DESIGN STAGE **CASE STUDY**

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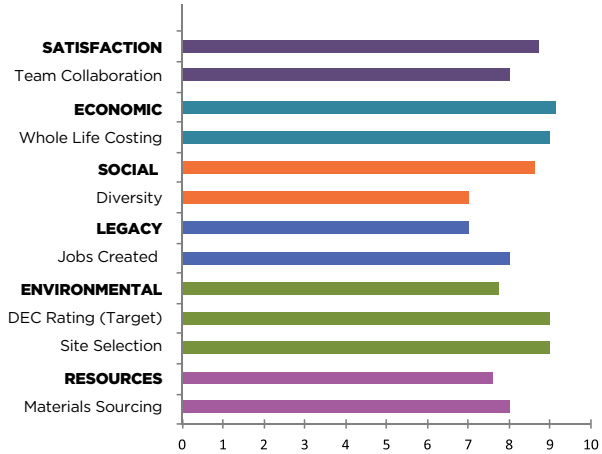
Coleg y Cymoedd, Aberdare College Campus

DESIGN STAGE



The new £22m Coleg y Cymoedd campus in Aberdare has been part-funded (50%) by the Welsh Government and is a priority scheme in the 21st Century Schools Programme. The new campus will open in September 2017 providing variety of practical workshops in carpentry, brickwork, plumbing, electrical, catering courses, hair and beauty spaces, and student facilities to replace those on the existing campus and offer new facilities.

The project also includes the refurbishment of the existing disused railway station building and car parking facilities for the college including local road upgrades. The project is set to achieve BREEAM Excellent, an accolade that demonstrates the combined team commitment to sustainability.

To ensure the scheme was feasible, a number of site related challenges needed to be overcome. These included dealing with contaminated land, and the nearby river leaving the proposed site on a flood plain. A collaborative engineered approach by Kier and the design team provided a workable solution, providing cost certainty, and delivered within the required timescale.

Procured under the SEWSCAP 2 Framework, Kier have been appointed under an initial pre-construction services appointment to develop the design and market test packages to achieve an agreed contract sum.

PROJECT DETAILS

Client:	Paul Davies, Coleg y Cymoedd
PM:	Alun Owen, Mott MacDonald
Contractor:	Mark Poole, Kier Construction
Designer:	Tim Young, Austin Smith Lord
Structures:	Marvin Owens, ARUP
M&E Design:	Lorne Stewart / ARUP
Value:	Circa £16m construction cost
Project size:	5,800m²
Contract:	NEC Option A (Priced Contract with Activity Schedule)
Duration:	64 weeks

Coleg y Cymoedd
Ysgolion yr 21ain Ganrif
21st Century Schools
Austin·Smith:Lord
KIER
ARUP
MOTT MACDONALD

KEY CONTACTS

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Noddir gan Lywodraeth Cymru
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CONSTRUCTING EXCELLENCE IN WALES

What is an Exemplar project?

An Exemplar is defined as **'something worthy of being copied'**. The Exemplar programme has been developed to help identify the reasons why certain projects are successful in a standardised, quantifiable way and to share with the industry what enabled these successes.

An Exemplar considers all aspects of sustainability, including economic, social and environmental, demonstrating that the scheme is well rounded and has incorporated best practice and collaboration.

Case studies are prepared at 3 Key Stages Design Stage; Construction Phase; Post Occupation

This ensures that lessons learnt can be demonstrated throughout the development of the project.

What Makes this Project Exemplar?

