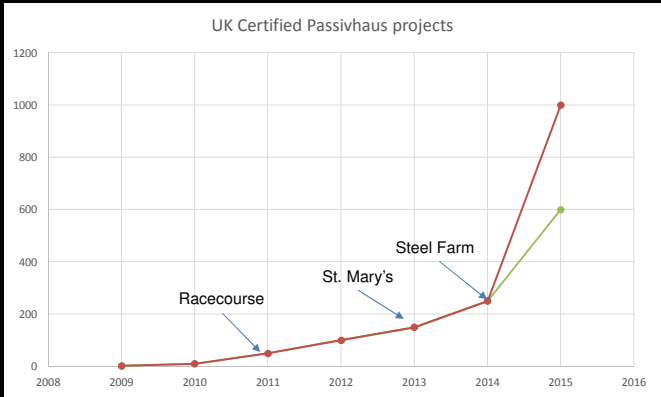
The Passivhaus Protocol™

The Secret Formula For Creating Large and Complex Passivhaus Projects

…a simple 4-step process for minimising risk and successfully building large, complex projects to the Passivhaus Standard

Introduction :

- Rapid growth of the Passivhaus Standard within the UK
- Increased volume, scale and complexity



Introduction:

Passivhaus projects have depended upon

- A motivated client
- A dedicated and enthusiastic design and construction team
- A high level of specialist knowledge and experience
- A close working relationship between all parties
- A commitment to the successful completion of the project

Increased volume, scale and complexity:

What is required:

- New, or at the very least more highly refined, quality assurance systems,
- New tools
- New methods

Purpose of this presentation:

- Illustrate the need for creating formalised quality assurance tools and methods
- Demonstrate examples of quality assurance tools

Who is Mark Siddall?

Architects Registration Board

CONSTRUCTING EXCELLENCE IN THE NORTH EAST

Passivhaus Trust
The UK Passive House Organisation

AECB
building knowledge

Risks for Large and Complex Passivhaus Buildings:

Where risks occur:

- The client organisations procurement process
- Design
- Construction
- Commissioning

Client Organisations

Common Risks: Client organisations

Problem:

- Clients without Passivhaus experience may not appreciate
  - The step change imposed upon the average design team or building contractor.
  - The extent to which inexperienced design teams will be learning at the clients expense
  - The benefit of using an experienced Passivhaus Designer (or Consultant)

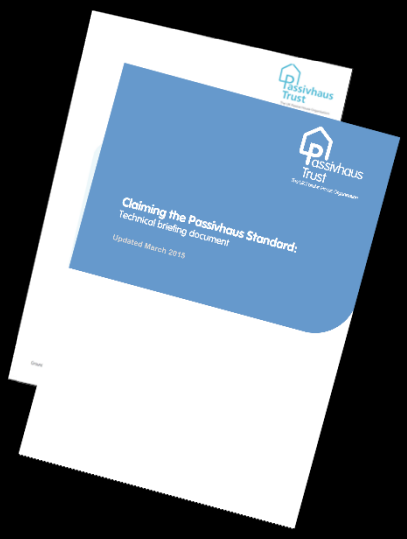
Passivhaus Claims

Clear & easily verifiable

- blower door
- thermography
- PHPP
- components

Trades description

- fake goods
- consumer law
- annoys those doing it properly



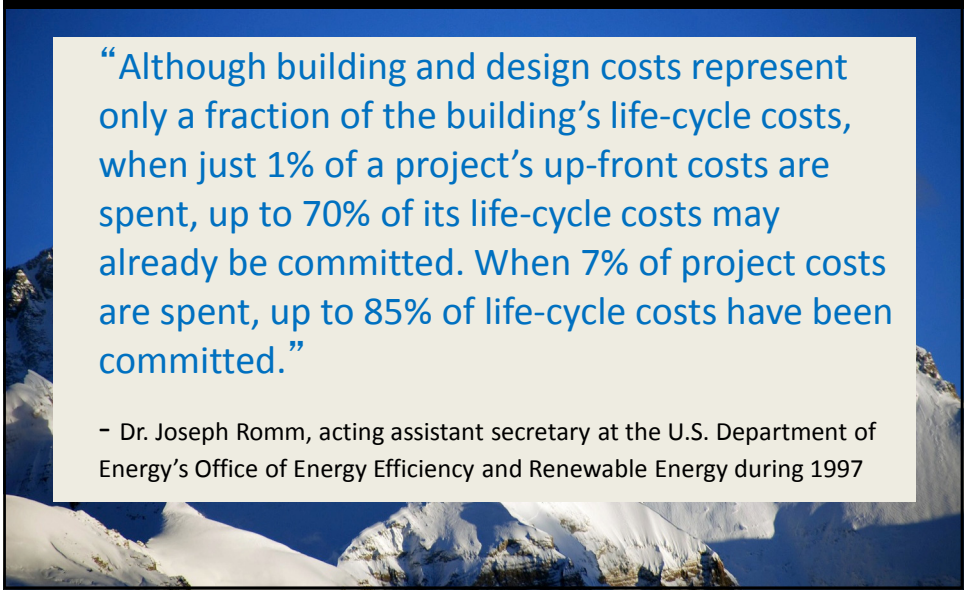
Claiming The Passivhaus Standard free download:
www.passivhaustrust.org.uk

