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**WHITSUNDAY SATINWOOD ALLIANCE**

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## Abstract

Delivery of development projects economically and within constrained timelines poses a significant challenge for the Developer, Consultant, Contractor and Local Authority. If these issues are associated with difficult site conditions, the process is further complicated by complexity in the investigation, design and construction process. The Satinwood project includes these elements and has utilised the alliance procurement process to achieve development outcomes. The project is a major residential/resort development located in steep terrain behind the Airlie Beach township. The site has gradients generally in excess of 26° and has required road construction across the steeper areas to provide outlook to the ocean and the Whitsunday Islands. The alliance process has allowed close relationships to be formed between the participants to overcome organisational barriers to sharing information and focusing on project solutions. Within the Satinwood project, this has permitted areas of uncertainty to be investigated to an unprecedented degree of detail and close scrutiny of design outcomes by the whole design, construction and management team.

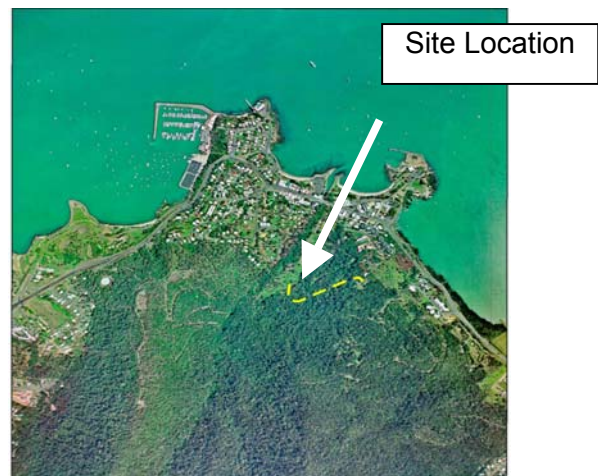
**Key Words: Alliance, residential/resort development, steep terrain, Airlie Beach, procurement, project delivery**

## Introduction

The Satinwood project is an alliance between DMHP Pty Ltd, represented by Milne Consulting Engineers Pty Ltd, Civdec Constructions Pty Ltd, Chenoweth EPLA and John Wilson and Partners Pty Ltd (JWP). The project is unique in that alliance procurement principles have been used to provide a relatively small, in alliance terms, infrastructure project which is privately owned. The alliance process was selected as the procurement method in order to allow close interaction between the team members to overcome a number of design and delivery issues. In particular, the steep nature of the terrain on the site and the desire of the Developer and Whitsunday Shire Council to provide an ecologically sensitive outcome has led to requirements for a development which will not unduly impact on the aesthetic appearance of the local area and the Airlie Beach coast. These outcomes have needed to be obtained whilst still maintaining budget and time constraints.

## The Project

The Satinwood project is a major residential / resort development located on a 40-hectare site directly behind the Airlie Beach township. The location of the site in relation to the Airlie Beach township is shown on Figure 1.



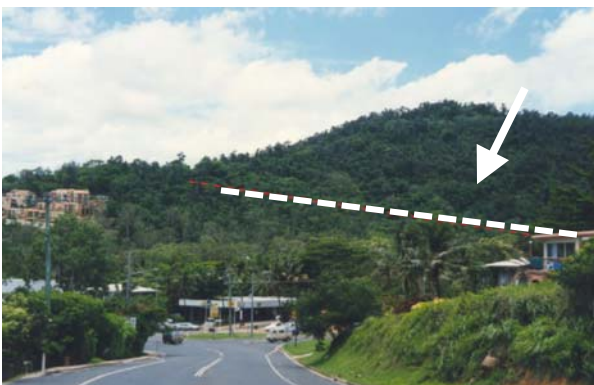
**Figure 1 - Site Location**

The development is known as the Whitsunday Horizons Development. The development comprises of a number of master lots including:

- 400 bed backpacker resort (Hazelwood)
- Three (3) multi storey residential unit developments ( Blue Pearl 1, Blue Pearl 2 and Double Cone Views)
- Four (4) standard residential lots (Raintree Heights)
- A 124 room resort hotel (Horizons Resort)
- Sixteen (16) special residential lots (Satinwood Heights)
- Fifty (50) unit eco resort

The Satinwood Alliance were responsible for the design and construction of the external roadworks, stormwater, sewerage, electricity and water supply to service all of the master lots and internally within the Satinwood Heights lot. This included 1000 metres of access roads, an extensive drainage system of piped drains and gabion lined open channels, retaining walls and a water supply network consisting of a pump station, 800 metres of rising main and a 500 kL concrete reservoir.

