

# **EVERYTHING BUT THE BUILDING**

PROJECT ORGANISATION, THE FIRST LIGHT HOUSE, SOLAR  
DECATHLON 2011

BY

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A thesis submitted to the Victoria University of Wellington,  
in fulfillment of the requirements for the degree  
of Master of Architecture.

Victoria University of Wellington, New Zealand  
2012

## Acknowledgements

I would like to sincerely thank all of the following for making this project and thesis possible:

My colleagues & friends, Anna, Ben and Eli

My friends and family

All of the staff at Victoria University

My fellow students and peers

Masters supervisors, Brenda & Robert Vale

&

All of the First Light family,

Supporters, Sponsors and Teachers

# 1 Abstract

This thesis is a reflection on Victoria University and New Zealand's entry into the U.S. Department of Energy's Solar Decathlon 2011, First Light. Beginning with a proposal in November 2009, the project team would spend the next 24 months developing the response.

Through the use of organisational charts and discussion this thesis details and documents the complex development that occurred in the project structure across 24 months that encompassed the project entry through to the final competition in Washington D.C., identifying and highlighting the challenges faced by the project team and how the team responded.

Also highlighting the success the team had outside of the built form, documenting achievements in the Communications, Public Relations and Sponsorship.

In doing so this thesis provides a record of achievement and provides a road map and precedent for future endeavors of this nature.

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# 4 Introduction

Architecture is often misconstrued as the art of one person, a creative artistic genius. However all Architects, Engineers and Planners know that buildings along with just about everything else in the built environment, are collaborative efforts and have been since the beginning of time. They are the result of the combined resourcefulness and creative energies of teams of design professionals. While a design team may initially be inspired by the creativity of a single person or idea, the execution of the design involves the hard work, dedication, talent, and inventiveness of many team members. And like most teams, the design team require leadership and coordination to work as a harmonious whole. (Ramroth Jr., 2006)

The Solar Decathlon was no exception to this statement, beginning with four undergraduate students and a clever concept, the project developed into a team that involved more than forty students, twenty-five staff, one hundred and thirty sponsors and numerous other individuals.

The challenge was unique and unprecedented in New Zealand. A student led team with a desire to win took on the challenge. Faced with a very rigid set of competition rules, a tight timeframe and a fluctuating budget the team saw uncertainty and risk while a mass of ocean drove innovation and pushed logistical boundaries. Complicated collaboration of academics, students and industry required management and organisation not experienced before.

This thesis chronologically documents and discusses the twenty-four month project illustrating the organisation and human resourcing while documenting the success of the communications, and fundraising and team support. This was a response to the initial 2009 proposal based upon which the team was a successful finalist and third place finisher. The organisational structure developed largely as a response to trial and error, overcoming conflict, while always learning and discovering new ways to manage. Organisation, planning, management, leadership, delegation, communication and responsibility were all factors that affected the outcome of the project and will be explored below.

With a relatively inexperienced core team throughout the project inevitably mistakes were made and challenges arose but at all times all members of the team were struggling towards the same goal, the common goal of delivering a competition winning house to the United States. While individuals may have had different goals, commitments, priorities and timeframes at no point was there any malevolence, everyone wanted the project to succeed. This chapter aims to accurately document the evolution of the project management and organisation in such a manner that it could be used as a reference for future practice. With success as the common goal, what worked, what didn't?

Every attempt at objectivity has been made by the author, who however himself was a member of the core student team. As a result his interpretation of events will have influenced the following document.

# 5 What is the Solar Decathlon?

## 5.1 About

The U.S. Department of Energy Solar Decathlon is an internationally renowned and award winning (for leadership in civic innovation, 2010 National Honors Awards) (U.S. Department of Energy, 2010) student led design competition that challenges student led university teams from across the globe to design, build, and operate solar-powered houses that are cost-effective, energy-efficient, and attractive. The winner of the competition is the team that best blends affordability, consumer appeal, and design excellence with optimal energy production and maximum efficiency. (U.S. Department of Energy, 2012)



**Figure 5.1** – The Solar Decathlon 2009, Washington D.C.

The first Solar Decathlon was held in 2002 with the idea spawned early in 2001 when founder and current event director Richard King of the U.S. Department of

Energy invited 14 university teams from across the U.S. including Puerto Rico to compete in the inaugural competition. The competition has since occurred biennially in 2005, 2007, 2009 and now 2011 with increasing success illustrated by the growing visitor numbers. So much so the event has expanded to include competitions in both Europe (2010, 2012) and China (2013) with further interest expressed from Australia, with the 2011 event attended by the Solar Association of Australia.

The first four events took place on the high profile 'front lawn of America' the National Mall in Washington DC, the nation's capital city. In early 2011 it was controversially announced that the U.S. Department of Interior had requested the 2011 competition be relocated, months later it was decided the event would take place on the National Mall's West Potomac Park in Washington, D.C. only a few kilometres from the original location. While the event lost its high profile site the event still recorded record visitor numbers, up almost 60,000 on the previous event, and international media interest unseen reaching into the millions worldwide. (U.S. Department of Energy, 2012)

The competition challenges the university teams to perform across a series of 10 contests that gauge each home's performance, livability, and affordability. Each of the 10 contests is worth 100 points, totaling 1000, the team that scores highest across the 10 contests wins. The 10 contests are made up of 5 judged contests, Architecture, Engineering, Market Appeal, Communications, Affordability and 5 measured contests, Energy Balance, Hot Water, Comfort Zone, Appliances and Home Entertainment. The contests demonstrate that the competition looks beyond the competition as a purely architectural or engineering contest but a contest that challenges students to address all the factors of everyday life. See Figure 5.3 below for a breakdown of the competition contests.

Over the past 5 competitions the Solar Decathlon has involved 92 university teams while affecting the lives of more than 15,000 university participants. The competition attracts the brightest student minds from around the world while providing student participants with hands-on training and collaborative experiences that prepare them to enter the clean-energy workforce.



The Solar Decathlon's primary goal has always been to educate consumers in the U.S. and abroad about clean energy solutions available today. By illustrating innovative ways to incorporate practical, affordable clean-energy products and ideas into homes this accelerates development of whole-house design solutions that improve performance and reduce costs for the homeowner and the environment.

Highlights: Of the 2009 Solar Decathlon:

- Provided 307,502 house visits to the public over 10 days
- Offered 32 workshops onsite for the public and held a dedicated day of workshops for builders and industry, which were attended by 506 professionals
- Partnered with the National Education Association, which broadcast daily educational programming to classrooms around the U.S.
- Reached millions of readers and viewers in markets across the globe through various media. (U.S. Department of Energy, 2011)

URL: <http://www.solardecathlon.gov>



**Figure 5.2** – Aerial view of the Solar Decathlon 2009, Washington D.C.

**Figure 5.3**  
Contest Criteria

### SECTION III: CONTEST CRITERIA

The Solar Decathlon competition consists of 10 separately scored contests. Each contest contains one or more subcontests. For example, Contest 8: Appliances consists of five separately scored subcontests. The team with the highest total points at the end of the competition wins. Table 2 shows the competition structure.

**Table 2: Competition structure**

Contest Number	Subcontest Number	Contest Name	Available Points	Subcontest Name	Available Points	Subcontest Type	Brief Description
1	n/a	Architecture <sup>4</sup>	100	n/a	n/a	Juried	Architecture Jury reviews and evaluates the drawings, construction specifications, audiovisual architecture presentation, and final constructed project
2	n/a	Market Appeal <sup>4</sup>	100	n/a	n/a	Juried	Market Appeal Jury reviews and evaluates the drawings, construction specifications, audiovisual sales presentation, and final constructed project
3	n/a	Engineering <sup>4</sup>	100	n/a	n/a	Juried	Engineering Jury reviews and evaluates the drawings, construction specs, energy analysis results and discussion, audiovisual engineering presentation, and final constructed project
4	n/a	Communications	100	n/a	n/a	Juried	Communications Jury reviews and evaluates the Web site, video walkthrough, onsite public exhibit, and public exhibit materials
5	n/a	Affordability	100	n/a	n/a	Juried	Cost estimator reviews the drawings and construction specifications to estimate construction costs
6	6-1	Comfort Zone	100	Temperature	75	Measured	Keep zone temperature in 71°F – 76°F (22°C – 24°C) range
	6-2			Humidity	25	Measured	Keep zone relative humidity below 60%
7	n/a	Hot Water	100	n/a	n/a	Measured	Deliver 15 gallons of water at average 110°F (43°C) temperature within 10 minutes; 16 water draws during contest week
8	8-1	Appliances	100	Refrigerator	10	Measured	Keep refrigerator temperature in 34°F – 40°F (1°C - 4°C) range
	8-2			Freezer	10	Measured	Keep freezer temperature in -20°F – 5°F (-29°C to -15°C) range
	8-3			Clothes Washer	20	Measured	Successfully wash 8 loads of laundry (one load = six bath towels) during contest week
	8-4			Clothes Dryer	40	Measured	Return 8 loads of laundry to their original weight (one load = six bath towels) during contest week
	8-5			Dishwasher	20	Measured	Successfully wash five loads of dishes (one load = six place settings) during contest week
9	9-1	Home Entertainment	100	Lighting	40	Measured	All interior and exterior lights on at full levels at night
	9-2			Cooking	20	Measured	Successfully perform four cooking tasks (one task = vaporize 5 lb of water in less than 2 hours) during contest week
	9-3			Dinner Party	10	Juried	Host two dinner parties for up to 8 guests; teams score each other
	9-4			Home Electronics	25	Measured	Operate a TV and computer during specified hours
	9-5			Movie Night	5	Juried	Invite neighbors to watch a movie on the home theater system; teams score each other
10	n/a	Energy Balance	100	n/a	100	Measured	Produce at least as much electrical energy (kWh) as is consumed during contest week
<b>TOTALS</b>			<b>1,000</b>	<b>515 total juried points and 485 total measured points from 19 individually scored contest elements</b>			

<sup>4</sup> Lighting quality and lighting control evaluations are conducted by the Architecture, Market Appeal, and Engineering juries.

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# 6 Project Beginnings

## 6.1 The Project Beginning

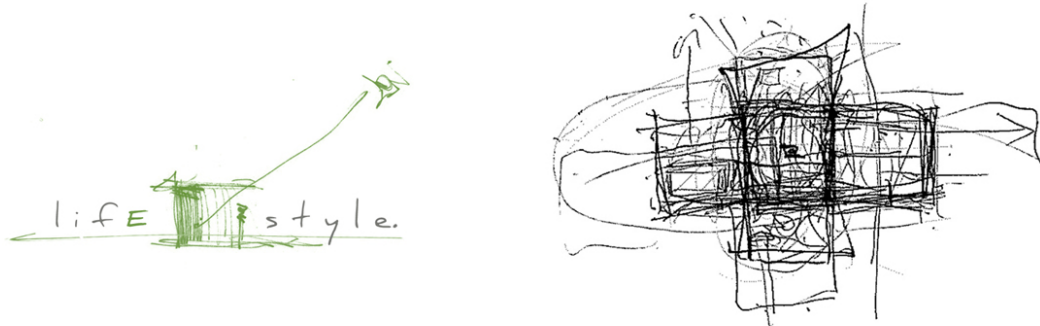
MARCH – JUNE 2009

It is important to understand where the project that became known as First Light began, as it has formed not only the beginnings of the team and the formal entry to the 2011 Solar Decathlon but also proved to be a crucial element in the development of a strong concept and team culture that created the successes seen two years later.

The project began on the back of a Victoria University School of Architecture & Design special topic (ARCH 383: Solar Decathlon – Stage 1); the paper was created and run by *Senior Administrator 1* with assistance from *Senior Academic 1*. It was his objective to introduce the school and the students to an international design competition that was at the forefront of not only Solar technology and innovation but sustainable building practices and design, a topic that is of growing global importance. It was to be over the next few years through a series of elective courses that *Senior Administrator 1* had planned to build the foundations for a successful entry into the later 2013 or 2015 Solar Decathlons.

The first half of the elective paper saw twenty students each complete a research report into the various aspects of the solar industry. Four students Anna Farrow, Benjamin Jagersma, Eli Nuttall and Nicholas Officer (author) who completed papers on The Kiwi Bach, Home Automation, Phase Change Materials and Organic Photovoltaics respectively were selected by *Senior Administrator 1* as a team to complete the second half of the elective, to design a solar powered house that closely met the requirements of the Solar Decathlon. For many of the students this was one of the very rare times that students were asked to work together to deliver a project as would happen in a real world architectural practice. This project called Life Style would later be renamed First Light, representative of New

Zealand's unique geographical location, and entered as the Southern Hemisphere's first entry into the Solar Decathlon.



**Figure 6.1** - LifeStyle logo & first concept sketch

Life Style garnered praise from the school, *Senior Administrator 1* and Head of School *Senior Administrator 2* who labeled it “world class” in a formal critique. In late 2009 the project was awarded the Supreme Award for sustainability and four Merit awards in the Benson Cooper Sustainability awards and it was later published by the faculty of Architecture and Design as *LiFE style / Anna Farrow ... [et. al]*. It remains in the faculty library.



**Figure 6.2** - LifeStyle Exterior Perspective

Unfortunately *Senior Administrator 1* left the school shortly after the elective course was completed but it was at his request that *Senior Administrator 3* of the



Victoria University research office arranged to take a serious interest in the project and meet with the four founding students, Anna, Ben, Eli and Nick to discuss the future of the project.



**Figure 6.3** – Lifestyle Transverse Section

## 6.2 The 2009 Proposal

NOVEMBER 2009

The proposal submitted to the U.S. Department of Energy (DOE) in November 2009 was the deciding document in the acceptance to the competition but also an important document in the future of the project. The purpose of the proposal, a 20 page (maximum) document, was to outline how the University as a whole would physically deliver a project, of such scale and of unprecedented nature, to the U.S. in a little under two years. In the 2011 request for proposal document the DOE outlined four key areas where they wanted to see commitment and understanding from the University. These areas were Technical Innovation and Design, Fundraising and Team Support, Organisation and Project Planning and Curriculum Integration.

This thesis will attempt to post analyze how the team and the university delivered on the 'promises' made in the 2009 proposal with a focus on organisation and project planning and fundraising and team support.

A summary of the 2009 document is provided below:

### 6.2.1 Technical Innovation and Design

The 2009 proposal identified key areas of innovation in the built project that would be focused on, these included Passive Systems and the use of Solar Energy, Active Solar Technologies, Life Cycle Analysis, Improved quality of life, Materials and Technologies, Building process, Transportation, Environmental, Safety, and Health Considerations.

NB: This thesis will not seek to explore the success of Technical Innovation and Design, for a complete project breakdown and for more information see theses completed by colleagues Anna Farrow (Interior), Ben Jagersma (Technology) and Eli Nuttall (Architecture).



### 6.2.2 Fundraising and Team Support

The 2009 proposal outlined and identified the 'significant level', of funding required to cover the costs involved in the project, but it also identifies the unique opportunity this project presented to the University and New Zealand. The proposal suggested a 3 pronged approach to securing funding – the University, Government, Industry (New Zealand and abroad) challenging these public and private sector organisations to use this unique opportunity to prove that New Zealand can compete on the world stage as a world leader in sustainable design and technology.

### 6.2.3 Organisation and Project Planning

The 2009 proposal recognized the importance of expertise in the area of organisation and project planning and outlined a project framework that included an independent advisory panel, a core management and delivery team as well as the need for a project manager. Key external groups were ear marked for support and there was an understanding and identification that the core student group needed to expand well beyond the initial four.

### 6.2.4 Curriculum Integration

The 2009 proposal recognised the Solar Decathlon's emphasis on collaboration and curriculum integration and quickly emphasized the university's need for a collaborative approach detailing what schools and faculties would be involved.

### 6.3 Motivations

For any project of significance motivations or objectives must exist on an organisational and personal level. The level of motivation to complete these goals will likely determine the success or failure of the project. Motivators are generally seen as achievement, recognition and advancement. (Chappell & Willis, 2010)

The 2009 proposal suggests very broadly the motivations behind the University's (and more widely New Zealand's) incentives for involvement – "This proposal comes from the world's first carbon neutral faculty, from a university that values its position in the nation's capital city and from a country that reveres innovation, that values its clean green image and markets itself internationally as 100% pure. The Solar Decathlon offers us the opportunity to further this commitment to these ideals." (Danielmeier, Burgess, Farrow, Nuttall, Jagersma, & Officer, 2009)

It is likely other motivations exist for the university, to commit to a project of such scale and financial risk; it suggests there must be far reaching rewards. It is beyond the author's position to identify these motivations due to their sensitive nature within the organisation, yet it should be identified that over the course of the project it is likely these motivations affected the outcomes of major decisions that were made by the upper management/governance. This thesis will not endeavor to comment on these motivations, rather acknowledge they exist.

For the student body the motivations are a lot simpler, the project presents unmatched experience, not only does it provide hands on experience of a real world situation but it provides lessons in leadership and team work that will exist in the workforce.

## 6.4 The Design

APRIL 2009 - APRIL 2010

The design of the First Light house developed over 12 months from April 2009 during the first elective paper through February/March - the conceptual design competition and finally developed design, which occurred through to the conclusion of the project.

The importance of a strong concept/idea was illustrated as the “Life Style’ drove the early success of the project and proposal. It was this idea that garnered support for the 2011 competition entry, which until then hadn’t previously even been considered.

Yet while a good idea may capture the imagination of the audience, it is the delivery of that idea to that audience that determines a project’s success. It is this that this thesis attempts to document.

While it is not realistic to attribute the success of the project to the design concept alone, it is important to acknowledge it. Below is a summary of that concept and the developed design on which this project is founded.



**Figure 6.4** -First Light Developed Design Exterior Render

### 6.4.1 The Concept

The starting point for our concept design was the reinterpretation of the historic

New Zealand holiday home, the iconic “Kiwi bach” – “A Bach for the 21<sup>st</sup> century” written by Anna Farrow was the design driver, a study into the evolution of the Bach in New Zealand, from its origins in the 1930s as the simplest of shelters it transformed over time to an expensive lifestyle choice, accommodating evolving owners’ demands. The classic Kiwi bach remains today – a New Zealand holiday home – where New Zealanders retreat to ‘get away from it all’ and get back to basics. Baches exemplify our Kiwi values: a strong connection with the landscape, a hands-on ‘do it yourself’ mentality and socializing outdoors.



**Figure 6.4.1** – Traditional Kiwi bach

*BACH DEFINITION: The Kiwi bach (pronounced ‘batch’) is a New Zealand holiday home. Traditionally the Kiwi bach was a small, modest dwelling found at beaches and remote holiday destinations. It was a basic edifice without electricity, running water or indoor toilet. Modern Kiwi holiday homes with all the mod cons are still referred to as ‘the bach’.* (Tourism New Zealand, 2012)

#### 6.4.2 The Final Design, a summary

The design of the house is oriented towards the outdoors. Decking runs around the house and right through its centre, allowing occupants to effectively live outside during summer, and bringing a sense of the outdoors inside all year round.

The ability to use the space for socializing is an important component of the First Light house. The layout provides functional, flexible social spaces, which can be transformed to suit the owner and make the most of the natural environment.





**Figure 6.4.2** – The First Light house interiors

The connection to the land was central to the design of the First Light house and the materials used reflect this. Key construction materials used within the house are natural, enduring and classic, including timber, concrete, glass, and natural sheep wool.



**Figure 6.4.3** – The First Light house interior, exterior and solar hot water

The First Light house is a net zero energy dwelling; designed to produce at least as much energy as it uses. The house has been designed to maximize energy drawn from the natural climate using a combination of passive and active energy strategies. The result is an energy efficient and comfort controlled house that

consumes less than a third of the energy of a typical NZ home, and that obtains all its energy from the sun.

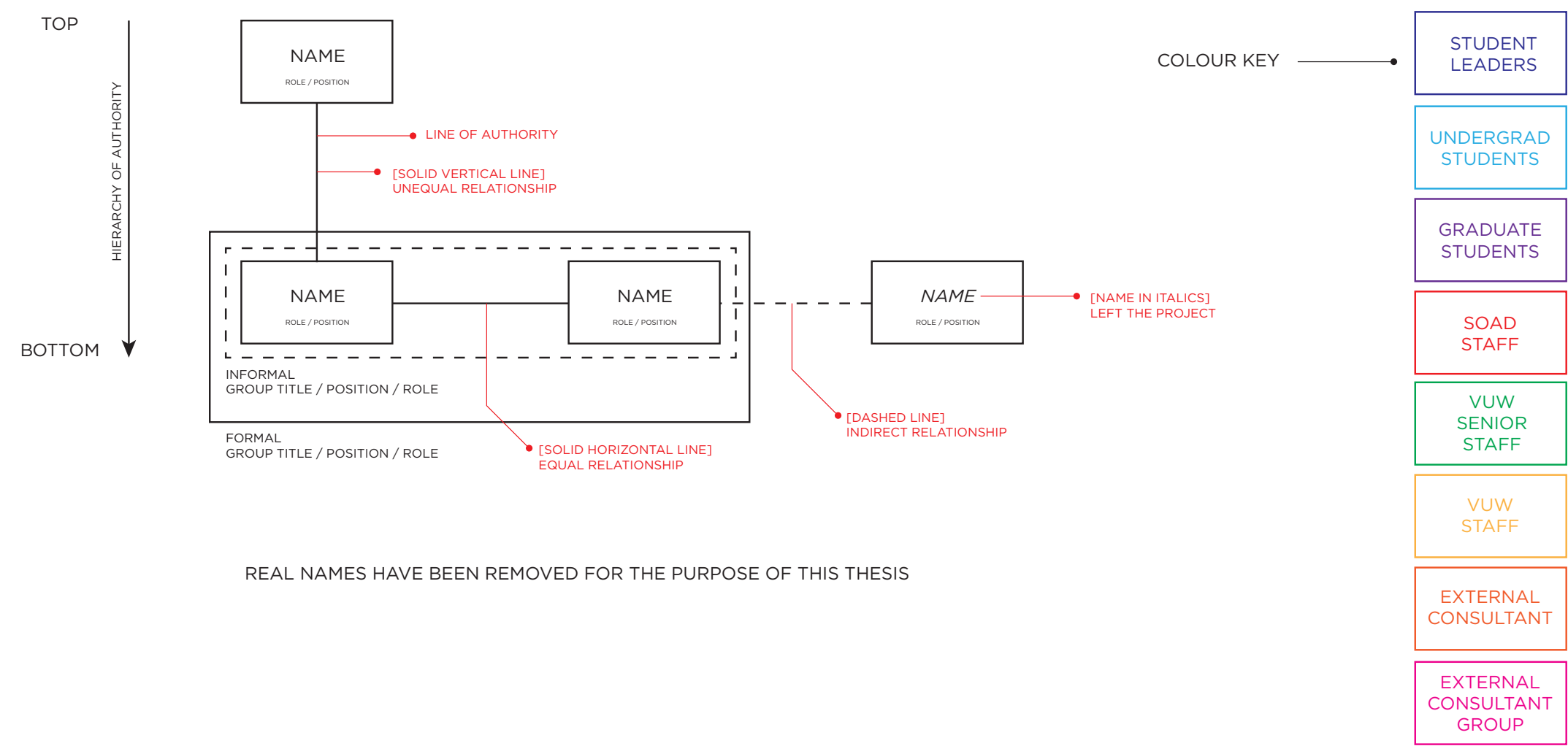
# 7 Organisation & Project Delivery

## 7.1 Organisational Charts

This chapter uses organisational charts to document the structure in project resource and management over the course of the project. Organisational charts are a diagrammatical representation showing the relationship between individuals, sections and departments. (Millar, 1999)

The key (Figure 7.1) below provides an illustration of the chart rules.

