Kia ora

Christchurch Campus Redevelopment Project

Overcoming Design Co-ordination Challenges
CCG Presentation September 2020

Rubix

WARREN AND MAHONEY

UNIVERSITY of OTAGO
Te Whare Wānanga o Otāgo
NEW ZEALAND
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Welcome and Agenda

Today's Presentation:

- Project Overview & Context
- The Problem
- The Proposed Solution
- Outcomes So Far
- Summary & Next Steps
- Q&A

Speakers:

- Tanya Syddall (UoO Project Director)
- Amanda Batchelor (Rubix)
- Brad Sara (Warren & Mahoney)

The Project

School of Medicine,
part of Division of Health Sciences

Co-located with the Christchurch Hospital

Supports:

- Medical and Nursing undergraduates 4-6th year
- Centre for Postgraduate Nursing Studies
- Significant research investment


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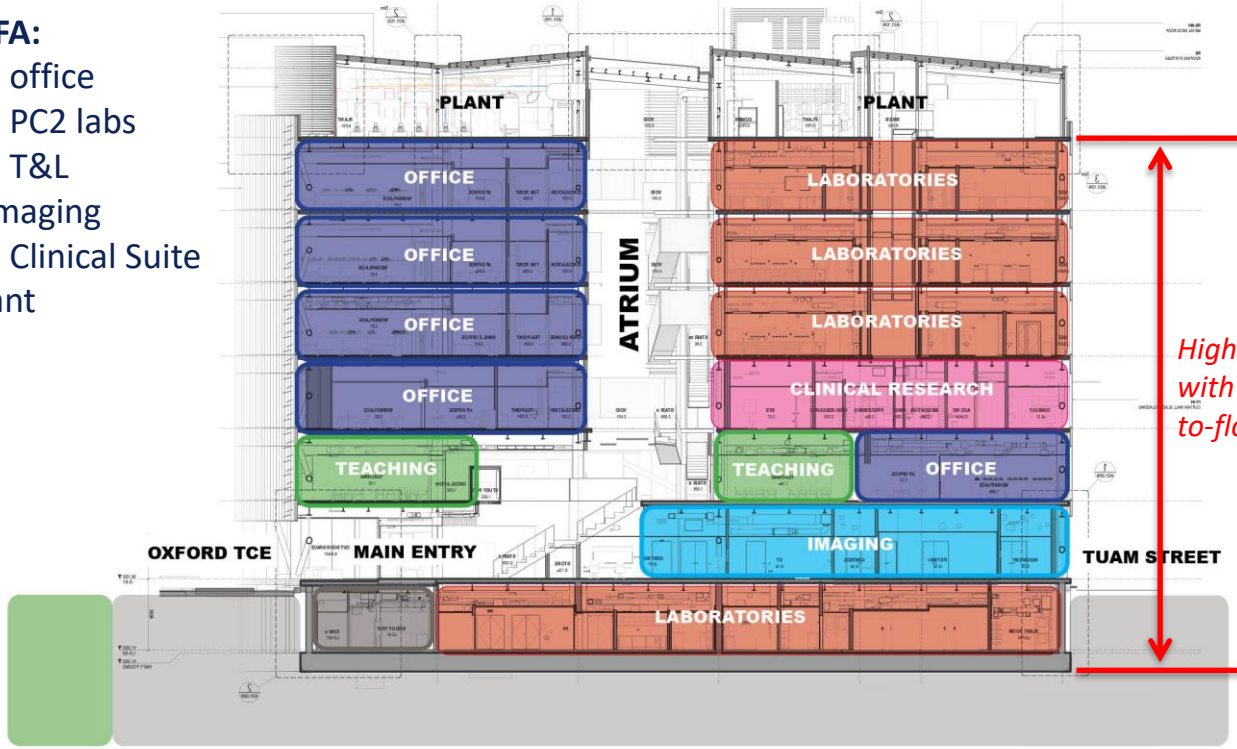
The Oxford Building

16,500m2 GFA:

- 4,500m2 office
- 4,000m2 PC2 labs
- 1,500m2 T&L
- 900m2 Imaging
- 1,000m2 Clinical Suite
- ~20% Plant



The Problem

Highly Serviced Building

Spatially constrained

Historical context does not point to recent success on these types of projects

If you always do what you've always done, you'll always get what you've always got.
- Henry Ford

The Actual Problem

What would we like to change?

