Reuse – The Lifecycle of Buildings in New Zealand
Master Thesis Explanatory Document

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Declaration

This Thesis entitled
Reuse - The Lifecycle of Buildings in New Zealand
is submitted in partial fulfillment for the requirements for the UNITEC degree of
Master of Architecture (Professional)
and for the Hochschule Wismar degree of
Master of Arts (Architecture).

I confirm that:
- This Research Project represents my own work;
- That only references listed were used;
- Research for this work has been conducted in accordance with the UNITEC Research Ethics
  Committee Policy and Procedures. Research Ethics Committee Approval No: - not given -
Ethical concerns are not issue of this research project and its set topic. All relevant information was
sought from literature and data already available.

.................................................................
Wismar, 10.01.2011
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Abstract

Since our built environment is partly proof of our history, it needs to be respected and maintained. Beyond this cultural value most existing buildings have, there are environmental and often economic benefits that should not be ignored. The world’s problems of declining resources and waste production can also be seen in New Zealand. Because of the environmental challenges the world is facing today, sustainability is an important factor in every aspect of life, but is especially so in the construction industry. Therefore, it is necessary to think about the lifecycle and possible future reuses of buildings. However, because New Zealand is geographically isolated there is a habit of reuse and recycling of materials anyway, but not for the reason of being deliberately sustainable. This thesis explores the possibilities of reuse and further, the possibility of functionally neutral structures in order to extend the lifetime of buildings.

As the metropolitan area of Auckland grows issues of urban sprawl, transportation, mixed-use and land values arise, therefore the intensification and liveability of the inner city area needs to be considered.

The aim of this paper is to retain and reuse a heritage protected building plus some adjoining younger theatres forming the Theatre Centre, to give it a useful existence again and to make it suitable for future use; this 82-year old theatre, the St James, need an addition in order to become economically and environmentally viable again. Therefore it is necessary to create a functionally neutral structure in addition to the existing building. This also offers the opportunity to mix the uses in Auckland’s CBD and therefore create a lively and safe inner city area.

The outcome of this thesis does not reveal an ultimate scheme for the St James, it is rather to be seen as a foundation for forthcoming research and design work. The results found might help to further develop the consciousness about how to find solutions to the environmental problems we are facing today and will be facing in the future.
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Introduction

This thesis is about the possibility of reuse in architecture and the introduction of functionally neutral building structures in New Zealand in order to maximise the lifetime cycles of buildings.

New Zealand is a relatively young country, thus there are relatively few buildings to be reused; but as the population grows, land use and intensification issues arise and environmental challenges such as the use of resources and sustainability become more important, it is necessary to think about the lifecycle and possible future reuses of buildings. As reuse is the most sustainable way to retain available resources, it should be compulsory to consider the reuse of any existing building.

Even though the metropolitan area of Auckland is quite spread out and offers lots of open spaces, inner city construction spaces are limited. In order to create a more mixed use environment which would foster a safe and versatile urban centre it is necessary to work with the existing building stock. Theatres are of high cultural value and often designed using a high quality, outstandingly detailed kind of architecture; therefore they are worth retaining.

The St James Theatre and its adjoining Theatre Centre in Auckland CBD offer a great opportunity to showcase what is possible through reuse and how to create a new structure that is functionally neutral in order to sustain in the future.

The architectural solution is supported by the findings of the research and serves to create an outstanding example of the possibility of reuse and functional neutrality in New Zealand; moreover, it will create a building which is compliant with today’s needs and technologies and will continue to do so in the future, while reflecting the building history of New Zealand.

10 This Research Project

The intention of this research project is to examine and to analyse the potential for reuse and the adaptability of existing buildings in New Zealand (including the consideration of materiality as well as structural and spatial conditions) in order to find sustainable future uses. The findings will then be adapted to an appropriate existing building in New Zealand.

The significance of this project lies in its future aspects. As mentioned previously, the population grows, land use and intensification issues arise and environmental aspects such as the use of resources and sustainability are becoming more important.
Consequently, it is necessary to think about the lifecycle and possible future reuses of buildings. Therefore it is important to find out how it is possible to adapt contemporary and future uses to existing buildings and how current schemes can be designed to be more flexible in order to have a greater possibility for reuse in the future.

In terms of the functional requirements, any function was possible as long as it differed from the possible future function. As one focus of this project is the functional neutrality of buildings, the functional requirements will be introduced as the project develops and appropriate future uses are found.

Regarding spatial requirements, the floor plans need to be adjusted to the needs of today’s users of the building. But as spatial needs change over the years, especially when the use of the building changes, they need to be kept as flexible as possible for any potential future uses.

For the design it is necessary to consider the lifecycle of building materials used according to the use and the possible lifetime of the building. The same applies to the structure of the building, which needs to allow for the highest portion of functional neutrality over its lifetime.

The main criterion for a suitable site was that it needs to have an existing building on it which both merits retaining and is in need of restoration. It was the intention to work with a building of public interest in an effort to showcase the possibilities of reuse to a broader public audience. For that reason a site was chosen where social and public interactions take place.

In order to create a building in which all of these requirements can be combined, the St James Theatre and the adjoining Theatre Centre in Auckland, New Zealand were chosen.

The chosen structure is, as a heritage listed building, officially recognized as an example of the building history of New Zealand. Additionally, it is necessary to apply contemporary New Zealand architecture to any alteration made according to the New Zealand culture.

Living in a world where the consciousness about environmental issues is rising, it is compulsory to design the building to be Green Star compliant with the intention of meeting or even exceeding the requirements for the highest rating possible in order to still be competitive in the future.

Overall the given environment needs to be respected; in particular because it is supposed to be a public project which is found in a public place. The new building needs to interact with its spatial and social context in order to integrate itself into this given environment and into New Zealand society.

10.3 Research Question

Although the awareness of historical importance is not as prominent as in Europe, it will be necessary to respect existing (heritage) buildings, meaning buildings that have had an impact in building history and are of cultural and historical importance.

Additionally, reuse is part of the integration of sustainable design and energy efficient methods according to the Green Star; however these regulations for sustainable design have been introduced recently only (Green Star – 2007). For that reason, there are a limited number of people who are experienced in this field. Consequently it is appropriate, or even compulsory, to conduct the substantial research (which is committed to the future) to consider these regulations.

The consideration of the lifetime cycle of structures and building materials in relation to sustainability came into discussion only recently overseas and research is still undertaken to find out more details.

For all these reasons mentioned above it is necessary to ask the research question:

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1 Environmental Rating System for Buildings
Is the reuse of existing buildings in New Zealand possible while still being economically and environmentally efficient or how could reuse be more adaptable with future buildings?

Therefore the developed hypothesis to be tested is: Seeing that reuse is the most sustainable way of using resources, it is a good option to make New Zealand’s buildings more efficient and sustainable.

Most buildings can be reused but it would be easier if they were designed more flexible in the first place.

10.2 Current State of Knowledge
The main purpose of this project is to find out whether reuse is possible within the existing building structures of New Zealand or if changes need to be made within the design process for future buildings to be more functional neutral and thus more efficient and environmentally friendly. Introducing sustainable reuse into the building industry would help to solve the issues around urban sprawl in Auckland as the city grows, as well as to retain older buildings for historical and cultural reasons. Retaining the existing buildings for environmental reasons would help to reduce the use of resources, materials, and land as well as the generation of waste.

Given that there are only few examples of deliberately sustainable reuse found in New Zealand it was essential to investigate similarly built examples from overseas, in order to find the most efficient and flexible way for the reuse of buildings. It will also be necessary to look into examples that have no obvious connection to architecture.

Most information was found in conference papers reporting on ongoing research. There was no research basis found on functionally neutral buildings in New Zealand; most information was drawn from the Netherlands. The same applies to the topic of the reuse of buildings; however about the reuse of materials in general much more information was available.

Little information was found on theatre buildings in New Zealand concerning the traditional theatre architecture. Research revealed that many of the (movie) theatres build in the first half of the last century no longer exist, and it seems that their architectural history has gone with them.

10.1 Methodological Approach
The reason for a more ‘international approach’ to this topic is that a major part of the architectural studies were undertaken in Germany at the Hochschule Wismar, however, including a year of exchange at UNITEC in New Zealand; therefore a basic knowledge in overseas approaches exists. Especially in Germany it is believed that a strong basis of information with respect to the reuse of buildings and the lifecycle of building structures and materials is given.

As a result of the exchange at UNITEC during the first six months of the research project a basic knowledge of New Zealand architecture, regulations and legislations was developed. Furthermore elements of the New Zealand culture, the heritage of the site and the fundamentals of what is considered as ‘distinctively New Zealand architecture’ serve as an influential part of this study.

After returning to Germany in August 2010 the research undertaken in New Zealand was finished off and appropriate European building methods were integrated and applied to the design project in New Zealand. This is necessary in response to problems identified previously concerning the lack of information and expertise available in New Zealand on this subject. Nevertheless, when applying standards from other countries it is essential to be aware of the cultural, technical and climatic differences.
The main principles and problems that directed the technical aspects of this design were researched in Germany and in response to this information a set of corresponding principles were developed for the New Zealand context.

This is a fundamental difference in approach to the research methodology of this thesis.

The methods of data collection were dictated by the circumstances during the project’s development due to having spent six months in New Zealand and the remaining time in Germany. During the first six months information sought on New Zealand building methods, style and culture was gleaned from books, literature reviews and personal experiences. During this time, the initial information retrieved on the reuse practices overseas was sought from books, literature reviews and manuscripts, with the internet acting as an informative resource.

Being in Germany this process basically worked the other way around, although a major part of research concerning the topics specific to New Zealand were finalised by that time.

Translations of texts were undertaken by myself.

The brief formulated is going to lead to an architectural solution of the research problem through the application of the findings to an existing building.

After the definition of reuse, functionally neutral buildings and other important frameworks, research about existing building structures of theatres and contemporary building practices in New Zealand and overseas was undertaken. In addition to the analysis of the chosen site and building a suitable concept of use was defined.

The architectural solution is supported by the findings gained from the research in order to create an outstanding example of the possibility of reuse and functional neutrality in New Zealand; moreover the project will create a building which is compliant with today’s needs and technologies while remaining so into the future, and reflecting the building history of New Zealand.

9 Environment

9.3 Geography

The islands of New Zealand are located in the South Pacific Ocean, southeast of Australia as part of the smallest continent Australasia/Oceania. It covers a total land area of 267,710 sq km (Germany: ~357,000 sq km) including some island groups. Its population is 4,213,418 (July 2009 est.)\(^2\) (Germany: ~82 M) which gives the country a total density of only 16 people/sq km. However, New Zealand is quite an urbanized country with an urban population of 87% of the total population (2008), increasing by 1% annually (2005-10 est.).

Because of its location on the edge of two tectonic plates (the Indo-Australian and the Pacific plate) natural hazards such as earthquakes and volcanic activity are common, though usually not severe.

The Auckland (Māori name Tāmaki-makau-rau) metropolitan area in the North Island is the largest and most populous urban area in the country. With a population of 1.46 million, 31% of country’s population lives here, and demographic trends indicate that the region will continue to grow faster than the rest of the country. Since immigration to New Zealand is heavily concentrated towards Auckland, ethnic groups from all over the world are represented here, which makes it country’s most cosmopolitan city.

With an urban area of 1,086 sq km Auckland has an urban density of 1,247 people/sq km.\(^3\)

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\(^2\) Ranking on a reputable annual survey of living conditions in 221 cities based on 39 criteria (http://en.wikipedia.org/wiki/World%27s_mostlivable_cities (accessed 07.12.2010))

The lifestyle in Auckland, also known as the „City of Sails“, is determined by mostly positive elements, such as the mild climate, plentiful employment and educational opportunities, as well as numerous leisure facilities. However, traffic problems, lack of good public transport, urban sprawl, increasing housing costs have been cited as negative factors of living, together with crime. Nevertheless, the 2009 Mercer Quality of Living Survey ranked Auckland on the 4th place in the world, the ‘The Economist’s World’s Most Liveable Cities Index’ of 2010 ranked Auckland in 10th place and in 2006, Auckland placed 23rd on UBS list of world’s richest cities. Auckland’s status as the largest commercial centre of the country makes it the economic capital of the nation (GDP of Auckland region in 2003: 36% of New Zealand’s national GDP, 15% greater than the entire South Island). Also there is a high median personal income in this region compared to the rest of the country.

A number of important educational institutions, including some of the largest universities in the country are found here as well.

Landmarks and public attractions in the metropolitan area which could be important for this project:
- Auckland Civic Theatre - a famous and culturally significant theatre in downtown; renovated in 2000 to its original condition;
- Auckland Town Hall - with its concert hall considered having some of the finest acoustics in the world, this 1911 building serves both council and entertainment functions;
- Aotea Square - the hub of downtown Auckland beside Queen Street, crafts markets, rallies and arts festivals (upgrading redevelopment completed in October 2010);
- Britomart Transport Centre - the main downtown public transport centre in a historic Edwardian building;
- Karangahape Road - known as „K’Road“, famous for its bars, clubs and smaller shops
- Queen Street - the main street of the city, from Karangahape Road down to the harbour;
- Viaduct Basin, High Street, Queen Street, Ponsonby Road, and Karangahape Road are very popular with urban social activities.

9.2 Climate
Auckland has a warm-temperate climate with sharp regional contrasts and seasonal weather. Climatic conditions vary in different parts of the city owing to geography such as hills, land cover and distance from the ocean. Usually there are warm, humid summers from December to February and mild, damp winters from June to August; Autumn is from March to May and Spring is from September to November. Thanks to its oceanic climate the region has the benefit of a warm coastal climate without extremes of temperature; the average daily temperature during January and February is 23.7° Celsius whereas during July and August the mean
daily temperature is 14.5° Celsius. The absolute maximum recorded temperature is 32.4 °C while the absolute minimum is 2.5°C. Auckland is the warmest main centre of New Zealand and also one of the sunniest, with an average of 2,060 sunshine hours per annum.

(Wismar:~1,750 hours per annum)

High levels of rainfall occur almost year-round with an average of 1240 mm annual rainfall spread over 137 ‘rain days’ (Wismar: 599 mm pa)

Because of its location at the geographic coordinates/latitude: 36°50’S 174°44’E the sun angle in Auckland lies between 76.5° in summer and 29.5°in winter.

Major winds are south-western maritime winds.

9.1 Planning Area

The planning area for this research project is centrally located; the building, the St James Theatre and the adjoining Theatre Centre, is found in the heart of the City Centre of Auckland within the so-called Entertainment Quarter.

Planned as a vaudeville theatre St James was built in 1928 in the Spanish Mission Style. Since then it has undergone several alterations, additions and different uses; however because of structural and earthquake safety problems the building has been vacant for the last two years. According to the New Zealand Historic Places Trust it is one of the best preserved theatres of that time in the country. At the time of this research it was still owned by a private developer and proposals for a new development had been made. The latest provided for a 39 storey apartment tower on top, requiring the demolition of the adjoining (movie-) theatres and parts of the heritage protected foyer of St James.

The site has the size of ~3,340 m² and is defined by two mayor façades on Queen St to the west and Lorne St to the east. To the north an approximately 13 story high office building, the former ASB Building, built in the 1950s/60s is found; bordering south are some two storey buildings with a historic Edwardian façade, accommodating a pub on Lorne St and a restaurant and some retail/shops on Queens St. Next to this the nine storey UDC Office Building
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(1970s) is found. For this proposal it turned out to be necessary to include most of the southern property (additional 450 m²) with the Edwardian buildings. Furthermore the site is surrounded by several retail and restaurants mainly on Queen St; Cultural amenities like the Town Hall, the Civic Theatre (and others), the State Library and Galleries are found close by as well as the inner city universities (AUT, UoA, UoO). Also, tourist attractions like the waterfront and the Sky Tower are within walking distance.

Transportation (busses, trains, major roads) connections are very good as a result of being in the middle of CBD.

8 Framework

The framework for this research project is determined by various influences. In order to create a sustainable building the fields of reuse, functionally neutral constructions, and lifetime cycles need to be investigated. Furthermore, an overview of other end-of-use options, the use of technology and rating options (Life Cycle Assessment, Green Star) is given.

8.7 Reuse

Reuse is the most sustainable way of using resources through retaining what is already being used - materials as well as land. Historically, buildings often had been deconstructed and construction materials had been reused; for example, columns from almost every epoch of Greek architecture can be found in the Cistern of Istanbul. Later after World War II in Germany most of the destroyed concrete as well as bricks were reused for construction purposes. Today reuse is seen as one of the key concepts of sustainability by lowering material, transportation and energy consumption, as well as reducing urban sprawl, construction waste and pollution. Moreover, since buildings usually last for decades, the importance of the existing building stock as an economic, social and cultural capital should not be wasted. Research has shown⁷ that the existing building stock has the greatest potential to reduce the environmental load of the built environment, particularly as a result of performance upgrading of the existing buildings.

Reuse can take place on every scale: on the grand scale, the (adaptive) reuse of a building (shell) - conversion of one type of building into another and on a smaller scale like reusing elements i.e. doors.

Designing for adaptive reuse allows the building to adjust to new technologies that become

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available, usually at lower costs than constructing a new building. The more flexible and adaptable the building is to different uses and inhabitants, the longer its useful life will be and that has economic and environmental advantages over time.

