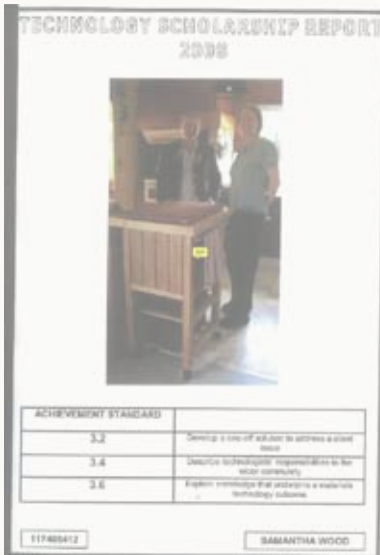
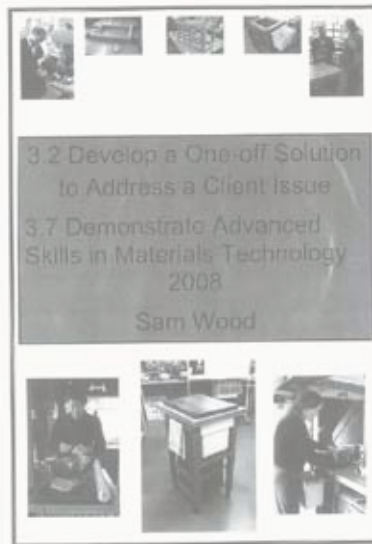
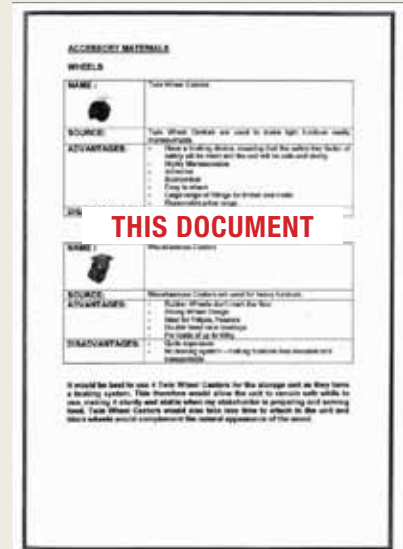


SCHOLARSHIP REPORT
 (comprehensively annotated)


www.techlink.org.nz/student-showcase/Scholarship/Sam-Wood/Sam-Wood-schol-report.pdf

PORTFOLIO: 1/2
 (two annotations)


www.techlink.org.nz/student-showcase/Scholarship/Sam-Wood/Sam-Wood-portfolio-1.pdf

PORTFOLIO: 2/2
 (no annotations)


www.techlink.org.nz/student-showcase/Scholarship/Sam-Wood/Sam-Wood-portfolio-2.pdf

TECHLINK SCHOLARSHIP EXEMPLARS
EXEMPLAR DESCRIPTION

This Scholarship Exemplar presents a student's portfolio of evidence which was submitted for Technology Scholarship Examination.

The exemplar has been annotated with 'call outs' that highlight the evidence presented by the student and 'Commentary on Evidence' boxes.

These annotations show where:

- student evidence was presented that exemplifies scholarship expectations
- opportunity existed for additional evidence to be presented

The intent of this exemplar is to assist teachers and students to develop an understanding of the nature of the evidence required for award of the Technology Scholarship standard.

Other Techlink Scholarship Exemplars can be found at: www.techlink.org.nz/student-showcase/index-scholarship.htm

In 2008 Samantha Wood was awarded a New Zealand Scholarship in Technology for her work on the project Butcher's Block.

Butcher's Block is a Technology unit that focused on the development of a preparation and food storage unit for a client with limited space in their kitchen and a desire to minimise her impact on the Earth's environment. The student consulted a variety of practising technologists to inform her own practise.


In this reflective report and supporting evidence, this student has demonstrated synthesis and integration of technological experiences in bringing together knowledge, skills, ideas and methods to allow the successful technological outcome (butcher's block) to be placed in its intended environment. There is evidence of elegance in their technological practice and the final outcome.


This student has justified how the technological practice was undertaken and how the outcome meets her clients needs by that meets all the specifications.

She has critically reflected on the information, understandings and practices of practising technologists from a range of contexts and how this was used to inform her own practice when developing the outcome for her client.

ACCESSORY MATERIALS




WHEELS

NAME : 	Twin Wheel Castors
SOURCE:	Twin Wheel Castors are used to make light furniture easily manoeuvrable.
ADVANTAGES:	<ul style="list-style-type: none">- Have a braking device, meaning that the safety key factor of safety will be met and the unit will be safe and sturdy- Highly Manoeuvrable- Attractive- Economical- Easy to attach- Large range of fittings for timber and metal- Reasonable price range
DISADVANTAGES:	<ul style="list-style-type: none">- Can only handle loads of up to 50kg

NAME : 	Miscellaneous Castors
SOURCE:	Miscellaneous Castors are used for heavy furniture.
ADVANTAGES:	<ul style="list-style-type: none">- Rubber Wheels don't mark the floor- Strong Wheel Design- Ideal for fridges, freezers- Double head race bearings- For loads of up to 90kg
DISADVANTAGES:	<ul style="list-style-type: none">- Quite expensive- No braking system – making furniture less movable and transportable


It would be best to use 4 Twin Wheel Castors for the storage unit as they have a braking system. This therefore would allow the unit to remain safe while in use, making it sturdy and stable when my stakeholder is preparing and serving food. Twin Wheel Castors would also take less time to attach to the unit and black wheels would complement the natural appearance of the wood.


DRAWERS

NAME : 	Wicker Baskets
SOURCE:	Hand-woven baskets come in a range of different colours (dark brown, brown and natural)
ADVANTAGES:	<ul style="list-style-type: none"> - Easily Accessible - Comes in a range of colours - Free standing - Accommodate a variety of storage needs - Come in three different sizes - Not too expensive or hard to source
DISADVANTAGES:	<ul style="list-style-type: none"> - Have no lid so the possessions could be seen and fall out easily
NAME : 	20 Litre Capacity Waste Bin
SOURCE:	Used for waste management in the kitchen environment
ADVANTAGES:	<ul style="list-style-type: none"> - Easily Accessible - Hygienic - Lid to block out smell from the compost - Range of colours
DISADVANTAGES:	<ul style="list-style-type: none"> - Because of its height, it would not fit in the allocated space on the unit - Hard to attach to the unit
NAME : 	2 x 18 Litre Capacity Waste Bin
SOURCE:	Used for waste management in the kitchen environment
ADVANTAGES:	<ul style="list-style-type: none"> - Easily Accessible (Pull out drawer) - Hygienic - Lid to block out smells - Two compartments - Easy to attach (screw on)
DISADVANTAGES:	<ul style="list-style-type: none"> - Waste will have to be emptied out on a regular basis as bins hold less capacity

The 2x18 Litre Capacity Waste Bin would be the best option for the waste as it can be easily inserted into the allocated space, allowing it to sit flush and slide out. It would be long lasting, hygienic and solve my stakeholder's composting issue as it has two different compartments. However, the Wicker Baskets can also be on the lower shelving, and can be used for my stakeholder to store her kitchen utensils, making the area not so cluttered.

