


<b>Trial project:</b> <b>New Prison North Wales</b>	<b>New delivery model / procurement route: Two Stage Open Book</b>
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**Cost savings achieved to date:** 26%

**Other key benefits achieved to date:** Collaborative design/ costing/ programming/ joint risk management, leading to innovative joint designs and operational efficiencies, cost and time controls, cost savings in a rising market, opportunities for local and regional businesses, apprenticeships and other employment/training opportunities, effective use of BIM Level 2, benefits of Government Soft Landings and Project Bank Accounts

<b>Trial report sequence:</b>	Kick off meeting	Brief/Team Engagement	<b>Decision to Build</b>	Build and Occupy
<b>Cost saving basis:</b>	Outline saving aspiration	Challenging cost target	<b>Award Cost</b>	Outturn Costs

**Trial project details**

<b>Project title</b>	New Prison North Wales	
<b>Client department</b>	Ministry of Justice	
<b>Project value</b>	£156,923,058 (original cost estimate £212,200,000)	
<b>Form of project</b>	New Build Prison	
<b>Main contractor</b>	Lend Lease	
<b>Lead designer</b>	Lend Lease	
<b>Key suppliers</b>	AECOM (Client Representative), Sweett Group (Cost Consultant and CDMC ), WYG (Technical Assessor), Capita Symonds (Architect), TPC Consulting (Civil and Structural Engineers), Hoare Lea (Mechanical and Electrical Engineers), Crown House (Mechanical and Electrical Specialist)	

**Executive summary:**

Ministry of Justice have created a collaborative basis under the PPC2000 contract for the design, construction and maintenance of a 2,100 place prison on a site in the Wrexham Industrial Estate. They selected a team from their National Alliance and undertook a 38 week period of programmed early contractor contributions to design, risk management and finalisation of agreed costs. Ministry of Justice are applying lessons learned from their Cookham Wood Trial Project (<https://www.gov.uk/government/publications/procurement-trial-project-case-study-cookham-wood>). These lessons have enabled the North Wales Prison team to obtain additional benefits from the use of BIM Level 2 and greater contributions from Tier 2/3 subcontractors and suppliers, including a specific focus on local/regional SMEs. The team are also using the CITB Client -Based Approach to maximise employment and skills benefits from the project. The North Wales Prison project is trialling Two Stage Open Book, BIM Level 2, Project Bank Accounts and Government Soft Landings. The savings are drawn from the combination of Two Stage Open Book with BIM, including market engagement and tender meetings to help de-risk the early selection of an Integrated Team. Additional savings are drawn from joint design development and risk management during the timetabled pre-construction phase of the project.

### Project summary

The North Wales Prison project comprises the construction of a 2,100 place prison at a site on the Wrexham Industrial Estate. The project is one of the largest new build prisons in Europe.

### Project time-line

- Ministry of Justice Internal Business Case, September 2013,
- Selection of Lendlease as Tier 1 Main Contractor (and of Tier 2 MEP Specialist Contractor, Crown House) after competition with other shortlisted Ministry of Justice Alliance members, July 2014
- Preconstruction appointment of Lendlease under PPC2000 Project Partnering Agreement to govern timetabled preconstruction activities, 15 July 2014
- Integrated team working on preconstruction design, value management, programming and risk management, July 2014 to March 2015
- Early work on site under PPC2000 Pre-Construction Agreement from August 2014
- Approval of Agreed Maximum Price ("AMP") within Budget , and signature of PPC2000 Commencement Agreement authorising project start on site, 25 March 2015
- Agreed Project Completion, 17 August 2017

### Key project features

- Effective use of 38 week main contractor preconstruction phase appointment
- Substantial cost savings achieved through joint value management in a rising market
- Joint risk management minimising cost/time effects of unexpected site conditions
- Time certainty achieved through joint programming, including re-sequencing to avoid delays caused by late authorisation to start on site
- Collaborative working by integrated, co-located team
- Creation of significant numbers of local apprenticeships and jobs

- Local and regional businesses appointed on substantial value/range of work packages
- Innovative design solutions and operational efficiencies identified through use of BIM
- Government Soft Landings
- Project Bank Account

### Client objectives and vision

This project will provide one of the largest new build prisons in Europe, with the potential to alleviate pressure on existing prisons and also to provide important business, employment and training opportunities in North Wales. The vision of Ministry of Justice and its team is to use Two Stage Open Book, a model already proven on their previous projects, as a means to maximise project value. This includes use of collaborative techniques to control costs in a rising market, to ensure cost and time certainty and to create an integrated team where all supply chain members make early contributions to design and project planning.

