BUSINESS CASE

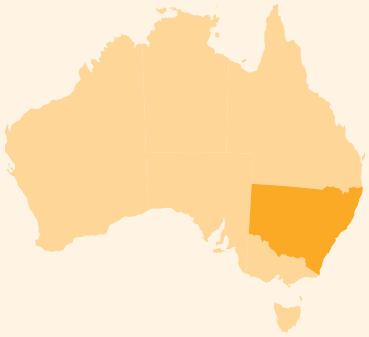
Options for Water Telemetry

Andy and Fiona McLeod run Coombah Station, a mixed sheep and cattle property located half way between Wentworth and Broken Hill, New South Wales. Recently they have moved to harvesting goats, as another source of income.

The McLeod's are integrating technology into their farming practices and are exploring opportunities to create efficiencies on Coombah Station. All water points are physically checked across the 80,000ha of Coombah Station. However, this is an arduous task that takes approximately 18 hours per week to ensure stock have a secure water supply.

BESTPRAC

Figure 1: Smart Water telemetry system.



BUSINESS SNAPSHOT

OWNERS
Andy and Fiona McLeod

PROPERTY NAME
Coombah Station

PROPERTY LOCATION
125km south of Broken Hill, NSW

SIZE OF PROPERTY
80,900 hectares

BRIEF ENTERPRISE DESCRIPTION
Sheep enterprise (3,000 Merinos, 1,000 Dorpers), harvesting feral goats and opportunistic cropping.

NUMBER OF PEOPLE WORKING IN THE BUSINESS
3 full time equivalents

AVERAGE ANNUAL RAINFALL
225mm

WHY THIS IS A PASTORAL ZONE INNOVATION
Frequently checking water is essential in the pastoral zone but water runs are time consuming. Water telemetry reduces labour and operating costs of checking multiple water points over large distances.

The harsh conditions of Coombah Station, where temperatures around 50°C are not uncommon, mean that water checks are vital for stock health and survival. The McLeod's are seeking to implement water telemetry infrastructure to secure this water supply, and save time and costs. It will also increase the safety of workers on their property by limiting water runs required.

The business case 'Options for Water Telemetry' discusses water telemetry to help understand the options available. It has been developed as a real example of a formal review and implementation process. This business case aims to provide useful information and tools to help you make a decision for your own business.

Just like the McLeod's, you can use the method shown here to help prepare your own business case and assess this innovation on your own property.

Section 1: Water Telemetry on Coombah Station

WHAT'S THE CURRENT SITUATION?

Andy and Fiona McLeod run Coombah Station, 125km south of Broken Hill in NSW. The property runs approximately 3,000 Merinos.

A wet year in the northern reaches of the Darling River system results in the lakes on Coombah Station filling up with water running down the Anabranch River. Following a flood event, the McLeod's look to use the soil moisture and apply for a licence to crop the lake beds. This is approximately a 'one in ten year' opportunistic event.

Andy and Fiona have being running Coombah Station for over 30 years, largely for breeding sheep. A recent enterprise review has led to an increased focus on harvesting feral goats. Whilst they don't run goats, by harvesting them from the property the business now receives more than 50% of its income from feral goats.

Stock water is a constant issue. In warm conditions, when temperatures can reach 50°C the stock have less than 24 hours before they are in serious trouble without water. A breakdown or problem can be noticed at other watering points when there's not enough pressure or no pressure at all, but this can take time to pick up. This often involves back-tracking and manipulating the taps to find the problem.

While temporary water can be moved quickly or stock shifted towards available water, the larger problems can take up to 48 hours to repair. In addition to the time spent, the McLeod's pay for their water and any water lost from leaks is an additional cost to the business.

Figure 2: Coombah Station.

WHAT IS THE OPPORTUNITY?

The current issue that the McLeods are looking to address is the time required to undertake a water run of all property waters.