TEA TOWEL RAILS

NAME : 	Aluminium Tea Towel Rail
SOURCE:	Used to hang and dry tea towels
ADVANTAGES:	<ul style="list-style-type: none">- Easily Accessible- Non - corrosive- Very easy to attach (screw on)- Come in different lengths- Can fit into small spaces- Range of colours- Come in plastic or aluminium- Suitable price range
DISADVANTAGES:	<ul style="list-style-type: none">- Will only be able to hold up to two tea towels at a time

NAME : 	Gate Rail
SOURCE:	Used to hang and dry tea towels
ADVANTAGES:	<ul style="list-style-type: none">- Non - corrosive- Easy to attach (screw on)- Provides space to hang more than two tea towels- Come in different lengths
DISADVANTAGES:	<ul style="list-style-type: none">- Quite large, so may not fit into the allocated space- Expensive- Come in only one colour (chrome)- Difficult to access

It would be best to use an Aluminium Tea Towel Rail for the unit as they are sturdy and strong. This would also allow the tea towels to dry out and be easily accessible. This towel rail would take less time to attach to the unit as it can be screwed on with ease.

FEEDBACK FROM STAKEHOLDER FROM DESIGN DEVELOPMENT

I have discussed the design development with my stakeholder who has made the following comments:

1. Definitely use Recycled Rimu, as the colour fits in well with the kitchen environment and recycled wood will not deplete the earth's resources.
2. Something needs to be added to the shelf at the base, so that it will be a more efficient storage space and things will not fall off it when moving the unit around the kitchen area.
3. If possible, add containers to the storage space as this will allow easier access to utensils used daily and the food that is stored

All the original Key Factors are still relevant, but I have now included the following:

1. Use sustainable wood that is recycled and environmentally friendly, but easy to clean and maintain.
2. Consider making the shelf on the base of the unit enclosed, to stop objects falling off when transporting/moving the unit around the environment.
3. Add flexible storage compartments for utensils, as this will allow my stakeholder easy access to the equipment that she uses daily.

JUSTIFICATION OF CHANGES

I have made three changes to my original butcher's block design following discussion with my primary stakeholder. All three changes are sensible, and do not impact adversely on the overall design concept. For example, sustainability was introduced as a new key factor because of the concerns both my stakeholder and I have around the depletion of New Zealand's forests. We have therefore agreed to use recycled timber as the main material. Closing in the bottom shelf will help my stakeholder to store objects with ease and prevent them from falling off the unit when she moves the outcome around the chosen area. However, I will also look at other options for solving this problem, as the structure will look less appealing if it is too closed in. Finally, I can see how my stakeholder needs a flexible, adaptable storage system so she can easily store her utensils and change things around to meet her requirements over time.

RE-DEFINED BRIEF

The Brief has been re-defined incorporating the new ideas and changes required by my stakeholders after the second interview.
(See Justification of Changes under Feedback from Stakeholder).

THE ISSUE:

My primary stakeholder has extremely limited storage space and bench space in her kitchen area. This means that she finds it difficult to find the space to prepare and serve food. Also, the area is always untidy as my stakeholder does not have enough storage facilities to hold and put away all of her kitchen utensils.

AIM:

To produce a food preparation and storage unit that will solve my primary stakeholder's issues. It needs to incorporate both bench and storage space, be easily accessible, transportable and blend in with the simple country rustic style house where the unit will be installed.

RE-DEFINED SPECIFICATIONS IN ORDER OF PRIORITY

- (1) The unit must incorporate bench and storage space, as well as cater for the disposal of kitchen waste (both recycling and compost).
- (2) A free-standing rectangular butcher's block type unit (52.5 mm by 46 mm dimensions) that is the same height as the existing bench (97.4 mm), with the storage space underneath being easily accessible.
- (3) The unit needs to be stable, non-hazardous (OSH compliant) and visually attractive as its usual location will be beside the entrance to the kitchen area.
- (4) The budget must not exceed \$400.
- (5) Environmentally friendly materials – sustainable, recycled wood preferred as the main material.
- (6) All materials must be non-corrosive as the environment where it will be principally located (kitchen) gets damp easily.
- (7) Undereath storage shelving with more than one compartment to store kitchen utensils and other items. Also need to ensure items do not fall off this shelving (consider closing in).
- (8) The unit needs to be easily transportable, so cannot be too wide or long as this would prevent easy manoeuvrability.
- (9) A plain, simple design is preferred to fit in with the Rustic Country style of the home (cannot be too modern).
- (10) A handrail could be attached for tea towels.

PLANNING AND PRODUCT DEVELOPMENT

ONGOING EVALUATION AND SUBSEQUENT MODIFICATION

THE BRIEF

To produce a food preparation and storage unit that will solve my primary stakeholder's issues. It needs to incorporate both bench and storage space, be easily accessible, transportable and blend in with the simple country rustic style house where the unit will be installed.

SPECIFICATIONS

- (1) The new unit should incorporate both bench and storage space, as well as cater for the disposal of kitchen waste.
- (2) The budget is a little flexible at this stage, but should aim no more than \$400
- (3) A butchers block type unit that is free standing, of the same height as the existing bench, and with storage space that is easily accessible
- (4) All materials must be non – corrosive as the chosen environment gets damp easily.
- (5) The unit needs to be stable, non-hazardous and visually attractive its usual location will be beside the entrance to the kitchen area.
- (6) A plain, simple design is preferred. To fit in with the Rustic Country style of the home (cannot be too modern).
- (7) The unit needs to be easily transportable, so cannot be too wide or long as this would prevent easy transportability around the kitchen environment.

IMMEDIATE PROJECT ACCOMPLISHMENT POINTS

- Identified a problem and issue
- First Interviews completed
- Conceptual statement and brief prepared
- Key Factor Identification
- Broader Factors Identified
- Existing product research
- Product Attributes determined
- Conceptual Drawings completed and evaluated
- 3-D Models constructed
- Design Development Research carried out
- Design Development progressed through to identification of preferred base structure

EVALUTATION OF PROGRESS

TIME MANAGEMENT

My time management has been efficient throughout Term 1 because I have been focused and worked steadily throughout the term and achieved most checkpoints on time. I have also kept my portfolio work up to date and organised. The evidence for this is shown in my workbook. An alternative explanations is that by keeping my work up to date, I am able to easily plan ahead of time which makes it easier to decide what I need to complete by certain dates. I am able to see clearly the tasks that have both been completed and are outstanding. I think the most likely explanation is that my time management skills have been good because of focus on planning ahead and using my Plan of Action to help with this task. Some strategies I could use to ensure my time continues to be well managed is to write up my Plan of Action at the start of each week, to develop a clear picture of what has to be done. Also, by completing given work on time I will make sure that I stay up to date and organised and ready for the next checkpoint.