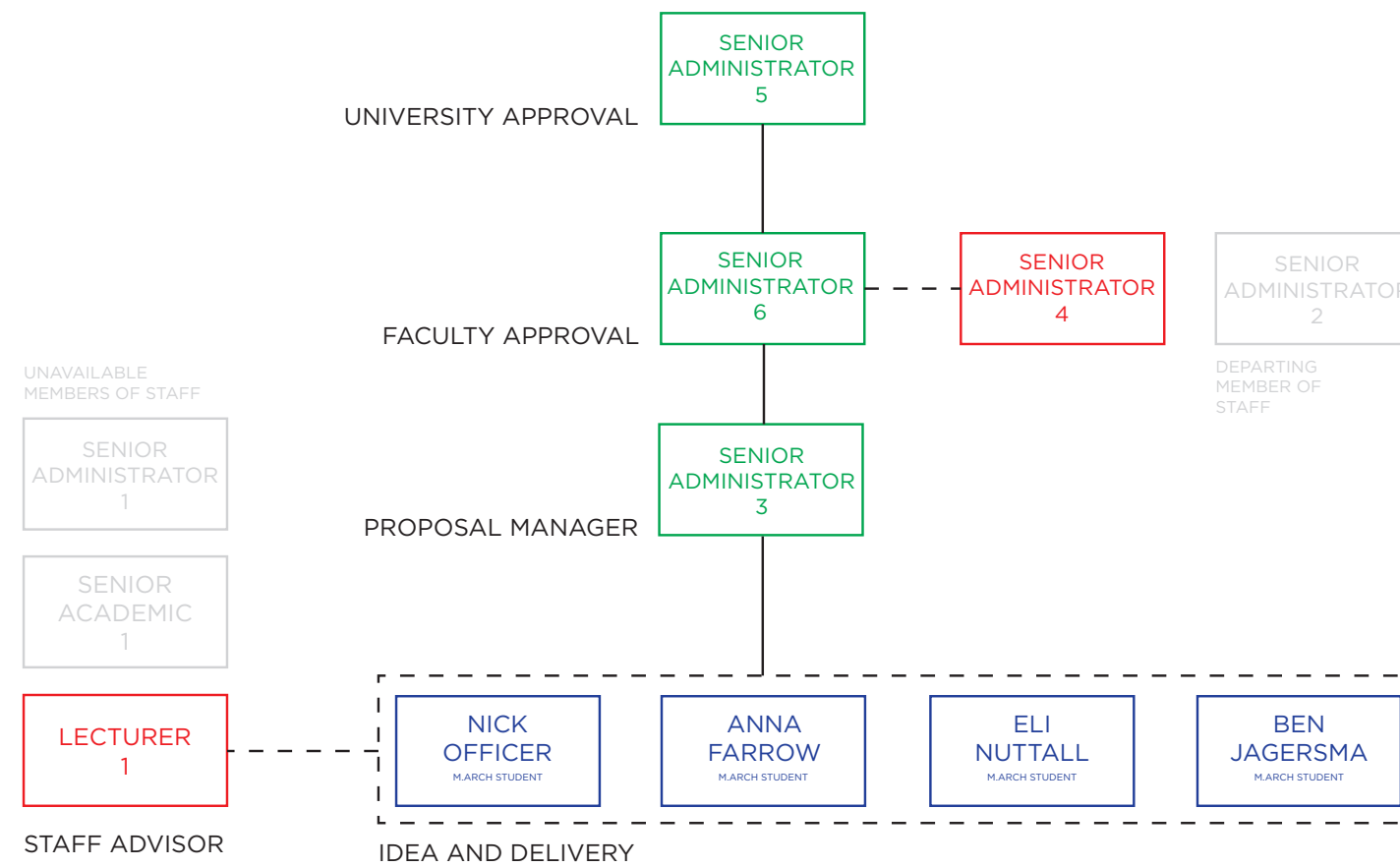
Figure 7.1  
Organisational Chart Key





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**Figure 7.2**  
Proposal Delivery  
OCTOBER - NOVEMBER 2009



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## 7.2 [Document] - Proposal Delivery

OCTOBER - NOVEMBER 2009

As discussed in Chapter 6 – Project Beginnings, the project began with a response to the U.S. Department of Energy’s Request for Proposals (2011 RFP). Before the proposal was put together support from the faculty was needed. *Senior Administrator 4* needed to sign off on the project. The project was presented to *Senior Administrator 4* by the four core students (Anna, Ben, Eli and Nick) and *Senior Administrator 3* and while farfetched presented a significant and internationally recognisable opportunity for the Faculty and as such the support of *Senior Administrator 4* was gained.

With the support of *Senior Administrator 4*, *Senior Administrator 3* took the lead in securing support from the top of the University, *Senior Administrator 5* and *Senior Administrator 6*. The support of other faculties was also important for ensuring the integrated faculty requirements of the proposal would be met. With University support in place, the proposal could move forward.

The departure of *Senior Administrator 1* and *Senior Academic 1* (returning to teaching and practice commitments) left the project without any expertise in the field of Architecture and Design or the project’s biggest supporter and instigator. It was at this point that the core group of students invited *Lecturer 1*, whom two had as their final year tutor, to the project. *Lecturer 1* was new to the school, and as such did not have a fully committed workload allowing him time to work with the students at this early stage, this move was supported by the students and the faculty.

Working together with *Senior Administrator 3*, who had taken on the role of managing the delivery of the proposal and *Lecturer 1* the four core students spent two months preparing the proposal for delivery to the U.S.

### 7.2.1 [Discussion] – Proposal Delivery

With the departure of *Senior Administrator 1*, this was a major loss of expertise and leadership, the extensive professional experience, guidance and authority of *Senior Administrator 1* would have made him an effective and influential leader of the team through the competition phase. The proposal phase presented an ideal opportunity to appoint and trial a replacement and as outlined in the Royal Institute of British Architects Practice Handbook; it is not often recognised that appointing the wrong person to a new position is one of the most costly mistakes an organisation can make. It takes time and effort to induct a new member of staff into the organisation in order that they are producing work of the required quality in the required time frame. The process of making a wrong appointment can be costly, and any reappointment process is time consuming. (RIBA, Royal Institute of British Architects, 2010)

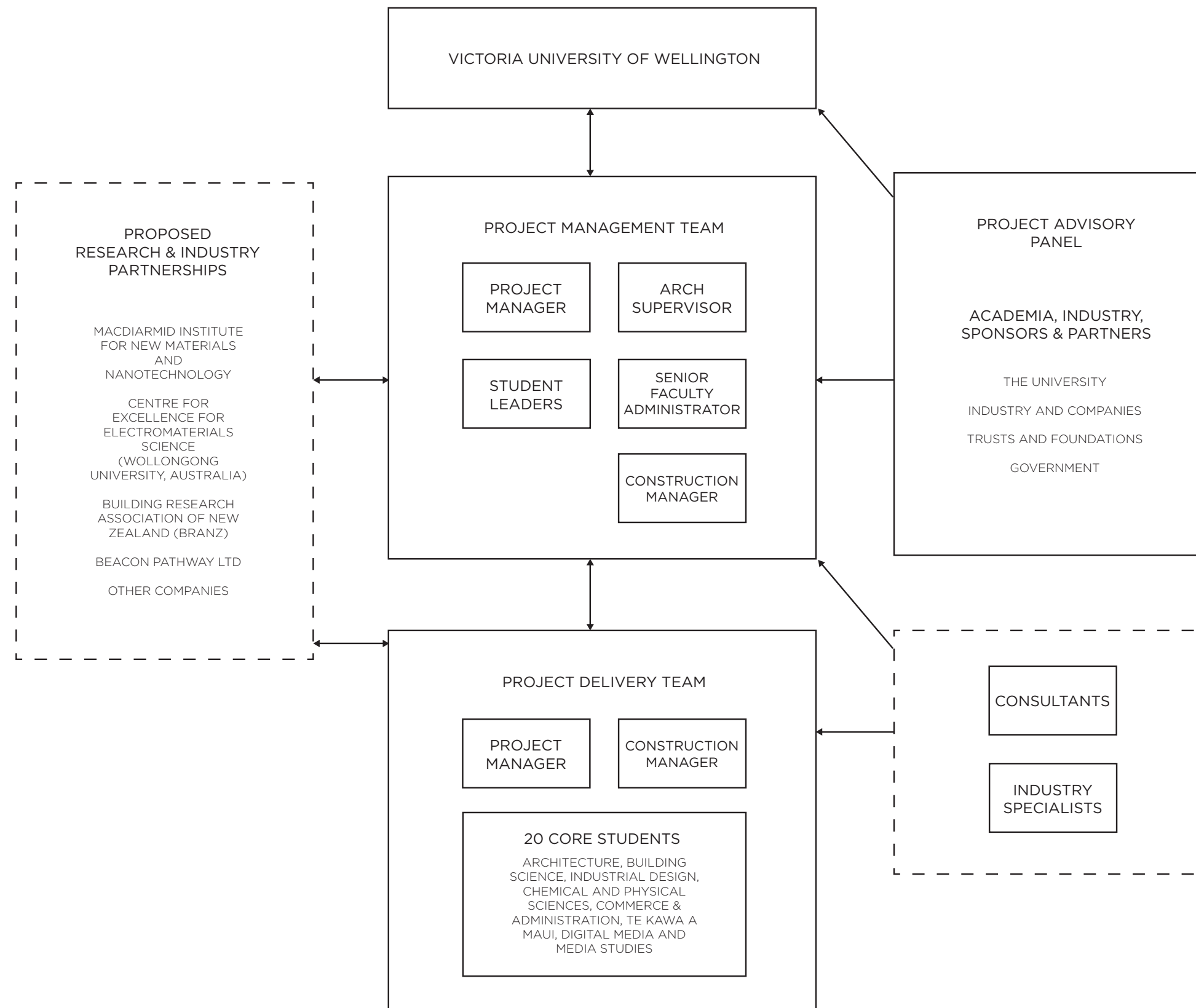
To successfully mitigate this risk would require multiple applicants and staff availability. Identification of a clear role description needed to be established and advertised while CV's of candidates needed to be screened for the appropriate skills and experience. (RIBA, Royal Institute of British Architects, 2010) It quickly became apparent that standard practice for the employing of new staff was not an option at this early stage of the project. Identifying interest was a lot easier than finding committed staff with no formal position of paid employment, nor any guarantee the project proposal would be successful.

This was also a busy time for students and staff as it coincided with the end of the teaching year with final projects and exams, illustrating that staff and students' time was already very committed.

**Figure 7.3**

Proposed Organisational Structure

NOVEMBER 2009



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### 7.3 [Document] - Proposed Organisational Structure

NOVEMBER 2009

The proposal was required under “Organisation and Project Planning’ in the 2011 Request for proposals (RFP) to *“demonstrate that the team understands all the activities involved in the project. The activities are planned and organised adequately to ensure successful completion. The organisation chart and timeline exhibit good planning and understanding of the deliverable schedule. How and who will make decisions and how conflicts will be resolved are adequately addressed.”*

Figure 7.3 illustrates how the University and student body responded to this request identifying key areas of need and how they planned to structure the project should the entry be successful. Key roles and responsibilities were identified including the need for a Project Manager, Architectural Supervisor and a Construction Manager all of which would make up a Management team that included the student leaders and a Senior Faculty Administrator. The Management team would be led by the School of Architecture on behalf of the University and would largely be made of internal members of the University.

The Management team would be supported by a Project Advisory panel (later known as the Governance committee) the purpose of the advisory panel would be to provide an independent evaluation and direction of the project from beginning to end. The advisory panel would be made of up people external to the project including members of relevant academia, Industry and government.

The project delivery team would comprise of a project manager, a construction manager, Student team leaders and a student team of up to twenty plus. The project manger would be employed to run the project day to day, while the construction manager would ultimately be responsibility for the construction of the house.

It was identified that where the University was not equipped, relationships or contracts with external research and industry partnerships would look to be



formed to support the project, while consultants and industry specialists would be employed where required.

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**Figure 7.3.1**  
Project Timeline  
NOVEMBER 2009 – OCTOBER 2011



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### 7.3.1 Project Timeline

NOVEMBER 2009 – OCTOBER 2011

Figure 7.3.1 represents the simplified task schedule as proposed in the 2009 proposal and as the project eventuated 24 months later in 2011. This illustrates that while the project may not have followed the exact plan the outcome remained the same, as the project followed the critical path. This was in large due to the immovable deadlines set in place by the Solar Decathlon competition organisers and the final date of the competition in September 2011.

### 7.3.2 [Discussion] – Proposed Organisational Structure

The original organisational structure (Figure 7.3) very closely resembled the final organisational structure as the project finished in late 2011. But like the project timeline the path taken to get there was considerably different than the 2009 proposal suggested.

The structure, based on the University's previous success establishing the internationally renowned MacDiarmid Centre, a collaboration between six New Zealand Universities and Crown Research Institutes, provided considerable detail; but there was no identification of how actions were to be taken to ensure the planning was implemented and by whom. The result meant in the months to come many of these positions shown in the organisational structure would not be filled.

Millar 1999, indicates that planning is an essential component of running an effective organisation and the first step in the management process. (Millar, 1999) The success of planning is in the implementation and delivery; Schermerhorn 1996, suggests there are four key principles required for successful management, Planning, Organising, Leading and Controlling. Planning sets the directions and allocates resources. Organising brings people and material resources together in working combinations. Leading inspires people to best utilise their resources. Controlling sees to it that the right things happen, in the right way, at the right time. (Schermerhorn, 1996)

This theory was reinforced by *Senior Administrator 7*, who was in charge of communications, whom identified the "Appointment of a Project Manager required to plan out, oversee and track all aspects of the project." was the project's number one priority when she met with the team early in 2010.

Attempts were made to spread the word of the project and incite interest from staff within the university but without certainty of entry into the competition staff could not commit to a project, which would not begin until halfway through the academic year.

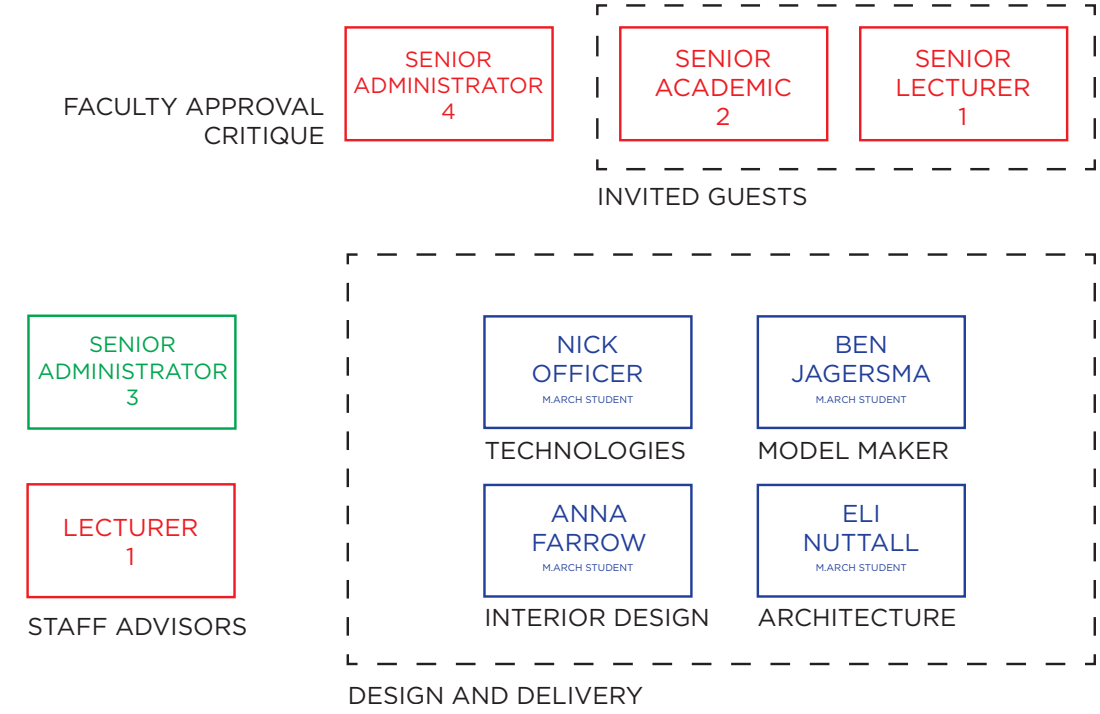
Resources were also sought outside of the University but without financial motivation it was very difficult to employ professional help. The budget suggested that resources would be available for this very reason yet without the cash flow that the project was likely to generate this promise did not eventuate early in the project.

Even though the 2011 RFP requested information on conflict resolution the 2009 proposal did not address this. Presumption could be made that had the external advisory panel been appointed at the beginning of the project they would be in the appropriate position to provide advice and resolution should the need occur.

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Figure 7.4  
Concept Design Phase  
FEBRUARY – MARCH 2010



#### 7.4 [Document] – Concept Design Phase

FEBRUARY – MARCH 2010

On January 20<sup>st</sup> 2010 almost two months after the scheduled announcement of the twenty finalists it was announced that Victoria University had been shortlisted with approximately fifty other Universities from across the globe to compete in a concept design competition that would ultimately decide the twenty finalists for the 2011 competition.

After almost three months apart the core student team re-formed to complete a concept design, which included producing a 1:50 scale model and a triptych panel of the project design.

*Senior Administrator 3* remained on the project, to see the project through its entry phase, although the project had shifted outside of his area of expertise. *Lecturer 1* acted in an advisory role to the students as they looked for advice on the design of the house and its systems. It was at this time that the students were looking for leadership and a mentor as they had little experience in the technicalities of designing a competition-winning house. Academic support was available sporadically across the faculty, which the students utilised over this period where possible.

The students were challenged to think beyond the design that had been produced for the elective course ARCH 383 - 'Life Style/First Light'. With a new concept in place the staff offered a formal critique and this proved crucial to the development of the concept. After an unsuccessful critique where all staff invited challenged the design it was evident that the initial concept while needing development would be pursued.

Initiative was taken by the student group and roles and responsibilities between the four students were divided internally based on the skills and previous knowledge that each of them brought to the project. Eli took a lead in Architecture, Nick in Technologies, Anna in the Interior and Ben in Model Making.

#### 7.4.1 [Discussion] – Concept Design Phase

The formal design critique was a realisation for the core student group that the project was without a singular leader or decision maker inside or outside of the student group. It was identified at an early stage that due to the equal qualifications and relationships as students that not one student would be given a leadership role but all four would interact as equal responsibility leaders. This decision was made within the student group to minimise the risk of hierarchal conflict later in the project.

It is also suggested in the literature of Markham, Walters & Bonjean 2001, that three distinct leadership models exist within the volunteer organisation, Democratic, Oligarchic, and Leadership by Default, the latter most closely resembling the structure that existed within the student group.

- The Leadership by Default Model: Leadership is taken on by those who have a strong commitment to the organisation's goals, but are often somewhat reluctant to lead, and welcome the opportunity to share leadership if appropriate personnel can be found. (Markham, Walters, & Bonjean, 2001)

By making this decision the team needed direction from a project manager who would sit above the student body and as suggested by Chappell & Willis 2010, a good leader really has only two functions:

- to decide objectives for those being led
- to set the pace (Chappell & Willis, 2010)

While the project had to date been successful, it was made clear that with so little experience within the student group the team needed leadership.

During the concept development conflicting views between staff advisors and the student group had developed into an informal decision making structure, the working and personal relationship between the students was growing stronger and was often used to find a majority to make decisions when necessary.

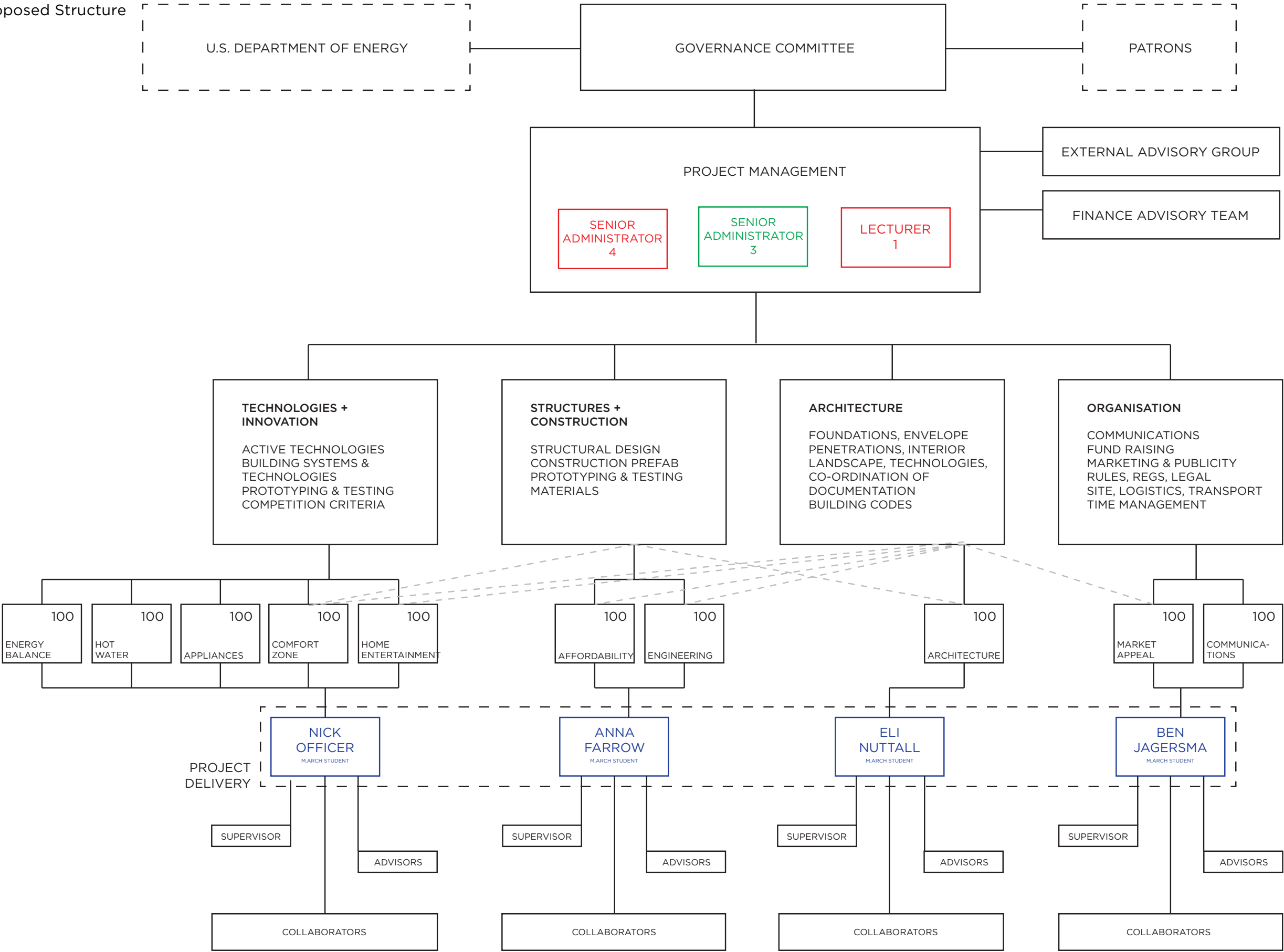
It was at this time that what is known as the 'informal structure' became apparent and illustrated its strength within the organisation. As opposed to the formal

structure which is clearly defined and visible, the informal structure is something that is not written down, but which can be very powerful. The informal structure is influenced by factors such as friendship or interest groups and develops independently of the formal structure. (Millar, 1999)

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Figure 7.5

Student Proposed Structure  
APRIL 2010



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## 7.5 [Document] – Student Proposed Structure

APRIL 2010

After acceptance into the final twenty, with almost 5 months of the expected project timeframe lost through team selection delays and the concept design phase, a team organisational structure needed to develop and the team needed to grow in size if upcoming project deadlines and deliverables were to be met.

Figure 7.5 represents an effort made by the four student leaders to identify a team structure that would work successfully given the complexities of the project. This identified that the organisational structure had to include not only day-to-day roles and responsibilities but also incorporate how within the team organisation the competition rules, contests, and deliverables would be met, this included the ten judged and measured competition contests.

It had become an ongoing challenge to involve other faculty members at short notice as the project was unfolding during the University trimester when commitments to curriculum and course work had already been made. Finding committed people with the right skills was an issue.

