

2015

The modern midden: visualising waste through information design

Joanna Stirling
University of Wollongong

Follow this and additional works at: <https://ro.uow.edu.au/theses>

University of Wollongong

Copyright Warning

You may print or download ONE copy of this document for the purpose of your own research or study. The University does not authorise you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site.

You are reminded of the following: This work is copyright. Apart from any use permitted under the Copyright Act 1968, no part of this work may be reproduced by any process, nor may any other exclusive right be exercised, without the permission of the author. Copyright owners are entitled to take legal action against persons who infringe their copyright. A reproduction of material that is protected by copyright may be a copyright infringement. A court may impose penalties and award damages in relation to offences and infringements relating to copyright material.

Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.

Unless otherwise indicated, the views expressed in this thesis are those of the author and do not necessarily represent the views of the University of Wollongong.

Recommended Citation

Stirling, Joanna, The modern midden: visualising waste through information design, Master of Creative Arts - Research thesis, School of the Arts, English and Media, University of Wollongong, 2015.
<https://ro.uow.edu.au/theses/4576>

Research Online is the open access institutional repository for the University of Wollongong. For further information contact the UOW Library: research-pubs@uow.edu.au



THE MODERN MIDDEN

Visualising Waste
through Information Design

Joanna Stirling

Supervisor: Dr Lucas Ihlein

This exegesis is presented as part of the requirement
for the award of Master of Creative Arts by Research.

2015

UNIVERSITY OF
WOLLONGONG



DECLARATION

I, Joanna Stirling, declare that this exegesis submitted in partial fulfilment of the requirements for the conferral of the degree of Master of Creative Arts by Research, from the University of Wollongong, and is wholly my own work unless otherwise referenced or acknowledged. This document has not been submitted at any other academic institution.

Joanna Stirling
March, 2015

OXFORD DICTIONARY DEFINITION

MIDDEN

A dunghill or refuse heap

CONTENTS

Acknowledgements	vi
Abstract	vii
List of figures	viii
Research question	xi
Introduction	1
Background	2
Project summary	8
 CHAPTER ONE: So what about waste?	
• Reports and policies – an overview	13
• Data and visual structures	15
• Insights about landfill	18
• Symbols of recycling	21
 CHAPTER TWO: Ways of seeing	
• Disruption	27
• Waste materials	29
• Installation spaces	32
• Seeing with information design	38
 CHAPTER THREE: The Modern Midden	
• Visual storytelling	43
• Stories and memory	44
• Establishing themes	48
• Visual evidence	55
 Conclusion	59
Bibliography	63
List of image references	67

ACKNOWLEDGEMENTS

The Modern Midden would not have been possible without the support and collaborative spirit of many. I would like to sincerely thank my supervisor Dr Lucas Ihlein for his steadfast belief in this project and for his affirmation that I would find the answers I was looking for.

Thank you to The University of Wollongong for providing the opportunity and support for this research. Thank you to my colleagues who have contributed to this journey by providing valuable scholarly insight, time and encouragement: Dr Agnieszka Golda, Gregor Cullen, Dr Jon Cockburn, Kim Williams, Grant Ellmers, Angelina Marcon-Jones.

The Upper Kangaroo River Progress Association provided a valuable opportunity to develop my research through their Artist-in-Residency Program. Thanks to Sarah Butler and Andy Gordon for your support before, during and after the residency.

A special thanks to David Cox who generously gave me his time and building design expertise; you are wonderful. During the residency I was able to design, build, and test my work to witness the enthusiasm of my community – by recording what they were teaching me and by sharing what I had learnt with them as well. Thank you to the community of Kangaroo Valley; I know you are proud to be a 'Plastic Bag Free Town'.

Finally I would like to thank my family: Lily Stirling, Jacob Stirling, Bradley Harvey, Jim Watson, Pam Watson, Chris and Jon Watson. This work is for my family who care about our planet too.

Every picture can share a story. Every story can be shared.

ABSTRACT

Australians are the second highest producers of solid waste per capita – waste which continues to increase annually. Although waste management technologies such as recycling, methane capture and landfill infrastructures are improving, national reliance on landfilling as a final destination for refuse materials remains prevalent.

This research investigates how visualisation strategies can be deployed to establish a broader dialogue regarding the profound environmental impacts of waste generation. I identify how the visual display of information can activate social behaviour change, with the inclusion of audience participation.

Data related to the collection and reprocessing of waste materials in Australia is found in the form of published reports, government policy documents and audits. For individuals, households and businesses deciphering their complexity and significance is challenging due to the form in which the statistics are presented. In this research project I visualise data from these reports and include it the design of an installation work entitled *The Modern Midden – a small part of the big story of waste*. The visualisation strategies I employ reveal the storytelling potential held within statistics when displayed for the purpose of audience participation and contribution.

This research draws from multi-disciplinary perspectives across visual communication, environmental science and psychology. These perspectives inform the practice-led methodology with the intention of triggering and witnessing social behaviour change occurring through contemplation and action.

This exegesis contributes to the field of visual communication design in three significant ways. First, it establishes new pathways between information design, waste management and social change using storytelling. Second, the design of an installation space in which participants are immersed and can build upon those stories collectively. Third, it reveals the connections and disconnections between refuse materials and consumer behaviours and their environmental impacts. Employed together these contributions offer a new strategy in which design practice can initiate, witness and record individual and social change occurring.

LIST OF FIGURES

INTRODUCTION

Figure 1. Stirling, J 2014, <i>The designer between the client and the project outcomes</i> . Diagram.	1
Figure 2. Shoalhaven Council, 2012, Landfill and alternative waste management solutions brochure.	3
Figure 3. Stirling, J 2014, Venn diagram showing the intersections of this research.	4
Figure 4. Stirling, J 2015, <i>The stages of the practice-led methodology</i> . Diagram.	9
Visual snapshot: First iteration of <i>The Modern Midden</i>	10
1. Stirling, J 2014, Entry Wall to <i>The Modern Midden</i> installation (detail).	
2. Stirling, J 2014, Sketch of display panel system design (detail).	
3. Stirling, J 2014, Teenagers front the entry point 'recording' the waste materials brought in by attendees. Photographer Chris Watson.	
4. Stirling, J 2014, <i>The Big Sort</i> – community waste audit.	
5. Stirling, J 2014, Opening Night: <i>The Modern Midden</i> – waste placed on floor space by participants. Photographer Chris Watson.	
6. Stirling, J 2014, Project Map, used in the installation (detail).	
7. Stirling, J 2014, Participants discuss the 100 year timeline. Photographer Chris Watson.	
8. Stirling, J 2014, <i>The Big Sort</i> – landfill audit.	
Visual snapshot: Second iteration of <i>The Modern Midden</i>	11
1. Stirling, J 2014, <i>The Modern Midden</i> central waste pile – 10 families, 1 week. Photographer Paul Jones UOW.	
2. Stirling, J 2014, Participants discussing The Pledge Wall. Photographer Lucas Ihlein.	
3. Stirling, J 2014, Waste audit begins, sorting the central pile. Photographer Lucas Ihlein.	
4. Stirling, J 2014, Waste audit complete to the outer walls of the installation.	
5. Stirling, J 2014, Embodied Energy – Infographic that visualises materials journey in closed and open loop systems (detail).	

6. Stirling, J 2014, *The Conversation Station* – Participants ask and answer questions.
7. Stirling, J 2014, *The Pledge Wall* – Making change to household waste practices. Photographer Paul Jones UOW.

CHAPTER ONE

- | | |
|--|----|
| Figure 5. Examples of the ‘data structures’ found in waste reports and policy documents. | 15 |
| Figure 6. Hyder Consulting 2009, <i>Waste and Recycling in Australia Amended Report, 2009, Total Waste Generation, disposal, recycling, energy recovery, 2002–03, 2006–07 & 2008–09</i> . Detail of a table structure converted to a bar chart structure. | 16 |
| Figure 7. Stirling, J 2014, <i>The Modern Midden</i> , Magnitude wall – replicates the 2011 waste categories measured in weight. | 18 |
| Figure 8. Geoscience Australia Meta Data, 2012, <i>Visualised using Google Earth</i> , (screenshot). Data Source: National Waste Management Database www.ga.gov.au | 20 |
| Figure 9. Universal Recycling Symbol. www.zerowaste.sa.gov.au | 23 |
| Figure 10. Australian aerosol brands, showing mixed use of materials, plastic, aluminium, paper, tin etc. www.science.howstuffworks.com | 23 |
| Figure 11. Resin Identification Codes. www.zerowaste.sa.gov.au | 23 |
| Figure 12. Revised Resin Identification Code – using closed triangle without chasing arrows. www.plasticsindustry.org | 23 |

CHAPTER TWO

- | | |
|--|----|
| Figure 13. Thomas Thwaites, 2011, <i>The Toaster Project</i> . | 29 |
| Figure 14. Lukatarina (for client Eco Vitae), 2011, <i>Marine Renegades</i> . | 30 |
| Figure 15. Mandy Barker, 2012, <i>Soup:500+</i> . | 30 |
| Figure 16. Chris Jordan, 2013, <i>Running the Numbers – An American Self Portrait</i> . | 31 |
| Figure 17. Stefan Saigmeister, 2013, <i>The Happy Show</i> , Museum of Contemporary Art, Los Angeles USA. | 33 |

- Figure 18.** Dietmar Offenhuber, Evelyn Münster, Jaume Nualart, Moritz Stefaner and Gerhard Dirmoser, 2009, *Mapping the Archive* – Ludwig Boltzmann Institute for Media.Art.Research. 34
- Figure 19.** Kimberly-Clark, 2010, television commercial for Scott Naturals Tube Free toilet paper (screen stills). 35
- Figure 20.** Carbon Visuals, 2012 – *One day of CO₂ generated in New York with 3D time lapse animation* (screen still). 37

CHAPTER THREE

- Figure 21.** Stirling, J, 2014, *The Modern Midden* – Waste collected from ten families over a seven day period (prior to the opening) is sorted over one month through audience participation. Innovation Campus, University of Wollongong. 45
- Figure 22.** Stirling, J, 2014, *The Modern Midden* – Pledge Wall and Conversation Station. Innovation Campus, University of Wollongong. 45
- Figure 23.** Stirling, J, 2014, *The Modern Midden* – 100 Year Timeline. Innovation Campus, University of Wollongong. 48
- Figure 24.** Stirling, J, 2014, *The Modern Midden* – Floorplan, showing bracket structures, panel order and sorting areas for materials. Innovation Campus, University of Wollongong. 50
- Figure 25.** Stirling, J, *The Modern Midden, Internal space of installation, magnitude, parts of a whole and dot wall*. Innovation Campus, University of Wollongong, 2014. 51
- Figure 26.** Stirling, J, 2014, *The Modern Midden* – Central mixed waste pile, moved to outer sorted waste categories. Innovation Campus, University of Wollongong. 53
- Figure 27.** Stirling, J, 2014, *The Modern Midden* – Symbols and Codes. Innovation Campus, University of Wollongong. 53

FRONT AND BACK COVER

- Stirling, J, 2013, *Impact*, digital photographic montage, print 300x100mm (detail).

RESEARCH QUESTION

*How might information design
be effective in changing behaviour
and social attitudes about waste
generation in Australia?*

INTRODUCTION

As a practising designer and design educator my enquiry stems from an interest in the role design plays in effecting social change for environmental benefit. Through my experiences within the design profession, I have often witnessed design practice to be perceived as limited to the service of problems presented by a client, typically within a commercial setting. The schematic diagram below (Figure 1) shows the designer positioned between the client, the constraints inherent to a specific project or design brief, and the solutions required to pursue a design outcome. Design theorist Richard Buchanan argues that this perception of design as purely a service industry is shifting. Buchanan writes, “we have seen design grow from a trade activity, to a segmented profession, to a field for technical research and to what now should be recognised as a new liberal art of technological culture” (1992, p.5). Over the last two decades it has become increasingly critical products, communication and service solutions to address the environmental and social impacts that design outcomes potentially embody. My research explores the ways in which design (in this case the visual display of information) can be employed to engage people with the environmental impacts associated with waste generation and disposal in Australia. I do this in a number of ways, first by employing multiple visualisation strategies to investigate the data available on waste, second by testing how audiences will participate with the information being displayed, and third, by witnessing how change might occur.

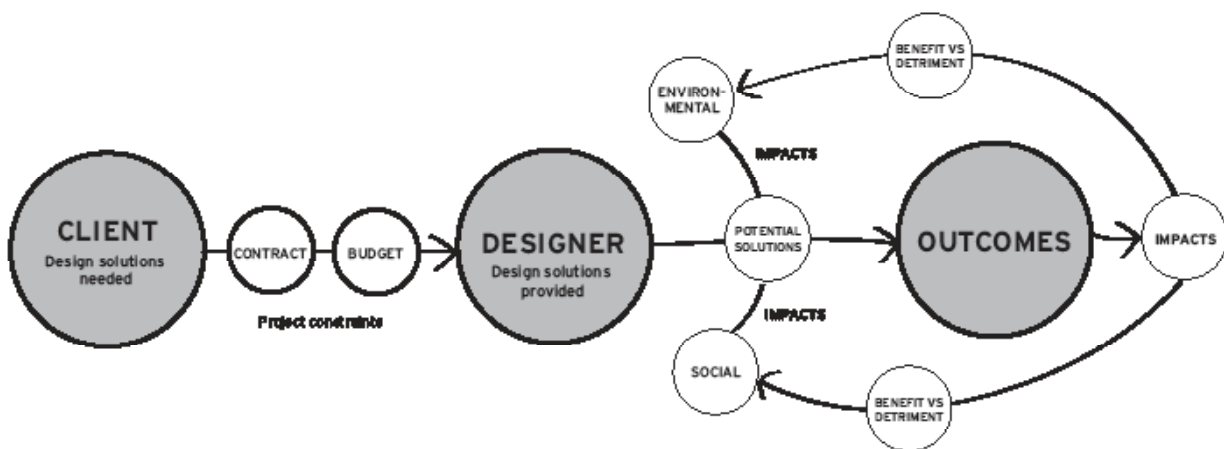


Figure 1. A depiction of the conventional position of the designer between the client and the project outcomes (Stirling, 2014)

The emerging practices of co-design and user-centred design show us that more collaborative and participatory approaches to solution finding (through design synthesis, rapid prototyping, testing and reflecting), can be a model for innovation in design practices and education. These integrated and inter-disciplinary approaches to design education are reflected in studies of design thinking and social impact design, and foster the integration of collaboration (often across discipline areas) to advocate for social or environmental benefit. This view is expressed in much contemporary discourse about the collaborative nature of design practice. Marianna Amatullo in a statement for *DesignMatters* asserts:

We view art and design as a space that invites collaboration with other disciplines, such as: development, science, business, engineering and anthropology. It is in the intersection between distinct areas of inquiry that we often find the most opportunity for innovation (DesignMatters 2015).

With this in mind, the research discussed in this exegesis, and explored through the creative work *The Modern Midden*, examines how visual display strategies of information design can encourage collaborative idea generation and solution sharing by inviting the audience to participate and engage in the concepts being presented.

Background

The question that frames this research, “How might information design be effective in changing behaviour and social attitudes about consumption and waste generation in Australia?” emerged from my initial encounter with a small and rather understated piece of visual communication produced by my local council in 2012 (see Figure 2). This printed brochure arrived in the mail requesting household responses to a survey about alternative and preferred options for waste management in our region. The brochure used technical language associated with the processing of waste materials such as ‘thermal treatment’ and ‘biological processing’ which at the time I did not understand. It made only a small point (circled in red) as to what I regarded as the core issue: “Why Change? West Nowra landfill will (otherwise) be full in 2024 with no alternative landfill currently available”. The impetus to investigate this alarming proposition was the beginning of my research journey. It began with my own lack of understanding about landfill, and with the insight that I had little connection to the waste

materials that were being collected in my red and yellow garbage bins on a weekly basis. Was my lack of connection to the life cycle of materials making me, as a design practitioner and as a householder, more wasteful? The poor visual communication and the confused messages the council seemed to be sending prompted the much deeper investigation embodied throughout this exegesis.



Figure 2. Brochure from Shoalhaven Council, 2012, calling for community feedback about landfill and alternative waste management solutions.

A core motivation for my research is to discover more about the individual and collective knowledge we have about the complex issues associated with waste generation. In a statement made by Clean Up Australia, it is claimed that “Australians are the second highest producers of waste per person in the world” (Clean Up Australia 2013). This revelation is sobering, with implications being highlighted in the global report *What a Waste*, published by The World Bank Urban Development Series, which states that “the impacts of waste are growing fast. Solid waste is a large source of methane, a powerful greenhouse gas” (2012, p.5). To *explore* and *explain* the impact of the design of products, packaging and

communication materials on the growing piles of post-consumer waste, I apply a practice-led methodology through my own creative work *The Modern Midden*.

This exegesis is structured to tell the story of the methodology employed in *The Modern Midden*. It is accompanied by a separate detailed report on the creative work which documents the design process, audience testing, and the visualisation outcomes developed through data collection, synthesis and reflection. The practice-led methodology uses and generates both the quantitative and qualitative data that frames the research and is analysed through the case study of *The Modern Midden* to draw out the intersections between information design, waste and social change (See Figure 3).

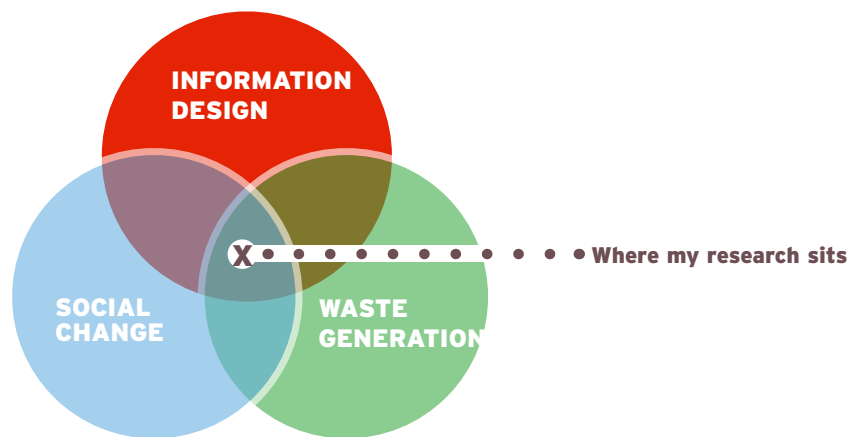


Figure 3. Venn diagram showing the intersections of this research.

In this exegesis, I discuss how the visual display strategies employed throughout *The Modern Midden* activate audience engagement around the problem of waste generation. The following series of stages demonstrate how this is achieved:

- 1) Analysing waste management processes via published data, reports and site visits;
- 2) Researching precedent visual display strategies across the field;
- 3) Synthesising key insights discovered in the data;
- 4) Prototyping and testing of *The Modern Midden* installation with audience participation (First iteration – Kangaroo Valley NSW);
- 5) Discovering ‘what we know’ about waste materials at *The Big Sort* community event and waste audit (First iteration – Kangaroo Valley NSW);
- 6) Observation and data collection from *The Modern Midden* and *The Big Sort*;

- 7) Reflection on insights and discoveries from the first iterations of *The Modern Midden* and *The Big Sort*;
- 8) Integration of insights, additions, adjustments and feedback;
- 9) *The Modern Midden* and *The Big Sort* integrated (Second iteration – Innovation Campus, University of Wollongong);
- 10) Observation and data collection from second iteration;
- 11) Reflection and new discoveries revealed, leading to future directions for research.

By applying this practice-led methodology, *The Modern Midden* establishes a space for visualising, sharing and interpreting individual and collective knowledge and concerns about consumption and waste. In this way, change is revealed, witnessed and recorded in a number of ways, which will be discussed throughout Chapter Three.

I use the term ‘installation’ broadly in this research to describe the physical space (in this case a gallery or community hall) and the physical structures organised within that space to support the visualisations being displayed. It is important to acknowledge here that within the scope of this research, the field of installation art is not the primary focus. However, *The Modern Midden* uses installation as a display and immersive framework for several reasons. First, it provides a way in which the visual display of information can be experienced with ‘others’ in the same physical space (although not necessarily at the same time). Second, it establishes a focus on the topic of waste by placing the visualisations alongside *the waste materials themselves* (not just pictures of the materials). Third, it provides a space in which the audience can navigate with autonomy and take time to contemplate or to physically contribute to the creative work. This allows participants the opportunity to interpret and include personal messages or leave behind evidence of performed actions for other participants to integrate. It is important to note that *The Modern Midden* was first tested as an installation during a two-week residency program within my own local community. The insights gained throughout the stages of the residency (particularly regarding audience participation) provided much of the qualitative data needed to inform the second iteration of the installation. This will be discussed further throughout the exegesis, and a more comprehensive documentation of the events and activities of the residency can be viewed in the accompanying *Creative Report*.

The title of the creative work *The Modern Midden* is used to evoke memory of a *place* which is hidden from view or taken from our sight. In archaeological and historical terms a 'midden' is a physical place in or on the ground where human settlements would deposit their waste materials – typically shells, bones, broken pottery, ash and organic materials. These sites offer a way for us to uncover evidence of past cultural practices and social behaviours. They also offer us a window into the layered stories of our past, present and potential future. The Indigenous middens in Sydney (some dating back 4,000 years), discovered by Europeans in the early 1800's are a good example of this. The shell material found in the middens became the resource to make lime for mortar in the early colony. In his history of the Australian lime industry, archaeologist Michael Pearson writes that "The early dependence on shell, which is a scattered and limited resource occurring as Aboriginal shell middens and natural shell beds, necessitated either transport of shell to a central kiln, or the use of simple and cheap burning methods at the location of the shell deposits" (1990, p28). The mortar remaining today is dotted with shell pieces and binds the bricks of Sydney's' first stone buildings. In contemporary consumer culture and with increasing population growth, the waste piles that human settlements now generate are growing faster than the management systems (landfill and incineration) or solutions (recycling and energy capture) can adapt to manage them. These middens are not like those of our past, as much of the waste will not break down through biological or geological processes. Of course waste needs to be *managed* but what do we know about where it goes and what happens to it? Does a disconnection occur between the person and the end life of purchased products that may lead to a more wasteful society as a result?

To clarify what is meant by 'waste' in my study, I begin with the definitions provided by *The Australian Government Department of the Environment: Landfill Waste Classifications and Waste Definitions*. In this document waste is defined as "any substance that is discarded, emitted or deposited in the environment in such volume, constituency or manner as to cause an alteration in the environment" (2004, p.5). Furthermore, waste is described as "any otherwise discarded, rejected, unwanted, surplus or abandoned substance intended for sale or for recycling, reprocessing, recovery, or purification by a separate operation from that which produced the substance" (2004, p.5). These definitions are useful as a classification of substances and processes associated with materials, yet they do not describe

waste as a *human activity* that has negative implications. For example, if waste is used as a verb, “to waste” or “to be wasteful” are actions that are associated with the human behaviours of misuse, squandering or the careless exhaustion of resources. *The Modern Midden* provides an opportunity to examine waste in both of these ways (as materials and as behaviours) but, more importantly, to highlight waste as an outcome of the human activities associated with consumer culture.

Information provided in current waste reports and audit documents is publicly available online. The primary purpose of these documents is to inform vested interests in the waste management sector about the effective implementation and progress of government policy. *The National Waste Policy Implementation Plan – Less Waste, More Resources* (the current Australian policy strategy on waste) outlines “aims, key directions, priority strategies, roles and responsibilities of governments” (2010, p.4). These documents were examined during the research and synthesis stages of the project to gain deeper understanding of the waste sector and to analyse the forms and structures of the data presented within them. Key insights from this process are discussed in Chapter One of this exegesis. I then synthesise these discoveries into themes by utilising a selection of critical data for each theme displayed in *The Modern Midden* creative work. This is to test if audiences outside of the waste sector might better interpret and respond to what is revealed by applying my new strategies for visualising the selected data. I discuss this further in Chapter Two and then investigate in Chapter Three, how social change relating to waste generation and disposal can occur by inviting the audience to participate with and contribute to the work.

In their text *Cradle to Cradle: Remaking the Way We Make Things*, William McDonough and Michael Braungart propose that “products should be designed so that after their useful lives are over they can provide “nourishment” for something new” (2002, p.90). Without denouncing commerce or industry, McDonough and Braungart argue that flawed design systems are a pressing problem. They describe ‘eco-efficiency’ as one such model for sustainability:

This concept is often put forward as a model for sustainable commerce, however it delays an inevitable problem – being ‘less-bad’ through waste ‘reduction’ and pollution ‘prevention’ and does not fully address the flaws at the root of our design (2002, p.31).

Throughout this research I consider what is implied by this proposition. For example, are these flaws only inherent to the design and production of unsustainable products? Or, are these flaws also found in the systems inherent to a capitalist structure fuelled by the consumption that benefits from wasteful design? Or, can the 'root of our design' be reviewed, by placing environmental or social impact at the centre of the personal choices we make about the products and services we support?

The relevant literature across the three core areas of this research (Waste, Information Design, and Social Change) is embedded throughout each chapter to contextualise intersections and discoveries. The literature available across these broad fields is extensive, however within the scope and purpose of this research, I select core influences in the waste sector, visual communication and psychology to focus the exegesis on how they have been applied, tested or questioned in the creative work *The Modern Midden*.

Project summary

This section of my introduction is provided to briefly describe the practice-led research undertaken throughout *The Modern Midden* as a participatory installation which occurred in the three stages shown in Figure 4 opposite. This is aided by the provision of the *Creative Report* which documents stages two and three for expanded detail when required. The project was a visual, immersive and social experiment designed to *present data* through the visualisation of statistics, facts and waste materials, and to *gather data* through audience participation and contribution.

The first iteration of the project (stage two) occurred during a two week Artist-in-Residency in my local community of Kangaroo Valley, NSW. During this stage I built, integrated, tested and developed the work with community participation. This residency had three parts: 1) a screening of the documentary film *Trashed* (2012); 2) the opening of the installation *The Modern Midden*; and 3) a community waste audit entitled *The Big Sort*. The first two events required attendees to bring household waste materials as an 'entry fee', which items were included in the installation. *The Big Sort* provided a one day audit of these waste materials by having the audience hand-sort them into categories. All of these

events resulted in the insightful discussion, feedback, observations and experiences that were critical to the development of the next iteration.

The second iteration of the project (stage three) occurred at The Innovation Campus, University of Wollongong. It was not possible to present *The Big Sort* in the same form as the previous iteration (as it would be open to the public for one month) therefore an integrated approach was designed so that encounters with waste materials and sorting could still be included. In this way, the space could remain active as participants slowly moved the mixed waste materials collected previously from ten families (contained in a central pile) into the materials categories marked out on the outer floor space of the installation. Since this research has a central focus on ‘visualisation’, to support the reading of this exegesis, I include a visual snapshot of each iteration on pages 10 and 11.

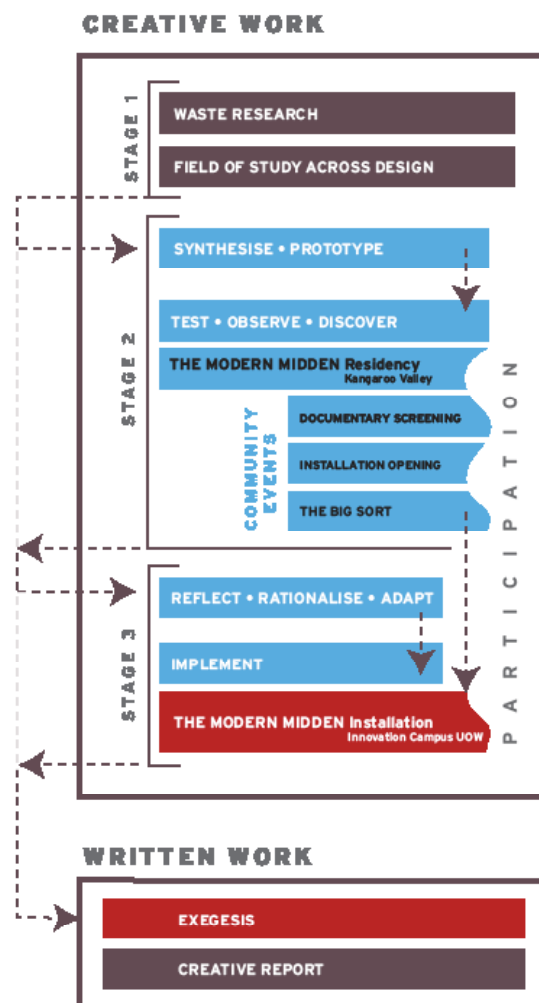


Figure 4. The stages of the practice-led methodology (Stirling, 2014)



TIME
DATA
STORY
ACTION
CHANGE

HISTORY

STATS

1

2

VISUAL

DOING

PEOPLE

THE MODERN MIDDEN & THE BIG SORT

STAGE 1

FIRST ITERATION

Artist-in-Residence,
*Kangaroo Valley
Community.*



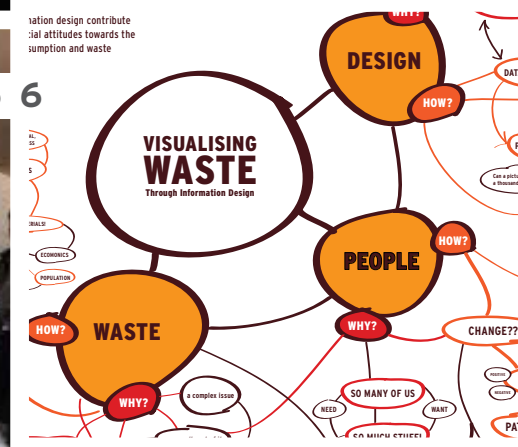
3



4



5 6



1. Detail: Entry Wall to *The Modern Midden* installation.

2. Detail: Sketch of display panel design.

3. Teenagers from the entry point 'recording' the waste materials brought in by attendees.

4. *The Big Sort* – the community waste audit.

5. Opening Night: *The Modern Midden* – waste placed on floor space by participants.

6. Detail: Project Map, used in the installation.

7. Participants discuss the 100 year timeline.

8. *The Big Sort* – landfill audit.



7

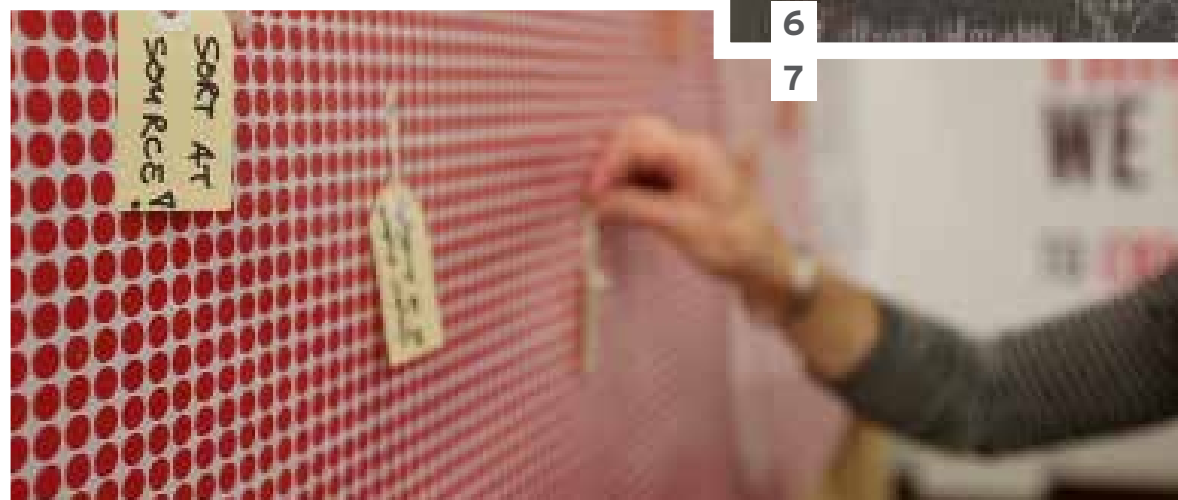
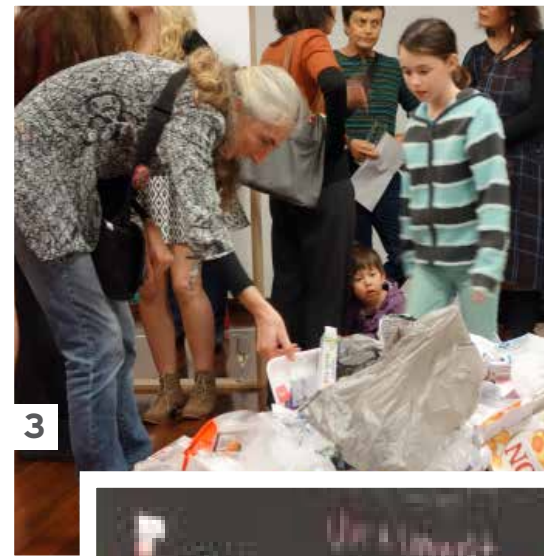
8



STAGE 2

SECOND ITERATION

Innovation Campus,
University of Wollongong



1. *The Modern Midden* central waste pile: 10 families, 1 week.

2. Participants discussing *The Pledge Wall*.

3. Waste audit begins, sorting the central pile.

4. Waste audit complete to the outer walls of the installation.

5. *Embodied Energy*: Detail of infographic that visualises materials journey in closed and open loop systems.

