Eco-Innovationz

Eco-Innovative & Economic
Low-Impact Logging
Solutions

Vision

This is my vision - as it was from the very beginning, it has never wavered.

To transform the legacy of steep land and water based commercial forestry in New Zealand.

To introduce a system that leaves the smallest environmental footprint possible while enabling the custodians of land the opportunity to fully nurture the cultural, ecological and economic potential of the land, now and into the future.

Darryn Newman

Director
Eco-nomic Construction Ltd
Trading as Eco-InnovationZ

By caring for the land we care for the water, the air and marine environments.

By caring for the land we care for ourselves and our grandchildren and their grandchildren.

By caring for the land we care for the ecology, we care for diversity, we care for our communities.

Eco-InnovationZ

Unique Leading Edge Technology

Skyline to Barge the world's first leading edge marine harvesting system for steep land marine environments. Our technology forms the basis of forestry 2.0 the next generation of economic and environmentally sustainable harvesting method that represents a paradigm shift for the forestry industry globally.

- Simple easily adaptable setup customisable to job scope and situation.
- Scalable - economically competitive option for small or large jobs.
- Suitable for both selective felling of native timber and full-scale commercial jobs.
- Ongoing R&D to adapt to every new or unique scenario.
- No need for major infrastructure projects before commencing harvesting.
- Low environmental impact with regards to soil, water, ocean and air.
- Lower costs, more economic overall.
- Proven - 25yrs of development for NZ conditions, based on technology with a proven 125yr history in Europe.
- Two intellectual property patents covering equipment design and systems.

Why has the Industry not already adopted this Technology?

Resistance has typically centred about some incorrect assumptions that were drawn by industry consultants during the low volume trial phases.

Misconceptions regarding the ability of the systems ability to scaled up to a commercially level have persisted within the ranks of those with influence in the industry.

Commercial capability waiting to launch after 25yrs of innovation and development on the proven 125yr old base technology, in conjunction with a team of overseas experts.

The pilot projects and Ross McArthur's original trials used the traditional 2 ton winch from Wyssen which was perfectly fit for European log harvesting, however the early trials discovered that with NZ pine being twice as dense the 2 ton system was too small for commercial purposes.

Unfortunately the assumptions recorded by industry consultants at that time, based on these pilot trials drew incorrect conclusions regarding the possibility of the system being scalable to a commercial level.

Blocking a Solution while Simultanously Looking for One . . .

The incorrect conclusions and lack of general knowledge surrounding the technology managed to stall Ross's early attempts to get the industry and councils to endorse it. The persistent nature of the misconceptions have made progress a frustrating and expensive exercise as almost all attempts to correct them have been met with resistance and even derision by those within the industry who have used an obstructive mindset to influence organisations such as MPI and Council to blocked progress. The sustained effort involved in blocking progress leaves many unanswered questions especially while others within these organisatons were ironically, simultaneously giving lip service to the urgency of finding another solution to conventional methods.

Appendix B1 - History in NZ, Ross Macarther | Appendix B2 - A Story of Collective Resistance

Eco-InnovationZ

Ushering in a Paradigm Shift for Marlborough Forestry

The timing of the culmination of years of development into this technology coming to fruition now, could not be more perfect. With many pine blocks consented under past guidelines now in desparate need of a solution that fits with sustainable development goals.

Skyline to barge a new tool for public, private and Iwi forest management in the Marlborough Sounds.

The only solution to mitigate the risk of siltation and erosion in the sensitive environment of the Marlborough Sounds.

Highly relevant for Marlborough due to the prevalence of steep to marginal pine blocks ready for harvest.

Many Iwi blocks where planted with no feasible options using conventional harvesting methods.

Local Iwi have expressed a desire for a low-impact solution that aligns with their values of Kaitiakitanga.

Many landowners including Iwi are activity looking for a solution that is conducive to replanting in native forest

Economic solution for pine blocks in the Marlborough Sounds effectively unviable using conventional methods.

Native Planting Partnerships

There is a great desire among private landowners, Iwi and groups like the Restoration Trust for alternative outcomes to those left by conventional methods. As a direct result of the low environmental impact the Skyline system has, these groups and individuals are showing great interest in the new opportunities for land restoration in the form of native plantings as an alternative to replanting in pine.

Eco-InnovationZ

Eco-Innovationz Method versus Conventional Method

ISSUE	Forestry 2.0 - SKYLINE	Forestry 1.0 - CONVENTIONAL METHOD
Major infrastructure	None	Expensive and time-consuming
Consent Times	Months to weeks. Minimal delays = stays within budget, quicker deliverables.	Years. Long delays = budget blowouts, delayed deliverables.
Soil and Land Integrity	Maintained or enhanced.	Major damage to land structure, high risk of erosion.
Aquatic Environments	Suitable because of it's low-impact nature	High risk of damage from slash and silt migration worsened by severe weather events.
Sensitive Enviroments	Suitable because of it's low-impact nature	Unsuitable because the method is inherently damaging
Steep and difficult terrain	Proven in Europe for this type of terrain	Logistically and economically not always a viable option
Private or Iwi blocks	Economic and adaptable solution	Uneconomic, limited scope.
Future potential	Opens the way for development of previously unviable areas	Limited
Scope of system	Infinitely adaptable to meet requirements of individual jobs.	Limited possibility for improvements or innovations.
Public roading damage	Public roading networks are not used during harvesting	Pot-holes, subsidence and slips become a local council and ratepayer problem.
Road Safety	Unaffected	Historically residents have strong objections to logging trucks on their local narrow roads.
Adjacent landowners	Unaffected	Potential objections and ongoing litigation around dust, noise, safety, water supply and erosion.
Visual impact	No visable scarring, leave subcanopy intacted	Visable scarring of landscape, all vegetation destroyed
Legal challenges	Legal challenges unlikely to be a major problem.	Litigation and legal challenges will remain a threat
Carbon Footprint	Minimal - One barge = multiple truckloads. Less machinery used.	High - Running costs of trucks, harvest machinery, fuel, oil, tyres, roading infastructure repairs etc.
Sustainability	Easily achievable.	Nearly impossible to achieve.
Environmental legacy	Enhanced environmental outcomes for land, water, marine and air.	Almost without exception - land is left in a worse state
Cultural	Aligns with the Maori concept of Kaitiakitanga	Culturally insensitive

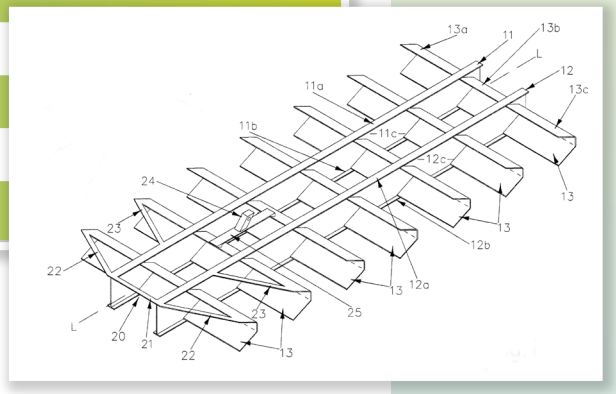
Appendix D1 - Skyline vs Conventional, Photographic Evidence

Eco-Innovationz

Milestones & Next Steps

The last 25 years has seen the completion of numerous successful trials, upon completion of each contract improvements and innovations where made to the technology and methods. We are at a point where we are now able to scale up to commercial volumes.

- Completion of 12 pilot blocks since 1994 leading to many innovations and improvements.
- Acquistion of vast technical capability through working alongside independent Swiss contractors.
- Formation of eco-Nomic Construction Ltd to hold the intellectual property and patents.
- Patented sea anchor, including skyline to barge method.
- Patent the LoadlineTM carriage, allowing transportation of single loads up to 10 tonne.
- Develop innovative hydraulic braking system enabling safer, faster movement of commercial volumes.
- Purchase of a 10 tonne Wyssen winch system.
- Development of a winch power unit to enhanced braking system.
- Development of a remote camera communications system.
- Development of a power over ground protection system.
- Fully trained, work ready crew.



In Progress & In the Pipeline

Our top priority is to securing a barge.
Resource consent process under way for contracted work.
Ongoing work with DOC including two years already under contract.
Four years of upcoming work for the Restoration Trusts
A number of private blocks under negotiation.

Appendix E1 - Training - Health & Safety

What Needs to Happen Next

It is no understatement to say that there have been calls for many years from many different directions for the solutions that the Skyline systems offers, and in particular Skyline to barge. Eco-Innovationz is posed and in possession of all the technical knowledge and experience to launch into commercial work, now is the moment we need the full commitment of stake-holders if we are going to make meaningful change, and ultimately influence the future legacy left by forestry in New Zealand.

- Secure urgent capital for machinery purchases to fully mechanise the system for commerical operation.
- Obtain formal letters of support from stake-holders who already know what the technology can offer.
- Be granted the opportunity to answer to any resistance through open forum with decision makers.
- Initiate a process within council to streamline consents, overcome obstacles and work together if solutions are needed to solve unique challenges.
- Enter into broader conversations with all stake holders, Iwi, Groups, Council, Government about what we have to offer the industry now and into the future.

Appendix F1 - Endorsements | Appendix F2 - Company Profile

Eco-Innovationz

Appendix A1 - Wyssen Base Technology

The Wyssen Skyline cable crane has provided an economic alternative for forest harvesting on steep slopes throughout Europe and America for 70 years.

