

Sydney Geodesign Workshop 2016: Developing a framework for collaborative multi-agency scenario planning

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Publication details:

pp. 1 - 12

Publication Date:

2017-07-03

Publisher DOI:

<https://doi.org/10.4225/53/5a8dfd09de724>

DOI:

<https://doi.org/10.4225/53/5a8dfd09de724>

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Built Environment

City Futures Research Centre

Sydney Geodesign Workshop 2016

Developing a framework for collaborative multi-agency scenario planning

July 2017

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Executive Summary

Sydney is facing a new, more intensely urban future with uncertainties such as climate change, digital and technological disruption, globalisation, population growth and migration already impacting the city. To address the infrastructure and planning challenges influenced and created by these trends, a major restructuring of the planning system is already underway. These changes involve the integration of local councils, the formation of new planning governance structure and the mandated collaboration of various agencies towards more comprehensive metropolitan based outcomes. Despite these changes, there are no effective available methods for multi- agency collaborative planning of complex futures in place, that integrate the fragmented knowledge, the specifics of geographic places, and a diverse stakeholder base.

This workshop addressed the need for such a collaborative method by introducing a new approach to Australia. This approach is known as “Geodesign” and is a dynamic process that facilitates productive collaboration in complex and demanding planning contexts. Geodesign is a well-tested and effective approach that has been used in places such as the United States and the United Kingdom but has never been used before in Australia. The project, therefore, brought world-leading experts in the field to Australia for the first time to work with local experts across some critical domains (transport, water infrastructure, housing, education, etc....) and develop necessary capacity to apply the approach. The result was the first Geodesign workshop and evaluation of the Geodesign approach in the Australian context.

The main objective of this Geodesign application was to run and evaluate a collaborative planning workshop with a focus on integrated land use–transport–infrastructure scenarios in the South-Eastern District of Sydney. The application of the Geodesign approach was set up to specifically benefit key infrastructure and service agencies like Sydney Water by improving their asset planning through better forecasting. The workshop developed a shared understanding between urban agencies regarding the future states of Sydney established a knowledge base for better forecasting and planning of urban futures. The Geodesign workshop held in Sydney in December 2016 resulted in the following key outcomes:

- Successful demonstration of Geodesign’s feasibility as a model for multi-stakeholder decision-making in Australia.
- The rapid development of 6 urban growth scenarios for South East Sydney until 2050.
- 480 project and policies developed by the participants of the Sydney Geodesign Workshop.
- Identification of different goals and concerns held by key agencies and stakeholders in Sydney’s future growth.
- Positive feedback from participants from across government agencies in NSW.

“The Geodesign approach is most effective in dealing with complexity and emergence of the city in the context of the city as a mosaic of places...” Rod Simpson Environmental Commission, GSC.

Introduction: Why Geodesign?

The projected growth of Metropolitan Sydney from 5 million people to 8 million people by 2030 is expected to place further stress on Sydney Water's assets, amongst a range of other urban infrastructure and services. This will make it more difficult for key urban agencies to meet customer demands and citizen expectations.

Traditionally land use, transportation, and infrastructure future scenario work has been undertaken via a siloed agency approach which leads to different understandings of where land use is likely to change, where growth will occur, where new transport infrastructure needs to go and which areas and assets need to be conserved and protected. This has implications for key service and infrastructure agencies such as Sydney Water in understanding customer demand and the need for further asset and utility planning and implementation. The problem addressed by the multiple agencies was the collective formulation and evaluation of medium and long-term integrated land use–transport–infrastructure change scenarios.

The project sought to develop an innovative collaborative scenario planning approach to address this problem based on the “Geodesign” approach which is entirely new to the Australian context. Both the Geodesign approach and its method of application was innovative in this regard: it was the first time it has been used in Australia and the first time such a range of high-level experts and collaborated to apply the approach to a problem. Geodesign is a scenario planning method which tightly couples the creation of scenario plans with impact simulations informed by geographic contexts and systems thinking. It also facilitates the integration of collaborative digital tools such as Geodesign Hub (Ballal 2016) which was developed to support and analyse the Geodesign process.