6. *The Conversation Station*: Participants ask and answer questions.

7. *The Pledge Wall*: Making change to household waste practices.

CHAPTER ONE

SO WHAT ABOUT WASTE?

This chapter provides an overview of key discoveries about solid waste generation and disposal in order to highlight the need for broader public communication strategies. A summary of reviewed policy intentions and the reports pertaining to waste generation and disposal in Australia is provided as further background to the positioning of the study. Included is a discussion of the visual data structures found in these reports and my insights about the material identification symbols used in Australian recycling practices. Further to this, I discuss the environmental implications of increased waste generation – in particular, Australia’s continued reliance on landfilling, and the ongoing imperative to promote recyclable materials as resources. This establishes the rationale and data gathering needed for the visualisations presented in *The Modern Midden* creative work discussed in Chapters Two and Three.

Reports and policies – an overview

The 2020 projections about waste and recycling targets are presented in The National Waste Policy Implementation Plan – *Less Waste, More Resources*. This document outlines “aims, key directions, priority strategies, roles and responsibilities of governments” (2010, p.4). One key strategy outlined in this policy document indicates a move towards implementing product stewardship by developing “extended producer responsibility schemes to provide for the impacts of a product being responsibly managed during and at end of life” (2010, p.13). This is clearly a positive proposal, however what is not detailed are any comprehensive strategies that include *social engagement* such as national community education strategies or funding opportunities for waste reduction.

A statement published by the Australian Packaging Covenant (APC) indicates that Australia had improved its national recovery of post consumer waste from 39% in 2003 to 63% in 2011. However, “achieving the 2015 target of a 70% recycling rate will bring significant challenge to all within the packaging supply chain” (2011, p.2). The APC, through the collaboration of government and industry, was established “to minimise the environmental impacts arising from the disposal of used packaging, conserve resources through better design and

production processes and facilitate the re-use and recycling of used packaging materials” (2007, p.14). It is evident on my examination of available data pertaining to current waste management trends that whilst there are innovations and policies developing to encourage and improve recycling practices, funding for social engagement and broader community education about *overall* waste reduction is lacking. Organisations such as Planet Ark and Clean Up Australia do an inspiring job of promoting recycling and communicating about litter and pollution. However, communication strategies that focus on the pressure that increased waste generation places on natural resources, and which explain the environmental impacts associated with reliance on landfilling are critical to making *change* happen – change not only to the design, manufacture and use of wasteful products but also change that addresses the long term polluting nature of landfill (atmosphere, soil and ground water). This study investigates (discussed in more detail in Chapter Three) how *The Modern Midden* instigates change in individual and community behaviours by raising awareness about contribution, connection or disconnection to these issues.

Reports developed to explain waste studies and data collections, such as *The Australian Recycling Sector* (2012) produced by The Department of Sustainability, Environment, Population and Communities, declare their specific objectives relevant to the ‘sector’. These reports are produced to “describe the key characteristics of the sector and the environment in which they operate, outline the social, economic and environmental benefits and identify barriers and future opportunities for the sector” (2012, p14). A key finding of this report states that, “at present there is limited up to date information on the recycling sector and the potential for this sector to contribute to environmental, economic and social outcomes” (2012, p14). For my research, these reports serve three core purposes: First, they provide access to current published data in the form of tables and graphs; second, they enable an examination of the visual structures used within these reports; and third, they reveal the environmental implications of continued reliance on landfill.

Data and visual structures

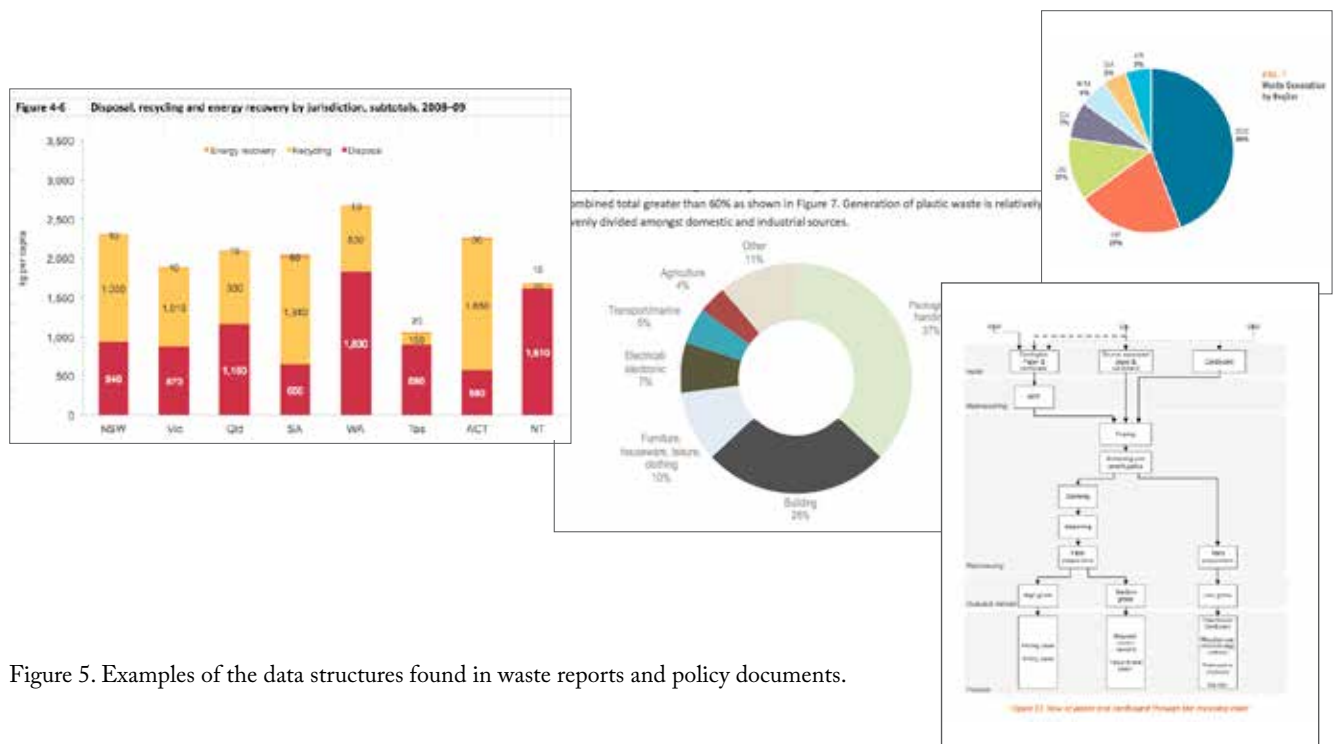


Figure 5. Examples of the data structures found in waste reports and policy documents.

Waste reporting and policy documents are designed to produce a body of evidence over a defined period of time for those within the waste management sector. Data structures such as charts, tables, graphs and text found throughout these reports (see Figure 5) are typically displayed in isolation from one another (on separate pages, chapters, or documents) meaning that the reader will view them in this way. This makes it difficult to align potential relationships *across data sets* or to make comparisons of the complex tabled information without having specific questions in mind. For example, when viewing Figure 6 below, which shows Australia's total waste generation, recycling and recovery since from 2002 till 2009, two questions arise. Is the energy recovery calculated significant in terms of total energy consumption in 2009? Is the increase in total waste generation from 2003 to 2009 linked to population growth? By posing questions such as these we can see that more information is required and other data sets will have to be sourced so that they can be analysed together to create new data structures.

The majority of public data available about waste is currently presented in this kind of format and is explanatory in nature, displayed without apparent intention to persuade nor to highlight important findings over insignificant ones. In other

words, these graphs provide a visual structure that represents the statistical numerical data *as* a visual description of the results. Media theorist Lev Manovich describes information design as “starting with the data that already has a clear structure”, and for Manovich the goal is to “express this structure visually” (2010, p.4). A simple and exploratory example of this would be to transform the structure of a table formatted with numbers across categories into a bar chart structure using an X and Y axis. In the example (shown in Figure 6 below), the goal has been to express the structure ‘objectively’, telling us what the data ‘looks like’ after it has been converted from a table format into a simple bar chart.

Table not in report	Total waste generation, disposal, recycling energy recovery, 2002-03, 2006-07 & 2008-09							
	2002-03	2006-07	2008-09 Subtotal	2008-09 Total	2002-03	2006-07	2008-09 Subtotal	2008-09 Total
	'000 tonnes	'000 tonnes	'000 tonnes	'000 tonnes	'000 tonnes	'000 tonnes	'000 tonnes	'000 tonnes
Disposal	17,423	21,426	22,635	34,264	17,400	21,400	22,600	34,300
Recycling	14,956	20,245	23,865	26,262	15,000	20,200	23,900	26,300
Energy recovery	0	0	300	300	0	0	300	300

Figure 4-7 Total waste generation, disposal, recycling energy recovery, 2002-03, 2006-07 & 2008-09

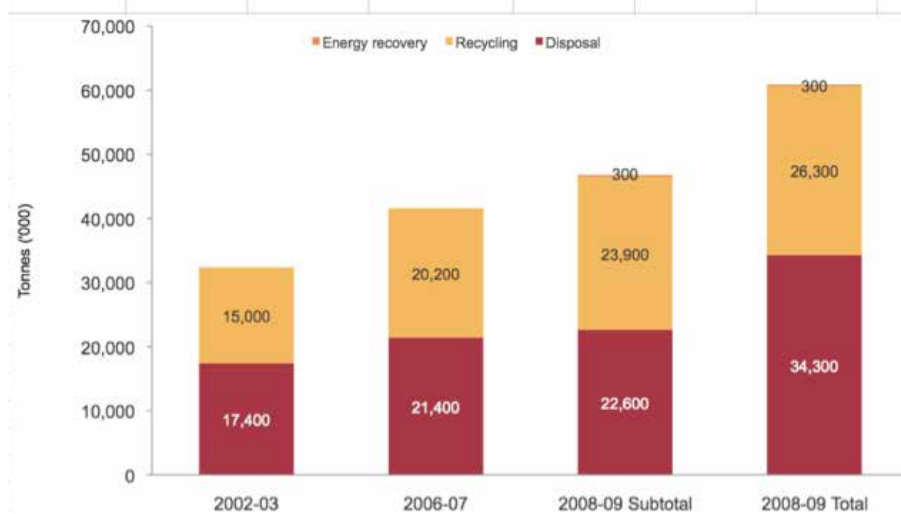


Figure 6. Total Waste Generation, disposal, recycling, energy recovery, 2002-03, 2006-07 & 2008-09. Source: Hyder Consulting 2009 Waste and Recycling in Australia Amended Report. Shown here as a table structure converted to a bar chart structure.

The table and chart shown in Figure 6 are typical of the style of data found in waste reports. This particular example reveals several important insights. First, there has been a significant increase in waste generated in Australia over a seven year period. Second, because of the colour key we can make a fairly quick comparison of landfill, recycling and energy recovered. Third, the bar chart uses an

X and Y axis which enables us to relate several values at once, here shown as weight over time progression. Although this visualisation does reveal important information, what is not visible in this example is any key or comparison that helps us to understand the significance of weight or to contextualise it. Weight is an important consideration in this context, as *all* measurements of waste in Australia are recorded in terms of weight (here shown in millions of tonnes), rather than volume (the amount of space a substance or object occupies). But if landfill capacities are stretched due to volume, why is weight the standard measurement applied in the data collection?

To understand the significance of weight to this study, further visual explanation can be used help us to ‘visualise’ weight by way of comparisons. Statistician and visualisation theorist Edward Tufte explains in his book *Visual Explanations* that “despite the chronic dangers of misrepresentation, appropriate re-expressions or transforms of scales are among the most powerful strategies for exploring data” (1997, p.25). Displays of weight shown in numbers make it difficult to determine any significance without a visual equivalent. For the purpose of demonstrating this further I suggest the following: imagine a male African elephant – he weighs approximately six tonnes. In 2008–2009 there were 34.3 million tonnes of waste dumped in landfill in Australia (as shown in Figure 6), meaning that the equivalent weight of almost 6 million elephants went to landfill. What occurs in this example is that when weight is visually assigned to something familiar (such as an elephant), we can imagine and engage with a better sense of *magnitude* by comparison. Therefore we can make a reasonable visual calculation as to *how much* 34.3 million tonnes is and what volume it could potentially occupy.

If we were to take this a little further (to assist with visualising landfill) and imagine those elephants in terms of volume, we would need roughly 80,000 olympic swimming pools to contain them (with elephants standing side by side, tail to trunk, foot to shoulder at seventy five elephants per swimming pool). This example works reasonably well when we are imagining elephants, however, it also highlights the difficulties with representing the weight of waste going to landfill due to the disparate *density* of materials.

The types of charts published in waste reports can easily be misinterpreted due to the difficulties inherent in visualising weight and how this actually relates to the materials being diverted to landfill. In *The Modern Midden* creative work, I explore

this assertion by including a replica of one of these charts, shown here in Figure 7 (a larger image can be viewed on page 30 of *The Creative Report*).

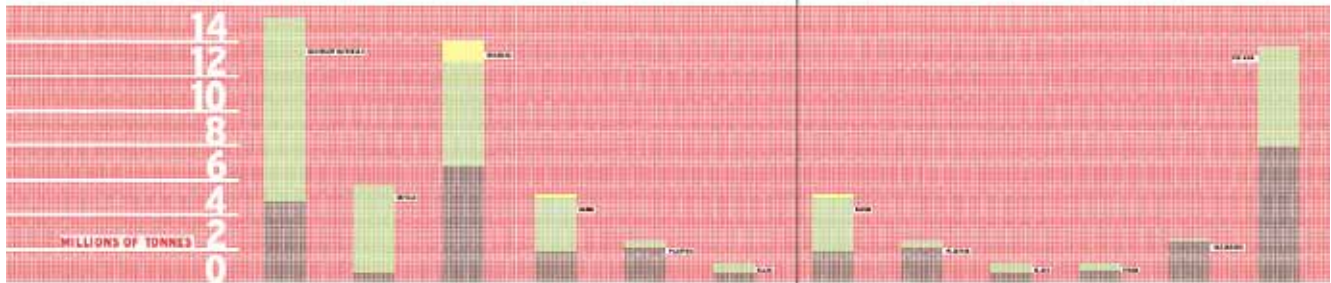


Figure 7. Magnitude Wall *The Modern Midden*, replicates the 2011 waste categories measured in weight.

This chart shows us what percentage of materials (in millions of tonnes, across *all* waste sectors) were diverted to landfill (brown), were recycled (green), or had the energy captured from them (yellow). We can then assess (by comparison) some of the details. For example, the organics category is one of the highest contributors to landfill (the brown section on the third bar across). What is interesting however, is that the measurement of weight makes it *appear* that the highest bars (in this case masonry materials) are the *most* – which they are in terms of weight, but not volume. Plastics (having much less density than masonry) make up just over half the weight of masonry materials that go to landfill, however if they were documented in terms of volume (such as cubic truckloads), plastics would most certainly rate higher than masonry. The majority of landfilled materials are not compacted, rather they are delivered loose with volumes of materials arriving in *truckloads*, not tonnes. This is significant because if landfill sites are ‘filling up’, perhaps visualising volumes might help us to understand the magnitude of overall waste ending up in landfill sites more clearly, thus providing a stronger message about not only the magnitude of waste being generated but the imperative to accelerate behavioural change.

Insights about landfill

As the human population expands, so do the demands on natural resources to fuel, manufacture, produce, design, package, sell, distribute, recycle and dispose of the artefacts of consumer culture. The raw materials required to manufacture these products are coming more than ever before from recycled materials, and in terms of environmental management this is clearly positive progress. However, it is also evident that we continue to produce more metal, plastic and paper products from

new and raw materials to keep up with the economic demands of growth embedded in post-industrial culture. The environmental impacts associated with landfill have been known for some time and are summarised here in the 2006 statement by the Australian Bureau of Statistics, *Australia's Environment: Issues and Trends 2006*:

The chief environmental concerns associated with modern landfills are emissions of greenhouse gases, particularly methane, and the long-term pollution of the environment through leaching of heavy metals, household chemicals, consumer electronic products and earlier generation rechargeable batteries, such as ni-cads. (ABS, 2015)

This is most certainly a *major* concern when we reflect on the magnitude of waste being diverted to landfill annually and of the long term polluting consequences of this system of management. I draw attention to this as Australia relies on landfilling as a final destination for waste materials as the 'preferred option' to other forms of waste management such as incineration. Is this because we have such large amounts of land space? This is not the case for many countries that have much higher populations than Australia with much less land space. Incineration and the transfer of waste to 'other countries' is practiced widely in Europe, The United States and across Asia. This is revealed in the documentary film *Trashed* (2012) which I screened in the community of Kangaroo Valley as part of this project. The film also discusses the serious implications (predominantly air pollution, contamination, human and livestock health and fossil fuel power usage) associated with incineration technologies, as well as being costly to run and maintain. It appears that neither incineration nor landfilling technologies are a viable long term solution for the management of waste.

My investigations into landfill continue through the exploration of GeoScience Australia's published metadata, *The National Waste Management Database* (2012). This data can be visualised using Google Earth (see Figure 8 overleaf), and has provided a number of useful insights to this research in relation to the quantity and characteristics of landfill (and other waste management) sites. First, the data allows a visual exploration of landfill from an aerial viewpoint. Attached to it (by clicking on the thumb tack icon) is specific data related to each of the 918 waste management facilities around Australia. Second, I discovered that many of the facilities appear to be privately owned and in these cases the data is not as

Australian councils vary enormously in their capacity to sort certain materials. Access to processing and recycling facilities varies across states, as does the market for the sale of many collected materials such as glass, plastics, paper, cardboard, metals and organics. Recycling processes can be further inhibited by geographical location. For example, in rural or country regions proximity competes with priority. Councils may have limited funds to make the transporting and processing of all recyclable materials viable and sending waste to the local landfill sites may generate income for those councils.

During my site visits to waste facilities (landfill sites, waste transfer stations (tips) and recycling centres) I was confronted by the visual impact of the quantities of waste that these facilities manage. I gained first hand sensory experiences through *seeing* waste in this unfamiliar, accumulated way. I began to think about materials as resources with an embodied energy life cycle, and I began to question the relationship we have with items we throw away on a daily basis. These experiences are embodied in *The Modern Midden* in a number of ways: First, by presenting the accumulation of waste materials over a period of time (something we do not generally witness); second, by presenting these items *as themselves* – waste (not images of waste, or sculpted into other forms); and third, by inviting the audience to sort those items by hand (to connect to the items as either landfill or as resources). Experiencing waste materials in this way evoked feelings and prompted questions for my own contemplation. For example, what journey have those materials been on? What was contained within them for our experiences with the materials to become so transient in our attention? Why do plastics need to be separated?

Symbols of recycling

During the residency that resulted in the first iteration and testing of *The Modern Midden* I began by screening the internationally acclaimed documentary film *Trashed* (2012). The film provides a global summary of waste management strategies such as landfilling, dumping and incineration. More importantly it highlights the environmental and health challenges we are currently facing due to poor waste management. Documentary film is a form of storytelling and opening the residency in this manner provided an opportunity to invite community into the physical space in which the work was being developed. By beginning in this way the audience became a part of, and invested in the residency experience right

from the beginning. The film also acted as a provocation for discussion about many of the issues associated with waste generation. More importantly it was screened to provide the audience with a broader global context for these issues (as my project was nationally focused). Attendees arrived at this event with waste materials in hand (a requested entry fee to the screening). They proceeded to queue up and have their items recorded by the teenagers waiting at a table by the door. Surprising observations were noted: one person said, “I feel bad handing my rubbish over to the next generation”; another whispered, “I am embarrassed by my garbage, I am hiding it under my coat!”; somebody else commented, “I don’t know where to put this plastic bottle, can I recycle it or not?” (a summary of observations and responses are included on page 69 of the *Creative Report*). These personal experiences confirm two fundamental insights (and this will be discussed in more detail in Chapter Three). First, we *do* have an emotional connection with waste when we are asked to think about it, and second, there is confusion about recycling codes, particularly in relation to plastics. Why is this the case and what strategies of visual communication can be used to mitigate this confusion?

A recent comparison of nine OECD nations (including Australia) conducted by sustainable materials research group Green Blue examines the nature and current status of the collection and reprocessing of used materials for recycling. The report entitled *Closing the Loop: Road Map for Effective Material Value Recovery* (2011) argues that “there is no comprehensive labelling system for recycling currently in use in Australia” (2011, p.14). I would argue in this context that ‘comprehensive’ might also imply ‘coherent or standardised’. It does appear that there are considerable differences in package labelling across Australian made and imported products, and this leads to confusion regarding how their end life should be managed by consumers. This insight is significant as it points to the need for further investigation regarding the way in which individuals understand and manage household waste, what is understood about materials processes regarding recycling and landfill, and what is known about the symbols and codes of materials identification.

Products and packaging that display the Universal Recycling Symbol (see Figure 9) to indicate they are *composed from* recycled materials often display the same symbol to indicate the product can be recycled again after its use, yet this is not always the case. The symbols become confusing when used on products that

contain components made from a variety of materials such as aerosols (see Figure 10), or paper/plastic combinations in packaging, and is similarly evident when dealing with products made from different types of plastic, such as soft drink bottles and their lids (made from different plastic compounds).

The Resin Identifications Code (RIC), developed in 1988 (see Figure 11), was originally designed to identify the composite (type) of the plastics *only*, however due to the similarity the RIC codes have with the Universal Recycling Symbol (mostly found on the graphic panels on labelling), confusion arises for end users about what their meaning really implies. This flaw was finally addressed in 2013, with the chasing arrows in the RIC being replaced by a closed triangle (see Figure 12) – only currently enforced on new plastics. The RIC code application is extremely useful for the system it was originally designed for (as plastic compound identification at product end-life), however for consumers of products it still remains problematic. This is because the identification system *is* now actually used for recycling purposes (during reprocessing), and consumers believe it to mean that the product is recyclable due to the chasing arrows (regardless of the numbers). This assertion is confirmed in a statement made by ASTM International Plastics committee that “the symbol is now used by municipalities, scrap brokers, recyclers, manufacturers, consumers and others in deciding the end-life destination of plastics materials” (2013). Communication provided by local councils about plastics separation also use these codes to explain what will be accepted as recyclable (for example, whether or not they will accept code six or seven).



Figure 9



Figure 10



Figure 11



Figure 12

Figure 9. Universal Recycling Symbol. Source: www.zerowaste.sa.gov.au Figure 10. Australian aerosol brands, showing mixed use of materials, plastic, aluminium, paper, tin etc. Source: www.science.howstuffworks.com Figure 11. Resin Identification Codes. Source: www.zerowaste.sa.gov.au Figure 12. Revised RIC code using closed triangle without chasing arrows. Source: www.plasticsindustry.org.

It is not immediately clear to consumers which plastics are (or are not) recyclable, and it appears that there are a number of reasons for this. There are many types of plastic compounds and not all of them can be recycled together. The codes that are moulded into plastics are often very difficult to see due to their size, and often difficult to locate, due to either the colour or transparency of the plastic type, or the awkward positioning of the symbol on the product. This becomes confusing for consumers as each number within this system determines not only the composite of plastic but whether or not councils can process those types of plastic. Plastics separation is a complex and labour intensive process, with one end result being that large amounts of plastics do become diverted to landfill due to contamination, or due to the limitations of manual sorting methods, such as the hand separating of lids from plastic bottles and the opening of plastic bags (often placed in household recycling bins). This is compounded by incorrect household recycling practices as well as the non-provision of recycling collection in many public municipal locations (such as parks, sporting grounds and schools).

On a weekly basis landfill and recycling materials are collected in household kerbside bins and taken away in a truck. Householders do not visually experience any accumulation of waste that is generated by them and thus have no connection to where that waste is going. Responses to an anonymous questionnaire (provided during the first iteration of *The Modern Midden*) asking “Do you know where your landfill (red bin) ends its journey?” show that 95% of participants answer ‘no’, with several participants indicating that they did not even know that the red bin was a landfill bin. This indicates that there is a clear disconnection associated with the waste that is generated at a household level and the understanding of what happens to it after it is removed by a garbage truck.

On observing the social habits of consumer behaviour in relation to the disposable nature of designed artefacts, I draw from design strategist and founder of DESIS (Design for Social Innovation towards Sustainability) Ezio Manzini who describes:

A feeling of generalised transience, an impoverishment of sensory experience, of superficiality and the loss of relationships with objects; we tend to perceive a disposable world: a world of objects without depth that leave no trace in our memories, but leave a growing mountain of refuse. (1992, p.7)

Interrogating the material nature of disposable products is important to the relationship we have with waste, as many packaged products are *designed* to have a short life span, to be convenient, and to make our lives 'easier'. In this context I propose that disposability is a *habit* of consumer culture sustained by the design, manufacture, and mass production of products that generate profit from those repeated or confused social behaviours. Disposable objects are not valued after their useful life is complete, and because they are designed to serve that purpose, the relationship we have with these objects becomes transient and habitual. How might our relationship with waste be disrupted? How could a disruption help to make visible personal or collective habits of wastefulness without causing paralysis? In the following chapter I explore this further by looking to insights found in the fields of visual communication and social behaviour change.

CHAPTER TWO

WAYS OF SEEING

This chapter begins with a brief exploration of a behaviour change theory of habit, environment and disruption. I develop this discussion by reflecting on the works of visual communication that have influenced this research through strategies of visualisation used across a range of forms. In this chapter I define my use of the term ‘information design’ for the visual display of either quantitative or qualitative data and discuss this through a review of relevant literature. This is followed by a brief reflection on the historical context and evolution of the visual display of information to highlight the tensions associated with terminology. I do this to explore motivation and human emotional responses which have informed the development of my own creative work *The Modern Midden*. I note that the premise for activating social change through design and participation is not a new idea, and can be found in contemporary creative practice and in many initiatives that promote sustainability or advocate for social welfare. The significance of this research, however, lies in the topic area of waste and how visual communication design can be applied to explore new ways of understanding what ‘change’ actually implies in this area.

Disruption

I begin by briefly looking at some of the insights found in psychology to examine human behaviour and I consider how information design might link to patterns of consumerism. Psychologists Wendy Wood and David T. Neal investigate ‘habit’ to analyse consumer behaviour, explaining that “consumers sometimes act like creatures of habit, automatically repeating past behaviours with little regard to current goals and valued outcomes” (2009, p.579). Jonathan Rowson explains in his study *Transforming Behaviour Change: Beyond Nudge and Neuromania* that “habits are important because they define who we are, but also they can be changed” (2011, p.26). These assertions are important to this study as they imply that we do not often consciously think about how our consumer habits might form. How does this idea transfer from individual habit forming to the *collective* habits of consumer culture? Can we use this knowledge to examine how new positive habits might begin to form?

Habits occur in real environments and situations, and Wood and Neal suggest

several strategies that can contribute to behaviour change associated with consumer habits. These include stating intentions (such as self control) or changing the cues that establish purchasing or daily habits (such as repetition or brand messages). Verplanken and Wood (2006) also suggest that more significant change to habits occur when there is a change in context: “context change is a powerful ally in changing habits because it frees people to establish new patterns of behaviour in the absence of competing habit cues” (cited in Wood and Neal 2009, p.588). In this way a change in context can act like a form of disruption in which habits might be noticed or witnessed.

Designer Andrew Shea (2011) tests an application of this theory by establishing simple observational experiments. What he suggests is that habits are entirely linked to the environments in which they occur, and a disruption can only be successfully designed following careful observation of the environments and patterns that help to establish that habit. British designer Thomas Thwaites uses visualisation to illustrate this concept in his work *The Toaster Project* (2011). Within a post-industrialised western society the simple toaster can offer a useful metaphor for social and behavioural habits. Thwaites’ nine month experiment building a familiar and inexpensive toaster from scratch (see Figure 13), takes us through the complex journey of extracting materials such as copper and mica, the making of steel and the moulding of plastics. Making even the smallest components that allow the toaster to function requires a series of lengthy investigations, testing and failures.

It is in the *making of* and *reporting on* the experience of replicating a toaster that Thwaites provides the disruption. His work reveals our disconnection from the hidden processes involved in extracting raw materials and in doing so he questions our cultural dependency on industrialised processes. *The Toaster Project* points out the environmental costs of the cheap, disposable electrical goods that saturate the consumer economy and our homes. Thwaites’ project manifests in a number of forms, including an exhibition (that displays the materials, processes and final outcome of a toaster and toast), a book and a humorous video documentary. What is significant about this work for my research is the simplicity of his visual display of ‘components’ disassembled and reorganised in a new context to reveal the complexity that is normally hidden from view. Crucially Thwaites uses *the materials themselves* as part of the visualisation strategy.



Figure 13. Thomas Thwaites, 2011, *The Toaster Project*.

Waste materials

I have found a similar deployment of waste materials themselves *as* visualisation for education about environmental impact in several visual communication campaigns. Slovenian designer Lukatarina employs this technique in the poster series distributed by Eco Vitae entitled *Marine Renegades* (2011) (Figure 14). In this work Lukatarina collects rubbish found on the Slovenian coastline and organises it as ‘infographics’ to illustrate how waste materials are threatening marine species. The example in Figure 15 shows the form of a sea turtle composed from the discarded daily items of human consumption. These items such as plastic lids, plastic bags, pharmaceutical packets and cigarette butts make explicit connections for the viewer, and very little textual explanation is required to comprehend the message. By employing materials in this way, Lukatarina directly implicates the viewer in the consequences of wasteful human habits and brings public awareness to the results – that the by-products of human behaviour are polluting ocean environments, being digested by marine life and thus threatening biodiversity. Powerful visual messages such as these are effective in building public awareness because not only can they become memorable, but because they can also evoke an emotional response in the viewer (in this case possibly shame, guilt, fear or sadness).

Similarly, photographer and designer Mandy Barker uses waste materials to evoke emotion. She describes her acclaimed photographic series *Soup: 500+* (2012) (see Figure 15) as aiming to “engage with and stimulate an emotional response in the viewer by combining a contradiction of initial aesthetic attraction and the subsequent message of awareness” (Mandy Barker 2015). Barker organises fragments of everyday disposable items into beautiful re-arrangements, such as the example shown below. The precise circular form is made up of 500 pieces of plastic debris found in the digestive tract of a dead albatross chick found in the North Pacific Gyre. Barker takes these familiar yet fragmented items out of the human context in which they would be originally found and invents a new world for them to occupy, thus telling us a new story about their impact. In this way, Barker provides a disruptive technique that draws attention to the prevalence of consumption to emphasise the ‘journey’ of those materials and our relationships with them. Both of these works provide useful strategies for using waste materials to bring awareness and evoke an emotional response in the viewer. How effective are those responses in effecting change to the relationship we have with waste generation?



Figure 14. Lukatarina, 2011, for Eco Vitae: *Marine Renegades*.

Figure 15. Mandy Barker, 2012, *Soup: 500+*.

The detailed digital imagery of Chris Jordan's work (for viewing online) provides one way for visualising 'accumulation'. Jordan's montages act as a reflective commentary on American consumer culture, and in his series *Running the Numbers: An American Self Portrait* (2013) he builds new images through the repetition of smaller ones. In Figure 15, Jordan depicts 139,000 cigarette butts; equal to the number of cigarettes that are smoked and discarded every fifteen seconds in the United States. The image we see at first glance is a forest, however, it is only when viewers 'zoom in' to interact with the image that they can view the fine detail and comprehend the magnitude of his message. This representational visualisation provides a method to imply the scale of accumulation by aligning it with a visual summary of time itself, in this instance fifteen seconds. Witnessing this approach inspired my exploration of the use of time in *The Modern Midden* to provide reflective opportunities for the viewer. Time is a powerful measure for contextualising the impact of accumulation, of not only waste but of the personal behaviours and social habits that contribute to waste and wastefulness. What if waste were to be presented exactly as it is (not as a tool to represent something else) and not inside a bin with the lid closed?



Figure 16.
Chris Jordan, 2013,
Running the Numbers
- *An American Self*
Portrait.

Evoking an emotional response in the viewer is one tool to motivate change, however when presenting confronting or disturbing images that potentially implicate the viewer, the spectre of ‘paralysis’ (otherwise known as ‘issue fatigue’) arises. Environmental and social science researcher Sophie A. Nicholson-Cole critiques the deployment of confronting visual communication for representing climate change futures. She expresses that this needs to be managed carefully, as

responses to emotional visual appeals can simply end up triggering defensive psychological responses, leaving the audience desensitised with a sense of ‘issue fatigue’ or leading to feelings of powerlessness to do anything to reduce the causes of climate change (2004, p.260).

This is a critical consideration in my research as my aim is to discover how information design can be effective in making change to individual and social behaviours. By presenting potentially confronting information associated with waste, I propose that a more inclusive and collaborative approach that empowers participants to discover and share solutions is required. Establishing a space in which *experiences* can take place provides an opportunity for the exchange of dialogue and for contributions to be witnessed and recorded.