The project delivery was divided into four key areas, Technologies & Innovation, Structures & Construction, Architecture, and Organisation. A decision was made based on the proposal phase which of each of the four student leaders would fill these roles. As graduate Architectural students the four student leaders had also taken on the challenge of completing a master's degree throughout the duration of the project, and it was identified that each student would have a supervisor that could also provide advice on their particular aspects of the project as well as external project advisors to provide support and advice.

It was also at this point that the management committee formed practically by default, the student leaders encouraged *Senior Administrator 3* to continue on in the project in a management role as to date *Senior Administrator 3* had successfully brought together a competition winning proposal and had formed solid relationships with not only the students but also with external partners interested in the project, and as it stood there was no one with more relevant



experience that could replace him. This did not fit into the initial organisational chart (Figure 7.3) as *Senior Administrator 3* did not fit the role of either the Project, Construction or Architectural Supervisor roles.

While it was identified that the project would have a Governance committee and External advisors none of these groups had been formally set up.

### 7.5.1 [Discussion] – Student Proposed Structure

This was the first and last time until August 2011 that an attempt to identify project roles and responsibilities would be formally documented. The structure of an organisation defines responsibility for tasks and lines of communications. (Millar, 1999) Figure 4.0 starts to illustrate the complexity of the project and the scope of work and resources required. It was for this reason that it was highly important all parties understood their role and responsibility within the organisation, where there were gaps and who could fill them.

It was at this time that the first top down organisational structure was formed. Produced by the student team this illustrated the acknowledgment and desire for formal leadership/management.

Early management theorists proposed that there were two main types of organisational structure: functional and divisional. Both structures were based on the traditional pyramid shape, representing a small number of people at the top and middle with a bulk at the lower end. (Millar, 1999) Without significant understanding or experience in management, figure 7.5 was a result of earlier academic teachings and common sense, as with many organisations the result was a hybrid of traditional theories. The most important feature of an organisation's structure is that it allows the work to be achieved effectively, with good communication between divisions or departments. (Millar, 1999)

Figure 7.5 most closely resembles the functional structure that divides the organisation up according to the roles or functions of the people within it. Useful in a small organisation, where people who do similar and related jobs work together as they are able to share expertise and work together as a team, it is illustrated successfully by the informal student delivery team. The downside is the structure can limit communication throughout the organisation. (Millar, 1999)

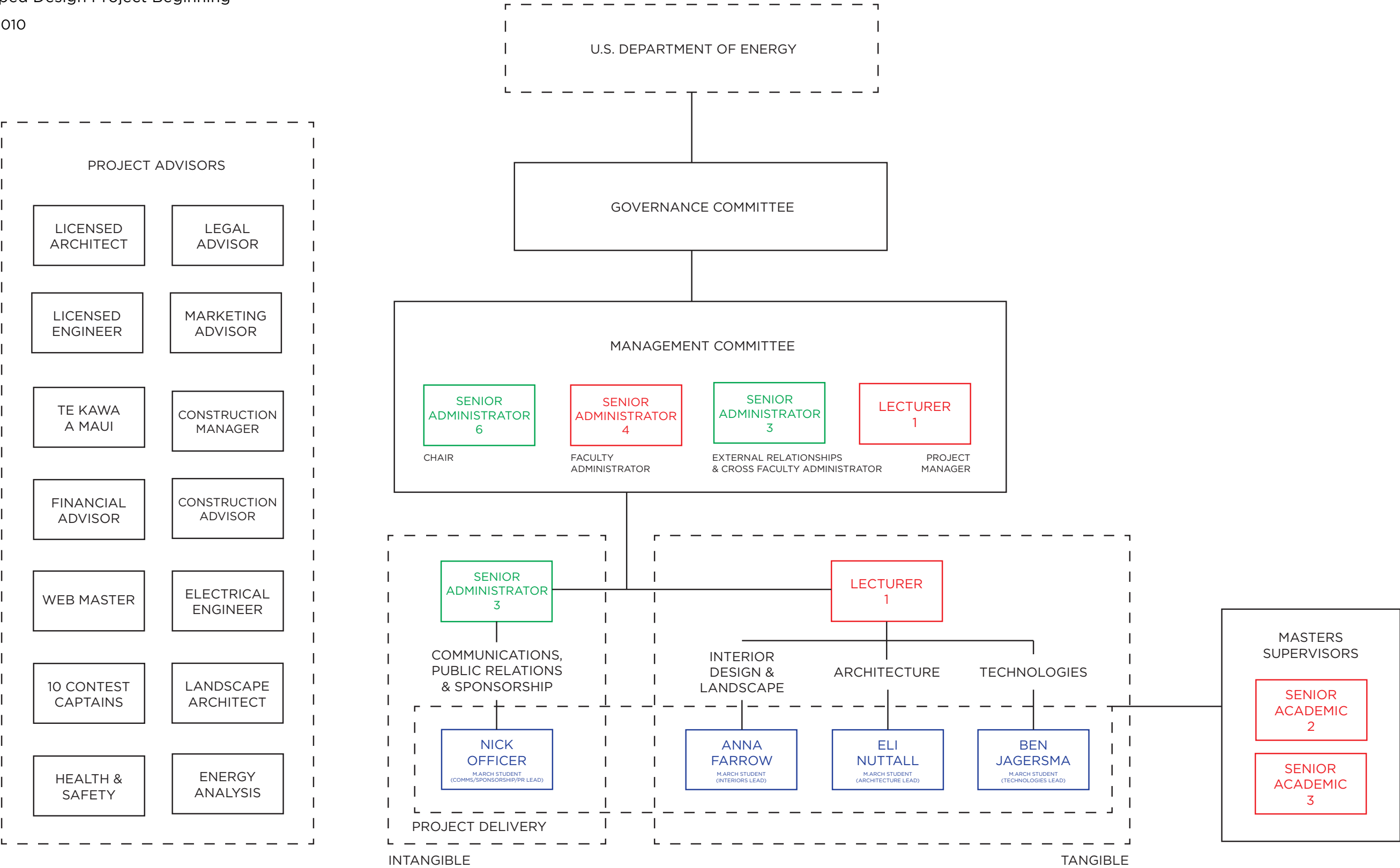
Figure 7.5 also highlighted some of the key benefits and downsides of what is known as the Matrix Structure. The Matrix structure allows people from different areas to work together on specific projects. (Campling, et al., 2008) Flexibility is a real advantage: people with different skills and experience levels can be involved

in projects as required. (Millar, 1999) This is illustrated by the identification of horizontal communications between the four defined project teams, which have leaders supported by advisors and collaborators with expertise best suited to that area. This was essential as the complexity of the competition rules required significant cross collaboration between project areas.

One problem with the Matrix structure is that it breaks the principle of unity of command. Unity of command suggests that an employee should report to only one person. When an employee has several bosses – whose directives may be in conflict – it puts them in a difficult position. To overcome this problem, it is important that there is clear communication between managers and teams operating in the matrix. (Millar, 1999) Figure 7.5 suggests already that a gap existed between the Project management and the Project delivery; no singular line of reporting existed or was identified. Thus the student delivery team largely directed decision-making while no project manager was appointed.

Had an advisory team been appointed they would have been able to provide advice and guidance on the structure of the project, including the identification of the right people for the right job.

Figure 7.6  
Developed Design Project Beginning  
APRIL 2010



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## 7.6 [Document] – Developed Design Project Beginning

APRIL 2010

After much discussion around team organisation and structure the first formal organisation structure was put forward to the entire team. This marked the formation of the first official management committee with identified roles, *Senior Administrator 6* would chair the management team and would take on the final decision making role at a formal management meeting to be held weekly. *Senior Administrator 4* would act as the faculty Administrator as she had the final say when it came to staff and resources at the school. *Senior Administrator 3* would remain in his official role with the University while committing part time to the project managing the project sponsorship and communications, which were commonly phrased the intangible aspects of the project. *Lecturer 1* would lead the ‘tangible’ side of the project with the official title of project manager, working with Anna, Ben and Eli on delivering the house. Between *Senior Administrator 3* and *Lecturer 1* the missing Project Manager had effectively been split in two between two staff members, this required communication between the two to be effective and concise.

A change had occurred within the student leadership structure, Ben had assumed responsibility for the ‘technology’ side of the project while Nick had taken on the role of ‘Communications, PR and Sponsorship’. This was the one area that was outside of the typical skill sets as an Architectural graduate so the decision on who was to lead this area was largely based on personal traits. Nick had developed a reputation for being an effective and efficient communicator with strong links to some existing external partners, thus the decision was made.

The students’ Masters supervisors at this point had been appointed. *Senior Academic 3* and *Senior Academic 2* would supervise the four students. This was a significant addition to the project, adding international expertise to the project and support outside of the project for the student leaders.

External advisor roles had been identified, but it was not clear who would fill these roles or how they would be supported.

### 7.6.1 [Discussion] – Developed Design Project Beginning

Responding to the concerns raised by the core student group, the Management committee appointed *Lecturer 1* as the official Project Manager. Following the advice of *Senior Administrator 7*, *Senior Administrator 3* had investigated employing an external project manager but due to the large time commitment required and the lack of cash flow in the project it was apparent this was not feasible. It was not obvious the effect this would later have but without an external view or experience of the project it was hard to identify.

Without a singular appointment in the role of Project Manager, communication was critical to the success of the shared project management. This will be explored in the next chapter.

Progressing from the 2009 proposal, the required project advisors were identified in detail, including such professional expertise as a licensed engineer and architect, both would be required if the house was to be built in Wellington, building service engineers and a series of specialist skill sets that were outside of the current student group, marketing analysis, legal and financial advisors, webmaster, and cultural advice, yet no appointments were made in the immediate future. Whose responsibility it was to find and appoint these people was unclear and often the team would have conflicting views. Not all of the advisors needed to be professionals; skilled students could have assumed many of these roles. Had many of these advisors been appointed early in the project there would have been a drastic improvement on the time, cost and quality of the project, as well as personal wellbeing.

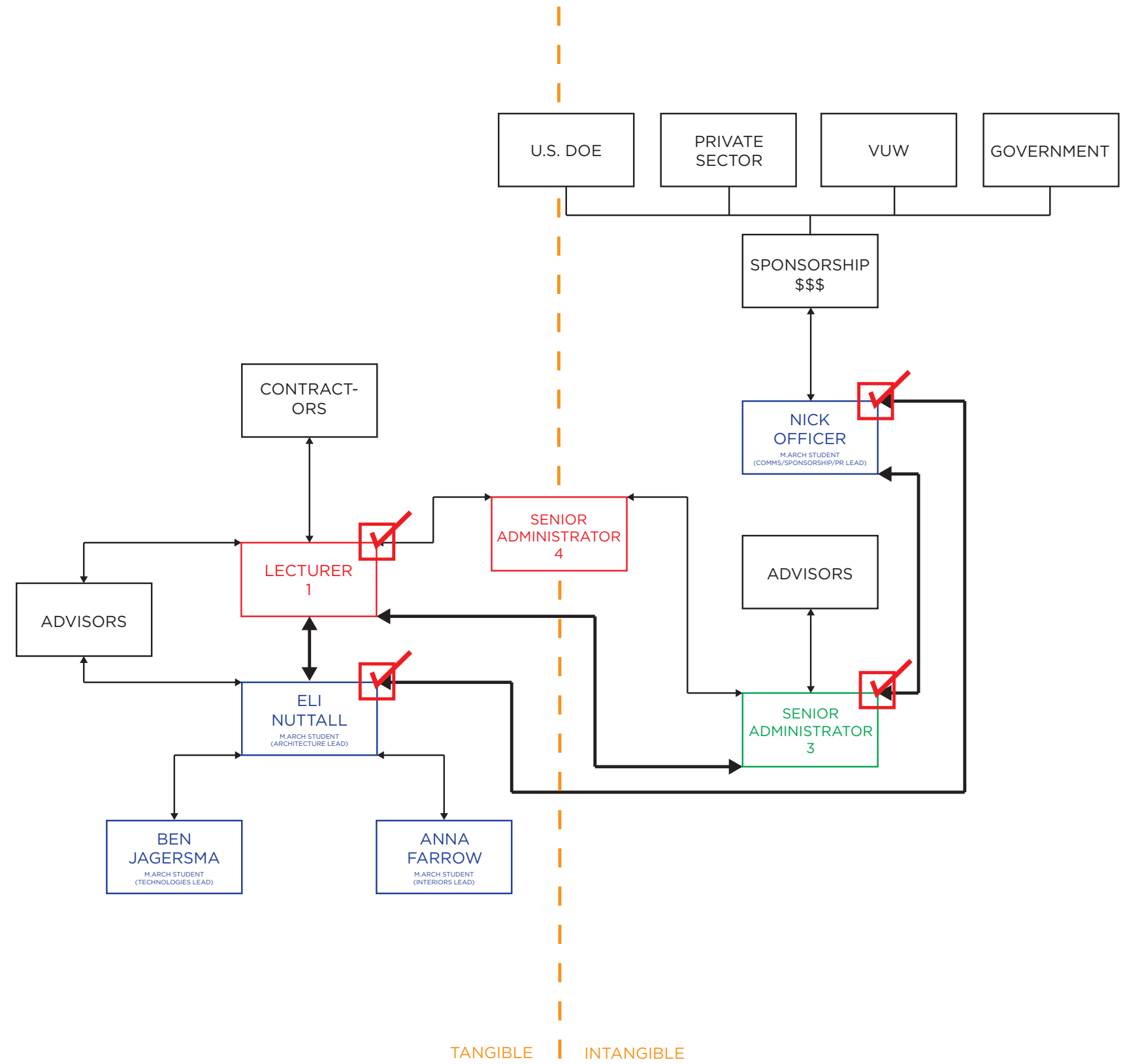
The amount of resource required in the area of “Communications, PR and Sponsorship” went unappreciated through the early phase of the project and could have benefited from expertise from these areas. The 2009 proposal suggested there would be significant input from faculties outside of Architecture & Design. If approached at this early stage the Commerce and Marketing school could have provided considerable human resource in the form of students.

Dividing the roles of the project between the intangible and the tangible while on paper appeared an obvious split, in reality the project was so closely intertwined that isolating communication paths between the areas was causing a collapse in communication. Important information was often being shared at either the management or the delivery level out of necessity and was not being conveyed through the documented line of communication.



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**Figure 7.7**  
Developed Design Communication Flow  
JUNE 2010



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## 7.7 [Document] – Developed Design Communication Flow

JUNE 2010

As the project progressed it was apparent that clear communication within the project was going to be critical to its success, as widely acknowledged across literature, not least by Lowy & Remus 1996, who note that 60% of all management problems result from faulty communications. (Lowy & Reimus, 1996) The project presented numerous challenges, including a fixed and very rigid brief from the U.S. DOE paired with a highly fluctuating budget, largely due to the uncertainty of project sponsorship. This created a need for daily communication and decision making as the project moved forward.

Already a number of issues had begun to appear within the core management group often caused due to the lack of a singular line of communication between the core student group and the management of the project, individual decision-making and the lack of any formal reporting structure within the core group as well as the separation between the ‘intangible’ and ‘tangible’ aspects of the project.

Figure 7.7 was developed as a response to these issues and as a preventative measure as the project began to expand. Communication lines were identified and ‘the four ticks’ decision-making structure was created, requiring both delivery and management to agree on both the ‘tangible’ and ‘intangible’ sides of the project. This structure was developed to harmonise and provide clarity around decision-making and remove the miscommunication issues that had begun to surface. There are no clear rules as how to best communicate – just the underlying principle that ‘more’ is better than ‘less’ or even ‘none’, in that it demonstrates a trust and respect between employer and employee. (RIBA, Royal Institute of British Architects, 2010)

It was also identified that if the project was to appear a professional organisation it was important that where a relationship with an external party existed one singular member of the team would hold that line of communication and communicate back to the wider team, figure 7.7 illustrates this.

### 7.7.1 [Discussion] – Developed Design Communication Flow

Chappell & Willis 2010, recognise that communication is the most vital aspect of management. Ineffective communication will render the most splendid ideas useless.

They identify four markers of good communication and they are:

- Clarity  
Clarity can be defined by the practice of being clear, certain, definite and transparent in communication.
- Certainty  
While this quality goes arm and arm with clarity this emphasizes that when communication with external parties exists, there should only be one interpretation possible. Very often a message, which may be a model of clarity in itself, may be capable of two meanings when read in context with other messages or with the project as a whole. An attempt was made as illustrated to maintain certainty in communications with external relations.
- Brevity
- Comprehensiveness (Chappell & Willis, 2010)

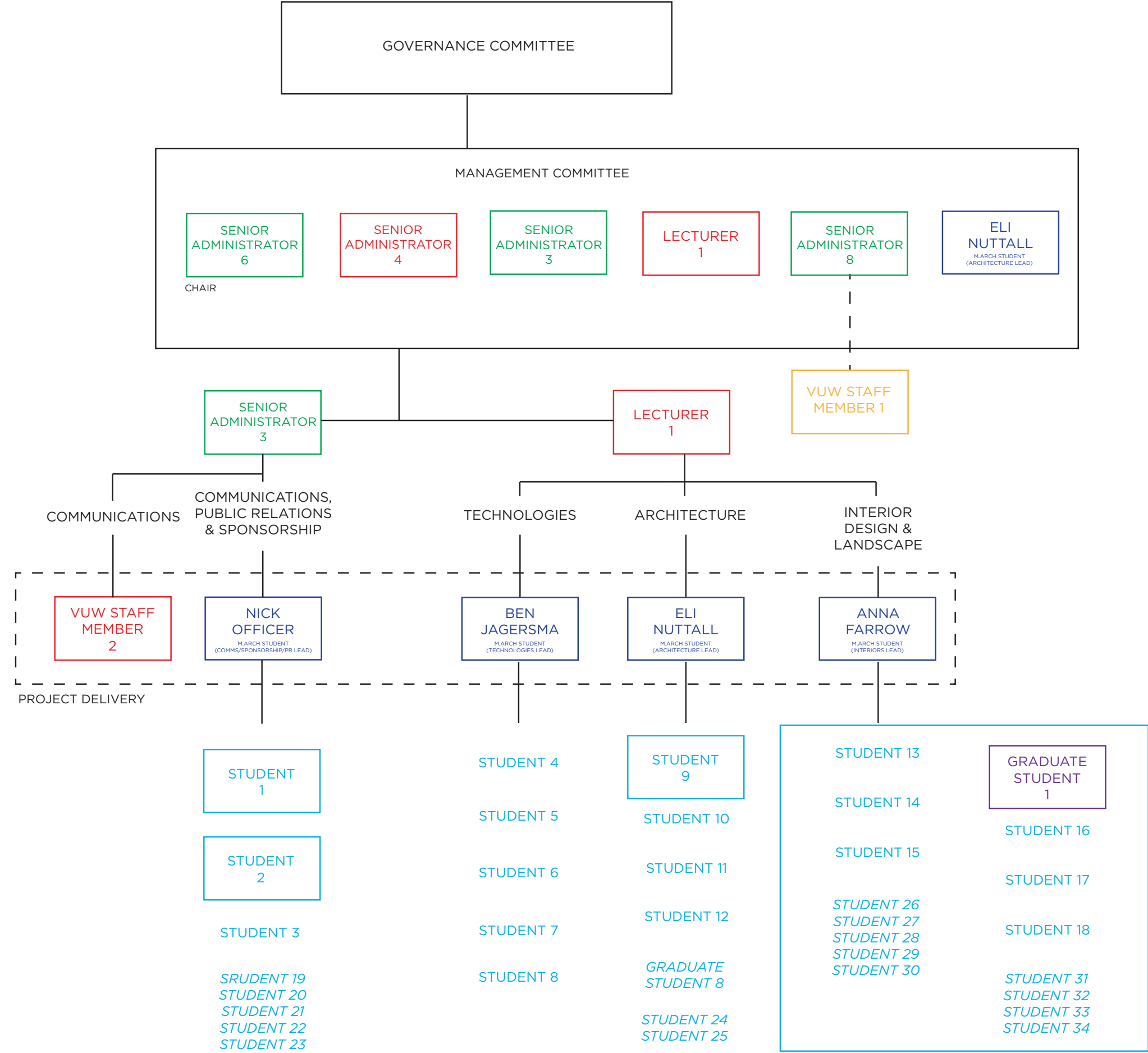
Figure 7.6 illustrates how the ‘tangible’ and ‘intangible’ aspects of the project were expected to communicate. With the core student group working closely together at the school of Architecture and Design communication between the students was occurring on a daily basis, creating a really strong line of communication on the delivery (horizontal) level of the project. Without a singular line of communication to the management level of the project, communication often broke down at this level (vertical) where either the student group had not informed both parties or the management group had failed to communicate with each other or back down to the core student group. Communication missed would often be caught by the students at the lowest level where a strong working relationship existed, often though this was too late. This served to highlight the point that communication is a two-way process. (Chappell & Willis, 2010)

Decision-making was highlighted within the group as an issue after numerous occasions where decisions were being made within the project that not all members of the team were aware of, agreed with, or that contradicted another

decision that had been made. Often this could be put down to the lack of a singular leader or the blurred line between management and delivery. The four ticks scenario was created to eliminate this problem, where a decision was to be made that would significantly affect the project it was important that all aspects of both the student delivery and staff management, the tangible and intangible sides, were aware and agreed to it. This cohesion between the two sides of the project was important. By creating this structure it meant that simple mistakes could be avoided. Another significant issue that existed was the lack of a single decision maker within the day to day management of the project, too often decisions could not be made until the Friday of each week at the regular management meeting where the Management committee would make the final call, this often put a lot of unnecessary time pressures on the project.

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Figure 7.8  
Student Recruitment  
JULY 2010





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## 7.8 [Document] – Student Recruitment

JULY 2010

The next few months would see significant expansion of the team, the necessary next step. While the Governance committee had yet to be appointed the Management team increased in size. Eli Nuttall was included in the weekly meetings as a representative of the student team.

*Senior Administrator 8*, of Campus Development and *VUW Staff Member 1*, Project Manager both joined the project part time from Facilities Management, a VUW division. This was a response to a need for management and delivery of the First Light house that remained largely in developed design at this stage in time, a long way from where the project needed to be. *Senior Administrator 8* joined the management meetings every Friday and provided advice, direction and contacts for the project while *VUW Staff Member 1* took the role of managing the programme, setting deadlines and seeing to it that these were met.

*VUW Staff Member 2* a recent VUW graduate was employed by the project in the role of Communications Officer. Working closely with *Senior Administrator 3* and Nick it was *VUW Staff Member 2* role to deliver written communications for the project documentation, outreach and media. While a staff member employed by the university *VUW Staff Member 2* would work closely with the student team in the project office.

Early in July, nearing the end of the first University trimester, the core student group advertised and gave numerous lectures inviting students from around the university to join the project team, offering university points in a paper titled SARC 383. The response was good and interviews were held by the students to determine who would be most suitable to join the project. Without room for error it was important that the students joining the project were committed to delivering results. As students were interviewed they were assigned roles in the project working under one of the four core students. The students were largely made up from second year Architecture as they had previously had exposure to the project through a paper run by *Senior Academic 4*. Students were also involved from Building Science, Landscape Architecture and Industrial Design.

*Graduate Student 1* another recent VUW graduate was introduced to the project by *Lecturer 3*, a Lecturer from the faculty of Landscape Architecture.

Later in July an attempt was made to include students from the Marketing and Commerce school, nine students showed interest yet after the next four weeks only one remained, *Student 1*.

### 7.8.1 [Discussion] – Student Recruitment

The inclusion of a student leader into the management committee was an inevitable yet important move that was largely a response to missed information due to the communication issues that were still present within the team. Without representation from the delivery team at the management meetings incomplete and selective messages were shared at the management meetings.

A lack of management and inexperience in delivery of an architectural project had led to the project drifting behind schedule. *Senior Administrator 8* and *VUW Staff Member 1* were brought into the project by the management committee who recognised the need to keep the project on track in what was a very tight timeframe. Planning and controlling are two very important roles of the project manager, by handing over another aspect of the management, the project programme, to a third party there was no one person whom had a handle on all aspects of the project.

At a similar time *VUW Staff Member 2* was employed by VUW and the project as Communications officer, reporting to *Senior Administrator 3*, this came at somewhat of a surprise to many in the team including the student team whom had invested considerable time in an attempt to resource financing, to little avail. The move to expand the communications side of the project was an important and necessary one and *VUW Staff Member 2* was well qualified for the role, but questions were asked internally whether the singular employment of one could be used to motivate many students into the project and reward those who had already spent considerable time on the project. Could Arts & Media students have been offered the position?