Common Risks: Client organisations

Solution:

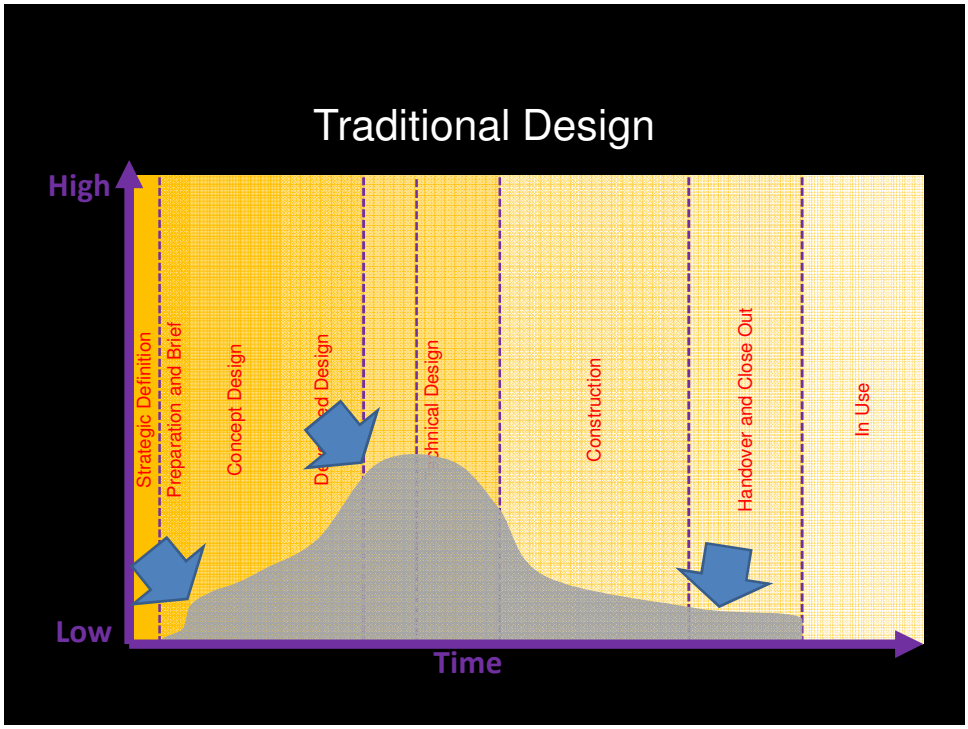
- Assess the design team experience
- Consider teams ability to deliver cost effective Passivhaus buildings
- Consider strategic advice regarding procurement from an experienced Passivhaus Certifier or Passivhaus Designer