Installation spaces

Installation design offers practical and conceptual advantages to the visual display of information. It provides a physical space for the construction of meaning and the transfer of ideas to be experienced in relation to the body and the senses (for example walking, stopping, bending to read, moving objects or listening to sounds and conversations). Installation spaces can encourage participation or collaborative experiences that are very different to those within digital environments. Display strategies within immersive spaces are found in contemporary museums or education displays where audiences can listen, touch, feel or play out ideas as a way to better grasp concepts or remember stories. In his installation entitled *The Happy Show* (2012) (see Figure 17), renowned designer and creative director Stefan Saigmeister demonstrates several ways of ‘inviting’ the audience in to contemplate notions of happiness. He establishes his visual storytelling by applying various modes of display and presentation, such as infographics, illustrations, typography in surprising spaces (such as toilet cubicles and elevator

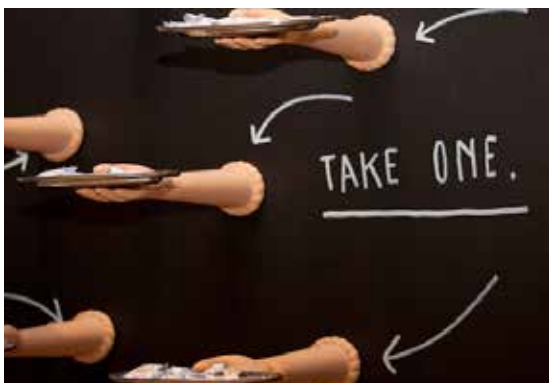
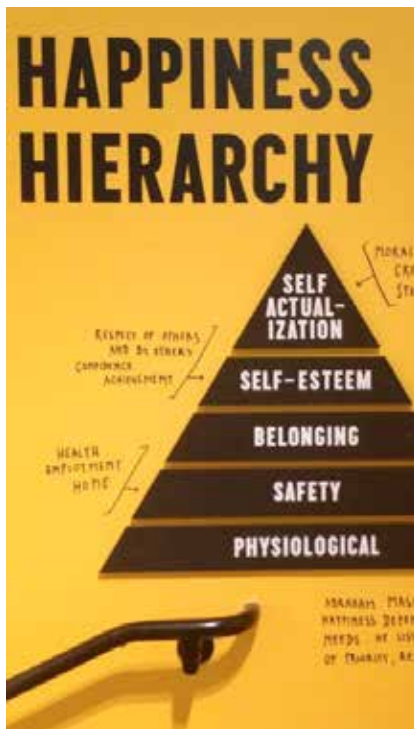


Figure 17. Stefan Saigmeister, 2013, *The Happy Show*, Museum of Contemporary Art, Los Angeles USA.

doors), photography and mixed media forms. Many elements of the work encourage participation, such as riding a bike to make text light up, taking a sweet from a tray, or placing a coin into a device that rolls it out onto the street for a stranger to collect. In *The Happy Show* we are experiencing Saigmeisters' personal interpretations and research about his discoveries of happiness (collected over ten years). Of significance to my research is Saigmeisters' expansive installation strategy and the immersive and sensory elements that offer the audience reflective and shared opportunities to consider their *own* happiness and what happiness might mean to them. This is important because although Saigmeister is offering an entry point into his own mind and his interpretations of happiness, without the audience to share in and explore these ideas themselves the work would remain inactive and silent.

While participation in installation can provide various sensory stimuli to aid in accessing information or interpreting messages, it is the immersive experience of 'visual scale' that I find of particular interest. In the image below, the ten by five metre visualisation depicts the long history of the Ars Electronica Festival. This work consisted of six different data visualisation pieces (created in collaboration) entitled *Mapping the Archive: 30 years of Ars Electronica*, 2009. In this example we can see the size of the work in relation to the size of the person standing in front



Figure 18. Dietmar Offenhuber, Evelyn Münster, Jaume Nualart, Moritz Stefaner and Gerhard Dirmoser, 2009, *Mapping the Archive* – Ludwig Boltzmann Institute for Media.Art.Research.

of the work. The immersive nature of this display enhances reading and access to the information being displayed. It does this by allowing the viewer to be inside the information, and to navigate through the visualised 'chunks' of data that have been placed together, in this case to map a story about the Ars Electronic Festival by showing networks and historical context and by using quantitative analysis.

As discussed in Chapter One, the application of visual comparisons is a useful tool for understanding the 'scale of things'. It is particularly helpful for determining the scale of objects or the scale of the impact of actions when visualised in three dimensions or in combination with time based and social media. For example, the television advertisement (shown in Figure 19) for *Scott's: Natural tube free toilet paper* (2010), visualises the enormous quantity of toilet paper tubes (17 billion) used annually across America to show us that it would 'make up' The Empire State Building (twice!). As a way to gain interest and to sell this new product to the public, Kimberley-Clark commissioned a 30 metre high replica of the building from toilet paper tubes.

Figure 19. Kimberly-Clark, 2010, television commercial for *Scott's Natural Tube Free toilet paper* (screen stills).



This spectacle was designed to raise awareness about wasteful and unnecessary product design by positioning it in a New York city street. The marketing campaign takes this opportunity further by connecting it to a social strategy for collective engagement through ‘pledging’ to #TossTheTube. In this way the public is encouraged to take part and witness a change-making activity occur (online we can see that over 13 million tubes have been ‘saved’). These combined strategies of visualising scale and time together provide a powerful persuasive story about the *magnitude* of accumulated actions in very tangible ways.

Similarly, the 3D animation company Carbon Visuals use a term they call ‘concrete visualisation’, describing it as “an approach to data that provides quantitative insight physically rather than purely numerically or geometrically” (Carbon Visuals 2015). In the example shown in Figure 20, Carbon Visuals present the scale of atmospheric pollution (CO₂) generated in New York City over one year at approximately two tonnes per second. Each blue sphere represents “one metric tonne of carbon dioxide gas (at 59° F) that would fill a sphere 33 feet across” (Carbon Visuals 2015). This visualisation work was an initiative funded by The Environmental Defence Fund in New York to motivate change and encourage an accelerated transition to a cleaner energy economy for the city. The sounds of the city (such as horns honking and people talking in the distance) provide further sensory experiences to aid our immersion into the environment of the city and our comprehension and understanding of the activities contributing to CO₂ output. It shows us ‘how much’ in relation to the size of something else, in this case the city itself and by using the blue sphere as a way to reveal something otherwise invisible to us (the magnitude of gas emissions generated over comprehensible periods of time – in this instance, one hour, one day, one week and one year).

All of these examples provide useful strategies for seeing things differently, more clearly or bringing attention to what we could not or did not see before. I propose however that to effect, witness and record social and behavioural change occurring in relation to waste (as substances and processes) and to being wasteful (as choices and behaviours), a combination of visualisations, installation and participation is needed. What is significant about the *The Modern Midden* is that none of the listed strategies can alone measure how change is occurring. Participation can be active (choosing and doing) or contemplative (thinking and feeling), however

when participants can affect the space itself and leave evidence of this for other participants, the ongoing dialogue creates new ways to share ideas and find solutions. By combining activities that leave behind a residue of performed messages a new form of public ownership can occur. In this designed space the dialogical experiences that unfold between participants can break down the daunting reality of confronting issues, those that potentially could result in negative emotional responses such as apathy, issue fatigue, fear or isolation. The immersive possibilities of installation for experiencing environments, witnessing the performing of actions and the telling of stories provides access to change-making in ways that can become constructive, interesting and enjoyable social activities. These can be activities however that one *chooses* to do as opposed to activities where one is *told* what to do and how to behave. *The Modern Midden* is an installation space that generates dialogue about waste generation by integrating participation with the waste materials as themselves. How then might the information design *within* the installation also support and provoke connection between waste, personal behaviours and social habits in a productive and empowering way? In the final section of this chapter I describe the way in which information design is integrated in *The Modern Midden* to contextualise the key insights discovered about waste.

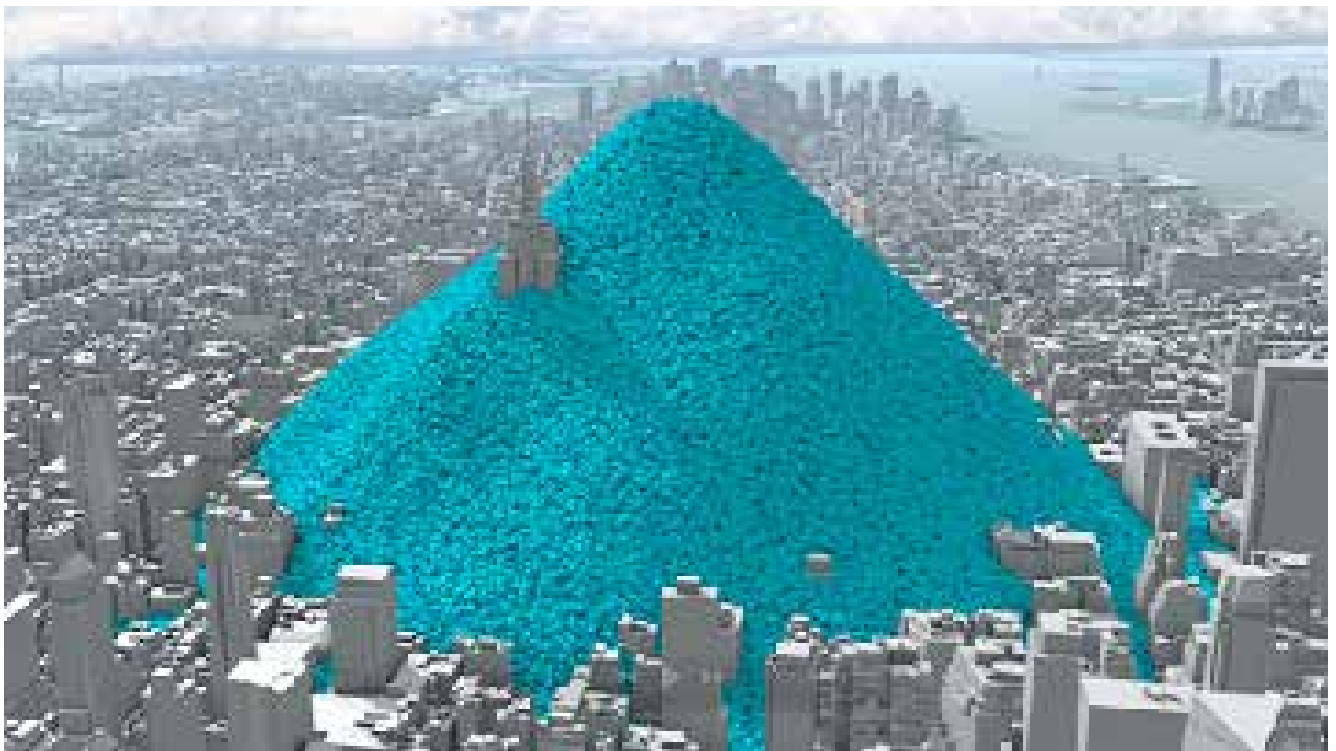


Figure 20. Carbon Visuals, 2012, *One day of CO₂ generated in New York with 3D time lapse animation* (Screen still).

Seeing with information design

‘Information design’ is the term I apply in this exegesis to describe the various visualisation strategies tested in the creative work *The Modern Midden*. These strategies (outlined in more detail in Chapter Three) are used to explore complex data for the purpose of explaining information to a broader audience (outside the professional waste sector). Visualisations are displayed in *The Modern Midden* as large printed panels that are included as part of the installation work and are designed to establish a ‘storytelling’ approach about waste. For the purpose of this design research, the terms ‘visual’ and ‘storytelling’ are integral to my use of the term ‘information design’. I define information design as a visual display that communicates information through the *exploration* and *explanation* of complex relationships, data and factual evidence to establish a story about a particular topic area.

Visualisation strategies which present complex information and tell visual stories can be identified across a diverse range of disciplines such as the sciences, medicine, geography, history, mathematics, informatics, marketing, finance, education and the creative arts (Friendly, 2009). Definitions of visualisation are generally specific to fields or discipline areas. Terms such as ‘data visualisation’ (referred to as “data vis”), ‘information visualisation’ (referred to as “info vis”), ‘information graphics’, ‘interactive visualisation’ and ‘cartography’ for example, are a means to describe categories or styles of ‘information design’, and in many cases imply the methods and techniques that are used to design them. All of these approaches are a means to ‘visualise’, either for the maker, or for the audience.

Of particular interest to this study is the intention and motivation behind the visual display of data. The power of persuasion (Barnes, 2007) lies at the cultural and historical heart of visual communication theory and is found in propaganda, activism, agitprop, advertising, film, campaign design, marketing and branding. In *The Modern Midden* installation I present waste information outside of the context in which it was published (in this case, waste reports and policy documents). I display this data and factual evidence by applying multiple visualisation strategies to encourage the audience to navigate and question their own personal relationships with waste generation and disposal. A key motivation of this research is to explore changing behaviours and this intention is not hidden from

the viewer. Information is structured to reveal existing ‘evidence’ found in statistics pertaining to waste and this data is selected, synthesised and displayed for this purpose, positioned alongside visualisations that reveal the project’s intentions and include the audience within the research process. In this way, the audience becomes aware that the intention of the installation *is* to motivate change, and that the work offers an opportunity to *choose* to participate.

The generation of data representations selected for *The Modern Midden* occurs through an analysis of information relevant to the topic area of waste, a key synthesis stage in the practice-led methodology. In this stage, exploratory visualisation approaches such as mind-mapping the project areas, developing charts and graphs from tabled numerical data, and plotting 100 years of seemingly unrelated events onto a timeline are a means (for me as the designer) to establish connections, cluster critical information and to assess what is revealed in the data (selected sketches are included in Stage Two of *The Creative Report* from page 11). Some of the panels in *The Modern Midden* are designed to show and explain (explanatory) and some are designed to analyse and engage (exploratory).

The Modern Midden presents the opportunity to include insights discovered during the exploratory processes (data to designer) and explanatory visualisation forms (designer to audience) together, in the same installation space. This approach is explored for two reasons. First, to establish a ‘storytelling’ approach that the audience can ‘choose’ to navigate (no explicit directions are provided, apart from an entry point). Second, to present information that allows the audience insight into my design processes as well as the visualised outcomes found in the data. By using this approach the information presented does not provide ‘all of the answers’ and encourages insights and understanding to emerge via a process of collective sharing where the audience becomes integral to the solution-finding process. In this way, the installation becomes an active exploratory visualisation for the audience, where potentially impenetrable information can become more accessible.

There are tensions revealed in the literature regarding the motivation and intention of visualisation. Edward R. Tufte describes the founding graphical statistical methods of William Playfair as having ‘graphical elegance’. Tufte expands on this, explaining that good design has two key elements; “simplicity of

design, and complexity of data” (2001, p.177). This leads me to question what is actually implied by the term ‘elegance’ (within the context of presenting information about waste), as elegance is a subjective and culturally coded term. It suggests to me that the execution of a visual display must reflect the complexity of data first and foremost and that this should be visually simple. Are elegance and simplicity therefore what make a visualisation more understandable?

Whilst a single visualisation might be able to achieve this quality, when multiple visualisations are placed together such as in *The Modern Midden*, it is the visual systems of communication design such as typography, colour, graphic style and the use of negative space, that become critical for integrating and linking the data together. The individual visualisations in *The Modern Midden* are designed to highlight specific themes about waste. When navigated as a collective of designed information, it is the visual systems and cues that occur across all panels that assist in establishing the connective and coherent visual language to form one larger visualisation.

Whilst ‘elegance’ and simplicity appear to be a reasonable consideration for the interpretative success of a visual display, I argue that this is not necessarily critical to presenting information that aims to encourage participation and for examining social attitudes about waste generation and disposal. After all, the topic area of waste generation and consumer behaviour is not exactly ‘elegant’ and to present it as such in fact might lead to a simplification of the data and fail to engage the audience on an emotional level. Tufte (2001) does discuss how a visualisation might be helpful for audience interpretation in other ways by stating that presentations of statistical information can “display an accessible complexity of detail and often have an accessible narrative quality, a story to tell about the data” (2001, p.181). In his book *The Functional Art*, visual journalist and designer Alberto Cairo asserts however that there is a ‘middle ground’ when considering a storytelling approach to visualising, and that integrated techniques to display infographics, illustration, graphing and text can provide a more layered, sensorial experience if this is required. Cairo describes a clash “between those who favour a rational, scientific approach to the profession, emphasising functionality, and those who consider themselves ‘artists’, placing emphasis on emotion and aesthetics” (2012, p.61). Cairo also proposes that this difference in visual approaches is due to

disciplinary motivations and describes these as being either from the technical backgrounds of cartography, computer science and engineering, or from the humanities, such as design, journalism or the visual and media arts disciplines.

In the following chapter I discuss how this middle ground is explored in the *The Modern Midden* to establish a storytelling approach to information design. I do this by providing a variety of visual experiences (such as photography, illustration, infographics, text, timelines, symbols, codes, charts and physical waste materials) and combine those with the immersive opportunity that installation offers. Using this approach allows the audience to take time and be immersed in an experience that may not have been accessible in this way previously. It also provides an opportunity to explore information and refuse materials in a way that would otherwise be hidden inside waste reports or within household garbage and recycling bins.

CHAPTER THREE

THE MODERN MIDDEN

This chapter provides a more detailed analysis of *The Modern Midden* to reveal how the insights and discoveries discussed in Chapter One and Two have been integrated into the practice-led research. I begin this chapter by exploring the use of visual storytelling with information design followed by an explanation of how this is applied in *The Modern Midden*. This is followed by a discussion about the significant connections between visual storytelling, memory and behaviour change. I then discuss how the synthesis of data pertaining to waste generation results in the establishment of ‘themes’ (such as *Magnitude*, *Time and Growth*, and *Symbols and Codes*) to support the storytelling approach. In conclusion to this chapter I examine how the provision of visual evidence about waste can reveal further evidence of social and behavioural change.

Visual storytelling

Telling stories has a long history in the development of human communication, yet it is in the telling of stories through pictures, or through a combination of pictures and words that visual communication can have a strong influence on memory and behaviour. My focus here will be on how storytelling is established through the information design and participatory experiences generated by *The Modern Midden* creative work. In their paper, *Storytelling: The Next Step for Visualisation*, leading visualisation researchers Robert Kosara and Jock Mackinlay explain that there is a need for further investigation into the value of storytelling in data visualisation. They state that “a story often tries to raise awareness and create interest in a topic area a reader may not otherwise have been aware of” (2013, p.48). This may sound logical for a topic area that is entirely new to a reader but how might we tell *new* stories about known, tired or confronting topics at the same time as including the reader within that story?

Storytelling is applied in *The Modern Midden* in various ways. First, stories emerge through the data and factual evidence that is displayed using multiple visualisation strategies across twelve printed panels. Stories are developed through the use of ‘themes’ which act as ‘chapters’ underneath the broader topic of waste such as *Time and Growth* or *Embodied Energy*. These themes are then sequenced loosely so that the audience can explore and make their own new connections across or

within those themes. Second, stories emerge through the audience participation occurring within the installation. This altering and adding to the space itself establishes a new approach to storytelling with information design and can then be witnessed by others that come to participate within the space.

There are three activities that encourage active participation in *The Modern Midden* (shown here in Figures 21 and 22). These are experienced through the *Pledge* wall, the *Conversation Station* and *Ten Families, One Week* (waste material sorting). All of these are designed to provide activities in the space that generate collective stories. These unfold and are shared through writing, reading, discussing or deciding. The sorting of household waste materials (*Ten Families, One Week*), allows for the activation of sensorial experiences such as touch, sound and smell (with common household waste items). In this way, making change to the space itself is analogous of making change to the way the individual and collective participants respond to the topic of waste. By performing actions (such as asking a question, making a pledge (or not) or sorting waste materials into resource categories) a form of audience ownership within the installation space occurs. This is played out through each individual contribution (writing, touching, discussing and transferring of objects) in the evolving story but also through the witnessing (reading, observing and reflecting) of what other participants have contributed. What is important to storytelling here is that by offering the audience a number of visual and sensory experiences in which they can process complex or confronting concerns about waste generation, the time spent within the space (and with others) becomes not only a social experience but a *collaborative* one. This collaborative process encourages reflection and the retention of information as memories.

Stories and memory

Storytelling is a way for us to process and accumulate knowledge fairly quickly, but, more importantly, in a more *memorable* way. In terms of visual storytelling, Kosara and Mackinlay explain that “given that the goal of presentation is generally to get the point across and have the audience remember it, the effect of visualisation on memory is important” (2013, p.46) Stories allow us to cluster ideas together, link themes and contemplate our own experiences. Bill Ferster discusses this in his text *Interactive Visualisation, Insight Through Inquiry* by explaining that “stories are used to chunk information into memorable units,



Figure 21. *The Modern Midden*, 2014, — Waste collected from ten families over a seven day period (prior to the opening) is sorted over one month through audience participation, Innovation Campus, University of Wollongong.



Figure 22. *The Modern Midden*, 2014 — Pledge Wall (with attached audience pledges) and Conversation Station (with audience questions and answers). Innovation Campus, University of Wollongong.

thereby avoiding some of the limitations of short-term memory” (2013, p.175). By providing diverse visual and sensory experiences, it is possible to establish stories using non-linear narrative structures. This occurs in the visualisations displayed on the walls of the *The Modern Midden* with the establishment of *themes*. I do this so that the audience is able to digest these select portions of information as their interest leads them, moving back, forward or through the information and relating it to other portions of information.

Individual panels are linked to each other more broadly by applying visual and written cues (such as headings, colour codes or typographic variation) as well as the appropriate visualisation strategy for each particular theme. As discussed in Chapter Two some of the panels are designed to *show and explain* and some are designed to *analyse and engage*. This approach provides several ways of ‘looking at things’, and gives the audience a variety of visual experiences in which to accumulate and access new knowledge about the topic area.

Stories and how they assist memory are significant to this research. Importantly, they are significant to how the themes about waste and materials are received by the audience in *The Modern Midden*. Kosara and Mackinlay point out that “stories naturally lead to questions, which lead to discussion, which leads to deeper analysis” (2013, p.54), and there are several ways that this is expanded upon in the creative work. First, the audience is able to assess new information and discuss it with others; second, the audience has an opportunity to act upon discoveries and contribute new insights by ‘pledging or not pledging’ or ‘writing or answering questions’; and third, the audience performs actions through the transfer of waste materials into categories.

All of these are sensory experiences which provide an opportunity for decision making. During these decision making processes, further observations arise and are shared with other participants. These externalised exchanges provide experiences that are able to be remembered differently to internal (reading or contemplating) experiences that participants might have whilst navigating the installation alone. My personal observations were recorded in a journal during the time spent in the installation at both iterations (these are transcribed and included in *The Creative Report*). For example, one participant noticed, “there seems to be a lot of paper and cardboard, it takes up heaps of space”, to which another

participant responded, “Yes it is quite surprising, makes me want to be better at recycling all our paper.” During further observations I witnessed several participants helping each other, asking questions such as, “where *is* the code on this plastic bottle? Is it recyclable?” or, “I am not sure where this ice cream tub goes, it has plastic and paper, do I pull them apart?” What I observed through this sharing of personal discoveries and questioning is that other participants would then build upon what was ‘left behind’, or already ‘sorted’ in the space. This ongoing process acts as a cue or permission-giving for others to continue. For example, “This plastic is soft like all of the ones in the landfill pile, does that mean *all* of these soft plastics go to landfill? I didn’t know that,” and, “I didn’t realise you should take the lids off, look they have done that because they are different plastic, I think”. This collaborative experience enables the installation to remain an ‘active’ story that is being uncovered over time. Participants that contributed to the sorting of materials did so to be included in the outcome of the story in some way, with many participants returning to the space over time to observe developments.

A significant discovery was revealed using an anonymous questionnaire in *The Modern Midden* and highlights a critical link between telling visual stories and memory. Kosara and Mackinlay go on to explain why telling stories with visualisation is particularly valuable for memory, saying “stories have proven to be not only an incredibly popular way of conserving information and passing it on, they provide the connective tissue between the facts to make them memorable” (2013, p.45). A questionnaire was provided for a number of reasons; first, to collect qualitative response data; second, to provide a further opportunity for participants to contribute thoughts or concerns; and third, as a further tool to reinforce experiences and memories. The question, “What was the most memorable part of *The Modern Midden*?” gives valuable insight in terms of memory. All comments to this question are recorded in *The Creative Report* (p.67), yet of particular note is that one third of the total responses mention the timeline (see Figure 23) as being most memorable. This is significant because to read and explore the timeline itself requires time and contemplation due to the scale and quantity of points plotted. In my observation of participants, discussion is initiated with others, and conversations are opened up about when events happened and why. Linking and relating to personal events such as dates of birth and other significant personal memories are also observed, and by doing this

individuals *place themselves* within the time and context of the information being displayed. This slowing down within the installation provides evidence of change occurring through these personal interactions — the sharing of memories, making of connections and reflections.



Figure 23. *The Modern Midden*, 2014, 100 Year Timeline, Innovation Campus, University of Wollongong.

Establishing themes

In order to summarise and present the relevant evidence that would aid in providing a compelling story, becoming visually rich (yet graphically simple), and for encouraging audience participation (that might activate change) I pose several questions as a way in which to extract and synthesise the data and waste materials. First, what evidence is relevant to *individuals* and *households* about waste

generation? Second, how might revealing that evidence *encourage* (not inhibit) audience engagement? Third, can historical knowledge about our materials economy provide an impetus and context for the need to change? This approach establishes the set of themes for synthesising the insights found in waste reports and combine this with other evidence that aids in answering these questions. Design educator Jon Kolko explains that “during synthesis, designers attempt to organise, manipulate, prune and filter gathered data into a cohesive structure for information building” (2010, p.15). The following discussion illustrates how these themes are established within *The Modern Midden* and are visualised as evidence of not only the synthesis and sense-making process but as the organised and filtered data, factual and historical evidence discovered during the research stages.

The Modern Midden is in itself a large-scale visual structure in the form of an installation. Within the whole structure are smaller, more specific, visualisations that divide the story being established about waste into digestible portions or themes. This is achieved by presenting each theme with the appropriate visual structure for that specific data set. For example; a timeline structure visualises and plots historical evidence; the bar chart makes comparisons across categories; a circular information graphic visualises closed and open loop energy systems related to manufactured materials; a physical structure holds the collected waste materials of ten families; and a table of codes and symbols provides a key for plastics sorting and clarification. These smaller visualisations act as the pieces of digestible information or data evidence that the audience can engage with (a piece at a time) whilst being immersed in the larger structure (all of the time). Together, the visualised evidence extracted from waste reports and the contribution being made by the audience as they participate with the work, form new ways of communicating about the impacts of waste and, more importantly, what ‘change’ might actually mean for the audience.

A floor plan (aerial diagram) of *The Modern Midden* (shown in Figure 24) illustrates the arrangement of display panels designed to support the printed visualisations that form the two large ‘bracket’ structures central to the installation. These two structures (indicated in red) provide internal and external surfaces in which to organise the themes being presented. The internal surfaces display a sequence of information that focuses on ‘household’ contribution to waste generation, and the central floor space (inside the bracket structures) provides an area in which pre-collected household waste materials are displayed (within a circular ring of two

metres diameter). The sequence of visualisations are not designed to be linear. Instead it allows the audience access to any part of the information so that they can relate it to other parts in the sequence. In this way ‘choosing’ how to navigate the space for either individual or collective sense-making processes provides further opportunity for engagement and decision making.

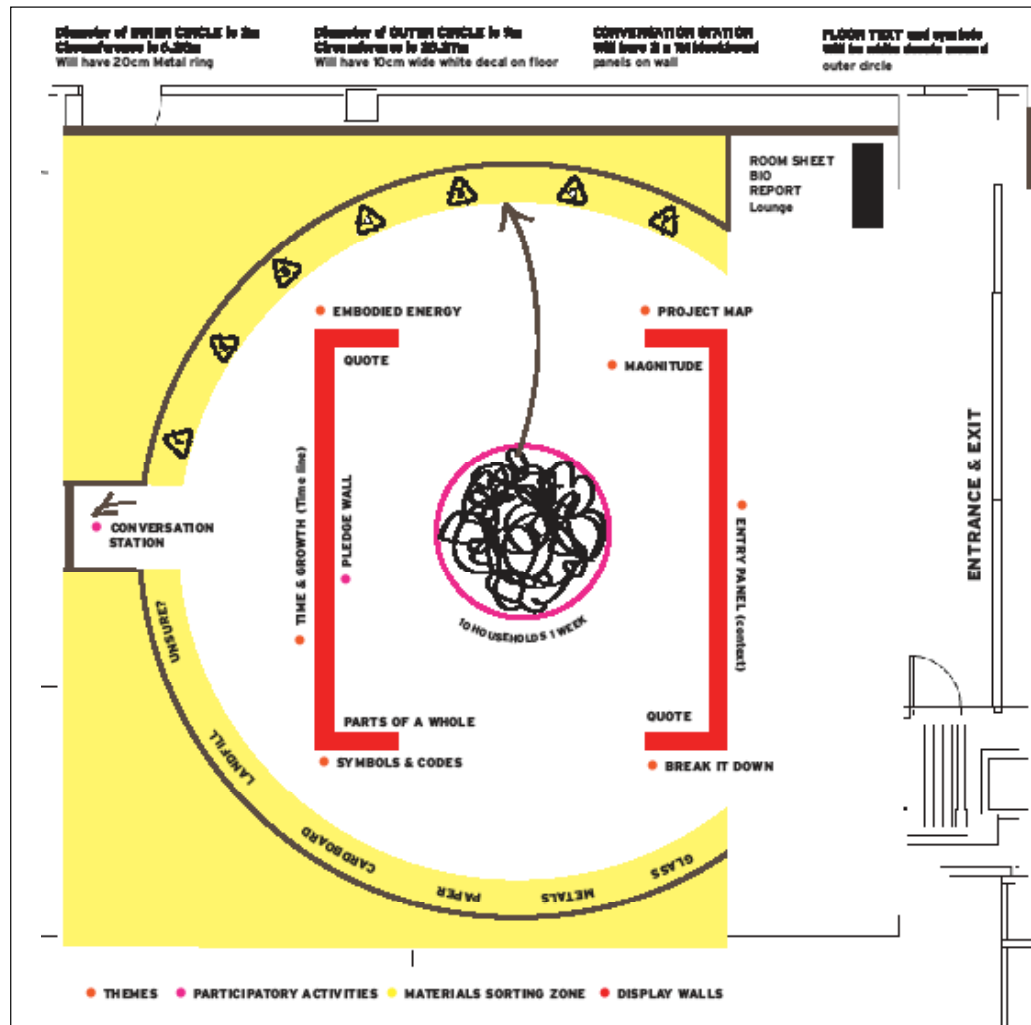


Figure 24. *The Modern Midden*, 2014, 2014, Floorplan, showing bracket structures, panel order and sorting areas for materials, Innovation Campus, University of Wollongong.

The theme of *Magnitude* is presented to contextualise quantities and, as discussed, in Chapter One, to highlight the perceptual challenges associated with measurements of weight. Magnitude is also visualised in the internal space for the audience to interpret quickly that household waste contributes *one third* of the total waste generated across all waste sectors. This is illustrated under the theme *Parts of a Whole* using the visual structure of a pie chart. Further to this, a ‘red dot’, is applied as symbolic of Australian households, to present visual evidence of

population magnitude through the visual strategy of repetition. Within the dot walls that line the interior surface of the installation are typographic cues, facts, a colour coded chart and quotes, with context established through the supporting text. For example, to describe the relevance of each red dot I explain that, “Australia has reached almost 23 million people, living in 10 million households. Each dot here represents 100 of those households.” (Stirling, *The Modern Midden*, 2014). One can stand inside the dot walls and ‘visualise’ the installation repeated one hundred times, giving a physical sense to the magnitude of population, and more importantly the waste generated by ten million households (see Figure 25).

The dot wall provides an opportunity for individuals to ‘choose’ and ‘claim’ one of the dots, by writing a pledge and pinning it to the wall. In this way participants choose to share with others what change they might make in regards to waste generation on their own household level, for example, “not getting individual plastic bags when buying fruit and veg” (pledge from participant, *The Modern Midden*, 2014). The pledge wall provides evidence that change is occurring through the experience of being within the installation and that this is being recorded and shared collectively (further reflection on the efficacy of the pledge wall is discussed in *The Creative Report* on pages 32 and 33).



Figure 25. *The Modern Midden*, 2014, Internal space of installation showing *Magnitude*, *Parts of a Whole* and *Dot Wall*, Innovation Campus, University of Wollongong

The Modern Midden provides a space to investigate audience knowledge about materials categories, and in doing so reveals some interesting discoveries. The theme of *Symbols and Codes* (shown in Figure 27) associated with plastic composite identification (discussed in Chapter One), is included in table form to provide a ‘key’ for participants during the hand-sorting experience (reflective of

the hand-sorting that occurs in reprocessing facilities). The activity of ‘sorting’ and ‘moving’ mixed household waste materials in *The Modern Midden* from the central ‘inner’ space to the ‘outer’ space marked out by defined resource category areas (shown in Figure 26) creates an opportunity to reveal collectively ‘what we know’, or ‘don’t know’ about materials as they accumulate in separate piles over time. These piles in themselves act as new sources of visual information for the audience to assess and observe. The household waste materials collected prior to the opening of the second installation, display how much waste was generated by ten families (comprising 39 individuals) over a seven day period (reflective of a weekly municipal garbage collection cycle). This central pile (shown in Figure 26) is contained by a circular ring to reference the household dot metaphor applied within the internal walls of the installation.