- Seismic NSE (non structural elements)
- Passive Fire
- Secondary Steel coordination
- Façade coordination

For the UOCCR Project we are aiming to do these better

What consequences can we expect if it doesn't?

- Provisional sum blowouts
- Programme blowouts
- Extension of time claims
- Design on-site (inefficient, sub-optimal solutions)
- Lack of clarity re who holds design responsibility
- Adversarial relationships

Unclear design responsibility + inefficient approach to design coordination (timing)

The Solution

Lots of talking

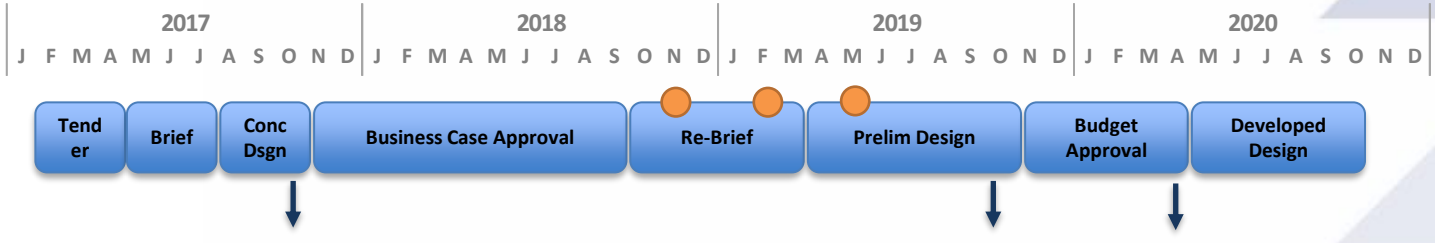
Specific approaches to our “Top 4 issues”

- Façade coordination
- Secondary steel coordination
- Passive fire
- Seismic NSE

Integrated BIM Approach

Programme re-visited

The Journey



Workshop lessons learnt

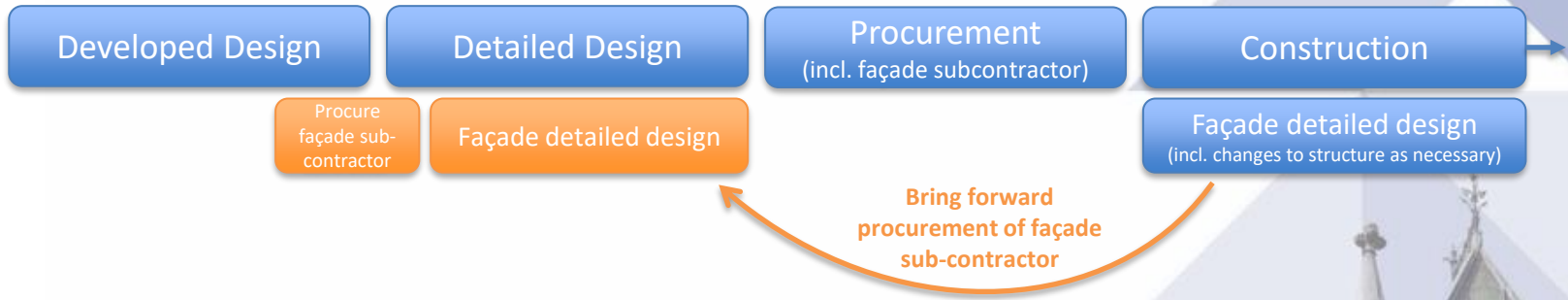
Procurement strategy agreed

Scopes amended, revised BEP adopted

Lots of talking to each other, and drawing on each other's knowledge

Façade Coordination

What have we done?