Workshop Background

To address the scenario planning needs of urban agencies in Sydney and Australia, a workshop was held to test the Geodesign collaborative planning approach. Geodesign is a multidisciplinary collaborative approach which uses brings together local stakeholders and domain experts to collaboratively and rapidly develop scenarios for geographically based problems. The process facilitates the synthesis of complex, conflicting problems and fragmented and diverse information layers. The process itself does not require or necessarily require GIS and technical digital skills but can be enhanced by sophisticated software that enhances the workshop workflow and records the decision-making process for future records and further analysis.

UNSW Australia's City Futures Research Centre UNSW and the Smart Cities Research Cluster UNSW invited the internationally renowned Geodesign expert Prof Carl Steinitz (Steinitz 2012) to facilitate the Geodesign workshop on December 1st-2nd of 2016. The UNSW team was led by Prof Chris Pettit with support from UNSW based team (Dr. Scott Hawken, Dr. Scott Lieske, Carmela Ticzon, Dr. Simone Zarpelon Leao, Dr. Aida Eslami Afrooz and Karolina Peret).

The hypothetical case study selected to test the Geodesign approach involved the southeast sector – one of the planning districts formed under the auspices of the newly established metropolitan planning agency, The Greater Sydney Commission.

In the workshop, stakeholders begin with creating six possible planning scenarios for a selected study area, before evaluating these scenarios against a series of metrics and indicators which the stakeholders have agreed to. The final stage involves the negotiated selection of a preferred scenario that synthesises agreed upon policies and projects for possible implementation.

Workshop Objectives

The workshop had two major objectives. The first objective of this joint project, between Sydney Water and City Futures Research Centre, University of New South Wales, was to develop a state of the art scenario planning framework which can be used to bring multiple agencies together to collaboratively formulate and evaluate medium to long term integrated land use – transport – utility infrastructure city futures. The second objective was to develop the capacity to run further workshops for urban agencies such as Sydney Water in the future.

Workshop Structure

The project was executed in two phases:

Phase 1: Scoping, Data Collation and Analysis

- **Selection of methodology for developing data driven scenarios, modelling platform and framework** - The Geodesign framework was chosen as a foundation for the scenario planning approach based on its extensive applications in different land use planning exercises around the world.
- **Study area selection** – The Sydney South East Catchment was selected for this exercise as it aligned with existing multi-agency work led by Infrastructure NSW. There were benefits in such a case study as there was already strong multiagency engagement in this study area by the UNSW team as well as substantial effort in collecting datasets from across agencies for this catchment. Also, there is some scenario development work being undertaken until 2031. Such as study area could also be interesting in investigating City resilience in the event of storm surge and flood events.
- **Identifying requirements/expectations within Sydney Water and with key stakeholders through consultation** – Consultations were held with Sydney Water and other key stakeholders including Transport NSW, NSW Education, Greater Sydney Commission, and the local councils within the study area. The stakeholders provided feedback on what variables would be important to investigate in the exercise and which datasets should be included in describing trends and development scenarios for the study area.
- **Gathering data inputs to describe trends and potential development scenarios** – Existing infrastructure reports and demographic forecasts were consulted for describing potential development scenarios. Datasets were sourced from ABS Census 2011 and NSW Open Data, Sydney Water, Transport NSW, NSW Land and Property Information, NSW Education.

Phase 2: Implementation

- **Workshop set-up** -The workshop was held over the course of two days from December 1-2, 2016. A pre-workshop public lecture on Geodesign was also held on November 30th by Prof Carl Steinitz to serve as a briefing for attending workshop participants. GeodesignHub, which is a cloud-based platform specifically designed to facilitate Geodesign exercises, was used by participants during the workshop.
- **Development targets and scenarios** – Participants were asked to respond to 2050 demographic projections and development targets in designing hypothetical development proposals for the study area. The main variables that participants needed to propose specific projects and policies for were:
 - Medium density housing
 - High-density housing
 - Commerce and Industry
 - Public transportation
 - Active transportation
 - Green infrastructure
 - Blue Infrastructure
 - Education
 - Tourism
- The participants were also grouped into six groups, each assigned to design for a specific development scenario to prioritise:
- Prioritising environmental sustainability and resilience
- Maximising housing development
- Designing for an emergent knowledge and healthcare precinct within the study area
- Optimising public service, prioritising liveability and quality of life for residents
- Promoting tourism and recreation
- Designing a compact city based on the 30-minute city concept
- **Evaluation** - Pre and post workshop surveys to collect participant feedback on the workshop's execution and its effectiveness in facilitating collaborative scenario planning.