This remained the case for the growth in all aspects of the student team. While the 2009 proposal identified the importance of growing the student team it was never acknowledged how or who would be responsible for recruiting and managing the resource. After acceptance into the Solar Decathlon an information workshop was held inviting staff and faculty to be involved in the project, interest was widely expressed but with teaching and academic commitment for the year already in place and no incentive for involvement, very little resulted from these

workshops. In desperate need of resources the student team advertised and interviewed students within the School of Architecture and Design offering the opportunity to be involved in a project that may offer overseas travel and an unrivaled experience. At late notice an elective paper was offered, providing academic credit for involvement in the project.

After formal interviews were held with the student leaders and CVs and portfolios screened, those whom were deemed fit for the project were selected and nominated a role. There was little room for failure in a project with a fixed deadline and only opportunity. The first elective paper with a 12-week duration provided an opportunity for students to prove their value to the project. An obstacle for students was time commitment, in an already demanding degree. If a student who was interested in the project had no need for the elective paper they were unable to commit to the project, this would end up costing the project valuable human resources and cost the project financially as we had to look outside of the university for those skill sets.

Outside of zero financial input and what little academic credit could be offered, the project existed at a voluntary level for a majority of the team members. Therefore a host of other motivations must exist, and many of these were found to align with the six pillars of the functional approach to volunteering as proposed by Clary, Snyder & Stukas 1996. This approach is founded on the theory that people engage in volunteer work to satisfy a number of social and psychological goals, which include:

- Values – to act on values important to self
- Understanding – increase understand and develop skills
- Enhancement – enable psychological development
- Career – benefiting career development
- Social – to join a social group
- Protective – coping with inner anxiety, protecting the ego

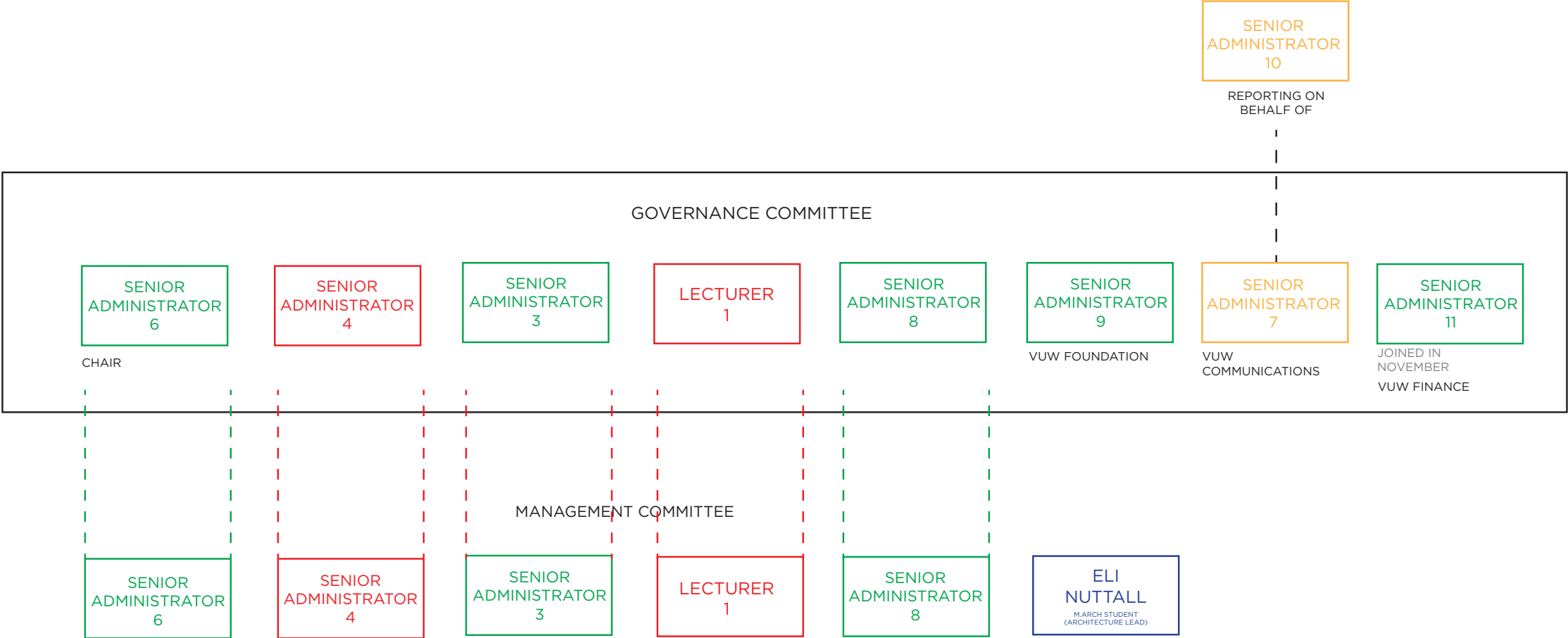
(Clary, Synder, & Stukas, 1996)

In an effort to expand the Communications team students from the Commerce and Marketing school were invited to join the project. Nine expressed interested and committed to the project. After four weeks, only one remained on the project.

While this could be credited to the lack of personal motivation or incentive for the students it could also be credited to a lack of transactional leadership exhibited by the student leaders. Predominantly they were acting in a transformational leadership manner, where by demonstrating commitment, enthusiasm and a positive future outcome they elicit greater motivation and positive emotion from their subordinates (Rowald & Rohmann, 2009) Often there was however a need for transactional style leadership, where the focus is on explicit instruction and direction from leader to follower. However this approach would require the team leaders to commit more time to designating and monitoring these tasks.

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Figure 7.9  
Governance Committee Formation  
AUGUST 2010





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## 7.9 [Document] – Governance Committee Formation

AUGUST 2010

*The purpose of the advisory panel (Governance Committee) would be to provide an independent evaluation and direction of the project from beginning to end. The advisory panel would be made of up people external to the project including members of relevant academia, Industry and government. (Danielmeier, Burgess, Farrow, Nuttall, Jagersma, & Officer, 2009)*

Late in August the Governance committee was formed, five months later than initially planned. Made up with five of the current management committee with the inclusion of only a few new members the new governance committee that was to meet monthly did not fulfill the initial objective (to be external to the project) as set out in the 2009 proposal.

*Senior Administrator 9*, was invited to join the committee after two months working on fundraising for the project. *Senior Administrator 9* was introduced to the project very early on when the students first appealed for financial support. *Senior Administrator 9* provided invaluable support to the project, bringing with her expertise in the area of fundraising and a wealth of networking opportunities. With experience in large projects she also brought advice and guidance to the core student team of whom she was very supportive.

*Senior Administrator 7* was appointed to sit in on the Governance committee meetings in place of *Senior Administrator 10*. *Senior Administrator 7* role was to provide guidance and expertise in the area of external Communications, *Senior Administrator 9* had also been working closely with *VUW Staff Member 2* and the student team prior to her appointment.

In November 2010 at the request of the governance committee *Senior Administrator 11* joined the project and governance committee as Finance Advisor assuming control of the project budget.

### 7.9.1 [Discussion] – Governance Committee Formation

Project governance is a critical success factor in the delivery of a project. (Garland, 2009) Garland 2009, identifies Project governance as critical to success, he identifies the main activities as:

- Programme direction;
- Project ownership and sponsorship;
- Ensuring the effectiveness of project management functions;
- Providing a forum for issue resolution
- Reporting and disclosure. (Garland, 2009)

Contradictory to what was outlined in the 2009 proposal, all members of the Governance committee had a close alignment with both the day to day running of the project and the university. As a result, objectivity of direction and effectiveness would be compromised and an open forum removed for members outside of the committee. Therefore the Governance Committee were failing to execute a number of their core tasks as identified above by Garland 2009.

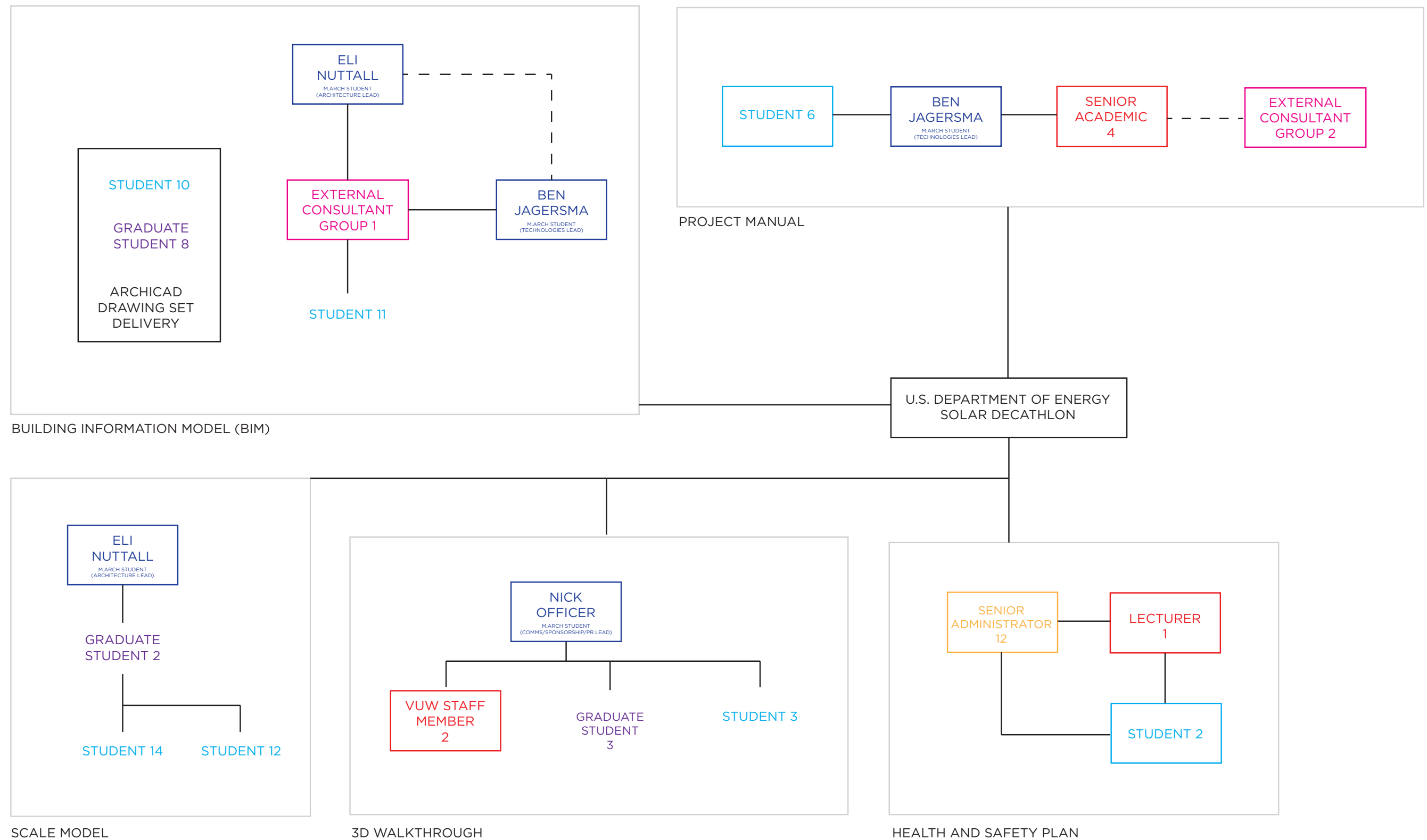
The add-on of these staff members could have been seen to create a strengthened Management committee, yet they were not fulfilling the objects of the project Governance role.

The addition of *Senior Administrator 11* in the role of Finance advisor was a positive one, he was employed to mitigate risk and regain control of project finances in a project that was growing exponentially in size and cost. *Senior Administrator 11* brought with him experience and solidarity to a project that was at times financially unstable. Project finances were controlled outside of the student delivery team. *Senior Administrator 9* appointment shifted another key role away from the project manager.

Figure 7.10

Solar Decathlon Deliverables

NOVEMBER – DECEMBER 2010



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## 7.10 [Document] – Solar Decathlon Deliverables

NOVEMBER - DECEMBER 2010

As a subcontractor of the U.S. Department of Energy, the team had deliverables that needed to be met over the course of the 18-month project. The motivation for completion of these deliverables which inevitably if met were designed to keep the twenty competing teams on schedule, was monetary, equating to USD\$ 100,000 over the course of the project, less than 5% of the final project cost.

November/December 2010 saw half of these deadlines transpire (50%), a Building Information Model (BIM), Project Manual, which included building specifications, a scale model, 3d animation and Health and Safety plan were all part of the requirements. The delivery of these projects formed a subset of projects that needed to be organised and managed by the student leaders. These deliverables did not fall into line with the critical path the project was following so the existing allocation of human resources could not be stretched any further to accommodate these requirements, a recurring problem. As acknowledged in the 2009 proposal this was one of the very many complexities of competing in a Northern Hemisphere competition where their university timeframes did not match ours. Due to the lack of availability of internal resources, external partners/people had to be brought into each deliverable aspect, in most cases costing the project in both time and money.

External resources were brought in including an Architectural firm – *External Consultant Group 1* - who were employed to meet the BIM (Building Information Model) deadline, working under the instruction of a student leader and with the help of *Student 11* an undergraduate Architecture student.

With a vested interest the university made staff resources available to complete the Health and Safety plan, *Senior Administrator 12* worked closely with *Lecturer 1* and *Student 2* to complete the deliverable.

Graduate students were both employed and worked pro bono to complete the Scale Model and 3d animation, working closely with student leaders and graduates.

The lack of human resourcing meant long hours and a need for the student leaders to become heavily involved in the delivery of the deliverable projects.

### 7.10.1 [Discussion] – Solar Decathlon Deliverables

The need for outsourcing a significant portion of this work increased the need to break away from the wider team organisation chart and create new management styles. The change was from a flat hierarchy where all persons involved were responsible for delivery, to the delegation of responsibility to an external person. By doing this, members of the team were often put in uncomfortable positions of authority, an unnecessary burden.

While external resources were sought this was often at a very late stage in the process, with student leaders already having to deliver a substantial amount of work, this blurred the line between management and delivery. This tended to result in long hours for the students and complicated hierarchies for the team.

While there was cash motivation for completing the contractual requirements equating to USD\$ 100,000 over the course of the project, this was less than 5% of the final project cost and would not prove as valuable as keeping the project on schedule. While significant pressure was added to the delivery team external motivations proved to be the key in progressing the current state of the project.

On specific occasions funding was made available by the management committee on behalf of the University for the employment of graduate students outside of the project team to complete deliverables, this set a dangerous precedent for future student and pro bono involvement.

The recurring problem of human resources within the academic system was highlighted when an architectural firm was employed to complete the BIM. If significant academic or modest financial motivations were made available to the student team this large cost could have been avoided at an early stage of the project. In a school full of architectural students did it seem foolish to have to employ an external firm to deliver drawings?

The 2009 proposal did not transpire as suggested; Curriculum integration was difficult for a number of reasons. An education system as complex as a university requires a significant amount of time to process new courses, and find the

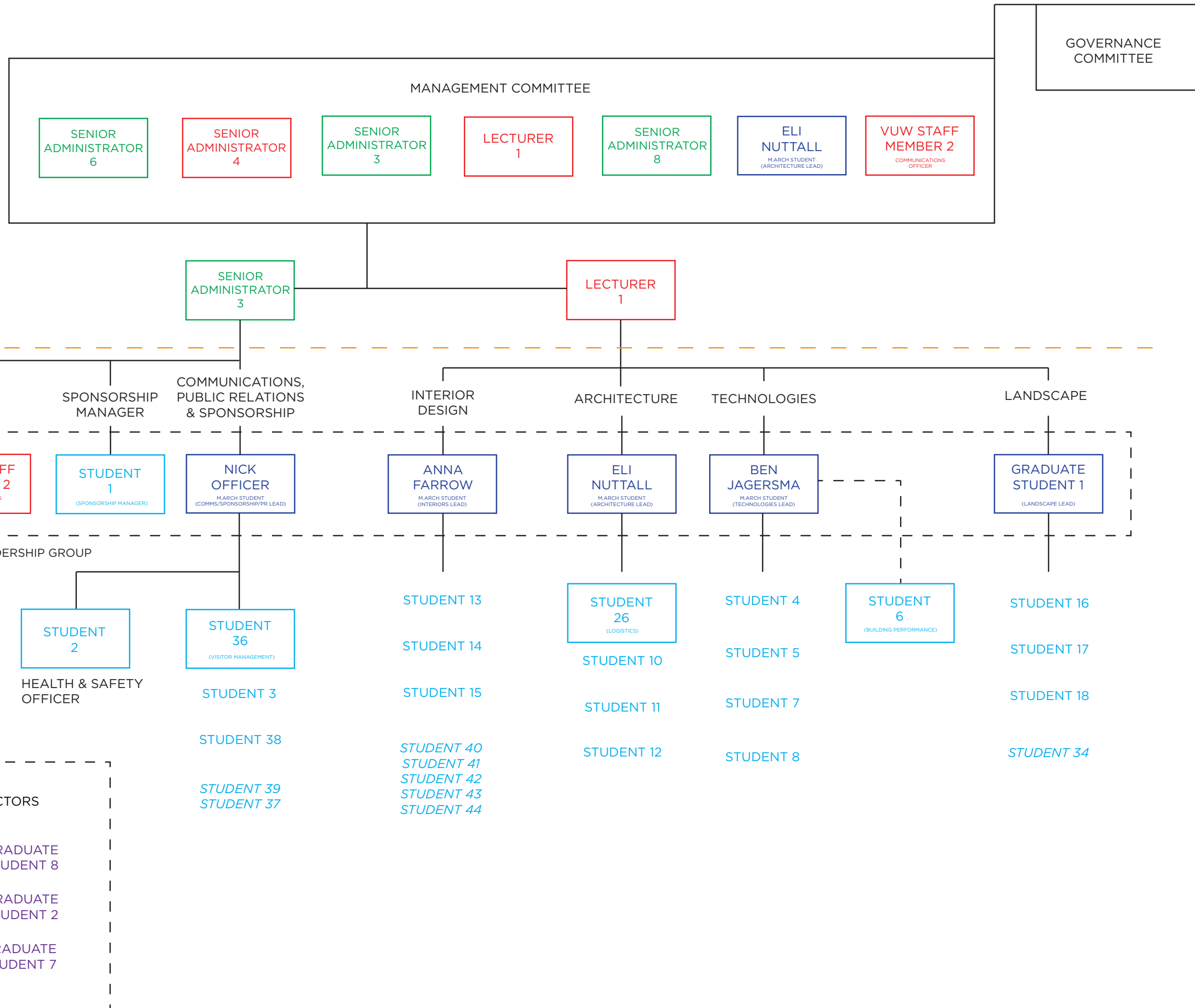


required resources, with the project always on the back foot this timeframe was often stretched beyond what was realistic. While students were working on a project more closely aligned with that of a practitioner the learning objectives and outcomes did not often meet up. With the significant time required from the student team full academic integration was required, this was not possible.

With sufficient foresight and planning, skills essential for a successful project manager, many of these issues could have been avoided.

Summer 2010/2011

DECEMBER 2010 - JANUARY 2011



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## 7.11 [Document] – Summer 2010/2011

DECEMBER 2010 - JANUARY 2011

The summer of 2010/11 saw the student team decrease in size as students left for the summer, very late in the year a university credited paper was offered over the summer, but for many it came too late and commitments saw them return to their respective home locations to earn money for the new year. The disengagement from the project for these students saw many not return.

With fewer students greater delegation of tasks and responsibility was essential and this saw the growth of some student team members. *Student 1* a fourth year Marketing student, who joined the project mid way through 2010 assumed the responsibility as Sponsorship Manager, an official Solar Decathlon team officer position. *Student 1* had been working closely with Nick, *Senior Administrator 3*, and *VUW Staff Member 2* as well as the wider student group consolidating and procuring new sponsors. As the project grew and the list of project sponsors grew so did the workload, *Student 1* introduced *Student 36*, a friend and fourth year Marketing and Tourism student to the project who began working closely with the sponsorship team.

*Student 6* had been working closely with Ben on the technology side of the project, *Student 6* recognised the opportunities that the project presented him and invested a considerable amount of his personal time into the project. *Student 6* continued to work very closely with Ben often taking control of a particular aspect of the project.

With a build and display earmarked for the Wellington Waterfront, *Student 38*, *Student 39* and *Student 37* joined the project from the VUW Tourism faculty, reporting to Nick. The inclusion of these students increased the reach and collaboration of the project further into the university. Quickly the complexity and scale of the project was apparent as these new students endeavored to grasp the project.

Where monetary or academic reward could not be offered the initiative for many of the involved students was an opportunity to travel with the team to the U.S.

Students who had put significant hours and personal contribution into the project would be rewarded. One way this could be acknowledged was to offer the students a position as an official team officer. These were positions outlined by the U.S. Department of Energy Solar Decathlon organisers and the appointed students would need to be present in the U.S. during the competition. *Student 2* a second year Architecture student had earlier been working with the team documenting team progress, and had volunteered to take a lead in delivering the Health and Safety plan. After significant work and personal investment *Student 2* was appointed our Health & Safety officer with the promise of future travel with the team.

Anna had been working closely with the Landscape Architecture students who joined the project in July 2010, after guiding the concept; the increased workload of the interior design and landscape was too great for one person. *Graduate Student 1* had been advising on the project and was asked by Anna and the team to take a lead role in delivering the landscaping for the project in Wellington and the US.

### 7.11.1 [Discussion] – Summer 2010/2011

November/December saw the student team regain control of the timeline as the work intensive deliverables came to a close, unfortunately this saw a lot of the students leave the project and what would have been an ideal time to regain control of the timeline instead saw the project again slip behind. There was very little future thinking or foresight of required resources. Instead it had become a constant struggle to retain the existing human resources as the student year came to and end bringing with it exams and final assignments. This was a combination of bad timing and poor management of resources.

The summer provided the opportunity for the student team to express their concerns about the project. The University had flirted with the idea of withdrawing the project before the signature of the principal sponsor, Meridian Energy was secured and the students were eager to enter the New Year without the mistakes made previously.

Of particular concern was the breakdown of the vertical relationship that existed and the affect it was having on the delivery team. While attempts were repeatedly made to communicate the concerns, there was little opportunity for bottom up feedback and minimal explanation of organisational strategy from top management. On reflection this was particularly concerning given the Postmes, Tanis & de Wit study of 2001, which found conclusive support of previous literature that indicated organisational commitment is more strongly related to vertical communication than horizontal. In other words, employees' sense of commitment to the organisation depends primarily on their appreciation of the management's communications rather than of their informal and socio-emotional discussions with colleagues. (Postomes, Tanis, & de Wit, 2001)

RIBA 2010, identify the most important asset of any organisation is its people. Keeping them happy and motivated is hugely important, in order to produce work of the highest quality. (RIBA, Royal Institue of British Architects, 2010) Increasingly members outside of the leadership group were expressing concern, adding pressure for the student leaders to maintain respect and at the same time

maintain the egalitarian environment that existed within the student leadership team.

Another major concern was that when a mistake was made or identified it was not acknowledged, and as Chappell & Willis suggest, every organisation should have a policy on admitting mistakes, including those of management, so that something can be done about them. Once a mistake is admitted, there should be commiserations, lessons should be learned and then the mistake should be forgotten and the concentration should be on the objectives. (Chappell & Willis, 2010) Unfortunately these concerns were not acknowledged and the project would continue to fall behind schedule, and responsibility wavered.

Delegation is a key function of management and the art of delegation is to know what to delegate, when and to whom. (Chappell & Willis, 2010) This became an important consideration as while the summer saw many students leave the project it was also an important period of commitment. Without academic burdens students who remained in Wellington and on the project were able to commit more time to the project, at the expense of personal financial gain, and were often rewarded with leadership roles which in turn encouraged them to take responsibility (Chappell & Willis, 2010) lightening the load on the student leaders.