Why?

- Façade design completed & coordinated in parallel with other disciplines
- CCC provided with PS1 and PS2 (if deemed necessary)
- Specialist contractor input received in time to impact buildability
- Potential programme benefit

☑ ~~Un~~clear design responsibility + ☑ ~~in~~efficient approach to design coordination (timing)

Secondary Steel

What have we done?	Added extra modelling effort into the structural consultant's scope to counter this known area of coordination and cost risk during construction: • Secondary steel modelled in 3D, rather than relying on typical details • Added back into scope items that could not be defined e.g. C-arm supports *Includes: Braces, end plates, base plates, collars, support of specialist equipment*
Why?	• Every location is checked for coordination issues • Secondary steel design is completed & coordinated in parallel with other disciplines
To note:	• This is difficult for consultants to scope & therefore price during tender • You must be specific – devil is in the detail. Items to clash with must also be modelled!

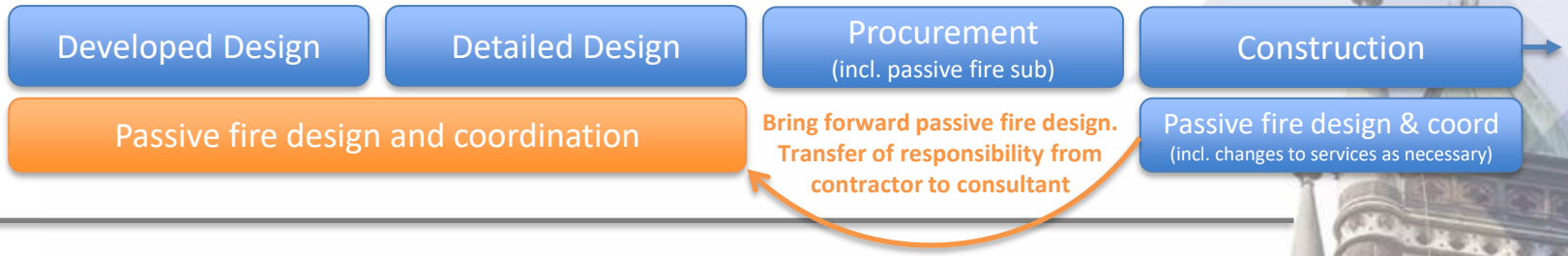
☑ ~~Un~~clear design responsibility + ☑ ~~in~~efficient approach to design coordination (timing)

Passive Fire

What have we done?

Added passive fire design and modelling into the fire engineer's scope:

- Design responsibility transferred from contractor (traditional approach) to consultant (represents current industry trends)
- Placeholders for treatments modelled in 3D to counter known area of coordination and cost risk during construction, rather than relying on performance specification



Why?

- Passive fire design is completed & coordinated in parallel with other disciplines
- Every location is checked for coordination issues. Bespoke treatments if required
- Fully scheduled - no provisional sums