By separating the waste into material categories and not into specifically defined recyclable and non-recyclable categories, the participants have an opportunity to query and consider what products actually consist of. Although this may appear obvious for many materials (such as glass and paper) the separation of familiar plastics requires enquiry. Through the collective sorting process we can observe how the quantity of plastic types accumulate and the ‘qualities’ that each plastic type has (rigid, soft, clear, coloured or ‘scrunchable’ for example). This reveals the visual differences and similarities between plastics when seen in an accumulated way and acts as a visual audit of familiar products and the materials they are packaged in, such as soft drink bottles (RIC Code 1 – PET) and their lids (Code 2 – HDPE or 4 – LDPE). A common query (noted during the time that the installation was open at UOW, and at *The Big Sort* in Kangaroo Valley) “Do I take the lids off plastic bottles?” indicates widespread confusion about plastic types.

The ‘hand-sorting’ material activities bring this issue to light, as participants could then relate to the hand-sorting processes that occur during waste management practices. Shoalhaven council states on their website that “Recyclable material is hand-sorted over a conveyor belt, and there is no time or opportunity for the sorters to separate lids from the bottles and jars.” (Shoalhaven Council 2015). One participant revealed that, “I didn’t really understand that not all plastics could be recycled together,” which highlights further lack of knowledge about plastics and whether they can be included in household recycling. I note that the waste collected from households prior to the opening of the installation did not include



Figure 26. *The Modern Midden*, 2014, Central mixed waste pile, moved to outer sorted waste categories, Innovation Campus, University of Wollongong.



Figure 27. *The Modern Midden*, 2014, Symbols and Codes, Innovation Campus, University of Wollongong.

food or hazardous waste (due the pragmatics of exhibiting in a public space). From the categories that were organised into zones, the largest single pile to emerge from the sorting process at both iterations of the project (in terms of volume) was landfill. This pile was followed by a combination of all of the separated plastics codes, indicating that plastics were by far the largest in volume of any other material typically found in household waste streams.

The sorting process in itself acts as a form of collective sense-making, as personal internal thought processes (or confusion) become externalised and acted upon. Many familiar household items were placed in the ‘unsure’ sorting zone. This zone was provided to allow for uncertainty and confusion to be assessed, with the majority of unsure items being made from mixed or bonded materials found in packaging such as plastic/paper, textile/plastic or paper/metal combinations. The anonymous questionnaire provided at *The Modern Midden* confirms the uncertainties associated with the recycling of household materials. When asked, “Do you get confused about what items you can and can’t recycle?” 70% of participants identified that they are *sometimes* confused, whilst 28% revealed that they are *always* confused. Only 2% of participants declared that they were *never* confused (*Creative Report* p.68).

The theme of *Time and Growth* presented in the timeline (see Figure 23) plots 100 hundred years from 1910 to 2010+, for the purpose of revealing and linking events across a number of categories in chronological alignment. The timeline in itself proposes a reflective opportunity for the audience to consider the implications of ‘growth’. The timeline shows growth not only in population over time, but shows the acceleration of industrialised processes and therefore the consumer economies that contribute directly to the environmental impacts associated with them over time. The nine fields plotted on the timeline include:

1) Environment 2) Patents 3) Technology 4) Materials 5) Food—Australian brands and facts 6) Human health / Medical 7) World events 8) Australian events 9) Australian population growth.

By plotting information in this explanatory manner (*this* event occurred at *that* time), new and exciting information is revealed (these single events occurred during the same period as other events). When information is presented in this way the experience of reading and sharing with others becomes exploratory in

nature, and new hypotheses about particular decades, for instance, can be put forward. For example, following the period after WWII there are considerably more advances in technology, coinciding with the first mention of global warming in the latter part of the 1950s; we can also see that there are more health and medical advancements coinciding with a steep increase in population. It is important to note that the inclusion of a timeline visualisation in *The Modern Midden* is designed to provide a retrospective context to the topic area of the materials economy. In this way, the timeline helps to contextualise the other visualisations within the installation and establish further connections between waste and wastefulness.

Further themes explored in *The Modern Midden* include *Embodied Energy*, a circular infographic that explores closed and open loop energy systems in relation to recycling and landfill. *Break it Down* shows how long materials will take to decompose in the environment (if at all). This theme has particular significance for discussion about the non-biodegradable nature of plastics and how this is miscommunicated (for example with plastic shopping bags that claim to be biodegradable). These visualisations can be viewed on pages 78 and 79 of *The Creative Report* for more detail.

Visual evidence

The Modern Midden acts as a space to present evidence of data as well as a space to assess evidence that changing behaviours and social attitudes about the impact of consumption and waste generation are occurring. Bill Ferster describes data as a form of evidence in his text *Interactive Visualisation, Insight Through Inquiry*: “data serves the same role in visualisation as evidence does in a courtroom procedure. The clues support the lawyer’s case, while data supports the visualisation’s ability to persuade or explain” (2013, p.66). With this in mind, I *include* my intentions and motivations to provoke social change within the work itself. This is articulated at the entry point of the *The Modern Midden* through a series of statements and questions:

Australians are the second highest producers of waste per person globally and continue to generate an annual increase in total waste. Dependence on landfill as a solution for waste management has long lasting environmental

consequences. However, the piles grow faster than the systems or solutions can adapt to manage them. How might information design help us see these issues? Can attitudes about the environmental impacts of consumption and waste generation be challenged? In a world saturated with information, what will motivate us to ACT? (Stirling, 2014).

These statements provide a geographical and topical context and position the installation with the proposition that there are issues that need addressing. The questions ask the audience to be part of the solution finding process, and indicate that the space is established to explore how information design might be a way to not only understand these problems more clearly, but also to help us to share insights and concerns and work on solutions *together*. At this point of the installation the viewer can choose to enter or not to enter into the space. Ferster (2013) explains further that “perspective can be a conscious act or simply reflect the values and life experiences that have shaped the visualization designer’s frame of reference” (p.177). To provide clarity for the audience about the perspective and processes of the research I also include a *Project Map* (exploratory mind-map shown on page 26 of the *Creative Report*). This illustrates the project focus areas and intersections and also reveals the complexities inherent to the design ‘synthesis’ stages. Its inclusion in the installation allows the audience insight into the thinking and linking stages of concept synthesis. The *Project Map* states that “this installation is in development, and your participation will help it to grow and change” (Stirling, 2014). Historian David Staley reflects upon this method of providing multiple types of evidence:

Evidence is something that makes something else evident. When evidence is understood in relation to specific inquiry, the data moves from evidence of something to evidence for something, and insight can be inferred from that transition. When evidence can be placed in context with other pieces of evidence, those in turn equally context-dependant, stronger inferences can be obtained (2007, p.65).

The storytelling about waste that is established in *The Modern Midden* is structured in precisely this way by placing explanatory and exploratory visualisations alongside one another, juxtaposed with the evidence of household waste generation displayed on the floor space, and supported by the messages and

changes that participants leave behind in the evolving story. By using this method, new meanings can be discovered and, as Staley (2007) suggests, “stronger inferences can be obtained”. The plotted points on the timeline are explanatory in nature for each individual category, however when assessed so that the relationships between and across the events of multiple timelines can be explored, new evidence can be derived.

In summary, the visualisation examples discussed within *The Modern Midden* provide a model that demonstrates how information design can establish a visual story that is not only reflective of the evidence found in current data forms about waste in Australia, but can record and instigate participatory experiences to build upon that evidence. By applying visual strategies and structures for this data to be displayed for an audience outside of the context in which it would be typically viewed, what is hidden about waste and what is understood about the topic can be revealed. In this way information design provides an opportunity to integrate collective knowledge into the storytelling experience and to witness social attitudes changing and individual behaviours being modified.

CONCLUSION

This research experience has presented an enriching opportunity for my own design practice through which I have developed a deeper understanding of design for social change with community collaboration. The project has also revealed some difficult challenges for me as a designer and researcher. At the outset of the project I was presented with the confronting challenge of 'scope'. The sheer quantity of information and data pertaining to waste has been a sizeable task to negotiate. Due to this challenge much of the formative stages of the research were spent gathering and deciphering available data sets and synthesising and testing key discoveries. Investigating recycling processes, global and national waste management and discovering landfill implications also posed a significant challenge. This is primarily due to the breadth of issues across this field, together with the emotive nature implicit to the disturbing reality of current waste generation and disposal. My desire to test the 'effectiveness' of information design in change-making relied heavily on the contribution of an audience so that I could explore the balance between shock, spectacle and the 'spectre of paralysis' versus active engagement, discussion and exchange. All of these experiences, whether they are individually felt or collectively shared, I would argue contribute to a change-making process.

Further challenges occurred during the design and building of a suitable (transportable and sustainable) display system that would support (not interfere with) the information and materials being presented as well as provide a stable structure that would assist in establishing a 'space' for an audience to navigate with autonomy and share dialogue comfortably.

There have been many highlights during both iterations of this project. The first iteration of *The Modern Midden* in Kangaroo Valley provided several concrete outcomes. First, the project uncovers the willingness and desire for people to act collectively, to discover and to expose their own personal uncertainties. This was seen to be possible as *The Modern Midden* was designed to support sharing and empower collaboration. Second, it is clear that visual communication design can and does play a vital role in effecting change. Not only can it act as a visual educational tool, but as a catalyst for further enquiry. I have witnessed 'new' personal and collective discoveries travel onto social media, blog sites, and in

printed media. *The Modern Midden* has inspired changes to waste sorting in two primary schools (Cambewarra Public and Kangaroo Valley Public) and has sparked a review and implementation of waste management in two large events in my community (The Kangaroo Valley Agricultural Show and The Kangaroo Valley Folk Festival). Third, this project has impacted directly on my family and household practices – we now make more considered purchasing choices, recycle better, and, as a result, have very little waste in our weekly landfill bin.

Although these are positive outcomes, they also highlight the flaws inherent to the continued design and production of unsustainable products and, as McDonagh and Braungart (2002) point out, “being ‘less-bad’ through waste ‘reduction’ and pollution ‘prevention’ does not fully address those flaws”. This most certainly presents further avenues for research. I propose that individual and collective choices about the products and services we support can and does effect change to the systems that benefit from wastefulness by questioning and exposing the collective compliance we have with those embedded systems.

The second iteration of *The Modern Midden* at the University of Wollongong resulted in even deeper discoveries due to the extended timeframe of the exhibition and the integration of the materials sorting process that remained active over one month (without requiring my constant presence in the space). During this iteration I was able to utilise and draw from *The Modern Midden* as a teaching tool for students across a range of discipline areas such as graphic design, visual and media arts, communications and journalism students. I was also able to spend time observing participants and witness their discussions and actions during this period of time. The project has generated further opportunities for collaboration with both the Shoalhaven and Wollongong council waste management departments expressing interest for *The Modern Midden* to travel to civic events and public spaces. As a result, a new project in collaboration with the Environmental and Sustainability Unit at UOW will investigate a design strategy (inclusive of information design) to eradicate the ‘epidemic’ of disposable coffee cups being used across the campus which end up as landfill. This project presents a challenging opportunity to implement and expand upon the research undertaken and discovered during *The Modern Midden*.

This research project has opened up several avenues for continued research, in

particular where information design can be used to bring awareness *to* and for the disruption *of* repeated individual and social behaviours by applying an immersive environment in which a collective storytelling can be witnessed. This approach does encourage participation and engagement so that audiences can become empowered to question and make changes to the relationship they have with waste and to behaviours of wastefulness. More importantly participation can act as a way to advocate for environmental benefit when there is support for design solutions that place materials and waste generation central to the life-cycle of manufactured products.

The practice-led research embodied in *The Modern Midden, a small part of the big story of waste* and as discussed throughout this exegesis was a visual, immersive and social experiment. First, the ‘visual’ component was designed to *present data* through information design using the visualisation of statistics, facts and waste materials. This acted as the catalyst for initiating audience participation and contemplation by revealing the story of waste in the display of information. Second, the ‘immersive’ component was established within the installation space itself, thus providing a disruption to the context in which we might typically encounter waste as *materials* and to allow us to consider *behaviours* of wastefulness. Third, it is a social experiment in which the audience could themselves add to the story of waste by collectively altering the installation space. It is hoped that this research will and can be used by others to further advocate for design solutions and systems that integrate and promote environmental benefit.

BIBLIOGRAPHY

G, Harris, P, 2015. *Design Genius – The ways and workings of creative thinkers*, Bloomsbury Publishing, London.

Australian Government Department of the Environment, Water, Heritage and the Arts, July 2010. *National Waste Policy: Less Waste More Resources Implementation Plan*, Environment Protection and Heritage Council (EPHC).

Australian Government, 2013. *Sustainable Procurement in the Australian Government Report*, Australian Government Department of the Sustainability, Environment, Water, Population and Communities.

Australian Bureau of Statistics 2015, website, <http://www.abs.gov.au>

Australian Packaging Covenant 2011, *Smarter Packaging, Less Waste, Cleaner Environment*, Statement, Recycling Data, ACP.

Barnes, S 2007, *Visual Impact: The Power of Persuasion*, Hampton Press, New York.

Barker, M 2015, website, <http://mandy-barker.com>

Bertin, J 1967, *Sémiologie Graphique: Les diagrammes, les réseaux, les cartes, (Semiology of Graphics: Diagrams, Networks, Maps)*, Gauthier-Villars, Paris.

Benyus, J M 1997, *Biomimicry – Innovation inspired by Nature*, Harper Collins, New York.

Bermudez, J 2004, *Art and Design: Cures for Society's Growing Data Perceptual Blindness?*, Leonardo, Volume 37, Number 5. The MIT Press.

Brown, T 2009, *Change by Design – How design thinking transforms organisations and inspires innovation*, Harper Collins, New York.

Buchanan, R 1992, *Wicked Problems in Design Thinking*, Design Issues: Vol 8 Number 2. The MIT Press.

Carew-Hopkins, D 2005, *Landfill Waste Classification and Waste Definitions 1996* (As amended), Western Australia Department of the Environment.

Cairo, A 2013, *The Functional Art: an introduction to information graphics and visualization*, New Riders, Berkeley, CA.

Corbett, J 2006, *Communicating Nature: How we create and understand environmental messages*, Island Press, Washington, D.C.

Crouch, C, Pearce, J 2012, *Doing Research in Design*, Berg, London, New York.

Daniel H, Perinaz, B 2012, *What a Waste: A global review of Solid Waste Management*, World Bank, Urban Development and Local Government Unit of the Sustainable Development Network. Urban Development Series.

Department of Environment, Climate Change and Water NSW (DECCW) 2010, *Waste Avoidance and Resource Recovery Strategy Progress Report*.

Designmatters Art Centre College of Design, (2015) website, <http://www.designmattersartcentre.org>

Ehmann, S, Bohle, S, & Klanten, R 2012, *Cause and effect – Visualising Sustainability*, Gestalten, Berlin.

Ferster, B 2013, *Interactive Visualization, Insight Through Inquiry*. Massachusetts Institute of Technology, The MIT Press.

Friedman, K 2003, *Theory construction in design research: criteria: approaches, and methods*. Journal of Design Studies 24. Elsevier Ltd.

Friendly, M 2008, *A Brief History of Data Visualisation*, The Milestone Project. <http://www.datavis/ca/milestones>

Friendly, M 2009, *Milestones in the history of thematic cartography, statistical graphics, and data visualisation*, National Sciences and Engineering Research Council of Canada.

Friendly, M 1999, *Extending mosaic displays: Marginal, conditional, and partial views of categorical data*, Journal of Computational and Graphical Statistics.

Friendly, M 2000, *Re-Visions of Minard*, Statistical Computing & Statistical Graphics Newsletter.

Grafetti, M, Scagnetti, G, Ricci, D & Masud, L 2011, *Tell them Anything but the Truth: They will Find Their Own. How We Visualise the Map of the Future with Respect to the Audience of Our Story*, Leonardo, Volume 44, Number 3. The MIT press.

GreenBlue 2011, *Closing the Loop: Road Map for Effective Material Value Recovery*. GreenBlue Institute, Charlottesville Virginia.

Gross, N 2011, *Design Thinking*, Berg, Oxford UK.

Haberman, S J 1973, *The analysis of residuals in cross-classified tables*, Biometrics, 29, pp.205-220.

Hyder Consulting 2009, *Waste and Recycling in Australia, Amended Report*, prepared for the Australian Government Department of the Environment, Water, Heritage and the Arts.

Hyder Consulting 2011, *Waste and recycling in Australia: Incorporating a revised method for*

compiling waste and recycling data. Australian Government Department of the Sustainability, Environment, Water, Population and Communities.

Jordan, C, website, <http://www.chrisjordan.com>

Kolko, J 2010, *Abductive Thinking and Sensemaking: The Drivers of Design Synthesis*, Design Issues: Volume 26, Number 1, Winter 2010, Massachusetts Institute of Technology, USA.

Kosara, R, Mackinlay, J 2013, *Storytelling: The Next Step for Visualization*, IEEE Computer (Special Issue on Cutting-Edge Research in Visualization), vol. 46, no. 5, pp. 44–55, Also in: IEEE Computing Now, January 2014.

Kosara, R, Ziemkiewicz, C 2010, *Implied Dynamics in Information Visualization*. *Proceedings Advanced Visual Interfaces*, AVI, pp. 215–222.

Kopec, D 2012, *Environmental Psychology for Design*, 2nd Edition, Fairchild Books, New York, USA.

Legrady, George 2012, *Culture, Data and Algorithmic Organisation*, Leonardo, Volume 45, Number 3, The MIT Press.

Lima, M 2011, *Visual Complexity: Mapping Patterns of Information*. Princeton Architectural Press, New York, USA.

Lupton, E 2011, *Graphic Design Thinking: Beyond Brainstorming*, Princeton Architectural Press, New York, USA.

Manzini, E 2009, *New Design Knowledge*, Politecnico, Milan Italy, Journal of Design Studies, Elsevier Ltd.

Manzini, E 1992, *Prometheus of the Everyday: The Ecology of the Artificial and the Designer's Responsibility* Journal of Design Studies, Vol 9, pp.5–20, The MIT press.

Manovich, L 2010, *What is Visualization?*, California Institute for Telecommunication and Information, USA.

McCandless, D, 2009, *The Visual Miscellaneum*. Harper Collins, USA.

Net Balance 2012, *The Australian Recycling Sector Report*, prepared for the Australian Government Department of the Sustainability, Environment, Water, Population and Communities.

Nicolson-Cole, S 2004, *Representing Climate Change Futures: a critique on the use of images for visual communication*, Journal, Computers, Environment and Urban Systems. Elsevier Ltd.

Papanek, V 1984, *Design for the Real World – Human Ecology and Social Change*, Academy Chicago Publishers, USA.

Papanek, V 1995, *The Green Imperative – Ecology and Ethics in Design and Architecture*. Thames and Hudson.

Pearson, M 1990, The Lime Industry in Australia - An Overview. *Journal of Australian Historical Archaeology* Vol 8, pp.28.

Playfair, W 1786, *Commercial and Political Atlas: Representing, by Copper-Plate Charts, the Progress of the Commerce, Revenues, Expenditure, and Debts of England, during the Whole of the Eighteenth Century*, Corry, London. Re-published by Wainer, H. and Spence, I 2005, *The Commercial and Political Atlas and Statistical Breviary*, Cambridge University Press, UK.

Rittel, H, Webber, M 1973, *Dilemmas in a General Theory of Planning*, *Journal of Policy Sciences* Vol 4, pp.155-169, Elsevier.

Robert, L 2006, *Good: An introduction to ethics in graphic design*. Ava Publishing, Switzerland.

Tufte, E 1990, *Envisioning Information*. Graphics Press, Cheshire Connecticut, USA.

Tufte, E 2001, *The Visual Display of Quantitative Information*, First Edition. Graphics Press, Cheshire Connecticut, USA.

Tufte, E 2011, *The Visual Display of Quantitative Information*, Second Edition. Graphics Press, Cheshire Connecticut, USA.

Tufte, E 1997, *Visual and Statistical Thinking: Displays of Evidence for Making Decisions*. Graphics Press, Cheshire Connecticut, USA.

Tufte, E 1998, *Visual Explanations: Images Quantities, Evidence and Narrative*. Graphics Press, Cheshire Connecticut, USA.

TRASHED 2013, DVD, Directed by Candida Brady, starring Jeremy Irons. Blenheim Films, United Kingdom.

Sherin, A 2008, *SustainAble, a handbook of material and applications for graphic designers and their clients*, Rockport, Massachusetts, USA.

Steel, J, Illinsky, N 2010. *Beautiful Visualization*. O'Reilly Media Inc.

Steel, Julie & Illinsky, Noah 2011, *Designing Data Visualisations*, O'Reilly Media Inc. CA, USA.

Swedish Environment Protection Agency 2005, *A strategy for Sustainable Waste Management, Sweden's Waste Plan*, Swedish Environment Protection Agency.

McDonough, W, Braungart, M 2002, *Cradle to Cradle: Remaking the Way We Make Things*. North Point Press, New York, USA.

Wood, W, Neal, D 2009, *The Habitual Consumer*, Journal of Consumer Psychology, Elsevier Vol 19, pp579–592.

World Economic Forum 2009, *Driving Sustainable Consumption*, Closed Loop Systems. viewed 12 July 2013, <http://www.weforum.org/pdf/sustainableconsumption/DSC%20Overview%20Briefing%20-%20Closed%20Loop%20Systems.pdf>

LIST OF IMAGE REFERENCES

INTRODUCTION

Figure 1. Stirling, J 2014, *The designer between the client and the project outcomes*. Diagram.

Figure 2. Shoalhaven Council, 2012, Landfill and alternative waste management solutions brochure, accessed 2/2/2012, doc.shoalhaven.nsw.gov.au/Displaydoc.aspx?Record=D13/263447

Figure 3. Stirling, J 2014, *The core intersections of this research*. Diagram.

Figure 4. Stirling, J 2015, *The stages of the practice-led methodology*. Diagram.

Visual snapshot: First iteration of *The Modern Midden*

1. Stirling, J 2014, Entry Wall to *The Modern Midden* installation (detail). Photographer Joanna Stirling.
2. Stirling, J 2014, Sketch of display panel system design (detail). Illustration Joanna Stirling.
3. Stirling, J 2014, Teenagers front the entry point 'recording' the waste materials brought in by attendees. Photographer Chris Watson.
4. Stirling, J 2014, *The Big Sort* – community waste audit. Photographer Joanna Stirling.
5. Stirling, J 2014, Opening Night: *The Modern Midden* – waste placed on floor space by participants. Photographer Chris Watson.
6. Stirling, J 2014, Project Map, used in the installation (detail). Vector graphic Joanna Stirling.
7. Stirling, J 2014, Participants discuss the 100 year timeline. Photographer Chris Watson.
8. Stirling, J 2014, *The Big Sort* – landfill audit. Photographer Joanna Stirling.

Visual snapshot: Second iteration of *The Modern Midden*

1. Stirling, J 2014, *The Modern Midden* central waste pile – 10 families, 1 week. Photographer Paul Jones UOW.
2. Stirling, J 2014, Participants discussing The Pledge Wall. Photographer Lucas Ihlein.
3. Stirling, J 2014, Waste audit begins, sorting the central pile. Photographer Lucas Ihlein.
4. Stirling, J 2014, Waste audit complete to the outer walls of the installation. Photographer Joanna Stirling.
5. Stirling, J 2014, Embodied Energy – Infographic that visualises materials journey in closed and open loop systems (detail). Photographer Joanna Stirling.
6. Stirling, J 2014, The Conversation Station – Participants ask and answer questions. Photographer Joanna Stirling.
7. Stirling, J 2014, The Pledge Wall – Making change to household waste practices. Photographer Paul Jones UOW.

CHAPTER ONE

Figure 5. Examples of the ‘data structures’ found in waste reports and policy documents.

Figure 6. Hyder Consulting 2009, Waste and Recycling in Australia Amended Report, 2009, *Total Waste Generation, disposal, recycling, energy recovery, 2002-03, 2006-07 & 2008-09*. Detail of a table structure converted to a bar chart structure, accessed 5/7/2013, www.environment.gov.au/system/files/...17a4.../waste-recycling2009.pdf

Figure 7. Stirling, J 2014, *The Modern Midden*, Magnitude wall – replicates the 2011 waste categories measured in weight. Photographer Joanna Stirling.

Figure 8. Geoscience Australia Meta Data, 2012, *Visualised using Google Earth*, (screenshot). Data Source: National Waste Management Database, accessed 12/9/2013, www.ga.gov.au

Figure 9. Universal Recycling Symbol, accessed 20/5/2013, www.zerowaste.sa.gov.au

Figure 10. Australian aerosol brands, showing mixed use of materials, accessed 20/5/2013, www.science.howstuffworks.com

Figure 11. Resin Identification Codes, accessed 20/5/2013, www.zerowaste.sa.gov.au

Figure 12. Revised Resin Identification Code – using closed triangle without chasing arrows, accessed 3/2/2015, www.plasticsindustry.org

CHAPTER TWO

Figure 13. Thomas Thwaites, 2011, *The Toaster Project*, accessed 13/3/2014, www.thomasthwaites.com/the-toaster-project/

Figure 14. Lukatarina (for client Eco Vitae), 2011, *Marine Renegades*, accessed 22/6/2014, www.lukatarina.net/projects/morski-odpadniki-sea-renegades-2011/. Also published in Ehmann, S, Bohle, S, & Klanten, R 2012, *Cause and effect – Visualising Sustainability*, Gestalten, Berlin, p.50.

Figure 15. Mandy Barker, 2012, *Soup:500+*, accessed 22/6/2014, <http://mandy-barker.com/current/soup/> Also published in Ehmann, S, Bohle, S, & Klanten, R 2012, *Cause and effect – Visualising Sustainability*, Gestalten, Berlin, p.51.

Figure 16. Chris Jordan, 2013, *Running the Numbers – An American Self Portrait*, accessed 10/1/2013, <http://www.chrisjordan.com/gallery/rtn/#cig-butts>

Figure 17. Stefan Saigmeister, 2013, *The Happy Show*, Museum of Contemporary Art, Los Angeles USA, accessed 12/8/2014, <http://thehappyshow.tumblr.com/>

Figure 18. Dietmar Offenhuber, Evelyn Münster, Jaume Nualart, Moritz Stefaner and Gerhard Dirmoser, 2009, *Mapping the Archive – Ludwig Boltzmann Institute for Media.Art.Research*, accessed 12/8/2012, http://infosthetics.com/archives/2009/09/mapping_the_archive_30_years_of_ars_electronica.html

Figure 19. Kimberly-Clark, 2010, television commercial for Scott Naturals Tube Free toilet paper (screen stills) accessed 15/11/2014, <http://www.scottbrand.com/products/toilet-paper/tubefree>

Figure 20. Carbon Visuals, 2012 – *One day of CO₂ generated in New York with 3D time lapse animation* (screen still), accessed 7/7/2013, <http://www.carbonvisuals.com/products-and-services/engaging-cities>

CHAPTER THREE

Figure 21. Stirling, J, 2014, *The Modern Midden* – Waste collected from ten families over a seven day period (prior to the opening) is sorted over one month through audience participation. Innovation Campus, University of Wollongong. Photographer Joanna Stirling.

Figure 22. Stirling, J, 2014, *The Modern Midden* – Pledge Wall and Conversation Station. Innovation Campus, University of Wollongong. Photographer Joanna Stirling.

Figure 23. Stirling, J, 2014, *The Modern Midden* – 100 Year Timeline. Innovation Campus, University of Wollongong. Photographer Joanna Stirling.

Figure 24. Stirling, J, 2014, *The Modern Midden* – Floorplan, showing bracket structures, panel order and sorting areas for materials. Innovation Campus, University of Wollongong. Diagram.

Figure 25. Stirling, J, *The Modern Midden* – Internal space of installation, Magnitude, Parts of a Whole and Dot Wall. Innovation Campus, University of Wollongong, 2014. Photographer Joanna Stirling.

Figure 26. Stirling, J, 2014, *The Modern Midden* – Central mixed waste pile, moved to outer sorted waste categories. Innovation Campus, University of Wollongong. Photographer Joanna Stirling.

Figure 27. Stirling, J, 2014, *The Modern Midden* – Symbols and Codes. Innovation Campus, University of Wollongong. Photographer Joanna Stirling.

FRONT AND BACK COVER

Stirling, J, 2013, *Impact*, photographic montage, print 300x100mm (detail).







THE MODERN MIDDEN

A small part of the BIG story of waste

Jo Stirling



CREATIVE REPORT

MCA Research 2015

University of Wollongong



This creative report is presented
as part of the requirement
for the award of Master of
Creative Arts by Research.
February 2015.



ACKNOWLEDGEMENTS

The Modern Midden would not have been possible without the support and collaborative spirit of many. I would like to sincerely thank my supervisor Dr Lucas Ihlein for his steadfast belief in this project and for his affirmation that I would find the answers I was looking for.

Thank you to The University of Wollongong for providing the opportunity and support for this research. Thank you to my colleagues who have contributed to this journey by providing valuable scholarly insight, time and encouragement: Dr Agnieszka Golda, Gregor Cullen, Dr Jon Cockburn, Kim Williams, Grant Ellmers, Angelina Marcon-Jones.

The Upper Kangaroo River Progress Association provided a valuable opportunity to develop my research through their Artist-in-Residency Program. Thanks to Sarah Butler and Andy Gordon for your support before, during and after the residency.

A special thanks to David Cox who generously gave me his time and building design expertise; you are wonderful. During the residency I was able to design, build, and test my work to witness the enthusiasm of my community – by recording what they were teaching me and by sharing what I had learnt with them as well. Thank you to the community of Kangaroo Valley; I know you are proud to be a 'Plastic Bag Free Town'.

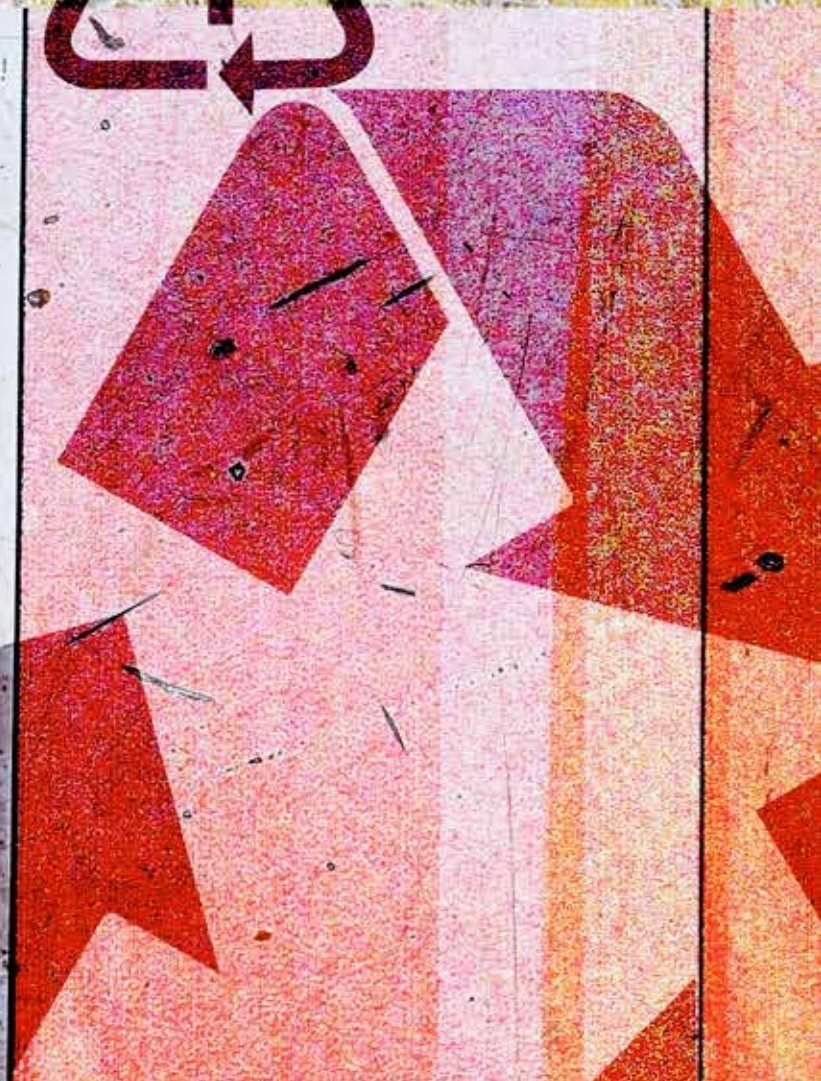
Finally I would like to thank my family: Lily Stirling, Jacob Stirling, Bradley Harvey, Jim Watson, Pam Watson, Chris and Jon Watson. This work is for my family who care about our planet too.

CONTENTS

5	DESIGN STATEMENT
7	RESEARCH QUESTION
6	PRACTICE-LED METHODOLOGY
9	STAGE TWO: PLANNING OF AN INSTALLATION Synthesising
10	Sketches
23	VISUALISATIONS FOR PANELS Synthesising & prototyping
35	THE MODERN MIDDEN RESIDENCY Prototyping & discovering
41	Community Event - Documentary Screening
45	Building of Display System
51	PARTICIPATION Discovering & Implementing
53	The Modern Midden - Opening Night
57	The Big Sort - Community Waste Audit
64	QUESTIONNAIRE
71	STAGE THREE: THE MODERN MIDDEN & BIG SORT INTEGRATED Implementing & Learning
83	SUMMARY & REFLECTION



Landfill



DESIGN STATEMENT

The Modern Midden creates a space for dialogues about waste through contemplation (thinking and feeling) and action (choosing and doing). The project explores how information can be designed to engage with audiences about waste generation and 'product end-life' through a series of exploratory and explanatory visualisations.