The site rises from RL 20m to RL 170 at gradients in excess of 26 degrees and is densely vegetated with Notophyll Vine Forest, which forms the characteristic green backdrop to Airlie Beach. Figure 2 shows the site as seen from the entry to the Airlie Beach township. The alignment of the main access road through the site is marked.



**Figure 2 - Project site as seen from Airlie Beach Township**

The steep site slopes are overlain by colluvium and residual soils to a significant depth overlying weathered rock of andesite with subordinate tuff and trachyte. The colluvium layers are inherently unstable and subject to downhill creep and slippage.

The steep slopes on the site and geotechnical conditions were major design issues on the project, particularly in relation to the main access road through the site. The design of the access road required considerable input and effort from all alliance team members to develop a design outcome, which was not only economic and practical to construct, but one that minimised the visual impact of the development.

The final design solution for the main access road through the site consisted of shotcrete walls of up to five (5) metres in height retaining the uphill slope and fill embankments of the downhill slope with a special outer zone consisting of compacted weathered rock won from the site. The landscaping design has ensured that the shotcrete walls will be adequately screened and all embankments are revegetated in order to minimise the visual impact.

Project construction began in May 2003, and currently site clearing, initial earthworks and a significant amount of the drainage infrastructure has been completed. The project is scheduled for completion in early 2004.

## **Alliance Process**

The Alliance Process provides a mechanism whereby different organisations can share resources to achieve specific project outcomes. The process is underpinned by a belief in the interaction of the various design, construction and maintenance elements being improved by a co-operative consultative driven mechanism.

The process specifically targets impediments to the successful co-operation of all parties involved by defining an operational environment which removes organisational barriers and provides financial incentives for efficient and timely performance. The

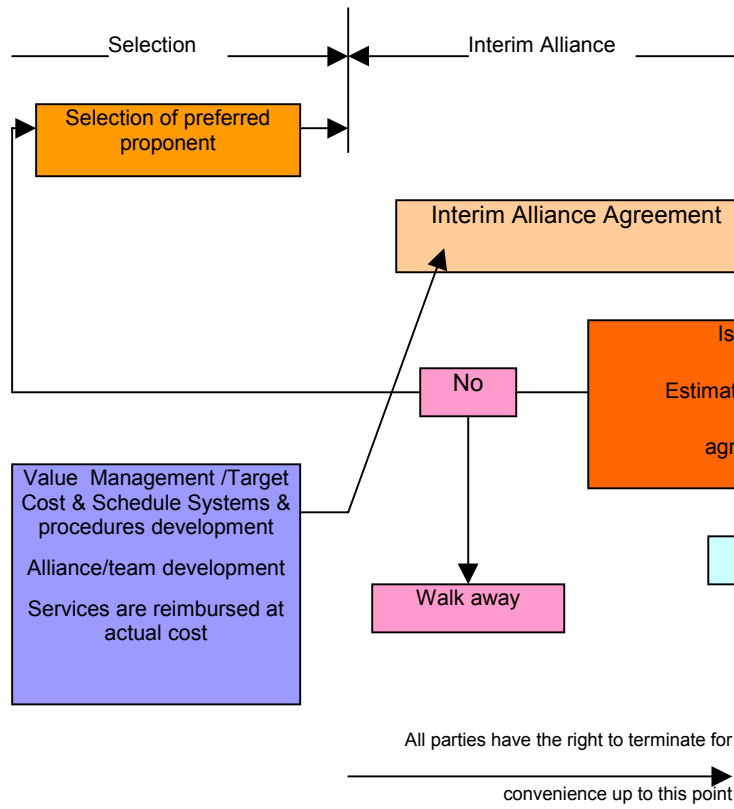
conventional adversarial contractual environment is removed and all participants are given incentives to perform as a combined team with the sole objective to achieve the required delivery outcomes. The behavioural characteristics of individuals to their respective organisations are suppressed by the requirement to operate under a “best for project basis” in relation to decision making and conflicts of interest. This is achieved through the financial drivers attached to the delivery mechanism which provide significant incentives and penalties for individuals and their respective organisations to meet or exceed the project requirements in respect to cost, delivery and any other agreed performance objectives. The outcomes are also structured in such a way that benefits of design and construction performance are returned to the principal as well as the Alliance Team which provides a benefit to all parties and incentive to the principal to minimise risk and consider the overall project delivery objectives.