The current water run:

Distance: 220km

Time required: 6 hours per run, 3 times per week

Water points: Approximately 25 tanks to check, which distribute water to more than 30 troughs

The team currently spends approximately 18 hours per week on the water run. Under the Modern Pastoral Award (2010), 1 full time equivalent (FTE) works 38 hours per week. The time to complete the water run each week equates to approximately 0.5 FTE; which means half a person's time is spent checking water points. The water runs are undertaken in all conditions, regardless of the weather or other things happening on the station.

The McLeod's are looking to reduce the risks associated with this task. Travelling long distances on undulating surfaces, limited mobile phone reception and fatigue management are all Work Place Health and Safety risks that need to be managed.

Checking water consumes a lot of time, as well as fuel and vehicle repair and maintenance. The McLeod's are seeking an efficient approach to reduce the time spent checking water, while ensuring water security for livestock. They are also looking for an early warning system for water issues. This will enable them to quickly identify and manage any issues.

The opportunity the McLeod's are exploring is the impact of water telemetry on their business – financially and otherwise. This business case will explore these benefits and also discuss the water telemetry options available.

WHAT IS THE VISION?

The McLeod's aim to implement a water telemetry system that achieves the following:

- Ensures efficient use of time
- Reduces costs such as labour, fuel and vehicle repair and maintenance
- Increases safety by not having to drive long distances for water runs
- Ensures water security for livestock
- Reduces water leaks that can become a major cost to the business
- Reduces worry in warmer weather

The water telemetry infrastructure will hopefully mean less stress and worry for Andy and Fiona. They believe it will help them to feel more in control. They will have the ability to go away from the property for short periods without water worries, particularly during warmer weather.

When they have a caretaker for the property for longer periods of time, Andy and Fiona will know they can check the water situation remotely.

The change will mean they can be proactive and responsive to water issues with information at hand. At present, they are reacting to issues while on a water run.

The McLeod's currently use a tablet for other aspects of the business, including emails and weather. They are keen to increase the use of this technology and see how water telemetry can be integrated into this.

WHAT IS WATER TELEMETRY?

Water telemetry is the wireless transfer of data that enables the water tanks, pumps, pipelines and bores to be remotely monitored and managed. Through various sensors, information such as flow rate, pressure, and tank levels are captured and relayed to a home base (or other locations depending on the set-up).

The interval between data recordings depends on the system, as does the way the information is displayed. It can come as a stand-alone package with its own screen, or offer smart phone applications and in-car devices to monitor water levels.

Automatic responses can be set-up and warning systems can be activated to signal any water security issues.

There are various levels of infrastructure available. The suitability of different options depends on what technology can work on a given property. Factors to consider include mobile phone reception, UHF signals, or if there is a line-of-sight between tanks.

OUTLINE OF THE OPTIONS

This business case assesses three options for water telemetry. The options vary in price and functionality, and these are identified below.

Tim Stockman, of Stockman Telemetry Systems based in Burra, South Australia, has provided technical insights within this business case. Please note that these are a sample of the systems available and only indicative of what the market has to offer. There may be other options available. For the purpose of this business case, these three options have been chosen for comparison.

Table 1: Three water telemetry options available.

Option	Description	Details
1	Maintain current situation; continue with physically checking waters	Undertaking 3 water runs per week with no water telemetry options installed.
2	Smart Water system	The cheapest system, which has limitations in its performance, however is low-cost and can be installed yourself.
3	Custom built system	A custom built system, specifically designed for the purpose and property.
4	Observant System	The top of the range water telemetry option with many extras included. This system can either be installed yourself, or by a professional.

It's important to note that water telemetry options are not a full replacement for a water run, or an indicator of sheep health. It's a tool to reduce water runs, to increase efficiency and to increase awareness of water levels. Andy estimates he will still go on a water run approximately once a week, or once every 10 days in cooler weather. There are other tasks that typically occur on a water run that can't be undertaken with water telemetry. These include cleaning troughs and visually checking on the health of the stock and feed.

The actual decrease in water runs following installation of a water telemetry system depends on the management decisions of the business. It will also change as you become more confident in the equipment and understand how it works.