One of the main advantages of reusing a building is the preservation of the original building’s embodied energy as well as reducing environmental impacts such as filling up land fill sites and pollution from the demolition of buildings. Existing buildings are usually significant reservoirs of materials and components which can be salvaged and reused. Many components can potentially be sourced to provide resources needed and can therefore significantly reduce the environmental impact of new buildings. Apart from the environmental advantages, designing for adaptive reuse may add short term economic costs to the project, but on a bigger scale of the lifecycle of the project, the long term benefits outweigh any initial costs. Furthermore it can create new jobs and business opportunities (i.e. specialists for deconstruction or salvaging).

Another important point, especially in this case, is the retention of the cultural heritage; also older materials often possess unique personality and offer great opportunities to show the integration of new materials with the old.

It is hardly possible to create a building completely made of recycled materials, but a high recycled content can be specified. However, it is not uncommon to reach 50-75% salvaged material on small to medium sized projects. The task of sourcing materials is often the driver during the schematic design phase and one of the key influences on layout, structure and systems used for the project.

There are different types of reuse:

• **On-site reused component:** Reusing a building considerably reduces the consumption of resources and waste generation though the sheer volume of materials already on site and in place. Not only does adaption lessen demands on diminishing energy and natural material resources, but it also contributes to preserving the cultural and historical values inherent in materials and buildings.

  • ** Salvaged from other:** buildings which are no longer suitable in terms of spatial, functional or formal requirements, may still incorporate numerous materials containing long term benefits due to their lifecycle which can be used elsewhere; reuse of the building’s components and materials should be maximised.

  • **Reconditioned components**
  • **Recycled content building products (RCBP’s)**

Obviously, current market conditions have an impact on the availability of components or materials. Therefore, decisions need to be made at the concept design stage. These are essential for future scheduling, resource planning and cost estimating. Expectations for the design may require some tolerance regarding the duration of the design and construction phases since they will depend entirely on the supply of suitable materials and components.

Some interesting niches developed out of the concept of reuse:

• **Designing for Deconstruction:** research is being undertaken in Europe, however this topic is not subject of this thesis;

• **Supply Driven Architecture:** the success of Supply Driven Architecture is dependent on buildings which are at the end of their economical and/or cultural life time; before designing it is necessary to identify and characterize the existing „stock“ of potential deconstruction sites;

• **“harvesting”**: introduced by 2012 Architects (Netherlands); a circle of a certain amount of kilometres is investigated for usable materials,
keeping themselves open for inspiration;

- *Alternative building design strategies* take into account the total life cycle of buildings.

The reuse of buildings or components clearly presents environmental, social and economic benefits, compared to the demolition of existing buildings.

**8.6 Definition of Ability of Reuse**

Adaptable buildings have the built-in ability to adjust to changing circumstances and technologies, without excessive waste and conflict. They are functionally „agile“, providing accommodation capacity far beyond what was functionally determined buildings. In buildings that can sustain in the future parts that change over time are designed for assembly, disassembly and reuse. Consequently, a building should be able to be changed over its life cycle to adapt to the inevitable evolving needs of their users; or at least be designed for deconstruction (i.e. no composite materials; partition walls to be easily removed, relocation causing minimum damage to flooring or ceiling systems and fully salvageable). Often the demolition of buildings is socially undesirable and considered an economic loss, in particular when the building has a special meaning for the users of the area, because of being a landmark or having memory value, or because demolishment eradicates the identity of the neighbourhood. Therefore buildings with cultural and historic value are a reason for preservation.

There are some significant differences to the design process if reuse of construction components is a goal of a project. These components have different patterns of availability. Also, the limited range of components requires the development of the building design around the available reused components rather than the traditional process of designing the features of the building and then identifying the components that will meet the required specifications. This means that ideally the reused components need to be identified at an early stage in the design process.

Multispace\(^8\) is the result of a recently undertaken concept study in Great Britain into a single, customisable design to be the basis of a variety of offices, residential, hotels and retail developments, for mixed-use development letting or selling. It outlines technical solutions, particularly for structure, cladding and building services and highlights barriers to the concept from users, developers, funding bodies and planners which need further research.

Issues of reuse could be:
- Contaminants such as oil, fertilizer, lead and asbestos inside a building can affect the quality and value of materials;
- Assessment of the mechanical properties of the components and the standing of surety;
- Lack of convenient and affordable storage space;
- Transport of matter and building components;
- The process of materials acquisition is much more complicated when using salvaged rather than new materials. It is not just about identifying sources, but also confirmation of availability, meeting required quantities and quality is extremely important.

**8.6.2 Buildings (Adaptive Reuse)**

The adaptability of any building depends on its design, form, materials, and the extent to which a building is appropriate for its purpose. Its capacity for adaptability is usually affected by its structural design, the different services within it, its finishes, the internal layout, and its external appearance; and

\[^8\] Life-cycle re-configuration concept by 3DReid. Adaptable Futures. www.adaptablefutures.com/ (accessed 29.09.2010)
the economic feasibility of changing any of this if necessary. Designing buildings for adaptive reuse should ideally expose the building’s structure to only minimal changes while undergoing major renovations and modifications, thus designing a functionally neutral building. However, the main problem regarding adaptability, disassembly and reuse of the existing building stock is the fact that over the past decades designers conceived buildings as being fixed and permanent.

Major objectives are a good location with facilities nearby, an attractive building appearance that evokes positive feelings and the opportunity to enlarge the building. Some buildings even have a particular emotional, architectural, historical or cultural value and/or contribute to the identity of the neighbourhood; when this cultural or historical value is high, the building may get listed as a monument. Its potential strength can then turn into a weakness, because of restrictions placed upon adapting the building to modern needs.

However, even if the benefits of transformation and reuse are evident from a sustainability point of view and with regard to socio-cultural issues, the financial-economic benefits are much discussed and not always convincing, yet.

Conclusively it can be noted that, “a construction that allows a fill in with different housing types without the need for complex and expensive technical interventions, a façade that can easily be replaced, and installations that can easily be replaced by installations that fit with the needs of new tenants. Other issues such as a location without public health risk, crime or vandalism, an attractive architectural appearance, daylight and sunlight, spacious floor plans, and a high energy performance not only support future conversions to other functions but contribute to the present quality of the building as well, making the building more attractive to office organisations during the whole life cycle of the building.”

8.6.1 Materials

The reuse of materials or components is highly dependent on their availability; there can always be the problem of not being able to find a salvaged material when needed, or enough of a particular salvaged material to complete the project.

For that reason warehouses for re-usable building components were established; also the internet offers a wide range of companies that reuse or recycle (building) materials. The direct reuse of removed elements should be maximised, and subsequently, the recycling of materials of damaged components into new ones.

Potential for reuse:

- **High-rise multi-family buildings** (large apartment buildings, hotels): contain many interior features (often similar kind) that can be salvaged and reused (appliances, cabinets, fixtures, etc.). These buildings are usually made of structural concrete and steel, structural materials may be good candidates for recycling or complete refurbishment;
- **Low-rise multi-family buildings**: significant potential for deconstruction of both interior and exterior materials; usually brick and block construction with wooden roof assemblies. Many interior elements (e.g., appliances, cabinets) can be salvaged;
- **Rowhouses**: multiple deconstruction opportunities.

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Exterior construction offers salvageable brick, roofing and architectural details; interiors can provide valuable wood materials and interior elements;
• Single-family dwellings (wood-framed): significant potential for deconstruction, possibility to salvage nearly the entire structure. (i.e. wooden framing, roofing materials, flooring, windows, cabinets, appliances).

8.5 Definition Functionally Neutral Buildings
Functionally neutral buildings minimize the functional integration of building parts and maximize accessibility, thus increasing the range of options for future refurbishment without compromising overall performance.

The pattern of use within a building over time is almost certain to change. This is driven by many reasons, for example from competitive pressures and customer requirements, new uses, new management approaches, new technologies, changing fashions and changes in regulations. As the pace of the demand for change within offices and other business premises increases, owners want to minimise the costs of these changes to their buildings.

Buildings usually get demolished for their inability to adapt to new technologies rather than structural deterioration. With buildings that are purpose built and difficult to adapt, the cost of remodelling can be as high as new build. Therefore it is more sensible to design buildings that can serve a variety of needs with minimal work to the shell and freedom for the fit out, thus a functional neutral building. This new building typology that can be adapted for uses to reflect changing social and economic trends as the neighbourhood grows and evolves.

From a sustainability point of view, transformation means less economic loss, less waste of materials and a reduction of building materials transport; further functional neutrality is seen as a means of expanding the buildings lifespan.

As the most static entity in a building, the load-bearing structure represents an important share of a buildings' longevity potential. Therefore, the ability to facilitate changes within the use of a building or its configuration without compromising structural performance is necessary to consider as a key precondition for the performance on adaptability.

Adaptable structures are considered to be able to provide a more efficient use of space and materials during their life cycle, an increase in longevity and an overall improvement in operating performance. Designing for adaptability increases the flexibility of spaces allowing the occupants to use the floor areas more efficiently.

These flexible spaces allow owners to alter the mix of use to respond to market conditions without altering the shell construction, thus maximising the return at all times and minimising construction time and costs. To meet the commercial requirements of a client, often translates into maximum occupancy of the building. This means to allow change of use throughout the structure’s lifetime, meeting the potential requirements of office, residential and retail uses, thus giving it the ability to adjust to changes in market demand for building usage. These requirements should be considered as early as possible in a project.

Functional neutrality and thus adaptability as a design strategy is closely related to two other strategies attempting to enhance the long-term environmental performance of buildings, namely ‘Durability’ and ‘Design for Disassembly or Deconstruction’.

Yet, adaptive buildings are often seen as an adaptive façade or an intelligent building which is adaptive of the surrounding weather conditions and that
adapts its behaviour to the needs and preferences of its inhabitants. However, this is outside the scope of this project.

A building should be configured initially to a wide range of scenarios and should be able to change, over its lifecycle, facilitating the evolving needs of their users. Therefore large floor spans and ceiling heights contribute to the range of possibilities for multifunctionality or spatial mutation. The benefits from investing in a building with a high transformation potential are earned in a later phase of the buildings lifespan; however, the possibility of different uses will increase the value in use of the building, thereby also increase the buildings commercial value.

A helpful conceptual framework could be the division of a building into different lifespan layers, with different functions, characterised by their anticipated need for modification; six shearing functional layers, namely Site, Structure, Skin, Services, Space plan and Stuff\(^\text{11}\) can be defined.

Criteria (key design parameters) for adaptable construction and functional neutrality\(^\text{12}\)

It is not necessary to apply all of these criteria by all means, but the more of the design criteria are applied, the more future adaptations will be eased.

1. Location
   - Mix of functions
   - Zoning plan permitting future modification
   - Size of the building
     (building larger than 7,000-8,000 m\(^2\))
   - No serious health risk (pollution, noise, stench)
   - No serious crime risk
     (vandalism, burglary, attacks)
   - Facilities nearby, in particular public transport, shops and greenery < 0.5 – 1.0 km
   - Sufficient parking space at a distance of preferably < 250 m

2. Building
   Appearance:
   - No “office building look”, attractive identity and entrances;
   - High spatial/visual quality by the design concept or the materials and colours used.
   Façade:
   - Replaceable, not load-bearing;
   - Daylight admittance at least according to building regulations for housing;
   - Opportunity to add balconies;
   - Operable windows;
   - Acoustic and thermal insulation according to building regulations for housing.

Adaptability of the structure:
   - Possibility to enlarge the building, horizontally or vertically;
   - Constructions extra load-bearing capacity (i.e. for additional floors) and large dimensions;
   - Dimensions of the spaces and rhythm of the construction; grid of columns that can accommodate floor plans for different target groups and functions (e.g. building depth >10 m);
   - Plan depth: generally determined by: natural daylight penetration, proximity to views, spatial proportions, space required to accommodate the smallest internal room component, and economy; limit: 13.5-21.0m on upper floors);
   - Preferably no load-bearing walls;
   - Access and escape routes (entrances, staircases, elevators) according to building regulations for housing;

\(^\text{12}\) Based on: Remøy, van der Voorst. Sustainability by Adaptable and Functionally Neutral Buildings
- Free ceiling height > 2.60 m; Storey height: 3.5 to 3.6m, can be reduced to 3.3m; greater the storey height, the greater is the range of service solutions possible;
- Floor load capacity > 3.5 kN/m², highest design loads (office building);
- Most important function of solids: initial quality of the building; use durable materials;
- Concrete slab technology: min 7.5m span, max 12m span;
- Fire safety (Travel distances for fire)
Secondary structure:
- Assembling the internal walls with dry-connected prefabricated wall panels;
- Independent layer of modular floor and ceiling panels within a grid of the prefabricated demountable panels.
Installations:
- No installations integrated in the load-bearing structure;
- Possibility to add service ducts;
- Central functional longitudinal axis for services (water, electricity, sanitary facilities, etc) in order to group the facilities;
- Centralised access to surrounding zones offers greater organisation freedom for the configuration of units;
- High energy performance;
- Flexible building services that are able to sustain the operational requirements of a building in a cost and time effective manner while responding to short-term changing requirements of a user;
- Widest possible variety of ventilation solutions;
- Luminaries to facilitate relocating within ceiling grid;
- Plant size and location must be considered.
Units:
- Floor layout simple and open plan, enables introduction of various dwelling typologies for different kind of occupants;
- Individual dwellings perform independently of structure; they can reconfigure, expand or contract inside an open plan structure;
- Flexible space on one floor which can be used as a playroom, office, gym or workshop depending on the needs of the building community;
- Variety of scenarios independent of structure;

Approaches in general:
• Keep it simple - avoid over-specification and over-complication;
• Design on a grid basis;
• Provide good services distribution infrastructure;
• Overcapacity only where it is too expensive to add in later;
• Leave sufficient space to alter or add to the services in the future.

8.4 Lifetime Cycles
The lifetime cycles of the different components within a building differ. In order to avoid having a building unusable after the lifetime cycle of the first component is expired it is necessary to be aware of those elements and design the building so that single components can easily be exchanged. Buildings must remain efficient places to live and work to ensure real life-cycle value. Therefore, extending a building’s useable life addresses both business and sustainability concerns. Because of changes in needs and context, a static building cannot guarantee the same level of performances over time, which can lead to a widening gap between the building and the environment. Therefore adaptability is seen as an instrument for expanding a building’s lifetime. Naturally, regular maintenance during use also helps to lengthen the lifespan.

High lifetime expectancy might as well be an economical requirement in terms of reduced material use due to longer replacement intervals,
construction materials and components with a long life cycle and low maintenance effort. This reduces investments for maintenance, replacement and renovation.

The life cycle design of buildings and materials integrates issues from spatial adaptability and flexibility of building systems to material efficiency and energy saving (embodied energy). Also, three different cycles should be considered: cycle of the building, cycle of its components and cycle of the materials used to manufacture the components. Additionally an integrative life cycle model of the built environment could be evaluated.

The concept of 4-Dimensional design (4D) developed out of these issues and refers to a design attitude to conceive ‘objects’ from a long term vision, hence integrating the fourth dimension, i.e. time, in the initial design phase. It takes into account the buildings’ life-cycles on three different levels - material, component and artefact, and introduces adaptability, reuse and recycling.

8.4.3 Materials

The lifetime cycles of building materials differ, therefore it is important to design a building in a way to easily access and remove materials (and components) with a shorter lifespan.

Some standard life spans: 100 years for construction, 75 year for insulation material; 35 year for distribution pipes; 30 years for radiators and heat pumps; 25 year for glazing and solar boilers; 15 years for boilers and mechanical ventilation and 8 years for pumps.

The façade is seen as an aspect that is often changed not only because of the style of existing buildings, but also because of the changing requirements on daylight, ventilation and acoustic- and thermal insulation.15

8.4.2 Structures

Because of the long lifespan of its material an adaptable structure needs to achieve a long life cycle which is economically and environmentally desirable (as can be seen in 8.5): The structural grid must ideally be compatible with several uses that they are fully interchangeable, without the need for significant transfer structures or uneconomically long spans. Generic limits for span in an adaptable structure are 6-12m, dependent on structural system and cost constraints.

8.4.1 Life Cycle Assessment (LCA)

Life Cycle Assessment (LCA) is a technique, still at the stage of development, for assessing impacts associated with a product or service in a life cycle perspective. It is a static method that sums up all environmental effects during the life cycle of the product, and ideally distinguishes between the cycle of the building, of its components and of the materials used to manufacture these components.

However, the behaviour of buildings is dynamic. Therefore, it is difficult to track the environmental effects of changes in buildings using LCA.

During a Life Cycle Assessment the energy use, the type of energy and the environmental effects are mapped from cradle (raw materials extraction) to grave (disposal); including production process, operational energy and material use. The energy used for production of the building components is needed to extract the raw materials, to transport them and to produce the components. The operational energy use is defined as the energy needed to heat, cool

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and ventilate the dwelling and to power electrical appliances. It also assesses the environmental effects of buildings in terms of material use, energy consumption, water consumption and environmental impacts and moreover takes into account the economic factors (life cycle costing).

Relevant international standards are (amongst others): ISO 14040, ISO 14044; Several different programs are available and are still being further developed.

8.3 Other End-of-Use Options
Apart from the direct reuse, as clarified at the beginning of this chapter, there are several other end-of-use options available in order to minimise the environmental impact of construction. The construction industry is the second largest consumer of raw materials after the food processing industry; thus the reduction and avoidance of waste are necessary.