INTERACTION WITH STAKEHOLDER

Interaction with my stakeholder has been average in Term 1. One explanation is that it has been relatively hard for me to contact my stakeholder, because she lives 90 minutes out of Auckland. She is also awaiting the birth of her first child, so is quite busy. The evidence for this is shown in my stakeholder interviews as I would have liked to have both completed and analysed two interviews with my primary stakeholder by the end of term. This would have furthered my design development and understanding of the outcome that she wants and requirements. One strategy that I could put into play to ensure this does not continue would be to get in touch with my primary stakeholder via email or a brief phone call on a weekly basis and ask her questions about certain aspects of the outcome to clarify my design development. I could also talk to her about what stage I am up to. By having these regular conversations with my primary stakeholder, I would make sure that the outcome I am producing will meet my stakeholder's needs and expectations.

THE INTERACTION BETWEEN KEY FACTORS THAT HAVE INFORMED MY DECISION MAKING

ECONOMIC AND MATERIALS KEY FACTORS

The Budget requirements and Materials Key Factors have greatly influenced my decisions during design development. There are several reasons for this. The primary reason is that the outcome will be placed in an environment that can get damp so the materials must be non-corrosive.

Also, my stakeholder has a maximum budget that cannot be exceeded, so testing and trialing different materials is crucial. By testing the materials I will be able to get a clear idea of what materials would be the best for the chosen environment while taking my stakeholder's preferences into account. Testing and trialing before purchase ensure that the required budget is met and not gone exceeded.

A further reason why my decisions on materials and budget are so important is that to meet the key factor of fitting in with the chosen environment the materials that the outcome is made of will have to complement the style of the home – in this case, a rustic, country style. This means that I will have to budget carefully and shop around for materials that will suit this particular style, so that the outcome will blend in with my stakeholder's environment.

So now I have come to understand why these two key factors have such a huge impact on the decisions I am making when designing and producing the outcome for my stakeholder.

ENVIRONMENTAL AND LEGAL KEY FACTOR

The two key factors of environmental friendliness and legal constraints have also impacted, and influenced my decisions in producing the final design for consideration by my stakeholder. The chief reason for this is that my stakeholder is environmentally aware and responsible, so she wants the outcome to be made out of environmentally friendly and sustainable products. At the same time I will have to make sure that the products used are natural and the colours fit in the environment as the outcome is going to be positioned in quite a central place in my stakeholder's home. Also, products like varnishes and stains will have to be non-toxic to meet OSH standards. For the same OSH reason, I must also make sure there are no sharp edges or hazardous accessories incorporated in the outcome. The products used to construct the outcome must also be long-lasting and durable so the outcome can continue to be used well into the future.

FINAL BRIEF

This Final Brief has been produced following further discussion with and feedback from my primary stakeholder prior to completing the final design. It incorporates all identified changes required as a result of feedback from my stakeholders.

THE ISSUE:

My primary stakeholder has extremely limited storage and bench space in her kitchen area. This means that she finds it difficult to find the space to prepare and serve food. Also, the area is always untidy as my stakeholder does not have enough storage facilities to hold and put away all of her kitchen utensils.

AIM:

To produce a food preparation and storage unit that will solve my primary stakeholder's issues. It needs to incorporate both bench and storage space, be easily accessible, transportable and blend in with the simple country, rustic style home where the unit will be installed.

Through ongoing consultation with the two principal stakeholders and trialling designs and materials to meet the key factors identified, the final specifications have changed and also have been reprioritised as follows:

FINAL SPECIFICATIONS

- (1) The unit must incorporate both bench and storage space, as well as cater for the disposal of kitchen waste (recycling and compost).
- (2) A free-standing butcher's block type unit that is no wider than and is also at the same height as the existing bench (974 mm), with accessible storage space underneath.
- (3) The unit needs to be stable, non-hazardous (OSH compliant) and visually attractive as its usual location will be beside the entrance to the kitchen.
- (4) The budget must not exceed \$400.
- (5) Environmentally friendly materials – sustainable, recycled rimu to be used as the main material, with a non-toxic finish to bring out the grain of the wood.
- (6) All materials must be non-corrosive as the environment where it will be principally located (kitchen) gets damp easily.
- (7) Underneath storage shelving, with more than one compartment to store kitchen utensils and other items. Including cane baskets for storage means the shelves can remain open and accessible.
- (8) The unit needs to be easily transportable, so wheels with a braking system have been included for both manoeuvrability and safety.
- (9) A plain, simple design is preferred to fit in with the Rustic Country style home (cannot be too modern).
- (10) A handrail will be attached underneath the top of the butcher's block for tea towels.
- (11) An extra chopping board will be made, smaller than the top of the butcher's block but still large enough for preparing and serving food.

REPRIORITISATION OF KEY FACTORS

	KEY FACTOR	JUSTIFICATION OF REPRIORITISATION
1.	The unit must incorporate both bench and storage space, as well as cater for the disposal of kitchen waste (recycling and compost).	This remains as the most important key factor as the main issues for my stakeholder are lack of bench and storage space.
2.	A free-standing butcher's block type unit that is no wider than and is also at the same height as the existing bench (97.4 mm) with accessible storage space underneath.	The priority for this key factor has also not changed as it is obviously important that the outcome fits into the environment in terms of size and height.
3.	The unit needs to be stable, non-hazardous (OSH compliant) and visually attractive as its usual location will be beside the entrance to the kitchen.	As my stakeholder now has a young baby, the need for safety for her family and visitors is crucial.
4.	The budget must not exceed \$400.	For affordability reasons, it remains very important that I do not blow the maximum budget.
5.	Environmentally friendly materials – sustainable, recycled rimu to be used as the main material, with a non-toxic finish to bring out the grain of the wood.	This new key factor was added in after the initial briefing. Following further consultation with my stakeholder it became clear that the use of environmentally friendly materials and practises were major priorities for her.
6.	All materials must be non-corrosive as the environment where it will be principally located (kitchen) gets damp easily.	The environment chosen for the outcome can get damp; especially in winter, so although this factor has declined in order of priority, it still requires consideration when choosing materials and accessories.
7.	Underneath storage shelving, with more than one compartment to store kitchen utensils and other items. Including cane baskets for storage means the shelves can remain open and accessible.	This is an aspect of the design that is important to solve the main storage issue noted as top priority. Shelving underneath also solves the accessibility.
8.	The unit needs to be easily transportable, so wheels with a braking system have been included for both manoeuvrability and safety.	Although a lower priority, transportability of the unit would be an added advantage for my stakeholder, provided this can be delivered safely.
9.	A plain, simple design is preferred to fit in with the Rustic Country style home (cannot be too modern).	This is a preference because a plain, simple design would complement the existing fixtures in the rustic, country, style home.
10.	A handrail will be attached underneath the top of the butcher's block for tea towels.	A handrail for tea towels is not essential, but would be a much appreciated accessory as there is currently nowhere to hang tea towels
11.	An extra chopping board will be made, smaller than the top of the butcher's block, but still large enough for preparing and serving food.	The addition of an extra chopping board is a "nice to have" as it means the board can easily be taken to the sink for cleaning. It is the last priority because it could be purchased separately at any time.

