Irrigation Good Management Practices

The following document outlines irrigation Good Management Practices and the documentation that can be collected to show this is being achieved. This has been developed with input from irrigation industry experts and fits within industry good management practices. The template below can be used as a 'go to' guidance document for all irrigators. The areas included in the following document are:

1. *Irrigation System Design and Installation*

Management Objective:
To ensure that all new irrigation systems and significant upgrades meet industry design standards.

Required outcome:

- New irrigation infrastructure is designed and installed to deliver water to industry best practice standards

2. *Irrigation Management*

Management Objective:
To ensure efficient on-farm water use that meets crop needs and minimises losses.

Required outcome:

- All irrigation applications are determined by an objective decision process
- Irrigation management practices optimise water applications from the irrigation system
- The effect of system failures and incidents are minimized with suitably trained staff.

HAWKE'S BAY
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TE KAUNIHERA Ā-ROHE O TE MATAU-A-MĀUI

Irrigation System Design and Installation

Objective: To ensure that all new irrigation systems and upgrades to existing systems meet industry design standards.

Required Outcome: New irrigation infrastructure is designed and installed to deliver water to industry best practice standards				
Acceptability of practices	**Baseline Practices (examples of practices, others may be added)**	**Current Practices (Y/N or N/A)**	**Additional actions & timeframes to meet outcomes**	**Evidence of Action**
Good Minimum Requirements	• All new on-farm irrigation infrastructure is designed by an Irrigation Design Accredited Company (INZ; from July 2022) in accordance with the current (at time of installation): ○ New Zealand Piped Irrigation Systems Design Code of Practice (Irrigation NZ); ○ New Zealand Piped Irrigation Systems Design Standards (Irrigation NZ).			☐ Provide record of company Irrigation Design Accreditation (INZ)
	• Meets consent conditions and the Resource Management (Measurement and Reporting of Water Takes) Amendment Regulations 2020 for measuring and reporting water use			
	• All new irrigation infrastructure is installed in accordance with the current (at time of installation) Installation Code of Practice for Piped Irrigation Systems (Irrigation NZ).			
	• Commission testing shows that the system performs to the design specifications and meets 'The New Zealand Piped Irrigation Systems Design Standards, Irrigation system performance indicators' including: ○ Application depth ○ Instantaneous application rate ○ Application Uniformity (DU or EU)			☐ Provide commissioning report including 'wet' testing
	• Operation and maintenance manuals are provided			☐ Machinery and Operating manuals available
Premium (Good plus)	• Independent review of design/s			☐ Documentation of review provided

Irrigation Management

Objective: To ensure efficient on-farm water use that meets crop needs and minimises losses.

Required outcomes:

1. All irrigation applications are determined by an objective decision-making process
2. Irrigation management practices optimise water applications from the irrigation system (spray systems or drip/micro)
3. All staff involved in the operation, maintenance or undertaking work that may impact on the irrigation system are suitably trained

2.1 Irrigation Management – Objective Decision-Making Process

Required Outcome: All irrigation applications are determined by an objective decision-making process

Acceptability of practices	Baseline Practices (examples of practices, others may be added)	Current Practices (Y/N or N/A)	Additional actions & timeframes to meet outcomes	Evidence of action

Good
Required minimum
	Soil (or Plant) Moisture parameters for each irrigation system:
	• Are assessed so water holding parameters and trigger points are known
	• Monitored to trigger irrigation applications by either:
	  ○ Soil moisture sensors (both permanent and portable)
	  ○ Soil water balance calculation or crop model or
	  ○ Leaf moisture monitoring
	• Depth profile soil moisture measurements recorded, or soil water balance done to determine:
	  ○ Soil Profile Available Water (PAW)
	  How soil moisture levels are managed between Field Capacity and Stress Point in critical root zone, showing that irrigation has not resulted in drainage into and through the subsoil
				☐ Record of soil water holding parameters for each irrigation system is available e.g. Field Capacity, Irrigation, Trigger Point.
				☐ Data is provided, and the farmer/ grower can describe their irrigation decisionmaking process in relation to it
				
				☐ PAW and Irrigation Trigger Point information
				☐ Soil moisture or water budget records

Acceptability of practices	Baseline Practices (examples of practices, others may be added)	Current Practices (Y/N or N/A)	Additional actions & timeframes to meet outcomes	Evidence of action
	Measurements taken and used: • Weather forecasts are used, e.g., rainfall, wind, temperature and typical evapotranspiration rates • Rainfall is measured and recorded • Soil temperature is monitored and recorded • Irrigation and/or effluent application depths are known and recorded			☐ Weather forecast information accessible and knowledge of typical seasonal ET rates ☐ Rainfall records ☐ Soil temperature records ☐ Irrigation application records ☐ Effluent application records
	Environmental risk: • Critical Source Areas (CSA) are identified, and irrigation applications managed to minimise impacts upon these			☐ Map of irrigation, CSA and associated irrigation management

Premium (Good plus)	• Additional technology or consultancy services used to support irrigation decision making to manage soil moisture between Field Capacity and Stress Point e.g.:
	  ○ Scheduling service e.g., neutron probe service
	  ○ Telemetered sensors
				☐ Soil moisture graphs/reports: Irrigation decision making demonstrates how soil moisture levels are managed between Field Capacity and the Irrigation Trigger Point and drainage is minimised.