Wyssen Seilbahnen AG

Wyssen Seilbahnen Ltd has been developing and manufacturing cable based timber and material transport solutions for challenging conditions for nearly 100 years. With the invention of the cable crane in 1939 by Jakob Wyssen as a solution to the challenges of forest logging in mountain terrain, a new era was heralded in the management of mountain forests. Currently Wyssen is market leader in the sector and its products are sold worldwide in more than 60 countries. The company is continuously setting new standards in modern cable crane manufacturing thanks to continuous engineering and development work that takes place in company's headquarters in Switzerland.

Wyssen Skyline in Operation

How it works.

Developed in Switzerland, it has changed little in 70 years apart from the addition of hydraulics and advances in carriage design.

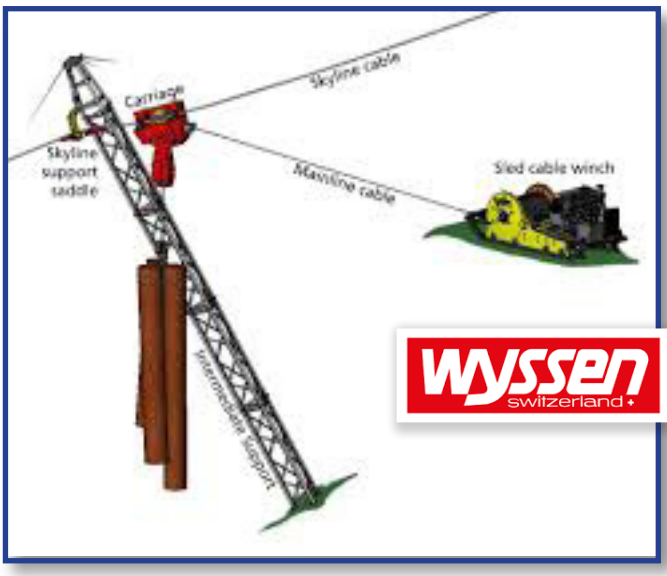
The principal is simple and is similar in nature to a flying fox, a 25 to 30 mm steel cable is secured at the top and bottom of a mountain.

A clamping carriage traverses up and down this skyline cable, the carriage is pulled up the skyline by the mainline cable that traverses through the carriage and drops to the forest floor, where logs are hooked on and pulled up into the carriage.

The carriage then unclamps and descends down the skyline by gravity, transporting the logs to the bottom landing. At the landing the carriage clamps once again and the logs are lowered to the ground.

Once the logs are released the winch pulls the mainline cable and the carriage back up the skyline to repeat the process.

Swiss Skylines average a distance of 2 kilometres, forming an aerial roadway, that can harvest up to 30 hectares in one setting.



wyssen switzerland seilbahnen

wyssenseilbahnen.com

EcoInnovationz

Appendix A2 - Our Unique Technology | Patents & Innovations

Darryn Newman investigated the Wyssen systems whilst searching for solutions to the wildling pine removal in his capacity as DOC ranger in the early 90's. Initiating join ventures with Skylogs Equipment Co he gained sufficient technical capability to instigate his own projects in the late 90's in the Marlborough Sounds with independent Swiss contractors.

With each successive contract Darryn, innovated and adapted the land-based system to New Zealand conditions, specifically for the sea based harvesting of the Marlborough Sounds.

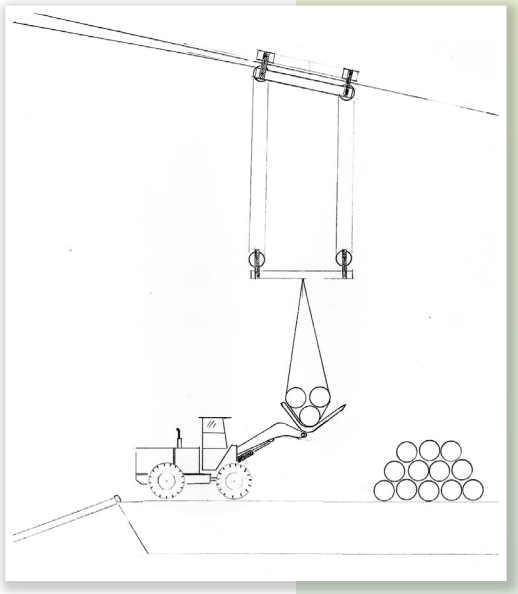
Two of these innovations have been patented, and form the core of the unique harvesting method developed by eco-Nomic construction ltd, a company formed specifically to hold the intellectual property.

The LoadlineTM Carridge Innovation & Patent

The first innovation was the design of the loadlineTM carriage, which is capable of transporting loads up to 10 tonne per flight

These improvements to the carridge design vastly Increased the productivity of the system from 125 tonne per day to 700.

Pivotal also to the success of the system was the development of a method for moving loads over a skyline to a moored ship, the core of the intellectual property which is patented.



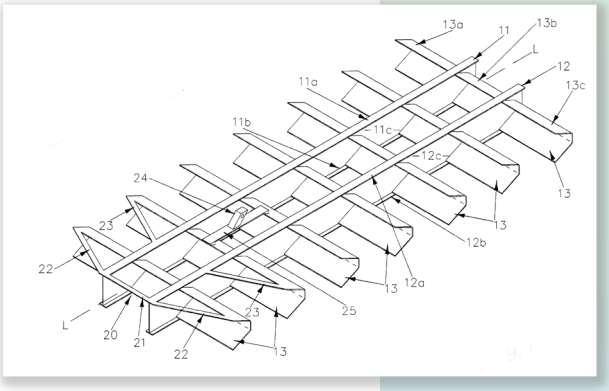
The Sea Anchor Innovation & Patent

The initial method trialled was firstly with a helicopter operation in the sounds where trees were felled, cut to length and transferred to a barge. The operation was successful for the moving of wood but had many issues associated with it.

It was these issued that inspired me to developed a unique approach to the issue of both difficult terrain harvesting and sea or water based harvesting and log transfer. My solution was to anchor a skyline to the sea floor to allow a carriage of logs directly from hillside to barge. Anchoring to the seafloor had never been done successfully and was generally thought impossible, my starting point was initially using commercial agencies that specialise in anchoring like ship anchors, concrete blocks and screw anchors etc, this turned out to be a huge 12yr journey and not one of these commercial processes of anchoring worked satisfactorily,

it was then I had an idea to implement a totally different process which I was able to design after gaining a grant to help with development costs. The design worked so well we patented both the anchor and process of moving loads.

We have since used the technology on a number of blocks both in the sounds and on land based operations so the technology is sound and commercially viable.



Commercial Productivity Realised

Anchoring the skyline cable to the sea floor enabling a barge to be moored under the skyline cable. This removes the need for any roading, landings or foreshore infrastructure. The logs are fully suspended and transported (flown) down the skyline to the barge.

These major milestones have enabled Darryn to unlock many of the constraints within the system and develop a series of improvements over time; collectively they represent a paradigm shift in productivity and economics.

Appendix A2 - Our Unique Technology | Patents & Innovations

The methods Eco-Innovationz have used are our own design modifications on the original Wyssen system. Through innovative thinking we have done what many deemed impossible which is to transfer 400 ton of logs in 8 hrs. To achieve this we invented a carriage system with much greater capacity than the original design.

We introduced power line removal through the corridor to allow safe extraction while the power was still connected - although this initially met with resistance, but we came up with a solution, that exceeded all expectations.

As well as the innovations mentioned above we have various additional modifications we wish to introduce to help with the system going forward, many of the jobs we have on the books require additional solutions, which we already have in the pipeline.

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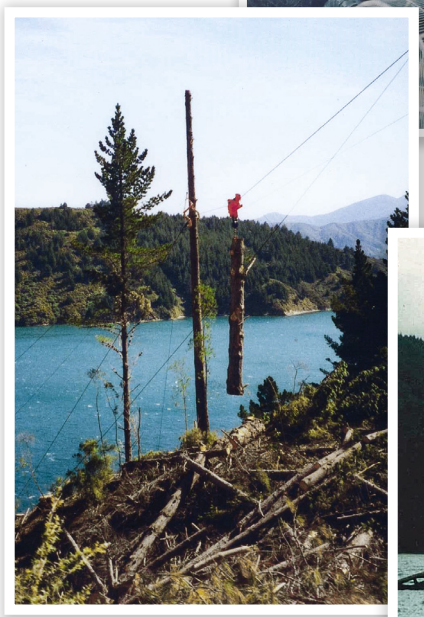


Eco-Innovationz

Appendix A3 - Timeline of Developments

Darryn Newman investigated the Wyssen systems whilst searching for solutions to the wildling pine removal in his capacity as DOC ranger in the early 90's. Initiating joint ventures with Skylogs Equipment Co he gained sufficient technical capability to instigate his own projects in the late 90's in the Marlborough Sounds with independent Swiss contractors.

With each successive contract Darryn, innovated and adapted the land-based system to New Zealand conditions, specifically for the sea based harvesting of the Marlborough Sounds.

A decade of innovation. Darryn used a number of companies to commercialise each stage of the marine based harvesting system.

1939 Wyssen Skyline Prototyped in Switzerland

1984 Koromiko Trial Marlborough (Ross McArthur - See Appendix B1)

1985 Blairlogie Trial Wairarapa

1991 Hughes Woodlot

1992 Onepua, Marlborough Sounds

1990 D Newman Doc Ranger looking for solutions to wildling pines in the Marlborough Sounds

1994 - 1996 Newman Forestry Ltd. joint venture with Gottlieb Kissler.

Newman Forestry - Crail Bay, 15,000 ton
Anchored skyline with ships anchors, designed prototype

Golden Downs 60,000 ton
Successful land based trial block for Tasman forestry,
offered another 8 blocks throughout NZ.