The end of a building’s useful life generates a stream of used materials that can be reprocessed for new construction. It is generally recognized that the use of recycled materials and the reuse of components in buildings can lead to a lower environmental impact of a building. However, there are differences in quality and processing of materials. Therefore, the selection of materials for reuse or recycling should not start at the end of a building’s life cycle; it should rather start in the design stage.

Regardless of the type, the used construction materials are valuable resources worth harvesting in order to preserve their embodied energy and the CO2 already invested in those materials.

This chapter explores the three main possibilities of further use of the materials, which are: reuse, recycling, down-cycling. Further the up-cycling of materials could be an option. However, the option of land filling, thus generating waste should be avoided.

**Reuse:**
Reuse is the most direct form because an entire structure or design components are to be adapted and reused in a new building. It is the option in which material quality is retained at minimal environmental costs. Besides, reuse is the only option that addresses carbon storage since other options require industrial processing.

There are three kinds of reuse:

- **Building Reuse:** revolves around repairing a building to accommodate a new use rather than tearing it down;
- **Component Reuse:** requires retaining the majority of the interior non-structural elements such as interior walls, doors, sanitary fixtures, floor coverings, ceiling systems and so on to be used in a similar or different application;
- **Material Reuse:** is the direct reuse of materials after deconstruction of the structure in new or existing structures. It allows to retain their current economic values, this reduces the embodied energy required to recycle, and minimizes the need to source new raw and virgin materials.

**Recycling:**
If materials cannot be reused recycling (recovery) should be considered. Recycling is the processing of the used material into a new one or a new component to give it a useful existence again. Attention must be paid to the kind of processing, since the conversion process could turn out to be more energy-consuming than the production of a new material. Also chemical ingredients can turn out to be harmful. Therefore recycling can be divided into three different categories: down-

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cycling, recycling, and up-cycling. Each one of these routes requires energy inputs and result in waste and emissions depending on the material itself. However, the use of raw materials is reduced by recycling. The degree to which increasing the recycled content actually has an environmental advantage is subject to the specific type and source of each material.

A closed-loop idea is a recycling concept that should be the ultimate goal of the industry in order to maximize the usefulness of the existing materials in use and reduce the need to extract and produce raw and virgin materials.

Examples of recycled materials\textsuperscript{17}:
- Recycled or scrap materials (scrap from wood strands or veneers, lumber);
- Wood i.e. preserves forests AND does not shrink, twist or warp (cup, crown) anymore; if not reused, it can converted into OSB or CLT plates, these carry greater loads as solid saw wood than a normal beam of the same size;
- Fly ash (by-product from coal burning plants) for concrete → adds strength, reduces permeability, reduces corrosion of steel, increases sulphate resistance, reduces alkali-aggregate reaction;
- Standard recycling bin i.e.:
  - plastic melted with wood chips = outdoor deck lumber;
  - insulation = recycled glass, cotton (denim), newspaper;
  - plastic bottles = carpet;
  - glass chip = concrete or tiles;
  - … and much more.

\textbf{Down-cycling}

Even though down-cycling is a kind of recycling it is not always a convincing concept. A lower-grade material is produced and the down-cycling procedures often include industrial (or even chemical) processes and long-distance transport, which demand energy, and release emissions and waste.

An example is the use of scrap materials i.e. melted steel from automobiles; the steel is usually melted including the paint/coating, reducing the initial quality of the new steel.

\textbf{8.2 High Tech – Low Tech}

In today’s world of technology it is easy to outfit a building with lots of technical appliances claiming that the building is an ‘intelligent building’ which reacts to its surrounding changing situations. However, it is not always the most sustainable option to put as much new technology as possible into a building. Actually, “it is possible to invest so much [energy and CO\textsubscript{2}] making something energy-efficient that over its lifetime it never saves as much energy as has been involved.”\textsuperscript{18} In contrast to the high-tech outfitting is low-tech; this kind of concept does not use any new technology, but reacts to the given circumstances by using (construction) techniques that have been proven to be sufficient over centuries.

Lots of new technical appliances are being developed and come onto the market every day claiming to make a building more energy efficient. However, they need to be chosen carefully since they could contain high embodied energy or require a high level of maintenance.

Helpful appliances could be:
- Good computerised systems which know when and how to ventilate, heat or cool, close doors (by measuring indoor and outdoor temperatures (or wind directions) and then adjusting the appliances);
- Monitoring systems can be helpful in the long-

\textsuperscript{17} Claudio Santini and Dafna Zilafro. \textit{Green is Beautiful – The Ecofriendly House} (Mulgrave Vic, Australia: The Image Publishing Group, 2009)

\textsuperscript{18} Johann Bernhardt, ed.; \textit{A Deeper Shade of Green}, (Auckland, New Zealand: Balasoglou Books, May 2008). 93
term in order to rate the (environmental) building performance over the years of use, systems then could be adjusted if necessary; these systems are monitoring almost everything: water quality and pressure, air quality and air flow, temperature, use of power, …;

With the concept of low-tech construction the unnecessary use of energy, in particular embodied energy, can be avoided. This concept begins with a responsible site selection: buildings interact with the surroundings; careful site evaluation, being aware of orientation of the building (i.e. seasonal shading, natural ventilation, day lighting, views/connection to surroundings) and providing services responsibly on site (i.e. water management, green roofs, porous pavers);

Some ideas\textsuperscript{19} on low-tech are shown below, and even with an existing building some of these principles can and should be applied. There are possibly much more options to be explored, in particular in the traditional Māori construction techniques since these were dependent on natural and local resources.

**Lighting – Daylighting**
- Natural lighting connects intimately the interior with its surroundings;
- Saving energy: less artificial lighting + reducing artificial cooling requirements (as artificial lighting produces heat);
- As much controlled daylight as possible deep into the homes interior;
- Indirect light reflected off a light-coloured surface provides better lighting quality than direct sunlight (i.e. clerestories);
- Clear or translucent glazing, low-e-glass and other coatings achieve varying lighting effects;
- Proper daylighting can guide circulation and improves overall mood and productivity of inhabitants.

**Passive Shading**
- Considers location and climate to keep the temperature moderate and comfortable throughout the year;
- Keeps direct sun off the homes windows in summer and allows it to fall through the windows in winter (roof overhangs to the north);
- Long north-south walls reduce the intense morning and evening sun (e-w);
- East/West facing: movable opaque screens (roller blinds, curtains), impede view and air movement → adjustable, fixed louvers provide additional security where desirable;
- Trellises, trellised vines, shutters, shading screens and other options;
- Myriad glazing alternatives: tints, fritting, metallic, low-emissivity coatings;
- Trees/vines outside on north facing façade → filter direct sun in summer, allow penetration in winter when leaves fall;
- Creeping vines on walls, green roof or extra layers of light-coloured structure above roof or around perimeter walls can additionally insulate walls from heat gain.

**Passive Solar (cooling and heating):**
- North facing openings glass to hold the winter heat;
- Elements capture, absorb, distribute heat from the sun;
- Thermal mass (masonry, concrete floors/walls; even better: organic materials like stone, natural earth concrete) + proper ventilation;
- Common areas to the north; storage, garage, e.g. south facing as buffer.

\textsuperscript{19} Source: Santini and Zilafro, \textit{Green is Beautiful – The Ecofriendly House}
Insulation
- Important component in residential energy conservation;
- Warmer in winter and cooler in summer easing costs and health issues;
- Absorbs unwanted sounds;
- Significantly decreases the diffusion of harmful air pollutants (i.e. nitrous oxide and sulphur oxide);
- Recycled content insulation (non-toxic)
  • Cellulose insulation (shredded newspaper) + boric acid (used in children pyjamas)
  • Cotton insulation
  • Cement-coated air bubbles
  • CO$_2$ foamed urethane

8.1 Green Star Rating System
Green Star is a comprehensive, national, voluntary environmental rating scheme that evaluates the environmental attributes and performance of New Zealand’s buildings using a suite of rating tool kits developed to be applicable to each building type and function. It is a relatively new development. The system is a customized version adapted from the Australian model by the New Zealand Green Building Council; it was developed by the New Zealand Green Building Council (NZGBC) in partnership with the building industry.

The New Zealand Green Building Council is a Non-Government Organization (NGO) which was set up in July 2005 and became a member of the World Green Building Council in 2006. The organization is committed to developing market based solutions that help deliver efficient, healthier and more innovative buildings for New Zealand and also to setting standards of best practice and leadership through the development of green building rating tools.

Green Star NZ addresses the needs of specific building types, such as office buildings, industrial buildings and education buildings, in the design phase, and following construction (the build phase). It was developed to:
• establish a common language and standard of measurement for green buildings;
• promote integrated, whole-building design;
• raise awareness of green building benefits;
• recognise environmental leadership;
• and reduce the environmental leadership of development.

The tools are evaluating a building against a number of categories that assess the environmental impact that is a direct consequence of a building’s site selection, design, construction and maintenance. The framework has nine categories:
  Management,
  Indoor Environment Quality,
  Energy,
  Transport,
  Water,
  Materials,
  Land Use & Ecology,
  Emissions,
  Innovation.

Credits, that address initiatives that improve or have the potential to improve a building’s environmental performance, are awarded within each of these categories. These are based on the building’s environmental merits in a range of areas and takes into consideration the unique development requirements and impacts of each sector once a building has met the credits criteria; a weighting factor is then applied to each category to reflect the overall importance of the environmental issue addressed by the category. These weightings vary between each Green Star tool to reflect the different environmental impacts of each building type. An overall score is calculated, determining the project’s Green Star NZ rating.

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Possible Green Star NZ Certified Ratings:
• 4 Star (score 45-59) for ‘Best Practice’
• 5 Star (score 60-74) for ‘New Zealand Excellence’
• 6 Star (score 75-100) for ‘World Leadership’

A residential rating tool ‘HomeStar’ came onto the market recently; however this does not assess multi-residential buildings.
Since there are only limited rating tools on the market at the moment for this project it needs to be thought about using one of the existing (not fitting) tools or an appropriate tool from the Australian Green Building Council.

7 History
Just like everywhere else in the world it turns out that theatres in New Zealand were and still are built to create another world for the audience. They were designed to create a striking place where people could flee from their ordinary day-to-day lives and forget about their sorrows. Small cinemas and theatres were found in almost every suburb of Auckland.
Almost all of the theatres and in particular those built at the beginning of the last century offer glamorous interiors and detailing for a ‘grand feeling’ for the visitor.
One of the most remarkable theatre architects in Australasia was Henry Eli White (1877-1952). He is supposed to have been a master of many styles and was fascinated by acoustics, structural engineering and new techniques. This can be experienced in the St James.

7.2 Brief Overview
This chapter gives a brief overview of larger theatres built in New Zealand at the beginning of the last century. Many cinemas were also built in the 1960s and 70s. However, with the advent of the 1990s, the declining movie theatre audience forced the closure of many theatres. Some of them were demolished; some were restored and adaptively reused.

1899 Royal Wanganui Opera House, Wanganui by George Stevenson; New Zealand’s last Victorian theatre. seating 830 ; venue for many local, national and international events
1900 Henry Eli White’s first theatre in Christchurch for Fuller & Sons;
1910 Mercury Theatre (former Kings Theatre), Auckland, by Edward Bartley; oldest surviving theatre in Auckland; English Baroque style; 1926 converted into a cinema and new entrance on Karangahape Road; now the Norman Ng building accommodating a Coffee Shop; theatre closed in 1992
1911 His Majesty’s Theatre (now St James) in Wellington by H.E. White; seating for 2,355 people; country’s biggest and best theatre, at that time the largest one in Australasia;
opulent Edwardian Baroque Style

1914 Municipal Theatre in Hastings by H.E. White; Spanish Mission Style façade; inside some Viennese architectural influences of that time

1914 Grand Opera House (now The Opera House) in Wellington, by William Pitt; a proscenium theatre; seating: 1361

1914 Mayfair Theatre (former King Edward Picture Theatre), Dunedin by Edward Walter Walden and Edmund Anscombe; one of the oldest remaining purpose-designed cinemas in New Zealand; seating 400; after renovation in the 1960s still in use

1916 Strand Theatre, Christchurch by Henry E. White; also Viennese detailing, but wiped away through later conversion

1924 Embassy Theatre, Wellington by Llewelyn Williams; Classical Style; the only custom-built 1920's cinema still in use in New Zealand; originally seating 1,749, after a series of remodels in the 1960s and 2000 reduced seating to 852;

1926 Regent Theatre, Auckland seating capacity 1,502; demolished

1928 St James Theatre, Auckland by Henry E. White; seating approx. 1,930

1928 Regent Theatre in Dunedin by James Hodge White; seating approx. 1,700; built as a cinema today used as a live venue (apart from the annual film festival); mainly in its original condition

1929 Civic Theatre in Auckland by Bohringer, Taylor & Johnson; is believed to be one of New Zealand’s most spectacular theatres and largest surviving Atmospheric cinema in Australasia; seating 2,378 people, largest theatre in New Zealand; specifically designed for talking pictures → first purpose-built cinema of this type in New Zealand; reopened in 2000 after a major renovation and conservation effort

1930 Regent on Broadway in Palmerston North by Charles Holingshed; original use cinema/ opera house; closed in 1991; after public response restoration in 1993 – reopening; now performing art with a removable seating of 1,393 for functions and ballroom dinners

7.1 Building Analysis – Theatres in NZ

Since theatres were meant to create a ‘grand feeling’ for the visitor they are usually extraordinary buildings with large open spaces and affectionate detailing and decoration. As with many of New Zealand’s buildings various overseas influences in architecture and style can be found.
7.1.4 Spaces
- No pillars to obscure the view to the stage (White);
- Atmospheric theatre with oriental, decorative scheme (Civic); Atmospheric Theatre Style: lights and design were used to convey an impression of being seated in an outdoor auditorium at night, creating the illusion of a seemingly limitless open, blue sky complete with twinkling stars;

![Fig. 9 Civic Interior built in the Atmospheric Style, creating the illusion of an outdoor theatre](image)

- Two identical staircases lead to circle foyer which has the appearance of a Moorish courtyard; main auditorium is a Persian walled garden with domes and minarets silhouetted against a ceiling;
- Stalls, circle and grand circle; on either side of the prosenium arch are two boxes - arranged on top of each other;
- Mezzanine floors;
- A rehearsal studio, which is used for numerous activities, ranging from ballets dancing to stage rehearsals;
- Characteristic rectangular auditorium and originally small space behind the proscenium of a cinema (purpose designed cinema).

7.1.3 Materials - Form - Decoration

**Exterior**
- Deeply modelled, symmetrical pattern of decorative elements which extend across the wide street frontage and gives the building a very grand appearance;
- Large fretwork screens which add to the vertical thrust provided by the corner tower (similarities to stripped back sky scrapers of that time); surface decorated with panels of sun bursts, dancing maidens, floral spirals, volutes and swags.

![Fig. 10 No columns obscuring the view to the stage (St James, Auckland)](image)

**Interior**
- Inside elaborate, mainly classical inspired plaster motifs extending from the central dome to the stalls;
- Auditorium tiers of boxes on either side of the stage decorated with the sinuous long-stemmed plant forms (Viennese influence at the Hastings Municipal Theatre);
- Decorative plasterwork including western motifs (such as fleur-de-lis or scallop) as well as Hindu and Moorish features;
- Vestibule’s interior decoration constructed from fibrous painted plaster;
- Marble staircase with brass fittings, tiled walls and floors, and dark wooden fixtures; furnishings reflect overall style, which even carries into the design of the restrooms, which mirror the tiling with and dark wooden fixtures (classical style);
- Fine mouldings and ornate dome;
- Elaborately decorated in a revived baroque style, characteristic of the super cinemas of the time;
- Staircase leading up to the mezzanine floor is carpeted in the centre, with marble on the sides; lobby is carpeted, with a special weave, and exact copy of linoleum, still lying underneath the carpet; mezzanine floor has carved kowhaiwhai panels in the ceiling.

7.1.2 Structures
- His Majesty’s, Wellington: the first steel framed, reinforced concrete theatre in Australasia; using cantilever principle to transfer the weight of the dress circle and gallery through joists to the main steel framework;

7.1.1 Ability of Reuse
Lots of the theatres were altered and reused over the last century. However, the new uses were usually related to the former such as cinema, ballet or conventions. Some also experienced the addition of other amenities such as lounges or cafés over time. For example the St James Theatre in Auckland became a whole Theatre Centre after the addition of three theatres in the 1950s, 60s and 80s.

Sadly, today, as with much of the grand architecture in Australasia, a great deal of the fine work of old theatres is demolished; i.e. the Strand Theatre in Christchurch.

Theatres usually offer large open spaces in which with modifications almost any use is possible. However, usually the cultural and emotional value of these venues is very high, therefore it seems to
be inappropriate to convert spaces like these into a supermarket for example. One fine, little conversion can be found on Karangahape Road in Auckland: the 1926 added entrance (and foyer) to the Mercury Theatre is now a charming Coffee and Burger Shop. Examples can also be found in some of the suburbs; i.e. in Grey Lynn and Pt Chevalier. These theatres got converted into shops and fast food retail; however neither an intention of deliberate sustainable reuse nor the esteem and appreciation of cultural value can be seen here.