A particular priority for the project team is to offer new jobs and training in North Wales and to ensure the maximum involvement of businesses within a 50 mile radius of the site.

### New procurement techniques and processes

The team have adopted the Two Stage Open Book procurement model and have followed the systems and techniques described in the King's College London/Cabinet Office "*Project Procurement and Delivery Guidance Using Two Stage Open Book and Supply Chain Collaboration*" (<https://www.gov.uk/government/publications/two-stage-open-book>). They have used the PPC2000 form of contract which sets out a structure for multi-party, two stage project alliancing that describes the processes of Two Stage Open Book.

On this project the Ministry of Justice applied lessons learned on the earlier Cookham Wood Trial Project and extended the pre-construction phase appointment of Lendlease alongside consultant /sub-contractor team members to 38 weeks.

In addition the team have implemented Building Information Modelling Level 2 at all stages of the design process. The use of BIM with Two Stage Open Book under PPC2000

has created a programmed approach to each stage of each team member's contributions to the BIM models. It has also enabled Specialist sub-contractors to make early contributions to BIM models.

The team have committed to use a Project Bank Account and also to implement Government Soft Landings, for example through a 24 month defects liability period.

### Cost targets and savings

Due primarily to a major shift in the sub-contractor market place and Client Change after the appointment of Lendlease as Tier 1 main contractor, costs were threatening to rise significantly from the original agreed cost estimate. The response from the entire delivery team, including Lendlease, was to explore the Value Engineering options available to bring the costs to an acceptable Agreed Maximum Price. The team focussed jointly on identifying cost savings through Value Engineering without eroding the quality or function of the Project being delivered, and these included:

- A more efficient way to achieving BREEAM excellence which resulted in a saving of more than £1 million,
- A reduced footprint for the Entry Building/Energy Centre, using lessons learned from the Oakwood prison project and consultation with operational colleagues,
- Re-location of the multi-faith building to provide a more operationally efficient layout of the site and a reduction in construction costs,
- Challenging the original costed design to incorporate an open "swale" in place of an attenuation tank, thereby also creating a new environment for wildlife while reducing construction costs
- Applying Value Engineering to the mechanical and electrical solution which resulted in an alternative lighting solution used in Scotland being applied to Wrexham. This solution complied with MoJ standards and brought savings to the MoJ. The Value Engineering has identified a cost saving solution which the MoJ can now use throughout the estate.

In response to the emerging risks created by discovery of asbestos on site which is a MoJ

risk, the team worked with Wrexham County Borough Council and the Health and Safety Executive to permit asbestos to be mitigated on site. This resulted in the MoJ avoiding costs of up to £4 million for moving the materials off-site.

### Employment and training and local/regional commitments

The project adopted the CITB Client- Based Approach whereby Lendlease committed to meet employment and skills targets proportionate to the project value, including 100 apprenticeships over the life of the project, and also to recruit 50% of the workforce locally.

As at July 2015 after less than 4 months from commencement on site (out of a total project duration of 28 months), 77% of those working on site are local and 11 new apprenticeships have already been created. In addition, Lendlease has also provided 202 work placement days out of its overall target of 500, working with local schools including their special needs pupils.

Current apprenticeships include 5 starting in June 2015 and provided by sub-contractor Jennings working with the Wrexham Jobcentre Plus. By that date Lendlease had also already taken a total of 15 people out of unemployment.

This project has been granted CITB "Skills Academy" status from September 2015, being the first Skills Academy in North Wales and the first prison project to have this status.