JUSTIFICATION OF REPRIORITISATION

I have reprioritised the key factors following several discussions with both my primary stakeholder and her mother to gauge what is most important to Libby. I have also added in some new key factors as a result of these discussions as the design development has been evolved and been shared with my stakeholder.

My primary stakeholder's main issue is still that she has a shortage of food preparation and shortage of space in her kitchen, so this remains as the first priority. The next three factors (structure type and size; safety features; and budget) also remain in their original order of priority, as all of these requirements must be met if I am to adequately solve my stakeholder's current issues.

The fifth priority is new. As I got to know my stakeholder better it became clear that responsible environmental practices are very important to her, and she is already an avid supporter of recycling and composting. She specifically requested that I should try to source and use materials that were environmentally friendly, and I agree with this sentiment. Hence, the use of recycled wood (in this case, rimu) has become a high priority.

The next four priorities (6, 7, 8 and 9) were specified in the first list of key factors and all remain important if they can be achieved without compromising those factors that are higher priority. For example, transportability would be an added advantage for my stakeholder provided it is also safe. It would mean the unit could also be transported to other places around the home, which would extend its use.

Priorities 10 and 11 are also new key factors. They are both accessories that would be useful to my stakeholder but are not essential to solve the original bench and storage space issues. I will look to deliver these accessories provided the main outcome is completed in time.

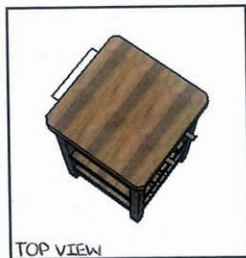
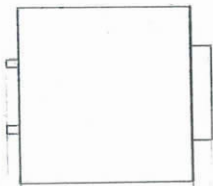
CONSTRUCTION BRIEF

I am going to construct a preparation and storage unit for my stakeholder, Libby Ashton. The dimensions and final specifications for production of this unit are:

- ◆ **Main Material** – Recycled Rimu
- ◆ **Finishes** – Teak Oil for the main unit and Vegetable Oil for areas where food will be placed
- ◆ **Height of Unit** – 97.4 mm
- ◆ **Width of Unit** – 46.0 mm (bench width) by 52.5 mm (to allow the fridge door to open)
- ◆ **Joints** – Mitre, Butt and Domino Joints
- ◆ **Glues** – Aliphatic Wood Glue (natural and non-toxic)
- ◆ **Storage Bins** – Hafele Storage Bins (2x18 Litres), for compost and recyclables
- ◆ **Wicker Baskets** – One Large and Two Small - for extra storage purposes (to be supplied by stakeholder)
- ◆ **Paneled Sides** – Three of the sides to be paneled with vertical slats made of recycled rimu to fit in with the existing environment
- ◆ **Aluminum Rail** – For hanging and drying Tea Towels
- ◆ **Separate Chopping Board** – 40mm by 46mm
- ◆ **Castors** – Inclusion of Lockable Wheel Castors so the unit will be transportable and safe.



FINAL DESIGN



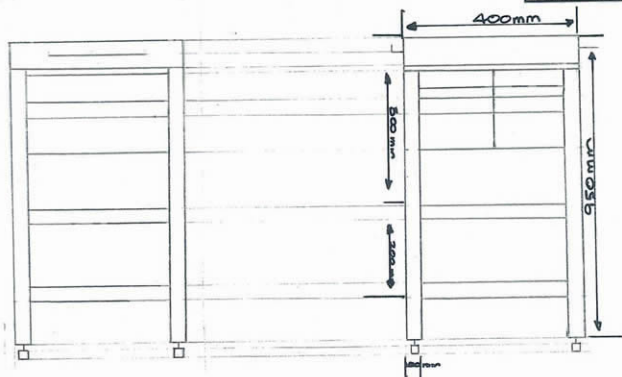
TOP VIEW



FRONT VIEW



BACK VIEW



SIDE VIEW

PROTOTYPE CONSTRUCTION









STAKEHOLDER PERMISSION TO PROCEED: DESIGN

This prototype of the proposed butcher's block preparation and storage unit provided my stakeholder with a 3-D real life idea of what the structure would look like when it was completed.

By constructing this prototype I could clearly explain and show my stakeholder certain aspects of the design and techniques that I proposed to use when constructing the final outcome. I could also actually test out whether certain ideas would work, both technically and practically for my stakeholder, and change or add to the design as required. For example, I tested the mitre joints for the border around the top of the butcher's block. Also, a prototype can help during the construction phase, as it allows you to see quite easily which parts go where and also assists the technologist to work out and plan how to join all of the parts together.

Having discussed the prototype of the design with my primary stakeholder and justifying to her the reasons for the different parts, joints and accessories, as well as taking her through my plan of production, I have been given permission to proceed with the production of the butcher's block (preparation and storage) unit.

CUTTING LIST

MATERIAL USED	QUANTITY	TOTAL COST
Recycled Rimu 	15m @ \$10 per metre	\$150
Hafele Waste Bins (2x18 Litres) 	1 x \$160	\$160
Twin Wheel Castors 	Castors = \$8.61 Castors/Brakes = \$10.96 Castor Sockets = \$3.69	\$23.26
Aluminium Tea Towel Rail 	1x \$21.53	\$21.53
Teak Oil 	1 litre = \$54.90 ½ litre = \$27.45	\$27.45
Domino Joins 	42 x 41¢	\$17.22
OVERALL COST		\$399.46

STAKEHOLDER PERMISSION TO PROCEED: COSTS

Having agreed on the Final Design that meets the Key Factors identified by my stakeholders, I then sourced the materials required to construct the storage unit. A cutting list, which sets out the materials to be used, the quantity required and the total cost of each item was then prepared for consideration by my stakeholder, who will be paying for these items.

I also discussed the cutting list with my secondary stakeholder (Mrs Ashton), explaining the reasons for recommending the use of each item. My stakeholder has agreed to the costs as set out in the cutting list, so I can now move to the production phase of the unit in accordance with the design already approved by my primary stakeholder.