6 Case Studies

“The debate surrounding the relationship between contemporary architecture and heritage fabric has been passionately contested over many decades, but has, in recent times, been marked by the negotiation of a comfortable architectural truce. [...] “Old” and “new” are at liberty to revel in their own time and tectonic if the moment of their meeting is orchestrated with deft, clinical precision – pared down to the barest of minimums and articulated by a wary and respectful distance.”

The examples were chosen with consideration for the suitability to this research project regarding concept, size and architectural design. The first example is the Theatre in Wismar, Germany which is currently restored to be the first ‘Passive House Standard’ theatre in Germany. Secondly the ‘Portico’ Redevelopment in Sydney, Australia is shown; a new structure was built on top of an existing, heritage listed church. The third building is found in Auckland, it is the AMP NZ Office Trust Building, which is one of the leading examples of adaptive reuse with highest sustainable specifications in New Zealand at the moment. Further some examples of Supply Driven Architecture are given in order to show the ‘beauty’ of reuse.

Fig. 15 New foyer for the Wismar Theatre

Fig. 16 ‘Portico’ - Scots Church redevelopment, Sydney

Fig. 17 AMP Office Trust tower, Auckland

6.5 Wismar Theatre by the Institut für Gebäude+Energie+Licht Planung (IGEL)

The theatre was built in 1949 as a conversion of an old infantry casern. The design by Leo Einzig has not been changed much (apart from new light installations and new seating) since. The theatre offers four venues each with a different character. The ‘Großes Haus’ offers seating for 556 spectators, the stage has a size of 12 x 8 m and has an orchestra pit. Smaller venues are the ‘Kammerbühne’, the ‘Theatercafé’ and the ‘Theaterclause’. Within the concept of ‘Hochschule Wismar 2020’ the theatre is sustainable reconstructed by the Institut für Gebäude+Energie+Licht Planung since 2007. It aims to be the first theatre built in ‘passive house standard’ in Germany. The energy costs are to be reduced by three quarters when the project is finished.

Restoration and reconstruction take place in several stages with focus on sustainable/low energy construction using the new structures as a climatic buffer zone around the original theatre. The first stage was completed in April 2008 when the new foyer was opened.

Form:
- Cubic – for a good surface/volume ratio;
- New foyer simple and modern;
- Light-flooded foyer facing south, 320 m².

Structure:
- Some load-bearing walls and ceilings as precast concrete elements, independent of existing structure;
- Mainly timber-frame construction with glued-laminated timber columns and trusses.

Materials:
- Load bearing elements timber and precast concrete;
- Facade: fibre cement panels on timber structure, insulation in between;
- Windows: aluminium/timber combination; double-glazing;
- Floor: industrial parquet;
- OSB- plates;
- Doors: timber;
- Fixed furniture: timber.

Services:
- Ventilation: windows to be opened for natural ventilation; mechanical ventilation (and heating/cooling) through heat exchanger;
- Heating: ceiling radiators and passive solar through large windows facing south (sun);
- Power: pv- panels.

Fig. 18 Concept for the existing theatre
6.4 ‘Portico’ – Scots Church Redevelopment, Sydney by Tonkin Zulaika Greer (TZG)

The Scots Presbyterian Church was established in Sydney in the 1920s; only the first five floors and the assembly hall had been completed when construction work was abandoned due to the Great Depression. By the end of 2005 the conversion of the disused heritage listed Scots Church into a 146-unit, cooperative-style apartment building was completed. The scheme combines the Neo-Gothic confection of the old building with new towers perched on top. The church was creatively redeveloped to include residential units with some commercial uses at the lower levels; at the same time the interior of the church including the original auditorium of 2,500 seats has been retained and was restored (in a separate commission). The new building retains its historical features and significance while providing the congregation with a modern house of worship.

The winning scheme in the City of Sydney Design Excellence Competition is based on the architectural expression of a series of towers, continuing the original 1926 Rosenthal, Rutledge and Beattie concept. This expression is created by the sequence...
of double storey apartment boxes continuing the proportions of the Perpendicular Gothic façade below, and emphasizing the building's verticality and silhouette.

Form:
- Volume equivalent to that of the original proposal; the formal massing is drawn from the alignment of the existing base and enmeshed with that of the original, characterizing the new work as the completion of a unified architectural project;
- Sloping height plane pitched at 45° from north to south along the site;
- The northernmost tower, lateral wall of the predominant housing module revealed as a comparatively solid elevation, terminating at a level that marks the city's original 150-foot height limit;
- Setback allows “new” to hover respectfully above “old”;
- Elevation: sequence of double-storey apartment boxes (Corbusian unite module) with double-height fenestration continues the proportions of the Gothic façade below.

Structure:
- The 1926 base is able to carry the load of the new structure;
- New development utilises original support structure and references the Neo-Gothic massing of the original design;
- Structural system: Structural steel framed building with concrete slab system
- Mezzanines supported by timber; partition walls made of plaster (due to the load constraints).

Materials:
- Ambivalent and provocative material sensibility that allows the fabric of the addition to engage with contemporary environmental demands;
- New towers sandstone colours to connect to the restored stone base; curtain wall expanses of seamed, pre-weathered zinc and brilliant glazing; → interplay of solid and light, zinc and glazing combined with the irregular rhythm of coloured glazing panels, blinds and shutters, creates an elevation that reflects the vitality of the urban setting;
- Roofing: Jarrah timber decking and Colourbond Longline roofing;
- Windows/Doors: new painted steel windows to match existing Church windows; frameless pivot hung glass doors; clear anodised aluminium doors;
- Interior finishes: plasterboard (acoustical ceilings,
Reuse – The Lifecycle of Buildings in New Zealand

- Demountable partitions, Tasmanian Oak and American Walnut veneer (cabinetwork and custom woodwork);
- Castellated steel stair risers; tapered aluminium reveals; existing Jarrah flooring recycled and new Jarrah floating floor acoustic floor system.

Lifetime:
- Church has been built almost 100 years ago;
- Heritage protected;
- New building holds a lot of embodied energy → should aim to stay for a long time;
- Relatively open floor plans → possibility of adaptive reuse in the future might be given in order to extend lifetime.

Services:
- Access: maximum number of high-quality apartments, a system of two-level units with corridors and lift access at every second floor;
- Sun: louvre panels integrating natural ventilation, operable sliding doors and shading blinds; wintergardens, as secondary layer of bi-folding doors with integrated sashes permit controlled natural ventilation, act as both acoustic buffer and passive solar warming system, allowing daylight to penetrate deep into the apartments;
- Ventilation: louvres in the ceiling plenums collect sun-warmed air rising behind the winter garden façades and direct the air outside. This serves as a natural cooling system, reducing the air-conditioning requirements; however air-conditioning elements in bedroom spaces openly flout the building’s integrated natural ventilation and cooling strategies;
- Power: Low voltage downlights.

Connection to neighbouring buildings:
- Adjacency to Wynyard Park south of the site, requirement for a recession plane to allow sunlight to penetrate the park → building within a 45° sloping height-limit plane, which preserves solar access;
- Double storey façade spaces enhance views to the sky and the city;
- York Street elevation: dignified verticality of the structural rhythm carefully referenced in the new volume; three original light wells are remade as deep cuts that retain the building’s formal intent as a cluster of articulated city towers;
- Northernmost looking towards the Harbour;
- Shifting calibration of vibrant, orange solar blinds forms a variable mosaic that records the intermittent traces of human occupation and use on the building’s façade;
- Constraints: directly above main railway line and overlooks automobile route to Sydney Harbour Bridge → noise and air pollution precluded balconies, but introduced winter gardens; → Building reacts to its given environment.

General:
- New volume is highly respectful and keenly curatorial in its response to the massing of the original building;
- The interplay of solid and light, zinc and glass, combined with the irregular rhythm of coloured glazing panels, blinds and shutters, creates an

![Image](Fig. 25 Standard double-height apartment)
urban elevation that reflects both its residential use and its relationship to the heritage building below;

- “provocative addition resists the imposition of a singular ideological response to the original building, deftly alternating between moments of considered conservation and deliberate disparity. This approach neatly negotiates the contradictory character of the original building itself and opens the work to contemporary environmental and

programmatic agendas. More broadly, the project proposes that “old” and “new” be allowed to breach their customary distance and tentative dialogue – so that each may engage in a more vital and spirited interrogation of the other.” 23

6.3 21 Queen Street - AMP NZ Office Trust, Auckland by Peddle Thorp & Aitken

Built in the 1970s this building has become difficult to fill over the years, even though it is located in the heart of Auckland’s CBD and has outstanding views over the harbour from at least 50% of the office space.

A series of scenarios were run to demonstrate that a major renovation rather than starting new was the best overall option both in terms of time and cost. Consequently ways were found to retain the building’s original use and upgrade it to current standards. This has been achieved at a fraction of the cost and time compared with building a new building of equivalent standard. The conversion of the building was completed in late 2009.

The design has achieved a 5 Green Star ‘New Zealand Excellence’ design rating (NZGBC 2007). One of the key design decisions was remove the original heavy concrete spandrel panels, and their replacement with a high performance solar and energy control double glazing façade system that improved energy efficiency, daylighting and glare control and reduced interior traffic noise, as well as presenting a modern image and increasing net lettable area.

Form:
- Addition of four floors (4,500m²) without changing the structure made the whole scheme economically viable (original 14,000m² of net lettable space);

- Improved Floor to Ceiling Height: original building: 2.4 m; extended height: 2.65 m due to smaller dimensions of services;
- Given cubic form offers a very good surface/volume ratio.

Structure:
Retained Structure:
- Massive, reinforced concrete structure; structural core, floor slabs and foundations (contribute 75% or more to total embodied energy content);
- Whole structure was able to be reused (saved months of construction time and a very significant quantity of material resources);
- Due to removal and replacement of heavy precast non-loadbearing concrete spandrel panels and the lighter weight of the curtain wall system the addition of four extra floors while permitting the retention of the original foundations and structure was possible.

Materials:
- Reinforced concrete (existing);
- Incorporation of environmentally friendly materials.

Lifetime:
- Concrete structure (lifetime expectancy: 100 years) is easily adaptable due to dimensions, even though this was not intended when built;
- After modernisation there is a good chance to sustain in the future.

Services:
- Modern, high performance, pressure equalised double glazed curtain wall system incorporates heat absorbing solar control glass externally and low-e-glass on the inner layer;
- Energy efficient lighting; semi recessed to illuminate and bounce light off the ceiling; lighting system designed to allow for the incorporation of LED strip lights;
- Chilled beam air conditioning system uses 100% fresh air and incorporates an energy recovery interface between the exhaust and inlet air intakes which recovers about 68% of the energy and can operate in both cooling and heating mode;
- Rainwater harvesting and storage (40,000 litre subsoil tank) used for stormwater detention and toilet flushing; plus water saving technologies (i.e. low flow water taps).

Connection to neighbouring buildings:
- Adjacent to Auckland’s transport hub, harbour and expansive city views;
- It has been included in its urban surroundings for decades, now with a modern and contemporary façade.
General:
- It is not recognizable as a converted building and could also be a new building
- Intelligent and innovative use of existing structure

6.2 Supply Driven Architecture (SDA)\textsuperscript{24}
Supply Driven Architecture is when the design of a building is determined and dependent on the supply of salvaged components and materials. The conceptual decision of using salvaged materials rather than virgin materials can be regarded as a new trend in architecture which will become important in the decades to come.

“\textit{The challenges of Supply Driven Architecture are hidden in the constraints connected to the specific properties of the available components. An architectural design will become a compromise between the goals of the architect and the design space offered by the available components.}”\textsuperscript{24}

Some examples of SDA are shown here in order to give an idea of how interesting and liveable designs are possible despite the fact that the supply determines the architecture and other restrictions erasing.

Some of the most famous examples are given by Friedensreich Hundertwasser who applied broken tiles, and old lampposts in his architecture, which is, generally spoken regarded rather as art than as architecture.

One of the Dutch projects in this context is the Villa Welpelo by 2012 Architects. The aim for this building was to create it out of reused materials found within a distance of 15 kilometres. For the support construction of this villa an obsolete paternoster was applied. The cladding is made of old cable-reels from a cable factory in the neighbourhood. The glazing and the insulation are made of manufacturing waste from nearby factories.

An interesting example of the social acceptability of architecture with reused materials is found in Christiania in Copenhagen, which was regarded as ‘an important corrective to a consumer society run amok’.

Supply Driven Interior Architecture or Furniture Design is easier to realise since less quantities are needed. Also, interesting and wonderful designs develop from the given materials and circumstances.
6.1 Conclusion

Lots of different approaches of how to work with an existing building and how to react to it can be found. These case studies show a variety, but only a small portion, of possibilities of reuse and do not conclude in one ultimate solution. Moreover they show the individual character each building has and that needs to be dealt with individually when working on an existing building.

In terms of the adaptability of structures it is found that the larger the space the more flexibility in order to adapt to future uses is given. The question that often needs to be dealt with is the cultural value of an existing building and if it is appropriate to repurpose it; thus besides some structural issues there are emotional or heritage issues that need to be considered.

Even though the original intentions and circumstances of ‘Portico’ were different, this example demonstrates that it can turn out positive for future additions to oversize a structure in the first place.

The Wismar Theatre shows how to add to an existing structure and making it competitive for the future without changing its original purpose and main spaces.

These existing buildings all have a high content of embodied energy being constructed of reinforced concrete and sandstone what makes it necessary to further use them. Often one can identify the different eras of design (Portico, Wismar Theatre), this shows and acknowledges the history of these buildings and turns out to be a kind of patchwork in architecture.

None of these examples was built with the intention of adaptable reuse; however, they were converted into interesting, sustainable, contemporary architecture with the interesting part of their building history included.
5 Resulting Design Guidelines

Grounded in the preceding research, principles can be defined in order to combine old and new structures and how to create a flexible building structure which is suitable for adaptive reuse in the future.

5.2 Principles – Combining Old and New Structures

Form:
- Modern form to not be competitive to the old one and to meet modern/flexible needs also in the future;
- Integrating old forms in a contemporary way and interpretation to create a connection between old and new (→ internal and external).

Materials:
- Use of modern materials to not to be competitive to the old ones and to meet modern, environmental needs that can sustain in the future;
- For restoration purposes use appropriate materials to not destroy historic component.

Lifetime:
- Old part needs special attention in terms of maintenance and restoration;
- New structure needs a lifetime which is according to the lifetime expectation of the old part;
- Especially if heritage listed it needs to be a functionally neutral structure to be adaptive to any future uses.

Services:
- All modern services and technologies (i.e. pv, water collection …) should be integrated in the new part of the building to service the old part and to assure that technologies do not destroy the old part.

Connection to neighbouring buildings:
- Exterior form of the new part should be matching with the existing surrounding buildings (i.e. height) in order to create a consistent urban environment, but at the same time it needs to be distinguishable as a new part of the environment.

General:
- Respect the existing and its built heritage;
- New elements not in competition but as addition, as continuing story of the built heritage → Patchwork;
- Maybe reflecting the original use (acknow-ledge);
- Create a strong connection between the old and the new building and the old and the new uses
5.1 Principles –
Creating Functionally Neutral Buildings

Form:
- Simple form, on a grid basis; at least the structural elements to be adaptable;
- Spacing of structural elements and height needs to be adaptable to different uses;
- possibility to extend the building vertically or horizontally;
- plan depth suitable for different target groups (>10m);
- Oversizing of the structure can be beneficial for future addition of floors, but has an economical impact at the outset.

Materials:
- Long lasting skeleton (main structure);
- All interior walls/fittings easy to be deconstructed;
- No compound materials;
- High quality façade, demountable/exchangeable.

Lifetime:
- Structural elements long lasting;
- All fittings, services, interior walls and other components to be able to be removed after their actual lifetime is over.

Services:
- Easy accessible and exchangeable in order to match with their lifetime and to be ‘up-to-date’;
- no installations integrated in load-bearing structure;
- Possibility to add service ducts or shafts.

Connection to neighbouring buildings:
- Neutral; matching at the time of construction with the possibility to adapt to future surroundings (i.e. flexible/exchangeable façade);
- Attractive to users ‘a beloved building is a sustainable building’.

General:
- Need to think about how long the building is going to be there;
- Best flexibility is given with large open spaces (i.e. St James and other theatres);
- consider requirements as early as possible in the planning process;
- ‘keep it simple’.
Part II
The St James Patchwork

4 Background
4.3 History of St James Theatre

After being a site of commercial spaces, which were twice rebuilt after fires in the mid-1800s, "the St James was built as a replacement for Fullers' Opera House on Wellesley Street in 1928" by the architect Henry E. White (1876-1952). "It was designed for travelling vaudeville acts, continuing a tradition of musical and comic entertainment that Fullers had pioneered in New Zealand. Vaudeville was popular among working-class audiences in the late nineteenth and early twentieth centuries but was eclipsed by the arrival of talking pictures. The St James was built just before this change occurred, and was modified the following year (1929) with the provision of projection facilities. It has continued to be used for both live performance and film, seeing entertainment as diverse as the Bolshoi Ballet and wartime newsreel.

The original building is remarkable for its well-preserved interiors, and is an unusual blend of traditional theatre and American picture house design. Traditional elements include the three steep tiers of seating, boxes and high-quality acoustics in the main auditorium, while the influence of cinemas can be seen in the elegant entrance tower on Queen Street (now concealed) and large foyers for public congregation. The ornate Spanish Colonial-style interiors include statuettes, marble steps and elaborate lighting, which was a way of transporting the audience away from their everyday life.