Lendlease has agreed to expend £30 million of the project value on local businesses within a 50 mile radius of the site, and the team members have run local Supply Chain Events .As at July 2015, £10.6 million had been spent on local businesses. In addition, Lendlease has already engaged SMEs on £30.2 million of work to date against an overall project target of £50 million. Work packages awarded to local businesses or SMEs so far include:

- Steelwork (Hayley Steel, plus steel erection awarded to a local erection contractor);
- Ground-works (Jones Brothers from Ruthin and Jennings from Colwyn Bay appointed as Specialist sub-contractors, plus concrete orders placed with Wrexham and Chester suppliers);

- Precast vehicles/logistics support and concrete supply (PCS Precast);
- MEP (Three local sub-contractors appointed by Crown House);
- Roofing (Weatherwise of Deeside).

A local landscape contractor James Wright provided early services to assist in meeting Wrexham's planning conditions in relation to waste disposal, working with WRAP to introduce locally generated green waste solutions that enhanced soil on site and considerably reduced vehicle movements. As a result James Wright were awarded a significant package contract for landscaping. The team are working closely with the local community, providing detailed updates on project progress and as to future job opportunities at the completed North Wales prison.

#### Additional benefits

The team faced significant early challenges caused by ground conditions on the extensive project site, including asbestos, soft spots and remnants of the concrete foundations of an old munitions factory. Joint working in co-located offices enabled the team to agree a strong response to these issues in finding ways to minimise any delays and cost overruns.

Lendlease encountered a major shift in the sub-contract market whereby increased workloads and rising prices have led to a scarcity of package contractors willing to make the long-term commitments required by the scale of this project. In response the team has supported Lendlease in:

- recognising the fact of increasing package costs during the preconstruction phase, and utilising Value Engineering measures as described above (see "Cost targets and savings") in order to reach an Agreed Maximum Price which was fair and robust taking into account Client changes and which will provide value for money,
- approving sub-division of works packages so as to secure the require volume of sub-contract works and supplies, for example:

- (a) for precast, engaging 8 factories in Germany, Ireland and Belgium as well as England
- (b) splitting roofing and brickwork each into 2 packages
- (c) splitting ground-works into 4 packages.

Collaborative work on Value Engineering to mitigate the threat of cost increases caused an unexpected delay in authorising start on site which in itself threatened to cause a construction delay of up to two months. The co-located team worked closely together to restructure the construction phase of the programme in a way designed to eliminate this delay while maintaining transparent milestones. In doing so they established a more logical sequence for phased handover of completed sections of the project.

The team used the "BIM Cave" in Salford to enable a walk-through of the virtual project. This opportunity offered major operational insights that benefitted the appointed Governor and SRO of the North Wales prison.

#### Overall assessment

The assessment of Constructing Excellence and the Project Mentor is that this Trial Project provides important lessons on how an integrated co-located project team can improve designs, can control costs in a rising market, can analyse and control time so as to mitigate delays, and can ensure benefits to the local economy. The use of the Two Stage Open Book procurement model has created early, transparent engagement with the Tier 1 main contractor and systematic early engagement with works package contractors. It has also provided a valuable means for the project team, including Tier 2 sub-contractors, to engage with local and regional businesses and to maximise their involvement combined with additional jobs and training.

Early contractor involvement under Two Stage Open Book combined with BIM has provided design improvements and has enabled effective value management at all stages of the project to date.

#### Key lessons

It is too early to draw conclusions but as interim key lessons:

- The team's understanding of Two Stage Open Book was enhanced through access to the King's College London/Cabinet Office "*Project Procurement and Delivery Guidance*"
- The team and the project benefitted from the longer 38 week preconstruction phase appointment of the Tier 1 main contractor
- The team benefitted from clarity in the PPC2000 preconstruction phase "*Partnering Timetable*", which contained agreed deadlines and interfaces for each stage of collaborative design, sub-contract tendering and the costing of each work package including the progression of BIM models.
- The team benefitted from use of BIM Level 2, and the value of BIM was enhanced through agreement under PPC2000 of mutual IP licences and clear deadlines for each team member's contributions to the BIM models

#### Miscellaneous

##### Authors

- This case study was prepared by Professor David Mosey of King's College London Centre of Construction Law and Peter Kitson of Trowers and Hamlin as joint Project Mentors, and has been approved by Ed Evans of Constructing Excellence as Academic Partner.