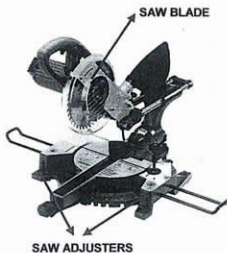
MACHINERY FUNCTIONS AND IMPORTANT CODES OF PRACTICE

MITRE SAW

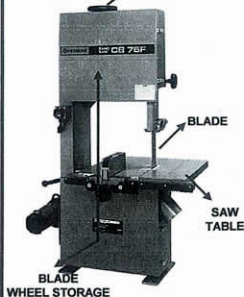
- Used for the precision cutting of angles and square ends.
- Can be turned to make angled cuts at 45°.

Safety of the Mitre Saw

- (1) Check that the guard is working correctly
- (2) Use the vice at the base of the saw to hold your work
- (3) Ensure the tilt adjustments are tight
- (4) Never cross hands when operating the saw
- (5) Always use the correct saw blade
- (6) Wear safety goggles and earmuffs when operating the saw



BLADE TENSION
ADJUSTER



BANDSAW

- Used for fine sawing.
- It has a continuous band of metal with teeth on the edge of it.
- Various thickness of the blade and different sets of teeth mean that small curves can be sawn too.
- Good general purpose machine

Safety of the Bandsaw

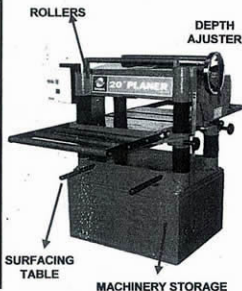
- (1) Wear appropriate safety equipment
- (2) Always ensure that the blade is properly tensioned and that the blade guide and rear thrust wheel are positioned properly
- (3) Never force the work. The blade should be sharp enough to do the cutting; Guide the wood

BUZZER (PLANER)

- Used for accurate, flat planing of the wood's surface to make it smooth

Safety of the Buzzer/Planer

- (1) The wood must be at least as long as the distance between the rollers – never plane wood lengths small than this
- (2) Always use the guard supplied
- (3) Wear appropriate safety equipment



THICKNESSER

- Used for planing the width and thickness of a piece of wood
- Essential for joining planks of wood together
- Makes sure the wood planks are even

Safety of the Thicknesser

- (1) Never make adjustments without turning off the power
- (2) Inspect the machine before you switch it on (check dial/guage adjuster)
- (3) Feed only one piece of wood board through the machine at a time
- (4) Never try to plane off too much material in one pass – put the piece of wood through again
- (5) Always wear appropriate safety equipment

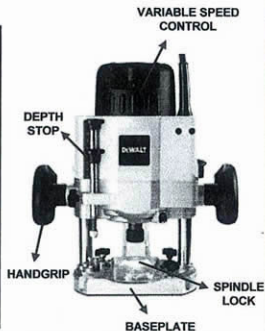


POWER ROUTER

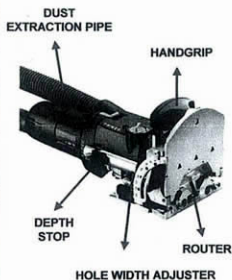
- Used for grooving
- Fitted with a cutter that can be adjusted to different levels
- Produces a professional appearance on wood

Safety of the Router

- (1) Advance the router steadily and lightly into the wood
- (2) Always operate a router with both hands
- (3) Withdraw the router cutter after every operation
- (4) Unplug the router before changing a cutter
- (5) Never start the router when the cutter is in contact with the wood
- (6) Use safety glasses, earmuffs and a dustmask



FESTOOL DOMINO JOINER



- Used for cutting and joining materials together
- Patented Mortising Technique
- Adjustable Mortise Sizing allows flawless and easy joinery

Safety of the Domino Joiner

- (1) Use safety glasses and earmuffs
- (2) Always operate a domino joiner with both hands
- (3) Advance the joiner steadily and lightly into the wood
- (4) Unplug the domino joiner before changing a cutter
- (5) Never start the domino joiner when the cutter is in contact with the wood

FLOWCHART OF PRODUCTION

- (1) Located Recycled Rimu using the internet site, Trademe

LENGTH	DIMENSIONS	COST PER METRE	TOTAL COST
15m	100mm x 20mm	\$10	\$150
TOTAL OVERALL COST			\$150

- (2) Wood Arrived – 16th June. It was de-nailed and a light finish.



- (4) Some edges of the Recycled Rimu were uneven, as they had been taken from an old demolished house, so they had to be put through the buzzer (planer) to ensure straight right angles.

Because we did not have access to a buzzer at school, I had to get the wood buzzed offsite at a place called Seawood Marine. This company had the right machinery to perform this task properly.

- (3) Cut the wood to the pre-measured required lengths using the compound mitre saw.

COMPOUND MITRE SAW

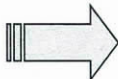


Cuts angles and square ends;
Can be turned to make angle cuts;
Can turn at a 45 degrees angle;
Used for cutting joints (mitre);
Easy to use and not time consuming

Always check that the safety guard is working correctly;
Use the vice at the base of the saw to hold your work;
Ensure the tilt adjustments are tight;
Never 'cross hands' when operating the saw;
Always use the correct saw blade
Always wear earmuffs when using the saw

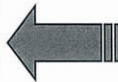
(5) **Thickness the wood** using the thicknesser machine.

I used the thicknesser because the Recycled Rimu was saw cut, so it had a rough surface. The thicknesser make the wood surface smooth and even. When joining the wood planks together this will ensure that they are even and flat.



(7) **Sanded down** the frame and top of the butchers block using both the Oval Sander and the Flat Sander.

By firstly using the Oval Sander to sand down the six sides of joined wood, this ensured that any bumps were removed and the surfaces of the six sides were even. I then used the Flat Sander to get the surfaces of the planks smooth and level with each other.



(9) **Sanded down** the frame and top of the butchers block by hand. However, I changed the grit of the sand paper often to a lower grit so that I was able to get a smooth finish.



(6) **Joined the wood planks together** to form the base of the butchers block:

- Legs = 4 (L/W = 930 by 60; Thickness = 40)
- Top side rails = 2 (L/W = 348 by 60; Thickness = 20)
- Top = 5 planks (L/W = 460 by 525; Thickness = 50)
- Top Sides 2 (L/W = 407 by 60; Thickness = 40)

Joined the 5 planks of wood together using wood glue and then clamped the joined wood while the glue was setting. This ensured that the wood would stay flat and level and wouldn't buckle.

Clamp for keeping wood flat and level



Wood Planks being joined together

Clamps holding the wood

I used the Festool Domino Joiner to join the parts of the butchers block frame together. However, I did not use wood glue on the frame at this stage as I had to make sure that every part of the frame fitted nicely together.