On Coombah Station there is a mobile phone tower near the homestead that services approximately two thirds of the property with 3G service. While this means there is internet available, there are also reliability issues if and when the tower goes out. This year it has gone out periodically for approximately 3-5 days at a time.

Figure 3: Smart Water telemetry system.

WHAT ARE THE LIKELY BENEFITS OF EACH OPTION?

Table 2 below shows the benefits of each system to help you consider whether each of the benefits is important to your business. Where there is a blank space, the system does not allow for that option. Other areas to consider include implications to Workplace Health and Safety (WHS), labour, time requirements, and how easy the innovation will be to implement.

Table 2: The benefits of each system are listed below.

Benefits	Option 1: Maintain Current Situation	Option 2: Smart Water System	Option 3: Made for Purpose	Option 4: Observant System
No additional capital costs	•			
No change to system	•			
Purchase product 'off the shelf'	N/A	•		•
Customised for specific telemetry applications	N/A		•	•
Optional self installation	N/A	•		Yes, can be complex so professional assistance will ensure it is set up correctly
Decreases labour requirements and number of water runs	N/A	•	•	•
Best suited to systems with shorter distances between the tank and home base	N/A	•		
Suited to a long-range system as the signals can travel further	N/A		•	•
Can be used for an unlimited number of tanks	N/A		•	•
Uses universal bandwidth, so that it can operate overseas	N/A	•		
The computer can be remotely accessed??	N/A		•	•
Has its own information display unit	N/A	•		
Operates from a PC with no internet	N/A		•	
Operates with internet, where available	N/A		•	
Operates only where internet is available	N/A			•
Only ongoing costs are repairs and maintenance. Businesses are not required to pay for access to the data through an annual subscription	N/A	•	•	
Direct access to water telemetry data via PC	N/A		•	•
Information uploaded to webserver on 'the cloud'	N/A			•
Integrates the internet and smart phones through apps	N/A			•
Sends email and text alerts	N/A			•
System can collect an intensive level of data including: • Photos • Livestock ear tag information • Collects data on how often animals drink	N/A			•

WHAT ELSE IS THERE TO CONSIDER?

For all systems, the required repairs and maintenance are similar and include:

- General inspection to make sure the system isn't damaged; this can take place during a typical water run,
- Keep solar panels clean, and
- Battery to be replaced every 3-5 years.

Further features of all water telemetry systems include:

- Work Health and Safety is improved by reducing the risks associated with regular water runs to remote areas of the property.
- Information is displayed on graphs.
- A different labour skill set is required with the change in system.
- Water runs are reduced, however, not eliminated and the water systems still require maintenance.
- The ability to plan water runs, based on information from the system.
- The impact of breakdowns is reduced, and can be quickly identified watching the information on the home base.
- Proactive repairs can be made, ensuring the right equipment and tools are on hand to fix the issue.
- Due to the time available, regular maintenance can be conducted when it should be done, instead of when time permits and being reactive to issues.

The efficiencies are not only a saving of time and resources, but the ability to reallocate time saved to undertake other tasks.

The observant system has a lot of features that may not be required or accessible if you are located in an area of limited internet. This means the high capital costs and ongoing subscription for data may not be necessary.

One add-on feature that water telemetry can be used for is photos, which is offered in this instance only by the Observant System. Enabling this feature is possible yet expensive. Tim advises to consider carefully if this is necessary. A photo will show a static image of a water tank but not indicate the level, or show a windmill without an indication that it is turning. Water telemetry equipment shows the water fluctuation levels of the tank to indicate both pieces of information.

One query Tim often receives is for clients wanting to monitor troughs. While it may be possible, it isn't practical. It's unlikely to be economically viable to manage every trough, however if the tanks are managed, then the troughs are a natural flow-on from the tanks.

Furthermore, depending on how the system is set up, you don't have to monitor every tank. Tanks can be set-up in systems where water flows from one tank to the next. Tim suggests assessing which tank best indicates the water levels for the whole system and to monitor that tank as an indicator.