*Graduate Student 1* accepted a leadership role in the project, taking control of the Landscape design team. As a graduate of the school she joined the project part time, without financial assistance or academic credit but remained very committed investing personal hours into the project. Precedents had been set where when someone was willing to provide their services free of charge they were used, where no available services were available from students the university were often very quick to pay for it. Often if a small amount of money had been made available to pay students early on that would have saved large amounts of money paid to commercial organisations later on.

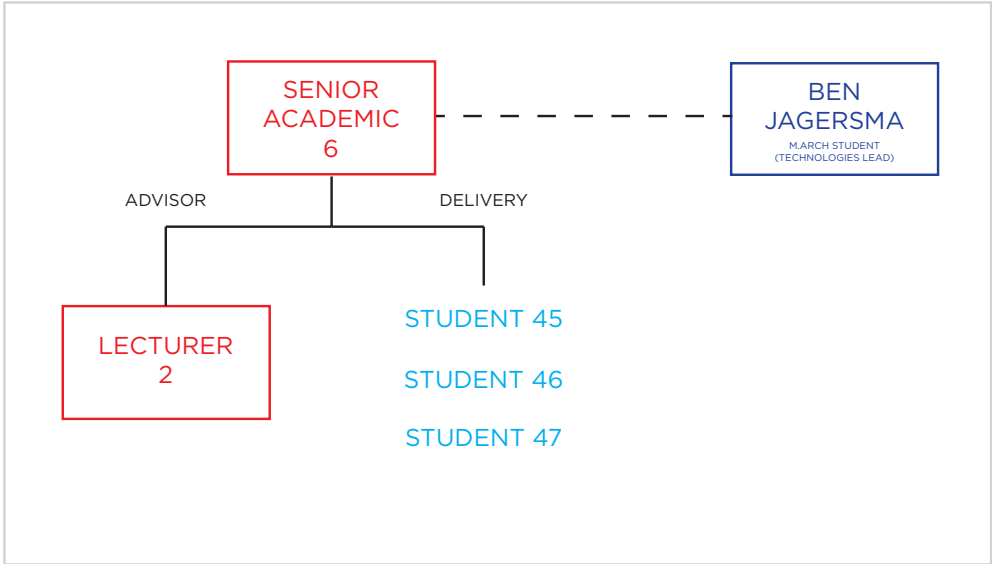
While they provided a resource in the area of event and visitor management, the inclusion of the students from the tourism school was not at the request of the student leaders. Rather the management committee required that faculties outside of Architecture & Design work with the project. At this late stage the

introduction of new students who had yet to prove themselves required significant micro management and would take valuable time away from the student leaders. This demonstrates the problem of trying to satisfy the Solar Decathlon requirement to include the widest possible range of skills, without realising that some students may not have the appropriate background for such a highly technically driven project.

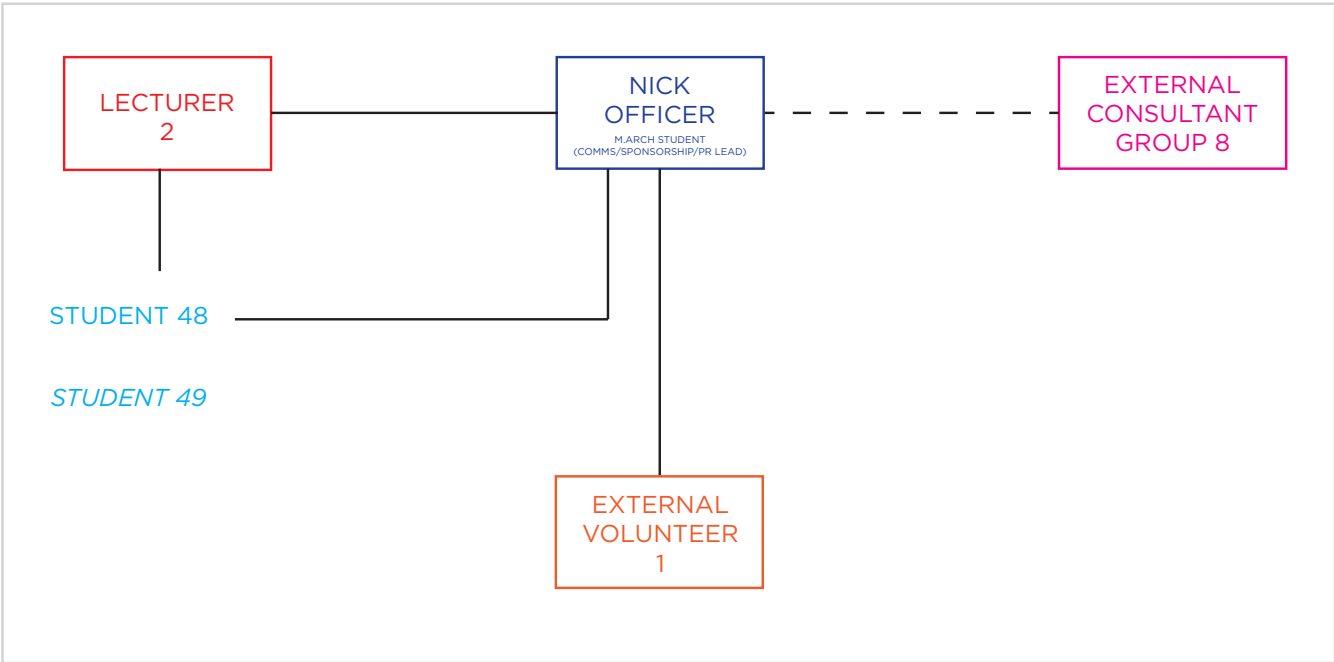


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Figure 7.12  
Side Projects  
2010 - 2011

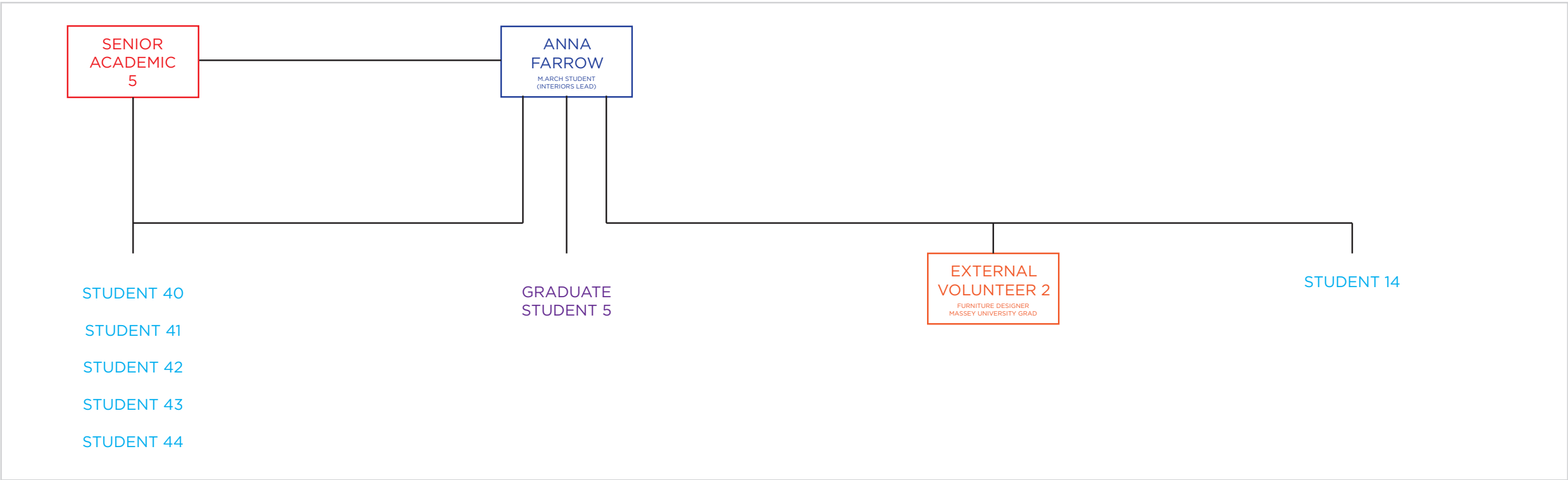


TRING  
2010/11



FIRST LIGHT WEBSITE  
2010/11

FL INTERACTIVE WALKTHROUGH  
MAY 2011



SOFA, BED, DESIGN  
2010/11

KITCHEN LIGHT  
2010/11

DINING ROOM CHAIRS  
2010/11

KITCHEN TABLE  
MAY 2011

FURNITURE

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## 7.12 [Document & Discussion] - Side Projects

2010 - 2011

The diagram above demonstrates the complex organisational challenges that were present within the project. Several side projects existed throughout the project that required time and resources from the project student leaders. This input ranged from direct management, to consulting and physical delivery.

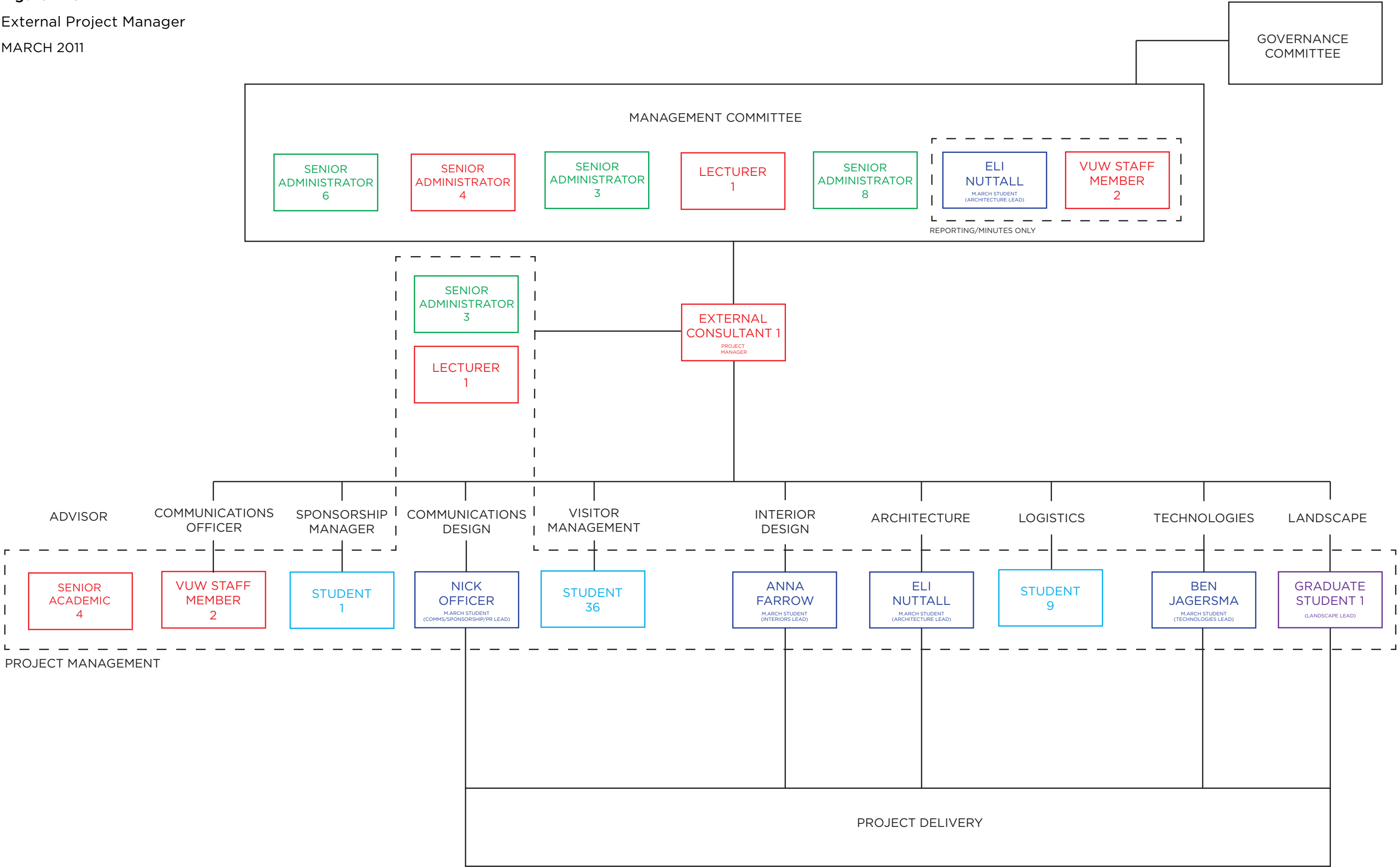
Anna worked with numerous individuals creating furniture for the house, extending her commitments, time and responsibility far beyond those of her designated role. Anna out sourced and commissioned selected works, and consulted with *Senior Academic 5* on delivery. Anna also worked closely on the design and managed the production of the central light with VUW Masters student *Graduate Student 5* and the dining room chairs with Massey University graduate *External Volunteer 2*.

The production of the interactive walkthrough brought about another challenge, with the only willing resource located in Christchurch, a long distance working relationship was forged requiring intensive communication and direction from a distance. This again proved time intensive and resource hungry.

Tring was an illustration of a successful project run outside of the project office. Run with external funding and management Tring provided an energy-monitoring application for the house. A brief was set and consultation in the form of weekly meetings occurred with Ben, providing direction and critique.

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Figure 7.13  
External Project Manager  
MARCH 2011



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### 7.13 [Document] – External Project Manager

MARCH 2011

After numerous requests and a considerable amount of time invested by the core student leaders in illustrating the need for stronger leadership, it was announced that the Management team had accepted the core students' proposal, the project would employ and fund an external project manager to see the house to completion in New Zealand. The significant management issues had resulted in the need for this move which was going to present a major shift in the running of the project of the project, the biggest challenge yet and the first step in a management renewal exercise which Brundney & Murray 1998, suggest is entirely necessary for the ongoing effectiveness of an organisation. (Brudney & Murray, 1998)

The project had at this stage reached a point where almost all communication had broken down between the delivery and management teams. Decisions were being made at the student level and when considerable sign off was required it was taken directly to the management committee meetings for signoff. This was caused largely by a loss of trust and professional respect, which without there was no leadership. With an incredibly tight schedule and the university's reputation on the line the student body took responsibility for the delivery of the house.

The students were introduced to *External Consultant 1*, a Project Manager who had been working at the University as a part time tutor. *External Consultant 1* was one of two competent Project Managers that had been recommended for the job. After a successful meeting with *External Consultant 1* it was decided not to follow up with the second recommendation. It was important that *External Consultant 1* could illustrate previous competencies in the field and that the current state of the project was completely understood, this was sufficiently demonstrated to the student leaders.

There was significant risk taken on by the student leaders in the employment of *External Consultant 1*, as they were required to go behind the back of the management committee to organise the proposal. It was important that the



students had backing from respected mentors, which included current members of the governance committee.

For the student body it was understood that *External Consultant 1* was the new project manager and that all reporting was to go to her, a single line of communication.

At this time *Student 9* had been identified as the key point of contact for the logistics coordination, which included *External Consultant 6* and a complicated relationship between *External Consultant Group 3* land shipping and *External Consultant Group 4* sea shipping.

### 7.13.1 [Discussion] – External Project Manager

The appointment of *External Consultant 1* as project manager so late in the project created several complex challenges, both personally for *External Consultant 1* and for the wider team of whom not all agreed with the move.

The informal interview with *External Consultant 1* was the first time in the project that the credentials of a manager had been presented to the student leaders. It was identified that if the employment of a new project manager was going to be successful that a relationship needed to be present between the student delivery team and the new manager. Previously management assumed control of new employments and a certain level of trust could be expected.

Had an external advisory group been appointed at the start of the project, with a responsibility for the direction and employment of staff, this move could have been made significantly earlier on in the project, and made without complicating relationships between existing members of the team.

The next major hurdle came in the acknowledgement of *External Consultant 1* as project manager. The acceptance and communication within the student delivery team was evident as *External Consultant 1* quickly moved to grasp the project and develop relationships with the student leaders. However with no written or formal documentation of *External Consultant 1* as the new project manager it was evident that not all members of the management committee understood her position.

If *External Consultant 1* was to be successful in her role it was important that she held authority in her position; Formal authority or power is that which the organisation gives to the individual. It is the power held by the manager, the power the person has to ask others to do things. The person with this power is said to have authority over others. Formal power is usually broken into three parts: reward power, coercive power and legitimate power.

- Reward: This is the authority to reward.
- Coercive: This includes the authority to punish.
- Legitimate: This is the authority to tell someone what to do. (Millar, 1999)

Without complete understanding that *External Consultant 1* held this authority *External Consultant 1* was in a difficult position.

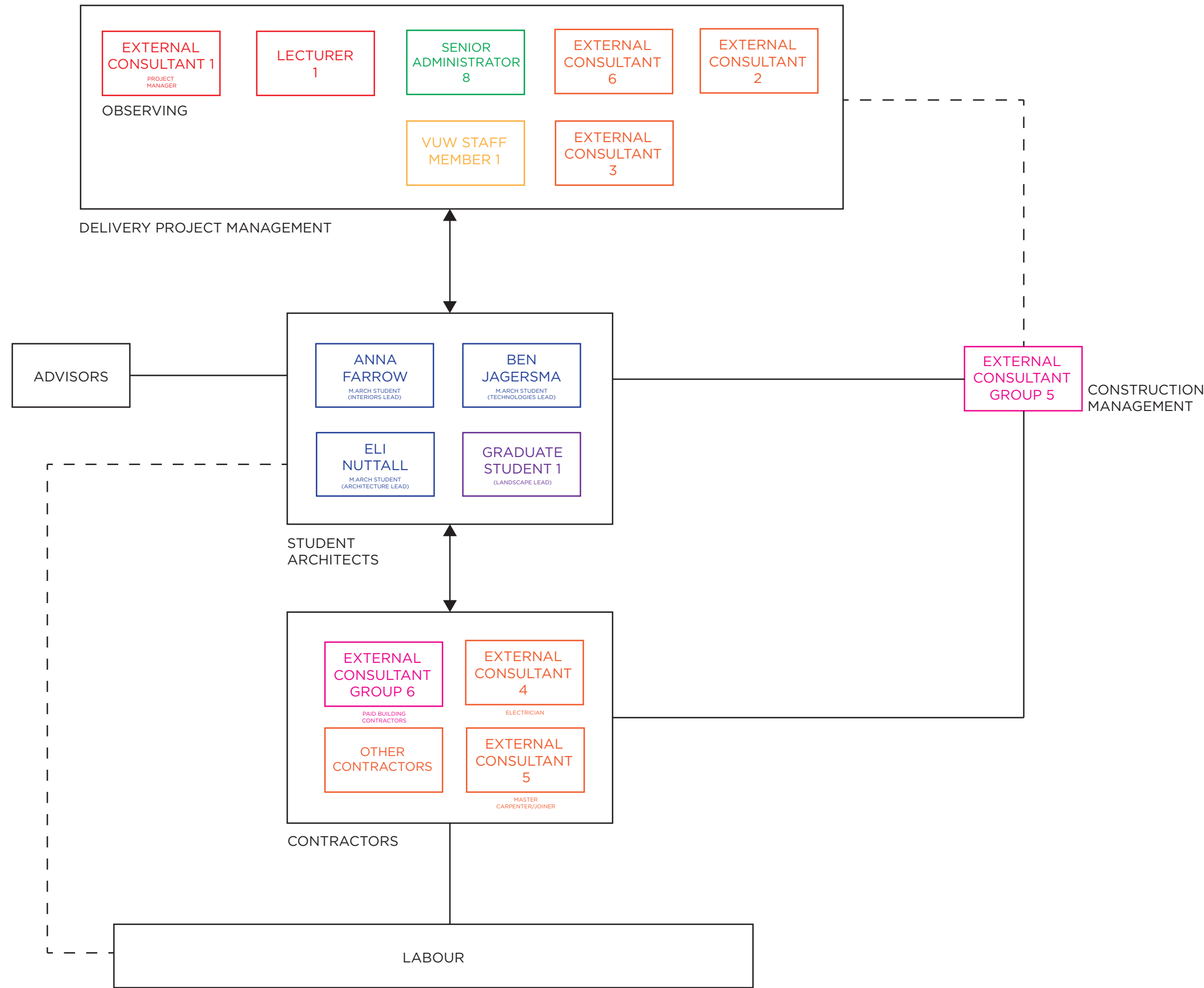
Over the past 12 months as the project had developed the lack of a capable project manager had meant that numerous roles had been spread between existing and new employees, including, programme management and control, finance, and curriculum integration. With these roles now in control of others it added additional communication lines that would have not existed had she been involved from the beginning of the project. In many cases the extent to which numerous individuals had become involved in the project meant it was very hard for *External Consultant 1* to regain control.

*External Consultant 1* brought with her a management trait, which had not existed previously, often known as informal or personal power in project management as it comes from within the individual – it is not bestowed by the organisation. It often exists in two forms:

- Expert Power: This is the informal authority to guide people because of some special expertise in a particular area. Expert power is usually the result of training or experience.
- Referent Power: People with referent power have the ability to influence others because they have ‘that something special’, often known as charisma. Others find they are happy to follow their lead. (Millar, 1999)

*Senior Academic 4* had by this time become an invaluable asset as an advisor to the project. Unfortunately even after numerous requests for his time, his position in the School meant the time he was committing to the project was often at his own personal expense and could not be guaranteed.

**Figure 7.14**  
Lyllall Bay First Build  
FEBRUARY –APRIL 2011



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#### 7.14 [Document] - Lyall Bay First Build

FEBRUARY - APRIL 2011

Construction of the house was overseen by a delivery project management team, that included *Lecturer 1* whose major role was monetary sign off; *Senior Administrator 8* who monitored the progress of *VUW Staff Member 1* who would later leave and be replaced by *External Consultant 3*, their role was that of programme management; *External Consultant 6*, of *External Consultant Group 7* who had joined the project part time as a logistics consultant and *External Consultant 2* of *External Consultant Group 5* who was the company's sole representation, working as a construction manager for the project. *External Consultant 1* later joined the group after her appointment in March but did not immediately look to take control of the build as significant professional resources existed already. This management group met weekly and remained largely away from the daily running of the build.

The core student leaders, the unofficial 'project architects', were seen as the final decision makers when it came to day-to-day decisions. Working on site and very closely with the experience of the contractors, decisions were often made in consultation with advisors and the construction manager at that point in time.

While acting as the 'architect' and final decision makers the students were also working as the labour making for a somewhat contradictory relationship between the contractor and architect.