Alliance delivery is defined by a number of distinct attributes which control organisational and project management behaviour. This includes the formation of a virtual organisation which combines desirably all project participants including the client into a unified management structure with project relevant lines of responsibility and authority. The operation of this organisation is desirably achieved by the formation of a project specific design and management team which are combined and co-located in a dedicated office for the duration of the delivery. The Alliance participants are contractually bound by agreements which enshrine the operation and structure of this process. The various board and team members are selected from each Alliance member on a “best for project basis”.

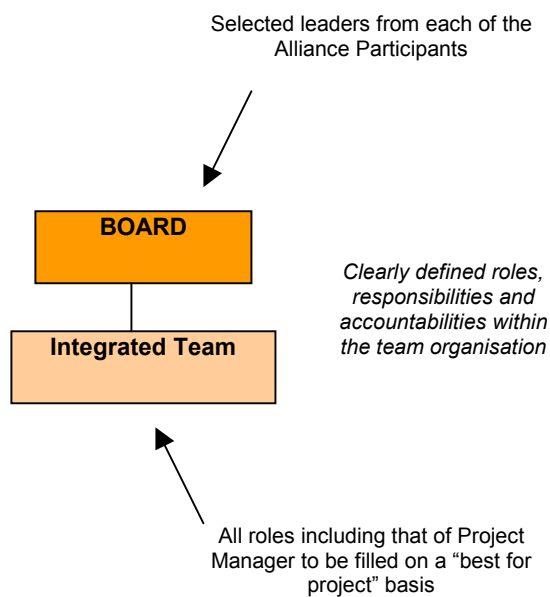
The agreements specifically prohibit litigation between the participants except in the case of wilful misconduct and provide for compensation, insurance, documentation and other operational matters. In particular, the agreements define a two staged process to the delivery of services. The first stage involves the assessment of project requirements to a degree of detail sufficient for the determination of a suitably accurate

estimate of cost. The estimate, once determined to the satisfaction of all parties, forms the basis for remuneration for the second design and construction components of the work. The initial stage provides a mechanism whereby any required reassessment of project requirements and constraints can be performed to ensure that outcomes are appropriate to client needs. The structure of specific Alliance contracts will vary depending on project needs and individual client and facilitator preferences and the above discussion outlines the broad principles only. The process is generally used for major projects because of the cost associated with facilitation and organisational overheads but can be used on any size of development where costs can be justified by potential benefits due to project cost reduction. The process is highly suited to projects where collaboration is likely to achieve efficient or innovative results. Details of the alliance initialisation and procurement process are shown in Figure 3. The management and operation of the alliance structure is diagrammatically depicted in Figure 4.