Double Cove 7,000 ton
A DOC block removing Wildling Pines Anchored Skyline across Bay.

Greentree Harvesters Ltd. Employed Mattius Albert & Peter Brand, Swiss contractors.

2000 Maretai Bay 10,000 ton, Seabed anchor system proven

2002 Creation of eco-Nomic Construction Incorporated to hold the Intellectual Property

2003 Blackwood Bay 10,000 ton Barging practice reconfigured

2005 Hitau Bay 10,000 ton Loadline Carriage prototyped

2006 Arapawa Island 4,000 ton

Our Patents & Innovations

- ***Greater Capacity Carridge***
- ***Hydralic Braking System on Carridge***
- ***Winch Power Unit Enhanced Braking System.***
- ***Remote Camera Communication System***
- ***Patented Sea Anchor system***
- ***Power Over Ground Protection***

Appendix B1 - History in NZ | Ross Macarthur

Ross Macarthur - Introduces Skyline Systems to NZ in 1991

Ross started this work in the 60s and as a soil conservator working for the then Marlborough Catchment Board and was instrumental in planting steep land and marginal land. He completed numerous pilot projects and travelled internationally to research and find the best solution for New Zealand .

His ideas were ridiculed for many years with the introduction of the skyline system but his projects were intended only as pilots to show what could be done with limited resources and the small (2 ton) system. I worked with Ross until his passing in 2005. I inherited many of manuals and thoughts on skyline operations and these are the basis of my work which would have been largely not possible without Ross's initial involvement .

PERSONAL PROFILE

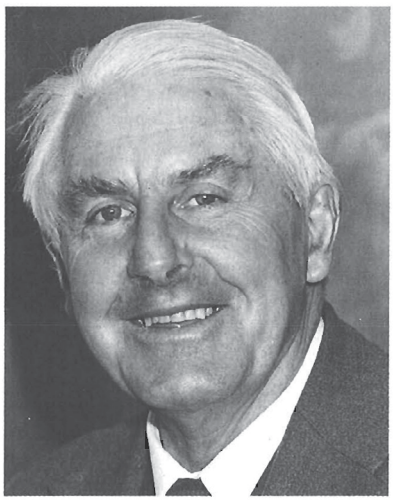
Ross Smith Macarthur

Ross Macarthur was born in Wellington in 1923, descended from Scottish grandparents who emigrated to Otago. He obtained a broad-based education at Scots College (Wellington), Victoria University and Lincoln College, and he then volunteered for war service. He gained the skills of pilot and navigator and served in Canada, Africa and Europe, at one stage with Malcolm Conway. He then went to Oxford University where he graduated with an Honours degree in Forestry in 1948.

Returning to New Zealand, Ross joined the Forest Service in Canterbury where he "shared an office with Jack Holloway and was lucky enough to do some beech forest field work with him". He also wrote a working plan for Hanmer Forest – a rather academic exercise because there was then no market for the wood.

Ross is an energetic, forthright and indomitable man of great integrity who does not suffer fools gladly and can, when he considers it proper, be blunt and acerbic. He "lambasted" several senior officers about the then universal planting spacing of 6ft x 6ft. NZFS Head Office put him on his mettle, under Fred Alsop and Hugo Hinds, to "find out what the correct spacing should be". Ross thinks that his report (unpublished) "was the best thing I ever did in forestry".

In 1953 he joined the Southland Catchment Board as Soil Conservator and Land Classifier. Four years later he was



Ross Macarthur

appointed the first Soil Conservator to the Marlborough Catchment Board. "The early years in Marlborough were a major pioneering effort on a solo basis," he writes, "in a region dominated by sheep grazing, burning and extreme climatic events. Soil erosion was everywhere at both high and low altitudes." From 1957 to 1958 he fought for the use of trees to heal the widespread erosion scars and as a profitable land use, throughout the region. His efforts were eventually rewarded with the formation of the Marlborough Forestry Corporation and his appointment as its Principal Executive Officer as an addition to his role of Chief Soil Conservator. Formation of the Marlborough Forest Owners Association followed with help from the Forest Service and NZ Forest Owners Association, "and today constraints on forestry are minimal".

His concern about logging impacts on steep country led him to visit Europe a number of times to study steepland logging systems and in 1984 he demonstrated a Wyssen system which proved conclusively its low impact on soils. After retirement in 1985 he formed Skylogs Equipment Co., which continues to promote protective logging systems. He is also now working on a Cork Oak project which he finds rewarding and a source of personal satisfaction.

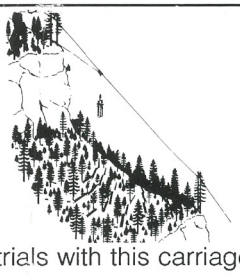
Ross has been a member of the NZIF since 1949, and from 1970 to 1975 he served on the Editorial Committee of the NZ Journal of Forestry. He has also presented a number of papers on soil erosion, management of steepland soils and of forests upon them. He was made an Honorary Life Member of the NZ Association of Soil Conservators in 1986 and served as President of that body in 1965-67.

Like his working life, his spare-time activities have been, and remain, vigorous, including outdoor recreation on land and sea. As a lateral thinker, he has long been keenly interested in monetary reform. As a staunch advocate of municipal composting and low energy organic farming he managed an organic farmlet for 17 years and is an Honorary Life Member of the NZ Soil Association, serving as President from 1970 to 1972.

To sum up: Ross has throughout his career been a fervent battler for what he believes to be right, and also for the honour and good standing of the forestry profession.

C.G.R. Chavasse

Appendix B1 - History in NZ



KOLLER CARRIAGE TRIA

We are pleased to announce th
KOLLER 2.5 tonne autom
clamping carriage is now under
by SKYLOGS in New Zealand
loggers interested in participat
trials with this carriage or a field inspection by arrang
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SKYLOGS EQUIPMENT CO.
BOX 273 PICTON (057) 42265

CHRISTCHURCH "PRESS"

THURSDAY, MARCH 10, 1988. 7

Marlborough-Nelson

Wider use soon for suspended logging

The chief soil conservator for the Marlborough Catchment Board, Mr Bob Chetwin, believes it is only a matter of time before mature forests are available and fully suspended logging becomes regularly used on difficult sites in Marlborough.

In his report to the soil conservation committee meeting of the board Mr Chetwin said the board had promoted the Wyssen skyline system to the full extent of its financial and physical capability.

The system had been promoted widely to all those interested. Operators had been expertly trained and had now joined up with commercial logging gangs.

"These trained operators are now using their knowledge and experience to consider using the Wyssen system in their operations," he said.

The board's staff were completely familiar with the advantages of the fully suspended system and could offer advice on logging in difficult situations. The staff also had the mechanical expertise and knowledge of the system to assist if required.

Mr Rex Frost said the board should make sure that suspended logging was the only method used in difficult country because of its low environmental impact.

"We should insist in our conditions that this system is used," he said.

Mr Chetwin said the advantages of using the skyline crane on steepland forests with erodible soils had been amply demonstrated. No expensive ridge roading was necessary and soil disturbance and tracking were reduced to a minimum.

The board's staff had made a considerable effort to obtain a well stocked stand of trees to test the productive capacity of the system but this had not been achieved.

"The major argument against its widespread acceptance is the lower production achievable, compared with the conventional uphill hauler system," he said.

It was not intended that the board should become a competitive logging enterprise. There were at least three trained operators formerly employed by the board who were now active in the logging industry.

Preliminary talks with one of these operators, Mr Peter Gill, had been held regarding sites in the Sounds where the Wyssen system could be used in a transport mode.

"The feasibility of anchoring the skyline in the sea and loading the logs on a barge has been discussed with the harbourmaster and he seemed very favourably disposed to the idea," Mr Chetwin said.

Skyline system suits steep hillsides and saves erosion

The 50 hectares being logged with the skyline system at Koromiko belong to the Marlborough Forestry Corporation.

It is expected that the trees will yield between 5000 and 6000 cubic metres of timber. Logging of the area should be finished by Christmas, and next winter it will be replanted.

The trees which are coming out are about 28 years old, said Mr Peter Gill, overseer of the logging gang. Being self sown, and more or less unmanaged they are not prime specimens.

Most of them are thin, some are forked and there are many small branches to be trimmed from the lower trunk. Even now, on the empty spaces, more tiny self sown seedlings can be seen.

The skyline system in use here is only a small one, with a maximum load capacity of 2.5 tonnes. Mr Gill said it was being used to train staff as well as log the steep hillside on which the trees were growing.

Other forest companies looked at the stand with the intention of logging it, but decided that conventional systems, with roads and skidders would not work.

Mr Gill said it would have been impossible to construct roads on the hillside. He, at one stage, prepared a plan showing eight roads to demonstrate how impractical it would be.

The logging gang had one observer when operations restarted. This was Mr John Galbraith, from the Log Industry Research Association, in Rotorua.

Speaking from there after his return, he said he admired the enthusiasm of the Marlborough Catchment Board and the national Water and Soil Conservation Authority in this project.

"I personally think, and I've said it at a public meeting, that NWASCA and the catchment board have been quite bold and progressive in being prepared to put so much money and effort into logging trials, especially considering they aren't logging organisations," he said.

"The attitude of LIRA is that we'll assist them and provide advice as required. We're very keen to study the system and arrive at its production capacity, limitations and expected costs."

TRIAL

Mr Galbraith said LIRA saw the board's trial as providing important factual information for the logging industry. It was possible that LIRA could purchase a bigger yarder to test it further, but at this stage he said the W30 operated by the catchment board was sufficient to study the principle.