Contributing to the growing pile of post-consumer waste that may end up in landfill regardless of projected life span my incentive to address and design communications solutions that reveal and explore the relationships we have with waste generation, disposal and consumption.

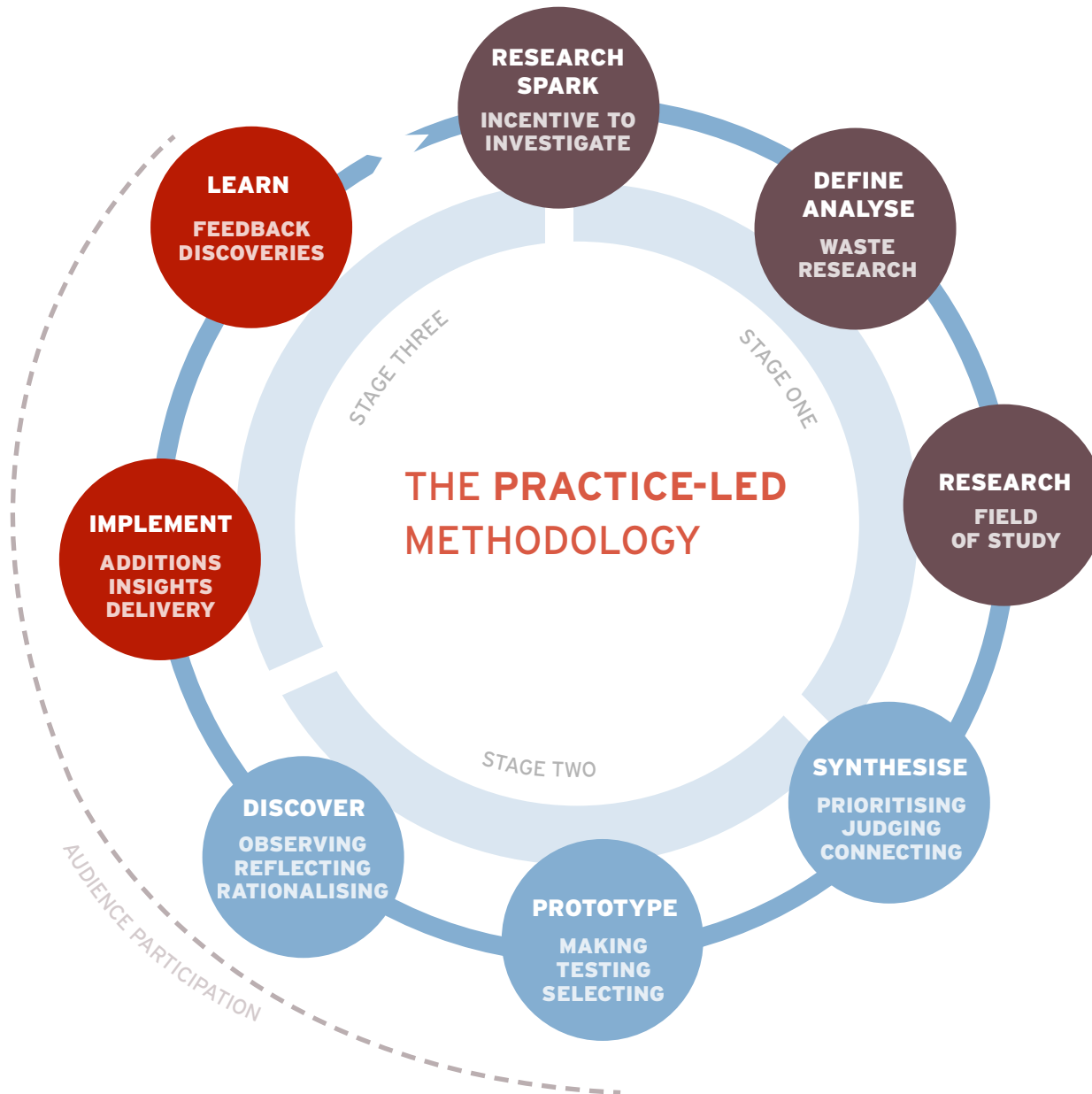
The Modern Midden interrogates the transient and momentary attention we give to the materials we throw away. The embodied energy and cultural value these artefacts contain is implied through their materiality, what was once contained within them, what purpose they might have served, and how far they might have travelled.

The project generates a space for collective ideation, iteration and participation. Through this process, shared concerns and encounters with waste create the possibility for individual and collective change.



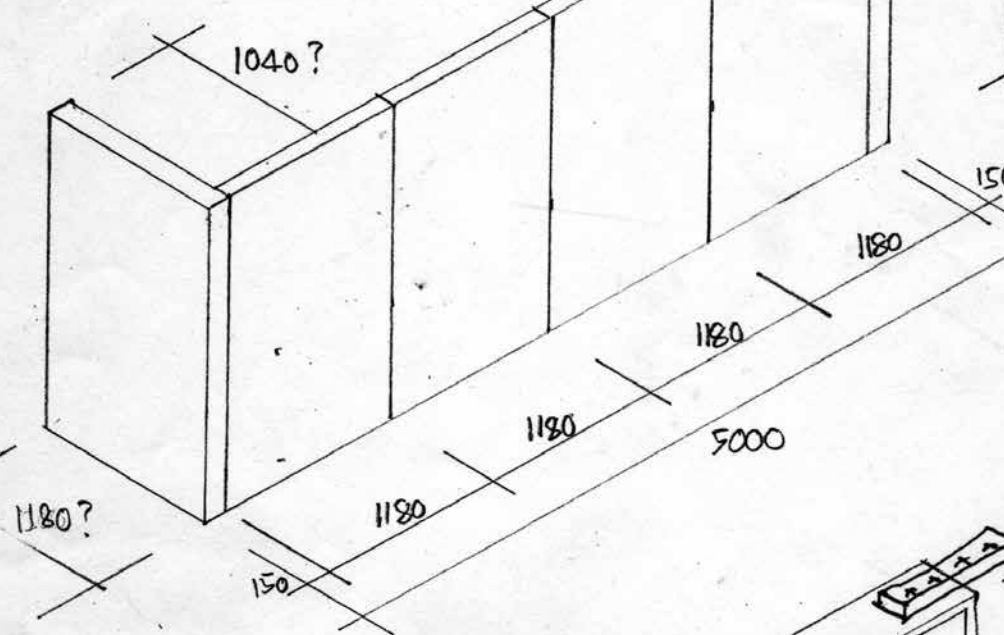
RESEARCH QUESTION

*How might **information design** be effective in **changing behaviour** and social attitudes about **waste generation** in Australia?*



This report acts as support documentation to the exegesis *The Modern Midden, Visualising Waste Through Information Design*. It provides detailed documentation of the practice-led methodology applied across the research in particular during STAGES TWO and THREE.

The diagram to the left illustrates these stages and the activities that occurred during each stage. STAGE ONE is discussed in the written exegesis to provide background to the study, reveal the key insights discovered across the fields of waste generation, information design and social change.



CORRUGATED
CARDBOARD.

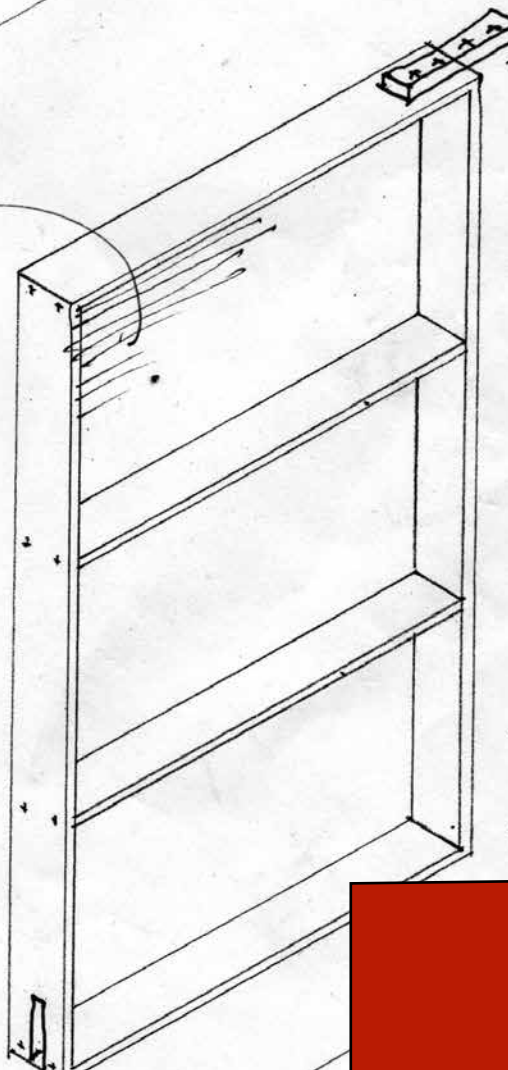
EACH PANEL USES:

/2000
/1160

by 4/2.4*

LENG/PANEL.

USED TO FIX PANELS



STAGE TWO

PLANNING THE INSTALLATION

SYNTHESISING

SKETCHES

Much of the design and planning process for the display system and for the information panels themselves occurred with sketching.

The selection of sketches included in the following pages shows these developments with mind mapping, planning of the panels as a series, lists and notes about format and space. Working with the dimensions of a space and designing a suitable solution for the display system occurred *prior* to establishing the 'themes' for the visualisations displayed. It was necessary to establish the potential scale of the visualisations and to visualise the three dimensional nature of the installation in relation to the human figure. It was also important to consider how the audience would be able to access and read the information being displayed for example, heights to average eye level.

Figure 1

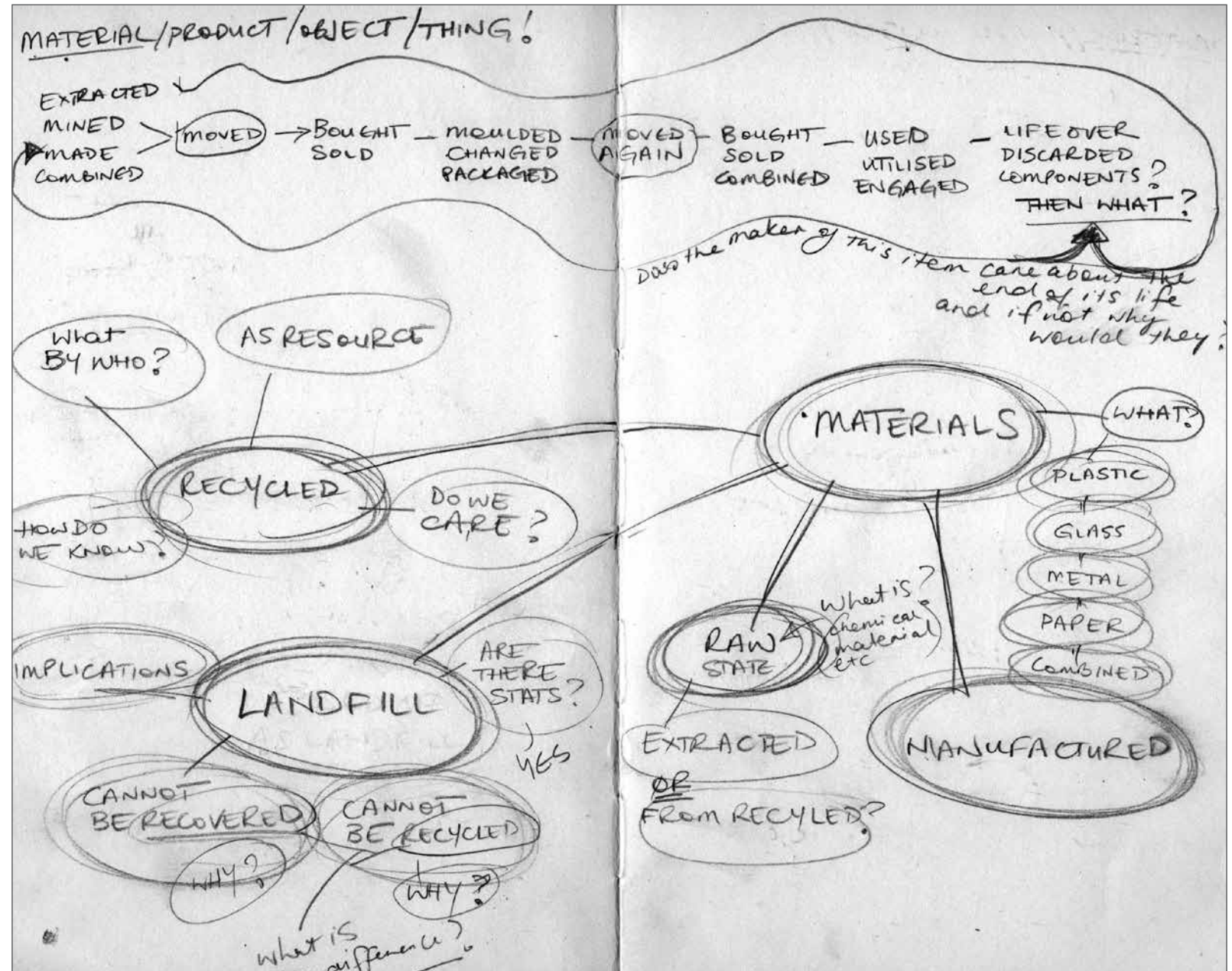


FIGURE 1. Mind-mapping as an exploratory tool through the duration of the project. This technique assisted in determining themes of the visualisations and to reveal the potential relationships between themes.

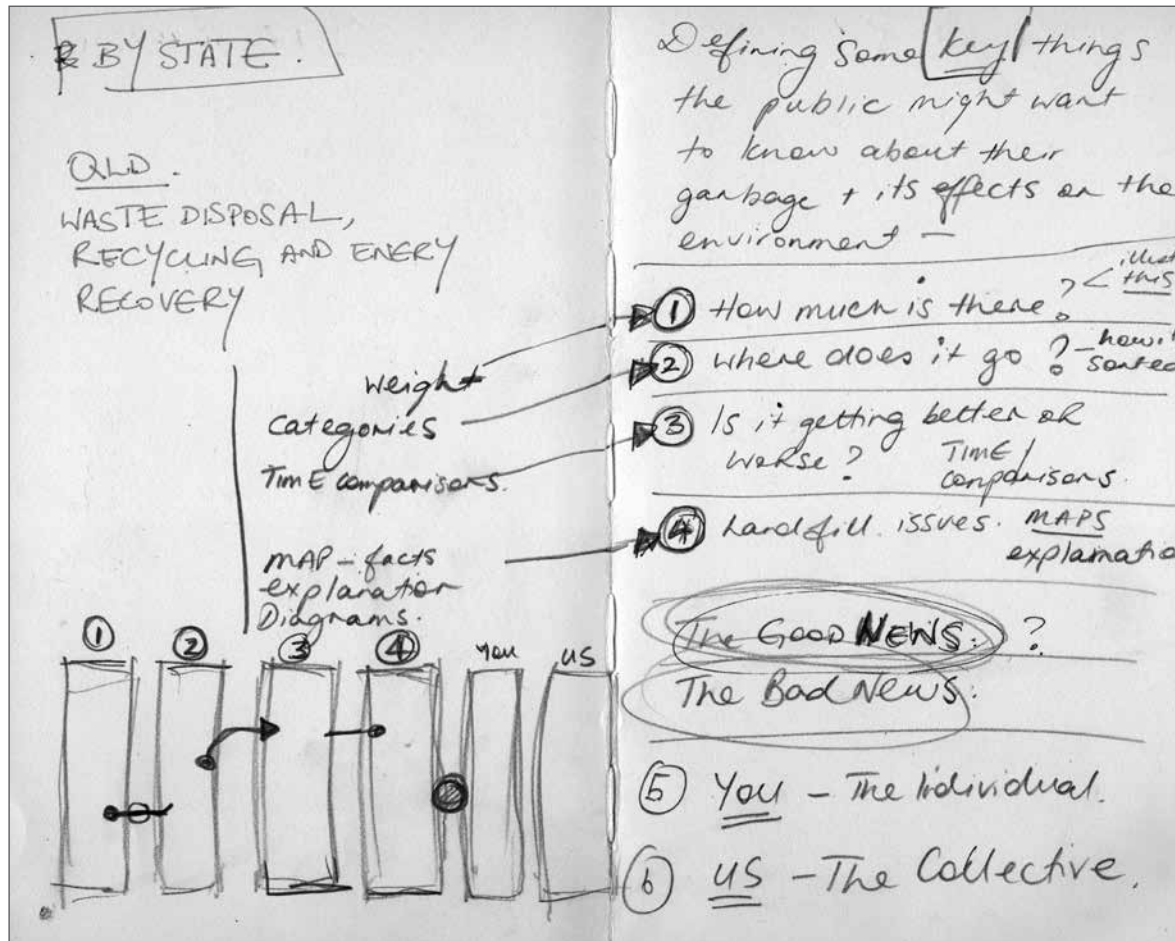


Figure 2



Figure 3

THEMES to begin emerged during the early research and planning stages. This helped to determine focus points within the information being displayed.

Early on each panel was imagined as tall narrow banner-like shape. The intention here was to link each panel more literally to the following panel (See Figure 2). This was to establish an 'expanding' story by zooming in on a key issues raised from the previous panel. Storytelling concepts evolved from this thinking.

Figure 3. *IMPACT* was designed to test the narrow format. I decided that this although useful for long online info graphics, this shape would not prove suitable for and detailed information that could be read in relation to eye line and body height. Information displayed at the lower or upper parts of a tall panel would become difficult to read or access.

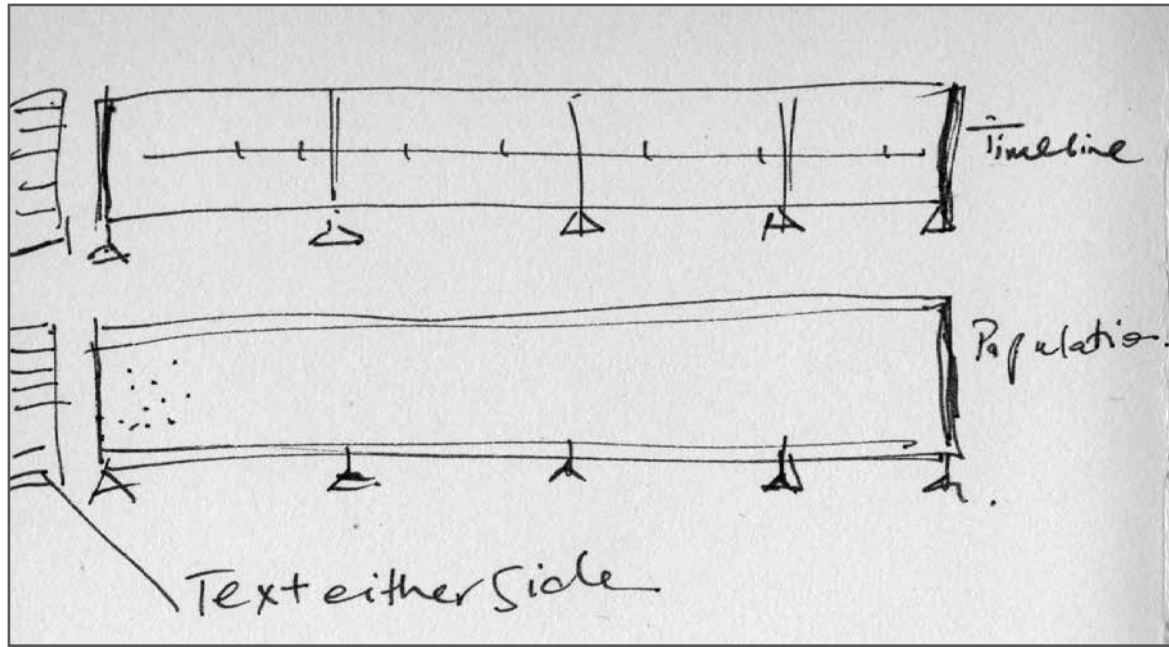


Figure 4

SPACE AND SCALE were considered in relation the human figure, eye heights and the physical space that the installation was to be tested in. Figure 5 shows a floor plan of Upper Kangaroo River Community Hall (the space in which the Artist-in-Residency occurred) and was used to make decisions about the potential scale of large horizontal prints. The Timeline (theme of *Time and Growth*) was the first exploratory visualisation I had commenced as a means to synthesise the historical context of the materials economy.

During this stage 'materials' became a critical consideration to the actual structure of the display system. The system needed to support the work and not interfere with it. All materials used needed to be sustainably sourced, recyclable and/or reusable and light.

The display system/structure also needed to be designed for flexibility (into moveable units), so that it could be easily erected (by two people in a few hours) storable and transportable. I also wanted it to be designed for re-use in a multitude of settings and spacial opportunities.

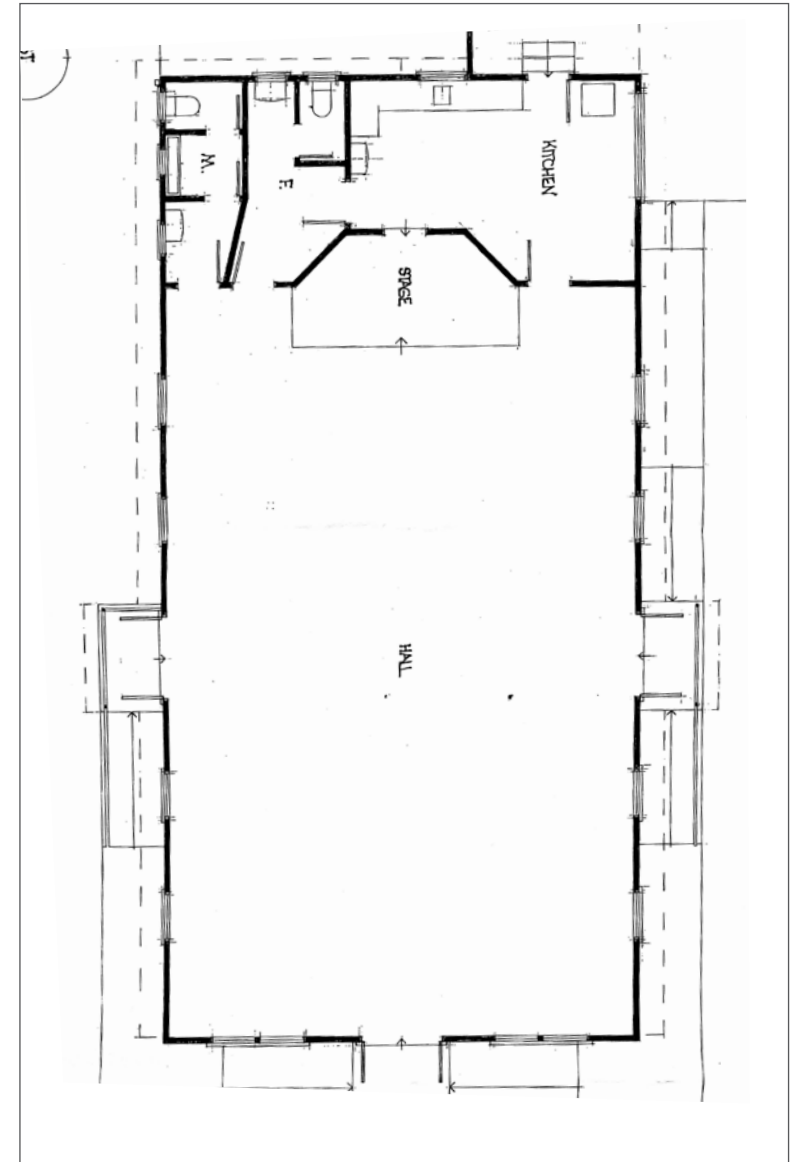
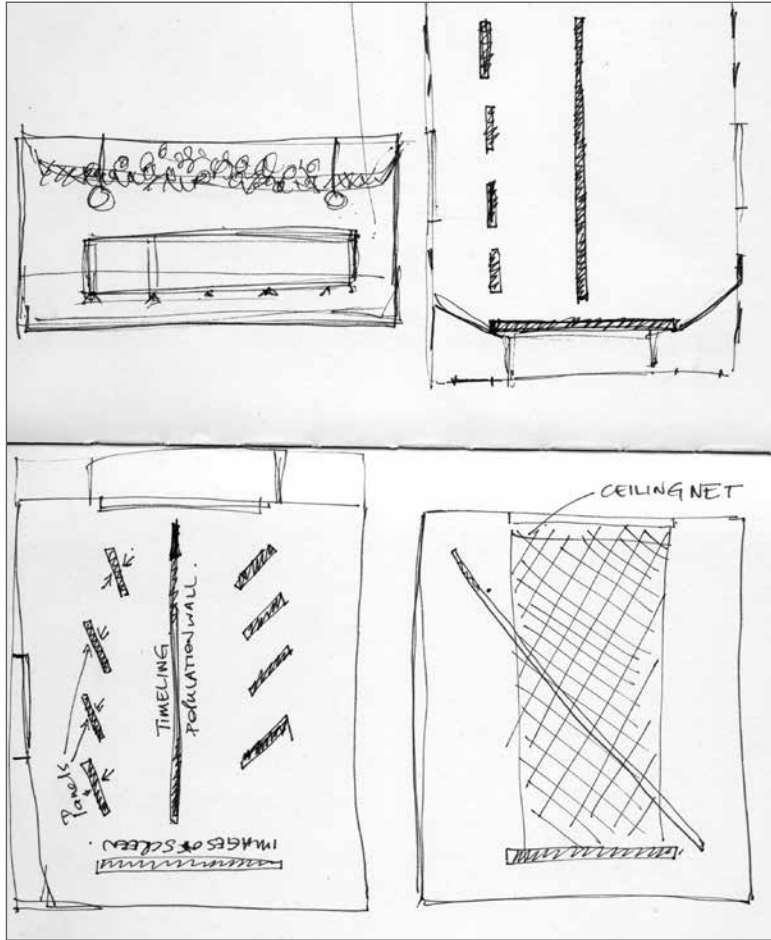


Figure 5



Potential arrangements within the space were explored through a series of sketches. Arrangement was important to how the information might 'tell a story' about waste but also to how this might be navigated by the audience.

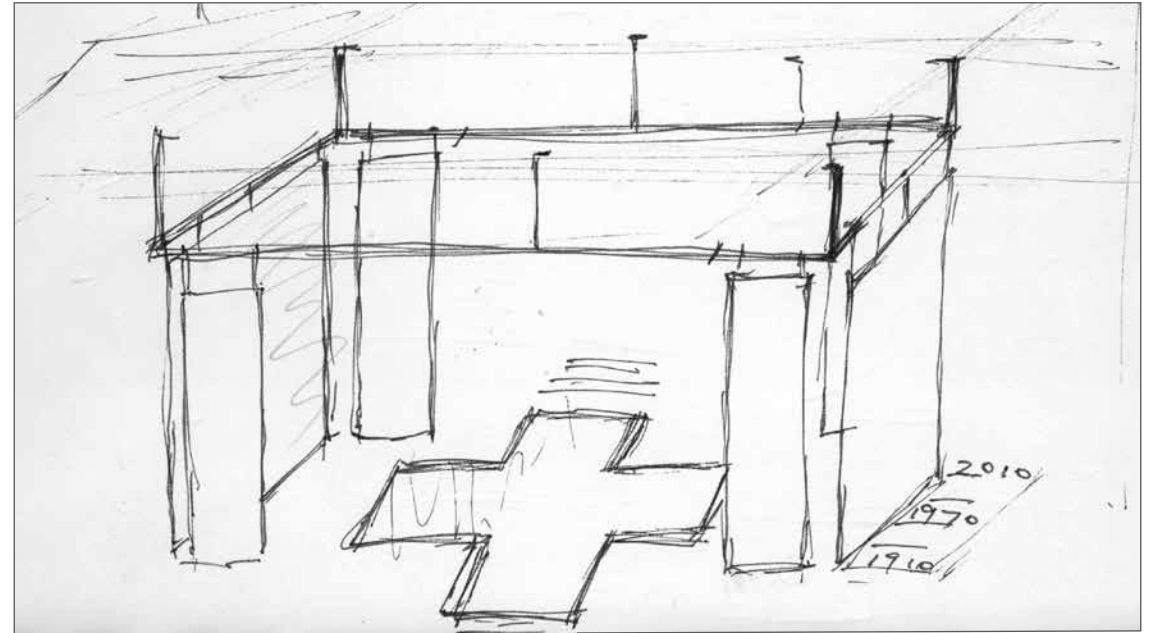


Figure 7

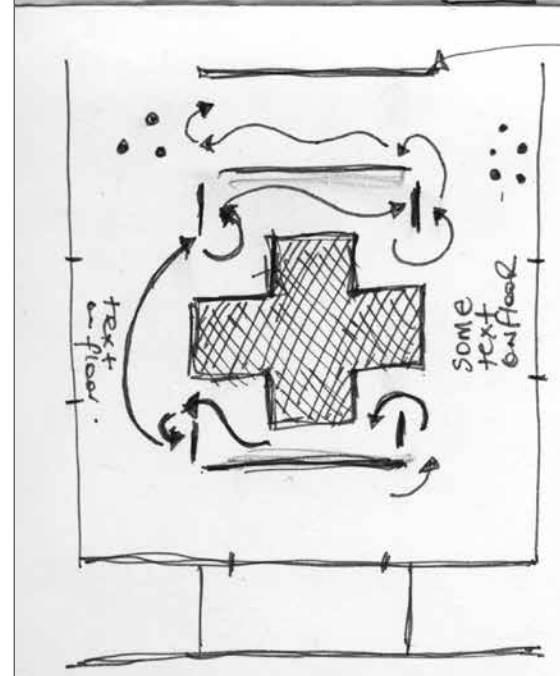


Figure 6

Figure 7, shows an early sketch addressing heights within the space. One potential design included a metal display system that could potentially 'hang' the printed work. The + shape indicates early thoughts about defining floorspace for waste materials to be placed into by the participants.

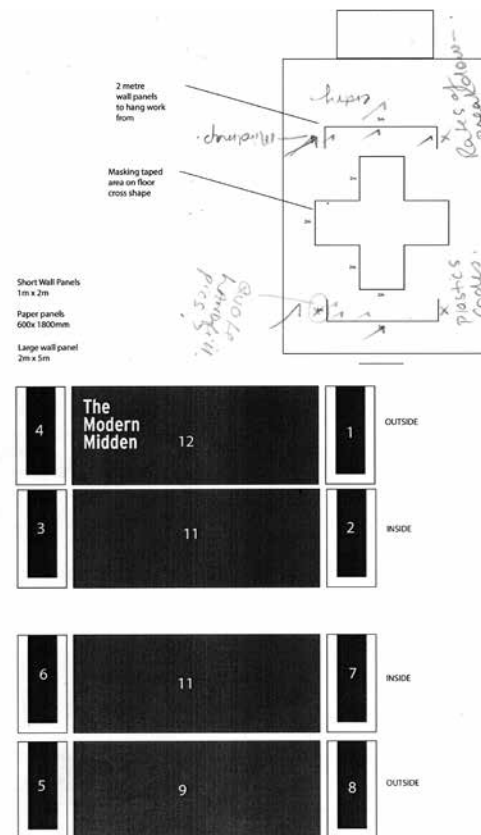
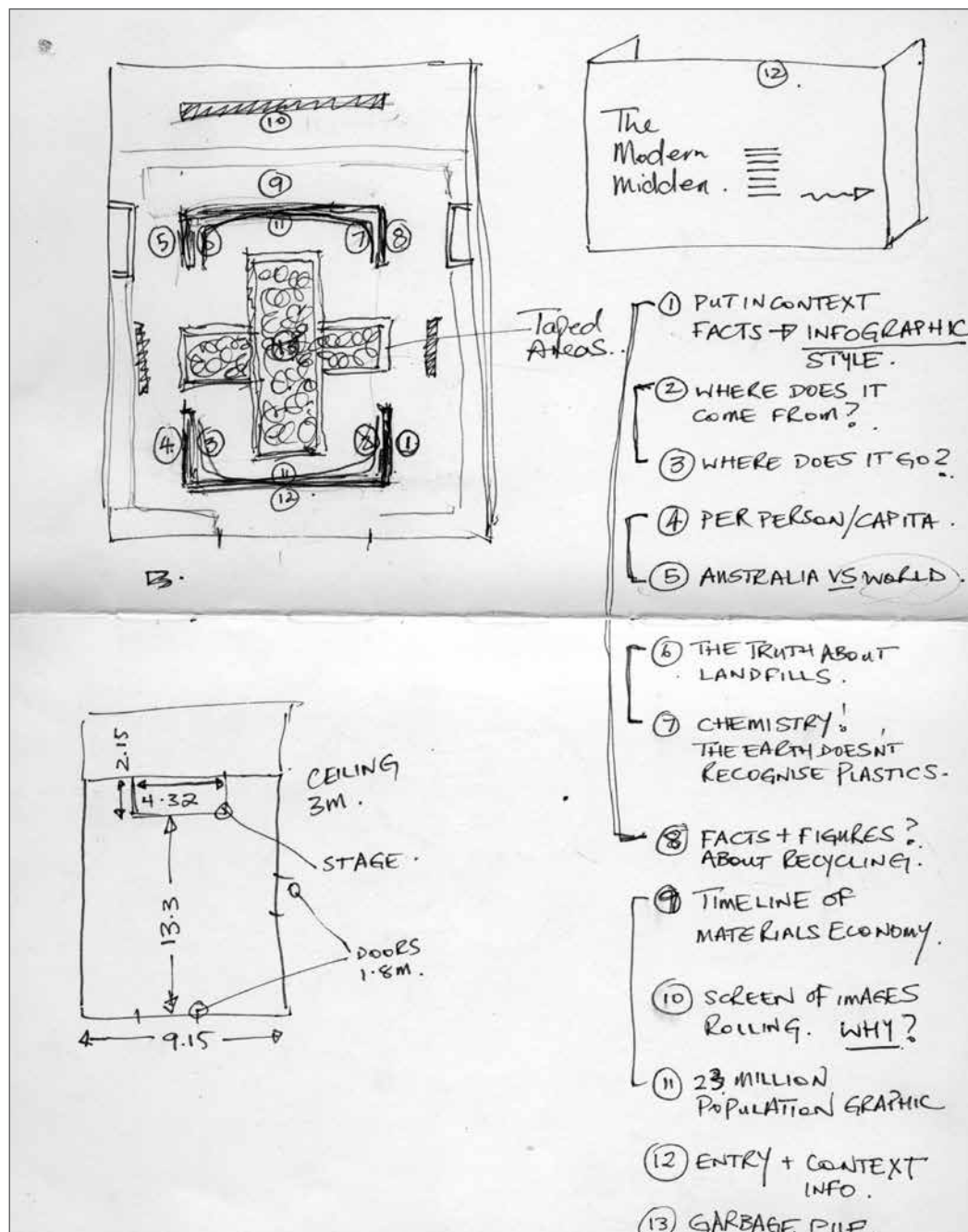


Figure 9.