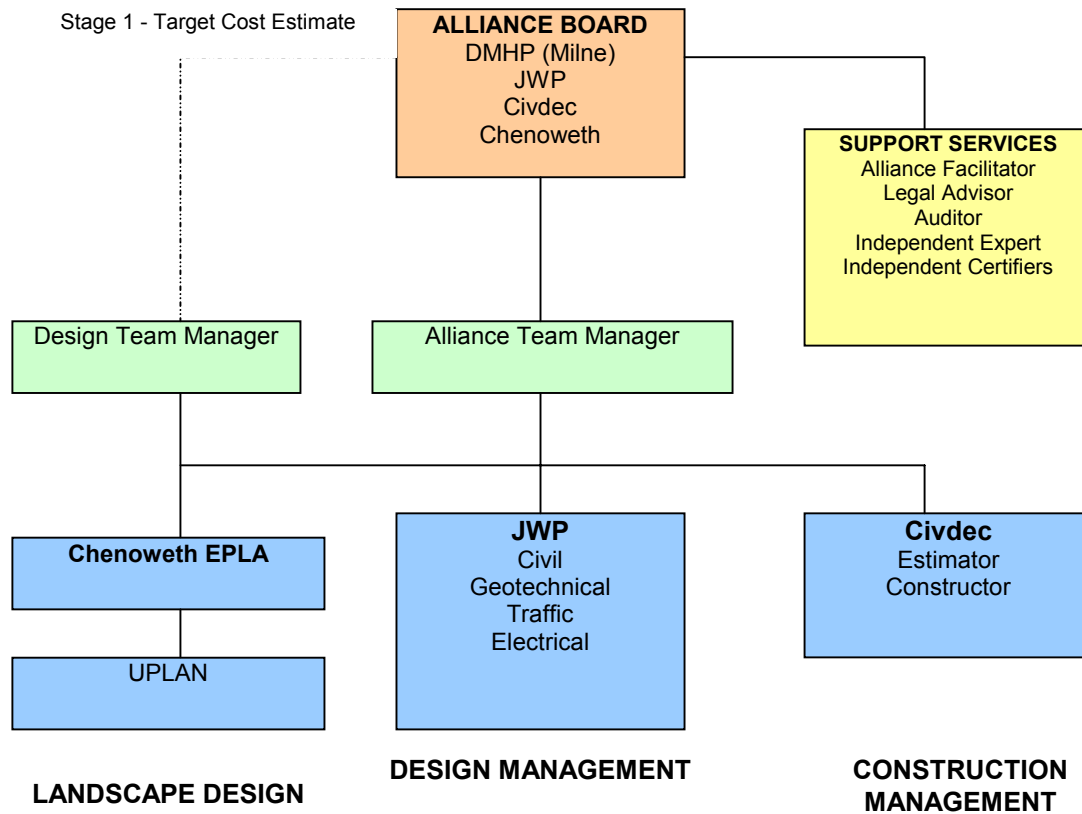
**Figure 3 - Initialisation**



Associates "the landscape architect". The scale of the project dictated that team members would remain within their respective organisations and would be joined as a unit in a virtual sense.

**Figure 4 Governance/Management Structure**

The Satinwood Alliance is at the lower end of this type of procurement method being of a value less than \$10 Million. The project has therefore been structured to adopt major alliance principles without some of the overhead cost associated with major public infrastructure works. Details of the organisational structure and associated support services are shown in Figure 5. The Alliance Team consists of four organisations, being DMHP "the client", JWP "the designer", Civdec "the constructor", and Chenoweth and



**Figure 5 Satinwood Alliance Organisation Chart**

The process has been managed by a Design Team Manager from JWP during the Stage 1 estimation and design phase and organisational control has reverted to the Alliance Team Manager from Civdec during the Stage 2 design, approval and construction phase. Team members from the respective organisations have been dedicated both on a full and part time basis as project delivery constraints have dictated. The alliance process is directed by the Satinwood Project Alliance Board which oversees the operational management process and provides final arbitration on project matters. The Board consists of membership from each full alliance partner and provides equal rights to all members. Decisions of the Board are required to be unanimous.

Operation of the alliance has been achieved through electronic communication by the various team members who are located in

Brisbane, Gold Coast and Airlie Beach. All communication has been lodged on a dedicated server (FTP site) with appropriate security and access rights to the various alliance members and associated supporting organisations. This approach has allowed rapid dissemination of information to all parties and provided for centralisation of all project information as would occur within a single unified organisation. The process has also provided a secure environment to protect the ownership rights of the principal to intellectual property. The FTP site has been used for storage of all correspondence, reports, design information, project documentation, minutes and financial transactions and statements. The use of electronic communication has allowed the virtual organisation to be created across organisational barriers without the overheads of a dedicated office with associated relocation and infrastructure costs.