"The main concern of the logging industry is that this system may get forced upon it where it isn't necessary.

"They think it's high cost, low production. Our attitude is that our only function is to provide factual management information to the industry," said Mr Galbraith.

ENVIRONMENT

In the North Island, steep hillsides and environmental concerns are not so important to logging firms as they are in the South Island, and this is another reason for reservation.

As Mr Gill had already shown, however, the conventional systems used in the North Island would not only have had disastrous effects on soil erosion, but would probably have been impossible to establish at Koromiko.

Using the skyline system, once a track is cut for the logs to travel down the cable way free from obstruction, the remaining soil and vegetation is undisturbed.

The skyline system is therefore ideal for steep hillsides where erosion control is important. Mr Gill acknowledges that ground operations do disturb the soil, but nowhere near as much as conventional systems.

Once the cable way is in place 50 metres can be logged on either side. The W30 system can take out 250 cubic metres in a week.

When a 100 metres wide strip is exhausted the cable is moved to a new site. Another spar, or support tree, is trimmed of all branches so that the cable can be attached to it.

The yarder, which sits at the top of the hillside and operates the carriage way, is not shifted. The removal operation usually takes between half a day and a whole day.

Bottom Doug Turner watches another tree fall after two or three minutes of being attacked by the chainsaw. Behind him, the slope of the hillside indicates why the skyline system is more suitable for high country logging than conventional methods.

Pictures by Liam Sheehy.

Appendix B1 - History in NZ | Ross Macarthur

Nelson Evening Mail, Saturday, February 23, 1991 — Page 3

Low-impact logging method championed

Ross Macarthur uses his new logging method at Rai Valley this week. Photo MARTIN DE RUYTER

By Jeremy Kirk

A Marlborough man is trying to kindle interest in an overseas logging technique that is easier on the environment and cheaper than traditional New Zealand methods.

Mr Ross Macarthur has spent the last week logging a steep hillside in Rai Valley using the method, and is encouraging commercial logging gangs to give it a try.

Instead of the conventional "high lead" system where trees are cut down and dragged up hillsides to waiting trucks using powerful winches, Mr Macarthur has rigged a skyline crane which lowers logs down a hill on a high-tech flying fox.

A wire is suspended down a slope using trees as supports. The logs are then suspended from the wire using a winch, and slide down the wire to waiting trucks under the force of gravity.

Mr Macarthur describes the system as "low-impact logging". Instead of trees being dragged up slopes, ripping up soil and later causing erosion, the ground around a tree is left undisturbed. Branches are pruned after the tree is cut and left to be reabsorbed by the soil, he says.

While he has been strip-logging at Rai Valley, Mr Macarthur said the new method was ideal for taking out individual trees and harvesting beech and rimu forests on a sustainable basis.

Under recent legislation native forests can no longer be strip-logged. Trees must be taken randomly at a rate no faster than they can be naturally replaced. With the skyline crane individual trees within 50 metres each side of the wire can be lifted out without damaging their neighbours.

The system is also cheaper than present methods. If Mr Macarthur had logged this site using the high lead system he would have had to build a zig-zag road up the hill wide enough to take logging trucks, and bulldozed off the top of the hill for a loading area. Apart from the damage to the landscape, this would have cost thousands of dollars.

The cost of hauling the trees to waiting trucks is similar for both systems, he says.

However, the skyline crane uses much less fuel than winches. His operation has been lifting out up to 80 tonnes of wood a day and using only an average of 13 litres of diesel.

Larger cranes can carry out up to 200 cubic metres of wood a day and can cover more than 1000 metres down a hillside. They can also cost up to $200,000.

The system is widely used throughout Europe, Canada and the northern United States.

Wyssen the NZ History.

Ross McArthur first introduced the Wyssen system into New Zealand, in his capacity as the Soil Conservator of the Marlborough Catchment Board. Later as the principal force behind the formation and management of the Marlborough Forestry Corporation he saw the system as a way of harvesting the forests without impeding the soil and water values they were planted to protect.

After retiring in 1985 he formed Skylogs Equipment Co., to focus exclusively on establishing the Wyssen low impact harvesting system as an alternative method of steep land harvesting in New Zealand. Ross undertook economically successful trials, which he tirelessly promoted, creating many joint ventures with European contractors who worked alongside New Zealanders, in an effort to train them in the specialist skills required to rig and work the systems.

Despite proving the system as an economic and environmentally sustainable alternative for steepland harvesting, the forestry industry regarded the Wyssen skyline as a system of low productive capability.

Bulldozers and High lead haulers that relied on a high investment in roads and earthworks, had a high daily production, and by not including the cost of the earthworks in their budget were economically viable. With no environmental accountability these systems have become the harvesting method that has predominated the industry until today.

Trees in the sky

Skyline Logging, an environmentally sound alternative for harvesting steepland forests, has recently been used with great success on a farm forester's woodlot in Marlborough

STORY & PICTURES: Ross Macarthur

More than 100,000 hectares of our exotic forest is planted on steepland slopes of 26° or more. Much of it was originally planted primarily for soil protection and water conservation but inevitably in our so-called 'free market' conditions that resource is going to be harvested. Some of it already is as commercial production from forests on relatively easy terrain begins to lessen.

The ground skidding logging techniques used in conventional logging have little respect for the land beneath the trees. The need for extensive roading and the intensive use of heavy machinery can lead to severe soil damage. In steep areas, accelerated erosion, silting of waterways and downstream flooding have often been triggered by conventional logging techniques.

We already have more than enough erosion and soil problems, but, despite the existence of a proven economic and more environmentally acceptable alternative — Skyline Logging — to conventional skidder techniques the forestry industry continues to opt for conventional techniques on steepland sites — usually in the name of productivity. The long-term environmental costs to the community are rarely calculated.

Skyline Logging was developed in Switzerland in the 1940's by the Wyssen company with the aim of avoiding undesirable environmental effects of logging on steep slopes. The Wyssen system is essentially a simple design. A skyline is strung along the length of the slope to be logged and anchored at the top to a living tree, at the bottom to a 'deadman' — a buried log. It may be given extra tension and clearance height by a mid-support tree or spar.

A motor-yarder is used for installing and operating the skyline crane. The yarder winch pulls a purpose-built locking carriage, to which the load is attached, uphill. Downhill, the load is transported by gravity, making the system extremely energy efficient. The descent is controlled by an airbrake with the winch brake being used only to position the carriage for loading and unloading. The motor-yarder can pull itself into position, even over steep slopes, making expensive and destructive roading unnecessary.

The set up has the capacity to systematically log strips 100 m wide and up to 3 km long and can harvest logs from the entire height and width of extensive valley sides with only a single operating cable and skyline. Logs can be yarded from either side of the entire length of logging line, be lifted in the same movement to the skyline, and carried uphill or downhill to be lowered beside the access road. The skyline becomes virtually a complete aerial

Left: Colin Adams trips the choker release on the carriage to collect another load of logs. The landing is less than 1,000 sq m, creating minimum environmental impact.

Facing page: Two logs descend the mainline cable to the landing. The carriage can handle up to 2.5 tonnes. The locking stop is on the right of the picture.

Logging of the Hughes' woodlot using the Wyssen Skyline System was carried out by

Skylogs Equipment Co. Ltd., P.O. Box 273, Picton. Tel: (057) 42265

roadway and can be established in any configuration across a hillslope, providing a versatile system for many different types of terrain.

The Wyssen Skyline system has been used successfully in Europe for more than forty years, and trials in New Zealand in 1984 by the Marlborough Catchment Board at Koromiko Forest in Marlborough and in 1985 at Blairlogie (Wairarapa Catchment Board) clearly demonstrated its potential for this country.

Unfortunately, this was also the time the forest industry began to suffer severe setbacks with the massive changes in Government policy that led to the sale of the State forests, the dismantling of the New Zealand Forest Service and the National Water and Soil Conservation organisation as well as local body restructuring with widespread redundancies and uncertainty in the forest industry generally.

The crews who had received some training in the skyline system were dispersed and moves to set up a New Zealand contract crew were unsuccessful despite encouraging visits from Swiss and Austrian loggers who could see the potential for the major use of skyline systems on our terrain. Without substantial wood volumes available for tender it was not economic for them to bring their own equipment to New Zealand.

The potential of this more environmentally sound method of logging steep slopes has however not been entirely forgotten and a recent project has once again demonstrated the effectiveness and economics of Skyline Logging systems.

In 1964 Jim Hughes, with the assistance of a Farm Forestry Encouragement Loan, planted a 3 ha woodlot on a steep, fern covered hillside across the highway from his dairy farm in the Rai valley, Marlborough.

The area was too poor for grazing and the objective was for good land use, conservation and protection of the slope and a small stand of native bush alongside; aesthetic improvement on a highly visible area and a long term financial investment with *Pinus radiata* as a commercial crop.

The pines were planted 2.4 metres apart at 1600 per hectare, released by hand where necessary and the family helped with pruning to 3 m at 10 years and thinning to 600 stems per hectare at age 12.

The woodlot achieved all the planned objectives in a few years. The plantation grew vigorously (site index 28), the fern disappeared and was replaced with an understorey of shrubs and ferns; the relict Tawa stand adjacent flourished and the steep slopes, (up to 42 degrees), were fully conserved and stable under the forest mantle. Barring accidents of fire, disease or windthrow an excellent commercial wood crop was assured.

However, it was not many years before the question of harvesting methods began to loom large in Jim's mind. How to get the logs off without destroying the very values for which the woodlot was established in the first place?

The answer became obvious after a visit to Switzerland where he saw steep forests harvested with these low impact multi-span skyline cable systems, clamping carriages and sledge yarders.