Figure 8 and 9 illustrate the emergence of displaying double sided panels using a 'bracket' structure. Conceptually and physically this would allow for an *interior* and *exterior* to be established. Using a bracket structure also meant that the framework would be stable and self-supporting, with no reliance on the walls of a space. This solution also meant that various arrangements for multiple spacial requirements would be possible.

Standing the display panels from floor to ceiling would exclude any issues associated with variable ceiling heights at different locations.

These sketches also indicate the numbering system employed in the designing of the panels (this was useful for planning and print production).

Figure 8

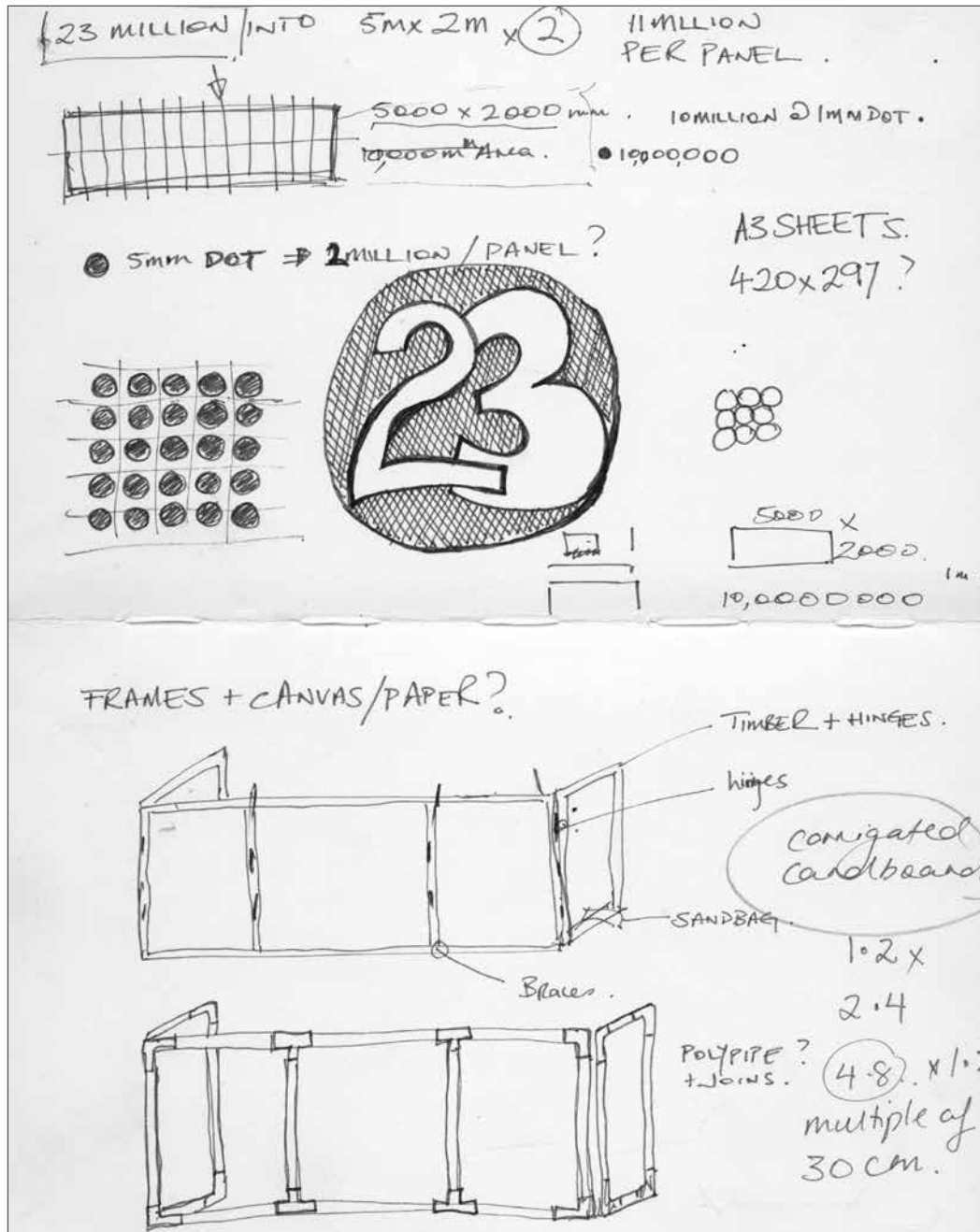


Figure 10

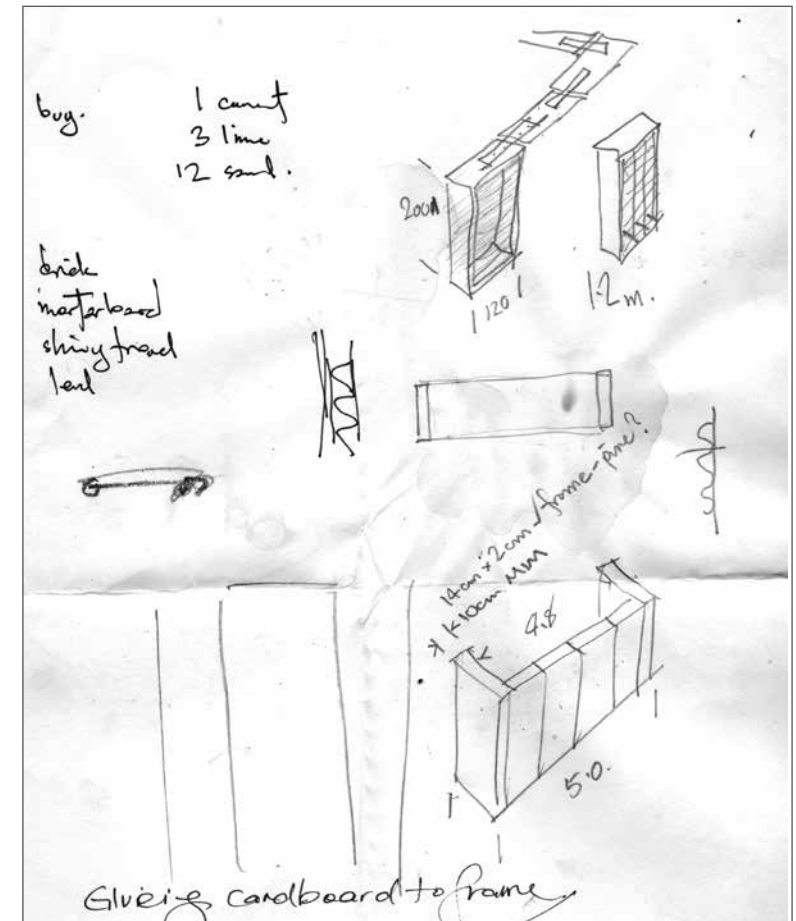


Figure 11

Figure 10 shows the evolving consideration of materials for the structure. Initially a solid structure was considered with hinged corners however this would have created weight and transport issues. It needed to be **stable** and relatively **lightweight** to be transportable as well as being a **flexible** system that could be arranged in a number of ways if required. Figure 11 shows the emergence of individual panel sections that could be positioned together as units.

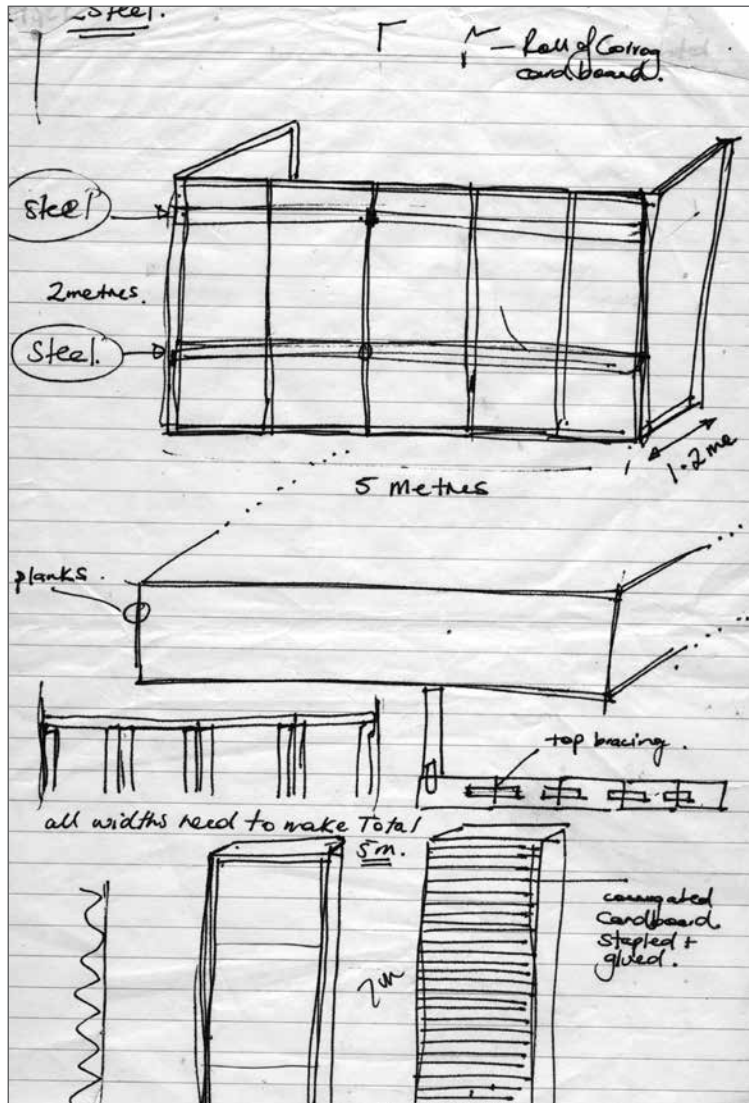


Figure 12

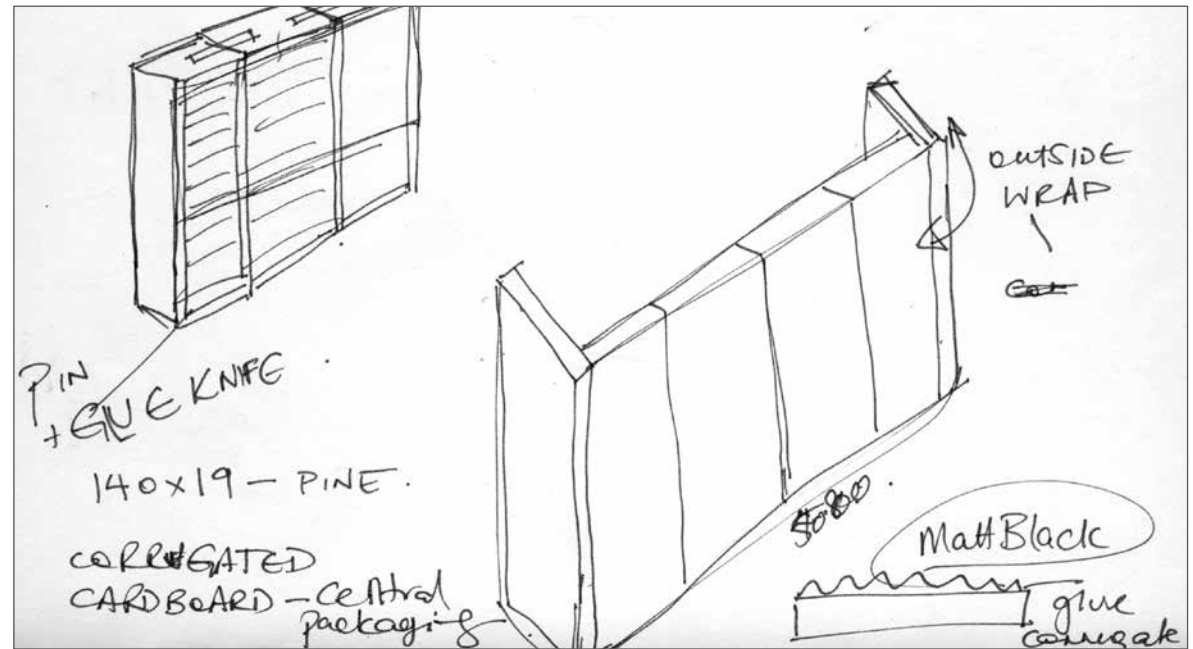


Figure 13

It was determined that the frames of the panels should be constructed using sustainable forest pine which is lightweight, strong and durable. It would also provided a flat edge face so that prints could be displayed against a flat surface. Bracing of the top section of the panels with recycled corrugated cardboard would provide resistance to twisting and a more solid surface for prints to be mounted against.

Metal strips would be then screwed to the top and one metre down from the top to provide a magnetic surface on which to attach the prints, thus not damaging or having to permanently fix them. This metal stripping would provided further stability, and smaller sections of metal could be used to easily join each panel to the next (unseen across the top). All timber joins would be screwed together not nailed.

The visual metaphor of the **bracket** employed as the physical structure for the installation also presented visual potential for framing each *theme* being explored.



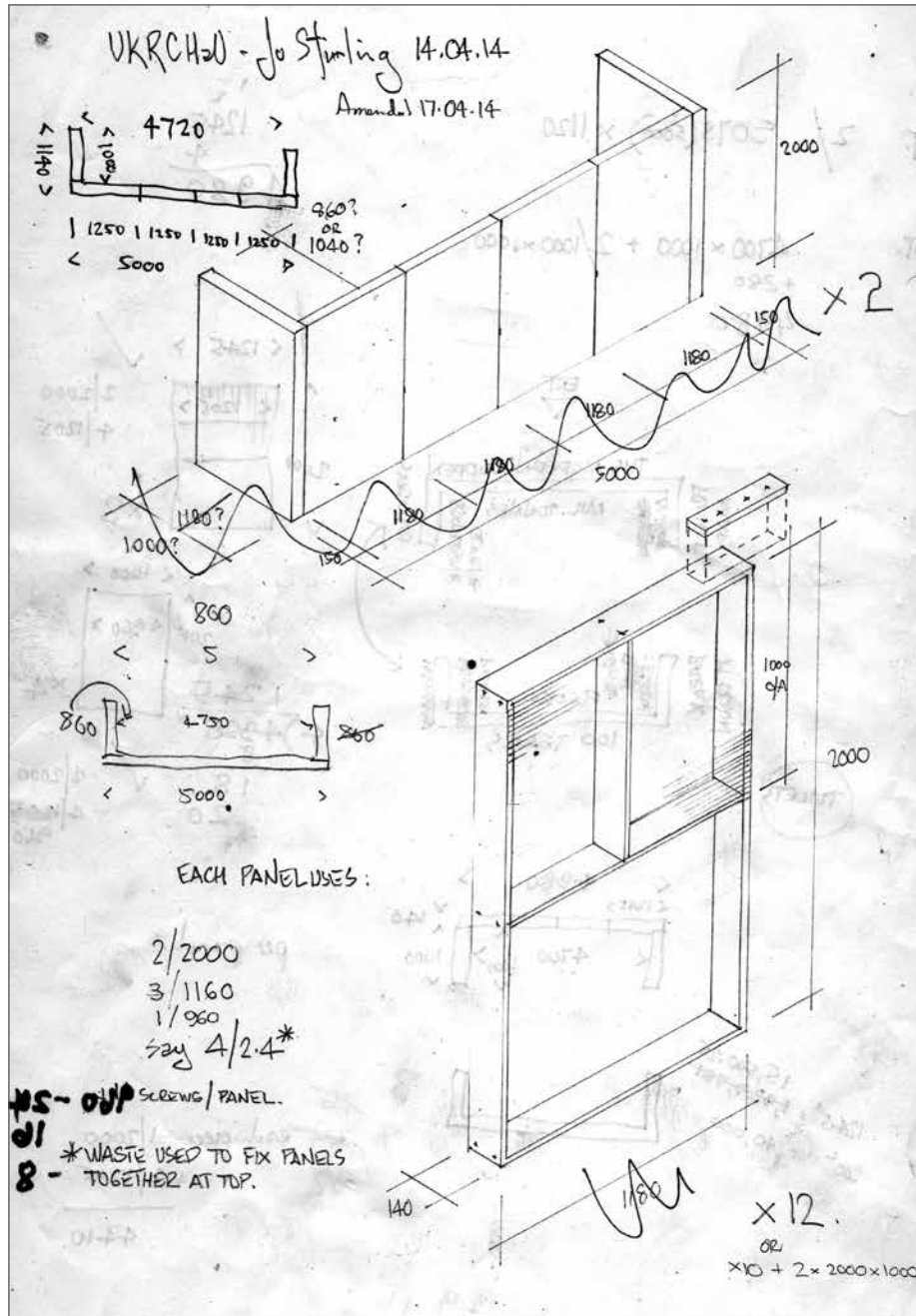
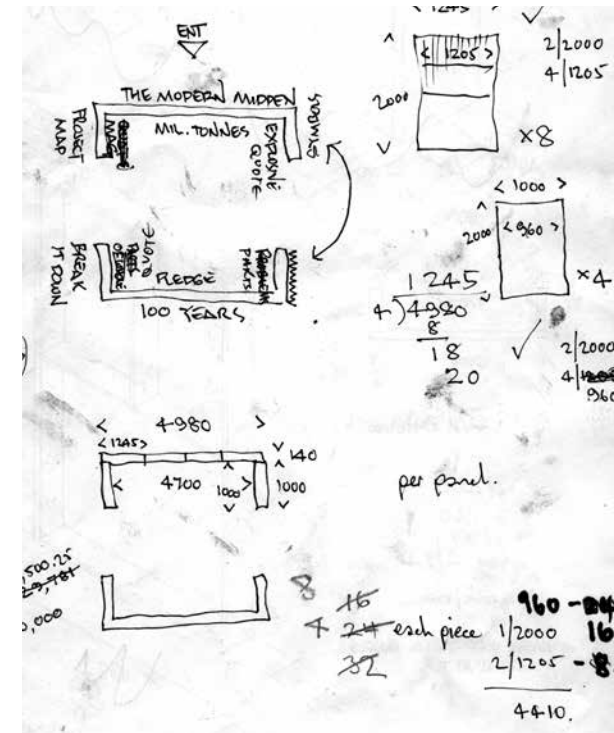
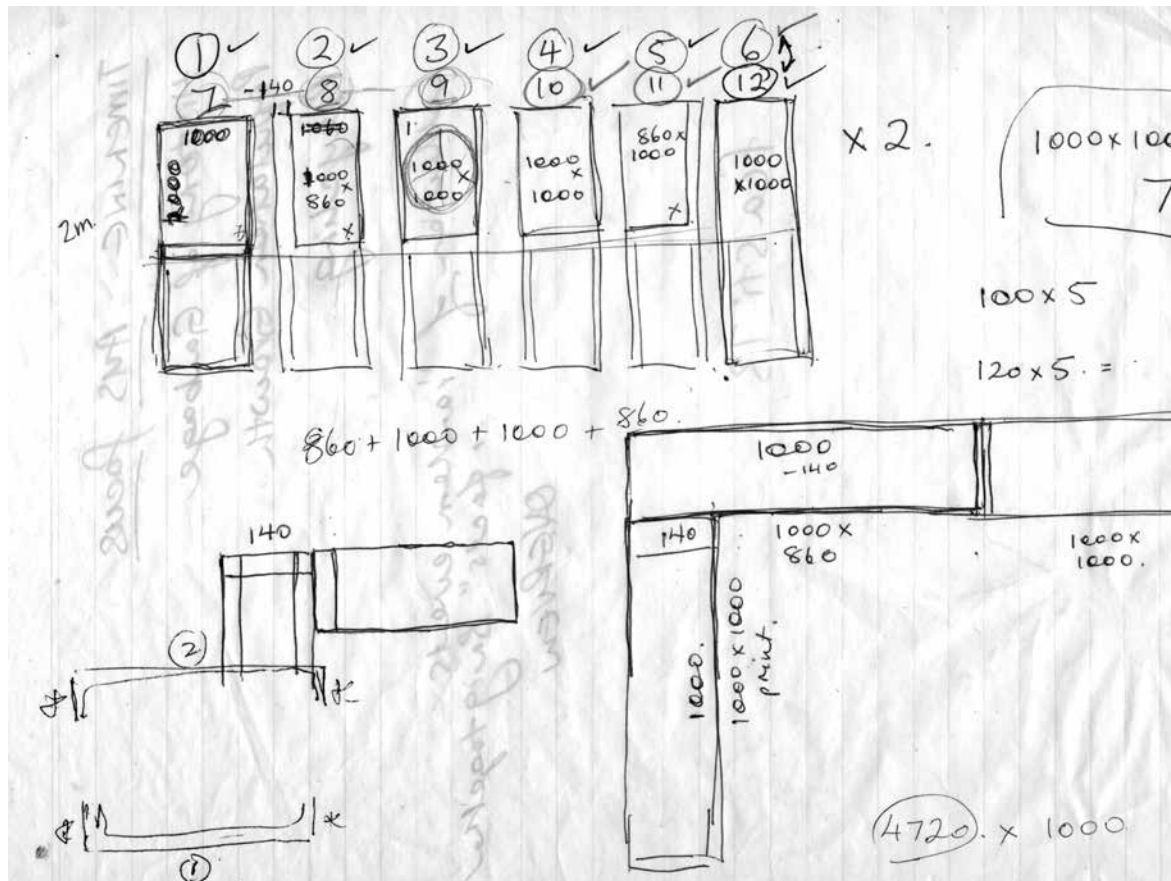


Figure 15

Further modifications were made to the panel interior design so that an *empty space* would appear in the bottom section of the panels and the skeleton of the structure allowed this opportunity. This decision evolved so that viewers would be able to see *through* the open spaces underneath the printed panels so that they could view the interior floorspace. This would mean that the audience could view others moving through the space with them.

Initially it was considered that waste materials would be organised in a pre defined area on the central floorspace, however with further consideration I determined **not to** define such a space for the waste to be 'controlled or contained' in initial testing. The reason for this was to encourage the participatory experiences of the audience further to allow for a more experimental and observational encounters with waste materials to unfold.

I determined to include the audience before they attended the installation by inviting them to contribute household waste materials to the project and bring them to the space as an entry fee. I wanted to witness how the audience might respond to placing their own waste materials within the installation with minimal instruction in a sense littering and polluting as integral to the space itself and the experience of the space.



Figures 16 & 17

These sketches show technical detail of planning sizes and the developing display order of the prints.

By this stage, many of the themes had been developed and visualisations were evolving.

The process of determining the display system for the printed visualisations and to understand the spacial qualities of the installation was integral to the overall outcome. This ideation stage occurred alongside the research and synthesis stages. This was also critical to developing a non-linear storytelling approach, due to the open nature of the space.

Designing the physical structure provided accuracy in the design implementation and for the dimensions of each panel. This process also enabled the participatory elements and immersive experiences to emerge as a critical consideration for the first testing of the installation, where they would be and how they could be integrated.



STAGE TWO

VISUALISATIONS FOR PANELS

SYNTHESISING & PROTOTYPING



DURING THE DATA GATHERING AND SYNTHESIS STAGES of the project, the emerging themes began to take shape. To establish an immersive and contemplative space in which ideas could be explored or explained visually my aim was to encourage engagement with the audience and *not* to be didactic in the way the story about waste could be told.

I was also mindful of presenting an overwhelm of confronting or overtly emotional content, that would result in paralysis or issue fatigue. Therefore I planned specific panels to provide breaking space allowing pauses in time. A number

of exploratory or explanatory approaches were included - all use image, text, graphics, or a combination of visual tools to link them together as a whole. Each visualisation is designed to form *themes* of information so that when placed together the viewer can navigate through the installation with more autonomy making connections and movements as they chose too.



[AUSTRALIANS ARE THE SECOND HIGHEST PRODUCERS OF WASTE PER PERSON, GLOBALLY.]

We continue to generate an annual increase in total waste.

Dependence on landfill as a solution for waste management has long lasting environmental consequences. However, the piles grow faster than the systems or solutions can adapt to manage them.

How might **information design** help us see these issues?
Can attitudes about the environmental impacts of consumption and waste generation be challenged?

In a world saturated by information,
what will motivate us to **ACT**?

Jo Stirling

THE MODERN MIDDEN

A small part of the BIG story of waste

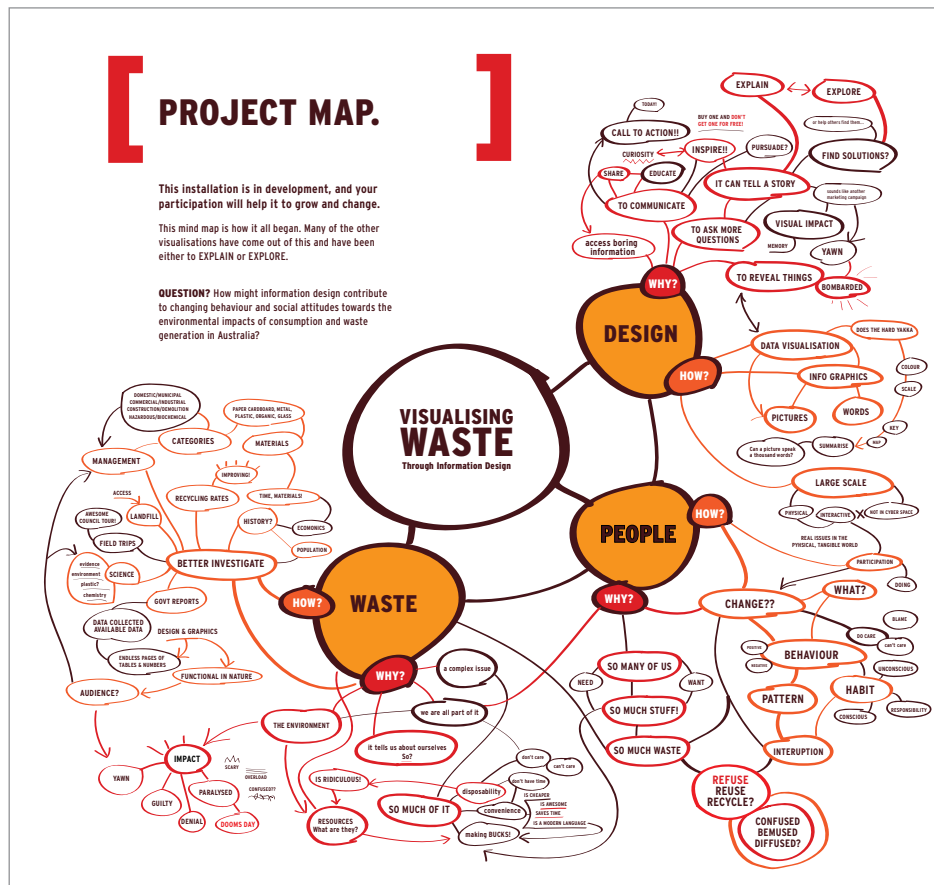
THEMES developing during the first iteration:

- PROJECT MAP (Illustrative Mind-map)
- MAGNITUDE (Households - Dot Wall + Overall waste destination - Bar chart)
- PARTS OF A WHOLE (Households - Interior Dot Wall + Pledge Wall)
- BREAK IT DOWN (Materials in the environment)
- TIME & GROWTH (Nine time lines from 1910-2010)
- SYMBOLS & CODES (Plastics and recycling codes & materials sorting key)
- CONVERSATION WALL (Paper & pen, question & answer)
- WASTE (Refuse materials on floorspace)

The above panel faces the entry to the installation and is designed to provide a topic context for the space. Here I include a series of statements and questions that position the installation as a space for the audience to consider individual and collective connection to the problems being presented.

This panel also positions the work in Australia. The montage includes selected visual strategies found inside the installation, and frames the 'whole' of the installation in terms of TIME, DATA, STORY, ACTION and CHANGE.

EXPLANATORY & EXPLORATORY - PROJECT MAP Figure 19



THE PROJECT MAP developed from a series of pencil sketches used as an exploratory process to find connections and relationships across the research. I chose to include this in the installation itself to as an opportunity to further contextualise the research scope and where intersections were being explored. The map also shows the audience some of the thinking and linking behind the design process. The project map also states that 'this installation is in development and your participation will help it to grow and change'.

EXPLANATORY - BREAK IT DOWN Figure 20



BREAK IT DOWN is included to consider the time it takes for familiar product materials to break down in the environment. This panel was positioned next to the 100 year time line to connect information about materials together with their potential contributions to energy use, disposal or pollution. During the *The Big Sort* community waste audit this panel became a discussion point for many and opened up conversation about landfill, litter and the non-biodegradable nature of plastics.

SYMBOLS AND CODES

WHY SO COMPLEX?

The thing about plastics, is that there are just so many types.

We use and depend on plastic materials for a vast array of purposes. Plastics are incredibly useful because they can be soft, flexible, rigid, strong, can be moulded to any shape, can be coloured, or be transparent. Although they are all plastics, we cannot just melt them down again to make new plastic. **SO WE HAVE TO SORT THEM** after their useful life is over! There is enough plastic on our planet to **NEVER** have to make plastic again. It is a resource so lets keep it out of the ground.

THE INTERNATIONAL PLASTIC IDENTIFICATION CODES

During their manufacture, plastic items are identified with a code. This code is given a number based on the chemical makeup of the plastic. Codes are assigned to plastics so that **WE** can use them to organise our recycling. I wonder how many of us buy, or not buy, a product based on this code? Most plastics are recyclable, however **CHECK** your council for the types they will not accept for processing.

COMMON CONFUSION

RECYCLING SYMBOL

You can recycle this item.

RECYCLING SYMBOL WITH %

Made from part recycled material

PLASTIC CODE

Tells what **TYPE** of plastic (only direct identification) so it may be sorted for recycling.

GREEN DOT

Compares code for indicating product stewardship contribution (that the manufacturer has contributed to the future disposal of the item)

TYPE

NUMBERS

COMMON USES

PET

Polythene Terephthalate

Soft drink, water bottles, salad domes, biscuit trays, polar fleece, carpet

HDPE

High Density Polythene

Shopping bags, freezer bags, milk bottles, ice cream containers, juice bottles, shampoo & detergent bottles, playground equipment

PVC

Unplasticised Polyvinyl Chloride PVC-U
Plasticised Polyvinyl Chloride PVC-P

VINYL, some shampoo bottles, food tubes (salad dressing, sauces etc) & cooking oil. Kids toys & plumbing pipe.

LDPE

Low Density Polythene

Food storage containers, dairy containers (yoghurt) dry cleaning bags, glossy shopping bags, 6 pack rings, moulded laboratory equipment

PP

Polypropylene

Medicine bottles, deli containers, nursery plant packs and some pots, industrial fibres

PS

Polystyrene

Dark coloured meat trays, fruit boxes, disposable cups, packaging cushion, hot food containers

OTHER

All other plastics
eg. SAN, ABS, PC, PU, Nylon

Window cleaners, water coolers, some mechanical products oils and lubricants. Nylon based textiles

MCA-Research - Creative Report - **The Modern Midden** 27

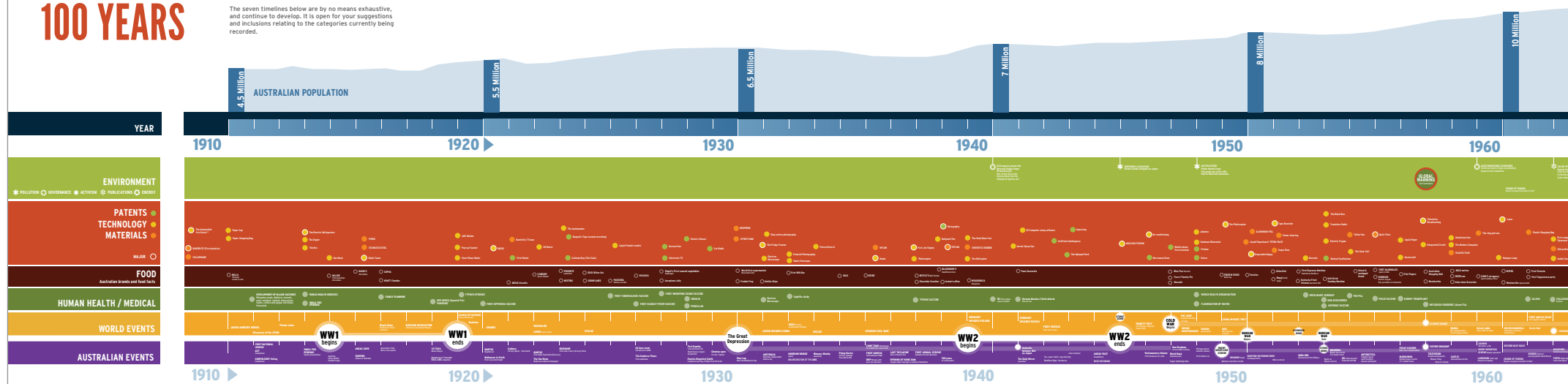
THE MODERN MIDDEN 100 YEARS

THE MODERN MIDDEN TIMELINE is being developed to plot 100 years, 1910-2010 for the purpose of 'seeing' a number of different pasts, in particular relation to the materials economy.

