PROCUREMENT, SUSTAINABILITY & ADAPTIVE REUSE PROJECTS IN SYDNEY

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ABSTRACT

With large scale projects like Baragaroo about to flood the market with a large supply of office space, the city of Sydney is poised to undergo a change whereby existing office stock will be made available for adaptive reuse projects. Some 102,000m2 of office space is earmarked for residential conversion in Sydney due to the growing demand for centrally located residential properties and to help house a population that is expected to increase by 4% by 2031. Adaptive reuse projects have an inherent bent towards sustainability in that they make use of existing structures, which reduces economic, environmental, and societal impacts associated with demolishing existing structures to make way for new ones. This paper investigates how project owners can best select designers and builders for their adaptive reuse projects. Using case studies from completed adaptive reuse projects and literature review, this paper makes recommendations as to the best practices for the procurement of design and construction services for adaptive reuse projects in the Sydney market.

Keywords: *adaptive reuse, sustainable procurement, Sydney, office space*

INTRODUCTION

The City of Sydney, Australia is currently experiencing a significant development of commercial office space projects within the city's central business district (CBD). Approximately 229,000m^2 of new build and refurbished office space is due for completion in 2015 and a further 611,000m^2 is currently in the development pipeline (Research and Forecast 2015, City of Sydney 2010). The rapid addition of office has stock has created a situation whereby vacancy is expected to increase in lower grade office stock, which is considered to be suffering from obsolescence, and as a consequence, will be made available for adaptive reuse projects. Some 102,000m^2 of this obsolete office space is earmarked for residential conversion in Sydney due to the growing demand for centrally located residential properties and, to help house a population that is expected to increase by 4% by 2031 (Remøy and Wilkinson 2015)

With such a large area of obsolete office space being made available for adaptive reuse, there are excellent opportunities to deliver sustainable housing that makes use of existing structures. Adaptive reuse projects have an inherent bent towards sustainability in that they make use of existing structures, which reduces economic, environmental, and societal impacts associated with demolishing existing structures to make way for new ones or simply abandoning structures in place. Adaptive reuse reduces the amount of waste that is deposited in landfill sites. Additionally, the amount of greenhouse gasses that are emitted during the transport of old materials to landfill sites and the harvesting, manufacturing, and delivery of new materials is reduced. Furthermore the overall embodied carbon in adaptive reuse projects is lower than new build projects. In order to maximise the potential for adaptive reuse projects to be sustainable, appropriate procurement methodologies need to put in place. The procurement of the 'right' designers and contractors allows for sustainability measures to be capitalized upon. These measures include reusing materials, minimising emissions and water consumption, maximising energy efficiencies, and creating positive social outcomes throughout the buildings lifecycle. This paper investigates the issues related sustainable procurement as it pertains to project participants.

ADAPTIVE REUSE

Adaptive reuse in the form of conversion of existing building stock is a practice has that been utilized in Europe for centuries. An example of adaptive reuse is the canal-houses in Amsterdam. Since their initial construction in the 17th century, the use of the buildings has undergone numerous changes. Over the past 400+ years, the Amsterdam canal houses have been used for housing, offices, retail, and warehousing at various different stages, with each change in use imparting some changes to the buildings (Leupen 2006, Remøy 2010).

Recent examples of places that have experienced adaptive reuse include Toronto and London, where reuse in the form residential conversions was used as means towards inner city redevelopment and revitalisation (Heath 2001). In New York City the government established a subsidy program as part of the Lower Manhattan Revitalization Plan in order to encourage the conversion of obsolete office spaces into residential apartments. The plan resulted in the residential conversion of more than 60 buildings (Beauregard 2005). A collapse of the Tokyo market for office space in 2002-2003, caused by oversupply, led to older offices becoming obsolete. The obsolete offices were then converted to residential housing (Ogawa, et al. 2007).

Adaptive reuse in Sydney, Australia

While adaptive reuse is commonplace in Europe, it is a relatively novel concept in Australia due to several barriers that face these projects. Wilkinson and Remøy (2015) categorized the barriers for conversion adaptation as either political, economic, environmental, social, technological/physical or legal. Further stating that one of the obstacles to residential conversion is the specialized nature of the work and competence of the actors. Identifying experts and outsourcing the decision making to those experts will help project owners to identify potential risks up front, as well as providing value added alternatives. Within residential conversion projects some of the technical areas and barriers that require expert attention include:

- Structural alterations may be required by regulations, causing exorbitant costs or potentially rendering a project infeasible (Bullen and Love 2010).
- As built construction drawings are not always available or accurate, which causes thorough inspections and opening up works to be necessary (Remøy and Van der Voordt 2007).
- Residential spaces require more vertical shafts for plumbing, electrical, and heating, ventilation and air conditioning necessary (Remøy and Van der Voordt 2007).
- Local infrastructure might not be in place to support the social needs of a residential conversion (i.e. healthcare, schools, shops, etc.) (Heath 2001).
- Removal and remediation of dangerous materials such as asbestos may cause a project to incur high costs (Remøy and Van der Voordt 2007).

