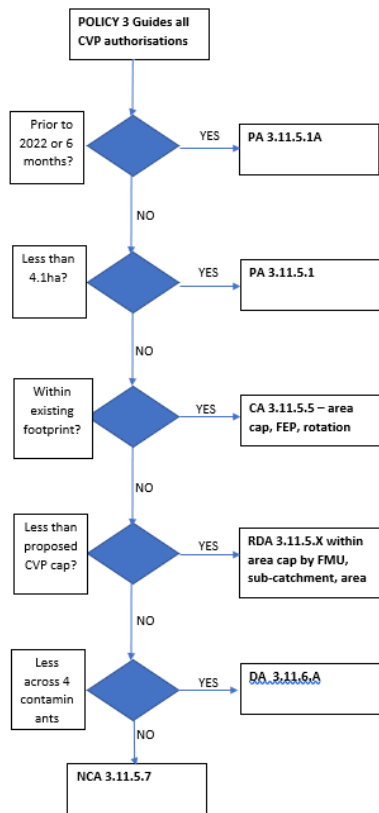
Peer reviewed

Process reviewed by a qualified ECan Farm Environment Planner & Certified Nutrient Management Adviser (CNMA)

1. Picked up improvement to maps – waterway location, critical source areas, etc
2. Irrigation – weather forecasting

How is assurance provided? – Damien Farrelly

Flowchart – PCI Commercial Vegetable Production Provisions



□ FEP - NZGAP EMS

□ NZ GAP auditing

EMS FEP and Schedule 1

Management Areas



SOIL



NUTRIENTS



IRRIGATION



WATERWAYS



BIODIVERSITY

Other Requirements



Mapping

OVERSEER[®]

NCheck

Estimate of Contaminate Loss
(e.g. Nutrient Budget)



EMS FEP and Schedule 1

□ Part A – Provision of FEP

- EMS templates including applicable requirements to be approved by Chief Executive (see ECan example)
- Draft data exchange requirements are very onerous, creating a need for significant investment in data, instead of outcomes and on-farm mitigations

□ Part B – FEP content

- Support alignment with GFP
- Need to include a representative CVP rotation an approved NRP, CVP area and minimum standards for commercial vegetable production

□ Part C – FEP Review Requirements

- Review should be able to be signed off by FEP auditor and/or CFEP
- Council should accept GAP scheme rules and FEP review processes