Soon after this, the 1984 trials by the Marlborough Catchment Board and the Soil Conservation and Rivers Control Council also showed how on site soil disturbance and damaging costly roading could be avoided by using Skyline Logging.

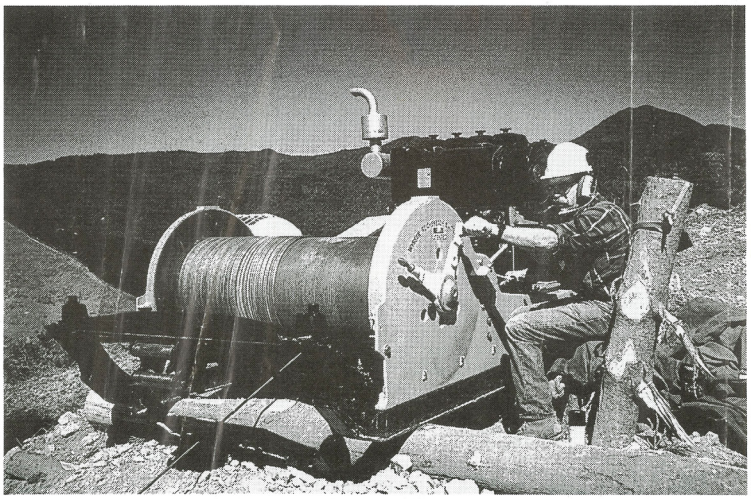
By the time Jim's trees were ready for harvesting however, the original trials had been abandoned, the Forest Service disbanded and little interest was being shown in environmentally sound steepland logging techniques. But help was at hand for Jim Hughes.

Huldreich Schmid, a Swiss forester who supervised the original Catchment Board trials, agreed that if the Hughes woodlot were available for logging, he could find the spare parts to repair an old W.60 yarder already in New Zealand and also locate other

essential accessories not available here and could come out to do the job at an acceptable economic price in the northern hemisphere winter of 1990-91.

Jim Hughes gratefully accepted the offer, as did Colin Adams who was now the owner of the remnant parts of the old yarder and carriage used in the Marlborough trials. During 1990 the machinery was rebuilt by Colin and all accessories made good. A satisfactory log sale was arranged for the woodlot and Huldreich Schmid with two Swiss crew and two local New Zealanders set up the first ever New Zealand private forest multi-span skyline operation with a sledge yarder in mid January 1991.

Two skyline settings have been used for the woodlot. The first is 368 m long and the second 318 m with a common ground anchor deadman and two yarder positions and anchors at the top — 185 m vertically above the landing. In this case the yarder was pulled to the top by a D.4 bulldozer which, with a tracked digger, installed the deadmen for the skyline and yarder.



Swiss forester Karl Wyssen operates the yarder at the top of the first line

The sledge yarder is a single drum 1955 Wyssen 60 with a 52 H.P. diesel motor. (Fuel consumption has so far worked out at 13 litres per day). The Wyssen Standard Carriage is of similar age and long since considered obsolete in Europe.

The carriage locks into a movable stop which slides up or down the skyline and is positioned with an attached wire rope which is secured to a handy stump or tree nearby. The loads, up to 2 ½ tonnes, are pulled up by the mainline into the carriage which locks on and separates from the stop and is allowed by mainline and winch to lower to the landing at controlled speed. The skyline is 24 mm Langs Lay and the mainline is 13 mm 6 x 19 steel core cable. Usual loads are of one to two logs and production rates varied from 50 to 80 tonnes per day.

The skyline is elevated off the ground by a spar tree at the top about 18 m upslope from the landing. All logs were trimmed and cut to length as much as possible in the bush but because of the very steep and dangerous slope this has not always been possible and extraction lengths have varied from 6 m to 20 m —and sometimes longer.

Loading was with a Michigan 55 tyred front end loader.

The landing area itself is under 1000 sq m and sited about 20 m above the main highway. Better deflection and log delivery would have been obtained if the skyline went across the highway. Although this would have been entirely practicable, (it is common elsewhere in the world), the expense of engineering reports to the highway authority; costly protection structures or stop/go lights, plus an unenthusiastic neighbour, mitigated against this option.

Site disturbance by the yarder was less than 200 square metres while the access road of 270 metres was already in existence and merely required some widening and metalling. All exposed surfaces and side cast material are being sown to grass and clover seed as their use terminates.

The logs have been graded into sawlogs and chip material. The sawmill is 52 kms distant at Kaituna near Renwick, and the chips go to Richmond past Nelson — a distance of 66 kms.

Considering the constraints of the site the impact of this logging can only be considered as minimal.

There are no skidder tracks or logging road with side cast material crossing steep sidlings to the top. The only extraction damage is the usual impact of butt logs and branch crown impacts at felling, unavoidable in any logging operation.

Lateral dragging to the skyline has made little impression on the ground but the longer log lengths have caused a degree of scouring below the skyline for some 100 m which is as deep as 0.5 m in some places, especially just above the landing for 20 m or so. This damage will be readily repaired with seeding and slash replacement.

The native understorey has survived remarkably well and the adjacent native stand is undamaged except for a few pungas.

The final yield was 1172 tonnes of 'A' Grade sawlogs, 592 tonnes of chipwood and 100 tonnes of 'B' Grade logs — a total of 1864 tonnes or 621 tonnes/hectare.

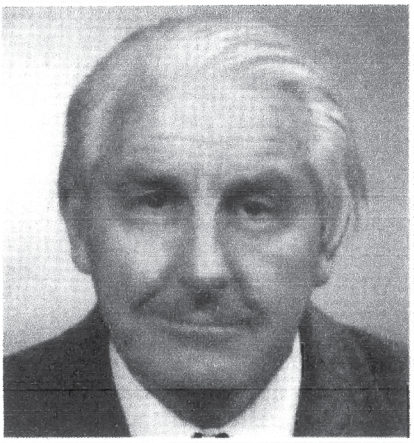
The return was some $6,000 per hectare nett, excluding tax. Considering the severe site constraints, not an unreasonable return.

The results of this multispan suspended load system of logging can only be considered as very successful, not only in terms of environmental protection but also economically with all the original management objectives of the owner well achieved.

The satisfactory outcome of the operation owes much to Huldreich Schmid, whose efforts to support local moves to ensure better logging standards have been both unstinting and generous. The forest industry in New Zealand owes this modest logger a sincere vote of gratitude.

A man who thought outside the square

Ross Macarthur
1923-2005



Ross Macarthur, a former Chief Soil Conservator of the Marlborough Catchment Board and past member of the New Zealand Institute of Forestry has died aged 82 after a career spent mainly in Marlborough where he was involved in the design, planning and execution of erosion control and conservation projects.

Born in Wellington, he was educated at Scots College, Victoria University and Lincoln College and post World War Two at Oxford University where he graduated with honours in 1948. During the war years he served as a pilot and navigator with the New Zealand Air Force and remained as a general reserve until 1953.

Between 1948 and 1953 he worked for the NZ Forest Service in Canterbury and at the Forest Research Institute until joining the Southland Catchment Board as a soil conservator and land classifier, a position he held until 1957. Then began his long association lasting 48 years with conservation and forestry in Marlborough, where he was of Chief Soil Conservator of the Marlborough Catchment Board and Chief Executive Officer of the Marlborough Forestry Corporation until his retirement in 1985.

During this time he initiated the first high country run plan at Rainbow Station and also commenced whole catchment approaches to land management, which included the Wairau Valley flood protection and the restoration of the severely eroded Wither Hills. Other key initiatives of the time were the introduction of fire processes to reduce burning on the Northbank hills of the Wairau and Northbank catchment control scheme. This led to a change of land use in the area to forestry.

As a consequence the NZ Forest Service, private landowners and some regional bodies acquired land to develop into forest. Former mayor Sid Harding and Ross were the driving forces behind the formation of Marlborough Forestry Corporation that was formed with various local authorities. This is now the Marlborough Regional Forest jointly owned by Marlborough and Kaikoura District Councils with an annual budgeted profit of about four million dollars and providing many benefits to the community.

He investigated the possibility of skyline logging to remove mature trees from steep hills, travelling extensively to America, Canada and Europe to learn advanced extraction methods. In 1971 he became a founding member of the Marlborough Forest Owners Association and remained on the committee until 1992, becoming an honorary member in 1995. For 12 years he was a member of the Nelson Lakes National Park Board and involved in the building of the Rotoiti lodge for school use.

In recognition of his outstanding service in the Marlborough district, he was awarded the Paul Harris award by the Blenheim Rotary Club. Contemporaries remember him as a visionary, a man who thought outside the square, was always open to new ideas and techniques and encouraged others to be the same. His many other interests from time to time included Social Credit philosophy, colour therapy, UFOs and growing organics, discussions of which enlivened many field trips.

He is survived by his wife Sylvia and sons Ian and Peter.

Adapted **7/6/05 by**
Maurice

LETTERS TO THE EDITOR

Swiss show way

Nowadays, we hear a lot about the ill-effects of bad logging practices in New Zealand.

My late husband tried for some years to demonstrate and to educate New Zealanders in the advantages of the Swiss and Austrian systems of logging, where the logs, when felled, are lifted to a skyline, suspended by a carriage on that line and then carried overhead downwards to a landing place below.

Thus there is no degradation of the land by dragging logs along the ground, no need to cut roads into the hillside, and the soil is damaged minimally in the process.

Why does man seem so blind to the methods that protect the land? You do not see such damage under the care of the Swiss, who understand the need to protect the environment.