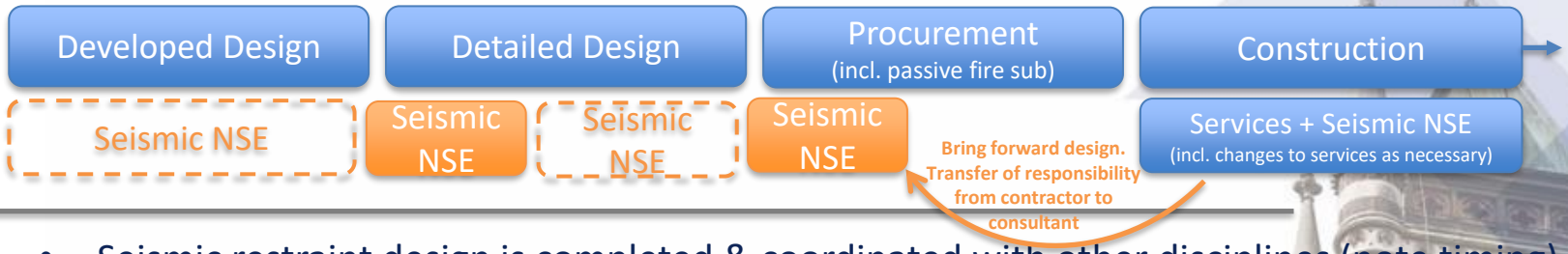
☑ ~~Un~~clear design responsibility + ☑ ~~in~~efficient approach to design coordination (timing)

Seismic NSE

What have we done?

Added seismic restraint design and modelling into the structural engineer's scope:

- Design responsibility transferred from contractor (traditional approach) to consultant (represents current industry trends)
- Zoned approach, modelled in 3D to counter known area of coordination and cost risk during construction, rather than relying on performance specification



Why?

- Seismic restraint design is completed & coordinated with other disciplines (note timing)
- Potentially problematic locations are coordinated. Bespoke solutions if required
- Scheduled - no provisional sums
- CCC provided with PS1 for consent

☑ ~~Un~~clear design responsibility + ☑ ~~in~~efficient approach to design coordination (timing)

Integrated BIM Approach

We cannot achieve the level of co-ordination required without being supported by BIM. BIM expectations were therefore aligned with our proposed delivery strategy.

What have we done?	Updated the BIM Execution Plan (BEP) to align with delivery requirement: • Specific MEA table (more elements, more specific requirements) • Additional commentary around how Model tailored to promote easy access and collaboration • Cloud based model & sharing • Regular model updates & clash detection • Element sharing
Why?	It enables the right conversations: • Everyone can see the issue at hand • Better appreciation of others' challenges • Progress more easily monitored

☑ ~~Un~~clear design responsibility + ☑ ~~in~~efficient approach to design coordination (timing)

Programme

This is not the "normal" way of delivering. We needed to recognize that up front.

What have we done?	Revisited our design programme in significant detail: • Individual consultant tasks re-visited • Linkages between tasks re-visited • New scope tasks added • Order and timing changed from "the norm" • DevD – DetD stage gate shifted
Why?	• We were proposing something different, and needed to make sure it would work
To note:	• Your programme will not align with normal expectations – CIC Guidelines breakdown • "Frozen" deliverables were no longer required

☑ ~~Un~~clear design responsibility + ☑ ~~in~~efficient approach to design coordination (timing)

Outcomes so far

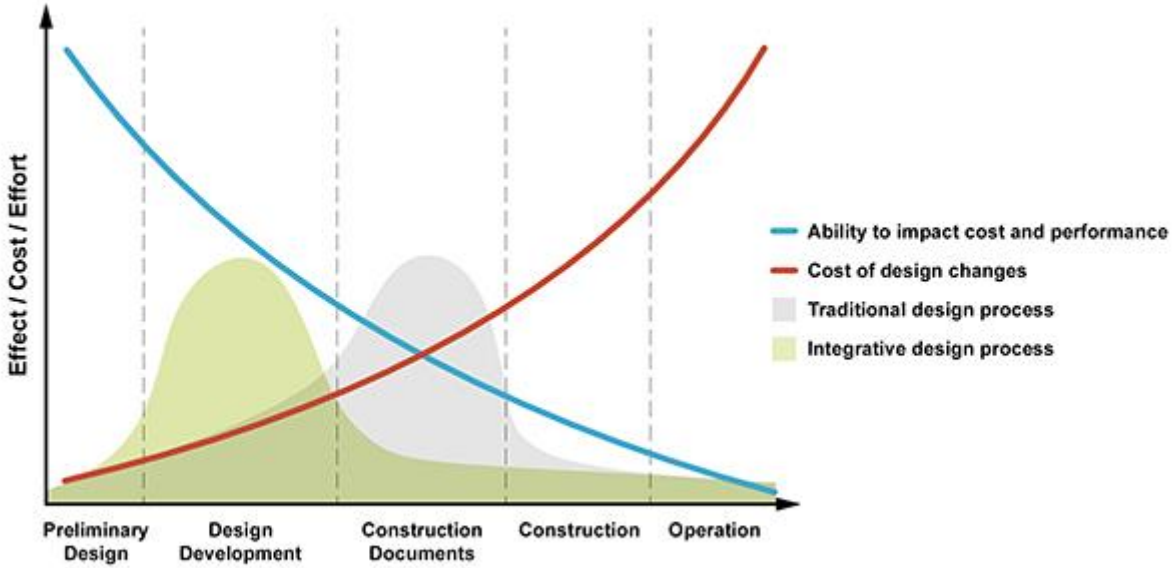
Better design development & coordination