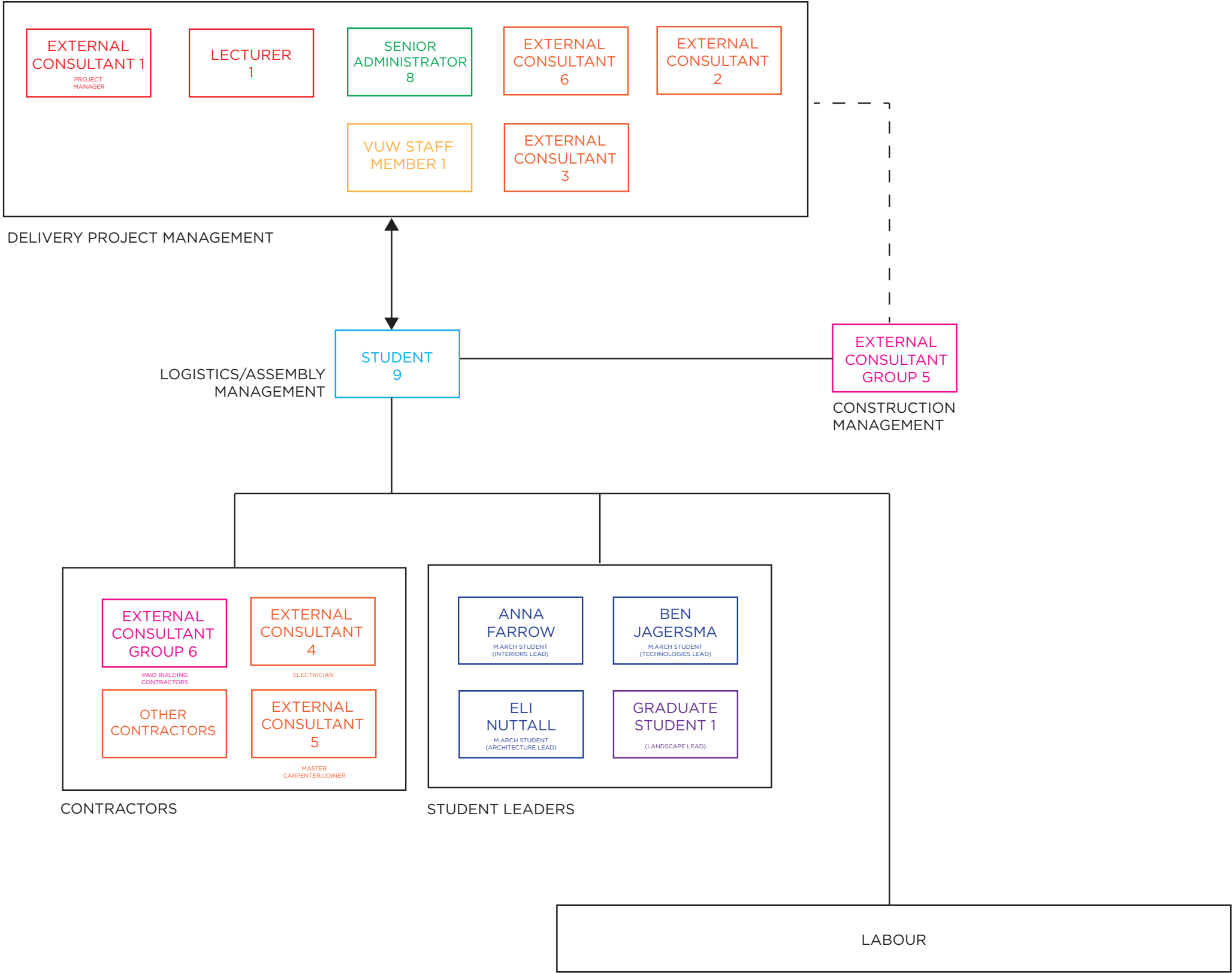
#### 7.14.1 [Discussion] - Lyall Bay First Build

A significant amount of money and professional resources had been poured into the delivery of the house, with no less than four staff or external advisors consulting on the project it was clear that there was a clear goal of completing the house. At times this affected the wider project, including event planning for public relations and sponsorship recognition, as the focus of resources and management was fairly narrow. This was another example of misguided human resource allocation.

This was not an example of a well managed delivery group, while there was considerable expertise at hand, either lack of motivations or risk saw to it that no one person was willing to take responsibility for the delivery. Working with *External Consultant Group 5* pro bono meant that there was no consequence for missing deadlines, as there would be if they were paid contractors, as a result projects of higher importance often took precedence.

The core student group had no experience in this field, so it was a learning experience which was often acknowledged as a benefit to the students' learning but also as an excuse for mistakes made.

**Figure 7.15**  
Frank Kitts Park First Assembly  
MAY 2011





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7.15 [Document & Discussion] - Frank Kitts Park, First Assembly  
MAY 2011

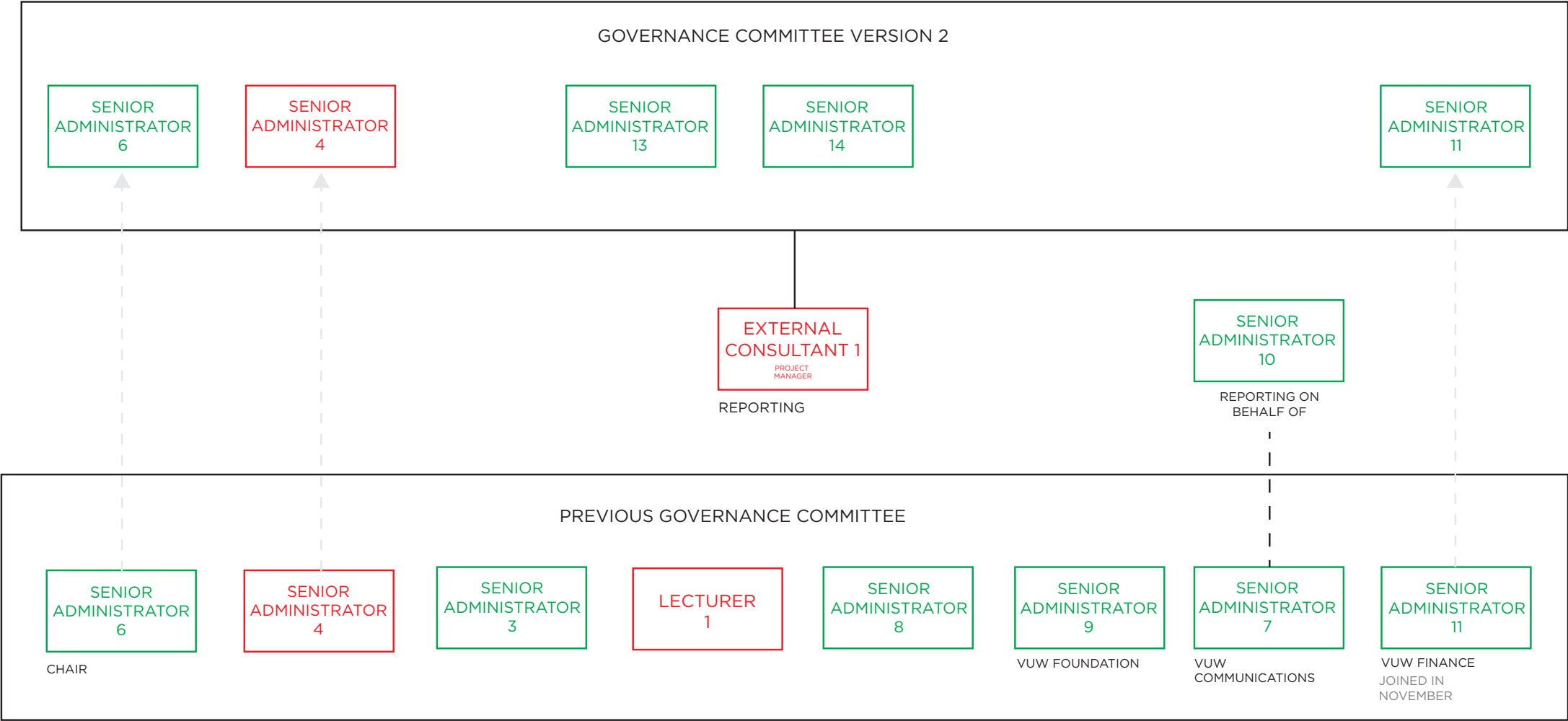
Frank Kitts Park on the Wellington waterfront offered the team a chance to assemble the house before it was shipped to the U.S for the final competition. This also presented an opportunity to understand the required resources, both human and other. For the university and sponsorship team Frank Kitts Park provided the platform to showcase the project to New Zealand and abroad.

The assembly saw a slight shift in the organisation structure. *Student 9* an undergraduate Architecture student was given the responsibility of Construction Manager, after proving himself with leading the assembly as a trial for his future role in the U.S.. Unfortunately construction of the house had not met the final deadline in Lyall Bay and as such there was still a significant amount of work left to be completed on the house. This not only confused the clarity of the organisation but added undue pressure on the project. There was still significant communication between the contractors and student architects around construction.

With the University trimester enforcing commitments on many of the students, the assembly was under resourced and fluctuating numbers made it hard to successfully gauge future requirements.

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Figure 7.16  
Governance Committee Reformed  
AUGUST 2011



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7.16 [Document & Discussion] - Governance Committee Reformed  
AUGUST 2011

The reformation of the Governance committee occurred in August 2011, after the house had left New Zealand for the Solar Decathlon. *Senior Administrator 13* and *Senior Administrator 14* were the two new inclusions in the smaller committee, both VUW senior management. *Senior Administrator 6* remained the chair with *External Consultant 1* the project manager reporting to the meetings. *Senior Administrator 11* remained on board for financial guidance.

In their roles as VUW senior management both *Senior Administrator 13* and *Senior Administrator 14* had had very little to do with the project's running day to day. While internal, both were good additions as they provided a fresh view with both looking to make decisions that better the project and have the university's best interest in mind.

According to the literature of Wilson & Connell 2007, the most important attribute that a project governance meeting must establish is free and open disclosure and reporting. A governance committee should encourage the project manager to present a true picture of the status of a project at regular meetings. To achieve this, a committee must develop an environment of trust, respect and support with the project manager. (Wilson & Connell, 2007) With the formation of the new governance committee *External Consultant 1* was able to report openly and honestly on the status of the project.

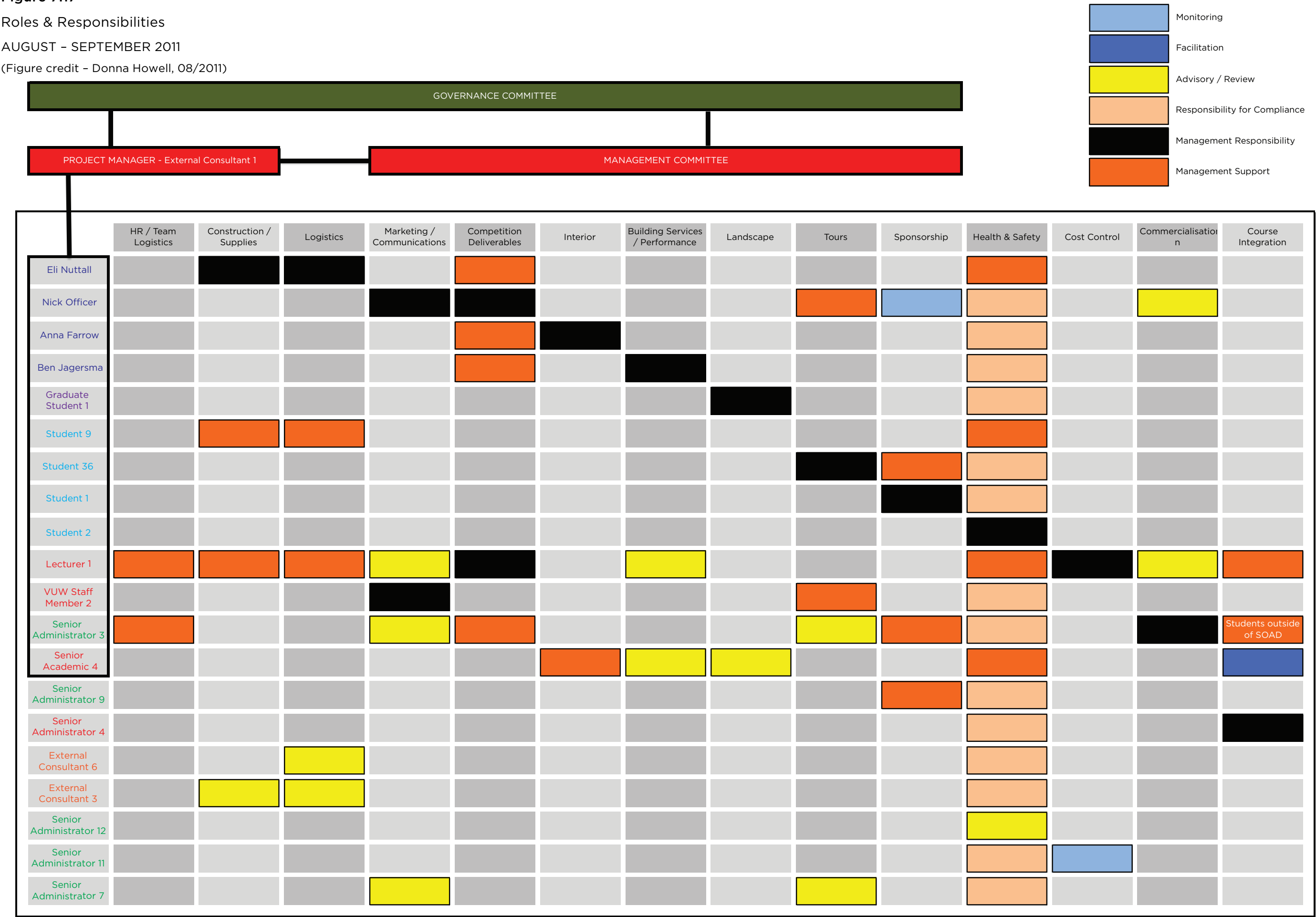
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Figure 7.17

Roles & Responsibilities

AUGUST – SEPTEMBER 2011

(Figure credit – Donna Howell, 08/2011)





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## 7.17 [Document] - Roles & Responsibilities

AUGUST - SEPTEMBER 2011

Hamilton 2004, suggests that the modern era of project management is seen as having three main ingredients. These ingredients are:

- Project organisational structure
- People's roles within project teams
- Project procedures and techniques (Hamilton, 2004)

With a high level understanding of the project organisational structure which had existed academically since the beginning of the project, in her new role as project manager *External Consultant 1* began to identify the roles and responsibilities of all parties involved, which did not prior to this exist as a written document.

Since the beginning of the project the roles of the student leadership team had grown from four, Architecture, Marketing & Communications, Technologies, and Interiors into thirteen key areas of responsibility as documented above in Figure 7.17. With this came a growth in the core management team, which had also grown from four to thirteen including four staff members.

*External Consultant 1* identified the complexities that existed in the project and working relationships, identifying responsibility in six different formats.

- Management Responsibility
- Management Support
- Facilitation
- Advisory/Review
- Monitoring
- Responsibility for Compliance

Roles and responsibilities were identified and Figure 7.17 was distributed throughout the team as a formal record/document.

With the employment of *External Consultant 1* as project manager there was now one official line of communication from delivery to management and governance.

The newly identified 'project management group' would begin meeting regularly, shifting the decision making procedures away from the regular management meetings.

### 7.17.1 [Discussion] - Roles & Responsibilities

Millar 1999, identifies that to manage effectively the manager needs to ensure the lines of authority are clear, and that people are aware of their responsibilities. There are three terms that are important, responsibility, authority, and accountability.

- Responsibility: is the obligation that an employee has to his or her manager to do a job that has been assigned.
- Authority: is the right to take action to get things done. A manager has formal authority over his or her subordinates. For example a manager can ask an employee to do a task, and most importantly expect the task will be completed.
- Accountability: is the ultimate responsibility to complete tasks in order to meet organisational goals. A manager is accountable – that is, they must be willing to take all responsibility. (Millar, 1999)

Distributing the roles and responsibilities chart *External Consultant 1* was able to allocate responsibility and authority to ensure mistakes do not happen or if they do then the right person is held accountable, while delegation encourages people to take more responsibility. (Chappell & Willis, 2010)

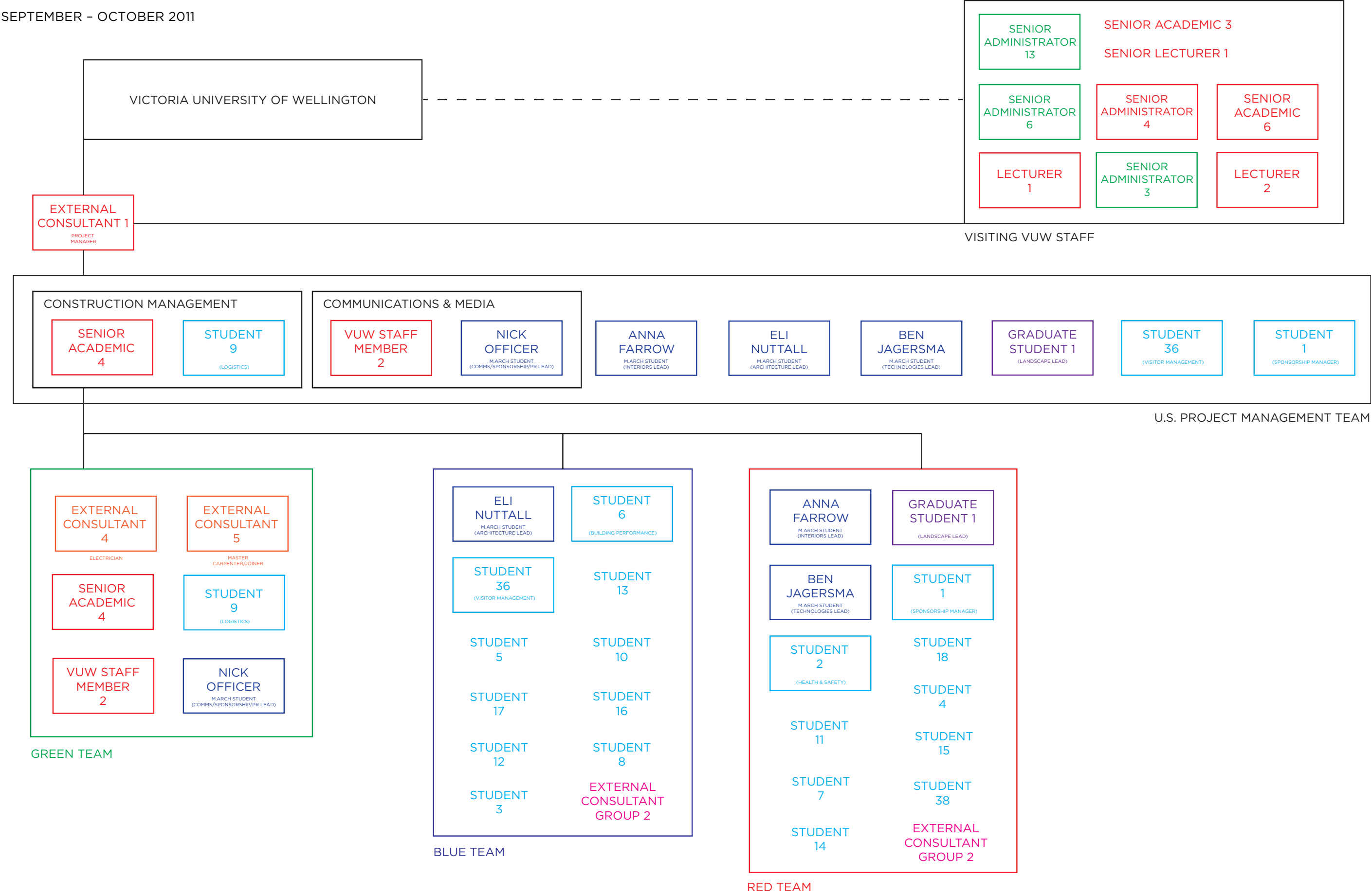
In identifying the roles and responsibilities of the wider team *External Consultant 1* was able to assert herself as the singular manager not directly responsible for one role but for all. This was a successful shift away from the complications that had previously existed when ‘management’ became bogged down completing tasks that should be completed by the delivery team, blurring the lines of hierarchy and authority.

Responsibility rarely existed as the responsibility of one person but existed in six different formats across multiple people, this was due in part to complex relationships that already existed and an effort to share the responsibility across several skill sets. With such defined responsibilities it was clear within the team whom was to be held accountable but also who was overburdened or had over committed themselves, which was often a cause of mistakes.

The newly identified 'project management group' would begin meeting regularly, shifting the decision making away from the management committee to the daily running of the project. *External Consultant 1* held decision-making power that once existed at the management meetings, the management exhibited trust in their employee.

Not all parties agreed with the role they were playing in the project, or agreed with the fundamental role of the project manager. Often underestimated, managing human resources, financial resources and material resources can be a challenging and demanding job. Managers need to understand many different things and work with many different people. (Millar, 1999) Millar highlights here that Project management can be a very difficult role not suited for all personalities, this had become evident over the course of the project.

Figure 7.18  
Solar Decathlon 2011  
SEPTEMBER - OCTOBER 2011



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## 7.18 [Document] – Solar Decathlon 2011

SEPTEMBER – OCTOBER 2011

By September 2011 the organisational structure was refined and a single line of communication existed between the University and the student leadership and delivery team. This more closely resembled the structure presented in the 2009 proposal.

The student leadership group had grown from the four original members to nine, with support from staff members heading to the U.S., *Senior Academic 4* and *VUW Staff Member 2*. The student team to travel to the U.S. was finalised at twenty-six.

*External Consultant 1* as project manager had assumed full responsibility for the delivery of the house and the competition team, reporting directly to VUW management. Supporting staff reported to *External Consultant 1*.

While in the U.S. the team was divided into three, the Red, the Blue, and the Green team. The Green team included paid contractors, *External Consultant 5* and *External Consultant 4*, *Senior Academic 4* and *Student 9*, the two construction managers for the duration of the trip and Nick Officer whom was acting as primary student contact for the competition and *VUW Staff Member 2*, Media liaison. The Green team worked throughout the day, 09:00 till 22:00 making sure they were available to competition organisers and split across both the Blue and Red shifts.

The Blue and red shifts were made up of the remaining students including volunteer *External Consultant Group 2* students, technical and physical skills were divided evenly across the teams. The Blue and Red shifts would work throughout the day and night combining for 21 hours of work per day maximizing working hours.



### 7.18.1 [Discussion] - Solar Decathlon 2011

September/October 2011 reflected a team organisational structure that was proposed almost 24 months prior in November 2009. All roles & responsibilities were assigned and understood, authority was clear and communication was succinct.

The foreign environment should have added additional stress to the project team, yet it was often talked about within the student group as the period of the project that was least stressful. This reflected the success of the organisational structure and the significant planning prior to departure, two tools of successful project management.

A removal from the academic environment could be in part credited to this success. The student team was no longer juggling class work with the project and the environment in which the project had become such a part of was removed. Where previous notions of the university organisation inherently existed the new environment was an opportunity to remove these often misconceptions and focus on the team, as it existed in the U.S.

A growth in the responsibility of the student team was exhibited throughout the project, roles that had been nominated for professionals in the 2009 proposal had now been assumed by students. While this may have had an impact across the project this provided invaluable experience for the students involved.

### 7.19 Solar Decathlon 2011 team Comparisons – Case Studies

The Solar Decathlon in 2011 demonstrated there is not one-way or right way to organise and manage a project of this nature. Nineteen teams competed with no two teams having identical resources or management structures, nor could any correlations between team size, staff numbers, or universities entered, be connected with success, after analysing Figure 7.19.

While teams that had previously competed in the competition placed in the top half of the competition, the departure of previous students meant that to a large extent experience left the project.

Below, the management of three university teams has been documented for comparison. Finishing from first place to thirteenth, the three teams below in comparison with the VUW project exhibit the different management styles used throughout the competition, highlighting that successful organisation, management, and delivery are just part of a successful project.