- In the Sydney market the key drivers for residential conversions are economic, and the social and environmental benefits are only realized coincidentally (Wilkinson and Remøy 2015).
- The Sydney housing market does not put great value on sustainability in the home buying decision, and thus developers have little need to market sustainability attributes to attract buyers (Wilkinson and Remøy 2015).

Even with these barriers in place, adaptive reuse is becoming an increasing popular idea within the Sydney real estate market and is fueled by increasing demand for housing close to or in the city centre (Wilkinson and Remøy 2015).

RESEARCH AIMS AND OBJECTIVES

Past studies on residential conversions via the adaptive reuse of office space have shown the potential for enhancing sustainability in urban areas in various different parts of the globe (Heath 2001, Remøy and Van der Voordt 2007, Bullen and Love 2010, Koppels, et al. 2011, Wilkinson and Remøy 2015). However, none have focused on the procurement of the design and construction teams tasked with actually designing and constructing these residential conversion projects. In addition to past case studies and research undertaken on adaptive reuse, there is a field of research focused on procuring the best value design and construction teams for construction projects. Using literature from both the field of adaptive reuse and the field of designer and contractor procurement, this study makes suggestions as to a theoretical framework to employ best practices for the procurement of design and construction services for adaptive reuse projects in the Sydney market.

Procurement of professional services for design and construction of residential conversions

Literature in the field of the procurement and management of architectural, engineering, and construction services has identified the need for the use of performance information when selecting professional service providers. The International Council for Research and Innovation in Building and Construction (CIB) commissioned a report that identifies the worldwide use and impact of performance information in the construction industry that advocates the need for greater use of performance information when procuring professional services (Egbu, et al. 2008). Performance information is the set of metrics used to quantify both the efficiency and effectiveness of actions (Neely, et al. 1995). When used correctly, performance information is used not only for selection of service providers, but also for benchmarking. Benchmarking can be used as reference points to measure change and improve future outcomes (Martin 2004). Research conducted into the use of performance information in procurement has yielded many successful methods or systems. These systems have been used to increase performance in terms of quality, budget, schedule, performance, and customer satisfaction (Carey 2009) and include: The Fort Worth ESD system, the Hong Kong Housing Authority's PASS system, and the Best Value Business Model (BVM) that was formerly known as the Performance Information Procurement System (Sullivan, et al. 2008)

While the PASS system and the Fort Worth ESD systems have found success in improving the performance of their contractors, both are highly specialised and configured to meet very specific program needs. BVM as presented by Kashiwagi (2012) is a formal structure that allows for considerations of both price and performance factors when selecting contractors and is flexible enough to be used in virtually any procurement scenario. Even though BVM involves a formal structure it is easily adaptable to meet any user's needs, this is evidenced by the breadth of different organizations that have achieved successful outcomes (i.e. on time and on budget) by employing BVM in the procurement and management of more than 1750 projects totaling $US6.3 billion in professional services. Organizations that have successfully employed BVM to procure construction and design services include, but are not limited to, the United States General Services Administration, the State of Oklahoma, the State of Idaho, the City of Peoria, the University of Minnesota, the University of Alberta, and the Rijkswaterstaat (highway agency in the Netherlands) (Performance Based Studies Research Group 2015)

In developing a successful methodology for the procurement of designers and contractors for residential conversion projects in Sydney, the research finds that the success and applicability of BVM across different countries and markets means that it provides a solid platform from which to start. The BVM approach follows three phases (Kashiwagi 2012, Smithwick, et al. 2013)

- Phase 1- Identification: Identification of the best value vendor using a weighted model based on the vendors proposed price, risk plan, value added plan, interviews and Past Performance Information surveys provided by the vendor's previous clients.
- Phase 2- Preplanning: The documentation of project expectations occurs in this phase, whereby the expectations of both parties (owner and vendor) are documented. Clarification of expectations is a structured process to help the owner fully understand the potential best value firm's offer. The potential best value firm or firms (in cases where both design and construction services are procured) must clearly explain their offer, and how they know their plan will be successful, how they will minimize risk and manage risks that come to fruition, and establish how success will be measured.
- Phase 3 – Project Management: After preplanning is complete to the owner's satisfaction, the contract is awarded and the project begins. In this phase the vendors complete and submit a weekly risk report. Should any previously identified risk come to fruition, it is managed in accordance with the risk plan created in Phase 2. Any unforeseen risks that are encountered are entered into the weekly report, along with the vendor's solution and submitted to the owner for their rating of the risk. At the end of the project, the owner rates the vendor using the same criteria from the Past Performance Information surveys and this rating then impacts the vendor's future ability to secure work with said owner.