□ Part D – FEP Changes

- Agree that changes could be made without requiring sign-off from CFEP

NZGAP assurance framework

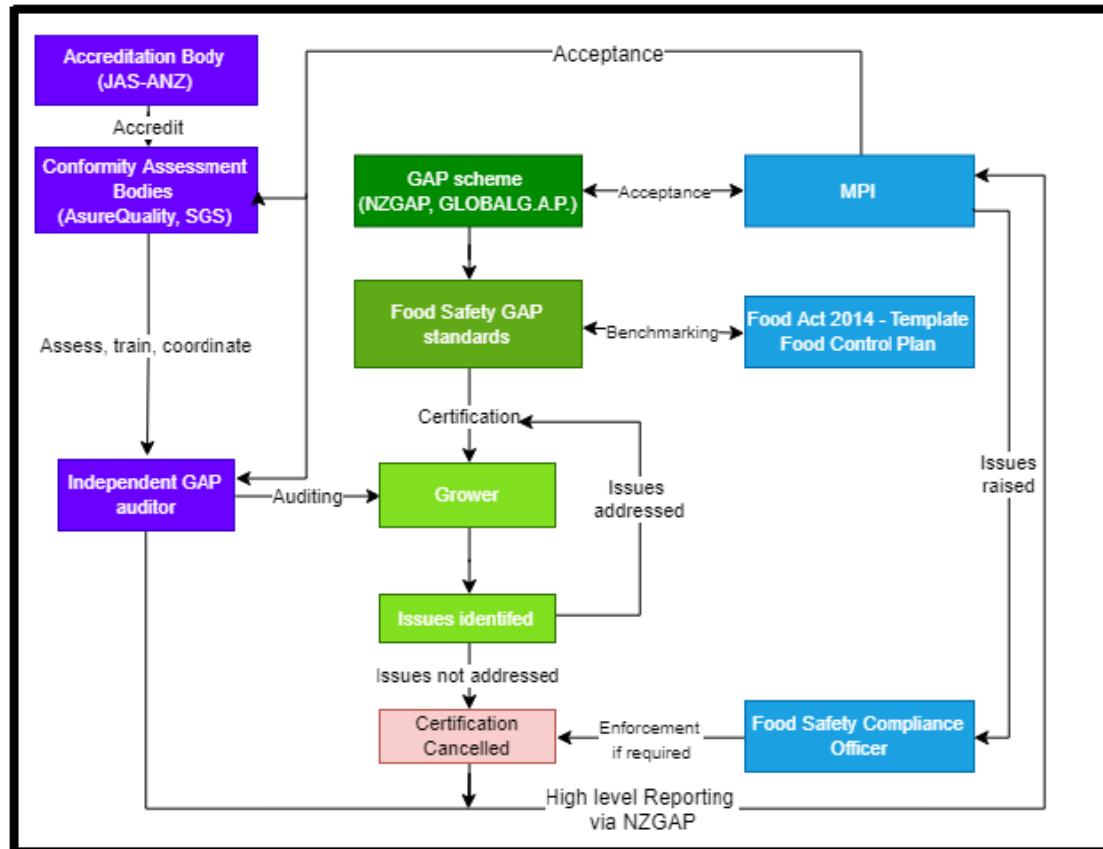


Fig 2: MPI recognition of GAP schemes assurance framework and processes

NZGAP Assurance framework

□ Certified Sector Schemes

- Independently audited self-management scheme
- 3rd audit of party of horticulture FEPs
- NOT an adviser approach, extension based scheme
- Focused on outcomes
- Complementary to council compliance, with any issues (e.g. D grade) escalated to compliance officers

□ FEP advisers vs FEP auditors

- These roles have been merged into CFEP
- Review of FEP rather than audit
- Development of FEP is separate from independent review of FEPs
- Aligns skills with activities and removes any conflicts of interest
- Auditors identify if compliant or not, they cannot provide advice

EMS alignment with ECan FEPs

Sch7 Ref	Sch7 Sub-Ref	Management Area	Objective / Target	Requirement	EMS Ref	EMS requirement	EMS source
	(1)	Cultivation and Soil Structures Management	Target	Farming activities are managed so as to not exacerbate erosion.	6.7	Are appropriate measures implemented or planned to reduce or minimise the risk of soil erosion (Template 6C)?	Checklist
					6.8	Are appropriate measures implemented or planned to reduce or minimise sediment loss (Template 6C)?	Checklist
					6C	Soil erosion and sediment loss - Control Measures and Action Plan	Templates
	(2)	Cultivation and Soil Structures Management	Target	Farming practices are implemented that optimise infiltration of water into the soil profile and minimise run-off of water, sediment loss and erosion.	6.3	Have techniques been used to maintain or improve soil quality and structure as well as reduce compaction?	Checklist
					6.7	Are appropriate measures implemented or planned to reduce or minimise the risk of soil erosion (Template 6C)?	Checklist
					6.8	Are appropriate measures implemented or planned to reduce or minimise sediment loss (Template 6C)?	Checklist
					6C	Soil erosion and sediment loss - Control Measures and Action Plan	Templates

ECan approval of EMS



ISO ACCREDITED AUDIT PROGRAMME APPROVAL

NZGAP

is approved as an ISO Accredited Audit Programme under the Canterbury Land & Water Regional Plan

Certification valid from: 1 April 2019 To: 1 April 2022

Date 11 April 2019

Bill Bayfield
Chief Executive



EMS assurance and consent compliance

NZGAP EMS Add-on

Certification process and consenting information for Canterbury Growers

1

Find out if you need a resource consent

Generate an **NCheck baseline** then email "Shapefile" and "Nutrient Loss Report" to info@hortnz.co.nz. NZGAP will reply with your compliance maps including "significant" areas and "phosphorous risk" areas.