## **Process Impact on Project**

The major impact of the alliance process on the project was that it provided a co-operative and consultative environment within which all partners could input into achieving an economic design solution in difficult terrain.

During the Interim Alliance Agreement period the major focus of the alliance was to produce a design and estimate which all partners could agree upon. The Alliance Designer Manager from JWP managed this process which involved the development of a number of design layout / solutions which would be reviewed by the other alliance partners. Throughout this period, in addition to communication via the FTP site, regular weekly meetings were held to discuss/ review the design.

The risk / reward nature of an alliance had a number of significant impacts on the project including the design, construction and the relationship with Council.

One of the impacts was on the amount of geotechnical investigation undertaken on the site during the design process. On a typical design project a certain amount of geotechnical investigation will be undertaken to ensure that a suitable design solution is achieved. The constructor usually takes on any risk in relation to unknown ground conditions and the designer would not be in a position to quantify this risk, which ultimately is passed onto the owner through a higher tender price. Although the initial geotechnical investigation would be considered comprehensive by normal standards, involving boreholes at ten (10) metre maximum spacings along all roadways, the alliance identified a need for additional testing in the form of a seismic survey to determine the depth and amount of unexcavatable rock. This additional testing enabled the alliance to confidently cost the earthwork component of the works and to minimise the risk contingency, which would be typically applied to such works. The additional geotechnical investigation also had the added benefit of enabling fine-tuning of the design to minimise excavation in hard rock.

As the estimate of cost adopted by the alliance partners was not based on a Council approved design, the alliance had to be confident that Council would ultimately approve the adopted design. In order to provide some certainty to the process the alliance design team had numerous meetings with Council Officers throughout the design process. At these meetings the major design features were discussed to ensure that Council had no major concerns with the approach. This process not only provided the alliance with the certainty required but it also provided Council Officers with an opportunity to review and comment on the design at an early stage, which is sure to have been of great assistance to them during the approval process.

With respect to the construction of projects, Councils will typically accept that designers certify that works have been constructed in accordance with the approved design. With the Satinwood Alliance project Council required that a person independent of the alliance team certify the works. This independence was achieved by the owner DMHP directly engaging a geotechnical and civil engineer to certify the various construction works on the project.

## **Assessment of Procurement Process**

The alliance procurement process is focused at improving project delivery through contractual arrangements which encourage co-operative/consultative behaviour between the various participants and the creation of an environment where innovation and efficiency are encouraged through risk sharing and reward. The process offers substantial gains for all parties through reduction in project cost, greater design effort and reduced construction risk. The consequence of this process on the Whitsunday Horizons project has been the achievement of an economic design solution in difficult terrain which achieves the aesthetic and engineering design objectives of the Whitsunday Shire Council. The final project outcome is anticipated to be of a high development quality and a benchmark for land development in steep terrain. Aesthetic treatments will minimise the roadway and

building impacts and retention of a large portion of the site in native condition will conserve an important natural resource.

The overall alliance process from a design management perspective has been positive with the reduced emphasis on investigative and design cost allowing project solutions to be developed without restrictive financial constraint. The reward to the Client has been a significant overall reduction in project cost (in the order of \$2 Million) and risk (geotechnical and wet weather). The challenge for the Alliance Team has been to maintain the timelines needed to meet market expectations and construction logistics. Table 1 provides a summary of the Satinwood experience to date in relation to various procurement issues.

The procurement process in relation to Whitsunday Shire Council is believed to have been enhanced by the co-operative environment existing within the Alliance framework, as well as the design approach which has provided a high degree of investigative and design effort to develop the final solution. These elements can be achieved outside an Alliance process but generally the commercial nature of land development procurement process lends to minimum cost outcomes for both the design and construction phases. These benefits, although not easily identified to Council at this stage, will come to the forefront with the recognition of the Whitsunday Horizons project as a benchmark in steep terrain developments.