SYLVIA MacARTHUR
Blenheim

27-1-2011

Appendix B2 - A Story created from Collective Resistance

A collection of 30yrs of news articles and endorsement letters

- 1984 - The Express Weekender - Skyline logging works at Koromiko
- 1984 - Marlborough Express - Skyline system suits steep hillsides and saves erosion
- Feb 1984 - Forest Industries Pub - New Steepland Logging Trials Undoubted Success
- 1984 - Soil & Water Issue 3 - The swiss log trick
- Dec 1985 - Forest Industries Pub - Skyline system solves sensitive soils logging problem
- WASCO 51 ISSN 0111-8692 - Swinging into steepland logging
- March 1988 - Christchurch Press - Wider use soon for suspended logging
- April 1991 - Trees in the Sky
- October 1995 - Colin Wisheart DOC endorsement
- May 1996 - Forest Harvesting in the Marlborough Sounds - Flying in the Face of a Storm
- Feb 2004 - Marborough Express - Log Truck Solution under way - Opua Bay Barge Site
- Jan 2011 - Letter to the Editor - Syliva MacArthur
- Feb 2011 - Marlborough Express - The day it rained timber - Northbank and Havelock
- Feb 2011 - Marlborough Express - Council looks at updating rules
- Feb 2011 - Marlborough Express - Forestry on steep slopes a disaster
- Jan 2012 - Marlborough Express - Landscape group pushes for change by council company
- Jan 2012 - Peter Jerram Endorsement Letter
- Sept 2012 - Marborough Express - Foresters urged to Co-operate
- Sounds Guardian's submission to Regional policy statement for future forestry in the sounds.
- June 2013 - What now for our Jewel - Peter Jerram
  The Marlborough District Council is looking for informed and sensible debate and opinion on issues involving landscape and sustainable use of land.
- https://www.pressreader.com/new-zealand/marlborough-express/20130617/281977490184063
- Nov 2015 - Fairfax - Call to step up Marlborough Sounds conservation
  The government pays scientists to investigate and 10years later nothing has happened - Rob Davidson Marine Biologist.
- https://www.stuff.co.nz/business/industries/74270672/call-to-protect-crown-jewels-of-the-marlborough-sounds
- Residents urge council to get trucks off road
- June 2018 - Shane Jones endorsement
- April 2019 - Department of Conversation Endorsement
- September 2020 - DOC - Endorsement
- October 2020 - Marlborough Recreational Fishers Association
- October 2020 - Brenda Tahi, Tuawhenua Trust

Appendix C - Historic Pressure Ignored

In October 2012 Peter Jerram, Chair of the MDC Environment Committee wrote of the reintroduction of the Wyssen system of aerial logging to Marlborough in a letter in which he says:

"As a previous professional Soil Conservator I well understand the benefits such a system should bring to our region.

Marlborough has particular problems for forest harvesting, having very steep slopes in the Marborough Sound and in North Marborough, and erosion prone schist or semi schist geology underlying the slopes. As a result traditional harvesting techniques can cause serious soil loss in the ever increasingly frequent major storm events we are experiencing.

The Wyssen system is seen by the Council as being able to minimise these effects by keeping logs off the ground and out of waterways during retrieval

In the Sounds, much of the current logging is likely to be followed by deliberate and encouraged reversion to native forest, making the Wyssen system especially suitable, as it creates much less disturbance of ground cover than ground based systems."

He went on to say that as a result the Council supported the introduction of this advanced system of forest harvesting.

www.marlexpress.co.nz

15/2/2011

Forestry on steep slopes 'a disaster'

Penny Wardle

Marlborough is heading for an "environmental disaster" if the Marlborough District Council does not shut down forestry on steep and erosion-prone slopes, council environment committee chairman Peter Jerram says.

The committee wants the council to review its rules to stop pine forests being replanted on steep, erosion-prone land.

Mr Jerram said Marlborough forestry was planted on some of the steepest country in New Zealand.

"I believe that the soil erosion we are seeing here is an indication that we are heading for an environmental disaster in this province if we don't shut it up."

Peter Jerram

Council regulatory manager Hans Versteegh said pine trees did not belong on steep, erosion-prone land. The storms on December 28, which he expected to happen once every 25 years, showed the land was not suitable.

Council soil scientist Colin Gray told the environment committee meeting on Thursday that most forests badly damaged during the storms were on class 7 and 8 land unsuitable for "sustained permanent production", including forestry. The land-use capability scale ranged from 1 for flat and fertile to 8 for unproductive.

Much of the damage came from thin soil in gullies becoming saturated and giving way, exposing the bedrock beneath, Mr Gray said.

Mudslides picked up logging debris and poured it on to flat land below. The block that spilled mud and logs across the Wratt family farm between Okaramio and Havelock was on class 8e land, deemed as both steep and highly prone to erosion, he said. A log avalanche narrowly missed the farmhouse full of family staying for Christmas.

Mr Jerram said forestry was important to the region's economy, so the council had to work with the industry "to significantly review" the rules.

"This was an extreme event, but climate scientists would suggest we are going to get a lot more like it," he said.

It was hard to be proud of the Marlborough landscape, when forestry was so destructive to some of the most vulnerable land.

Council compliance officer Mark Spencer said rule changes to look at included leaving natural vegetation in gullies, setting planting and harvesting further back from gullies and staggering the tree harvest.

The committee recommended that the council budget to do more compliance checks and review its rules on land disturbance and forestry. The committee called for the council to commission a study of erosion in steep hill country.

Mr Versteegh said a proposed national environmental standard for forestry was due to be released in a couple of months.

Wind as bad as rain, page 5.

Appendix C - Historic Pressure Ignored

What now for our jewel?

The Marlborough District Council is looking for informed and sensible debate and opinion on issues involving landscape and sustainable use of land, writes council environment committee chairman **Peter Jerram**.

The Marlborough District Council's draft proposals over the future of the Sounds have caused a stir in the community, and that's a good thing.

It means people are watching, listening and using the democratic process. But before raw emotion takes over, it's important to know the facts and to understand the processes.

The council must regularly review its regional policy statement and district plans every 10 years under the Resource Management Act, and that review is due right now. For the past 2½ years, the staff have been doing that, and passing it by the plan review committee for approval or alteration.

The draft is being discussed with landowners before going into the final draft plan, which will be available for public submission, probably next year.

Two of the 19 chapters in the new plan concern landscape, and the Marlborough Sounds.

The plan must have a landscape chapter and a landscape plan. Several recent decisions of the Environment Court have confirmed that.

In 2008, leading nationwide landscape company Boffa Miskell was employed to update the existing landscape plan, which they had prepared 10 years earlier for the council.

Landscape experts (and those are the people who the courts will listen to) mostly agree that the whole of the Sounds area is an outstanding landscape.

Some areas are more outstanding than others, and that is recognised in the resulting plan, which has only two areas:

- those designated as outstanding natural landscapes (ONL);
- all the rest, which has been called visual amenity landscapes, (VAL).

It is around the second tier, visual amenity landscapes, that the current discussion is taking place.

The thought of the committee was to look ahead, not just 10 years, but 50 or even 100 years, and to ask: "What do we wish the Sounds to be like then? Do we want a completely altered landscape or do we want a balance, as at present, between natural and altered, pristine and commercial?"

Actually it isn't important whether it is called visual amenity landscapes or something else – the question remains the same.

The supplementary questions came next; do we want more or less commercial forestry, and is there a need for future built structures to blend in – ie, a recommended colour palette?

It is these questions which the present consultation (that is what it is) is seeking answers to.

So let's look at these two rather separate issues, colour and commercial forestry.

Colour

It is interesting and enlightening to watch the strong reactions, which are mostly around "don't tell me what to do," and "my property rights", and which reflect the strong individuality of those who have chosen to live in the Sounds.

I like that.

Some do agree on having controls, and it's hard to get a representative feeling from the meetings, because those in favour of the proposals often tell staff and councillors only after the meetings.

But the general impression at this stage is that colour control is not welcomed. If that's the case – and it's early days yet – it's quite likely it won't be introduced.

Interestingly, in the only visual amenity landscape proposed for the rest of Marlborough – the Dry Hills behind Blenheim – there is overwhelming support for the colour palette.

That shows that in our community there is a wide divergence of views and opinions, and that's mostly a good thing.

Forestry

We should remember the recent history of the Sounds. It was mostly forested when the Europeans came here, and we spent the next 100 years harvesting the rimu and matai, and clearing land for farming.

By the 1950s and 1960s, profitability for Sounds farming was waning. It was simply too far from markets, too expensive to get the inputs, and the income-to-cost ratio meant farming gradually disappeared. Sad but true.

By the 1970s forests were being established, mostly pinus radiata, and this was seen as re-establishing some prosperity to the Sounds. That is completely understandable.

The Sounds land is steep, and in places quite erosion-prone, and the forest harvesting practices of the 1970s are understood to be damaging in terms of soil erosion.

The harvesting of Farnham forest in the Bay of Many Coves in 1973-74 led to severe siltation in that bay for many months, colouring the bay a dirty khaki.

I visited then as a West Coast soil conservator.

Marlborough soil conservator the late Ross McArthur was sure that aerial logging techniques would be necessary to prevent such damage in the future.

We now know that didn't happen. Instead, a mix of hauling up to skid sites, and ground-based logging (ie, hauling logs along the ground) was used. The visual effects of this have been a question to many, and the long-term effects of the silt in the water, and the soil loss on the hills, is of concern to all, including the marine farming industry.