The proposed system will utilize a similar three phase framework to BVM. Due to the fact that sustainability is a point of emphasis in residential conversions in the form adaptive reuse projects, the research proposes a procurement system that differs from BVM in that it would monitor and rate designers and contractors beyond project completion, by collecting performance information throughout the lifecycle of the building and. This is necessary in order to see if sustainability goals and building performance are met throughout the building's lifecycle, and to use in the procurement of design and construction services on subsequent projects.

SUSTAINABLE ADAPTIVE REUSE PROCUREMENT

The proposed Sustainable Adaptive Reuse Procurement (SARP) and project management system takes pieces of other successful procurement and project management systems and modifies them to best suit the Sydney market. On such best practice that should be incorporated is Early Contractor Involvement (ECI). Having the project contractor onboard during the design stage has long been shown to positively affect project outcomes via (Song, et al. 2009)

- specialized training and field expertise allows contractors to provide feasibility analysis;

- ability to provide an in-depth knowledge of construction materials, methods, and local practice;
- contractors are in the best position to provide project and contractor specific information on the availability and limitations of resources in terms of cost, performance, access, and site conditions to support design; and
- contractors' inputs to design have a direct impact on their own construction performance.

ECI is particularly important for sustainability oriented adaptive reuse projects due to the highly specialized nature of the projects. When paired early on in the design phase, contractors can provide the designers with accurate feasibility and cost information in relation to the reuse of materials and structural elements on the project. Additionally, contractors are able to provide feedback as to the performance of the systems they will be installing. Thus, EVI will be used in SARP and designers and contractors will be tasked with teaming together on their proposals.

SARP will utilize a small set of performance specifications rather than filling a request for proposals (RFP) with owner generated specifications that designers and contractors are required to follow. The RFP will make use of performance specifications that will be used to guide designers and contractors in their proposals, while allowing them to leverage their expertise in creating and implementing solutions to the owner's needs. Kashiwagi's BVM method has shown that a reduction in an owners prescription specifications leads to higher performance, and that when project owners defer to the experts that they are hiring to tell them what is achievable that customer satisfaction increases (Kashiwagi 2003, Kashiwagi 2012) Hence performance specification is suitable to SARP.

SARP framework

The SARP will use a four stage framework as outlined in Figure 2, and is based on Kashiwagi's BVM. The phases are designed to address each of the barriers to residential conversion projects in the Sydney marketplace.

Stage One will consist of an owner identifying their needs and desires for their adaptive reuse project. This will be used to create the RFP by where the desired performance and characteristics of the residential conversions will be conveyed to proposing teams of partnered designers and contractors. Performance specifications will need to include: material reuse, landfill diversions (tonnage), embodied energy of new materials, water efficiency of constructed facility, energy efficiency of constructed facility, operational costs for tenants of constructed facility, as well social wellbeing indicators such as open space and community connectivity. Proposers will be required to submit proposals consisting of the following (consistent with BVM):

- Simple past performance surveys from past clients, used to show that the experts have successfully performed in the past
- Risk analysis plans detailing the major risks that could prevent them from achieving the sustainability, cost, and schedule performance specifications, and how the team will minimize those risks. The risks will be only the risks that are beyond the proposing team's control, for any true expert should already have minimized the risks they are in control of.
- Value Added Sustainability measures that are beyond the scope owner's original requirements that can be included for an extra price should the owner choose to do so.
- Price to carry out the proposal to meet the owner's needs.