Stakeholder Participation in Workshop

The UNSW team worked with Greater Sydney Commission to identify other government and non-government agencies to include as participants in the workshop. Prof Carl Steinitz also provided guidance based on his extensive experience at conducting Geodesign workshops.

Representatives from the following agencies and institutions participated in the workshop:

- Sydney Water
- Greater Sydney Commission
- Infrastructure NSW
- Land and Housing Corporation
- Urban Growth NSW
- Transport NSW
- NSW Department Planning and Environment

- NSW Department of Education
- Randwick City Council
- City of Botany Bay Council
- University of New South Wales
- University of Canberra
- Arup, Sydney
- Ernst and Young, Sydney

The workshop was the first to involve such high-level urban professionals and decision makers in the Geodesign process. The advantages of working with this calibre of participants were the ability to run a highly-compressed workshop to establish a “proof of concept” within the Australian context. Conventionally Geodesign workshops are held over a longer period. To align with the visit of Prof Carl Steinitz an intensive two-day workshop format was undertaken.

Workshop Overview

The participants were first introduced to the study area, the objective of the workshop, and the year 2050 projections that they would need to consider in their design. After a quick tutorial on how to use GeodesignHub the GeoDesign companion software selected as a platform for the workshop, the participants were instructed to individually come up with project and policies related to their area of expertise that they would like to implement in the study area. They used simple quick to produce diagrams to represent these projects and policies on maps within the Geodesignhub software. Diagrams are simple polygons that highlight areas of change that will be affected by the proposed projects. Examples of the diagrams can be seen in Figures 1 and 2.

Figure 1 Drawing a proposed high-rise project across UNSW campus using GeodesignHub