##### Key contributors

- Ministry of Justice (Client), Lendlease (Main Contractor), Capita Symonds (Architect), TPC Consulting (Civil and Structural Engineers), Hoare Lea (Mechanical and Electrical Engineers), Crown House (Mechanical and Electrical Specialist), Aecom (Client Representative), Sweett Group (Cost Consultant and CDMC), WYG (Technical Assessor)

#### Background: Trial Projects programme

The Government Construction Strategy aims to change the relationship between clients and the entire supply chain within the industry. The trial projects perform a central role in delivering the Strategy's sustainable 15-20% reduction in costs and are currently

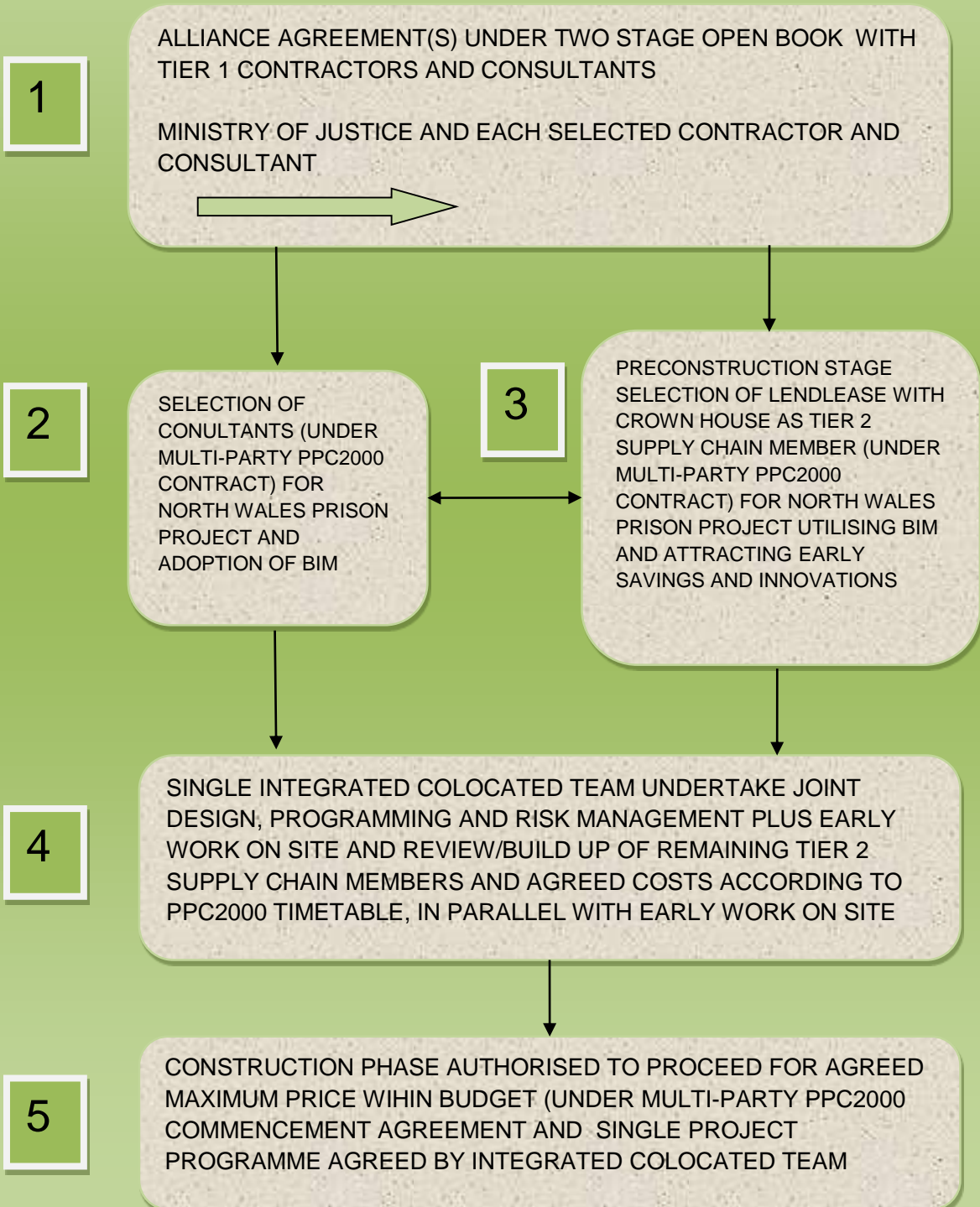
testing three new procurement models (Cost-Led Procurement; Integrated Project Insurance; Two Stage Open Book) that were proposed by industry and developed by a joint task group. Case study reports are therefore an output of monitoring the progress and outcomes of the trial projects. They are produced at four stages: Kick-off Meeting; Brief/Term Engagement; Decision to Build; Build and Occupy. Other case study reports can be found at:

<https://www.gov.uk/government/publications/government-construction-strategy-trial-projects>

#### Project contacts

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## TWO STAGE OPEN BOOK



<b>How the reported savings were achieved</b>				
<b>Strategic context</b>		<b>Client</b>	<b>Collaborative</b>	<b>Supply chain</b>
Aggregation of demand	<b>Yes</b>	Project formed part of MoJ Alliance		
Significant committed spend	<b>Yes</b>	£900m Alliance Work Programme		
Standardised procurement / streamlined approval processes	<b>Yes</b>	MoJ systems and contractual preconstruction processes under PPC2000		
Lean programming	<b>Yes</b>		MoJ lean system and additional team proposals	
Client cost data base	<b>Yes</b>	Published benchmarks		
Performance management	<b>Yes</b>		Framework performance initiatives	
<b>Common new delivery model characteristics deployed</b>		<b>Client</b>	<b>Collaborative</b>	<b>Supply chain</b>
Challenging cost target / open book	<b>Yes</b>	26% target with open book measurement	26% delivered by Two Stage Open Book	
Affordable standardised output / outcome requirement	<b>Yes</b>	Standardised designs developed through Alliance and captured in BIM library		
Early contractor involvement	<b>Yes</b>		Early appointment of Tier 1 contractor and Tier 2 subcontractors	
Lower tier engagement: fully integrated supply chain	<b>Yes</b>		Tier 2 early appointments	
Lower tier engagement: innovation encouraged / achieved	<b>Yes</b>			Joint innovations saved time/money and improved quality
Standard form of contract with minimum amendments	<b>Yes</b>	PPC2000		SPC2000
Effectively led change in team behaviours and practices	<b>Yes</b>		Personal commitment of all key individuals	
<b>Two Stage Open Book characteristics deployed</b>		<b>Client</b>	<b>Collaborative</b>	<b>Supply chain</b>
First stage selection of integrated team on open book basis and ability to deliver savings / project objectives	<b>Yes</b>	Open-book MoJ Alliance Agreement and two stage delivery under PPC2000		
Joint work of integrated team (incl. Tier 1 and lower tier contractors) on design, risk management, reduced costs under early appointments	<b>Yes</b>		Collaborative joint working at selection and throughout project	
Approval to construct on basis of demonstrable ability of team to achieved targeted costs and progress against project objectives	<b>Yes</b>	Preconditions agreed by team	PPC2000 Commencement Agreement established commitment to start of construction phase	

Other cross cutting initiatives deployed		Client	Collaborative	Supply chain
Building Information Modelling	Yes	BIM Level 2 adopted	Supply chain procured using BIM model	
Procurement Routemap				
Government Soft Landings	Yes		Team commitment	
Project Bank Accounts	Yes		Implemented throughout project	