Tim recommends assessing individual properties for the best system. This includes knowing the:

- Distances between the home base and tanks,
- Terrain and topography of the property,
- Vegetation type and density,
- Number of tanks to be monitored through the system,
- Amount of information required,
- How the information is best displayed for you, and
- The level of technology to be incorporated, eg. a PC, internet, smart phones.

Once these aspects are known, the strength of the signal can be assessed and the right system can be selected for the property. There is no 'one size fits all' that will suit all properties and businesses.

Figure 4: Smart Water telemetry system.

Section 2: How to use a business case to assess the 'Options for water telemetry'

AIM OF THE BUSINESS CASE

A business case is a practical process to assess investment options; whether it is a new practice or a piece of machinery. This business case aims to assess water telemetry systems which will achieve the McLeod's business objectives.

Section 1 detailed the McLeod's background and why they are considering shifting to water telemetry. The following section will show how a business case can be used to formally assess the costs, risks and other considerations involved when making an important business decision.

WHAT ARE THE COSTS?

Assessing the costs of water telemetry is an important step in determining the return on investment. It's important to understand how long it will take to pay off the capital costs of water telemetry infrastructure. This section assesses these factors in two separate ways, through a development budget and a cost: benefit assessment.

Blank templates for you to assess the costs on your own property are in Section 3.

Assumptions

Assumptions included in the current water run are as follows:

- The vehicle costs are 75c per kilometre.
    - This is based on the Australian Tax Office's method of calculating vehicle cost. This is for a vehicle with an engine over 2.6L of capacity. This is one of four methods the Australian Tax Office describes.
    - If you know the cost of operating your vehicle, use your own figures for increased accuracy of results.
- The average distance of a water run at Coombah Station is 220km.
- Andy costs his time at $50/hour and other employees at $30/hour. For the purposes of this assessment, we have based the calculations on $30/hour.

Table 4: Undertaking the water run on Coombah Station in the current situation.

Option 1: Maintain current situation				
Item		Cost per trip	Cost per week	Cost per year
Hours per week	18 hrs @ $ 30/hr	$180.00	$540.00	$28,080.00
Average water run distance	220km x 75c/km	$165.00	$495.00	$25,740.00
TOTAL:		$345.00	$1,035.00	$53,820.00

Water Telemetry Options

Assuming with telemetry, Coombah Station will undertake one water run per week instead of three trips, the physical cost is $345 (from table 4) x 52 weeks = **$17,940**

Total savings per year = $53,820 - $17,940 = $35,880

Assumptions included in the water telemetry options are as follows:

- Repairs and maintenance of the systems is set at a nominal amount of $500 per year.
- The prices are indicative; they are the best known prices at the time of publishing and are subject to change.
- These figures are based on a 4-tank system; there are many variables on offer, however these figures are for a comparable situation.

Table 5: The cost of each water telemetry option.

	Option 1: Maintain current situation	Option 2: Smart Water System	Option 3: Custom Built System	Option 4: Observant System
Capital Costs				
Base			$1,500	$2,634
4 tank system		$1,000	$10,000	$16,170
5 relay antennas		$875		
Dipole antenna at the house		$220		
Annual Ongoing Costs				
Repairs and maintenance		$500	$500	$500
Cost of water run	$53,820	$17,940	$17,940	$17,940
Ongoing fee				$600
Total	**$53,820**	**$20,535**	**$29,940**	**$37,844**

Development Budget

A development budget is a tool that can be used when a new project or capital expense is being planned for a business. Development budgeting is used to evaluate whether investing in long-lived assets, such as water telemetry, is worthwhile and should be accepted or rejected.

It is designed to highlight the break-even period on the initial investment. Net Present Value is an important feature in calculating this break-even point as this discounts future dollars so we are comparing apples with apples.

Because money has a time value, it is not valid to directly compare cash flows which take place at different times. To properly evaluate an investment, its cash flow must be converted to its equivalent at a common point in time. The present is where we are concerned, so this is why we convert the money to Net Present Value (NPV).

Further information is available in Section 3 where you can complete this table for your own assessment. Table 6 shows an example of the development budget for Option 4: Observant System.