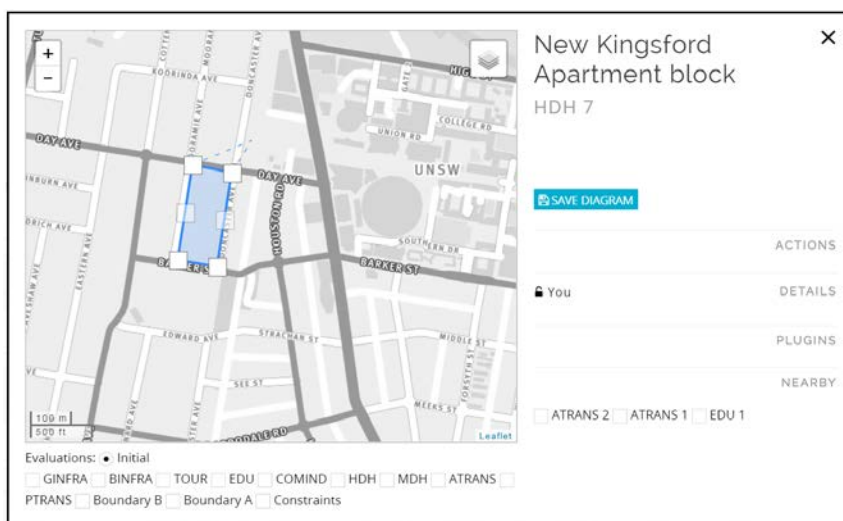
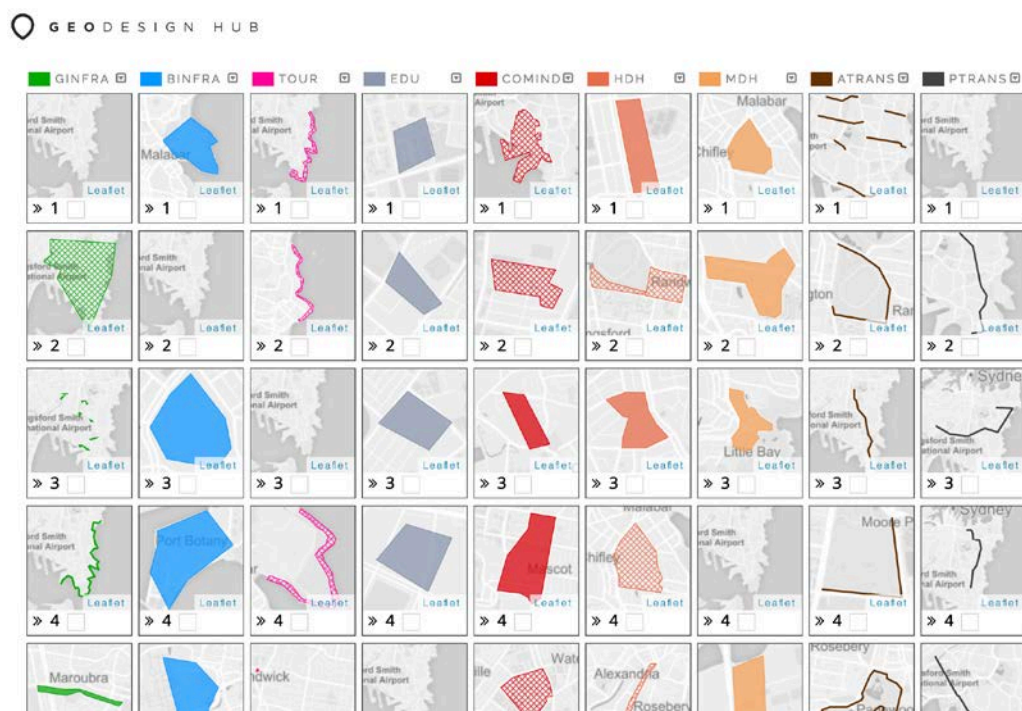
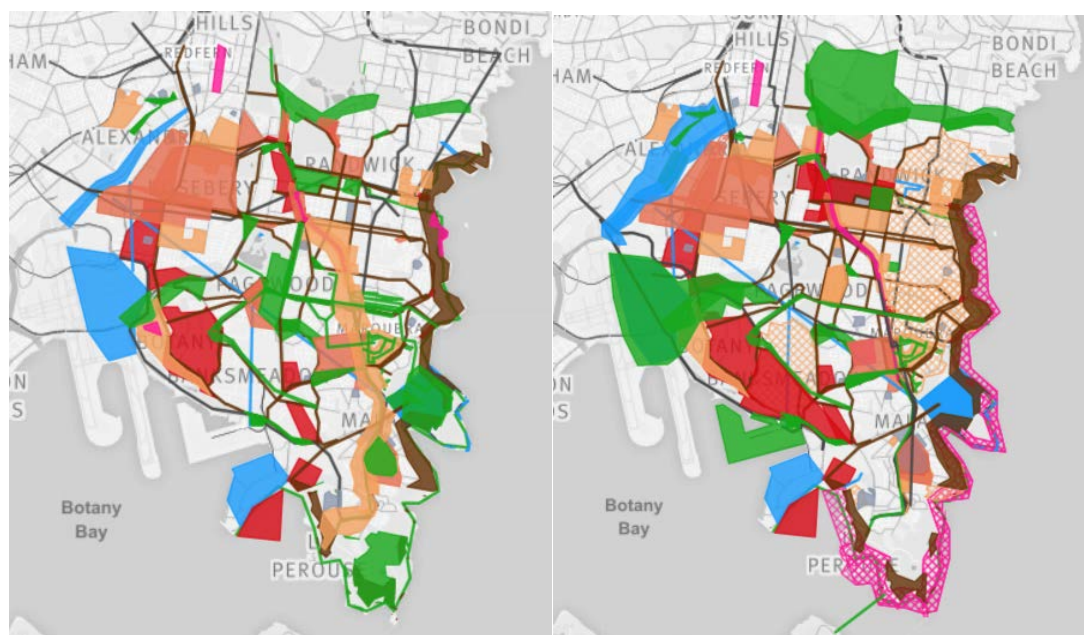


Figure 2 Participants *rapidly* created a total of 480 project/policy diagrams created *in the space of a morning*.