1. Climate Resilience and adaption: Building on a flood plain has introduced a non-standard design, including building on stilts, maintaining the existing ground profile to avoid a consequential flood effect of the building footprint on other areas within the identified flood plain; introduction of a river level monitoring device as an educational tool and early warning to imminent floods, which could affect the operational aspect of the college; under croft drainage and incoming services design to absorb the effects of deflection / movement and to resist the effects of any flooding
2. Reducing risks prior to construction of abnormals: transparent approach to contamination material management strategy using a 3rd party consultancy (Sanctus) to effectively manage heavily contaminated materials from the previous land used as railway sidings. These included fused slag, asbestos, hydro-carbons and Japanese Knotweed. The influence of the River Cynon has affected the water table, which is variable at times of flooding
3. Technical solutions due to the proximity of the River Cynon and the chosen piled foundation technique. Intensive discussions with National Resource Wales and Arup were undertaken to investigate the effects of potential environmental impact of contaminants reaching the river
4. Managing defects via soft landings approach. Pre-handover defect management tool used based on propriety electronic system for a defect free hand over. Also, Kier's aftercare management which provides a single source for notification of post completion defects, which is then locally managed by Kier's maintenance manager. This would be supported by a member of the construction team being site based post completion
5. Design fully co-ordinated utilising BIM (Building Information Modelling) software to assist in clash detection. The BIM model will be handed over to the client showing as built information for educational purposes
6. Early stage stakeholder consultations involving staff, learners, estates, health & safety representatives, which were reviewed throughout the design and construction stages with regular site visits as a learning tool for the College and staff. Open doors events held inviting local businesses and members of the public onto site including Stake holder engagement at key points during the development of the scheme has enabled the integration of all client requirements were cost permissive, e.g., early client access to install IT equipment bringing early practical use of the building for the client as part of the fit out process
7. Ongoing opportunities tracking programme which engages with staff, learners, community, and other stakeholders. Also, Kier and the College are currently developing a long term agreement for "employer engagement" with Coleg y Cymoedd for a long term Kier and supply chain training programme.

Transferable Lessons Learned

Lessons learnt have been particularly captured via workshops and experiences from previous Exemplar projects on the Nantgarw Campus. They include:

1. Procurement process and how the integrated team was established – by agreement NEC option A to reduce the risk profile of the project
2. How risk and value are being managed to give greater certainty - transparent approach via combined client risk register and monitored by the team
3. How energy efficiency, carbon impacts and whole life costs can be better managed
4. How the development of an integrated project team from a very early stage supports the achievement of high levels of community benefits
5. How construction waste can be managed out of the project via the use of SMARTWASTE and Kier's environmental management systems
6. Feedback from the facilities Management (FM) team i.e. lessons learnt from previous capital projects, as highlighted below.

Also the team recognised improvement through previous experiences with:

1. Single Ply roofing – resulted in a change in specification to built-up felt system
2. High level window maintenance – all window areas are accessible and maintainable
3. Building Management Controls – user friendly BMS system with open protocols to ease environmental control of the building
4. General M&E maintenance – exposed insulation on roof mounted ductwork to be avoided due to nesting birds.

Notable Achievements

The other main points in terms of dealing with key issues facing the industry include:

- Maintaining cost and time certainty - Kier offered an additional five weeks to the 2nd stage to de-risk this phase by introducing an enabling works phase and reducing the construction programme
- Maximising the value of ECI during the pre-construction phase with An Early Engagement of specialist suppliers e.g. hair & beauty, catering, FFE; Addressing whole life cost issues to reduce future running costs & Streamlining the procurement process to reduce cost and bureaucracy (and to engage more attractively with the market place)
- Education Initiatives with college students - programme developed for extent of the project
- Reducing the volume of waste generated and the percentage of material going to landfill - meeting WG drive towards zero waste to landfill
- Maximising the potential for community benefits by having a well-structured and education/skills focused community engagement plan in place and regularly monitored and tracked to achieve the project KPI's
- Welsh Government 21st Century Schools match funded (50%) project with specified criteria to comply with funding requirements including: Achieving BREEAM Excellent; Incorporating 15% recycled material; Installation of fire sprinklers; Achieving BB93; Producing a Site Waste Management Plan; Achieving the required Community Benefits targets as set out in the contract.