Assumptions that have included in this calculation are as follows:

- Depreciation is 10% of total capital cost.
- The desired rate of return is 16%. This takes into account a risk free rate plus a margin for risk plus the risk involved in the type of business. This is a variable number that can change.

Table 6: Development budget for Option 4: Observant System.

Option 4 – Observant System					
		Year			
	0	**1**	**2**	**3**	**4**
Capital Cost					
Base	$2,634.00				
4 tank system	$16,170.00				
	$18,804.00				
Operating Income *Value of costs foregone (3 water runs/week)*					
Hours		$28,080.00	$28,080.00	$28,080.00	$28,080.00
Vehicle		$25,740.00	$25,740.00	$25,740.00	$25,740.00
Total Income		$53,820.00	$53,820.00	$53,820.00	$53,820.00
Operating Expenses *Cost of one water run per week*					
Hours		$9,360.00	$9,360.00	$9,360.00	$9,360.00
Vehicle		$8,580.00	$8,580.00	$8,580.00	$8,580.00
Depreciation		$1,880.40	$1,880.40	$1,880.40	$1,880.40
Ongoing		$600.00	$600.00	$600.00	$600.00
Total Operating Costs		$20,420.40	$20,420.40	$20,420.40	$20,420.40
Operating Surplus	-$18,804	$33,400.60	$33,400.60	$33,400.60	$33,400.60
Desired Rate of return	16%				
NPV Factor		0.862	0.743	0.641	0.552
Net Present Value		$28,793	$24,821	$21,398	$18,446
Cash Flow	-$18,804	$9,989	$34,810	$56,208	$74,654

This assessment indicates that the capital investment of water telemetry was covered and paid for within the first year of purchase and operation.

Cost Benefit Assessment

A cost benefit assessment is another way to assess the investment in capital. The cost of ownership is compared to the benefits. In this case, the benefits are the costs saved from two water runs per week. This return is shown as a ratio;

- A ratio of less than 1 indicates caution against the investment, and
- A ratio of more than 1 indicates an attractive investment.

Assumptions made for the cost benefit analysis are as follows:

- Lifespan of the equipment/system is at least 15 years, based on expert opinion.
- The end value is assessed as zero.
- Depreciation is the change in value divided by the period of ownership.
- Interest is 5% of the purchase cost, and can be changed to your figure to increase the accuracy of the results.

Figure 7: Cost benefit assessment for Option 4: Observant System.

A: Cost of Ownership		
Purchase cost	$19,464.00	
End value	$0	
Period of ownership	15	years
Change in value	-$19,464.00	
Item	**Costs**	
Depreciation	$1,297.60	per year
Interest	$973.20	5%
Labour	$9,360.00	per year
Vehicle	$8,580.00	per year
(cost of one trip)		
Access fee to data	$600.00	per year
Total Cost	**$21,310.80**	

B: Benefits	
Hours	$28,080.00
Vehicle	$25,740.00
(cost of 3 trips)	
Total Benefit	**$53,820.00**

C: Benefit:Cost	
Cost	$21,310.80
Benefit	$53,820.00
Benefit:Cost	**2.53**

This assessment indicates that the investment has a cost: benefit ratio of over 2, indicating a smart investment based on the financial figures.

ASSESSMENT OF THE RESULTS

The Smart Water System has the lowest entry price. It can be installed by the landholder and it's easily understood. The distance between tanks and the house base has to be considered. The system has a limit of 4 tanks, so further units are required for more than 4 tanks.

Coombah Station has more than 4 tanks and will require multiple units that will increase complexity of monitoring. The distances between the tanks and home base will require multiple relay antennas. The options for Coombah Station are that they monitor the 4 tanks close to the house with this system and find another solution for the remaining tanks, or they purchase multiple systems.

The custom built system and the Observant system have a higher capital cost. They have almost limitless (~99) points that can be measured, and have a number of functionalities available for remote observation and management of the system.

For Coombah Station, either of these systems may be applicable. It depends on the availability and functionality of the 3G network. It also depends if the McLeod's will use the extra features of the Observant system, or if a custom built system will be more applicable.