The participants were then reorganised into the six groups, one group for each scenario. Each group, each assigned to champion and develop one of the development scenarios mentioned in the previous section of this report. The groups were instructed to create an overall design proposal for the study area, by incorporating suitable project/policy diagrams in their maps. After the finishing their initial design proposals, the groups were asked to evaluate their designs using the tools provided by the Geodesign Hub. The Geodesign Hub analyses the cross-system impacts and cost of the six designs produced and reiterate the process to produce a more optimised version.

Figure 3 Early design iterations from Environmental focused group (left) and Urban Development focused group (right)



The participants then presented their second version to the other groups (Figure 4). Each group rated the designs according to how well each design responded to their own group’s interests (Figure 5). This rating grid served as a guide for which teams were more likely to partner with each other in the upcoming negotiation rounds. The participants were then asked to reiterate the third version of their design. In anticipation of the subsequent negotiation rounds, they were encouraged to coordinate and collaborate with the other teams based on the commonalities they share in their design.

Figure 4 Public Services Design Presentation



Figure 5 Design rating grid

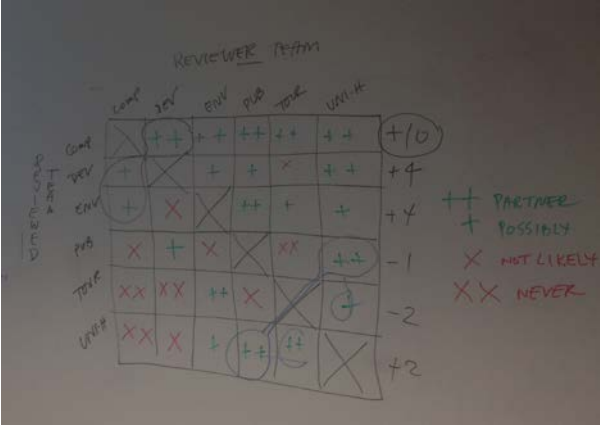


Figure 6 Negotiation between two teams. The left panel is filtered to indicate all the project/policy diagrams the two groups do not have in common with their designs. The map on the right is filtered to show diagrams related to Green Infrastructure and Commerce+Industry that the groups do not have in common.

NEGOTIATED DESIGN

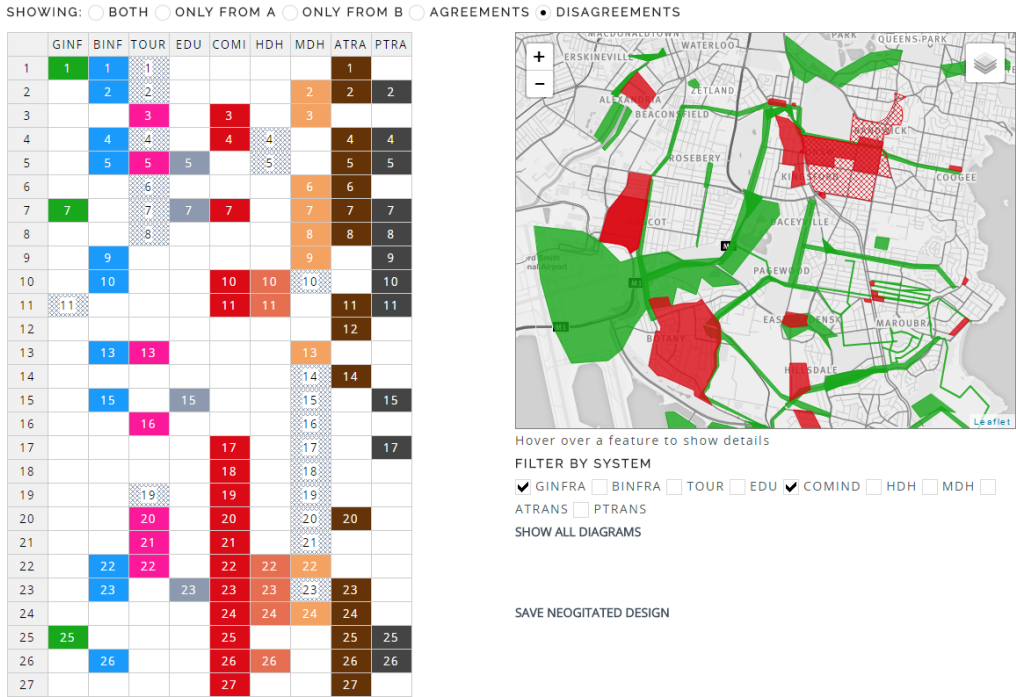


Figure 7 Design negotiation between Housing Development, Compact City, and Environmental teams