Resourcing profile has shifted

Excellent team collaboration

Noting that we are currently at the end of Developed Design, but observing the trends we were hoping to see.

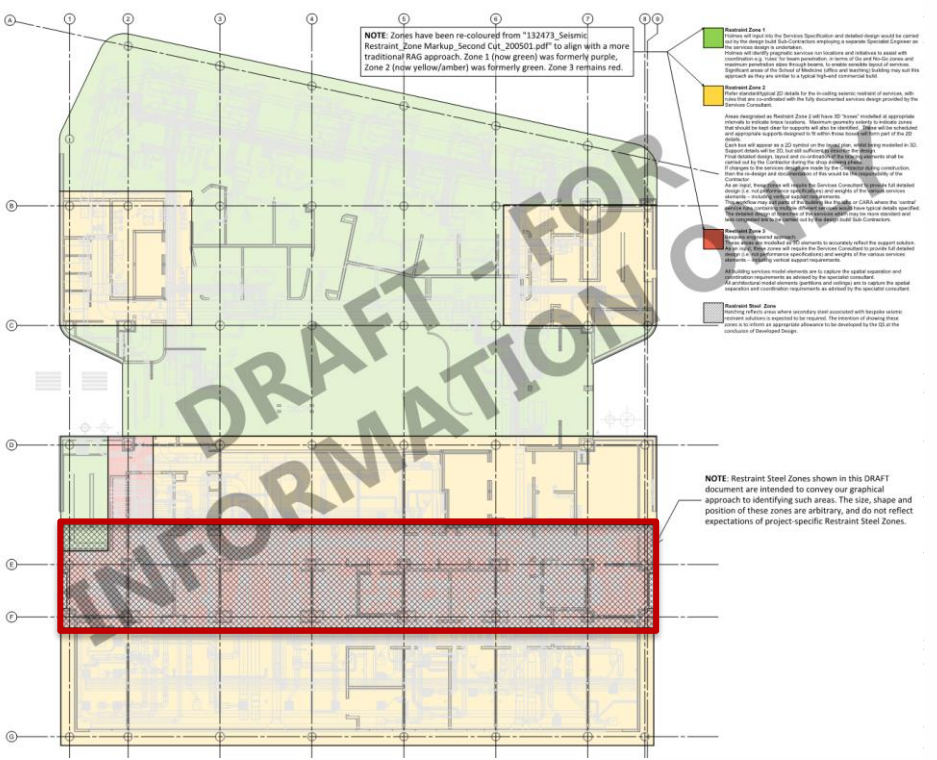
Ahead of the curve

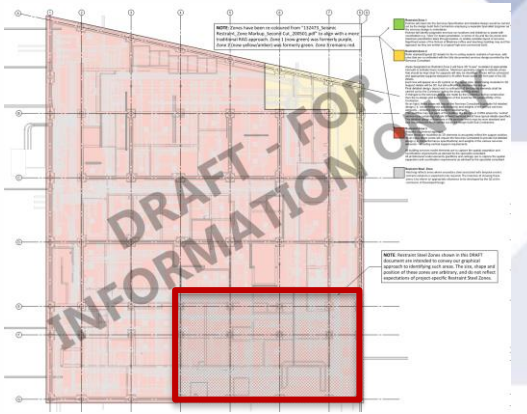


The MacLeamy Curve (2004) has been leveraged by advocates of integrated project delivery (IPD), building information modelling (BIM), design performance modelling (DPM) and other frameworks/platforms that foster an integrative process.

The premise of the MacLeamy Curve is that an integrative process shifts design efforts toward the front-end of a project timeline - where there is maximum flexibility to make high-impact design decisions and interdisciplinary efforts are coordinated much sooner versus a more traditional design process.

Issues being raised & solved





Restraint Steel Zone: *Hatching reflects areas where secondary steel associated with bespoke seismic restraint is anticipated.*

Collaboration

This is not the normal way of delivering a project, and it has taken a lot of open and honest discussion to implement. The following parties have been an indispensable part of the team; bringing their collective expertise to the table, helping to develop the approach, and working in a collaborative manner to offer the Client a different way to resolve these industry issues.