Procurement Issue	Comment
Quality of constructed product	<ul style="list-style-type: none"> <li>• Provides a process where the Designers have a vested interest in the method, output and quality of work of the Constructor;</li> <li>• Allows a close interaction between the Designers and Constructor on design intent;</li> <li>• Encourages the Constructor to instigate design changes during construction;</li> <li>• Ensures that construction issues are considered and addressed during the design phase;</li> <li>• Encourages design efficiency and innovation by extensive review and input from all parties to the project;</li> <li>• Can drive design solutions to minimum cost outcomes;</li> <li>• Allows a more rigorous investigation of site constraints;</li> <li>• Can be used to achieve outcomes not specifically part of the physical works such as environmental performance and community relationships.</li> </ul>
Local Authority requirements	<ul style="list-style-type: none"> <li>• Provides a process where development requirements are critically analysed;</li> <li>• Design outcomes are encourages to stretch boundaries which may conflict with conventional wisdom;</li> <li>• Permits greater consultation between the Project Team and the Local Authority;</li> <li>• Introduces independent certification requirements;</li> <li>• Process can be used to compress timelines;</li> <li>• Provides a more holistic approach to the project outcomes;</li> <li>• Potentially provides a project with reduced engineering risk.</li> </ul>
Project Cost	<ul style="list-style-type: none"> <li>• Can reduce project financial risk by provision of a higher level of investigative and design effort;</li> <li>• Provides a reiterative process for cost reduction and budget control;</li> <li>• Ensures that project costs are understood to a high level of accuracy through extensive evaluation and review prior to construction;</li> <li>• Provides a mechanism whereby design and construction efficiency are rewarded;</li> <li>• Binds the Alliance partners with the Client to the financial performance of the project work.</li> </ul>
Timelines	<ul style="list-style-type: none"> <li>• Can extend the project timeline due to additional investigative and design effort;</li> <li>• Can be used to compress timelines through interaction of the design and construction process;</li> <li>• Consultative and rigorous approach should lead to minimisation of approval issues;</li> <li>• Breakthrough approach can lead to unrealistic expectations of design, approval and construction process.</li> </ul>
Contractual arrangement	<ul style="list-style-type: none"> <li>• Minimises risk of contractual disputes during construction;</li> <li>• Provides incentives to all Alliance partners to provide efficient design and construction;</li> <li>• Shares project financial risk to all Alliance partners.</li> </ul>

**Table 1 Alliance “Positives” and “Negatives” based on Satinwood Experience**

## **Conclusions**

The Satinwood project is an example of using the alliance procurement process on a major residential/resort development of Airlie Beach. The project, whilst not considered large compared to typical alliance projects, demonstrates how alliancing can lead to design optimisation and economic results consistent with the project objectives of a high standard, environmentally sensitive development.

The procurement process should not be of concern to Local Authorities and if managed correctly should achieve development outcomes which are superior to conventional relationships through improved investigative effort, greater knowledge of project constraints and costs and flexible contractual processes and outcome benchmarks. The Satinwood project when complete will define a new standard in procurement methods for private infrastructure projects of a residential/resort nature where site and delivery constraints can significantly impact on the economic viability and the final development solution.

## Author Biography



Steve Settle (BE (Hons), Grad.Dip.Comp.Sc., ME) is a civil engineer who has over twenty-five (25) years experience in a wide range of projects including major and minor roadwork, stormwater drainage, major dams and hydraulic structures, public infrastructure, and residential/commercial development infrastructure. Steve is a Director of JWP and Manager of the Civil Infrastructure Division which has specialised in providing partnering procurement design and construction services to both Local Authorities and the private sector. JWP has undertaken a number of Alliance projects including the Brisbane Water Alliance with Brisbane City Council, and the Maroochydore STP Alliance with Maroochy Shire Council.

Steve was the JWP representative on the Satinwood Alliance Board and has undertaken the role as Board Chairman as well as providing technical support to the design team on geotechnical, structural and drainage matters.

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Stephen Joughin (BE (Hons), M.Eng.St.) is a highly experienced civil engineer who has managed JWP's Roads and Drainage Department since 1994. He has over fifteen (15) years experience in road and drainage design, pavement design, urban development, traffic engineering, hydraulics and hydrology, contract management and project management.

Stephen was the Design Manager on the Satinwood Alliance and was responsible for all aspects of the design and documentation on the project.

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