2

Create your property maps

Map your property and identify all features required for your Farm Environment Plan. Please share your map shapefile with NZGAP.

3

Prepare a ECan approved Farm Environment Plan

Select an approved template from the Canterbury Water website.

4

Prepare your nitrogen baseline

Prepare average baseline for 2009-2013 using NCheck or OVERSEER. Find out more on the Canterbury Water website.

The five steps to getting the thumbs up.

Need a consent to farm? Then let's get started.

Prepare your Nutrient Budget

If your nitrogen losses are less than 15 kg/ha/year you need to demonstrate this when you lodge your consent. You can use OVERSEER® or the NCheck tool at www.canterburywaterfarm. If you have greater losses, you will need to prepare a nitrogen baseline, using OVERSEER® or an approved alternative.

We know there may be a delay for some nutrient budgets to be completed, so let us know when you are on the waitlist to get yours done. See www.canterburywaterfarm for information.

Apply for your Resource Consent to farm

Apply before July 2017 if you need a consent to farm. See www.canterburywaterfarm for information.

Have your Farm Environment Plan audited

An audit of your FEP is required within one year of gaining your consent, to demonstrate you are operating at Good Management Practice. See www.canterburywaterfarm for auditing information.

Plan for further nitrogen loss reductions

Start thinking about how you will make further improvements beyond OMP by 2022, if your losses are over 15kg/ha/year.

Create your Farm Environment Plan

Use an approved template to create your FEP. See www.canterburywaterfarm for templates and industry contact details.

This procedure explains how to step through the ECan consenting and compliance process using NZGAP's EMS add-on, systems and tools.

5

Apply for a resource consent

Contact your **Zone Manager** for more information

6

Complete NZGAP EMS add-on self-assessment within 12 months

Prepare for audit using the EMS implementation guideline and audit checklist

7

Audit of EMS add-on

Have your EMS add-on audited within 12 months of obtaining a resource consent

8

Reduce future N loss and Maintain certification

Complete annual renewal and have EMS audited alongside your usual NZGAP audit



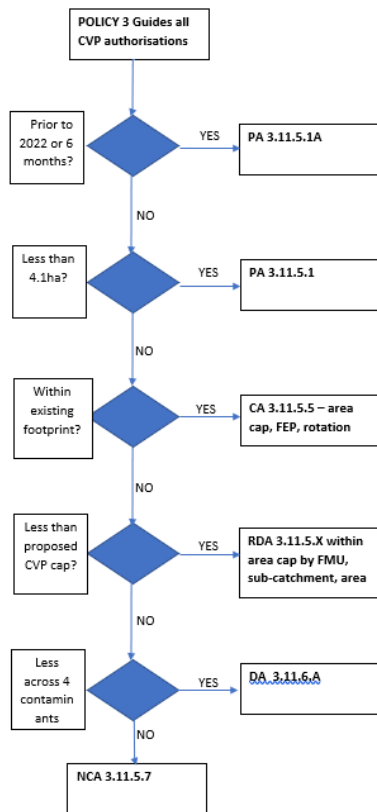
Please contact us for more information:

Email: info@hortnz.co.nz
Phone: +64 4 472 3795
Free phone: 0508 467 869



Calculating the water quality effects - Stuart Easton

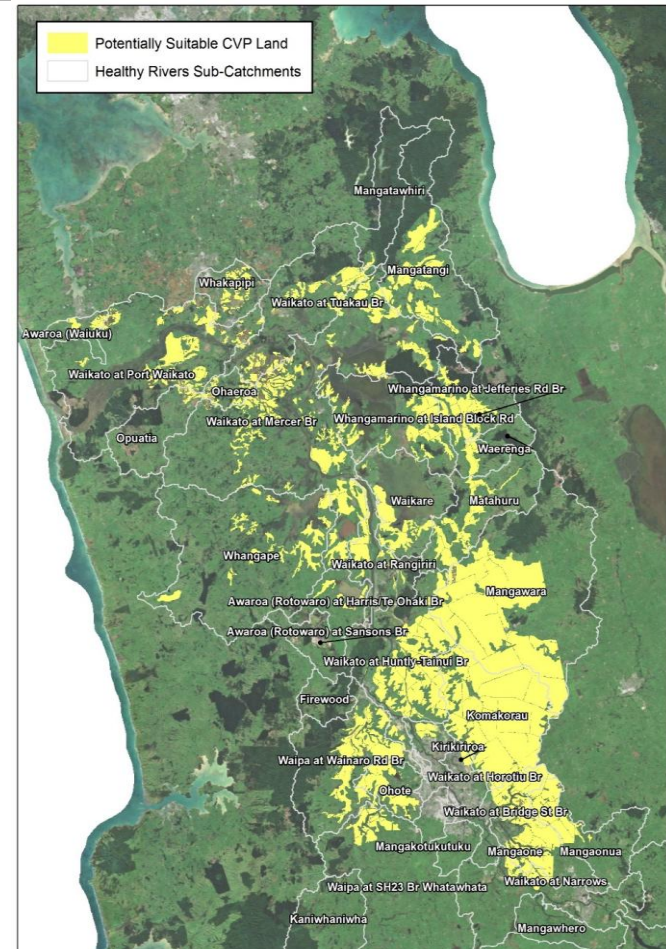
Flowchart – PCI Commercial Vegetable Production Provisions



- ❑ Provisional CVP growth area
- ❑ Contaminant loss and mitigation assumptions
- ❑ Change in contaminant loads
- ❑ NRP calculation

Provisional CVP growth

- ❑ Provisional growth area – 716 ha
 - ❑ Provides for population growth and current CVP lost to urban expansion in Waikato region only
- ❑ Potential CVP growth area – 82,400 ha
 - ❑ LUC 1 or 2, and
 - ❑ Existing land use is Dairy, Forestry, Miscellaneous, or Sheep & Beef (i.e. not Urban or Horticulture), and
 - ❑ Zoned as ‘rural’ in WDC proposed plan.



Modelling assumptions

❑ Baseline assumptions

- ❑ NIWA Healthy Rivers modelling for Nitrogen and *E. coli*
- ❑ Sediment and Phosphorus based on Don't Muddy the Water research

❑ CVP GMP

- ❑ Nitrogen - 5% reduction (Ford 2014).
- ❑ Sediment and Phosphorus – 80 - 90% reduction (Barber et al. 2019).

❑ Dairy GMP reductions

- ❑ PC1 assumptions, 75th percentile accounted for.
- ❑ PC1 assumptions, 50th percentile, not accounted for (conservative assumption).

Nitrogen

- ❑ N load associated with new CVP equivalent to difference between current land use (average of suitable CVP areas) and CVP
- ❑ Averages 50 kg/ha across identified sub-catchments
- ❑ 716 ha is provided for with no more than 1% increase in load for a single sub-catchment and 0.23% increase in N load at Waikato River mouth
- ❑ With CVP GMP: 0.09% increase in total N load
- ❑ With CVP GMP and Dairy GMP reduction to 75th percentile: -2.45% decrease in total N load

Sediment, Phosphorus, *E. coli*

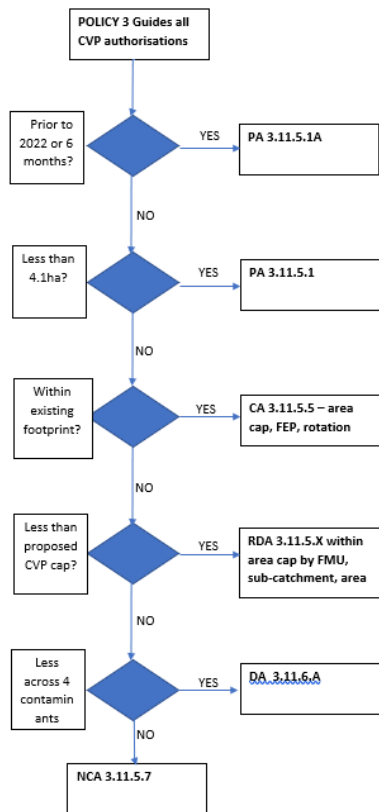
- ❑ Sediment
 - ❑ Net sediment reduction of 140 – 500 t/year
- ❑ Phosphorus
 - ❑ P reduction associated with reduced sediment load
- ❑ *E. coli*
 - ❑ 78% reduction in *E. coli* loading per hectare
 - ❑ -0.06% reduction in total *E. coli* load