The groups then engaged in negotiation rounds. In each negotiation round, the paired groups would consolidate their two designs by negotiating which project/policy diagrams will remain in their “negotiated design.” The groups were able to arrive at a consensus design for the study area by the end of the workshop.

Workshop Outcomes: Feedback and Results

The workshop demonstrated the Geodesign approach’s potential in facilitating a constructive negotiation process between stakeholder groups to arrive at a consensus. 21 participants completed the post-workshop survey, and the results reveal that majority of the participants agreed with the final design proposal for the study area (Figure 8) and that a majority felt that their interests have been represented (Figure 9).

Participants commonly cited the negotiated process as the most influential part of the workshop. They also indicated the usefulness of Geodesign Hub’s tools for comparing different design proposals. Rod Simpson, Environmental Commissioner for Greater Sydney Commission, was present as an observer and remarks that “The selection process (negotiation) in the Geodesign process itself could be considered a form of emergence. Particularly, if emergence is seen to be a pattern or idea that gains prominence—this is through the negotiation process and consensus which is where the Geodesign process adds significant value.”

Moreover, despite the complexity of the exercise, survey results indicate that participants found it fairly easy to follow the Geodesign approach. Rod Simpson’s comments added a further perspective on Geodesign’s value in this regard;

“The Geodesign approach is most effective in dealing with complexity and emergence of the city in the context of the city as a mosaic of places—this is an approach that is

gaining currency at the Greater Sydney Commission. Place-based planning allows a wide range of factors to be considered concurrently by reducing the scale not the scope. It also allows a contextually specific response which Geodesign supports[...]Taken together the geodesign process and supporting technology might be seen as a ‘model’ of the processes and conditions that exist in the city, ‘scale down’ in both space- the drawings, and time - compressed into two days for deriving evidenced based future city scenarios.”.

The following charts describe the participant feedback on the day Figures 8, 9 and 10.