Improving The Process

A single set of KPI's set out in the SEWSCAP2 framework, CEW and Community Benefits Management Tool will be measured throughout the duration of the project and reported accordingly.

Safety, cost certainty, time and local spend are the key performance indicators recognised also by the client. There is a budget and absolute deadline end of July 17 for facility to open its doors in September 2017.

The College will fit out areas with ICT from early June and transfer other equipment and learning materials from the existing Campus throughout July and August as part of fully coordinated occupation programme with Kier.

Throughout the procurement the project team will bring opportunities with local spend thereby delivering maximum value for the Welsh pound. Strongly encouraging local subcontractors to employ and train apprentices and unemployed people on the project.

The KPI's will be monitored at project progress meetings and report back to SEWSCAP on a quarterly basis. Subcontract meetings will include feedback as part of the main agenda.

An Accident Incident ration of zero is the target of the construction team, which will be achieved by effective leadership, intelligent upfront planning, supply chain competence and buy in, good communication at all levels and effective monitoring from everyone involved.

Kier's 'Positive Safety Leadership' (PSL) commenced eight years ago and it has positively impacted on staff, operatives, subcontractors, consultants, clients and third sector organisations, such as, Construction Youth Trust, Bridges into Work, schools, Clubs and other community bodies. In collaboration with stakeholders, Kier have achieved best practice nationally and set the benchmark for all UKCG Companies to aspire to.

A Considerate Contractors score of 41+ has been set, also a target for a BREEAM innovation credit.

Education Initiatives are is also a project KPI and a programme of events developed for targeting minimum one per month for the duration of the scheme is in place.

Strategy

The client is leading this process and has shaped the process for specific outcomes and will be involved throughout. The project is being progressed in a collaborative fashion with the establishment of an integrated team from an early stage in the project's development. The SEWSCAP2 Framework has been used to engage a main contractor and design team on a 2-stage design and build basis. NEC Lump Sum is favoured for greater certainty for the client but the client is involved in the development phase to reduce project risks and hence make a lump sum approach more suitable and better value for whole team.

End users and key stakeholders are involved throughout the project development process to ensure that the final product reflects their needs. Particular attention has been given to specialist fit out areas i.e.

1. **Construction workshops -** use of ground floor space and external areas for workshops (i.e. brickwork, carpentry, plumbing, electrical) with ease of transferring and storing materials, training bays, etc. to ensure training accreditation needs and end user requirements are fully satisfied
2. **Hair & beauty -** use of specialist equipment within practical training areas for hair salons, beauty therapy, among others incorporating a commercial function with customer reception, product storage and displays, appointment booking system, etc
3. **Catering -** college operated commercial training restaurant using staff and learners with "meet and greet" areas, bar, demonstration and practical kitchens, etc. Also, independent main canteen and kitchen, storage areas, etc. operated by external catering contractor.

The process has involved the early appointment of a preferred sub-contractor for each of the above fit-outs. Regular meetings have been held involving the contractor, sub-contractor, designer and end user to ensure the end user's requirements were met. Samples and 3D imagery have been provided where possible so the end user fully understood the products they were getting. Quality is being maintained via soft landings approach whilst bringing client's lessons learnt from experience on Nantgarw. Lessons learnt workshops were held early on, which helped influence the design. For example, in the past, the client has experienced problems with single ply roofing, thus, determining the specification for the flat roof.

Risk and value management processes are being applied throughout the project development process with the whole team involved in managing changes and ensuring that certainty is maintained in terms of cost, time and quality. Commitment to the people involved in the project is being addressed by regular review of design development to ensure aspirations are being met. Client and stakeholder reviews/presentations are being undertaken. BIM presentations have been given to staff and students to brief them on the understanding and long term legacy of facilities management.