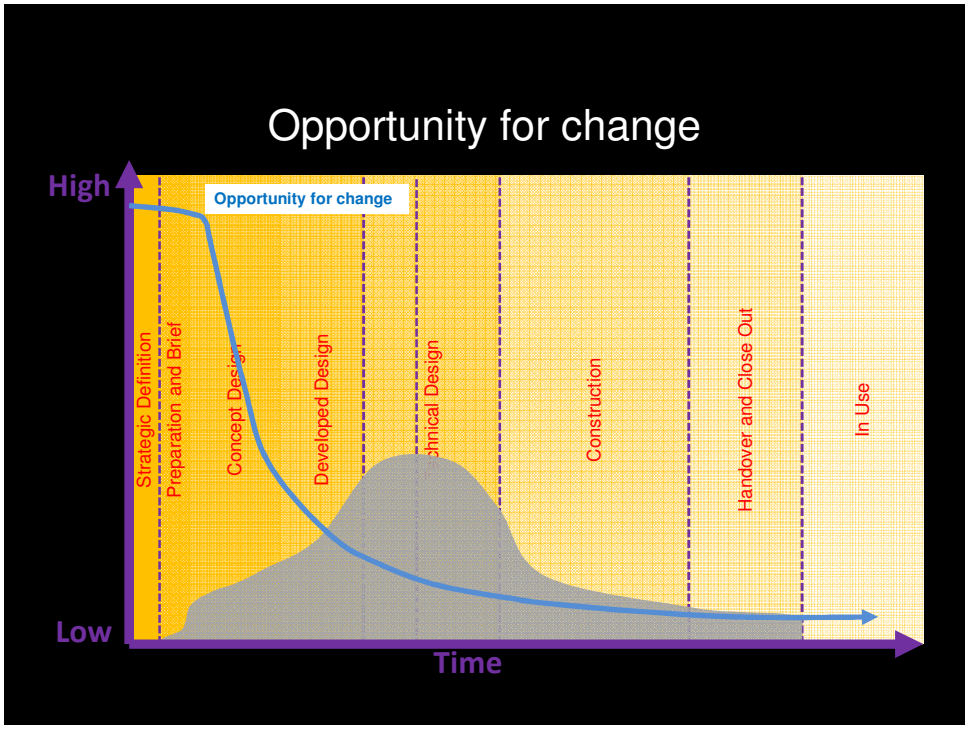
Design Stage: Risk and Cost Control



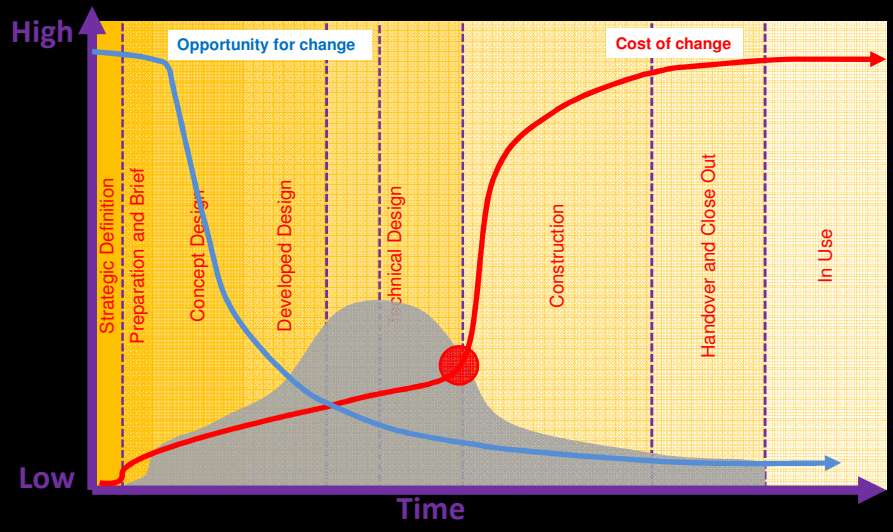
"Although building and design costs represent only a fraction of the building's life-cycle costs, when just 1% of a project's up-front costs are spent, up to 70% of its life-cycle costs may already be committed. When 7% of project costs are spent, up to 85% of life-cycle costs have been committed."

- Dr. Joseph Romm, acting assistant secretary at the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy during 1997