Fig. 38 Queen Street elevation in 1957

Fig. 39 Queen Street looking north in November 1963

Fig. 40 Original facade of the St James Tower in the 1940s

Modification on Queen Street façade and the vestibule were made in 1953 and Queen St façade was further modified in 1966. Purpose-built cinemas were added to the original structure in 1957 (Odeon Cinema), 1966 (Westend Cinema) and 1982 (Regent Theatre), some with heritage value of their own. Shops were included along the main frontage at this time, similar to the nearby Civic Theatre.

"The building is nationally significant as one of the best-preserved vaudeville theatres in the country, and illustrates important changes in popular entertainment during the early twentieth century. It is closely associated with the early motion picture industry in New Zealand, and subsequent developments in cinematic history. It has considerable aesthetic appeal, with many rare or unique elements in its intact 1928 interior. The theatre contains most of the original Spanish Mission style furniture and fittings.

The St James was lit with thousands of coloured globes concealed behind the decorative plaster and leadlights. Ross Thorne states that the leadlight enriched mouldings, capitals and panels in the box and balcony fronts are unique."

More recently until its closure in 2007 is has been used as a location for concerts and a nightclub.

The building has additional value for its proximity to other places of public entertainment (see 'Civic Theatre' and 'Auckland Town Hall'), showing the importance of Upper Queen Street in the cultural life of the early twentieth-century city. Its 1957 addition is significant as the first public space in New Zealand to be fully supplied with air-conditioning. The St James also enjoys high public esteem as a major place of recreation in Auckland."

St James was registered as a historic place in Category I under the Historic Places Act 1980 in 1988 (24.11.1988) and also by the Auckland City Council under Category A including the interior.

"Registration covers the building, its fixtures and finishes. It also includes recent modifications. The building lies on the site of possible Maori settlement and early colonial structures. The 1957 addition incorporates the standing remains, including the facade, of a nineteenth-century commercial building.

Fig. 41 Concert in St James (2005)

Fig. 42 Entrance on Lorne Street in April 2010

The theatre contains most of the original Spanish Mission style furniture and fittings. The St James was lit with thousands of coloured globes concealed behind the decorative plaster and leadlights. Ross Thorne states that the leadlight enriched mouldings, capitals and panels in the box and balcony fronts are unique."

More recently until its closure in 2007 is has been used as a location for concerts and a nightclub.

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26 Highest protection possible; see Appendix II
27 Highest protection possible; see Appendix I
4.2 SWOT Analysis

**Strengths**
- Location, plus additional value for its proximity to other places of public entertainment;
- Lots of different architectural and cultural influences are shown through the additions and alterations over time;
- Two street facades; therefore access points;
- Huge public awareness + loved by the public;
- Nationally significant as one of the best preserved vaudeville theatres in the county:
  • Considerable aesthetic appeal;
  • Many rare or unique elements in its 1928 interior (→ listed by NZHPT and Auckland City Council);
- Composition of different styles/eras of theatre architecture;
- Large seating capacity;
- Cultural environment:
- Great acoustics (believed to have the best acoustics in Auckland);
- Versatility – Spaces: several foyers, bars (11), theatre spaces, movie theatre spaces, retail, office space.

**Weaknesses**
- Structural safety (earthquake);
- Not compliant with current building code regulations (fire safety);
- Outdated electrical system;
- Location – provision of parking and fire vehicle access;
- Lack of contemporary light and sound equipment;
- Size of stage - too small for larger performances (i.e. ballet);
- Heritage listing could turn into a weakness due to restrictions on design decisions.

**Opportunities**
- Adds to and completes the Auckland CBD Entertainment Quarter;
- Because of its well preserved state – to enjoy the old glamour again;
- Heritage listing by two authorities: total or substantial demolition of items is a prohibited activity;
- Public awareness and media of the last years were good advertisement;
- Individual and personal high quality venue;
- Versatility – Spaces: several foyers, bars (11), theatre spaces;
- Working together with other venues (cooperation THE EDGE);
- Because of its versatility → lots of different uses possible (events, festivals, movie, live performances of any kind, conferences, TV productions) → in order to achieve a better ‘round the clock’ occupancy;
- Possibly suitable (with alterations) for National Convention Centre.

**Threats**
- Could be too many offers in the entertainment district;
- If not planned properly – destroying very important cultural heritage;
- Listed by NZHPT and Auckland City Council; under this District Plan, total or substantial demolition of Category A items is a prohibited activity;
- Construction of any new building could have negative impact on the weak structure of St James (i.e. ground movement as a result of excavations or new foundations – different ground pressure; vibration during construction work; construction debris falling from building; …);
- Declining live theatre audience.
4.1 Current Situation
The St James and its adjacent Theatre Centre have been vacant since its closure after a fire in the adjoining Westend in 2007. Without any occupation it has been continually decaying since then. Plans and proposals are being made for a 39-storey apartment building (Antipodean Apartments) above and around the St James, requiring demolition of the disused Odeon, Westend and Regent cinemas. These plans were submitted by developer Paul Doole and his Norfolk Trustee Company and were approved by the Auckland City Council and the NZ Historic Places Trust; however, the opposition went into court (High Court) and got the development put on hold.

After a significant public opposition increasing over the last years St James is for sale now for NZ$ 11 million; yet, the estimated restoration costs are around NZ$ 60 million.

A public campaign to save St James was launched by the NZ Herald at the end of September 2010. Several people of political and public importance are backing up plans to save St James. Further a group of New Zealand actors, historians and politicians was formed which calls itself the „St. James Saviours“. Many people are of the opinion that „as a reminder of the city’s rich theatrical past, it needs to be preserved“.

Also, it is widely noted that Auckland needs a 1,300-seat lyric theatre to host drama, opera and ballet; and that Auckland is desperately short of even an 800-seat theatre. The Theatre Centre would fit these smaller and mid-sized shows while being close to the festival hub in Aotea Square.

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28 THE EDGE: New Zealand’s leading performing arts, commercial entertainment and convention facility; Comprising four of the city’s finest venues - Aotea Centre, Auckland Town Hall, The Civic and Aotea Square (www.the-edge.co.nz/ (accessed 11.09.2010))
29 As planned to be located in Auckland CBD by Council (www.aucklandcity.govt.nz/news/council/201005/23/a01.asp (accessed: 24.05.2010))
At the moment proposals are being made for a National Convention Centre in Auckland. Under The Edge’s plan, the St James would complement the convention centre on Majoral Drive and would become the main venue for theatre, opera and ballet instead of the Aotea Centre, which would be incorporated into a new convention and exhibition centre.

Regardless of all the talk, newspaper reports and proposals for the site and its buildings it is a matter of fact that it need to be restored and occupied as soon as possible in order to not being lost as cultural heritage.

3 The Site

St James is located in 314 Queen Street within the so-called ‘Entertainment Quarter’ towards the southern end of Auckland’s CBD. It has a second street façade on Lorne Street opposite the State Library; there are plans to pedestrianize Lorne Street in this section. To the north it is bounded by a 16 level ‘copy of the international style’ office building built in the 1960s (former ASB building). To the south an Edwardian terrace shop building (only few left in the CBD) is found next to the former UDC office building (1970’s). Opposite on Queen Street as part of the Entertainment Quarter the Civic Theatre is found. This was opulently restored and redolent in the extravagant decoration of a picture palace. It is adjacent to an unremarkable but inoffensive example of early twentieth century office building, ‘large zinc plated loaf of bread’ (IMAX) and the new entrance to the Force Entertainment Centre. Further the recently redeveloped Aotea Square including the Aotea Centre and the Auckland Town Hall are found here.

This chapter gives a visual overview of the site and its setting.

3.3 Photo Documentation

In order to develop a better feeling for the building and its location this photo analysis gives an overview and provides an insight of the site and its surrounding area. For clarity and better orientation reasons it was tried to find higher positions for taking photographs.

In the first part the building itself and its site (street block, immediate surroundings) is documented; whereas in the second part the surrounding area
3.3.2 Planning Area

Fig. 47

with the Entertainment Quarter and Queen Street is shown.
It becomes apparent that the building occupies a site in one of the prime locations of Auckland. It is located in a vibrant area with lots of amenities close by.
No. 1  St James (Theatre Centre) on Queen Street (Fig. 49)

No. 2  St James on Queen Street from Aotea Square construction site (Fig. 50)

No. 3  St James façade on Queen Street looking north-east (Fig. 51)

No. 5  St James façade on Queen Street looking south-east (Fig. 53)

No. 6  St James entrance on Queen Street (Fig. 54)

No. 4  Tower behind cladding on Queen Street (Fig. 52)

No. 7  Footpath on Queen Street looking north (Fig. 55)
3 The Site

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No_8  Footpath on Queen Street looking south (Fig. 56)

No_10  Queen Street - view north towards downtown (Fig. 58)

No_9  Neighbouring UDC office building (Fig. 57)

No_11 Corner Lorne Street - Rutland Street looking northwest (Fig. 59)

No_12 St James façade on Lorne Street (Fig. 60)

No_13 Neighbouring old building on Lorne Street (Fig. 61)
No_14  Lorne Street looking north (Fig. 62)

No_15  St James façade Lorne Street looking south (Fig. 63)

No_16  State Library on the corner of Lorne Street and Wellesly Street East (Fig. 64)

No_17  View down Lorne Street from Wellesly St East (Fig. 65)

No_18  State Library and St James on Lorne Street with the AUT tower at the end (Fig. 65)

No_19  High rise (former ASB Building) on corner Lorne Street - Wellesly St East (Fig. 66)

No_20  View down Wellesly St East towards Queen Street with the Civic Theatre on the corner (Fig. 67)
3.3.1 Surroundings

Fig. 68 View south, up Queen Street; with the tower of the Civic and the Town Hall in the background

Fig. 69 View into Elliot Street from Wellesly Street West

Fig. 70 Wellesly Street West, view from Queen Street

Fig. 71 Wellesly Street - Queen Street intersection

Fig. 72 Queen Street looking south, the ‘Entertainment Quarter‘ with the Civic, Sky City Cinemas, Town Hall and potentially St James Theatre Centre

Fig. 73 Queen Street in front of St James

Fig. 74 Sky City Cinemas, entrance on Queen Street
Fig. 75 Aotea Square construction site (July 2009)

Fig. 76 Auckland Town Hall

Fig. 77 Rendering, proposed Aotea Square Redevelopment

Fig. 78 Auckland Town Hall on Queen Street

Fig. 79 AUT Tower on Rutland Street

Fig. 80 Wakefield Street, view from Queen Street

3 The Site
3 The Site
3.2 Site Analysis

Fig. 89 Site - The site with the St James Theatre Centre is located in the middle of and towards the southern end of the CBD (Central Business District) of Auckland within the so-called Entertainment Quarter
Fig. 90 **Existing Buildings** - set in quite a dense area; which is getting a bit less denser towards the south
Fig. 91 Surrounding Uses - area of public interaction with the universities and other public buildings, the entertainment buildings and the shops and restaurants on Queen St (and on Lorne St and High St) as well as on the smaller streets
Fig. 92  **Roads Parking Pedestrians** - Major traffic routes and minor traffic routes surrounding the site, which guarantees good accessibility for the building/site; although parking is a difficult topic in the city centre, however it is available existing close by; the pedestrian routes go along basically every surrounding road (majoring Queen St)
Public Transport - Public transport is a difficult topic in Auckland (there is effort to improve it constantly), but being in the middle of the city the site is well served with several bus stops around the site; also, Britomart Train Station (main train station in Auckland) is only 850m away and therefore is in walking distance; the bus services Link and Free City Circuit run close by as well.
Fig. 94  **Parks & Trees** - Although the site is located in the middle of the city, there are recreational green spaces around; the closest are Albert Park and Myres Park, but also Victoria Park and the Auckland Domain (not on map) are not far away; plus there is a lot of greenery on the side of roads found the further away from downtown city centre
Fig. 95 **Views** - possible views from the site from upper levels to the Sky Tower, Albert Park, Aotea Square and even to the Harbour; existing tower sits central on an axis of view from the centre of Queen St at its termination at Queen Elizabeth Square to the north.
3 The Site

Siteplan Scale 1:1000
3.1 Conclusion - Brief of Use
The site of the Theatre Centre is found in an excellent location in the middle of Entertainment Quarter. Because of this special location it should be actively included in the public live again. Thus it should be used as a public venue again; as shown in previous chapters, there is a lack of certain kinds of venues in Auckland which could be considered. Additionally other uses (such as residential or business premises) should be included in order to create a more mixed use environment making the inner city area safe, liveable and versatile.

Parking close by might be a problem; however lots of public transport (improving) as well as some multi-storey car parks are found around the site; also plenty of work, educational and entertainment opportunities are available.

Outdoor (recreational) spaces are found close by in the form of parks. Also, the waterfront (Harbour) is in walking distance; together with some magnificent views from possible upper levels the site becomes suitable for residential uses. Being located in the middle of the CBD it could also be attractive for visitors of Auckland.

At the moment the large vacant building is causing inactive, unpleasant spaces on Lorne Street which can result in crime, violence and vandalism. An occupied building, particularly a mixed-used building which is occupied 24/7, would strengthen the streetscape by providing passive surveillance and add a positive feature to the proposed Lorne Street upgrading.

2 The Building
The Theatre Centre consists not only of the historic St James Theatre but of three purpose built movie theatres which were added over the centuries. Moreover several foyer spaces and bars are found within the complex. On ground level and in the basement on Queen Street frontage retail facilities and take-away restaurants are found.

St James itself is of significant historic value as it is listed by the NZ Historic Places Trust (Category I) and the Auckland City Council (Category A). Its unusual design, referred to as ‘Spanish Mission’, combines elements of the English tradition of theatre design, which came from Victorian and Edwardian theatres, with influence of American movie palaces.

The only remaining proof on Queen Street of the theatre itself is the historic tower which is hidden behind an inappropriate cladding since the 1950’s.

"The Spanish Mission style was particularly appropriate for the St James. The decorative scallop (common in Spanish Mission style buildings) was St James’s motif and appears throughout the design of the St James Theatre. Few interiors of this style remain in New Zealand. “31

The other theatres are designed in their very own style of the time built and have some heritage value of their own even though they are not listed.

2.9 Use
The Theatre Centre has been vacant since 2007 because of fire damage in the Westend Theatre and structural safety concerns. Although the younger cinemas had been closed for a few years (since 1999), St James remained operational as a venue for concerts and parties until then. The site was no longer used for picture theatres, since this function had been overtaken by the Force Centre opposite side of Queens Street. According to the Architectural Design Statement there is hope that a new tenant or owner ‘with a more theatrical focus will initiate a return to the more appropriate original function’32

32 Architectural Design Statement. Architectural Design Statement – The St James Apartments; Auckland City Council File
However, even though the theatres are closed at the moment some parts on Queen Street still remain operational.

Current uses are:
• Internet Café(s) in basement area (cover assumingly 80% of the area between Queen St and the theatre building)
• Small restaurants and food outlets with limited seating on Queen Street
• Other retail on Queen Street
• Office areas: upper two levels of building between ASB bank and St James

Former uses:
• Civic facilities and recreation – Nightclub, live venue for concerts, Theatre, Cinema/movie theatre
• Retail and Commercial - Shopping/retail complex
• Youth Hostel with 55 beds

The tower on Queen Street’s original purpose is to be the only visible reference of the theatre AND to mark its entrance from the main shopping street.

2.8 Spaces
Being designed as a ‘grand palace’—spaces in general are quite large; the sheer volume of them would offer great opportunities for alteration, however the cultural value is high, thus extensive alterations are not possible. Also, most of the additional spaces are purpose built and therefore are not suitable for alterations. Some of the latter additions on Queen Street however offer some opportunities being a skeleton structure.

The St James entry foyer at ground level has been extensively altered over the last 40 years. The entrance on Queen Street has been widened and the cash box and candy bars have been altered. Additionally, the foyers have been recarpeted but most of the decorative features remain intact.

The St James auditorium with the three levels and boxes, the intimate scale of the theatre, and the small stage and pit indicate that St James was designed for touring vaudeville acts which only required a backdrop. Attention was given to the design of sight lines from the back of the theatre to the proscenium, this meant that a screen could easily be installed which was only a year after completion.

“Early vaudeville theatres were designed to strictly segregate the classes and often contained separate entrances with little if any foyer space; however influence of the ‘movie palace’ designs the entire theatre became luxurious, regardless of the price of the seat.” “From the stalls foyer the marble staircase leads to the dress circle and the grand circle. Both of these provided with fine foyers and that at the entrance to the grand circle, the least expansive section of the house, is no less elaborate than on the dress circle floor.”

Inside the auditorium boxes show the influence of the ‘Atmospheric’ style designs, they are set in walls typical of an old Spanish Mission house, against a background of deep sky blue.

The other (movie) theatres spaces offer large open spaces and additional foyer spaces. The former hostel and office could be eligible as functional neutral space being a skeleton structure.

2.7 Materials
It seems that with every addition made, materials typical for that time were used. This has left an interesting mix of materials. However, the building will require substantial work to meet modern building safety requirements in order to survive.