Impact

Kier have developed a Corporate Responsibility Employment Skills Plan which outlines how we will achieve and exceed all community benefits and employment and training targets. Through timely pre-start engagement with local organisations including Job Centre Plus, Working Links etc. They are able to support locally employed individuals into sustainable employment across the scheme.

The local community will be involved in the project throughout the community; with liaison meetings, site tours and school visits. Kier will inform local people of construction progress through regular newsletters.

Key community benefits include:

- 780 person weeks; 6 trainees/apprentices; 3 graduates; 2 long term unemployed; 3 people upskilled
- Provide 400 hours of in-kind contributions to community and education
- Utilise 85% of Welsh businesses, 50% of which need to be SME's
- Value Wales toolkit - targeting £1.90 generated from every £1 spent on the project

Supply Chain Strategy

Kier will utilise local subcontractors to deliver work packages throughout the project. A Meet the Buyer event will be organised and advertised on Sell2Wales for local subcontractors to access opportunities on the project.

Kier will embed principles and values of the project with regards to health and safety by ensuring that people are not harmed at their place of work through effective leadership, intelligent upfront planning, supply chain competence and buy in, good communication at all levels and effective monitoring from everyone involved. The Wales business operates a Supply Chain management system covering 44 key trades across our geographical area. Each member company has to be compliant with 'Safety Schemes in Procurement'. Performance is tracked monthly and on completion with comments fed back into the system. We provide training and assistance to subcontractors to attain such accreditation where required.

Supervisor competence and buy in was identified by management as a key focus for the business back in 2009. Since this date the business has trained 621 subcontract supervisors on the CITB two day Site Supervisors Safety Training Scheme. This was undertaken at no cost to the contractors.

Kier will embed principles in line with people development through supply chain training utilising the Colleges training and development courses. Kier will support the supply chain through required training where necessary to ensure they are fully equipped to carry out work. Supply chains are encouraged to complete toolbox talks on a regular basis to address any training needs.

Kier will embed principles of best practises through lessons learnt captured via workshops and experiences from previous projects on the Nantgarw Campus.

Sustainability

The team are currently on course for a score of 75.49% leading to BREEAM Excellent under New Construction 2011. The project is currently being managed by Darren Baker, of Melin Consultants through the use of the Kier 4Projects system and Regular design team meetings, regular design team collaboration and updates to the score via credit trackers on 4P.

Under BREEAM there was an awareness of the benefits of delivering against certain credits had its own business case and so the team progressed:

Life cycle costing has been carried out in order to ensure that the most cost effective materials and specifications are used in order to reduce the whole life cost of the building, durability measures will also be installed to ensure that the maintenance costs are reduced where possible.

Stakeholder participation has also been targeted ensuring that the building delivers what the users will need, thus ensuring that fewer changes are required to the building once it is complete.

An Ecologist, Aislinn Harris, from Dave Clements Ecology was appointed to advise on ecological protection required prior to construction /clearance works. In addition a report was produced by the Ecologist providing recommendations which the client and Kier have signed up to implement. A landscape and management plan covering five years after completion was produced

Flood Risk Assessment and Surface Water Run Off assessment was provided in accordance with current best practise national planning guidance, which took all current and future sources of flooding into consideration.

Thermal Comfort Model is being undertaken by Arup MEP to comply with Hea 4 and report to be issued along with design drawings to show thermal zoning and controls. This led into a full review of SBEM to Lower U values, reducing carbon emissions and operational costs throughout the life of the building. Air permeability and thermographic testing targeted below industry standards were also implemented.

Travel plan issued with a copy of the site specific transport survey/assessment. Design drawings issued demonstrating examples of design measures.

Reduction of carbon emissions over 2014 regulations by 18.19% through the reduction in Primary Energy Consumption of 8.9% over the target Primary Emission rate; Efficient lighting, heating and cooling systems have been used to help reduce the energy usage and carbon emissions of the building and Inclusion of 350m2 of PV panels, with a peak output 64 kW, giving an annual energy generation of 54,500kWh.