(8) I then measured and cut out the two shelves sides and slats for the bottom of the butchers block.

Domino Joined them and glued them together and positioned them on the frame, for a dry run to see if there was any adjustments or changes I needed to make to ensure that every part would fit together.



- (10) The different parts of the butchers blocks were glued together so that the domino joints locked together to form the frame of the butchers block.

I had to place bar clamps at each of the joints on the frame while the glue was drying as this made sure that the frame would be sturdy and also stopped the frame distorting its self.

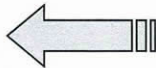
Next I attached the three wooden sides to the top shelf of the butchers block where the waste bins were going to be positioned.



- (11) I cut four mitre joints for the frame that will be affixed around four sides of the top of the butchers block.

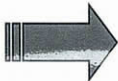
The frame was attached to the sides of the top using wood glue and stainless steel screws. The screw holes were then filled with wood putty.

I added a frame around the top of butchers block, as without it, the design looked top heavy and unbalanced.



- (12) I then attached the waste bin frame into the allocated space using screws.

After attaching the bins, I then fastened the lid/top of the butchers block onto the frame.



- (13) Then using Teak Oil, I oiled the outside and inside of the chest. The oil was applied using a cheese cloth and steel wool. Any excess was wiped off. The chest was left to dry in a clean, dust free environment



- (14) The **Twin Wheel Castors** purchased to attach to the bottom of the four legs of the butchers block.

Because the Twin Wheel Castors would make the height of the butchers block higher when attached to the legs, making it not level with the existing bench. I had to cut them down using the table saw so that the butchers block when positioned in my stakeholder environment would be level with the existing bench.



- (16) I then bought **Wicker Baskets** for the two bottom shelves of the butchers block.

I added the 3 Wicker Baskets into the design to make it easier for my stakeholder to store her kitchen utensils and also to free up her environment and make it less cluttered.



- (15) The **Tea Towel Rail** was screwed underneath the lid of the butchers block.

The butcher block then was given a final oil to bring out the grain of the wood.



- (17) **FINAL PRODUCT**



3RD INTERVIEW: PRIMARY STAKEHOLDER

(LIBBY ASHTON)

This interview, held during the construction phase of the butcher's block storage unit, is on the disc. The following two pages summarise the main points that are discussed in the video-recorded interview with my primary stakeholder.

1. STORAGE

My stakeholder felt that the storage additions to the butcher's block design will go a long way toward addressing the shortage of space and storage in the kitchen.

Recycling Bins

- Having two bins clearly meets the environmental key factors of recycling and composting, with separate storage space for compost, recycling products and rubbish;
- The drawer bin will make recycling easy for my stakeholders;
- The bins I have used can also be easily taken out and cleaned – hygienic factor.

Underneath Storage

- Stakeholder wants different options available – separate compartments for utensils and some food items;
- Upper shelf for utensils and the lower shelf for vegetables and fruit;
- My stakeholder already has three cane baskets that she would like to use to place on the shelves as she knows this style fits in with the environment. Using these baskets also means the lower shelves will not need to be closed in and I will not need to request my stakeholder's permission to exceed the agreed maximum budget of \$400.
- This underneath storage incorporated in the design will allow for more order in the kitchen environment, making it less cluttered and messy.

2. WHEELS

The stakeholder agrees that the addition of wheels on the legs of the butcher's block will allow for flexibility around the kitchen and also means she will be able to move it to other places around the home environment (e.g. for an outside BBQ).

- The built in functionality of the unit means that my stakeholder will be able to use it for different things – preparing food as well as serving, and both in the kitchen and outdoors;
- The unit must be secure and stable to make sure it is not hazardous to people working in and around the environment, as well as for visitors;
- The wheels need to have a braking system included on them, for both safety of wider community stakeholder's like Atariki and ease of use reasons.

3. SIDES OF BUTCHER'S BLOCK

To add an aesthetic appeal and make the unit fit into the home, vertical wooden slats will be added around the three sides of the recycling bins.

- My stakeholder would prefer the bins to be hidden from view on three side, but with gaps between the planks of wood instead of the sides being fully covered in as this will allow ventilation and be more hygienic.

4. TOP OF BUTCHER'S BLOCK

Because my stakeholder does not want undue wear to the top of butcher's block, she would like me to include a separate chopping board to sit on top.

- Adding in a second chopping board will make the butcher's block system more hygienic;
- The chopping board should not be as thick as the top of the butcher's block;
- The stakeholder would like the chopping board to be smaller than the top but large enough for food preparation;
- Would not like the board to be too large as otherwise it will be hard for the stakeholder to wash and clean.

5. EDGING AROUND THE TOP OF THE BUTCHER'S BLOCK

The stakeholder has a range of different options that she can choose for the edging around the top (I can use the router to create this effect).

- Consistent with her preference for a non-decorative outcome, my stakeholder has indicated that she would like the top edge of the butcher's block to be simply rounded off;
- A curved sanded edge means that the top will not be hazardous;
- I will use the rounding over-cutter to create a simple routed edge on the extra chopping board only

6. TEA TOWEL RAIL

My stakeholder's tea towels are not drying out properly as she does not have a suitable place to hang them, so I have incorporated a tea towel rail in the design

- Adding a tea towel rail, was approved by my stakeholder, as it will fix the problem of the tea towels not drying out properly;
- My stakeholder would agree with my suggestion that the rail be positioned underneath the top of the butcher's block, so it is not hazardous for people walking past.

7. FINISH




A finish on the final outcome will help protect the wood and also add to the longevity of the product.

- I will have to research different options for the finish, as it has to be non-toxic and also fit into the chosen environment;
- The finish needs to bring out the grain of the wood

ANALYSIS OF PRIMARY STAKEHOLDER INTERVIEW **(LIBBY ASHTON)**



- For the underneath storage space, the stakeholder wants separate compartments to cater for utensils and food;
- The unit must be secure and stable and not hazardous to people working in and around the environment;
- The wheels need to have a braking system for both safety and useability purposes;
- The top half of the storage system should be covered in on three sides with wooden slats positioned vertically with small gaps between each plank of wood to allow for ventilation;
- An extra chopping board is required, which must be smaller than the top of the butcher's block but still large enough to prepare and serve food on;
- The tea towel rail should be attached underneath the top of the butcher's block;
- A finish that is non-toxic and light coloured to bring out the grain of the wood is required.