Structural elements in the whole theatre centre are made of reinforced concrete or steel. In some of the

## Materials

It seems that with every addition made, materials typical for that time were used. This has left an interesting mix of materials. However, the building will require substantial work to meet modern building safety requirements in order to survive.

Structural elements in the whole theatre centre are made of reinforced concrete or steel. In some of the newer parts there is a possibility of asbestos being used (based on the time of construction).

Inside furnishing and fittings were all carefully designed to add to the ‘luxuriousness’ of the theatre. “This attention to style is characteristic of the movie palace designs, where the whole theatre is the setting, not merely the stage.”

St James staircases are made of marble whereas in the Odeon staircases are made of steel.

Outside the original tower currently is covered with an inappropriate cladding; the rest of the Queen Street façade is either covered in metal sunshading devices or hidden behind large advertisements.

### Approximate Floor Space Areas

<table>
<thead>
<tr>
<th>Use</th>
<th>m²</th>
<th>Seating Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>St James</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basement</td>
<td>865</td>
<td></td>
</tr>
<tr>
<td>Ground Floor</td>
<td>1210</td>
<td></td>
</tr>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; Floor</td>
<td>822</td>
<td></td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Floor</td>
<td>822</td>
<td></td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Floor</td>
<td>390</td>
<td></td>
</tr>
<tr>
<td><strong>Westend</strong></td>
<td>656</td>
<td></td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Floor</td>
<td>755</td>
<td></td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Floor</td>
<td>700</td>
<td></td>
</tr>
<tr>
<td><strong>Odeon</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basement</td>
<td>805</td>
<td></td>
</tr>
<tr>
<td>Ground Floor</td>
<td>690</td>
<td></td>
</tr>
<tr>
<td><strong>Regent</strong></td>
<td>675</td>
<td></td>
</tr>
<tr>
<td>Ground Floor</td>
<td>30</td>
<td></td>
</tr>
<tr>
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<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Floor</td>
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<td><strong>Retail – Food Outlet</strong></td>
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<td></td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Floor</td>
<td>275</td>
<td></td>
</tr>
<tr>
<td><strong>Theatre Centre (over all)</strong></td>
<td>10,054</td>
<td></td>
</tr>
</tbody>
</table>

Source: Drawings - approximate

Fig. 96 Approximate floor space areas of the different uses
Fig. 97 Plan existing Theatre Centre - Basement (Scale 1:500)
Fig. 98  Plan existing Theatre Centre - Ground Floor (Scale 1:500)
Fig. 99 Plan existing Theatre Centre - First Floor (Scale 1:500)
Fig. 100 Plan existing Theatre Centre - Second Floor (Scale 1:500)
Fig. 101 Plan existing Theatre Centre - Third Floor and Roof (Scale 1:500)
Fig. 102/102 Sections existing Theatre Centre - Section E-E (top) showing the St James Foyer with the Staircase and Section D-D (bottom) showing the St James auditorium (Scale 1:500)

Fig. 104 Approximate Section existing Theatre Centre - Section C-C through Queen Street frontage (Scale 1:500)
newer parts there is a possibility of asbestos being used (based on the time of construction).

Inside furnishing, fittings and plasterwork were all carefully designed to add to the ‘luxuriousness’ of the theatre. “This attention to style is characteristic of the movie palace designs, where the whole theatre is the setting, not merely the stage.” St James staircases are made of marble whereas in the Odeon staircases are made of steel.

Outside the original tower currently is covered with an inappropriate cladding; the rest of the Queen Street façade is either covered in metal sunshading devices or hidden behind large advertisements. Lorne Street elevation is dominated by the intact elevation of the theatre; it provides a strong and singular expression of the theatre behind it. This concrete façade has remained almost entirely intact except for some polychromatic decorative panels which had to be removed because they were falling off.

The visible area of the southern, windowless wall of the podium is constructed of precast concrete, approx. 25m wide and 16m high and rises above the neighbouring two level commercial building.

2.6 Structure
According to a Report from Buller George Turkington, the St James Theatre is a well-constructed building using reinforced concrete and structural steel. However, it would not comply with modern building codes with respect to earthquake resistance.

Other structural features are:
- Supported by reinforced concrete foundation pads
- Steel framing and reinforced concrete; decorative plasterwork supported by a wooden framework;
- Plaster ceiling in the auditorium is suspended from trusses;
- Foyer was constructed to be fireproof and had sprinklers installed

It is believed that the newer parts of the complex are also constructed in reinforced concrete. The Regent and former hostel are constructed as a skeleton structure on a grid basis.

2.5 Heritage Values
The St James Theatre is registered in Category I under the Historic Places Act 2003. This category applies to “Places of special or outstanding historical or cultural significance or value”.

It is also scheduled as a Category A heritage item (No 145) in the Auckland City District Plan (Central Area); Criteria for which the building (theatre and the tower) is listed here are: Style, Architect, Design, Interior, Personnel, Events, Social Context, Continuity, Group Significance, Location and Intactness. These classifications prohibit any total or substantial demolition or alteration of the protected elements, moreover they advise broken elements to be reconstructed. Further, of all the Queen Street

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35 Buller George Turkington (Structural and Civil Engineers). ‘Comments on Construction Methodology’ (Re: The Antipodean Apartments). 01.11.2007. Auckland City Council File
36 Higest protection possible; see Appendix
37 Higest protection possible; see Appendix
theatres built for live shows, the St James is the only remaining one.

The latter added movie theatres have some heritage value of their own (according to NZHPT) even though they are not listed, yet.

St James has been a major focus of social life in Auckland for the best part of a century. Its large seating capacity had made it economical to bring large shows to Auckland for the last fifty years; thus it had been a venue for many important cinematic and theatrical events held for several royal and important occasions. Moreover internationally recognized music acts performed here. According to newspaper reports and internet forums almost every Aucklander has personal memories of the building; whether it is the older generations (theatre and movies) or the younger people (live concerts and house parties).

2.4 Adaptable Factor

The theatre spaces, as clarified before, offer large spaces with a good potential to be adaptable, but emocional issues. However, even the traditional form of the auditoriums offers besides the traditional performance uses possibilities for related uses (i.e. conferences, TV productions, graduation shows). The skeleton structure on Queen Street designed on a grid basis offers good opportunities for versatile uses.

2.3 Photo Documentation

This chapter gives an idea of the former beauty and glamour of the St James Theatre. First some important exterior details are shown; then some impressions of the current interior. To complete this picture some older photographs, from the time when it was still in use are shown. It becomes quite obvious that the theatre used to be one of the grand locations in Auckland and that, because of its preserved state, it could become one again. Unfortunately due to safety reasons no pictures could be taken in the other parts of the theatre centre; however some impressions of these facilities were found though other sources.
Fig. 106 Location of photographs taken at ground floor

No. 2 (Fig. 108) Foyer at ground floor is used as storage at the moment, it was left as it was after the last performance

No. 3 (Fig. 109) Entrance from Queen Street with the stairs to the Regent (front right)
No. 5 (Fig. 111) Ornaments in the ceiling (mezzanine) to the dress circle

No. 6 (Fig. 112) Stalls seating had been taken out years ago for a more versatile use of the space

No. 7 & No. 8 (Fig. 113) Boxes and plasterwork detail in the auditorium

No. 9 (Fig. 114) The stage remained closed for the last years

No. 10 (Fig. 115) Entrance to the backstage area

No. 11 & No. 12 (Fig. 116) The stage
No_13 & No_14 (Fig. 117) Basement backstage area

No_15 (Fig. 118) Basement - Dressing rooms without daylight lighting inappropriate for today's requirements

No_16 (Fig. 119) Marble staircase in the foyer leading to the dress circle

No_17 (Fig. 120) View from the staircase into foyer with the bar and Lorne Street entrance
Fig. 121 Location of photographs taken at first floor

No_18 (Fig. 122) Plasterwork details in the foyer

No_19 (Fig. 123) Coming up the stairs into the dress circle
No_20 (Fig. 124) Detail staircase handrail

No_21 (Fig. 125) Detail in the dress circle

No_22 (Fig. 126) One of the bars on the first floor, towards Lorne Street

No_23 (Fig. 127) Dress circle entrance to the auditorium

No_24 (Fig. 128) The seating in the circles remained, but it is inappropriate to today's standards

No_25 (Fig. 129) Atmospheric details in the auditorium
No_26 (Fig. 130) View into the circles

No_27 (Fig. 131) The two circles in the auditorium

No_28 & No_29 (Fig. 132) Boxes of St James

No_30 (Fig. 133) The stage

No_31 (Fig. 134) Escape routes

No_30 (Fig. 133) The stage
Odeon Impressions

Fig. 135 Odeon foyer, staircase featuring mosaic (1958)

Fig. 136 Foyer of the Odeon (1958)

Fig. 137 Façade on Queen Street

Fig. 138 Lounge with steel staircase and rock wall (1958)
2.2 Current Overall Situation
The existing building offers large spaces some even with historical value, which are perfectly suitable for public events. It is obvious that the building needs some restoration and construction work done in order to preserve it and to meet modern building code (and safety) requirements. However, after some alterations and modernisations it could become a charming venue for all kinds of events.

The Theatre Centre is very well located to be reused as theatre; this questions the current construction of the new Q Theatre behind the Town Hall which is supposed to open in September 2011.

The latest proposed plans for the St James site (Antipodean) do destroy part of the movie theatre history (by demolishing the Odeon, Regent and Westend) and even parts of the heritage protected foyer of the St James. Further there are no plans to restore the old theatre in this proposal, only the most necessary structural works would be done and otherwise left as it is at the moment while around and above it a new building arises. However, these plans have been put on hold due to legal discrepancies and significant public oppositions.

The Aotea Square Redevelopment has just been completed; as an ‘Art Space’ it is to strengthen the connection within the Entertainment Quarter.

Also, there are plans for pedestrianizing Lorne St. The part around the site is to be completed in August 2011. Since it is one of the dominating façades on Lorne Street the restoration of it could have been included in the plans, simply to create a more attractive streetscape impression.

2.1 Conclusion – Brief of Use
It is obvious that the whole building needs some use as soon as possible in order to survive. The previous chapters show that the Theatre Centre is quite a ‘Patchwork’. This is instantly recognizable in the pictures but also the years of construction and frequent alterations are an indication.

With an additional building this ‘Patchwork’ should be allowed to continue to grow in order to show the continuing the history and development of the Theatre Centre.

Since St James and the additional buildings are well retained with most of the interior intact it might be the most economic option to use them as (movie) theatres again. Furthermore, other public events (i.e. conferences, concerts,…) could be hosted as well. But since the scale of St James’ stage and backstage area are not suitable for contemporary performances they need to be extended. However, detailed designs on this and restoration works are beyond the scope of this thesis. It is mainly restricted by heritage protection and requires special attention and restoration techniques.

In order to create a sustainable building for the future, an additional building part is necessary; this needs to be able to survive the lifetime of the heritage protected building (what is concluded to be a very long time). Requirements of use are not foreseeable for such a long time therefore a neutral structure is needed. Moreover the new part must be able to supply the old building with every contemporary service necessary, since not many changes may be made to the existing theatre.

Due to the inner city location of the site there are restrictions on extending the building horizontally. Thus, a new addition should be built above of the existing building. Ideally the new design is able to cover expenses and turns out to be economically worth, which then can be seen as an opportunity to prove the Antipodean scheme is not necessary in order to be economically efficient. Naturally environmental efficiency is one main focus in this design.

Among the creation of functionally neutral spaces above the existing building, the existing structure
on Queen Street can be used as adaptable structure as well.
A public space above the existing Theatre Centre could additionally connect Queen Street (Aotea Square) and Lorne Street and create an ‘urban garden’ away from the inner city disruptions.
A mixed-use Theatre Complex to be used for all kinds of public events and in combination with other uses (i.e. residential, retail, offices,...) create a vibrant place in the city.
The project would restore the existing tower on Queen Street for its original purpose – marking the entrance of the Theatre centre, and give it an additional use. Moreover another marking element which is adjusted to today’s scale of the urban environment should be created.

1 Concept of Use
This concept of use shows the possibility of how to create additional functionally neutral structures to the existing Theatre Centre, while having a minimum of constructional impact on the existing structures.
The theatre has always been for a special, creative, glamorous kind of people; now the new parts need to reflect that. Therefore the development of a concept for this very special building is a challenge and as it requires that certain something.
The existing parts are used as: theatre, cinema, live venue, conference facilities, for TV productions and much more related uses; the different sized capacities offer every opportunity for versatile uses.
The new building needs to serve the old one while being an independent building. There is no use specified in particular for the new structure, but different options are shown. However it is designated to people who love to watch, to be seen and like to celebrate cultural values. These future inhabitants could enjoy specialities like for example the connection with the theatre through the opportunity to by a seat in the theatre.
Due to independent secondary structures for the different uses the functionally neutral main structure is able to accommodate versatile uses over its life time.

1.2 Patchwork
Because of the way the Theatre Centre developed over the decades, the idea of a patchwork design appears to be obvious. This chapter gives a brief overview of the interactions.

1.2.3 Definition
“Patchwork or „pieced work“ is a form of needlework that involves sewing together pieces of fabric into a larger design.”

These larger designs are usually based on repetitive patterns built up with different coloured shapes.
The shapes are typically basic geometric shapes and straight-sided, making them easy to piece together. Traditional patchwork uses identifying names based on the arrangement of colours and shapes; there are three traditional structures used to construct a patchwork: patchwork blocks, overall patchwork, and strip piecing. An additional, unique kind of patchwork is the ‘crazy quilt’, which was popular during the mid–late nineteenth century. The crazy quilt is made up of randomly shaped patchwork pieces made of luxurious fabric such as velvets, silks, and brocades. Decorative needlework embellishes the seam lines between the individual shapes which are stitched together forming „crazy“ or non-repetitive, asymmetric compositions.

During the Great Depression Patchwork was a way to recycle worn clothing into warm quilts. Even very small and worn pieces of material are suitable for use in patchwork as the basis for designs.

1.2.2 Illustrations

These illustrations developed out of the years of construction of the different parts of the Theatre Centre. They show the major stages of additions and alterations over the decades.

The forms were chosen in accordance with the built volumes in plan. The colours represent either the era of construction or the function of the ‘patch’. A framing of single elements underlines the importance of these.

The resulting pictures could be hung into the individual units of the new building as a reminder of the history of the complex of buildings.

Fig. 139 St James Patchwork prior 1900
Fig. 140  St James Patchwork 1927/28
Fig. 141  St James Patchwork 1929
Fig. 142 St James Patchwork 1953
Fig. 143  St James Patchwork 1957
Fig. 144 St James Patchwork 1966
1  Concept of Use

Fig. 145  St James Patchwork 1982
Fig. 146 St James Patchwork 2000
Fig. 147  St James Patchwork 2007
Fig. 148  St James Patchwork 2011
1.2.1 Conclusion
St James and its Theatre Centre can be defined as patchwork, moreover as the style of ‘crazy quilting’. This becomes obvious in the illustrations of the different years. Over the past decades pieces (buildings) of different shape and style were added to St. James, also some were altered or replaced when their lifetimes were over. This turns out to be quite a sustainable concept, since only elements with an expired lifetime were demolished and reconstructed, while they simultaneously extended the lifetime of the whole.
Furthermore, the continuing addition of building parts tells the story of the building through its style and materials; just like some patchwork quilts tell a story.
For this design, the concept of patchwork will be continued and developed further by adding new buildings to the existing composition. Moreover, the basic structure of the new design will create a frame for future patchwork within.

1.1 Development of the Design
Because St James is such a significant building the decision was made not to change it too much, but to restore it to its old glamour.
Rather than changing the existing building, a new building is to be built above the existing one, to support and supply the old building, basically serving the old building, economically and technologically. Here, the new elements need to be clearly distinguishable from the old ones; this is achieved through modern forms, materials and colours (i.e. smooth straight forms in white; glass and plaster).
The new shape of the Queen St façade retains the existing tower, which is going to be uncovered, restored to its original configuration and still be visible from either direction on Queen St being the traditional element of the new street frontage.

The new façade is inspired by the old one, even though it will not show the old pattern of windows; its design clearly showcases a new building, distinguishing the new bit from the old one. It is not competing with the existing but celebrating the old tower in order to acknowledge the history of a glamorous performance era gone by. Due to the contrast of the two facades a strong connection between the old and the new building is created. This connection is underlined by the old and new uses as well.
St James need to be adjusted to contemporary needs and requirements; this includes the extension of the stage (and backstage), daylit dressing rooms and the provision of accommodation for performers.
A new access tower in the middle of the site and its scale matching today’s urban environment is necessary strengthen the landmark character of the old tower without being in competitive.
Having developed over the last century due to frequent additions – like a Patchwork- this design is to become the next one, by having its very own style of the time. But still connecting with the existing for a new Theatre Centre which is capable of competing today and will be in the future as another part of the St James Patchwork.

1.1.10 Influences
The design of this concept is inspired by several theatre elements:
- Light installation structure used for the bridges;
- Stairs + stage interior of the units;
- Large windows (framed);
- Boxes - winter gardens;
- Curtain – façade;
- Pattern of a Punchinello - coloured mosaic façade in form of rhombuses;
- Double doors.
1.1.9 Connection to Surroundings

St James was designed to complete the ‘tower triplex’ in the Entertainment Quarter on Queen Street. It is necessary to strengthen this connection again and to integrate the Theatre Centre into the Entertainment Quarter again. Furthermore, a connection of Queen Street and Lorne Street could be beneficial since public and entertainment amenities (Library, Academia Cinema) are found on and beyond (Art Gallery)Lorne Street as well. This can happen via the existing foyer and a roofgarden on the Theatre Centre.