	• Field observations of plant growth stage and development are used			☐ Demonstrates understanding of link between crop water demand and growth stage (if applicable)

2.2 Irrigation Management – Spray systems

Required Outcome: Irrigation management practices optimize water application from the irrigation system
Irrigation System Type: multiple spray line systems e.g. K-Line, travelling, and fixed spray systems e.g. gun, turbo-rain, centre pivot or linear irrigators
(Only fill in sections relevant to your irrigation type)

Acceptability of practices	Baseline Practices (examples of practices, others may be added)	Current Practices (Y/N or N/A)	Additional actions & timeframes to meet outcomes	Evidence of action
Good (Required minimum)	**Irrigation System Performance** • Irrigation System Performance evaluation by certified evaluator 5 yearly, and programme implemented to remedy poor performance • Annual irrigation system bucket test to identify issues and programme implemented to remedy problems			☐ System evaluation report that sets out the system performance and remedy workplan ☐ Bucket test/retest results
	System operation: • System design plan visible at controller/pump shed, mainline location, hydrant(s) identified • Standard Operating Procedures in place that clearly show how systems are to be monitored and managed (including rotation positions and durations – pods only) • Application to non-target areas is avoided e.g. roads, tracks, or other unproductive areas, and across property boundaries • Spray line (pods only) shifts follow plan (e.g. GPS on bike; follow map, markers on fence posts)			☐ Sight system layout plan ☐ Standard Operating Procedures including evidence of their use ☐ Sight system layout plan ☐ Sight markers or GPS system (Pods only)
	System Maintenance: • Maintenance programme in place • Regular checks for blocked nozzles, leaking hydrants or hoses, sprayline alignment and problems fixed • System in place for staff to report/fix problems e.g. persistent ponding or runoff			☐ Evidence of a system maintenance programme and record of work done

2.2 Irrigation Management – Drip and micro systems

Required Outcome: Irrigation management practices optimize water application from the irrigation system
Irrigation System Type: Drip and micro sprinkler systems (Only fill in sections relevant to your irrigation type)

Acceptability of practices	Baseline Practices (examples of practices, others may be added)	Current Practices (Y/N or N/A)	Additional actions & timeframes to meet outcomes	Evidence of action
Optimise applications for drip/ micro systems				
Good (Required minimum)	**Irrigation System Performance** • Irrigation System Performance evaluation by certified evaluator 5 yearly, and programme implemented to remedy poor performance • Annual irrigation system bucket test to identify issues and programme implemented to remedy problems			☐ System evaluation report that sets out the system performance and remedy workplan ☐ Bucket test/retest results
	System operation: • System design plan visible at controller/pump shed, mainline location, irrigation zones identified • Standard Operating Procedures in place that clearly show how the drip-micro systems performance is to be monitored and managed • Regular readings of operating pressure and flow logged by block to identify system issues			☐ Sight system layout plan ☐ Standard Operating Procedures including evidence of their use ☐ Record of operating pressure and flow readings
	System Maintenance: • Maintenance programme in place • Regular checks for blocked nozzles, leaking hydrants or hoses, sprayline alignment and problems fixed • System in place for staff to report/fix problems e.g. persistent ponding or runoff			☐ Evidence of a system maintenance programme and record of work done

2.3 Irrigation management – Staff training

Required Outcome: All staff involved in the operation, maintenance or undertaking work that may impact on the irrigation system are suitably trained				
Acceptability of practices	**Baseline Practices (examples of practices, others may be added)**	**Current Practices (Y/N or N/A)**	**Additional actions & timeframes to meet outcomes**	**Evidence of action**
Required minimum for those working in the vicinity of irrigation systems	• Provide on-farm training for all staff, including but not limited to: ○ Irrigation system layout ○ Emergency shut down ○ procedures ○ Identification of irrigation system "problems" and reporting procedure(s) ○ Individual staff responsibilities and accountability			☐ Staff assessment to determine competency ☐ Irrigation safety information is available to all staff
Additional minimum requirements for those operating irrigation systems	• Provide on-farm training for staff required to operate the irrigation system, including but not limited to: ○ Irrigation system operation including: ▪ Irrigation schedule including application timing and depth ▪ adjusting run times and application depth(s), ▪ on/off for blocks ○ Individual staff responsibilities and accountability ○ Emergency shut down procedures ○ Irrigation system monitoring ○ Irrigation system maintenance			☐ Staff questioning to determine competency ☐ Irrigation management data and information is available to staff
	• Staff members responsible for operating/managing irrigation systems onfarm are suitably trained to manage irrigation with evidence of completing HBRC approved training, either: ○ Irrigation System Operator Training Standard. ○ INZ Irrigation Scheduling e-learning platform course			☐ Certificate of attendance and successful completion with level of competency assessed.

Summary of actions to improve irrigation performance

Improvement actions	Completion date	Person responsible	Completed
1. Irrigation System - Design and Installation			
2.1. Irrigation Management – Objective decision process			
2.2. Irrigation Management – spray or drip/micro			
2.3. Irrigation Management – Staff training			