This 'exploratory' visualisation is concerned with mapping selected historical data, events, and facts in chronological alignment during this extraordinary period of acceleration in human growth and global change.

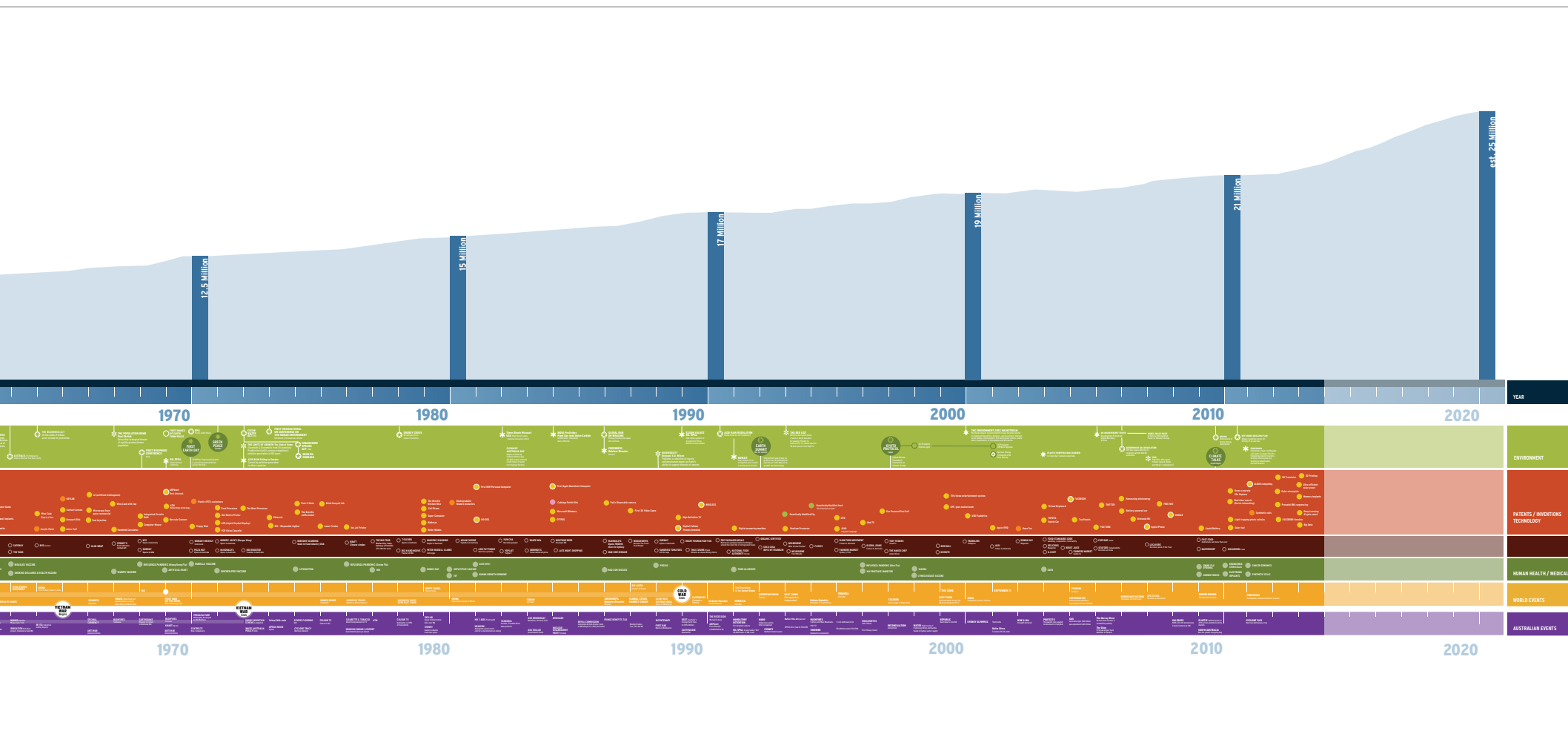
The developments of the 20th century are reflected in this great acceleration: a sharp increase in human population, economic activity, resource use, transport, abundant cheap energy, communication and scientific advancement. This is evident in particular following World War II and has continued into the 21st Century.

The seven timelines below are by no means exhaustive, and continue to develop. It is open for your suggestions and inclusions relating to the categories currently being recorded.



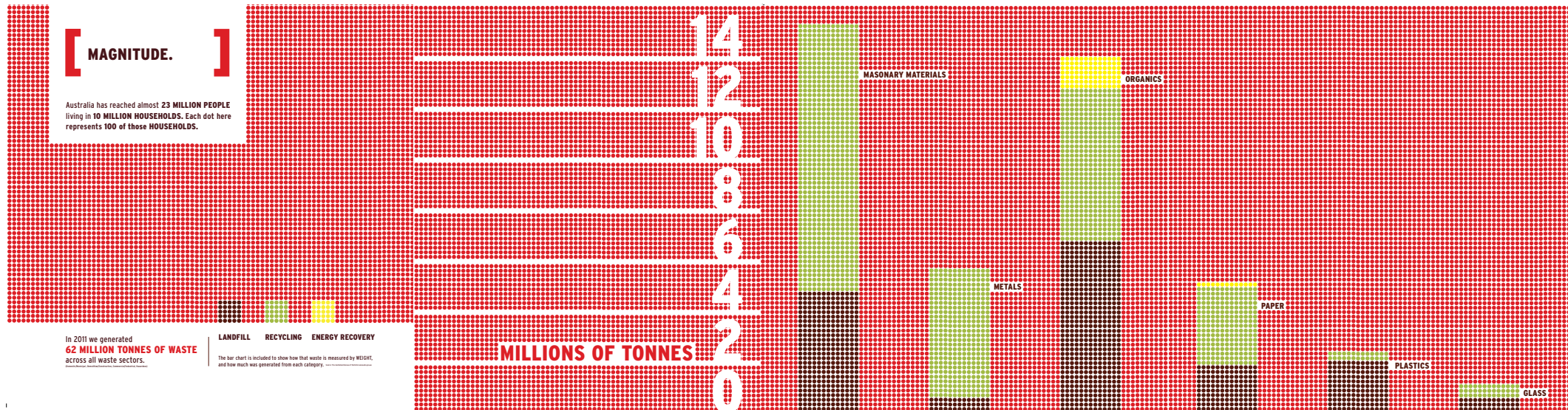
This visualisation of 100 years was included to provide a reflective opportunity for the audience. It plots the evolution of materials and technologies in relation to the development of post-industrialised economies. Prior to 1900 household items were made from biodegradable materials, such as paper, pottery, metal, glass and natural fibres such as cotton linen or silk. This extensive record was designed to provide a

broader historical context for all of the other visualisations in the installation. My initial intention exploratory in nature, to experiment with how displaying multiple timelines together (nine in total) might reveal or link phenomena across the century. The timeline also includes Australian population growth rate and major world events to act as reference points (within the decades) for the inventions, patents and



technologies that are plotted. This visualisation was not intended to be exhaustive, and was proposed as 'still in development' in the first iteration and the audience was invited to contribute inclusions. The categories displayed in the time line are: Population, Environment, Inventions & Patents (coloured coded into a further four categories), Food, Health & Medical, Major World Events, Major Australian Events.

EXPLANATORY Figure 24

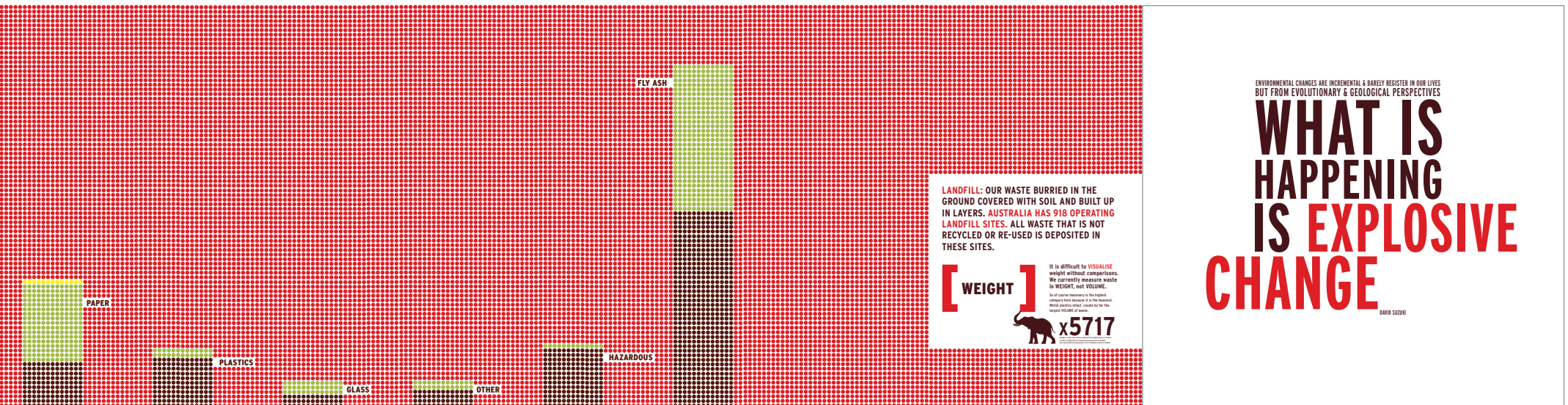


THE INTERNAL WALLS & CENTRAL FLOORSPACE were developed to establish a place for visualising a number of waste related issues together and encourage the audience to reflect on their own relationship with waste materials on a household level.

MAGNITUDE (INTERNAL WALL SIDE ONE) shows the total amount of waste that is generated in Australia by using the most current published data from waste reports published in 2011-12. The structure is presented in tonnes (as it is in the report) to explore the difficulties inherent to presenting measurements of weight. The bar chart presents waste

measured across ALL of the waste streams. The bar chart is most useful to compare the percentages of recycled, landfilled or energy captured within each category. We can see that only half of the organics are being recovered which contribute the highest greenhouse gas emissions. A simple explanation of landfill is included with a message about weight as the unit of measurement to ask the audience to consider how weight is presented in these types of charts.

The repetition of a dot symbol, and household contributions to those waste streams by juxtaposing household waste materials brought in by the viewers to occupy the floorspace.

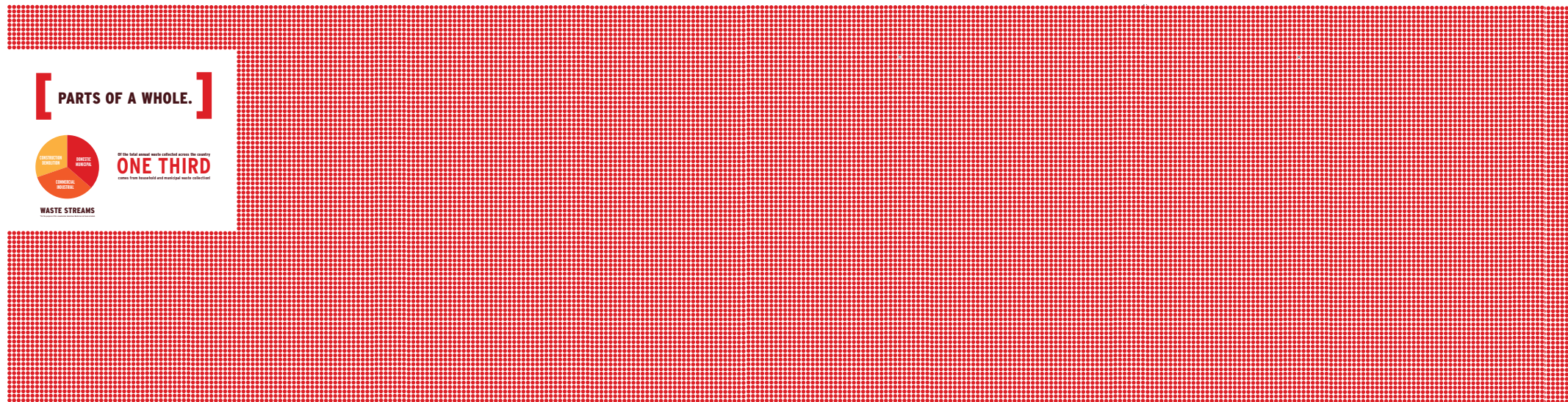


The repetition of dots as a method to denote households was significant in that it provided an opportunity to provoke thought about the waste being generated by households and families. There are 10 million households in Australia and each dot within the internal space represents 100 households, (one tenth of all the households in Australia generating waste materials = 100, 000 dots in the internal space of the installation).

Environmental activist David Suzuki quote, “Environmental changes are incremental and barely register in our minds,

but from evolutionary and geological perspectives, what is happening is explosive change”(www.davidsuzuki.org) acts as typographic visual punctuation. It provides a pause for reflection about the explosive nature of change that has occurred in the last century due to human activity.

All of the internal visualisations are vector based graphics. Current software does not allow a page size to be larger than five metres and due to the large file sizes (and the prints needing at correct size), the internal panels were divided into individual prints that could be pieced together in the installation.



THE SECOND INTERNAL SPACE was established to encourage participation by asking the audience to make a PLEDGE. The theme of this was framed as PARTS OF A WHOLE. A pie chart was included to indicate that **one third** of all waste generated in Australia comes from households and municipal waste streams and serves to inform about various waste streams.

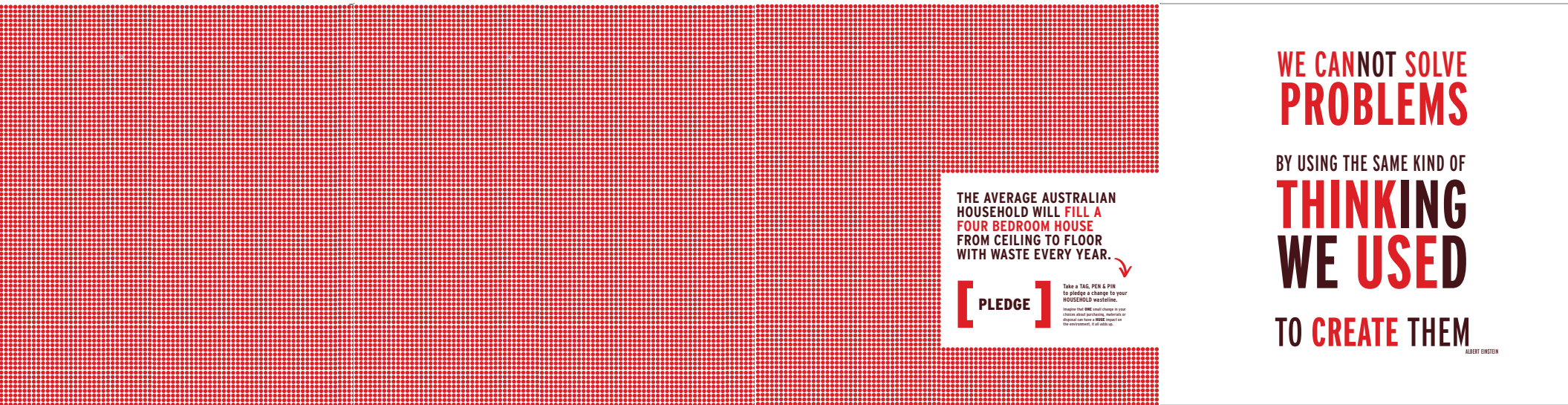
The PLEDGE (INTERNAL WALL SIDE TWO) wall was designed to provide an opportunity to explore firstly, *if* participants were willing to engage with the action of pledging (or not pledging) and secondly, what those pledges might be (this was reflective of what was being learnt and observed in the space, and for the audience to see what *others* were contributing).

The prompt to make a pledge was reinforced through a 'visual' fact, one that acts to demonstrate the volume of waste that households (on average) actually generate.

On reflection, as the pledges began to increase the impetus to do so seemed to increase exponentially, and I observed viewers reading and enjoying other peoples pledges and talking about them. Children found this particularly fun to engage with, like they were hearing secrets!

Similarly, participants shared their difficulty in pledging such as "it is to hard to make that commitment right now" or "I need to think about it longer" and, "I don't do pledges, it feel like a promise I can't keep".

I decided to keep the pledge wall on the second iteration due to the value it served during the first iteration. The experience enriched discussions, revealed concerns, and also supported the notion of acting through a collective response.



WE CANNOT SOLVE
PROBLEMS

BY USING THE SAME KIND OF

THINKING
WE USED

TO CREATE THEM

ALBERT EINSTEIN

OVER 120 PLEDGES
WERE MADE DURING
THE MODERN MIDDEN
RESIDENCY AT
UPPER RIVER,
KANGAROO VALLEY.

Here are some
of the pledges:

*Buy less packaged products from supermarkets.
Use containers in lunch boxes instead of packaging.
Be more mindful of what I am purchasing.
More vigilant with plastic recycling.
Not getting individual plastic bags
when buying fruit and veg.
Take bottled water NEVER buy.
Don't be lazy. Wise up.
Bake biscuits not buy.
Never use disposable coffee cups.
Separate my lids from the bottles.
Take my bags to the supermarket.
Find an alternative to freezer bags.
Think about reuse before throwing away.
Buy op shop clothing more.
Teach my primary school students.
Sort my recycling better*





STAGE TWO

THE MODERN MIDDEN RESIDENCY

PROTOTYPING & DISCOVERING





THE RESIDENCY
PROVIDED A
SPACE FOR THE
CONCEPTUAL
DEVELOPMENT TO
BE PUT INTO
PRACTICE & TESTED.

The Artist-in-Residency program in Kangaroo Valley NSW, May 2014 was the opportunity to bring the installation to into a community space and test the participatory elements. The two week residency initiative was offered by the Upper River Progress Association to support practitioners in creative arts research and project development. As a condition of the residency I was asked to share my practice by including community engagement associated with that developing work.

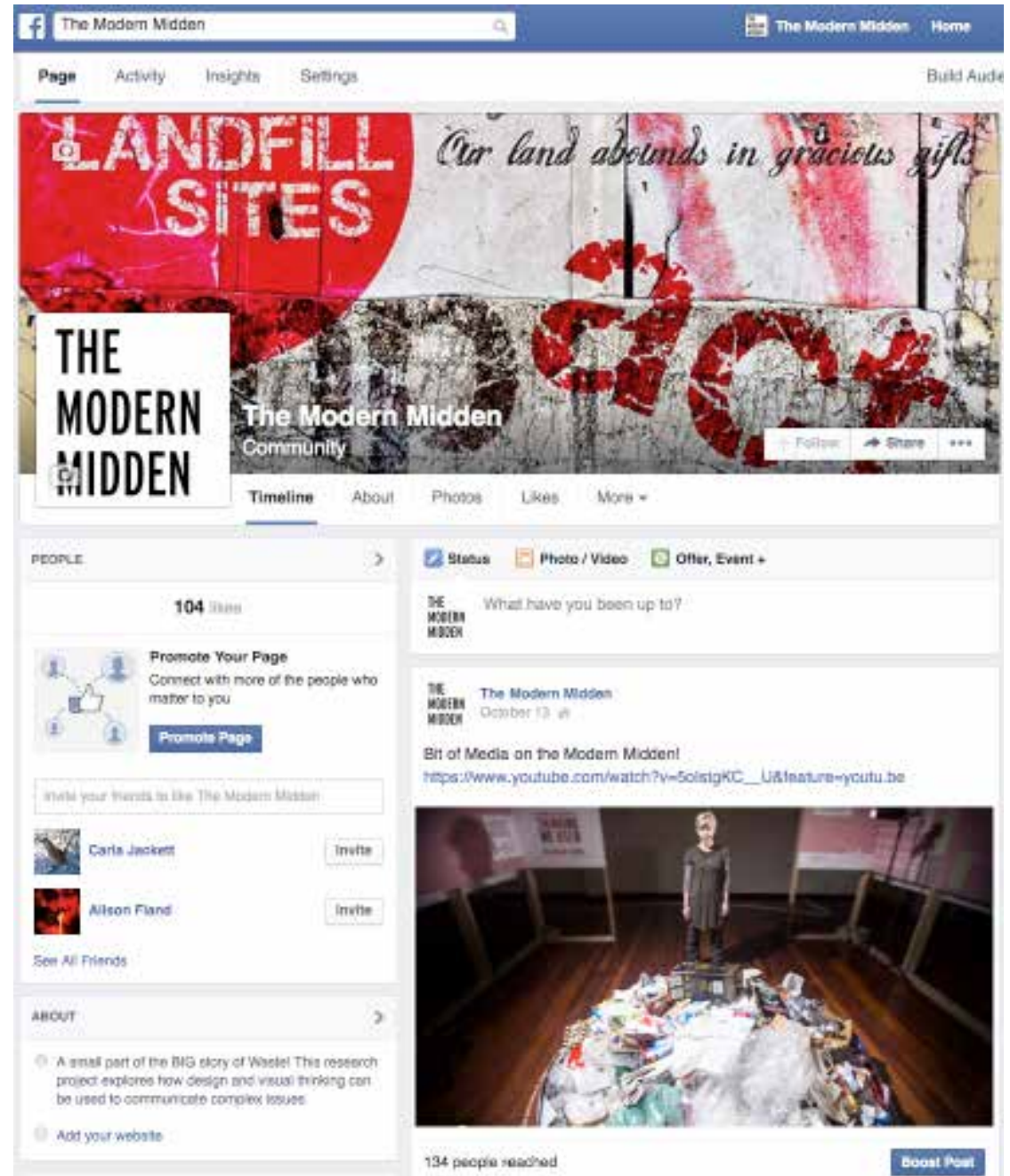
The Upper River Community Hall is located in Kangaroo Valley NSW, and is set amongst green pastures, and the nearby Kangaroo River. The historic hall also provides an outdoor covered area that would be ideal for the building of the display structure for the visualisations and to host the three community events planned for the residency.

The proposal for this residency included a multi-event approach that would engage with community in relation to the context of waste, visualisation strategies and call for participation. Structuring it this way allowed multiple opportunities and occasions to test ideas, provoke and hear discussion and with a range of age groups.

STAGES of the Residency:

- 1. Screening of documentary film TRASHED**
- 2. Installation opening THE MODERN MIDDEN**
- 3. THE BIG SORT:**
Community waste audit,
Education Day & BBQ

A social media site was established to communicate about the events of the residency. This site also acted as a place for community commentary about how the project had or was making an impact on them as participants. This site was also useful for sharing related links and stories. This page shows selected snapshots from the Facebook page.





Cecily Thew Paterson ▶ The Modern Midden

October 2, 2014 · 🌐

These are my reactions on seeing Jo's wonderful show.



What are we going to do about our rubbish problem?

I've been at the beach for a week. It's been glorious. Blue skies, crashing waves, pristine sand. Oh, and the rubbish. One morning while following my four year old around the lagoon area (my usual occupation, I have to admit... can't wait until she's older and wants to surf

CECILYPATERSON.COM

Unlike · Comment · Share

👍 The Modern Midden likes this.



Write a comment...



This is a no brainer. Not necessary.. Bad for the environment. Waste of money and resources. No good reason to do it.



Woolworths and Coles supermarkets: Stop wrapping small portions of herbs, vegetables and fruit in plastic and styrofoam. - Sign the Petition!

SARAH BUTLER JUST SIGNED THIS PETITION ON CHANGE.ORG.



Sarah Butler

June 4, 2014 at 11:38am 🌐

📷 This is what your work has inspired Joanna Stirling. Full recycling unit set up and I got to educate 40 people from all over Australia on the weekend about how to recycle properly. AND after 4 days of 40 people we have accumulated only about half a wheelie bin of landfill!!!! the rest is recycling or feeding chooks :)



Write a comment...



Angelina Marcon-Jones Well done Jo. The impact you have had on our family is significant and my kids are so lucky to have had exposure to your work to better understand how we should live to protect our future. Thank you!

Unlike · Reply · 🗨️ 1 · October 11, 2014 at 12:23am



Penny Bell Fantastic Jo. Love the concept of a midden. Suspect that our modern middens will not have the same future archeological significance as those of our aboriginal brothers and sisters.

Unlike · Reply · 🗨️ 1 · October 10, 2014 at 1:18pm

Write a comment...



The Modern Midden shared a link.

April 27, 2014 🌐

A snapshot of The Modern Midden's first opening! More to come and Thankyou to Shawn Burns from the University of Wollongong for putting this together.

http://www.youtube.com/watch?v=WJc_OWHGqy0&feature=youtu.be



The Modern Midden

The Modern Midden - Jo Stirling University of Wollongong

499 people reached

Boost Post



OFFICIAL SELECTION
FESTIVAL DE CANNES
2012

A VITAL DOCUMENTARY

LA TIMES

SOUND
VAN

CRUCIAL VIEWING



NEW YORK DAILY NEWS



JEREMY IRONS

TRASHED

IF YOU THINK WASTE IS SOMEONE ELSE'S PROBLEM
...THINK AGAIN



COMMUNITY EVENT
DOCUMENTARY
SCREENING - *TRASHED*

THE RATIONALE for screening the documentary film *Trashed* (released 2013) was to begin dialogue within the community of Kangaroo Valley about the residency intentions and the research. Screening this film provided a opportunity to discuss the global context of waste generation, consumption, pollution and resource management *prior* to the opening of the installation. It was hoped that this experience would established interest in the topic area and generate curiosity about the project.

This event was planned to engage the audience with the *materials* that would be used as part of the installation: the disposable waste and recyclable materials themselves. As part of this process, guests where required to bring with them disposable items as an entry fee for the events.

By doing this, the 82 participants that attended the film night became active contributors in the developing work by having to consciously 'make decisions' about what to bring with them, queue up to have it recorded (see Fig.26), and place it in a space provided.

To the entrance of the screening local teenagers volunteered to record each item and from which materials categories they belonged too. This process brought attention to the physical nature of products as waste and encouraged community to consider themselves as part of a collective. Although this data was not intended to be used specifically (and played a more performative role), the process of collection also established a cross generational dialogue. Participants were told to take their materials into the space and that "*they would know what to do*".

Fig. 26

THE MODERN MIDDEN	
KANGAROO VALLEY 25.4.2014	
ITEM DESCRIPTION	MATERIAL CATEGORY ie/plastic metal
easter egg packaging	Cardboard/Plastic
Plastic bag x 2	plastic
Yellow pages book	Paper/Card
iced coffee bottle (double espresso)	Plastic
Beer bottle	glass
dog food box	cardboard
plastic bag	plastic
detergent	plastic
toothpaste box	Card
Vitamin Container	Glass/plastic
plastic bag	plastic
plastic bag	plastic
wine lid	metal
coffee cup	card
dishwashing liquid container	plastic
camera & base	plastic
plastic bag	plastic
plastic drink bottle	plastic
cardboard box	cardboard
Jar	glass
Shave cream	plastic
razor & razor holder	plastic metal
tooth paste tubes x 2	plastic
plastic bag	plastic
Sheet	linen
Cereal box	card
plastic box x 5	plastic
Shopping bag (broken)	string
foil	plastic
plastic utensils	plastic
milk bottle	plastic
bubble wrap	plastic
paper bag	paper
banana skin x 2	organic
plastic bag	plastic



Community **screening**
of critically acclaimed
documentary film **TRASHED**.

**KANGAROO VALLEY
UPPER RIVER HALL**

**THURSDAY
APRIL 17
6.30PM**

This screening will be the launch of a research project by local designer Jo Stirling and will be the first artist residency sponsored by the Upper Kangaroo River Progress Association. Jo will be developing a large scale installation entitled "The Modern Midden" that will form part of her research at the University of Wollongong.

Rating: This film is not suitable for persons under **12**

***COST: Free, however please bring
a disposable item to contribute!**

These images shows the promotional material used in local newspaper, posters and flyers. This was accompanied by an editorial piece in the local community newspaper, about the residency and unfolding events. Images included here show the hall in action and some of the waste collected!





BUILDING OF DISPLAY SYSTEM

PROTOTYPING

The following pages provide a photographic narrative of the process behind the building of the display system for *The Modern Midden*. This was planned and constructed to a tight schedule in order to allow plenty of time for modifications if needed before the installation was opened to the public. The outdoor covered area was ideal for this stage.

The collaboration and support of community members meant I was able to access required carpentry tools and build the initial prototypes for each panel - these were then duplicated over a three day period.

All materials were considered in relation to their sustainability, timber, cardboard, metal stripping, water based glue and screws were ordered and delivered prior. All materials used are able to be reused or re-purposed.



FIRST PROTOTYPES completed with the help of building designer David Cox. This was critical to establishing an order in which to build each panel and meant we had a production system to work to. Accurate measurements were calculated for the making of all twelve panels.



Frames were built first from timber (pine) using screws only, so that they could be dismantled easily when required.



Recycled corrugated cardboard was measured and glued into place on the top half of the frames, excess was trimmed off. Metal strapping was screwed to top and bottom of each panel to provide the magnetic surface for attaching prints.



THE MODERN MIDDEN

A small part of the BIG story of waste

Jo Stirling

Upper River Hall Kangaroo Valley

OPENING NIGHT
APRIL 25th 6.30pm

OPEN:
SAT 26th & SUN 27th
10-2pm

AN INSTALLATION

**ALL AGES,
ALL WELCOME,
ALL NEEDED!**

**Bring disposable
item/s as your
ENTRY FEE!**

This Research Project is made possible through the Upper Kangaroo River Progress Association residency program and The University of Wollongong.
For more information on this and other events, find us on Facebook: **The Modern Midden**

PARTICIPATION

DISCOVERING & IMPLEMENTING





OPENING NIGHT of The Modern Midden welcomed over 120 willing participants and lots of waste materials were recorded at the entry point of the event. These were then placed within the space at the discretion of the participants. During this process emotions such as disgust, shame and embarrassment were expressed by the participants about what they had either brought along with them or about walking around in piles of refuse.



THE TIME LINE & SYMBOL PANELS were a active points of discussion. As the waste continued to grow and spread across the floor of the installation, participants examined it, grouped it in clusters and socialised around it.



During the three day opening, participants continued to come and add the work, pinning pledges, adding questions and responding to the anonymous questionnaire.



Upper River Hall Kangaroo Valley

SUNDAY 27th
2pm onwards

THE BIG SORT

Hands on learning about how we SORT our waste!

EVER WANTED TO KNOW MORE
ABOUT WHAT YOU CAN RECYCLE?
THIS 2 HOUR EVENT WILL BE AN
INTERACTIVE LEARNING DAY
FOR ALL AGES.

**ALL AGES,
ALL WELCOME,
ALL NEEDED!**

**BBQ
PROVIDED!**

PARTICIPATION

DISCOVERING & IMPLEMENTING





THE BIG SORT was designed to bring community together and provide an opportunity for further discussions about how waste is actually sorted once it leaves in red or yellow household waste bins. A long table was used as a metaphor for the conveyor in materials re-processing and to experience the challenges of hand-sorting. Participants transferred the waste from the floor of the installation and the sorting began.



THE BIG SORT was an experimental, social and participatory event. Much of the research I had undertaken involved understanding what was happening in recycling processes, and what was going to landfill and why. Through this collective process, shared concerns, confusion and insights were explored and discussed.

The event was designed to bring community together and establish a site for active thinking through the doing process of sorting. Discussions about plastics identification, landfill and confusing packaging in that participants began to reveal the role they played in the making of individual and collective choices about what and how they purchased household items.

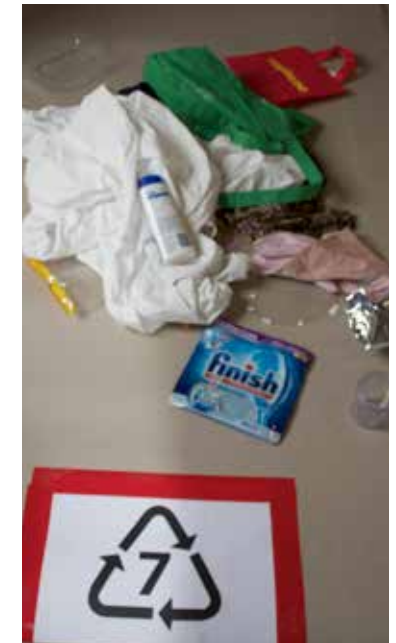
Categories Sorted:

PLASTIC CODES 1-7
PAPER
CARDBOARD
METALS
ALUMINIUM
RUBBER
GLASS
LANDFILL
WE DON'T KNOW?
PLASTIC BAGS
PLASTIC LIDS
ORGANICS



CODES AND SYMBOLS panel was brought out and used to act as a key for the plastic codes.