Being a patchwork, like basically the whole CBD, the new building is clearly recognizable as a new part of the urban environment. The façade is easily demountable for alterations in the future. The new structure is to ‘hover’ above the old one and also above the neighbouring Edwardian building.

There is a little direct connection to the northern building with the new northern tower attached and the use of the blank wall in cooperation with a roof garden.

A connection to the surroundings can only be achieved with the form, by taking the existing boundaries and height limits due to the stylistic patchwork of the city. However, buildings within an urban environment need to work together in order to create an attractive inner city environment.

At the moment there is a lack of activity on Lorne Street due to ‘inactive’ surrounding sites a large underutilized space developed. In order to reverse this and to create a more attractive streetscape again the restoration of the façade is essential. The current plans for pedestrianizing Lorne Street offer a good possibility to integrate the large façade.

However, vehicle servicing will take place at the northern and southern end of the site on Lorne Street since no vehicle crossing is allowed from Queen Street.

39 The three towers on Queen Street: Town Hall, Civic Theatre and St James
1.1.8 Use
The existing theatres could be used as theatre, performing arts centre, ballet venue and cinema; for concerts; as lecture hall or conference facility; also to be used for special events (i.e. graduation ceremonies) or TV productions. Comprising of four theatre spaces, several foyers and eleven bars uses can be versatile and spaces can be chosen in accordance with the size of the event. With all these different uses it should be possible to keep the building occupied almost 24/7.

In the ground floor and basement level on Queen Street retail and food outlets are the most suitable and economic option. Above offices for the administration of the Theatre Centre are planned. However, these spaces can also be seen as functionally neutral.

The existing roof space is to be converted into a public open space connecting Queen Street and Lorne Street. Cafés, restaurants, a Black Box and an outdoor cinema can be found here. Access to the outdoor cinema takes place via the existing tower (existing stairs) in order to give it an additional use. However, the public use of the roof garden has the ability to change and to adjust according to the needs and the use of the new structure.

Within the new building the idea is to create quality spaces for people who love the stage and their presentation, also watching others, thus for people who enjoy the vibrant inner city living.

The proposed structure is functionally neutral; therefore no use in particular is defined. Moreover flexible spaces developed featuring different sizes and ceiling heights. This gives the opportunity to accommodate almost every kind use due to three main floors with a floor-to-ceiling height of 10.3 m. Uses which can be accommodated with this floor-to-ceiling height are for example: functions, gym/sport studio, a garden or storage space. Within these spaces up to two additional floors can be constructed as a secondary structure. The floor-to-ceiling height of 2.8m is then suitable for residential use. The floor-to-ceiling height with only one additional floor of 4.5m allows for businesses such as offices or restaurants.

Additionally some extending spaces for the St James are found in the new building. In order to make it capable for contemporary performances storage spaces and workshops located within the existing building as well as daylit dressing rooms and the stage extension found in the new structure are planned.

Also short term accommodation for the people who perform on the stages of the Auckland Entertainment Centre is planned as a separate structure creating the new landmarking element of the Theatre Centre.

For its construction a small part of the existing building need to be demolished; however, a new atrium extending the space of the St James foyer and bringing daylight into it will be created.

1.1.8.2 Catalogue
This catalogue was developed to show the flexibility of the spaces. Eleven options of different uses and out-fitting possibilities were designed. These options cover a broad range of uses, such as different residential and commercial uses, as well as a restaurant, spaces for functions, and even an outdoor space.
Fig. 155 Apartment I - sizes can vary between 80m² and 140m² (one or two bedrooms)
Fig. 156 **Functions** - 140m² offer space for a podium, audience (~60 seats), storage and an entrance area
Fig. 157 Hotelrooms - ~33m²
Fig. 158 Office - 280m² open plan office, interior walls could be introduced if necessary
Fig. 159  **Open Plan or Storage - 140m²**
Fig. 160 Apartment II - 80m² - 140m²
Fig. 161 Garden - Outdoor space; for example being used by the community of the building; permanent southern façade protects from strong (southern) winds
1  Concept of Use

Fig. 162 3-Storey Apartment  - 225 m²  four bedrooms
Fig. 163  Gym/ Sport Studio - 300 m²
Fig. 164 Apartment III with Home Office - 300 m² + 160 m²
Fig. 165  **Restaurant** - 250 m² (use of second floor possible)
1.1.8.1 Roof Garden

The roof garden is to connect the existing building with the new one. Further - as a public space - it connects Queen Street and Lorne Street, basically including the public venues on Lorne Street and beyond into the Entertainment Quarter.

The roof garden creates a place for the interaction of people - the public, actors or performers, and the inhabitants of the new building - by being the connection area between the buildings with open spaces, restaurants/cafés, and lobby; plus the visual connection from the new units and into the new atrium. Important influences in creating this space of connection are the bridges above, connecting the new structures; because of them the roof space becomes dynamic and is clearly defined.

Furthermore two more audience spaces are created, an outdoor cinema and a ‘black box’.

The existing roof of St James remains in its form (however, the cladding might need to be renewed) as the historic element reaching into the new space.

The new atrium with its transparent roof basically works the other way around, reaching into the historic space as a new element.

A separate access for the public via the atrium is created in a sculptural form; as well as the ‘black box’. These two monoliths on the roof can be seen from street level in order to attract the public.

Access to the outdoor cinema is given via the existing tower; this has the advantage of providing an additional use for it.

Despite all these uses and designs proposed for the roof garden this space is quite a flexible space too and can be used in more private ways as well. One option of conversion can be seen in this chapter, however, there possibly even more opportunities.
Fig. 166 **Roof Garden** - as another extension of the Theatre Centre (1:500)

Fig. 167 **Roof Garden** - possible more private use of the roof garden (1:500)
1.1.7 Spaces

The theatrical influences are reflected in the floor plans:
• Split levels in almost every apartment create a stage feeling;
• Stairs and steps (different levels) create different viewpoints of the spaces;
• Large windows (floor to ceiling) with modern curtains imitate the stage and bring plenty of daylight into the rooms;
• Bridges above the roof garden give the opportunity to watch and being watched (stagy feeling).

The sizes of the interior spaces in the new building vary since they develop from the different uses – basic floor area (3x fixed) with the maximum possibility to triple it

Basic Floor Spaces:
Northern Building:
Useable Space: 176 m²/Floor
Access and service: 75 m²/Floor

Southern Building:
Useable Space: 728 m²/Floor
Access and service: 200 m²/Floor

1,179 m²/Floor

Total basic floor space: 3,537 m²

An extension of the stage and backstage area of St James is necessary.

The additional spaces are:
- Stage;
- Backstage;
- Storage and Workshops;
- Dressing rooms.

1.1.6 Materials

Materials for the new building need to be chosen carefully, the proposed lifetime of each element needs to be considered before choosing an appropriate material. Preferably recycled and/or recyclable materials should be chosen; modern (high-tech materials) should only be used where appropriate.

Materials need to be sourced locally or at least restricted to the north island in order to keep cost and environmental impact due to transportation emissions as low as possible.

Salvage companies are found in Auckland (Great North Rd) and could be able supply larger amounts of building materials depending on current deconstruction. Because of the size of the project it might turn out to be difficult to solely construct it from recycled materials, nevertheless there will be a high recycled content in materials used. However, in the case of the quantities of components not being enough, similar components can be selected; this would strengthen the individuality of each unit.
Materials for the restoration of the old building need to be chosen carefully as well but with different intentions. These materials need to be in accordance with the existing ones and should not destroy the existing materials.

**Construction:**

**Main structure:**
- Demounted steel from other large structures (i.e. Auckland Harbour Bridge, Queens Wharf Sheds)
- Concrete with recycled contents or on a natural basis

**Example exterior wall:**
- Cladding (…) (gypsum board, straw mats with clay cladding)
- Insulation (Newspaper, Sheep wool, Straw,...) between timber frame construction
- Weatherproof façade (recycled glass, multiple layers);

**Elements/Appliances:**
Reuse of elements and appliances is compulsory; It is intended to have matching elements within each residential unit, but different elements in different apartments would rise the feeling of individuality thus being special. Original architectural elements from the protected part of the building which have been identified in the Conservation Plan as having heritage significance will be salvaged and reused in the building new facilities. The seating for example is not conform to contemporary needs, therefore it could be used in the units (the remaining could be sold to people who would like to have a piece of memory of the old times of the theatre).
1.1.5 Structure

The new structure is completely independent of the old one; however the existing structure needs additional support according to the structural (earthquake resistance) problems identified earlier. St James Theatre is a heritage protected building, thus it is supposed to last very long. This means that the additional structure has to last a long time as well. But since no one can foresee what kind of uses and its requirements will be needed in the future this long-lasting structure needs to be as neutral as possible in order to meet the different requirements for room heights (and spaces) for different uses. In order to keep the building as adaptable as possible the new structure consists of a main structure and minor structures.

Main Structure (long lifetime): Steel and reinforced concrete structure with steel trusses cantilevering above the existing. The more steel is used the better the possibility of disassembly (and reuse) would be after the life time of the structure is over.

Service and access cores function as bracing. The new concrete pile foundations would eliminate the risk of vibrations from building activities (likely to be less than those caused by heavy traffic).

Because of being located in the middle of the City Centre the site does not allow for horizontal future extensions without demolishing other buildings; however there is the possibility to provide for vertical extension by over-sizing the structure. This, obviously, would cause additional costs.

Secondary structures: timber construction to add one or two floors in between the slabs of the main structures. These could possibly be prefabricated and just need to be slid into the main structure.

1.1.4 Elevations

The elevations of the new buildings are slightly set back from both site boundaries to not compete with the old building.

The existing Lorne Street elevation is going to be restored because of its intact state and to provide the expression of the theatre behind it again.

Queen Street façade, apart from the restored tower, is a modern, demountable façade with its design in the basis of the former façades. It combines the vertical elements of the early elevations and the
horizontal elements of the more recent elevation. This arrangement combined with the third dimension (depth) creates an interplay of the different façade elements that reminds of a patchwork. Due to the modern forms used there is no competition between the existing tower and the new façade; however, the times of construction are clearly distinguishable. The main entrance on Queen Street is going to be recognizable as such again. In acknowledgement of the former curved canopy a new curved one was designed; however this one is made of modern materials like an air cushion roof, also used for the roof of the atrium and the ‘black box’. The northern façade of the new building appears to be an abstract version of the curtain pleats. This image is created through the back and forth dropping balconies and winter gardens in combination with large vertical windows (high-performance double glazing). The same pattern is found on the western façade of the northern tower. The winter gardens on north façade act as climatic buffer and noise level regulator.

The southern façade is glazed with coloured mosaic in form of rhombuses (pattern of Punchinello) from the inside the impression of looking through a kaleidoscope is intended; together with the internal access ways behind the façade creates a climatic and visual buffer towards the units. The changing floor heights guarantee privacy inside the units. The internal façade is based on a skeleton with elements that can easily be exchanged (glass, opaque glass, solid) depending on the use and preferences of inhabitant. The Punchinello pattern is also found on the western façade of the northern tower where greenery grows on it.

The new tower in the middle of the site is made of plain white facade elements. Together with the clear glass frontage of each cube the impression of ‘show boxes’ erases. Sunshading devices guarantee pleasant temperatures inside.

The bridges connecting the three new parts of the building add the ‘drama’ to the design; they create a lively atmosphere as they seem to be different from every viewpoint on street level.

1.1.3 Services

No modern services are put into the existing building (apart from provisions required); however these are necessary to provide for a contemporary venue and make it economical and environmental viable. For that reason all modern services necessary for the existing Theatre Centre are located in the new buildings close to the old ones. Existing services need to be checked and replaces if necessary. However, the existing sprinkler system works and is inspected on a regular basis at the moment. Even though separate systems for the different uses (Theatre, practicing spaces, retail, residential) are needed they can work together. For example the heat generated by the chillers for theatre (heat load: 2000 people →400 kW) could be stored in thermal storage tanks and then be used as heating for apartments though a heat exchanger.

Cooling devices in the theatres could be placed underneath the seating. The provision of a hydraulic platform in the stage can be located in the now vacant basement area (former dressing rooms).

In regards to the ‘1000 of coloured globes’ which used to lit the St James LED’s could be used.

The new building is equipped with:

- PV devices (shading elements and integrated in the air-cushion roofs)
- Radiant heating and cooling: underfloor or wall heating/cooling sourced by solar water heaters or cool nighttime airflows;
- Solar hot water collectors on roof (mean optimum angle 36°)
- Use of computerized controlling systems for ventilation, heating, water pressure, airflow
Fig. 180 Queen Street Elevation

Fig. 181 Lorne Street Elevation
etc. need to be examined in terms of energy consumption, embodied energy and maintenance costs;
• Rain water collection and use (additionally grey water treatment on roof in ‘wetlands’ possible).
Access within the Theatre Centre is given by the existing assess ways. The new buildings can either be accessed via the existing St James foyer, the new tower and the bridges or via new access points on Lorne Street. The elevators in the access cores are glazed including a glazed roof in order to bring daylight in.

1.1.2 Environmental Building Performance
I order to create a sustainable building that will continue to do so in the future it is necessary to provide appropriate services and designs.
These are:
• Compact building shape to minimize surface area (main buildings)
• Wintergardens and double facade as climatic buffer zone to ensure enough daylighting
• Thermal mass in concrete floors and service cores
• Adjustable sun shading devices on north facade; with PV panels (also as stunning design element, casting prisms of light and reflection into space)
• Adjustable, vertical shutters on western and eastern facade also direct views for privacy
• Rain water collection
• Green walls + roof
• No air-conditioning, but natural ventilation and mechanical cooling plus chilled ceilings and heat exchanger
• Solar warm water
• Atrium for more daylighting in foyer space
• Reuse and recycling of building materials – as many as possible
• Source materials locally

When using Australian Green Star Rating Tool attention must be paid to the climatic conditions. The results of Life Cycle Assessment or Green Star rating will be presented at the final presentation.

1.1.1 Impressions
Based on the previous conceptual decisions the design for the proposed building developed. The changes within the existing Theatre Centre are on a conceptual basis an need further development with a particular focus on the heritage values. However, they showcase the possibilities of how to adjust St James and its Theatre Centre to make them economically useful again.

The new buildings of the St James Patchwork demonstrate an addition that is able to maintain the existing while being a new part of the urban environment.
Selected plans, sections renderings and model photographs are shown in this chapter.
1 Concept of Use

Reuse – The Lifecycle of Buildings in New Zealand

Fig. 183 Environmental Building Performance - Section 1:500
1 Concept of Use
1 Concept of Use

Fig. 185  First Floor after conversion 1:500
Fig. 186  Temporary accommodation for performers - Plan 1:200

Fig. 187  Section C-C 1:500
1 Concept of Use

Fig. 188 Model Pictures

Fig. 189 Queen Street Perspective
0 Conclusion

With this concept, developed from the research question and hypothesis, a sustainable proposal for the historic St James theatre, the Theatre Centre and its location has been developed. Through analytical comparisons, a wider view into different areas concerning reuse, recycling, lifetime cycles and functional neutrality a suitable use could be found which will be attractive for the majority of the population; Due to the liveable design and integration in the urban structure of the Entertainment District it is also attracting visitors of the city.

However, because of the amount and complexity of the project and in order to meet the predefined time limits this concept is not to be seen as a final solution, but as the foundation for forthcoming research and design work.

Additionally this proposal should be seen as an alternative for the current plans of the developer to create a high-rise apartment block which risks losing valuable cultural heritage and creating even more, impersonal space in Auckland’s CBD. This proposed repurposing is seen as unsuitable, because of this loss of cultural heritage (in particular the listed parts of the foyer), the missing integration into the urban framework, the kind of use (parking deck and low quality apartments) and certainly the missing reflection of sustainability in a world of growing environmental consciousness.

Through the proposed partly demolition of the theatre complex the cultural landmark St James which finds wide acceptance and appreciation in the public would be destroyed.

Also, the construction of the Q theatre is to be questioned, since there are existing theatre spaces across the road, which could have been restored and reused in the first place.

In contrast, this proposal provides a sensible and sustainable addition for the existing complex and the surrounding entertainment district though its design and flexibility. It responds to its surrounding social, cultural, structural, and urban environment and will be able to do so in the future. Being an addition to a heritage protected building this is absolutely necessary in order to meet the lifetime requirements.

Moreover, because of its high quality it will be economically sustainable and support the old theatre even better than the officially proposed scheme. Also, environmentally and technically it is able to support the existing building. Likewise it is a great addition to the planned pedestrianization of Lorne Street.

Exclusive and individual inner city spaces are provided. Through different uses, a better utilisation of the potential of the buildings and their equipment is achieved. Versatile uses keep the building occupied almost around the clock.

Showing the potential of revitalisation and for the connection between such an old and a modern building and demonstrating the adaptability of this modern building can possibly result in imitators and generate a shift in public thinking in terms of reusing buildings rather than demolishing them and the adaption of possible lifecycles of building while planning it. Further the consciousness about the preservation of their built cultural heritage might be able to rise. The results found might help to further develop the consciousness about how to find solutions to the environmental problems we are facing today and will be facing in the future.