NRP for landlord's baseline

- ❑ Average land use in the baseline period for land suitable for CVP, that wasn't used for CVP
 - ❑ LUC I and II assumed to be suitable for CVP
 - ❑ Land use assumptions in NIWA modelling for suitable land (LUC I and II)
 - ❑ 58% of Dairy, and 33% of Sheep and Beef (remaining 8% Misc & Forestry)
 - ❑ NRP calculated at 19.1 kg/ha/yr
 - ❑ To update the NRP - model the baseline average land use following NIWA assumptions, in the most recent version of Overseer.
- ❑ The method:
 - ❑ Avoids double counting
 - ❑ Retains CVP NRP load with CVP land area
 - ❑ Avoids transfer of CVP NRP to other landuses
 - ❑ Provides landlord with a NRP (baseline land use intensity) similar to similar land.

Water quality effects – Tim Baker

Flowchart – PCI Commercial Vegetable Production Provisions



- ❑ Water quality effects at spatial scales with proposed framework
- ❑ Sensitive sub catchments

Increase in Maximum Area Cap for CVP – Overview & Scale

- ❑ An additional 716 ha of CVP (above current cap) is recommended (Easton)
 - ❑ As previously described this accounts population increase (9.9% by 2030) in the Waikato (equivalent to 619 ha) and
 - ❑ Accounts for existing CVP land re-zoned as urban in the Waikato District Plan (96.5 ha)

- ❑ Scale of effects:
 - ❑ Footprint of CVP is small relative to overall catchment landuse
 - ❑ Effects of individual CVP observed locally, but not catchment scale
 - ❑ Importance of considering relative effects at subcatchment scale

Increase in Maximum Area Cap for CVP –Water Quality Effects

- ❑ What is the N load from the additional CVP land?
 - ❑ The additional N load from the 716 ha CVP is calculated as 0.23% of the total catchment load, i.e. a relatively minor increase at the catchment scale
 - ❑ If restricted to Lower Waikato, Waipa, Central Waikato FMUs this is only 0.5 % of the total catchment load. This is where all existing CVP is.
- ❑ In the context of other PC1 provisions:
 - ❑ CVP GMP estimated to reduce N load by 5% which is equivalent to 418 ha of additional CVP
 - ❑ Dairy reductions to meet 75th percentile N loss are equivalent to 8,792 ha of additional CVP
 - ❑ Overall, accounting for the above PC1 provisions, there is still a -2.45% change in total catchment N load with the additional CVP land included
- ❑ Sediment load would decrease with increase in CVP of 716 ha
 - ❑ Because BMP CVP adopts sediment retention ponds for all cultivated areas
 - ❑ On low slope land (average 0.9 degrees), replacing pasture
- ❑ E.coli expected to decrease (based on NIWA Healthy Rivers data)

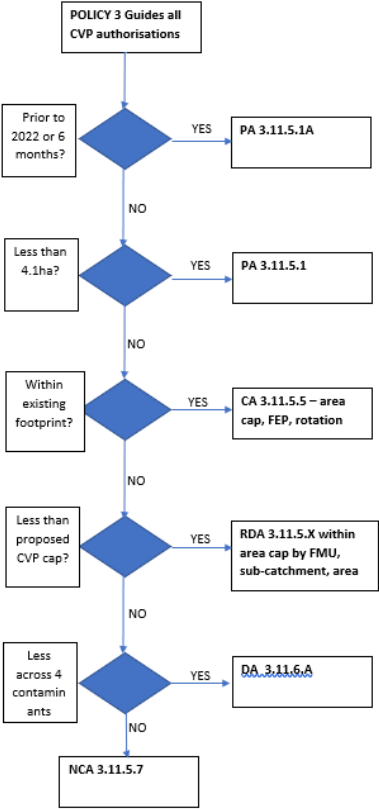
Increase in Maximum Area Cap for CVP – Expansion locations