So the questions being asked about commercial forestry in the Sounds are:

- Do we wish this to continue as it is now?
- Should we restrict the area to what is there now, and say, "no" to any new areas, as the proposals are asking?
- Should there be restrictions on how the trees are harvested and where they are planted, so as to prevent soil loss and also improve visual effects?
- Is commercial forestry commercially viable in the Sounds?

The council is open minded on these questions and mindful that forestry brings jobs and wealth to Marlborough.

The draft proposals are asking these questions, and the council is really looking for informed and sensible debate and opinion on these matters, which are twofold. They involve landscape, and they involve sustainable use of land.

Looking after the landscape, and how the land is used aims to protect the soil and water qualities, and visual values. These are important for our tourism industry and for our recreational enjoyment of the Sounds.

This needs to be balanced with the productive and sustainable use of the Sounds for forestry, farming, tourism and aquaculture.

I look forward to the discussion, and the sensible decision making process which I hope will follow.

The Marlborough Sounds deserve nothing less.

Appendix C – Overcoming Resistance

The Marlborough Express 25/9/2012

Foresters urged to co-operate

Kat Pickford

A forestry working group are predicting a skills and infrastructure shortage over the next 10 years that will make it difficult for small operators.

A group of North Island foresters have established the working group to look at new ways to deal with some of the major issues facing New Zealand's second largest export industry.

Wellington consultant Geoff Thompson, who has expertise and interests in forestry, agriculture, the Emissions Trading Scheme and climate change issues, discussed the aim of the working group with about 50 Marlborough and Nelson foresters in Blenheim on Wednesday.

He said not much was known about the large number of small-scale foresters operating in New Zealand, except that a huge proportion of them would be looking at harvesting within 10 to 15 years.

Rising costs were cutting the bottom line of small-scale operators and when they all decided they wanted to harvest, there would not be enough haulers, working gangs and skilled people to go around.

"The idea that a forester can go it alone is a pipe dream, it's just not possible," he said.

"We need to have a very hard look at how we will manage forests over the next 10 years."

The working group, which is funded by the Primary Industries Ministry and the Wood Council of New Zealand, are compiling basic data to look at ways of rationalising small-scale operators.

They have studied the way small-scale operators work co-operatively in Europe.

Marlborough Forest Industry Association president Michael Cambridge said Mr Thompson's message was particularly important to Marlborough, with 50 per cent of the region's forests owned by small-scale operators.

Marlborough has 72,000 hectares of forest; 37,000ha is owned by small-scale operators, he said.

Appendix D1 - Skyline vs Conventional

After harvest, with Barge, showing untouched understory vegetation

Skyline

The benefits of the system are huge in terms of ecological impact on the harvested hillside both asthetically and environmentally. We aim for no roading, no skid sites or barge infrastructure which all create damage to the environment our method is totally sustainable, and sees our actual foot print with the patented anchor system on the sea floor able to be re-used and very easily mobilised. Our approach is simple and minimise all effect associated with harvesting in the sounds.

In contrast to this, to this day our method demonstrates no adverse effects on the many blocks we did during the period between 1994-2006. The best example from our efforts would be that of Blackwood Bay - the result exemplifies what can be achieved with no roads, no skid sites or barge landings. The area was cleared of all wilding pines using our system in 2003 and today the site is well established in beautiful native bush. So we can use this example to show case the system and what can actually be achieved when it is implemented.

Our technological innovations and improvements have many additional benefits enabling large volumes of wood to be transferred via one vessel in contrast to the many trucks required to move the same volume.

One major advantage of our skyline to barge system is that it creates no damaging roading infrastructure, so no consents for this type of infrastructure are needed, speeding up the harvesting process considerably.

The harvesting operation is low-impact leaving behind only superficial changes to the landscape. This makes it a valuable and very beneficial system to operate in the Marlborough Sounds where there are large blocks of land that could potentially be planted in Native or Pine. With this technology at the forefront commercial opportunities exist that have, up to this point been problematic or impossible to resolve, the skyline to barge system now makes these opportunities logistically, commerically and environmentally sound investments.

Eco-Innovationz

Appendix D1 - Skyline vs Conventional

Conventional

There is so much literature and condemnation of traditional methods of operation, because of this the average consent takes 6 years to obtain.

The only way industry can manoeuvre through the consent process is to operate using permitted activity and best practice - even then the negative effects on the environment are still substantial

and on many sites there is an ongoing legacy of problems occuring well after the site is vacated.

I have experience many conventional operations that all have created damage in many forms some went to court and some are still being cleared to this very day.

Marlborough Sounds - high potential for slips

Conventional roading requires a wide cutting into the hillside

Appendix E1 - Training | H&S

Over the many years of developing this technology I have also developed and maintained relationships with experts in the field in Switzerland and with a number of companies specialising in this technology incuding Wyssen, Konrad and Kollor as well as learning institutions like IBW (we could use logo and site action ?) will send these .many contractors and up and coming technologies .

Training

The process of training operators to use the skyline and operate the hauler, power plant and other equipment is a simple process as the manufacturers of the equipment that Eco-InnovationZ is recommending, give full training in the safe use of that equipment.

Darryn has spent time in both the Wyssen and Ganter factories servicing and building equipment for the skyline system, so has an in-depth understanding of, not only the operational side of skyline harvesting but also the workings which will enable the possibility to build and innovate on aspects of the operation if required.

Training Program Scaffold already Exists.

In-depth training into the system, can be run with the support of Callaghan Innovation, who see the importance of having a qualified trainer come out from the IBW School of Switzerland, where Darryn has spent time learning what was required to facilitate training, including meeting compliance obligations and initiate an on-going training program to support expansion of the Skyline project once he returned to NZ.

It is understood that IBW already has a number of people wanting to come to New Zealand to assist, which is very encouraging. Once some key team members become competent in the workings of the system it will then be possible to replicate the system and associated training, as a full video of the set-up is available to assist with any on-going training programmes into the future.

We also have the had the encouragement of Rien Visser, Associate Professor in Forest Engineering at Canterbury University who has already demostrated support in the past by setting an assignment for his students to design a long reach cable system to load logs directly to barge. This was after Darryn was invited to speak to students in 2012 on the Skyline system.

https://www.canterbury.ac.nz/engineering/contact-us/people/rien-visser.html

Safety

The operations are all run under the manufactures instruction or a long as the machinery and equipment is not modified and when we did it was always in conjunction with the manufacturer so the manufacturer has guidelines to follow.

We have also been in talks with OSH with regard to the Skyline operations. They are very supportive of the operation and will help document the process, including if we introduce new equipment.

Appendix E1 - Specialised Expertise & Knowledge

Darryn Newman - Credentials

I have worked for and operated equipment in both conventional harvesting and very steep land operations as well as working overseas in Europe in both the factory and forestry industries in an effort to understand what alternative equipment and techniques were available.

I have owned a number of operations - first, a ground base skidder and bulldozer operation on both the North and South Islands and in the Marlborough Sounds.

I worked alongside Ross McArthur during my forest service time when he was trialling a two ton Skyline system from Wyssen (W60)

Through my research I have been fortunate to travel to both Switzerland and Austria where the skyline equipment was invented and have worked in the factories of both Wyssen in Switzerland and Gantner in Austria with visits to a number of leading machine companies i.e. Koller and Konrad. Gaining extensive working knowledge and understanding of the equipment.

Broadbased Knowledge

So my knowledge is broad in the sense of operations and workings and I've been able to share some of that knowledge along the journey.

A personal highlight of this journey for me was when Canterbury university did a paper on getting wood out off the sounds using a hauler based system to transport to barge. They invited an international speaker there for two weeks prior to me being asked to attend and listen to the papers being presented and take questions. It was astounding to listen to the 3rd year graduates and realise they had no knowledge of the existence of any machines other than those used in New Zealand operations. However it was refreshing to hear their knowledge base and also go through aspects of what I had done, mistakes made and how we had arrived at where we were.

There is much to do it improving the knowledge of those working within the conventional industry and I look forward to the opportunities where I can share my knowledge and pass it on to the younger generation.

Callaghan Innovation

The previous Skyline work I've done with the backing of Callaghan Innovations will now lend incredible advantage to any work going forward, the problem solving done on previous projects will benefit all contracts from this point forward.

My involvement with Callaghan Innovation came about through contact with Paul Mather when he was involved with Weltec in Wellington, when Paul moved to project assistant at Callaghan Innovation we worked closely during the research and development phases of my Skyline and Sea Anchor projects

The most encouraging aspect though is the training support, in my passed involvement they have enabled an IBW tutor to come here from Europe and pass on the necessary skills for workers and trainers and more importantly establish ongoing ways to up-skill in various ways of sensitive harvesting and skyline operations. That potential also exists for Iwi projects.

Appendix F1 - Endorsements

30 October 2020

TUAWHENUA

To whom it may concern

Our initial meeting back in 2010, with Darryn Newman was purely by chance at a time when we were searching for an alternative solution to harvest both native and exotic timbers, on both Ruatuhuna Trust land and private forests in our area. We immediately recognized the potential of the skyline system as a solution to achieving multiple goals the Trust had in the pipeline for its otherwise inaccessible steep bush-covered lands of 9000 ha, but we were also extremely impressed by Darryn's enduring passion for the system, in-depth knowledge, obvious expertise and positive solution-focused thinking.

Up until we met Darryn we had been advised by consultants that the solution was to use conventional methods which included the construction of a large and expensive roading network to allow trucks to enter and exit the block. The cost of the roading was huge and with it came additional expenses to mitigate the effects of the environmental impacts caused by this conventional method of harvesting. If we hadn't meet Darryn and learned about his work in Marlborough and specifically the Marlborough Sounds we would have blindly gone with the conventional method, not knowing any better.