WHAT ARE THE LIKELY RISKS?

When considering implementing a new practice into your business, it is important to consider the potential risks of doing so. For this business case, a number of risks and strategies for managing these risks have been identified. The impact of the risks can be mitigated if management approaches are implemented to protect the business.

Table 8: The risks associated with water telemetry.

What is the risk?	How can this risk be managed?
Failure of the system	• Regular repairs and maintenance checks of the equipment. • Understand the options and alerts that can be activated. These include alarms, warnings, low battery indicators, and alerts that sensors are not recording. • Get to know how the graphed information shows 'live' what is happening at the tanks and troughs. You can quickly interpret what may be happening. For example, the natural up and down of a graph may show when stock are drinking and the troughs are refilling. • Test the equipment to see the response of the graphs and to check the warning systems. • Implement a back-up procedure to activate when there is a breakdown.
Not purchasing and installing the right system for the purpose	• Undertake research of water telemetry systems available. • Understand what you need from a water telemetry system. • Understand the conditions of your property to apply the right system for your property.
Not understanding the system	• Research the system. • Ask questions of the dealership or installer. • Consider purchasing a training session or support package (e.g. 3 months) to assist in the transition. • Test the equipment to see the response of the graphs and to check the warning systems. • Understand water runs are reduced, not eliminated. Water telemetry is not a full replacement of a water run; it's a tool to reduce unnecessary water runs.
High investment for low return	• Know the cost of your current water run; this includes wages (even if wages aren't paid in an owner-manager situation), fuel, and other running costs of the vehicle. • Consider the cost of a water telemetry system, as well as the non-financial benefits. • Make an assessment on this information, to know the costs and benefits.
Building trust in the system	• Undertake a transition period; gradually adjust your water run frequency. • Trial scenarios of low water situations and assess the response of the system. • Compare the physical information with the computer information.

FURTHER INFORMATION

For more information, please contact:

- Tim Stockman, Stockman Telemetry Systems, Burra South Australia
- Australian Tax Office, for vehicle operating methods: http://www.ato.gov.au/Business/Deductions-for-business/Motor-vehicle-expenses/Calculating-your-deduction/

Section 3: How can you make the change?

Section 3 provides all of the tools necessary to work through a business case process to assess a change. You can assess the option of water telemetry on your own property by completing the templates below.

HOW TO ASSESS YOUR CURRENT SITUATION

To assess the impact of water telemetry on your business first understand the cost of water runs at present. Then a comparison can be made.

You need to know:

- How long a water run takes,
- How many water runs are undertaken per week,
- What rate do you value your or your employees time at (we have used $30/hour),
- The average distance covered in a water run, and
- The cost of running your vehicle (we have used 75c/km).

1. Enter this information into column 2 below, and calculate the cost per trip (column 3).
2. Calculate the total cost of a trip at the end of column 3.
3. You can either continue to cost the time and distance costs individually across the table to assess both aspects, or you can use the bottom line only to assess the total costs.
4. This process can also be used when assessing the impact of reducing the number of water runs.

Option 1: Maintain current situation						
Item	Your Situation	Cost per trip		Cost per week		Cost per year
Hours per water run	hours x $ /hr =	$	x trips/week =	$	x 52 weeks =	$
Average water run distance	hours x $ /hr =		x trips/week =		x 52 weeks =	
TOTAL:	hours x $ /hr =		x trips/week =		x 52 weeks =	

WHAT ARE THE OPTIONS?

Identify three feasible options for you to move forward. One option can be to stay as you are and make no change. You can therefore compare your current situation with other options.

Option	Description
1	Maintain the current situation
2	
3	

WHAT ARE THE BENEFITS?

Benefits can be measurable, such as income and wool yield; or non-measurable, such as safety and achievement of business goals. Assess the benefits you see for you and your property in the table below for each of the options.

Option 1:	Option 2:	Option 3:

WHAT ARE THE LIKELY COSTS?

Use the blank templates to work through the process to assess the costs for your business.