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Holmes Consulting

wsp

labworks architecture

Beca

BRINGING BUILDINGS TO LIFE cosgroves

RLB Rider Levett Bucknall

In Summary

WHAT WE THINK HAS WORKED WELL:

- Identify the risks. Be project specific!
- Tailor the delivery approach accordingly
- Assign design responsibility to align with your delivery approach (incl deliverables)
- Leverage off the team & keep talking to each other
- Recognise that one size does not fit all
- Use the tools available, in particular:
  - BIM approach aligned
  - Procurement strategy aligned
  - Recognise when programme shift is required

NEXT STEPS:

- *Seismic NSE coordination realised*
- *Work through how we can keep collaboration going into construction*

Questions?


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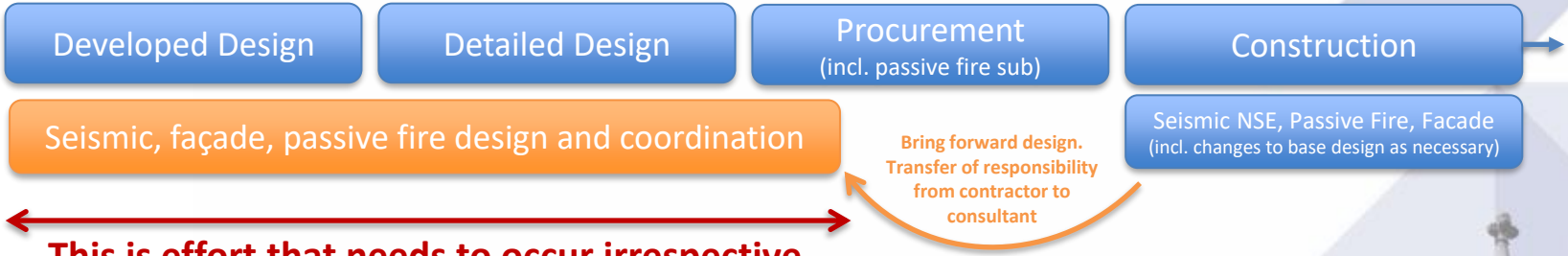
Cost (*because we knew someone would ask*)

This is not extra cost… it is transferred cost:



This is effort that needs to occur irrespective.
We are simply doing it virtually, not on-site.

The cost of not addressing these issues can be significant:

Let's remind ourselves of the potential consequences:

- Provisional sum blowouts
- Programme blowouts
- Extension of time claims
- Design on-site (inefficient, sub-optimal solutions)
- Lack of clarity re who holds design responsibility
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