Although sorting of plastics is not structured in this way at a household level by separating I was hoped that we were able to visualise what items are typically made from what plastics and how much there was of each category.



When materials were sorted into categories we were able to reflect on the piles as a group. For example what really was in the Landfill pile? Much of the materials going to end up as landfill were everyday items, such as toothbrushes, toothpaste tubes, broken children's toys, and all of flexible (scrunch-able) plastics, used in food packets such as chips, biscuits, bread bags and dry goods.

I decided that providing a pile entitled "We don't know?" would open up discussion about the materials participants were unsure of. The majority of in this pile were made from mixed material components and did not seem to fit into any other categories neatly. Items such as tetra paks, paint rollers, batteries, and unmarked (no symbols) plastics featured in this pile.

All categories were then collected up, placed into hessian bags, labelled and taken to the local waste transfer station.

The Modern Midden - another Inconvenient Truth

Jo Stirling's project *The Modern*

Midden, created as part of her Masters research, illustrates graphically, and in a way that we can all understand, how explosive that change has been and how vital it is for us to clean up the mess we have made.

Some may say she is preaching to the town proud of it's status of being the first mainland town to stop using plastic bags. But I would doubt any visitor to the installation has come away without a better understanding of the issues and some ideas of what they could do better in their dealings with waste.

The residency began on Thursday 17 April with the showing of *Trashed* - a powerful and heart breaking documentary about what the human race has managed to "achieve" in a very short time and it's devastating impact on the natural world. Eighty people came to the hall and bore witness to these crucial facts. It wasn't easy to watch but it is vital viewing. We cannot afford to ignore this problem and hope it will go away. It won't. Plastic is forever. And it is our problem!

But there are things we can do to stem the tide. There are things we can do now to make sure that the future generations will have an earth that is still inhabitable. A huge part of the problem is domestic waste and solutions can be found at a local level. Yes! Even in Kangaroo Valley. And that's where Jo's amazing graphic installation, which visualises

Environmental changes are incremental and barely register in our lives but from evolutionary and geological perspectives WHAT IS HAPPENING IS EXPLOSIVE CHANGE.

David Suzuki

waste through information design, comes into it. This wasn't about turning waste into an attractive art installation (though that is certainly one way we can recycle and reuse waste). This was about messages and how graphic design can be used to help people see and understand this vital issue. Created and built over a week at the Upper River Hall as part of an artist residency offered by the Upper Kangaroo River Progress Association, the installation provides information that we can easily understand about the processes and issues around recycling and waste. It offers the public the chance to learn, to think about what they can do in their own homes, to offer solutions, to ask questions, to explore waste in a constructive, creative way.

The residency and installation wrapped up on Sunday 27 April, with a production line sort of the waste that had been brought to the hall as part of the project, and a community BBQ to celebrate. But it doesn't end here. The installation is now a prototype that Jo hopes will tour to other places and other communities. The engagement and input from the community will be analysed and form part of Jo's Masters thesis and the discussions and questions about waste and how we

deal with it must continue to happen. To that end, here are some questions and ideas that were raised during this project that are relevant to our community things that we could try and do something about. Why don't we have recycling bins in the village for tourists to separate their waste into? Why don't we have a bulk co-op outlet in the village where we can buy rice, grains, flours, sugar and other goods using our own glass containers or paper bags? How can we avoid single use plastics when making our purchasing decisions? What is the alternative to the plastic that cannot be recycled? How can we as a community lobby the NSW state government to adopt a 'cash for containers' initiative like they have had for years in South Australia. At the very least what can we as individuals do to REFUSE. RE-USE. RECYCLE.

If you think waste is someone else's problem, think again.

Sarah Butler



Fig. 27

Article published in the local newspaper *The Kangaroo Valley Voice*, reporting on the events of the residency.

QUESTIONNAIRE

An anonymous questionnaire was provided during the residency as another point of data collection, feedback and education. The questions are divided into 3 areas:

1-19 are about information pertaining to waste, symbols, recycling and access to council information.

20-29 are about the choice and decisions participants make at point of purchase and their motivations.

30-36 are about litter, emotion and what they remember most about the events.

Fig. 28 provides an example of the anonymous survey. It was hoped that from this data I would be able to determine what were the most visual strategies employed and also to assess the knowledge had about particular issues and how participants felt about them.

Three questions in particular were used to develop the second iteration of The Modern Midden and those responses are recorded here.

QUESTION 35.
WHAT WAS
THE MOST
MEMORABLE
PART OF YOUR
EXPERIENCE AT
THE MODERN
MIDDEN?

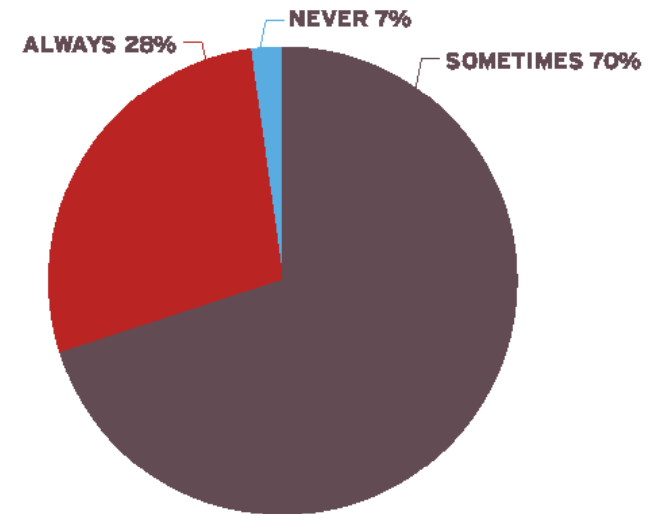
One third of
all responses,
highlighted
in red mention
the Time line.

Rubbish on the floor of the hall
Being enlightened
Clear well presented
The weight of refuse
Communication
It was very thought provoking
Learning about waste, symbols and the time line
Is a fantastic education tool.
The questions + discussions it generated
The knowledge it imparted
The time line
The history wall of product inventions
Walking through all the garbage
Seeing how much waste was brought in from just us
Awareness
Will try harder
The Facebook Page
Thought provoking
Awareness that we need to start discussing the issue
I really enjoyed being part of the creative process
Being able to see the rubbish differently and the time line
The planning and conversation leading up to it.
Time line - every kid should have that as part of History
The time line
Watching the film Trashed
Being there
The time line display was fantastic

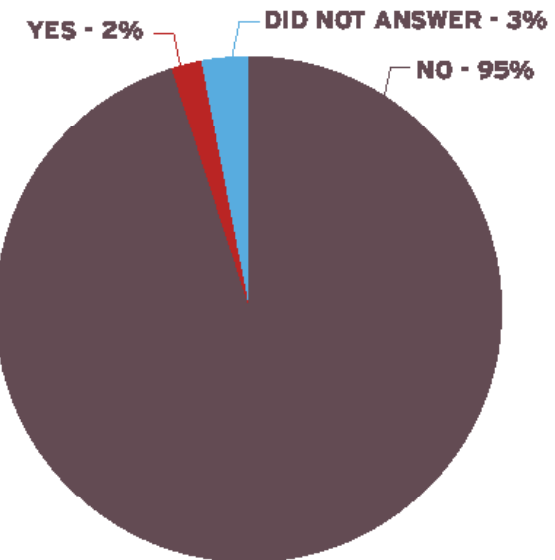
Reality check
Visual design
Haven't considered what other people recycle
The time line and population, history fascinating.
Big research
When Jo struggled to speak due to emotion, I got tears in my eyes too, its all so sad
Overwhelming despair
The time line was really great
Having an overview of past events in relation to now
Seeing the waste we produce and not knowing where it goes.
The movie and educational aspect
Learning about the zipper and all the dots!
The passion of this great community to make change happen
Learning about when things happened
The facts on materials breakdown. Not good!
How emotional Jo was in her delivery
The numbers!
I love the time line of inventions etc. I'd like a copy of it please to study at my leisure
The sheer magnitude of the problem
The products that are presented to us that are not that necessary
All the rubbish on the floor. And the time line... lots of great facts.
Listening to Jo
The time line with the population growth
Seeing how fast things have accelerated

QUESTION 8.
DO YOU GET
CONFUSED
ABOUT WHAT
ITEMS YOU CAN
AND CAN'T
RECYCLE?

Please circle:
NEVER
SOMETIMES
ALWAYS



QUESTION 18.
DO YOU KNOW
WHERE YOUR
LANDFILL (RED
BIN) ENDS ITS'
JOURNEY?



OBSERVATIONS FROM ALL EVENTS OF THE RESIDENCY

The summary of observations included here recorded in a personal journal during all three events of the first iteration of *The Modern Midden*

Screening of documentary film *Trashed*

I feel bad handing my rubbish over to the next generation

It is a great idea to get us thinking about rubbish by bringing it

I don't know where to put this plastic bottle, can I recycle it or not?

I had to really think about what to bring like it was really important

Sorry I didn't bring anything I am sure there will be something in my car

What are you going to do with all of this rubbish?

Why are they writing down what we brought?

I brought heaps of rubbish is that ok?

I brought lots of those McDonalds toys, always end up in the bin

I am looking forward to this movie although I have a feeling it is going to be depressing.

I only brought one thing, do you want more?

I am embarrassed by my garbage, I am hiding it under my coat!

Opening night & weekend *The Modern Midden*

The plastic codes are really confusing that is stupid why it looks like the recycling symbol

It feels weird walking around in all the rubbish

I don't understand why we still use plastic bags

We should make the supermarkets more responsible

The government should be doing more about waste

I would love for this exhibition to come to our school

Why don't we know more about landfill?

Who makes money from recycling anyway?

Why does plastic take so long to break down?

I think we should get supermarkets where you can fill up your own bags and jars no packaging.

I don't know what to pledge, it's really hard.

The Big Sort - community waste audit

What do we do with batteries?

Where is the code on this plastic bottle? Is it recyclable?

I am not sure where this ice cream tub goes, it has plastic and paper, do I pull them apart?

I wonder if you can recycle paint rollers? To which another participant responded: If you aren't sure I would put them in that pile but I don't think you can recycle those.

There seems to be a lot of paper and cardboard, it takes up heaps of space. To which another participant responded: Yes it is quite surprising, makes me want to be better at recycling all our paper.

It is interesting how you don't think of plastic packaging as landfill

The landfill pile is mostly that soft stuff they don't have code

What happens when you have broken glass

I don't understand why these symbols are so similar and so small

Why do they have this logo with Keep Australia Beautiful on it

Make better
choices at
point of purchase

Give old clothes
to charity.

containing
to the b

Make better
choices
at point of purchase

Wipe down
before use

pledge to
also buy
only what
needed in next
10 days

LEAVE
TAKING IN
IN THE P
HARDER
PURCHASE

Use local
unpackaged
fruit & Veg

Make every
choice at
point of purchase

Research an
alternative to
flea bags

Make every
choice at
point of purchase

Take me
to the
to the b

Make every
choice at
point of purchase

Make every
choice at
point of purchase

Make every
choice at
point of purchase

Make every
choice at
point of purchase

Make every
choice at
point of purchase

Make every
choice at
point of purchase

Make every
choice at
point of purchase

Make every
choice at
point of purchase

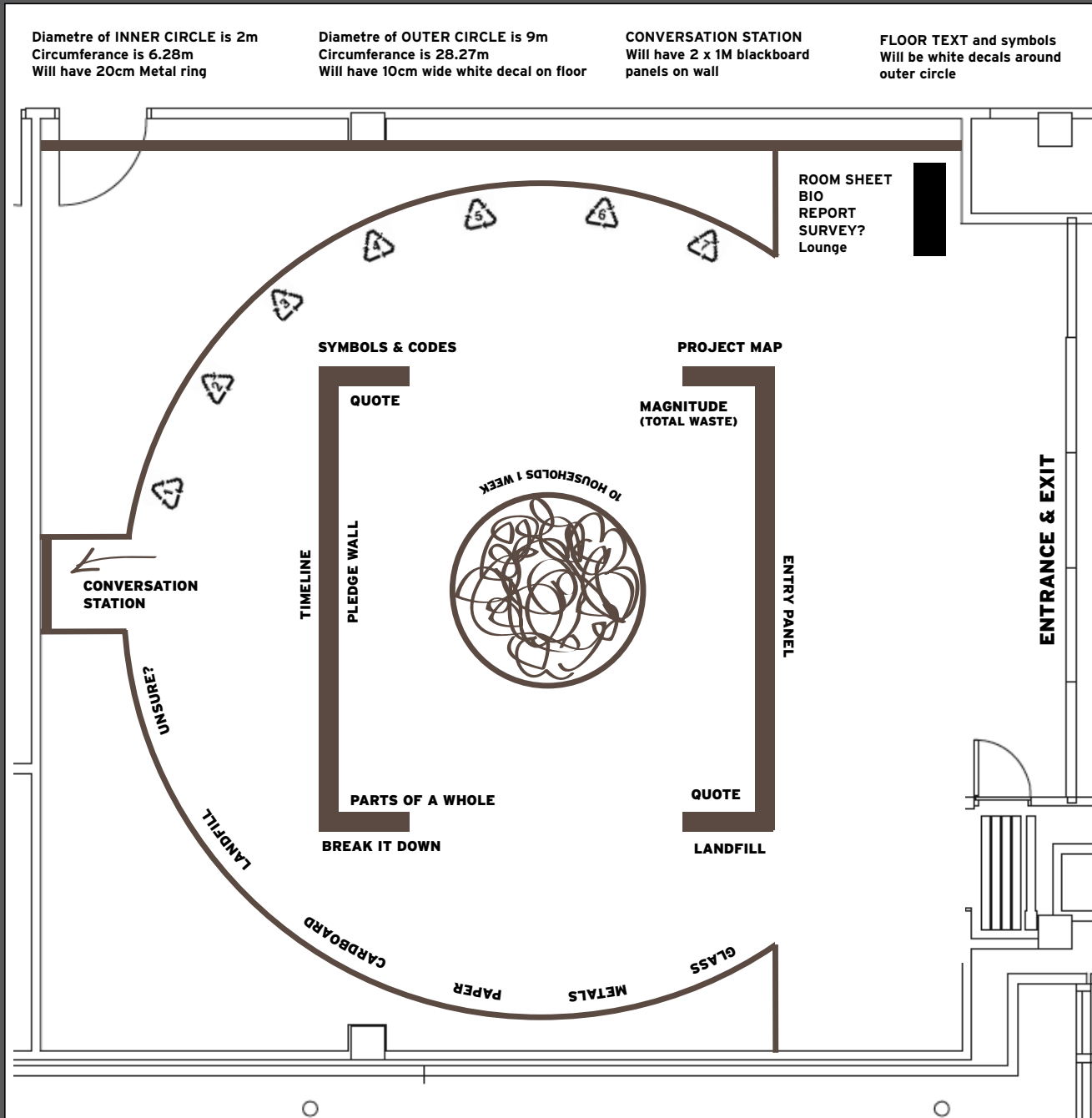
Make every
choice at
point of purchase

STAGE THREE

THE MODERN MIDDEN & BIG SORT INTEGRATED

IMPLEMENTING & LEARNING

Fig. 29



KEY INSIGHTS during the first iteration and testing of *The Modern Midden* resulted in an integration of concepts presented across the events of the residency. The unexpected energy and success generated at *The Big Sort* was a primary consideration to incorporate in the exhibition at The Innovation Campus.

The challenge here was to design another opportunity for the sorting to remain active whilst unattended and over a longer period of time.

It was clear that presenting the waste materials themselves established activity and the sorting allowed contact with the material nature of ubiquitous household items. Minimum instruction was provided around a pre-collected central waste pile, the aim being to test if this would in-fact become and remain active over one month.

The central waste pile became a visualisation in itself – 10 FAMILIES 7 DAYS. This waste included ALL household materials, with the exclusion of organic and hazardous waste for OHS reasons. Each family washed and collected these materials from the day their bins were collected for a one week period. Fig. 29 Shows a plan of the room and intentions for organising the sorting on the floorspace outside of the panels.



The central waste pile provided an anchor for the entire work. It also was designed to remain in a contained area, to reference the dot (household) symbol used in the interior space of the installation.

Pledges from the first iteration were used again, acting as a prompt and providing a continuation of the collective conversation the work was generating.





OPENING NIGHT AT THE
INNOVATION CAMPUS,
UNIVERSITY OF
WOLLONGONG.





The sorting began, conversations and discussion continued, the space became active through participation.



These images document the end result of the materials sorting process after being open for one month. It was interesting to witness the piles shifting and changing each week. Often groups of people would be found in there, sorting and talking together.



Once again the landfill pile was certainly the largest in volume. The paper and cardboard piles were also large in volume and second heaviest in weight after the glass pile.



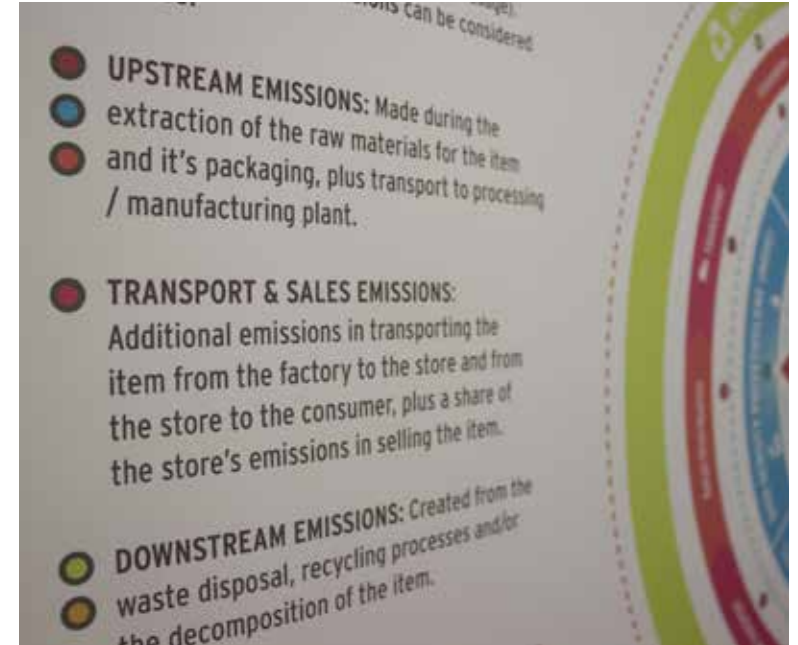
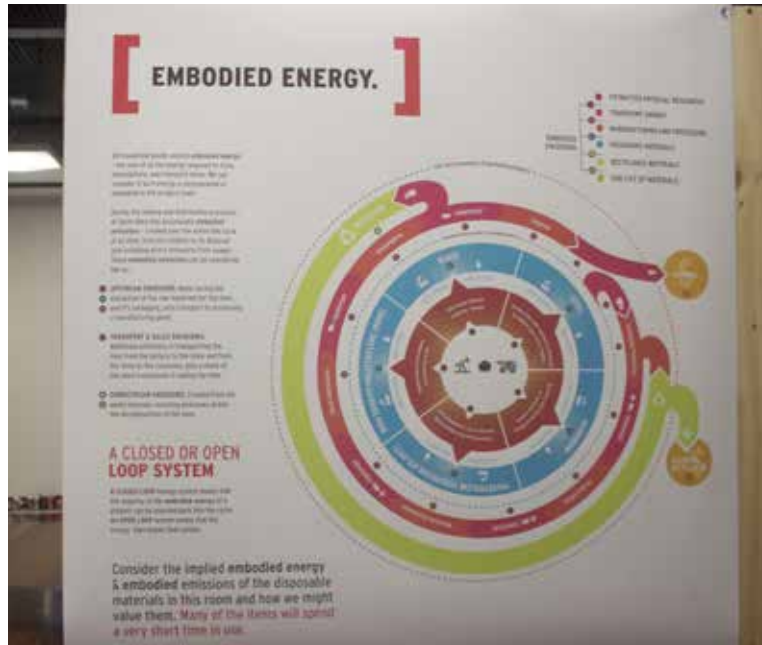
Providing an UNSURE area (image directly above) gave participants an opportunity to 'not know' everything and for collective understanding to be established about common confusions that were occurring. Tetra paks featured heavily in this pile again as well as toothbrushes and mixed materials waste, such as paper/plastic, or meta/paper combinations.

A new panel was designed to address considerations of EMBODIED ENERGY.

This panel resulted from community discussion about where 'our stuff comes from', and the feedback supplied during *The Big Sort* about resources.

Considering how we recycle and the lack of knowledge we have about where our waste materials end up, provoked discussion about where these materials begin and on what journey they have been on from beginning to end.

This visualisation aims to link our concerns with the disposable nature of materials to the energy it takes to make, transport, sell and dispose of them.





THE TIME LINE was renamed TIME & GROWTH and was further developed to include another 180 items across all sections. Several suggestions made by participants during the residency were included.

The colour palate was refined to integrate the visual style established in EMBODIED ENERGY and SYMBOLS & CODES.

The information was raised on the panel so that the lowest information could be accessed more easily.



EMBODIED ENERGY.

All household goods contain **embodied energy** - the sum of all the energy required to mine, manufacture, and transport items. We can consider it as if energy is incorporated or embodied in the product itself.

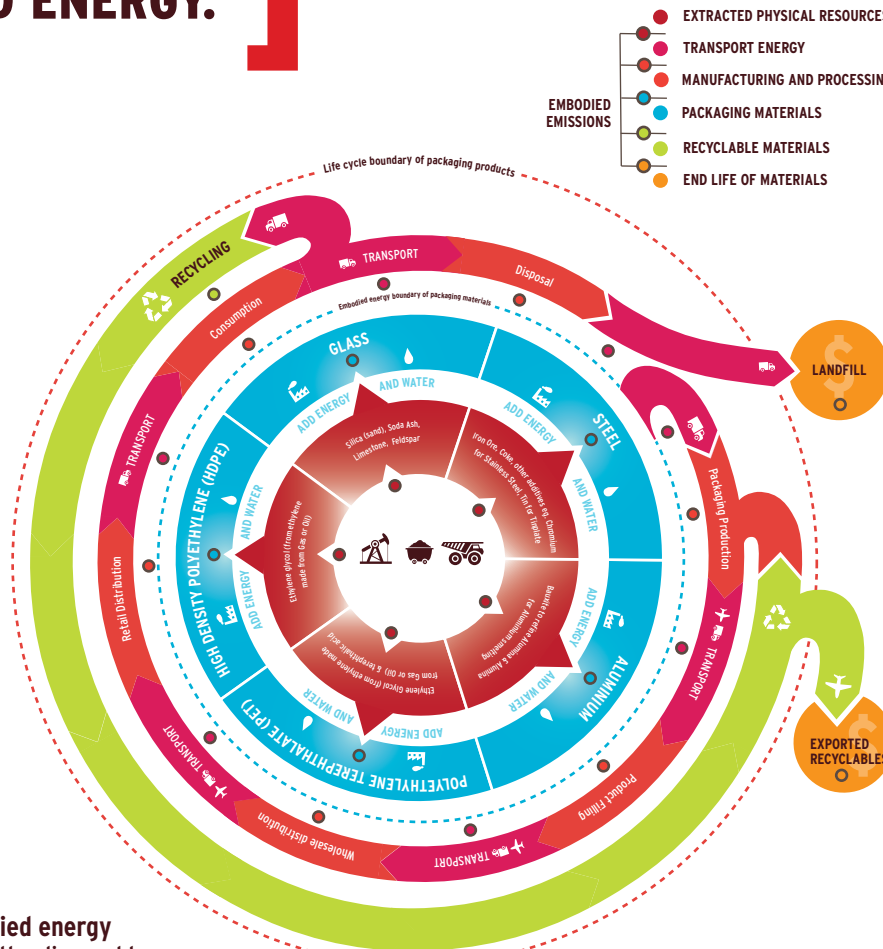
During the making and distribution processes of items they also accumulate **embodied emissions** - created over the entire life cycle of the item from its creation to its disposal (not including direct emissions from usage). These embodied emissions can be considered like so:

- **UPSTREAM EMISSIONS:** Made during the extraction of the raw materials for the item and its packaging, plus transport to processing / manufacturing plant.
- **TRANSPORT & SALES EMISSIONS:** Additional emissions in transporting the item from the factory to the store and from the store to the consumer, plus a share of the store's emissions in selling the item.
- **DOWNSTREAM EMISSIONS:** Created from the waste disposal, recycling processes and/or the decomposition of the item.

A CLOSED OR OPEN LOOP SYSTEM

A **CLOSED LOOP** energy system means that the majority of the embodied energy of a product can be inserted back into the cycle. An **OPEN LOOP** system means that the energy then leaves that system.

Consider the implied embodied energy and embodied emissions of the disposable materials in this room. **Many of the items will spend a very short time in use and may or may not stay in the energy loop.**



EMBODIED ENERGY was designed as an info graphic / diagrammatic inclusion. I decided to include information about closed and open loop energy systems. This provides an opportunity for the audience to consider disposable materials in terms of energy and that they are designed to be thrown away.

This info graphic also aims to highlight how important it is to keep materials within the energy system, that although recycling and reprocessing materials also requires resources and energy, less is used than making these products from scratch.

When resources and waste find their way into landfill, or the environment as litter, the rate of decomposition varies according to the material.

Organic matter such as food, timber, paper and natural fibres like cotton will break down, however in the process they will create methane and other greenhouse gases. Whilst methane capture and energy recovery technologies are developing, keeping organics out of the landfill stream is essential, being a resource that can be recycled or composted.

Recycling materials such as glass, and aluminium are important to keep in the RECOVERY LOOP, to save the energy of remaking them from mined resources. These materials do not degrade through the recycling process (unlike plastics) and can be remade infinitely. Through the collection process however, glass will break into smaller and smaller pieces, therefore making it more difficult to sort and separate.

PLASTICS ARE NOT RECOGNISED BY NATURE. They will degrade (break down), however they will NEVER Biodegrade.

All petrochemical products never truly breakdown and remain in the environment forever. Exposed to the elements, plastic will degrade into smaller and smaller pieces. These smaller pieces are often mistaken as food by animals such as birds and fish.



FOOD

4 WEEKS



PAPER

1 MONTH



CARDBOARD

2 MONTHS



METALS

1 MILLION YEARS +



GLASS

1 MILLION YEARS +



12 YEARS +



500 YEARS +



20 YEARS +



450 YEARS +

BREAK IT DOWN

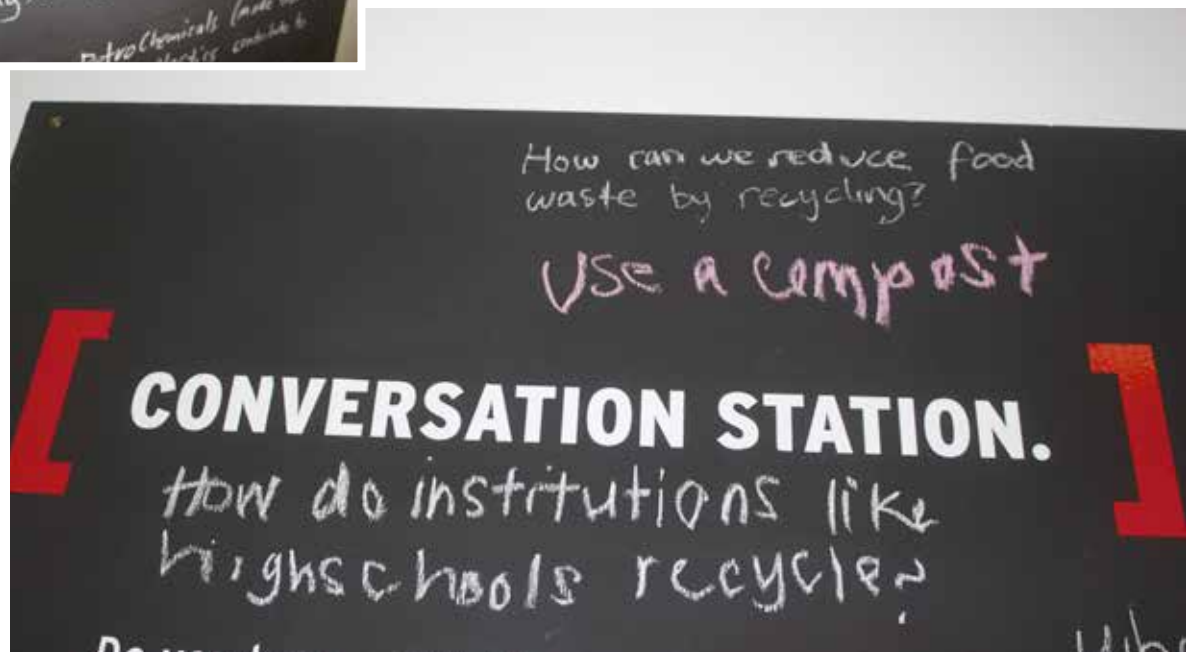
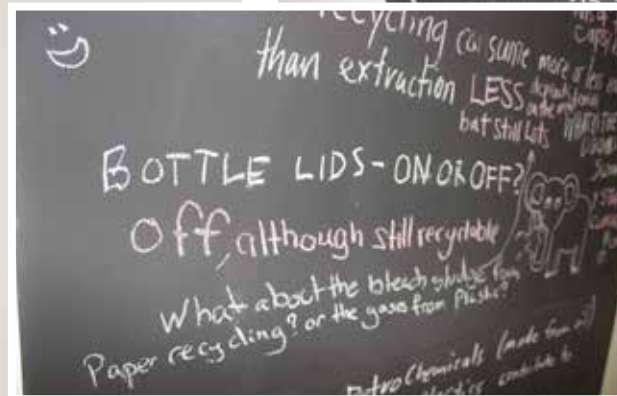
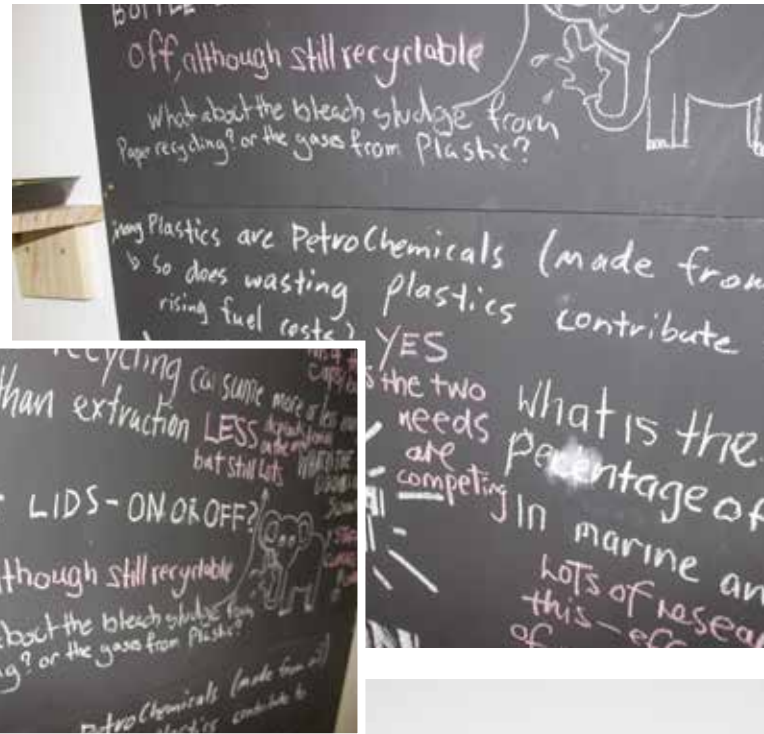
Breakdown rates source: Department of Environment and Conservation www.dece.wa.gov.au

BREAK IT DOWN was adjusted by placing more emphasis on the non biodegradable nature of plastics and that although plastics do degrade faster than aluminium or glass, they are not able to be used within ecological processes – in other words they cannot provide nourishment for natural energy systems.

This point surfaced during the residency as many types of plastic products particularly some single use plastic bags 'claim' that they are biodegradable. Unless they are made from vegetable gums or plant materials these false claims create widespread confusion about plastic.

Plastics DO degrade when exposed to the elements, however, they break down into smaller and smaller pieces which can become mistaken by birds and marine life for food.

In an anaerobic environment such as a landfill site, it is estimated that some plastics will take hundreds of years to break down and as they do, chemicals and toxins enter the ground as leachates, causing contamination of ground water sources and leaving heavy metal residue in soils.



THE CONVERSATION STATION was a site for sharing questions and answers. This strategy proved very useful in the initial iteration, however by taking this component to the outside wall, I was able to provide more space over a longer period of time. All of the answers provided were from other participants.

SUMMARY & REFLECTION

The practice-led research embodied in *The Modern Midden* provided me with the vehicle to explore how information might be designed to activate change in social attitudes, and to promote awareness regarding the environmental impacts of waste materials, their use and their disposal. The insights uncovered throughout the processes and activities of this project are analysed and discussed in depth throughout the exegesis to answer the research question posed at the outset of this research.

This project has been an enriching experience for me as a designer practitioner, educator, as a householder and parent. I have witnessed change occurring within my own community of Kangaroo Valley and of my ever expanding community in Wollongong, most notably in design students exploring complex environmental or social problems using communication design.

This research report is designed to support the exegesis and it is hoped can also be used by others to further advocate for design solutions and systems that integrate and promote environmental benefit.

FRONT AND BACK COVER

Stirling, J, 2013, *Impact*, photographic montage, print 300x100mm (detail).