1<sup>st</sup> Place - Maryland

4<sup>th</sup> Place - Middlebury College

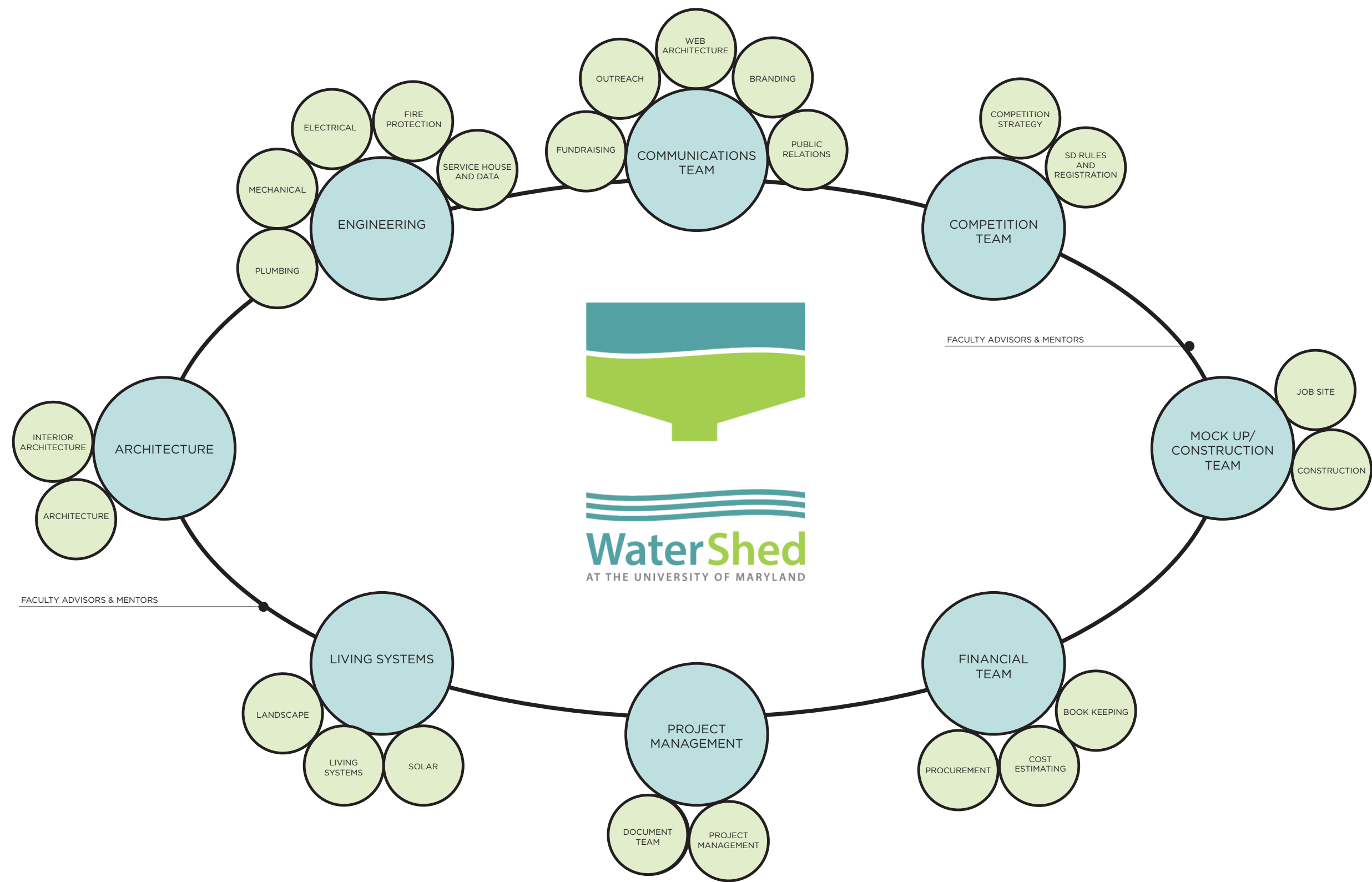
13<sup>th</sup> Place - Parsons NS Stevens

**Figure 7.19**

2011 Team Comparisons

TEAM & HOUSE NAME	# UNIVERSITIES	UNIVERSITIES	YEARS BEFORE	# STUDENTS (APPROX)	# STAFF	FINAL PLACING
Maryland - Watershed	1	University of Maryland	3	40 (123)	8	1
Purdue - INHOME	1	Purdue University	0	50	9	2
<a href="#">New Zealand (INT) - First Light</a>	1	Victoria University of Wellington	0			3
Middlebury College - Self Reliance	1	Middlebury University	0	88	8	4
OSU - enCORE	1	Ohio State University	1	71	3	5
Sci-Arch, Caltech - Chip	2	Sci-Arch, Caltech	0	73	7	6
Illinois - Re_home	1	University of Illinois at Urbana-Champaign	2	41	7	7
Tennessee - Living Light	1	The University of Tennessee	0	16	7	8
Team Massachusetts - 4D Home	2	Massachusetts College of Art and Design and the University of Massachusetts at Lowell	0	36	2	9
<a href="#">Team Canada (INT) - TRTL</a>	1	University of Calgary	1	38	5	10
FIU - perFORM(D)ance house	1	Florida International University	0	42	5	11
Appalachian State - The Solar Homestead	1	Appalachian State University	0	58	/	12
Parsons Stevens - Empowerhouse	2	Parsons The New School for Design, Stevens Institute of Technology	0	45	/	13
Tidewater Virginia - Unit 6 Unplugged	2	Old Dominion University and Hampton University	0	35	4	14
<a href="#">Team China (INT) - Y-Container</a>	1	Tonji University	0	24	3	15
<a href="#">Team Belgium (INT) - eCube</a>	1	Ghent University	0	30	3	16
Team New York - The Solar Roof Pod	1	The City College of New York	0	63	11	17
Team New Jersey - ENJOY house	2	Rutgers - The State University of New Jersey and New Jersey Institute of Technology	0	31	10	18
Team Florida - Flex House	4	The University of South Florida, Florida State University, The University of Central Florida, and The University of Florida	0	63	19	19

**Figure 17.19.1**  
Maryland College - WaterShed  
(Figure credit - Maryland College)



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### 7.19.1 Case Study 1: Maryland College – WaterShed

1<sup>ST</sup> Place 2011 Solar Decathlon

Maryland College whose team and house is known as WaterShed, structure their organisation around “a unique educational experience” which is designed to not only teach students about clean energy building practices and technologies, but also prepare them for the professional world they will enter.

Based on the practice of Californian based design firm IDEO, team Maryland operates as a flat hierarchy in which arriving at consensus is a central principle. All involved – students, faculty, and mentors – find themselves sometimes leading, sometimes following. The core of the project is not a single student or faculty leader, but rather a set of principles shared by the team about what it means to design a sustainable and sound building, which permanently connects and focuses our project.

Around these core principles, leaders from all invested disciplines – architecture, engineering, and plant science students – head up teams of students working on multiple fronts. Mentorship for these emerging leaders is provided by faculty members, architects, engineers, communication experts, and tradespeople who help the students learn rapidly about professional practice and the art and science of integrated design and building. (University of Maryland, 2010)

This structure resembles that of the VUW delivery team, working as a flat hierarchy within a common space, the VUW project team identified student leaders of the core areas..

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**Figure 17.19.2**

Parsons Stevens - Empower House

(Figure credit - Parsons Stevens)





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### 7.19.2 Case Study 2: Parsons Stevens – Empower House

13<sup>TH</sup> Place 2011 Solar Decathlon

Approximately forty-five students across two New York schools, Parsons the New School for Design and Stevens Institute of Technology, in partnership with Habitat for Humanity of Washington, D.C., and the D.C. Department of Housing and Community Development delivered their project by taking a whole-system approach. The multi-disciplinary team represents the fields of architecture, engineering, lighting design, product design, fashion design, communication design, public policy, finance and non-profit management.

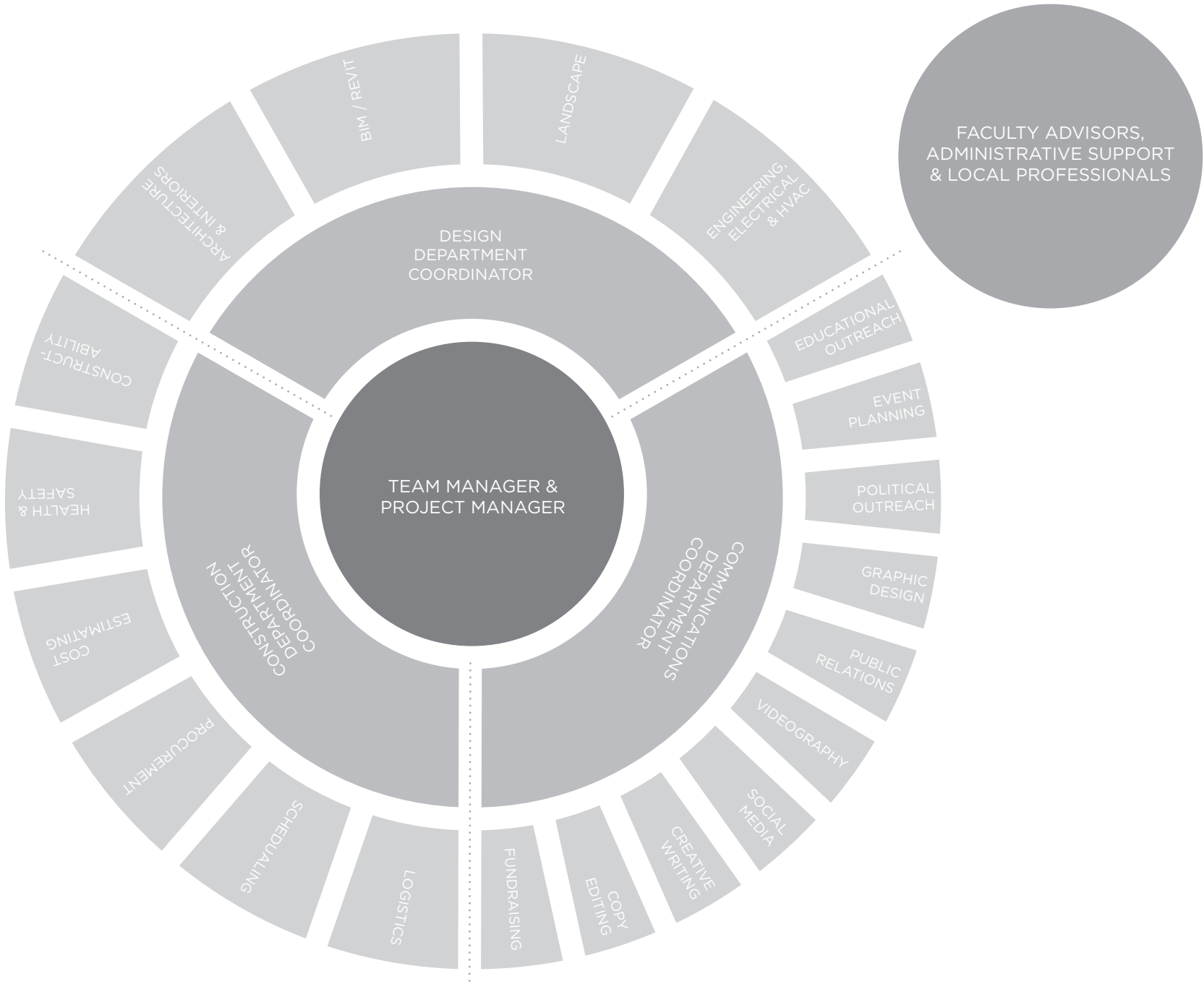
Decisions are made by congress; the meeting of core functions enables collaborations across key areas as identified in Figure 7.21, schools and faculties. The external client is adding a level of rigidity and stability beyond the rules and regulations set forth by the Solar Decathlon competition while providing a clear brief and set of objectives.

Supported by external advisors and faculty the project is guided by the executive committee who give direction and monitor progress of the project delivery.

The core functions of Fundraising and Communications are separated from the core Architectural and Design functions in an attempt to provide fluidity to the process.

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**Figure 17.19.3**  
Middlebury College – Self Reliance  
(Figure credit – Middlebury College)



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### 7.19.3 Case Study 3: Middlebury College – Self Reliance

4<sup>TH</sup> Place 2011 Solar Decathlon

Team Middlebury is comprised of over 85 students from more than 25 different academic disciplines. To coordinate such a diverse group, the team is organised in a three-layer orb. The inner core is composed of the Project Manager and Team Manager.

The Project Manager founded the team and ensures that the team's work supports the mission statement. The Team Manager handles the project schedule, runs meetings and facilitates department coordination.

The second layer is divided into three departments—Design, Construction, and Communications—each led by a student Department Coordinator. These Coordinators communicate with the Project and Team Managers and organise the third layer of sub-teams, ranging from Educational Outreach to Cost Estimating.

Students hold all leadership positions, and are assisted by two Faculty Advisors who specialize in architecture and construction. Middlebury College also provides administrative and staff support for various operational tasks. Additional professional consultants assist with engineering, Revit modeling, and other special skills. Over 460 cash and 20 in-kind donors helped to make their project possible. (Middlebury College, 2010)

# 8 Project Success: Competition, Communications, and Fundraising & Team Support

## 8.1 Introduction

*“Third place in the 2011 U.S. Department of Energy Solar Decathlon goes to... New Zealand!”* (U.S. Department of Energy, 2011) Secretary of Energy Dr. Steven Chu announces the winners on the final day of the 2011 Solar Decathlon, forever engraving VUW in the history books.

Rapturous applause at the 2011 final prize giving, as recorded and published by the U.S. Department of Energy (U.S. Department of Energy, 2011), was just one indication of the significance of success achieved by the New Zealand team. As the first ever entry from the Southern Hemisphere, reaching the podium in a competition on foreign soil with foreign judges and audience in foreign climatic conditions (in a competition where five of the ten contests are decided by the weather) was considered a real success, outweighing many of the odds, including travelling almost 14,500 kilometers.

Much of the project success was not recognised by the competition contests that focused principally on the competition house. Many aspects of the project while successful remain largely intangible or undocumented (project planning and management, student development, sponsor benefits, knowledge shared/gained, advertising dollar value). This chapter documents this success and identifies the strategies and resources used, both human and otherwise to achieve them, in response to the goals set out in the 2009 proposal under Fundraising and Team Support. (See Chapter 5.2.2)



**Figure 8.1** – Team New Zealand finishes third

## 8.2 The Solar Decathlon results

The most measurable success was that achieved at the competition in Washington DC, in September/October 2011. The First Light house finished third overall, out of 19 teams from 5 countries. Success was recognised with podium placings in three of the five judged contests with a third place combined finish. This included 1<sup>st</sup> place in Engineering, 2<sup>nd</sup> place in Architecture and 3<sup>rd</sup> place in Market Appeal, and two first place finishes in the measured contests, Energy Balance and Hot Water.

These were not the only accolades bestowed on the New Zealand team who also illustrated their excellence in organisation and team work by finishing as the outright safest team to compete, an unofficial acknowledgement. The New Zealand team was also the second team ready to compete, meeting all the requirements of the competition and code compliance before seventeen of the other teams.

The results are achieved by a combination of a competition winning design solution and a hard working team determined to succeed.

Below are the overall standings and the breakdown of points and placings contest by contest for the New Zealand team.



### Solar Decathlon final standings

- |                           |  |
|---------------------------|--|
| 1. Maryland               | 12. Appalachian State                      |
| 2. Purdue                 | 13. Parsons NS Stevens                     |
| 3. New Zealand            | 14. Tidewater Virginia                     |
| 4. Middlebury College     | 15. Team China                             |
| 5. Ohio State             | 16. Team Belgium                           |
| 6. SCI-Arc/Caltech        | 17. Team New York                          |
| 7. Illinois               | 18. Team New Jersey                        |
| 8. Tennessee              | 19. Team Florida                           |
| 9. Team Massachusetts     | 20. University of Hawaii (did not compete) |
| 10. Canada                |  |
| 11. Florida International |  |

### Team New Zealand results

CONTEST	RANKING	POINTS
Architecture	2	95
Market Appeal	3	93
Engineering	1	93
Communications	5	84
Affordability	9	94.6
Comfort Zone	12	77.3
Hot Water	1	100
Appliances	14	86.5
Home Entertainment	8	96.079
Energy Balance	1	100

100 points possible per contest



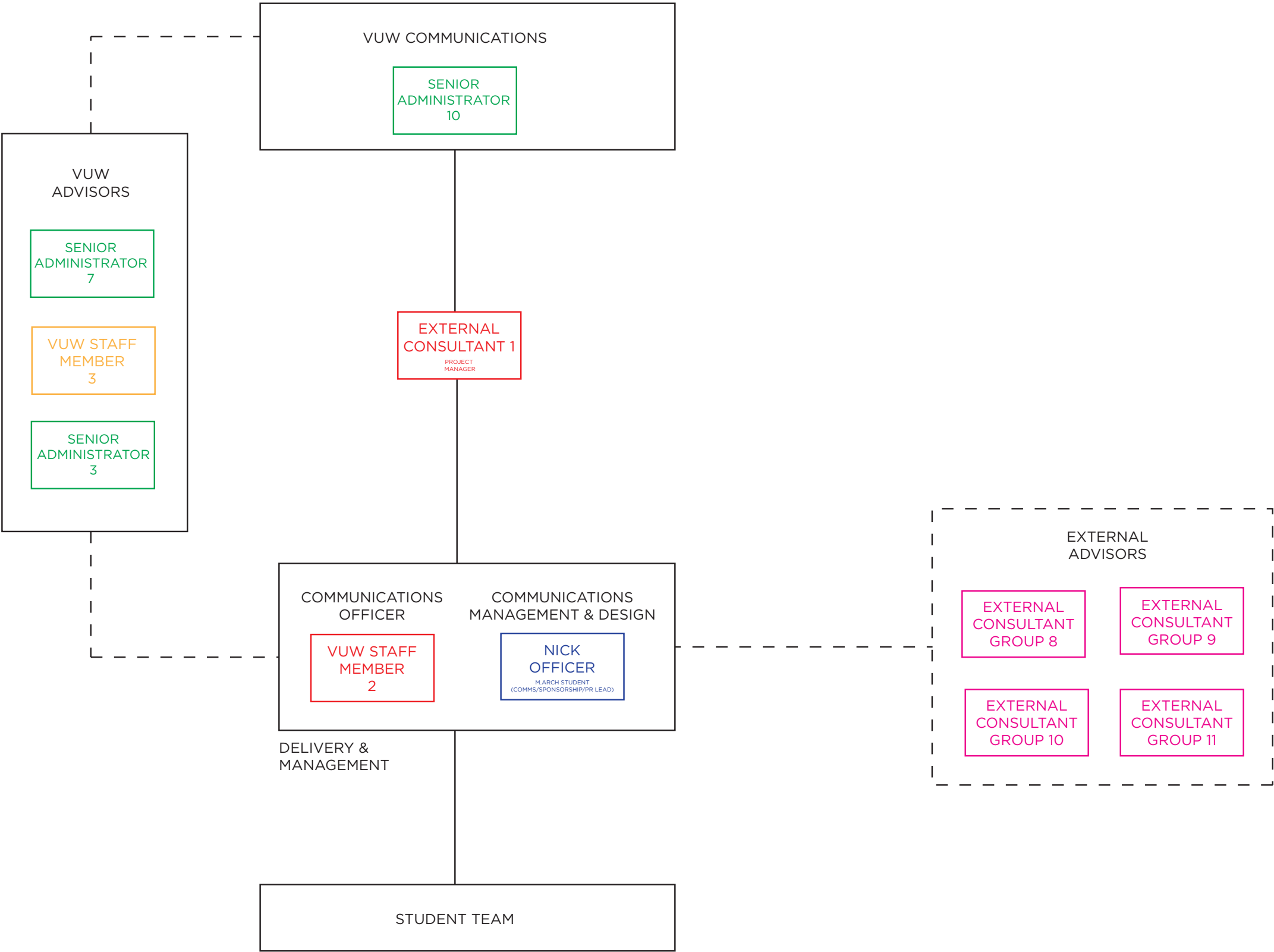
### 8.3 Communications and Media

As an academic/government (U.S. Department of Energy) funded and run event there is a clear and documented focus on education, and for these institutions success cannot simply be measured by the results of the competition, rather by the impact the project had as a tool for education, outreach and learning. While this is an intangible figure what we can measure is the impact the project had in the public domain, ie, how many times the key messages were mentioned or viewed.

The success of the media/public outreach can in part be credited to the uniqueness of the project, the presently relevant topic and the international stage but more important was the communication and planning, brand exposure and the marketing strategy employed by the project team. Using social media, public display, professional expertise and well-known public figures the project became widely recognised across New Zealand and the international Architectural community (examples to follow). Below is a breakdown of facts, figures and strategies highlighting where resources were affectively used to achieve success.

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Figure 8.3.1  
Communications Team Structure



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### 8.3.1 Communications Team Structure

As documented throughout Chapter 6, the communications team expanded in size from one to the final structure as illustrated by Figure 8.3.1. *VUW Staff Member 2* a recent Victoria University graduate, (Script Writing & Media) employed by the project was responsible for all written communications, while Nick was responsible for all visual communications. Due to the shortage in human resources, both acted in management and delivery roles utilising the available student resource when required.

The VUW department for Communications and Marketing were ultimately responsible for the messages that went out to the public in targeted campaigns. *VUW Staff Member 2* worked closely with *Senior Academic 7* and *VUW Staff Member 3* when required who reported directly to their superior *Senior Academic 10*, successfully eliminating middle management and decreasing the likelihood of error. As project manager *External Consultant 1* provided support as required and was kept informed of all actions.

In a project that was so often in the public eye, all members of the team were in their own way responsible for Communications, whether directly or indirectly. And they were often called upon to deliver messages on the project. This allowed the team to grow and shrink in size as required.

An informal external advisory group which included award winning Public Relations and Communications consultancy, Ideas Shop and leading New Zealand branding and design firm Designworks, provided advice and consultancy directly to the student team.

### 8.3.2 Media Success and Outreach

APRIL 2010 – NOVEMBER 2011

Using regular media releases, targeted media approaches, regular speaking opportunities for team members, regular video and written blogs, social media, newsletters, and articles for both the First Light web site and other external publications the team was able to spread the key messages and exhibit the First Light project, the results of this effort can be seen in the sheer numbers achieved (below). A media plan planned and documented progress throughout the project, managed internally by the student management team.

Mainstream media are uncontrollable and often unpredictable. Yet the First Light project managed to hold the attention of the mainstream media for 18 months while the project evolved. The ability to assemble the First Light house on Frank Kitts Park in Wellington contributed greatly to the media success of the project in New Zealand, this allowed us to build interest, spark intrigue and build a following before heading to the United States.

#### Media Distribution:

Newspaper articles: 55+

Online articles: 170+

Radio segments and interviews: 15+

Magazine articles: 35+

Television: 4

Other (newsletters etc): 10 recorded + many more we have not seen

Publications included the majority of major architecture, design and industry magazines along with general news outlets including national TV news, multiple national radio appearances and regular articles in major New Zealand newspapers.

Out of those listed above, in the US we had:

Newspaper articles: 39

Magazine articles: 1

Online: 60+

Radio: 2+



Television: 1+

Media success was seen on a global scale. A selection of US publications the First Light house featured in included: Archdaily (Cilento, 2011), Inhabitat (Pham, 2011), AIArchitect (Hoyt, 2011), CBS Planet Forward (CBS Planet Forward, 2011), Buildpedia (Murrye, 2011), Washington Post (Fears, 2011), Huffington Post (Harrington, 2011), and USA Today (Koch, 2011).

### 8.3.3 Social Media

Social media became the most important tool for the project team to communicate day-to-day activities with the project's followers as well as enable the team to spread the messages of our project partners/sponsors, which was crucial to the relationship management of the sponsors. Facebook, Twitter, Flickr, and YouTube provided free platforms to share the team messages to a large audience using very little human resource. The ability to use the wider team, university, and project followers to promote and share the messages of the project often resulted in further interest in the project from industry and others.

- YouTube: We posted 23 videos between October 2010 and September 2011, across the 23 videos we had 19,301 views.
- Blogs: Posted over 100 website blogs between June 2010 and November 2011
- Facebook: 1655 people like the page (as on 17 November 2011)
- Flickr: Photos regularly updated 77 pages of photos on Flickr

### 8.3.4 Website

The First Light website was a requirement of the Solar Decathlon competition but was also used as a major communication tool for the project team and its sponsors. Figures below highlight the success of the website as a tool for mass communication.



**Figure 8.3.4** - NZ URL: [firstlighthouse.ac.nz](http://firstlighthouse.ac.nz)

Statistics taken from period starting 15 June 2010 ending 28 November 2011

- 52,974 Visits came from 128 countries/territories
- 32,985 Absolute Unique Visitors
- 177,919 Page views

Top 10 visiting countries

Country/Territory	Visits
New Zealand	37,325
United States	7,911
Australia	2,018
Canada	1,127
United Kingdom	629
Germany	437
Spain	219
China	217
France	169
Italy	158

### 8.3.5 Frank Kitts Park

In April/May 2011 the team built the First Light house on Frank Kitts Park on the Wellington waterfront. The result was an overwhelming response from the Wellington public (not just Wellington but we had visitors from as far as

Christchurch and Brisbane). Around 20,000 visitors made their way through the house over the 18 days it was open to the public with the media acknowledging this interest.

The majority of team sponsors are New Zealand based and do not consider the United States as an immediate marketplace. Frank Kitts Park provided an ideal platform to launch their own marketing campaigns, further spreading the messages of the project.