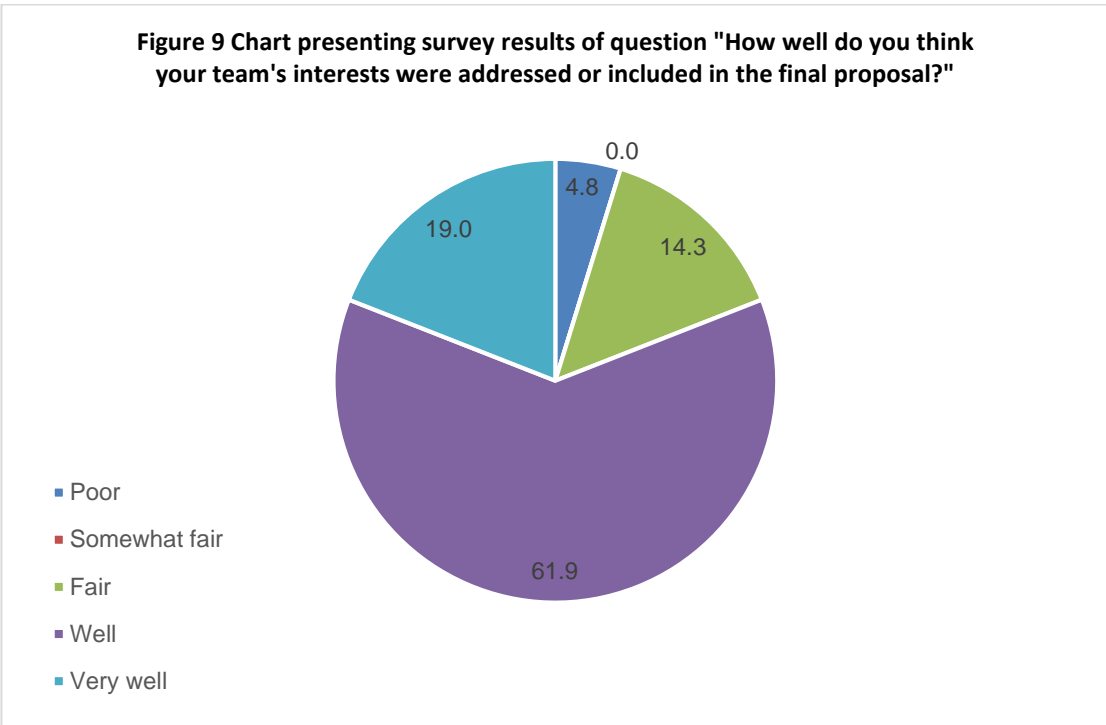
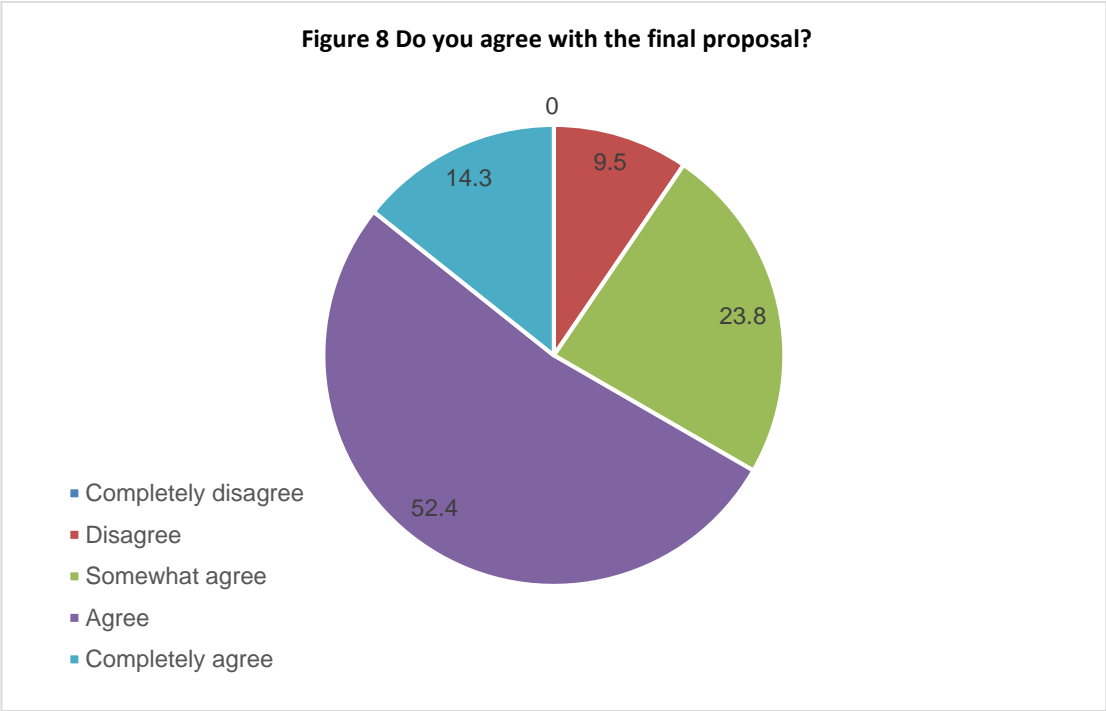
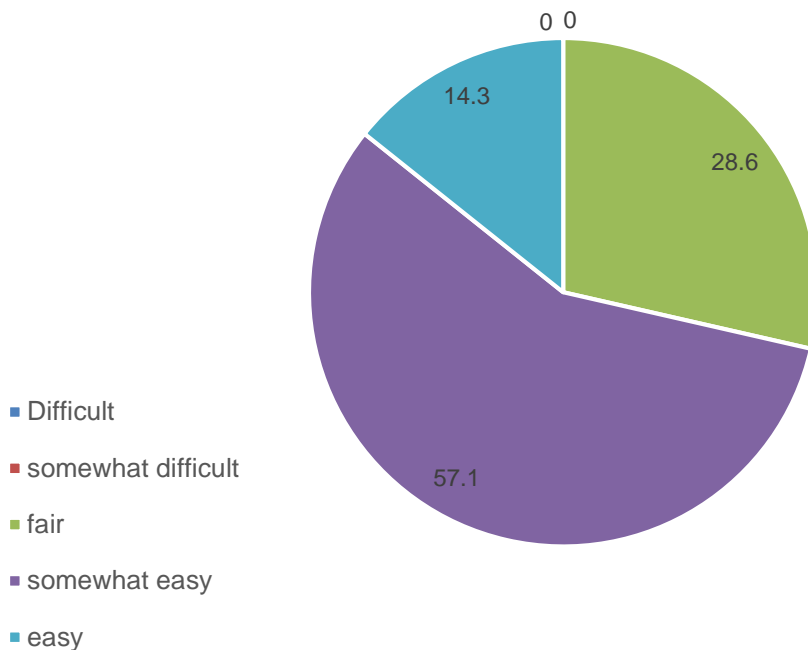