Even though the significance of this project lies in its future aspects by making a building capable for the future today, this building can be seen as a strong, powerful and dramatic advertisement for how significant new space and new use can be made on old buildings.
Through this concept the planning area with its existing and historic buildings experience a significant upgrading in every aspect as well as the surrounding district. Through the restoration and reuse of the existing buildings, but also through the integration of new buildings, technologies and uses, the building adds an essential dimension to the Entertainment Quarter in the heart of Auckland’s CBD.
Photograph Credits

Part I
Fig. 1: www.sovereign-ancestry.com/images/map-new-zealand-large.jpg (14.11.2010)
Fig. 2: www.gaisma.com/en/location/auckland.html (10.12.2010)
Fig. 3: www.nzinfo.de/images/auckland_map.gif (14.11.2010)
Fig. 4: Claudia Ninas
Fig. 5: http://maps.google.de/ (14.11.2010)
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Fig. 7: Shaw, Peter; A History of New Zealand Architecture; Hodder Moa Beckett, New Zealand; first published 1991, 3rd Edition 2003; p. 106
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Auckland City Council

Glossary

Building Materials

CLT Plates: Cross Laminated Timber
OSB Plates: Oriented Strand Board
PCM: Phase Change Material

General

CBD: Central Business District
Black Box: System or object that can be viewed solely, without any knowledge of its internal workings

New Zealand

City Circuit: Free bus loop in the Auckland city centre
Kowhaiwhai: Painted scroll ornamentation - commonly used on meeting house rafters
Link: Frequently served bus route (loop) in the inner city area
Maori: Indigenous Polynesian people of New Zealand
NZ Herald: Daily newspaper
NZ HPT: New Zealand Historic Places Trust
Appendix I

Auckland City Council Heritage Protection
(www.aucklandcity.govt.nz/council/services/heritage/types.asp (21.11.2010))

Types of protection

Auckland has a rich legacy of widely appreciated heritage elements, both natural and built. The district plan has a particular responsibility to secure the preservation and maintenance of these resources for the experience and enjoyment of present and future generations as well as preserving their intrinsic values and finite characteristics. Heritage resources cover a wide spectrum. They range from dominant landscape features, like the volcanic cones; through historic buildings and highly regarded townscape inherited from former generations; to sites of high archaeological value.

* Scheduled archaeological features
* Scheduled buildings, objects, heritage properties or places of special value
* Scheduled ecological sites
* Scheduled geological feature
* Schedule of notable trees
* Waahi Tapu areas (Scheduled Maori heritage sites)

Categories of protection

Scheduled buildings, objects, heritage properties or places of special value are classified into one of two categories.

Within each of the categories protection is given either to a particular heritage building or object, or to a particular heritage property. A heritage property refers not only to a particular building or object but also to the site or area on which those features are located.

---

Category A

Criteria

In this category are buildings, objects and places (or parts of these) which have outstanding natural beauty, or architectural, scientific or historical significance well beyond their immediate environs. It is of prime importance that items listed in Category A are protected.

Category A classification gives district protection to the exterior of the building together with such other elements (interior, site) as are particularly specified in the schedule. The demolition of Category A heritage items is a prohibited activity in the district plan.

Category B

This category includes buildings, objects and places (or parts of these) of such quality and character that, although less significant than Category A items, they should not be wilfully removed, damaged or altered in a significant way unless there is a compelling reason.
A Category B classification gives district plan protection to the exterior of the building together with such other elements (interior, site, etc) as are particularly specified in the schedule.

Criteria

To determine whether a building, object, property or place is worthy of protection in the district plan, any proposed heritage item is assessed and evaluated against the following factors.

* architecture
* history
* environment
* usefulness
* integrity

Appendix II

NZ Historic Places Trust

Assessment criteria to assist in the identification of Historic Heritage Values (extract)

The following best practice criteria are promoted by the NZHPT for use by local authorities and communities to encourage a systematic and transparent approach to identification and assessment of historic heritage.

Physical values
Archaeological information; Architecture; Technology and Engineering; Scientific; Rarity; Representativeness; Integrity; Vulnerability; Context or Group.

Historic values
People; Events; Patterns.

Cultural values
Identity; Public esteem; Commemorative; Education; Tangata whenua; Statutory recognition.

More detailed information is found in the Information Sheet No.2, Assessment Criteria to assist in the identification of Heritage Values and Significance (draft for consultation) under http://www.historicplaces.org.nz/~media/Corporate/Files/Submissions%20and%20Research/InfoSheet_IdentificHeritageCriteria.ashx
Appendix III - Presentation

Site Model Existing 1_500
Site Model Proposed 1_500
Model Detail 1_100
Patchwork Illustrations
## Environmental Building Performance

<table>
<thead>
<tr>
<th>Main Structure</th>
<th>PEI [MJ/m³]</th>
<th>CO₂</th>
<th>Lifetime [a]</th>
<th>Reusability</th>
<th>Reused*</th>
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<td>Concrete Bottom Plate</td>
<td>1136</td>
<td>128,9</td>
<td>min. 80</td>
<td>Concrete and sub-flooring: as crushed aggregate (high use of energy); Reinforcement: salvage; Other: depending on Material - landfill</td>
<td>only if no impact on quality</td>
</tr>
<tr>
<td>and Strip-Footing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Walls</td>
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<td>Precast Concrete</td>
<td>774</td>
<td>60,1</td>
<td>min. 80; cladding less</td>
<td>good demountability; Concrete: as crushed aggregate (high use of energy); Reinforcement: salvage; Other elements can be reused depending on their type and conditions</td>
<td>only if no impact on quality</td>
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<td>63,9</td>
<td>min. 80; sub-flooring:40</td>
<td>Concrete and sub-flooring: as crushed aggregate (high use of energy); Reinforcement: salvage; Other depending on conditions</td>
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<tr>
<td>Reinforced Concrete</td>
<td>1447</td>
<td>187,3</td>
<td>min. 80</td>
<td>Concrete: as crushed aggregate (high use of energy); Reinforcement: salvage</td>
<td>only if no impact on quality</td>
</tr>
<tr>
<td>Column (steel only to be used if reused)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floor</td>
<td>36 MJ</td>
<td>2,4</td>
<td>60-100</td>
<td>good demountability</td>
<td>yes</td>
</tr>
<tr>
<td>Roof</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green Roof</td>
<td>2323</td>
<td>101,5</td>
<td>Structure: min. 80; Other: 20-30</td>
<td>good demountability; Concrete: as crushed aggregate (high use of energy); Reinforcement: salvage; Plants and Drainage: direct reuse; other elements can be reused or recycled depending on their type and conditions</td>
<td>structural: only if no impact on quality; Plants: yes</td>
</tr>
<tr>
<td>Fassade</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glazed Double Fassade</td>
<td>80 (expected)</td>
<td>243,5</td>
<td>min. 80; finish: 40-50</td>
<td>reuse of complete element possible; or as crushed aggregate (high use of energy)</td>
<td>only if no impact on quality</td>
</tr>
<tr>
<td>Stairs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reinforced Concrete (pre-cast)</td>
<td>1608</td>
<td>243,5</td>
<td>min. 80</td>
<td>Concrete: as crushed aggregate (high use of energy); Reinforcement: salvage</td>
<td>only if no impact on quality</td>
</tr>
<tr>
<td><strong>Total (Main Structure)</strong></td>
<td>8256</td>
<td>785,2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary Structure</th>
<th>PEI [MJ/m³]</th>
<th>CO₂</th>
<th>Lifetime [a]</th>
<th>Reusability</th>
<th>Reused*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Timberframe with Sheepwhool in between</td>
<td>193</td>
<td>-35,2</td>
<td>highly influenced by construction method and maintenance (35-60)</td>
<td>good demountability; elements can be reused depending on their conditions</td>
<td>yes, only if no impact on quality</td>
</tr>
<tr>
<td>Ceilings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laminated Timber Beam Construction</td>
<td>1409</td>
<td>-66,1</td>
<td>30-80; highly influenced by construction method and maintenance; sub-flooring:40</td>
<td>good demountability; elements can be reused depending on their conditions;</td>
<td>only if no impact on quality</td>
</tr>
<tr>
<td>Stairs (steel only to be used if reused)</td>
<td>676</td>
<td>-25,7</td>
<td>maintenance: 20-30</td>
<td>- 80 (45); Maintenance: 20-30</td>
<td>good demountability; elements can be reused depending on their conditions;</td>
</tr>
<tr>
<td>Steel</td>
<td>3539</td>
<td>243,3</td>
<td>90; Maintenance: 30-50</td>
<td>good demountability; elements can be reused depending on their conditions;</td>
<td>yes</td>
</tr>
<tr>
<td>Windows</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Timber-Aluminium Frame; double-glazed</td>
<td>1642</td>
<td>49,8</td>
<td>~ 50-80</td>
<td>demountable; components can be reused or recycled; coated glas: landfill (maybe down-cycling)</td>
<td>framing: yes; glazing: no</td>
</tr>
<tr>
<td><strong>Total (Secondary Structure)</strong></td>
<td>7289</td>
<td>56,9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Finish</th>
<th>PEI [MJ]</th>
<th>CO₂</th>
<th>Lifetime [a]</th>
<th>Reusability</th>
<th>Reused*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flooring</td>
<td>4,7</td>
<td>-1,6</td>
<td>long (50-70)</td>
<td>good demountability; elements can be reused depending on their conditions if not glued; or recycling</td>
<td>yes</td>
</tr>
<tr>
<td>Walls</td>
<td>5,2</td>
<td>-1,46</td>
<td></td>
<td>reuse with water possible</td>
<td>yes</td>
</tr>
<tr>
<td>Fixed Furniture</td>
<td>3,6</td>
<td>-1,55</td>
<td></td>
<td>elements can be reused depending on their conditions;</td>
<td>yes</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>yes</td>
</tr>
<tr>
<td>Bathrooms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walls</td>
<td>1,9</td>
<td>0,2</td>
<td>20-40</td>
<td>not possible</td>
<td>no</td>
</tr>
<tr>
<td>Floors</td>
<td>7</td>
<td>0,34</td>
<td>long (50-70)</td>
<td>no reuse possible, but pieces of tiles can be used as gravel for noise protection embankments or roadworks</td>
<td>no</td>
</tr>
<tr>
<td>Elements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>yes</td>
</tr>
</tbody>
</table>

| **Total (Finish)**                  | 22,4        | -4,07|              |                                                  |         |

* depending on availability

Sources:


Walten, Tobias (ed.) Ökologischer Bauteilkatalog - Bewertete gängige Konstruktionen. IBO & Donau Universität Krems; Springer Verlag/Wien, Austria, 1999
## Environmental Building Performance

<table>
<thead>
<tr>
<th>Secondary Structure</th>
<th>PEI [MJ/m²]</th>
<th>CO₂</th>
<th>Lifetime [a]</th>
<th>Reusability</th>
<th>Reused*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gypsum on Aluminiumframe</td>
<td>5.1 MJ/kg + 127MJ/kg</td>
<td>0.3 kg + 7.2 kg</td>
<td>highly influenced by construction method and maintenance (35-60)</td>
<td>good demountability; elements can be reused depending on their conditions</td>
<td>no; Aluminium 50% recycled component</td>
</tr>
<tr>
<td>Ceilings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precast Reinforced Concrete, Timber</td>
<td>968</td>
<td>63.9</td>
<td>min. 80; sub-flooring: 40</td>
<td>Concrete and sub-flooring: as crushed aggregate (high use of energy); Reinforcement: salvage; Other: depending on conditions</td>
<td>only if no impact on quality; framing: no</td>
</tr>
<tr>
<td>Stairs (steel only to be used if reused)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Timber</td>
<td>676</td>
<td>-251.7</td>
<td>~ 80 (45) Maintenance: 20-30</td>
<td>good demountability; elements can be reused depending on their conditions;</td>
<td>no</td>
</tr>
<tr>
<td>Steel</td>
<td>3539</td>
<td>243.3</td>
<td>~ 90 Maintenance: 30-50</td>
<td>good demountability; elements can be reused depending on their conditions;</td>
<td>yes</td>
</tr>
<tr>
<td>Windows Aluminum Frame; double-glazed</td>
<td>2141</td>
<td>122.9</td>
<td>~ 40-60</td>
<td>components can be reused or recycled; strong emissions during recycling process; coated glas: landfill (maybe down-cycling)</td>
<td>framing: no; glazing: no</td>
</tr>
<tr>
<td>Total (Secondary Structure) excluding reused components</td>
<td>7324</td>
<td>178</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flooring Timber (Parquet)</td>
<td>4.7</td>
<td>-1.6</td>
<td>long (50-70)</td>
<td>good demountability; elements can be reused depending on their conditions if not glued; or recycling</td>
<td>no</td>
</tr>
<tr>
<td>Walls Gypsum Plaster Board</td>
<td>5.1</td>
<td>0.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Furniture Timber</td>
<td>3.8</td>
<td>-1.55</td>
<td></td>
<td>elements can be reused depending on their conditions;</td>
<td>no</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bathrooms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walls Gypsum Plaster</td>
<td>1.4</td>
<td>0.14</td>
<td>20-40</td>
<td>not possible</td>
<td>no</td>
</tr>
<tr>
<td>Floors Tiles</td>
<td>7</td>
<td>0.34</td>
<td>long (50-70)</td>
<td>no reuse possible, but pieces of tiles can be used as gravel for noise protection embankments or roadworks</td>
<td>no</td>
</tr>
<tr>
<td>Elements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (Finish) excluding reused components</td>
<td>21.8</td>
<td>-2.37</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* depending on availability

Sources:
- Walten, Tobias (ed.); Ökologischer Bauteilkatalog - Bewertete gängige Konstruktionen; IBO & Donau Universität Krems; Springer Verlag/Wien, Austria, 1999
Environmental Building Performance

These calculations are only an overview to showcase that the proposed building has the great potential to have a much better energy performance in terms of embodied energy than a conventional building. The total figures do not show the complete use of embodied energy of the building since they are still given per square metre (or kg). However the comparison was made simply on the use of different materials and already proofs that the proposed building has less embodied energy and uses a lot less CO$_2$ than a building with a conventional construction, because of reused components and materials used.

Some issues for the calculation were found:
- CO$_2$ and PEI (Primary Energy Index) figures are based on the use of new materials – considering that mostly reused and recycled materials are proposed these figures are expected be different (smaller);
- CO$_2$ figures do not include transport to construction site – only until end of production;
- The Bauteilkatalog is based on Austrian figures and since power generation is different from the power generation in New Zealand it is possible that New Zealand figures are lower;
- Due to the long lifetime of most materials, the scenarios of waste disposal in the future are hardly foreseeable – innovative development could change everything.

These brief calculations showcase that the proposed structure is better regarding the CO$_2$ consumption, simply because of the use of more timber and less concrete. There was no difference for these calculations in the main structure. However, it would probably change in mass due to the different loads of a conventional structure. Even though the proposed building does not have a significantly better PEI if new materials were used, these calculations show that if the opportunities to use reused (or recycled) materials are taken, the use of embodied energy and CO$_2$ can be reduced significantly.

For the performance of the building not only these figures are important, but other influences like:
- Because of the renunciation von compound materials it is easy to demount components which do not have the same long lifetime expectancy as others;
- Maintenance effort is to be kept as low as possible;
- Health factor;
- Comfort factor.

In the case of demolition approximately 90% of the secondary structure and 66% of the finishes/interior fitting could be reused depending on their conditions. It is estimated that round about 15% of both structures can be recycled and 29% cannot be used any further. Even the primary structure could be reused or recycled if necessary.

The amount of operating energy after completion of the building cannot be specified since no uses are defined. However it is intended to keep the energy consumption as low as possible. This is achieved through PV sun shading, solar warm water, heat exchanger, chilled ceilings, mechanic ventilation, green roofs and walls, double facades, … (as can be seen in the section).
The St James Patchwork

Reuse - The Lifecycle of Buildings in New Zealand

Research Project - Master Thesis

Claudia Ninas

UNITEC - HS Wismar

January 2011

"This concept of use shows the possibility of how to create additional functionally neutral structures to the existing Theatre Centre, while having a minimum of constructional impact on the existing structures."

"It is obvious that the whole building needs some use as soon as possible in order to survive. The Theatre Centre is quite a 'Patchwork'. This is instantly recognizable in the pictures, but also the years of construction and frequent alterations are an indication. With an additional building this 'Patchwork' should be allowed to continue to grow in order to show the continuing the history and development of the Theatre Centre."

"Exclusive and individual inner city spaces are provided. Through different uses, a better utilisation of the potential of the buildings and their equipment is achieved. Versatile uses keep the building occupied almost around the clock."

"The structure is functionally neutral; therefore no use in particular is defined. Moreover flexible spaces developed featuring different sizes and ceiling heights. This gives the opportunity to accommodate almost every kind use."

"Through the restoration and reuse of the existing buildings, but also through the integration of new buildings, technologies and uses, the building adds an essential dimension to the Entertainment Quarter in the heart of Auckland's CBD."

"It is advisable that the whole building reach some use as soon as possible in order to survive. The Theatre Centre is quite a 'Patchwork'. This is extremely recognizable in the pictures, but also the years of construction and frequent alterations are an indication. With an additional building this 'Patchwork' should be allowed to continue to grow in order to show the continuing the history and development of the Theatre Centre."

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