The Trust wishes to endorse not only the Skyline system but Darryn's innovative problem solving. We put our master plan in front of Darryn and after numerous meetings, phone calls and personal visits to the Ruatahuna land, he has come up with exciting and viable solutions to numerous aspects of our project. Thus, we strongly endorse Darryn with his years of experience within the industry and we have found him excellent to work with.

One of the most positive aspects of using this system is that we know we are going to be able to leave a legacy we are proud of for generations to come – where we have not wrought environmental damage in the utilization of our lands. We are also hugely excited by the opportunities of multiple land use that are made possible through this Skyline technology. This is just what we need not just for sustainable forestry management but also for other enterprises with a gentle environmental footprint such as apiculture and tourism. We see that this is a technology that we could take ownership of to grow it within our hapu as our own, creating new opportunities to generate income, jobs and connection for our Iwi, all the while expanding our ability to care for our land and grow future enterprise opportunities.

Finally, we strongly encourage those facing the harvesting of native or exotic trees to explore the potential of the skyline technology, especially for sensitive, steep or hard to access terrain. In our view, the skyline system is a perfect solution for more than just logging in New Zealand.

Heoi ano naku na

Brenda Tahi

Executive Trustee

TUHOE TUAWHENUA TRUST 363a Mataatua Rd, Private Bag 3001, Ruatahuna 3079, New Zealand
P: +64 7 3663 166 E: office@tuawhenua.biz W: www.tuawhenua.biz

Links to Endorsement PDF

Appendix F1 – Endorsements

Department of Conservation
Te Papa Atawhai

25 September 2020

Darryn Newman
Darrynnewman@gmail.com

Dear Darryn,

Skyline logging in The Marlborough Sounds

We are happy to endorse the skyline logging system as a lower impact logging system in the Marlborough Sounds.

It is, apart from the heli-logging, the lowest impact extraction technique for logging exotic trees in the Sounds. This is particularly relevant in areas adjacent to coastal areas where less impact results from significantly reduced roading, skid sites and also barge loading sites. This reduction in infrastructure results in greatly reducing the chance of sediment entering waterways.

Barge anchoring systems will produce some seabed impact and these need to be considered in the overall assessment of the specific sites especially if this is within sites that have significant marine values.

I wish you all the best in continuing to establish the skyline logging system as the go-to method for reducing the environmental effects of logging tin the Sounds.

Kind regards

Dave Hayes
Operations Manager, Sounds
0272919143 / dhayes@doc.govt.nz

Department of Conservation *Te Papa Atawhai*

Appendix F1 - Endorsements

Darryn Newman,
Eco-Nomic Construction Ltd

16 October, 2020

Dear Darryn,

On behalf of the President and members of the Marlborough Recreational Fishers Association, I write to thank you for your most interesting presentation to our association. Your proposed solution to the problem inherent in removing felled timber is most ingenious and illustrative of the ways in which harvesting of timber can be made more sympathetic to the environment.

As an association we are collectively concerned about the accumulation of silt and woody residue in the Sounds which result from the rather crude forestry methods used to date, as well as the expense of making roads and skids though this difficult terrain, and the inefficiencies of multiple handlings, so the concept of moving trees straight to offshore barges is a very attractive one, and which is likely to also be persuasive to forestry owners as being 'green' and economically attractive.

We hope that your project is successful and we look forward to hearing of your progress.

Yours sincerely,

Jennifer Leader
Secretary Marlborough Recreational Fishers Association,
P.O. Box 834,
Blenheim

Marlborough Recreational Fishers Association Inc.

Appendix F1 - Endorsements

Darryn Newman,

Renwick,

Marlborough

17 January 2012

Dear Darryn,

Re Wyssen Logging System for Marlborough Sounds and Other Steep Logging Sites

As Chair of the Marlborough District Council's Environment Committee (effectively the Regional Council as we are a unitary authority) I can confirm my firm support for your logging system.

In the 1970's I was a Soil Conservator with the Westland Catchment Board, at which time I gathered a good working knowledge of forest harvesting operations, in particular logging methods and their effects on soil erosion and stability of waterways.

When the Marlborough Sounds was widely planted in the 1970's and 80's it was anticipated by the Marlborough Catchment Board that aerial logging techniques would be necessary to prevent damage to the steep delicate geology of the hills, and to the waterways of the Sounds, especially the prevention of siltation. That these logging systems didn't eventuate is a matter of concern for the current Council, which is currently developing its second generation Regional Policy Statement and District Plans. As a member of the small sub-committee dealing with these plans I can confirm that the Plans are likely to encourage aerial logging methods with the view to protection of said soil and water resources.

In short I am giving my firm support to your system and would strongly encourage any organisation or individual with an interest in the system, which has large advantages in environmentally efficient forest harvesting over current practices.

With Regards,

Peter Jerram BAgrSc.,BVSc(dist)

Chairman Environment Committee

Marlborough District Council

jerram@xtra.co.nz

Appendix F1 - Endorsements

Marlborough Sounds
Restoration Trust

24 May 2011

Attn: Marlborough District Council

LETTER OF SUPPORT FOR RESOURCE CONSENT APPLICATION (DARRYN NEWMAN)

The Marlborough Sounds Restoration Trust is a registered charitable trust that was established with the aim of undertaking a range of projects that delivered positive environmental outcomes for the Marlborough Sounds.

In the past three years, the Trust has undertaken wilding pine control throughout Inner Queen Charlotte Sound, with funding support from landowners, central and local government, and regional business interests.

The Trust has excluded several thick forests of pines from treatment, as they are more suitable for commercial felling. In this regard, we have worked with Mr Newman to get landowner support for the felling of these stands, using the proposed skyline cable felling method. We believe the proposed method offers the most appropriate technology to undertake logging in the area, as it involves minimal soil disturbance and a reduced risk of run-off, and is therefore in accordance with the Trust's environmental objectives.

While the stands are on conservation land, the Trust has undertaken to work with the Department of Conservation to manage the rehabilitation of the sites after felling has taken place, primarily by the removal of all pine regrowth using aerial boom-spraying. This post-felling management will contribute to the Trust's objective of preventing the further re-establishment of wilding pines in Inner Queen Charlotte Sound.

Yours sincerely

Andrew Macalister
Trustee

Appendix F1 - Endorsements

Department of Conservation
Te Papa Atawbai

FILE: FOR:002
(USE:5940)
CJW:GA

17 October 1995

TO WHOM IT MAY CONCERN

FULL SUSPENSION LOGGING SYSTEMS

The Department of Conservation owns areas of pine forest growing within scenic reserves in the Marlborough Sounds. The Department intends to gradually remove these pine forests to enable the reserves to revert to a full native vegetation cover.
Because most of our blocks have sea access only, the handling of pine logs is more difficult than on conventional sites and the foreshore area in particular can be seriously damaged using conventional logging equipment to load barges, etc. The Department of Conservation will foster only those logging methods which inflict very little damage on the environment and to this end, we are interested in suing the Swiss developed full suspension logging system which results in minimal soil disturbance as logs are transported from the forest via an aerial cableway directly down to a barge.

We would welcome the introduction of this system into New Zealand and indeed would hope that this type of logging will become more widespread because of its environmental advantages.

Because of the specialised nature of this type of logging system, skilled operators will be needed to not only run the equipment initially but also to teach New Zealanders the proper use and application of the machinery so that its use can be extended throughout the country. At this initial stage of development, there will be a need to "import" skilled operators to not only run the machinery but to pass on their knowledge to others.

The Department of Conservation supports any move in this direction.

Colin Wishart
Use Manager
Nelson/Marlborough Conservancy

Nelson/Marlborough Conservancy
Private Bag 5, 186 Bridge Street, Nelson, New Zealand
Telephone 03 546 9335 Fax 03 548 2805

Appendix F2 - Company Profile

Mission Statement

Eco-InnovationZ directive is to identify problems with existing methodology, within primary industry and present solutions that are not only innovative and cost-effective but also leave a legacy of a lower-environmental impact than existing models.

- *Eco-InnovationZ - Creative Low-Impact Solutions*
- *Our core values closely align with other stake holders wanting to focus on minimising the environmental impacts of their projects, this means we already have the basis for successful collaborations to move those projects forward.*

Guiding Principals & Ethics

The principles that guide Eco-InnovationZ business model is based on the following:

- *Deep respect - for both people and environment.*
- *Integrity - to ensure our actions help and not harm.*
- *Opportunity - to expand and innovate leaving footsteps for generations to follow.*
- *Sustainability - of partnerships and of methods of operation.*

Corporate Values

The corporate values governing the RMA Foundation's development are based on a forest legacy created by Ross MacArthur 40 years ago. We are fulfilling his legacy and taking a leadership role in creating the next generation of forest management and as such our operations will be very public and open to scrutiny.

At all times we will;

- *We will maintain transparency and accountability as a core value of the organisation.*
- *We will conduct ourselves with honesty, integrity and professionalism.*
- *We will invest in & nurture people; they are the foundation and lifeblood of our company.*
- *Safety is a prerequisite for our work.*
- *Environmental integrity must be maintained in everything we do.*
- *Returns to our shareholders, the environment and the community we work in, are an investment in all of our futures.*
- *Jointly and severally we are all responsible for our success.*
- *Collectively we are change, and will have fun doing it. It is with these binding values we will maintain the support and goodwill of the community, our partners, associated stakeholders, our customers and our employee's.*

Eco-InnovationZ

eco-Nomic Construction Ltd
trading as Eco-InnovationZ

Darryn Newman
P: 021 141 7315
E: skyline@eco-innovationz.co.nz