Figure 10 Chart presenting survey results of question "Did you find the Geodesign process difficult or easy to follow?"



Recommendations

The project has demonstrated Geodesign's viability as a framework for collaborative decision-making. Taken together with a technological platform like GeodesignHub, it is effective in facilitating communication and negotiation among stakeholders and driving consensus.

As a tool for supporting strategic scenario planning, the approach's feasibility is dependent on the quality and availability of data inputs that are needed to describe both existing and projected states of the study area. The knowledge of expert stakeholders is a great asset in accurately modelling the dynamics of impacts and costs associated with development scenarios. A precondition of interagency cooperation would facilitate these stipulations. Following are recommendations for future workshops:

Recommendation 1: Include data discussions during stakeholder engagement – Governmental agencies and other entities that have been identified as relevant stakeholders to the study area may be able to provide data needed for the exercise. Communicate the importance of complete and reliable data to the credibility of any design outcomes from the Geodesign workshop.

Recommendation 2: Align development scenarios to be explored with government-endorsed strategic plans that coincide with the study area – The preparations for the Sydney Geodesign workshop were near completion when the Greater Sydney Commission released the District Plans draft. Had there been more time for further preparation, the exercise would have benefited from the incorporation of the District plans' implications to the development scenarios being explored.

Recommendation 3: Conduct the exercise stages over a broader time frame – The Geodesign process requires multiple reiterations of designs for the study area. These stages of design reiterations could be held over a series of workshops rather than fitted into a single intensive workshop. If logistical feasibility and continued interest from participants can be ensured, holding the process in stages may allow more time for preparation as well as the incorporation of new data/knowledge pertinent to the study area.

Recommendation 4: Investigate feasibility of adding 3D visualisation – Incorporating 3D visualisation may help participants articulate the spatial and visual impacts of their proposed designs. This may also be useful if design proposals would be shown to the public or a wider expert community for feedback.

Recommendation 5: Establish labelling conventions with workshop participants – Over 480 project/policy diagrams and more than 50 design proposals for the study area were created during the two-day Sydney workshop. Having a pre-established labelling convention for diagrams and design proposals would avoid confusion during the negotiation stages of the exercise, and facilitate communication among participants.

Recommendation 6: An independent review of the preferred scenario design maybe be necessary to validate the workshop outcomes. Such a review should be open to community consultation as well as with senior government bureaucrats and politicians.

Conclusion

The Sydney Geodesign Workshop 2016 established the approach as a viable method for use in the Australian context. Strong, positive feedback from the end of workshop questionnaires supported this. The complexity of the task was supported by high-level participation from multiple government agencies, and the approach facilitated their collaboration and stakeholder “buy-in”. Preparation in the lead up to the workshop was extensive, but the workshop itself was compressed and rapidly produced and evaluated the various designs formulated during the workshop process. Further lead times could be completed in shorter timeframes depending on the availability of data.

References:

- Ballal, H. (2017). Geodesign Hub. Retrieved May 19, 2017, from <https://www.geodesignhub.com/>
- Steinitz, C. 2012. *A Framework for Geodesign*. Redlands, CA: Esri Press