TABLE OF RESOURCES AND CODES OF PRACTICE



RESOURCE NAME	PROPERTIES OF RESOURCE	HOW THE PROPERTIES RELATE TO THE KEY FACTORS / FINAL SOLUTION	HOW THE RESOURCE HAS BEEN USED; JUSTIFICATION FOR USING THE RESOURCE	APPLICABLE CODES OF PRACTICE THAT ARE IN KEEPING WITH USING THE RESOURCE
FINISH				
<p>INTERIOR PAINT STAIN</p> 	<p>Interesting effects; Disguises the grain; Broken Finish; Can allow some hint of timber to show through</p>	<p>A paint finish relates to the key factors as it can bring out the natural effects on the wood. Paint could be used to protect the wood but can still allow some timber to show through. Frequent re-painting is usually required if the structure is outdoors.</p>		
<p>BRIWAX TEAK OIL</p> 	<p>Gives a beautiful, rich finish; Enhances the grain; Most easily repaired/reapplied of all wood finishes</p>	<p>Applying oil to my unit would relate best to my stakeholder's key factors. Oiling would create a hard surface and would also allow the natural grain of the Recycled Rimu to show through.</p> <p>The application of oil would relate well to my stakeholder's requirement incorporate colours that blend well into the existing kitchen environment</p>	<p>I used the Briwax Teak Oil for the finish on the butcher's block as it suits the Recycled Rimu and brings out the natural finish of the wood, making it blend into the chosen environment better.</p>	<p>Apply the oil with tack or cheese cloth; Make sure the surface is wiped down so that it is clear from dust and other fine particles; Rub the oil over the timber surface using even strokes; Make sure the tack cloth has a reasonable amount of oil on it, while not being dripping wet.</p>
<p>RESENE AQUA CLEAR VARNISH</p> 	<p>Creates a fairly hard and resistant surface; Available in different glosses; Can be water or solvent based; Protects the wood</p>	<p>The properties of varnish do not really relate to the stakeholder's key factors. Even though varnish is one of the most easily repaired wood finishes, because the structure will be placed in an environment that gets regular sunlight, this will cause the varnish to fade quickly, meaning on-going maintenance and re-varnishing will be required.</p>		

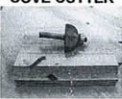
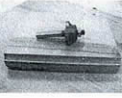

RESOURCE NAME	PROPERTIES OF RESOURCE	HOW THE PROPERTIES RELATE TO THE KEY FACTORS / FINAL SOLUTION	HOW THE RESOURCE HAS BEEN USED; JUSTIFICATION FOR USING THE RESOURCE	APPLICABLE CODES OF PRACTICE THAT ARE IN KEEPING WITH USING THE RESOURCE
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NAILS / SCREWS

<p>STAINLESS STEEL SCREWS</p> 	<p>The chromium content prevents corrosion; Sharp; Long Lasting; When comes into contact with water it does not rust; Tough</p>	<p>Stainless Steel screws relate well to the key factors because they do not corrode when they come into contact with water. This is essential because the unit will come into contact with liquid and may also be transported outside. These screws are also preferable as they are long lasting.</p>	<p>This type of screw was used to join the waste bins to my unit because they can withstand dampness, while galvanised nails cannot. Stainless Steel screws are also long lasting, strong and sharp so they can screw easily into timber.</p>	<p>Drill the hole into the wood then screw each screw into the timber; Make sure all loose hair is tied back so it doesn't get in the way; Screw in straight, not on an angle.</p>
<p>GALVANISED NAILS</p> 	<p>Can ruin the timber because black rust can come off the top of the nail heads; The zinc coating on the nail disappears quickly when exposed to weather; These nails can react with the wood if it is not treated, leaving a rust stain</p>	<p>The properties of galvanised nails do not relate well to the key factors. Galvanised nails are not good for products that are taken outdoors as their zinc coating disappears when exposed to weather. The nail will then start to corrode and leave a rust stain on the wood. Eventually the structure will prise apart.</p>		

RESOURCE NAME	PROPERTIES OF RESOURCE	HOW THE PROPERTIES RELATE TO THE KEY FACTORS / FINAL SOLUTION	HOW THE RESOURCE HAS BEEN USED; JUSTIFICATION FOR USING THE RESOURCE	APPLICABLE CODES OF PRACTICE THAT ARE IN KEEPING WITH USING THE RESOURCE
MACHINERY - SAWS				
BANDSAW 	Continuous band of metal with teeth leaning on the edge; Various thicknesses of blades and different sets of teeth; Quite small curves can be sawn; Extremely good general purpose machine	The Bandsaw properties do not relate to a significant degree with the key factors as there are no curves incorporated in my design. Even though this machine is a good general purpose machine, I need to use a specialised machine that can cut angles.	This machinery was only used sparingly to trim the individual pieces of wood to ensure they were of consistent length. It is a good general purpose saw for these sorts of tasks.	Wear appropriate safety equipment; Always ensure that the blade is properly tensioned and that the blade guide and rear thrust wheel are positioned properly; Never force the work. The blade should be sharp enough to do the cutting; Guide the wood
COMPOUND MITRE SAW 	Cuts angles and square ends; Can be turned to make angle cuts; Can turn at a 45 degree angle; Used for cutting joints (mitre); Easy to use and not time consuming	The properties of the Compound Mitre Saw would fit with the key factors incorporated in my final design. I need to cut my bits of wood in 45 degree angles so that they all fit together to make a rectangular shape. The Compound Mitre Saw can do this for me very efficiently.	I used the Compound Mitre Saw to cut out the pieces of wood for my structure. Because the Compound Mitre Saw cuts 45 degree angles quickly this helped with my time management so that I could get on with other tasks. Also, the saw was good for cutting joints like mitre joints, so I could use it to join the pieces of my unit together.	Always check that the safety guard is working correctly; Use the vice at the base of the saw to hold your work; Ensure the tilt adjustments are tight; Never 'cross hands' when operating the saw; Always use the correct saw blade Always wear earmuffs when using the saw
CROSSCUT SAW	Can cut solid timber; Teeth are sharpened at an angle so the saw has a knife-cutting edge; Has more teeth than other saws; Takes more time to cut wood than a machine saw	It would take considerably more time using the Crosscut Saw to cut up my pieces of wood because a hand saw is slower than a machine saw. Even though it is easier to get a more accurate cut using a hand saw it is a far less efficient process.		