After the proposals are submitted, there will be a short listing of the top proposals followed by interviews where the major participants (i.e. project manager, design manager, construction superintendent) of shortlisted teams are allowed to present their solutions to the owners and/or owner's representatives. From there, one team will be advanced to Stage Two, where in depth project preplanning can begin

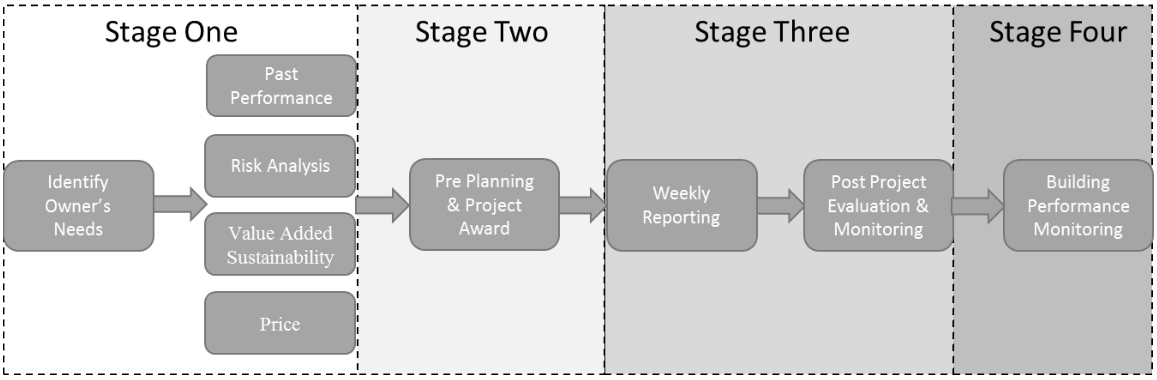

Fig. 1 SARP Framework based on Kashiwagi's BVM (Kashiwagi 2012)

Stage Two will consist of the preplanning of the project where the team that is selected will work to solidify the project plan and satisfy the owner's concerns prior to contract award. The metrics by which the design and construction team will be measured will be agreed upon during this stage. This stage will follow the outline of BVM Phase Two described above in Section 3 of this paper [for in depth overview see Kashiwagi 2003 and Kashiwagi 2012], and the stage will end with a signed contract.

The third phase will include weekly reporting and measuring against the expectations established during preplanning through till project completion, as in (Smithwick, et al. 2013) At the end of BVM project projects are assessed by owners in terms of budget performance, schedule performance, and customer satisfaction.

Stage Four will be where the primary difference between SARP and BVM occur. In SARP, the team of designers and contractors will be measured against expectations beyond project completion. For SARP projects, the building will be measured at the end of a project and throughout its lifecycle to see if it achieved its intended goals. As proffered by Love et al. (2015) it is important that projects take a life-cycle approach to their evaluation. A lifecycle approach is needed to 'future proof' building performance and ensure the value and sustainability characteristics of an asset, while also providing key decision makers with the ability to make informed decisions across a project's life-cycle (Love, et al. 2015).

Taking a lifecycle approach to the measurement of the success an adaptive reuse project and annually updating the evaluation of the project team allows for owners to make better decisions when procuring design and construction teams on future projects. Rather than only utilizing information specific to the project phase like budget and schedule performance, actual lifecycle performance (energy, water, operational costs, social wellbeing indicators, etc.) can be fed back into the selected teams past performance information and used in Stage One when selecting a potential best value vendor for future projects.

CONCLUSIONS

The SARP framework was presented for the procurement of design and construction services for sustainable residential conversion projects in the Sydney market. There are many sustainability related benefits to adaptive reuse projects that make use of obsolete office space for residential conversions including:

- Materials can be reused and diverted from landfill
- Embodied carbon is lower than new build

- Emissions can be reduced in the form of reduced transportation and harvesting of materials
- Costs can be kept down by reusing existing structural elements and a faster build time
- Social benefits in the form of neighborhood revitalizations or transformation.

In order to ensure that these sustainability related benefits are achieved, owners need to select the correct designers and contractors and defer to their expertise in completing these projects at the best value. The barriers to realising these benefits are many and can be categorized as political, economic, environmental, social, technological/physical or legal [9]. While political barriers cannot entirely be addressed by the procurement of the best value vendor, a best value vendor can ensure that economic, environmental, social, technological/physical and legal barriers are all minimized.

In the SARP framework presented, the economic, environmental, social, technological/physical barriers to sustainable adaptive reuse in the form of residential conversions are addressed systematically during the first three stages of the SARP process and the fourth stage ensures that accurate performance information as to building performance is used for future procurements. SARP capitalises on designer and contractor expertise by allowing them to team together and develop sustainable solutions to the challenges that face adaptive reuse projects and then monitor those solutions over the lifecycle of the building in order to prove their performance and use that performance in the evaluation of future proposals. The next phase of this research is to test the framework with Sydney developers specialising in adaptive reuse projects.

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