Insert the cost of the options; this may take some research for the up to date costs and specific devices and set-ups applicable to your situation.

	Option 1: Maintain current situation	Option 2:	Option 3:	Option 4:
Capital Costs				
Annual Ongoing Costs Repairs and maintenance Cost of water run Ongoing fee				
Total				

Development Budget

A development budget is a tool that can be used when a new project or capital expense is being planned for a business. Development budgeting is used to evaluate whether investing in long-lived assets, such as water telemetry, is worthwhile and should be accepted or rejected.

It is designed to highlight the break-even period on the initial investment. Net Present Value is an important feature in calculating this break-even point as this discounts future dollars so we are comparing apples with apples.

Because money has a time value, it is not valid to directly compare cash flows which take place at different times. To properly evaluate an investment, its cash flow must be converted to its equivalent at a common point in time. The present is where we are concerned, so this is where we convert the money to Net Present Value (NPV).

- By multiplying the operating surplus by the NPV Factor, you are calculating the Net Present Value (NPV) of that money.
- The NPV can be used to calculate cash flow and break-even point for the project
- The process of finding the present value of a sum of money received or paid in the future is known as discounting and the opposite is known as compounding.

Accept or Reject?

• If the NPV is greater than or equal to zero after your desired time period, an investment should be accepted. If it is negative it should be rejected.

Calculating: **Net Present Value = Future value X Net Present Value Factor**

Put your own figures into the development budget template provided to assess the financial impact of investing in water telemetry.

Development Budget Template

Year	0	1	2	3	4	5	6	7	8	9	10
Total Capital Cost											
Operating Income											
Value of costs forgone, rather than actual income											
Hours											
Vehicle											
(the cost of all water runs in a year)											
Total Income											
Operating Expenses											
Hours											
Vehicle											
(the cost of reduced water runs following installation of water telementary)											
Depreciation											
(10% of capital cost)											
Ongoing costs											
Total Operating Costs											
Operating Surplus											
Desired Rate of return	**16%**										
NPV Factor		0.862	0.743	0.641	0.552	0.476	0.410	0.354	0.305	0.263	0.227
Net Present Value											
Cash Flow											

Cost Benefit Analysis

The cost benefit analysis assesses the ration between the cost and the benefit of the investment.

1. The cost of ownership in A and the benefits in B are calculated.
2. Then they are compared in C to come up with a ratio
3. A ratio of less than 1 indicates caution against the investment
4. A ratio of more than 1 indicates as ideal investment

A: Cost of Ownership		
Purchase cost	$	
End value	$0	Assumed $0
Period of ownership	15	years
Change in value	-$	
Item	**Costs**	
Depreciation *(change in value/ period of ownership)*	$	per year
Interest	$	5% interest rate assumed
Repairs and maintenance	$	per year
Labour	$	per year
Vehicle	$	per year
Ongoing cost	$	per year
A: Total Cost =	**$**	

B: Benefits	
Hours	$
Vehicle	$
B: Total Benefit	$

C: Benefit:Cost	
A: Cost	
B: Benefit	
C: Benefit:Cost = B / A	

WHAT ARE THE LIKELY RISKS?

When considering implementing a new practice into your enterprise or business, it is important to consider the potential risks. The impact of the risks can be mitigated if management approaches are identified and implemented to protect the business.

Identify the risks of your chosen option/s (you may need to adapt the table if assessing more than one option). Consider management strategies to control these risks.

1. What can you do to reduce the risk?
2. How can the risk be mitigated?

What is the risk?	How can this risk be managed?

WHAT ELSE IS THERE TO CONSIDER?

When making a decision, the cost of implementation isn't the only thing to consider. To undertake a robust comparison, other areas are identified. Other areas to consider include implications to Workplace Health and Safety (WHS), labour, time requirements, and how easy the innovation will be to implement.

1. Identify different aspects for your property.
2. Assess the impact on your property against the options. Identify how each option can be implemented, the impact on your business and property, and how you can address each aspect.

What to consider?	Option 1:	Option 2:	Option 3:

CONTRIBUTORS

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