RESOURCE NAME	PROPERTIES OF RESOURCE	HOW THE PROPERTIES RELATE TO THE KEY FACTORS / FINAL SOLUTION	HOW THE RESOURCE HAS BEEN USED; JUSTIFICATION FOR USING THE RESOURCE	APPLICABLE CODES OF PRACTICE THAT ARE IN KEEPING WITH USING THE RESOURCE
MACHINERY - DRILLS				
PEDESTAL DRILL 	Heavy duty machine; Good for accurate and repetitive drilling; Adjustable table to accommodate different sizes of timber; Depth gauge can be used to measure the hole depth	The Pedestal Drill properties relate well as I need to use a drill that will make an accurate drill hole in my structure. The depth gauge would also be helpful to ensure that all the holes drilled are the same depth so the screws will not slip through to the other side of the piece of wood.	I used the Pedestal Drill to drill the holes for the four castors as they needed to be a specific depth, as well as the same depth as each other. This drill would also be good for drilling holes on different timber sizes as I could adjust the table to accommodate them. By using this drill I would get a clean and accurate hole.	Always wear safety glasses; Tightly secure the work; Do not wear loose clothing; Keep hands well away from drill bits; Tie back long hair securely; Always select the correct drill speed; Never use a tool for a job for which it was not designed; Make sure you use sharp drill bits; Never force the tool - let the bit slide into the work; Wear earmuffs when operating the drill.
HAND DRILL	Simplest type of drilling tool; Several types of drill bits can be used; Can perform different functions when using different drill bits	The properties of the Hand Drill do not really meet my requirements. One positive for the Hand Drill is that it has quite a few drilling bits; this would be useful if I needed to make some holes bigger than others. A negative is that a hand drill is not as accurate and is slower than using a machine drill.		
BATTERY OPERATED DRILL 	Different types of battery operated drills; Performs many different tasks; Different speeds available; Light weight and Heavy - Duty	The Battery Operated Drill relates very well to my final solution because I need to attach screws the top to the main structure. This drill is good for drilling accurately sized holes for screws and it can go different speeds for harder tasks.	I used the Battery Operated Drill to drill the holes I needed for the four screws as this ensured all holes were the same depth.	

RESOURCE NAME	PROPERTIES OF RESOURCE	HOW THE PROPERTIES RELATE TO THE KEY FACTORS / FINAL SOLUTION	HOW THE RESOURCE HAS BEEN USED; JUSTIFICATION FOR USING THE RESOURCE	APPLICABLE CODES OF PRACTICE THAT ARE IN KEEPING WITH USING THE RESOURCE
<u>ROUTER CUTTERS</u>				
<p>COVE CUTTER</p> 	<p>Can be used for decorative uses; Gives a scalloped edge cut; Comes in a range of different styles;</p>	<p>A decorative cutter is not required for my final solution as my stakeholder has specifically requested a plain design.</p>		
<p>BEADING CUTTER</p> 	<p>Cuts two small shoulders on the edge of the timber; One of the most common cutters used;</p>	<p>The beading cutter would create a simple but effective edge along the edge of the timber which is not needed for my final solution. Nevertheless, the beading cutter is one of the most common cutters used and easy to resource.</p>		
<p>ROUNDING OVER-CUTTER</p> 	<p>Gives a simple routed edge; Reduces the risk of damage along the edge of the timber; Can create a decorative edge along the timber.</p>	<p>The properties of the rounding over - cutter relate well to the key factors as it can reduce the damage along the edge of the timber. Also, the cutter can give a quite simple decorative edge along the timber. This relates well as my stakeholders' would prefer a simple outcome rather than an over-detailed or decorative one.</p>	<p>I used the rounding over-cutter to groove the extra chopping board I made to sit on top of the butcher's block. This gave the cutting board a simple, but effective edge. This type of edge cutter also has a ball bearing race, preventing burns in the wood, so I did not have to start again</p>	<p>Advance the router steadily into the work, using light pressure only; Always operate the router with both hands; Always unplug the router before changing cutters or fitting accessories; Use sharp cutters; Secure the work well; Never start the router when the cutter is in contact with the work;</p>

INSTALLATION OF THE OUTCOME IN CHOSEN ENVIRONMENT



EVALUATION OF INSTALLATION:

I have solved all of my stakeholders' principal issues by adopting a design and using materials which are compatible with both all key factors and the environment into which the outcome was required to be installed. The shape of the butcher's block unit and grain and colour of the wood blends well with the house. Using recycled rimu also recognises the importance of sustainability of New Zealand's forests. The outcome also satisfies the OSH regulations as it is stable and well constructed with routed edges and smooth surfaces.

Ongoing maintenance of the butcher's block requires oiling of the top and chopping board to ensure they stay smooth and retain their shine.

One weakness identified was sourcing the right sized containers for the storage of utensils and vegetables on the bottom shelves. Although the containers sourced in consultation with my stakeholders allow flexibility, they have no lids, meaning they can still be visible to visitor's eyes, and their storage may not be as hygienic as it would be with a closed storage option.

Overall, both my primary stakeholder and secondary stakeholders are extremely pleased with the final outcome. The butcher's block preparation and storage unit has certainly solved the clutter problem and lack of bench space in Libby's kitchen environment!

FINAL OUTCOME



COMMUNICATION WITH STAKEHOLDERS:

Having solved the initial contact problems with my primary stakeholder, I communicated frequently with all of my stakeholders to ensure the design would meet the key issues as well as any later issues identified during the design process. Changes and additions were only introduced following consultation with my primary stakeholder. This was important to ensure that the end product not only solved all of the key issues, but would also be a useful, practical addition to my stakeholders' environment.

Communication with wider community stakeholders also helped to inform my practice. For example, views expressed by Libby's wider family group caused me to critically reflect and sometimes change some design aspects.

BUDGETING:

I used careful cost planning and looked at alternative materials that I could use during construction to reduce the cost. For example, I carried out research into different wood types, storage bins and wheels. I also confirmed with my primary stakeholder that the overall budgeted cost was acceptable before proceeding to the production phase. Any changes that were made during the design process that affected the overall cost were also verified with my stakeholders.

My stakeholder specified a maximum budget of \$400 and the finished outcome came in at a total cost of \$399.46. I therefore achieved this objective (thanks to my stakeholder providing the three wicker baskets herself).

COMMUNICATION WITH OTHER TECHNOLOGISTS:

One aspect that worked well for me was the access I had to other technologists, especially those in my own field, particularly Simon Coughlan and Martin Bell from Rose and Heather Furniture Makers and Jonathan Symons. They were able to question my design decisions and make suggestions to improve my process, which assisted my overall performance and improved the quality of the final outcome. For example, Simon Coughlan spoke to me about the joints that would be required to cater for expansion if the wood gets wet.

CHALLENGES ENCOUNTERED DURING CONSTRUCTION:

Whenever I encountered a problem during the construction process, I brainstormed different solutions, both with my direct stakeholders and people in the wider community. For example, before the addition of the slats to the sides of the unit, the butcher's block looked unbalanced and the two rubbish storage bins were too visible. I discussed this with my advisers at school and also brainstormed different solutions with my stakeholders on how I could make the unit look balanced and hide the bins. My primary stakeholder then came up with the idea of adding slats to three sides of the unit, which we all agreed was the best solution. Another challenge I encountered was that there was no thicknesser at our school. I solved this problem by calling an outside resource and arranging to use their equipment.