Frank Kitts Park was the time of greatest outreach and exposure in New Zealand. The local media were more interested in this phase of the project than they were in the competition event at West Potomac Park. Unfortunately the Solar Decathlon event in the United States coincided with another big media event, the Rugby World Cup 2011, this could have contributed to the lack of exposure over this time period.



Figure 8.3.5 – Visitors at the First Light house on Frank Kitts Park, Wellington



### 8.3.6 Solar Decathlon Print Material

While electronic forms of media were used heavily throughout the project, the team also used print material in New Zealand and the US to spread the key messages of the project and recognise project sponsors. A team handout was a requirement of the competition and examples can be seen below.



**Figure 8.3.6** – First Light print material

### 8.3.7 Awards & Accolades

The First Light project not only picked up awards in the Solar Decathlon but was recognised within the New Zealand community. Some of these awards include:

- Benson Cooper Supreme Award for Sustainability, A Victoria University award recognising excellence in sustainable design.
- New Zealand Timber Design Awards 2011 – The First Light house won the Clever Wood Solutions Award, and was highly commended in the categories of Sustainability and Residential Architectural Excellence.
- Anna, Ben, Eli and Nick were finalists in the Wellingtonian of the Year awards 2011 (Environment category) and nominated for the New Zealander of the Year awards 2012.

### Publications

While it was not possible to register every mention of the project the project website features a comprehensive list of stories or articles where the First Light house was featured. (this is not a record of every story, as some could not be found, but it is a good representation)

<http://firstlighthouse.ac.nz/media-releases/>

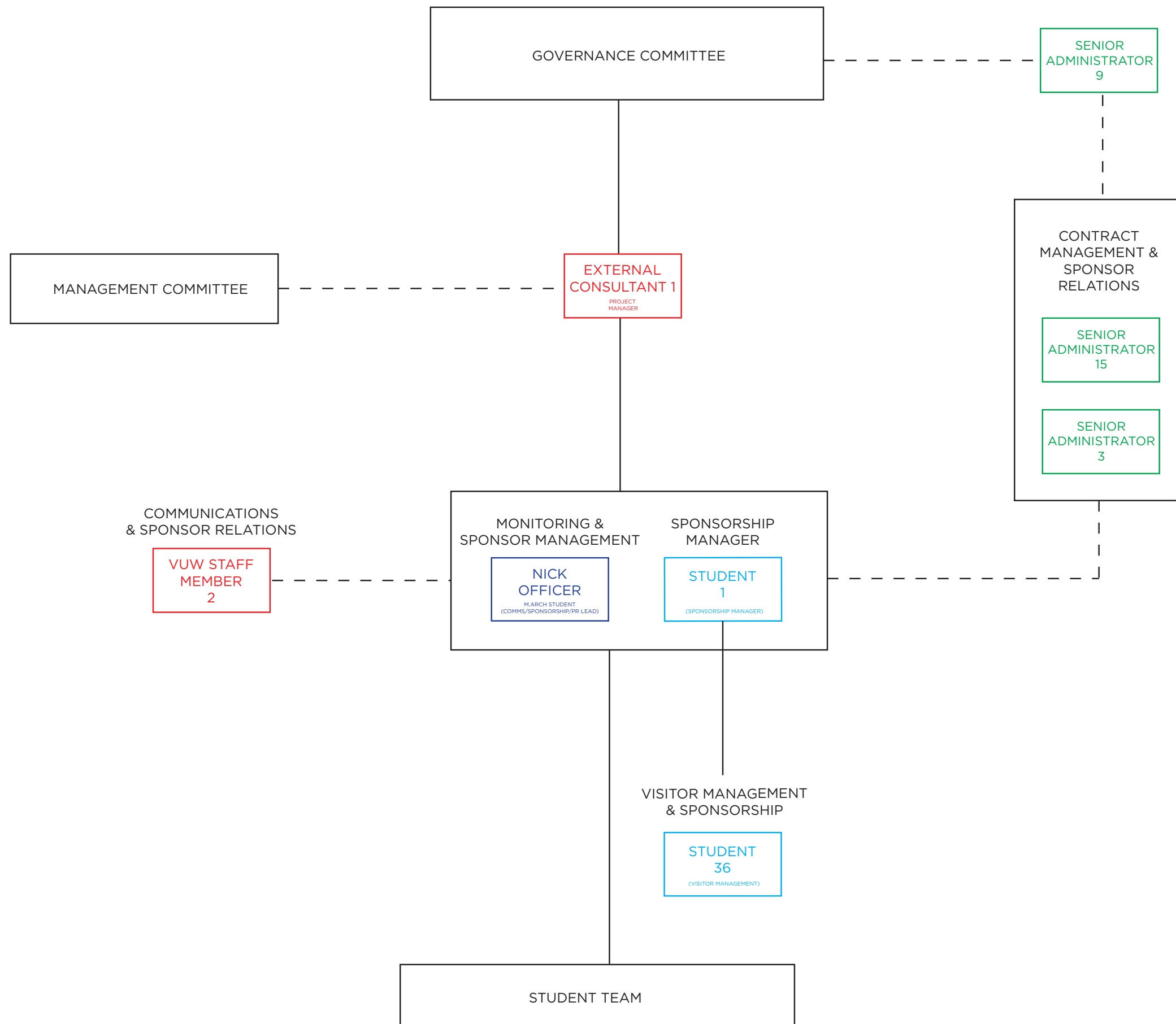
#### 8.4 Fundraising and Team Support

The 2009 proposal identified the 'significant' funding required and outlined broadly the sources of that funding as, the University, Government, and Industry from New Zealand and abroad. Unidentified were both the method and the challenges the team would face to deliver on these goals. This chapter will outline the structure and methods used by the team to obtain an incredible 130+ sponsors, from New Zealand and abroad, and achieve the goals set out in the 2009 proposal.

Figure 8.4.1

Sponsorship & Fundraising Team Structure

JANUARY 2011





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#### 8.4.1 Team Structure

JANUARY 2011

Natural expansion of the sponsorship project team occurred over the course of the project. Figure 8.4.1 represents the final organisational structure as seen from January 2011. The core sponsorship team operated a top down vertical hierarchy. *Student 1*, a final year Marketing & Philosophy student was appointed as Sponsorship Manager, Nick Officer provided management support, and *Student 36* a final year Marketing & Tourism student worked closely with *Student 1* to manage and deliver on fundraising.

The core sponsorship team was very small; utilising the wider student team was how the team achieved such success, while not always intended that way, sponsorship was a collaboration of the entire student and staff team. This was largely due to the relationships that developed with companies and partners as the project progressed, placing them in the best position to approach for sponsorship.

The VUW research office provided management and contractual support for the student team. Contracts were drawn up by the student team and administered by the *Senior Administrator 15* and *Senior Administrator 3* of the VUW research office.

*Senior Administrator 9*, VUW Foundation, procured and managed the relationships between the team, VUW and the sponsor for all major sponsors. The expertise and networks that *Senior Administrator 9* provided were an invaluable resource. *Senior Administrator 9* worked closely with the student team and worked directly with VUW management as a member of the governance committee.

Sponsorship recognition was as important as procurement of the sponsors themselves. Nick and *VUW Staff Member 2* worked directly with the sponsorship team to ensure all recognition was delivered to the appropriate sponsors.

## 8.4.2 Project Sponsors

Sponsorship donations were recognised with specific benefits dependent on the financial contribution. The table below illustrates the sponsorship tiers and dollar value associated with them. While the benefits to those sponsors are listed in the figure below.

### Sponsor Tiers & Benefits

#### Final Sponsorship numbers

Principal (\$300,000+): 1

Gold Elite (\$100,000+): 1

Gold (\$25,000 – \$100,000): 28

Silver (\$10,000 – \$25,000): 19

Bronze (\$1,000 – \$10,000): 58

Friend (\$1 – \$1,000): 25+

	Principal	Gold Elite	Gold	Silver	Bronze	Friend
Website - Home page Sponsor page	✓	✓				
	✓	✓	✓	✓	✓	✓
Logo on Uniform	✓	✓	✓			
Display board - NZ U.S.	✓	✓	✓	✓		
	✓	✓				
Naming rights in NZ	✓					
Naming of parts (web)		✓	✓			
Newsletter - Feature Logo	✓	✓	✓			
	✓	✓	✓	✓	✓	
Video Blog - Feature Logo	✓	✓				
	✓	✓	✓			
Public handout - NZ U.S.	✓	✓	✓	✓		
	✓	✓				
Logo in presentations	✓	✓	✓			
Launch Invite	✓	✓	✓	✓		
Host event in house	✓	✓				
Photo with team	✓	✓	✓	✓	✓	

Plaque	✓	✓	✓	✓	✓	
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#### Sponsorship – Goods, Service, Cash (\$NZD)

Goods: \$487,379\*

Services: \$354,956\*

Cash: \$1,270,487\*\*

\* Confirmed amount plus estimations to come

\*\* Includes NZD\$326,000 for sale of house and money contributed by Victoria University and DOE

#### 8.4.3 Budget - Predicted and Final

The budget below reflects the predictions made in the 2009 proposal versus the final costs of the project as of November 8, 2011. Considering the complexities and relative unknowns of the project, the difference of \$400,000 was to be expected. The final cost of constructing the house was significantly more than expected yet transportation and logistics came in well under budget. A significant amount of the project cost was covered by donations to the project as Goods & Services while cash donations were made up by a handful of contributors.

All figures represented in New Zealand Dollars (\$NZD)

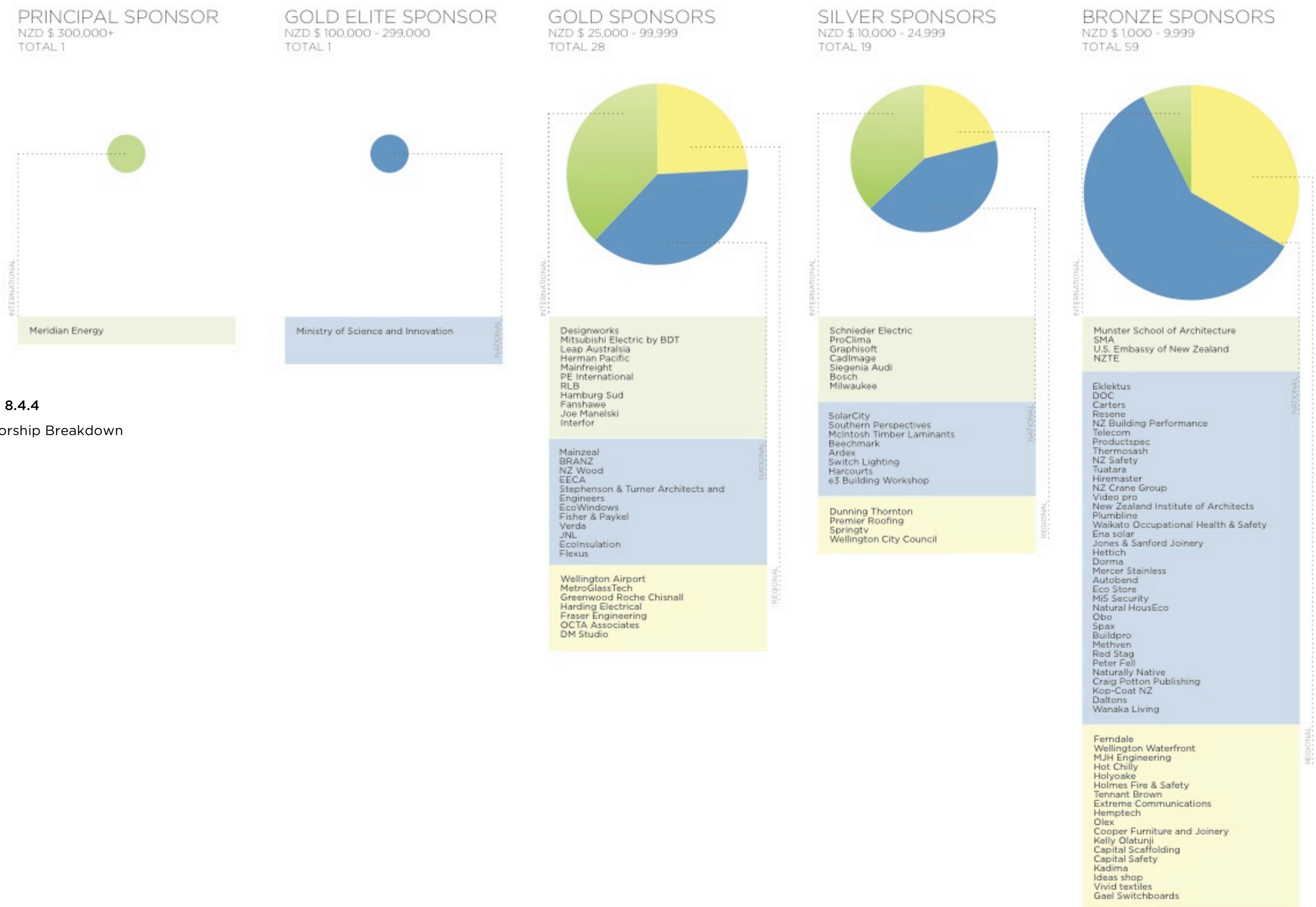
	Original Budgeted Costs (2009)	Final Costs*	Final Costs funded by:	
			Donated Goods & Services	Cash in Kind**
Construction	516,163	725,203	463,905	261,298
Professional Fees	445,500	502,608	351,500	151,109
Transportation/Logistics	506,211	388,876	110,000	278,876
Travel & Accommodation	276,400	393,920	124,395	269,525
General Costs & Overheads	299,974	441,713	132,034	309,679
Total	2,044,248	2,452,321	1,181,834	1,270,487

As at 8 November 2011 – final costs will be not be available until early December 2011 once final

invoices have been received and processed

\*\*Includes funding contributed by Victoria University

\*We had a large number of companies who contributed their products and services free of charge. At times, it was difficult to get information from these companies on the exact market value of products or services they offered to the university. It was particularly difficult to determine an estimate after the advice or products had already been donated to the project. While some companies got back to us with confirmation we have had to estimate the dollar value contribution of many sponsors.



**Figure 8.4.4**  
Sponsorship Breakdown

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#### 8.4.4 Team Support

Figure 8.4.4 above provides a breakdown of the team sponsors into their tiers and company location. This highlights the National response to the project. A large number of smaller donations were made locally. Where internationally companies tended to donate larger contributions.

#### 8.4.5 VIP Support

Numerous influential New Zealanders and other VIPs visited and showed support to the First Light house and Victoria University team. The interest of these individuals demonstrates the success of the project and the reach of the key messages the project was attempting to spread.

- Hon Helen Clarke - Administrator to the United Nations Development Program, former Prime Minister of New Zealand
- Hon Mike Moore - NZ Ambassador to the United States, former Prime Minister of New Zealand
- Hon Bill English - Deputy Prime Minister of New Zealand, Minister of Finance
- Professor Peter Gluckman - Chief Science Advisor to the Prime Minister of New Zealand
- Hon Wayne Mapp - Minister for Science
- US Embassy delegation including US Ambassador: David Huebner
- Celia Wade Brown - Mayor of Wellington, New Zealand
- Ian McKinnon - Deputy Mayor and Chancellor of Victoria University Wellington
- H.E Thomas Meister - German Ambassador
- H.E Caroline Chretien - Canadian Ambassador
- Marcel Deneux & Catherine Morin-Desailly - French Senators
- Tim Lusk - CEO of Meridian Energy
- Pat Walsh - Vice Chancellor of Victoria University of Wellington



- MPs: Charles Chauvel (MP), Nick Smith (MP), Chester Burrows (MP), Chris Hipkins (MP)  
Mike Underhill – CEO EECA



**Figure 8.4.5** – Right to Left - Hon Helen Clarke, Hon Minister Bill English, Hon Mike Moore

#### 8.4.6 Gaining sponsorships

Gaining sufficient sponsorship was one of the major challenges of the project and took an enormous amount of time and energy from the various people involved. In collaboration with the Victoria Foundation, the team worked to secure the required funds, services, and product donations. The process for approaching and securing potential sponsors was a five stage process. Potential sponsors and donors were:

- identified
- researched
- rated
- cultivated and engaged with the project
- solicited through personal approaches to major donors/sponsors, and a direct mail and/or on-line appeal to alumni, general public, and friends and followers of the School of Architecture, VUW and partner organisations.

The first stage required prospective donors and sponsors to be identified and categorised, as individuals, companies, and government. These included, but were not limited to:

#### Individuals

- Major individual donors with a special interest in:
  - Architecture, Design, innovation, renewable energy
  - Victoria University
  - Wellington and promotion of Wellington
  - New Zealand and promotion of New Zealand
- Victoria graduates living in the USA
- Americans with a special interest in New Zealand
- Graduates of the Schools of Architecture and Design – towards end of the Appeal to close it out
- Competition to buy the house(s) @ c. US\$250,000 (e.g. all sponsors in a draw to win the house, generating interest and publicity)

#### Organisations

- Companies in the energy, construction, home fittings and appliance sectors
- Other project-related companies e.g. marketing, film, tourism
- New Zealand companies exporting to the USA and other markets
- Industry organisations and professional groupings
- Banks with a strong New Zealand brand eg Kiwi Bank, ANZ, Westpac, TSB
- U.S. companies with New Zealand links
- U.S. Trusts and Foundations eg the US-New Zealand Foundation
- Advertising agencies including with clients in the above sectors
- Architecture firms
- Victoria University suppliers

#### Central and local Government and government agencies

- Wellington City Council, Grow Wellington and Creative HQ
- Ministers of Energy, Economic Development, Tourism, Finance, Trade, Commerce, Research Science & Technology, Tertiary Education, Building, Construction

- Energy Efficiency and Conservation Authority (EECA), New Zealand Trade and Enterprise (NZTE), Ministry of Foreign Affairs and Trade (MFAT), Department of Building and Housing (DBH), Ministry for Culture and Heritage (MCH), Ministry of Economic Development (MED), Ministry of Tourism, Ministry of Science and Innovation (MSI), and the Tertiary Education Commission (TEC)
- US Embassy in Wellington and NZ Embassy in Washington DC

The team then conducted research and the approach was made through personal or professional connections, if these were not available an approach was made to the CEO of the company directly. Sponsors and donors were also approached during the design process by various team members and likewise the team was approached by potential industry partners as the project developed and gained attention of the industry..

A key to successful sponsorship was knowing what you want, the team quickly learnt that designs and specifications of elements of the house should be completed before requests are made to potential sponsors. Not having confirmed material properties or dimensions before approaching sponsors created additional work and meant predominantly the design team got involved in initial sponsorship discussions. When designs, material qualities and quantities were specified before a meeting, the discussions with potential sponsors were often more directed and fruitful.

In very rare cases products for the house were selected based on sponsorship opportunities. After a basic understanding was reached with a sponsor they would be passed on to a team member who would work out the details with them and draw up a formal contract.

#### 8.4.7 Sponsor Relationships

To have so many stakeholders involved in the project (over 130 sponsors) was not as beneficial as first anticipated, every extra sponsor secured meant additional work for the team. The amount of administration and efforts that went into securing sponsorships and recognising them adequately was very time

consuming. Often small product or service donations would require significant work in securing and recognizing the sponsor.

The team needed to be very clear on what could be offered to companies by way of benefits to make sure they did not promise something that cannot be delivered. Making promises that could not be followed through with created complications and often gave the sponsor unrealistic expectations.

Once sponsorships were gained, the team was responsible for keeping the sponsors informed about progress of the project, following through on promises given, reporting on project specific research activities and sharing social activities and events. This job spread out over a number of people in the team, it would have been beneficial to have all correspondence going through one person. Splitting design and sponsorship activities requires a transparent flow of information among team members.

It was important to set up a very clear table of benefits (see 8.4.2) for different levels of sponsorship – these needed to be set from the start and remain unchanged during the process. When clear expectations were set with sponsors then both, the sponsors and the team, benefited. It was important to be succinct and consistent with each company or service provider on sponsorship benefits.

While some sponsors are offering products, materials or cash others offer their time to collaborate on the project. In this case it can be very time consuming to manage these relations as they often come from people with different industry backgrounds and experiences. These contacts often brought in new and fresh perspectives and approaches into the project team. It became very important to define the nature of the collaboration from the start and set up clear expectations and timeframes.

The problem with this was that sometimes the benefits that could be offered to a sponsor for their contribution may have been overstated or misunderstood early in the process.

The University required that a formal contract be drawn up with every sponsor

involved in the project. This was a work intense process and many of the smaller companies appeared not to be particularly interested in the setting up of formal sponsorship agreements.

## 9 Conclusion

The New Zealand entry to the 2011 U.S. Department of Energy Solar Decathlon, the First Light house, caught the imagination of people the world over. Finishing third in Washington D.C was just the tip of the iceberg. The project would continue to achieve success capturing international media, VIP visitors including two former Prime Ministers of New Zealand and no less than 35,000 individuals that personally toured the house while it was on display in New Zealand and in the U.S. the project was deemed a success by all.

But the true success was the project team that brought the house to life. It was the combined resourcefulness and creative energies of many dedicated, talented and hardworking individuals, driven by international glory, pride and responsibility to the organisation, Victoria University of Wellington, whose belief and support made the project possible.

But for the team, overcoming such a complex challenge that was the Solar Decathlon, was a struggle, over 18 months the project was pushed to its limits, none more so than the organisation and project planning. As documented throughout this thesis, there was significant development in management, planning, organisation, leadership, delegation, and communication. And while the project would eventually reflect what was identified in the 2009 proposal it developed as a result of trial and error rather than good management and it was only fixed deadlines and a hard working team that ensured the project remained on track.

So the question remains, was it inevitable that the project would develop this way? Or was it possible to identify and mitigate these issues as the 2009 proposal suggested. Although the history of Project management suggests it is possible, the issue existed not in the planning but in the delivery, the proposal of 2009 successfully identified all the key strategies for delivering a house to the competition, but how it would be delivered was never outlined. The

uncontrollable variables of an unstable and fluctuating budget, minimal cash flow, human resources, staff and student availability, and politics meant the project would eventuate as it did.

Had a professional project manager been employed from day one many of these issues may have been foreseen and alleviated, while also providing the team with the leadership and coordination it required.

Designing, building, and assembling the First Light house in two countries separated by 14,500km of ocean was a complicated process. This thesis documents the changes in the organisation through 18 organisational charts over two years. This project was never simple and was forever evolving as the project required. While the journey to the finish may have been a struggle, the final results highlight its success.



**Figure 9** - The First Light house, West Potomac Park, Washington D.C.

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# 11Figure Credits

**Figure 5.1, Figure 5.2** - Stefano Paltera/U.S. Department of Energy Solar Decathlon, 2009

**Figure 5.3** - U.S. Department of Energy Solar Decathlon, Rules v1.1, 2011

**Figure 6.1, Figure 6.2, Figure 6.3** - First Light - Anna Farrow, Benjamin Jagersma, Eli Nuttall, and Nicholas Officer, 2009

**Figure 6.4** - David Moore (DM Studio), Bronwyn Phillipps and Nicholas Officer, 2011

**Figure 6.4.1** - Traditional Kiwi bach - Authour Unkown

**Figure 6.4.2, Figure 9** - Ron Blunt, Ron Blunt Photography, Washington DC, 2011

**Figure 6.4.3** - First Light, 2011

**Figure 7.1, Figure 7.2, Figure 7.3, Figure 7.3.1, Figure 7.4, Figure 7.5, Figure 7.6, Figure 7.7, Figure 7.8, Figure 7.9, Figure 7.10, Figure 7.11, Figure 7.12, Figure 7.13, Figure 7.14, Figure 7.15, Figure 7.16, Figure 7.18, Figure 7.19, Figure 8.3.1, Figure 8.3.1, Figure 8.4.4, Figure 8.4.1, Figure 8.3.6, Figure 8.3.4** - Author: Nicholas D. Officer, 2011/12

**Figure 7.17** - Donna Howell, Project Manager, First Light, 2011

**Figure 17.19.1** - Maryland College, 2011

**Figure 17.19.2** - Parsons Stevens, 2011

**Figure 17.19.3** - Middlebury College, 2011

**Figure 8.4.5, Figure 8.3.5, Figure 8.1** - Sophie Prebble, 2011

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