- ❑ Sub-catchment allocation of the additional land needs careful consideration as not all sub-catchments are suitable for increased development.
- ❑ Excluded sub-catchments are those currently in or below the NOF C Band for nitrate (>2.4 to <6.9 mg/L)
 - ❑ Mangone (Central Waikato)
 - ❑ Whakapipi, Komakorau (Lower Waikato)
 - ❑ Mangamingi, Kawanui (Upper Waikato)
- ❑ Also excluded are sub-catchments that containing sensitive lake environments that are impacted by current land use practices. This is consistent with Objective 6 of PC1 (short term improvement of Whangamarino wetland catchment). These catchments are:
 - ❑ Waikare
 - ❑ Whangamarino at Island Block Road
 - ❑ Whangamarino at Jeffries Rd
 - ❑ Whangape

Planning – Vance Hodgson

Flowchart – PCI Commercial Vegetable Production Provisions

□ Proposed provisions



Policy 3

Restructure to:

- Provide flexibility for crop rotations within sub-catchments and within an FMU
 - With WRC accounting for land area caps.
- Provide a land area cap for *Existing* CVP
 - With GMP/FEP and NRP (for nutrient budgeting and accounting).
- Provide a land area cap for a defined area of *Provisional Growth* CVP
 - with GMP/FEP and NRP (for nutrient budgeting and accounting).
- Provide a pathway for other CVP
 - Where the farm level NRP is the limit.
 - Where reductions from the load associated with the previous land use are proved.
 - Where offsetting may be considered.
- Recognise the CVP related difficulties in establishing an NRP and provide options to do

Controlled Activity

Rule 3.11.5.5: Existing CVP

Restructure to:

- ❑ Provide for *Existing CVP* as PA until 2021 or 6 months after PC1 is operative then a CA
 - ❑ Note, change in land use to CVP from 2016 is not captured under this rule.
- ❑ Limit *Existing CVP* to a land area cap
 - ❑ Maximum area in CVP existing between 2006-2016.
 - ❑ Requires WRC accounting to enable rotations across sub-catchments (within an FMU) not exceeding total aggregated CVP area. If no capacity then not able to be approved.
- ❑ GMP/FEP
- ❑ NRP
 - ❑ Calculated via an approved method.
 - ❑ Used for nutrient budgeting and accounting. Inform future allocation.
- ❑ Matters of Control
 - ❑ The CVP Farm System.
 - ❑ Area of land in CVP.
 - ❑ FEP – actions, timeframes, reviews, auditing.
 - ❑ Consent duration.
 - ❑ Consent review.

Restricted Discretionary Activity

Rule 3.11.5.X: Provisional Growth CVP

Restructure to:

- Provide a land area cap for a defined area of *Provisional Growth CVP*
 - Limited to a land area defined in Table 2.
 - Requires WRC accounting. If no capacity then not able to be approved.
- GMP/FEP
- NRP
 - Calculated via an approved method.
 - Used for nutrient budgeting and accounting. Inform future allocation.
- Matters of Discretion
 - The CVP Farm System.
 - Area of land in CVP.
 - FEP – actions, timeframes, reviews, auditing.
 - Consent duration – to avoid land banking.
 - Consent review.

Discretionary Activity

Rule 3.11.5.6A

- ❑ **Restructure to:**
- ❑ Provide a pathway for other CVP where land area caps are not met but:
 - ❑ Where reductions of all 4 contaminants from the load associated with the previous land use are proved.
 - ❑ Where offsetting may be considered.
- ❑ GMP/FEP
- ❑ NRP
 - ❑ Calculated via an approved method.
 - ❑ The farm level NRP is the limit.
- ❑ Non-compliance with CA or RDA conditions e.g. FEP
 - ❑ Discretionary Activity.

Non Complying Activity

Rule 3.11.5.7

Restructure to:

- ❑ Non Complying Activity catch all.