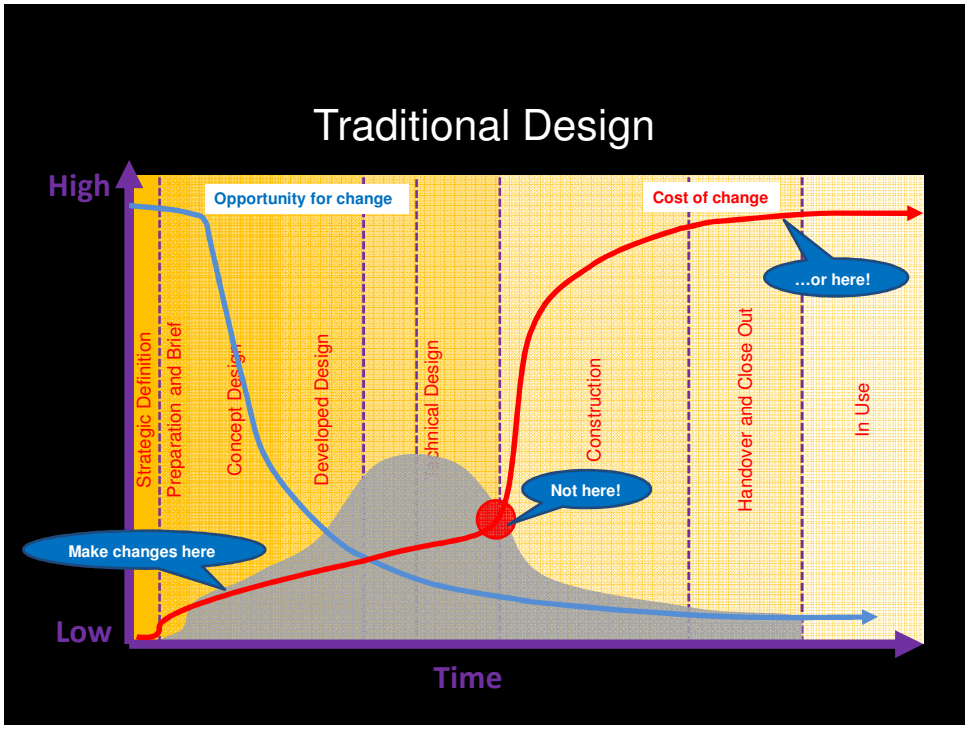

Traditional Design
High
Low
Time
Strategic Definition
Preparation and Brief
Concept Design
Construction
Handover and Close Out
In Use


Opportunity for change
High
Low
Time
Opportunity for change
Strategic Definition
Preparation and Brief
Developed Design
Construction
Handover and Close Out
In Use

Cost of change



"If I had nine hours to chop down a tree, I would spend the first six hours sharpening my axe."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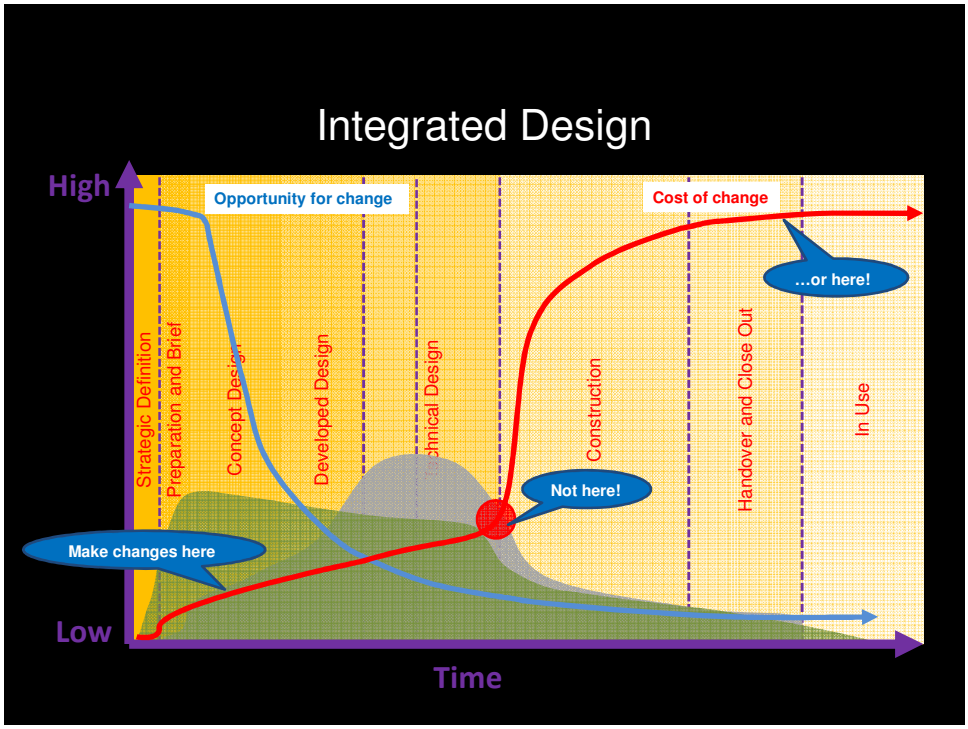
In Use
Not here!
...or here!
Make changes here


Integrated Design
High
Low
Time
Opportunity for change
Cost of change
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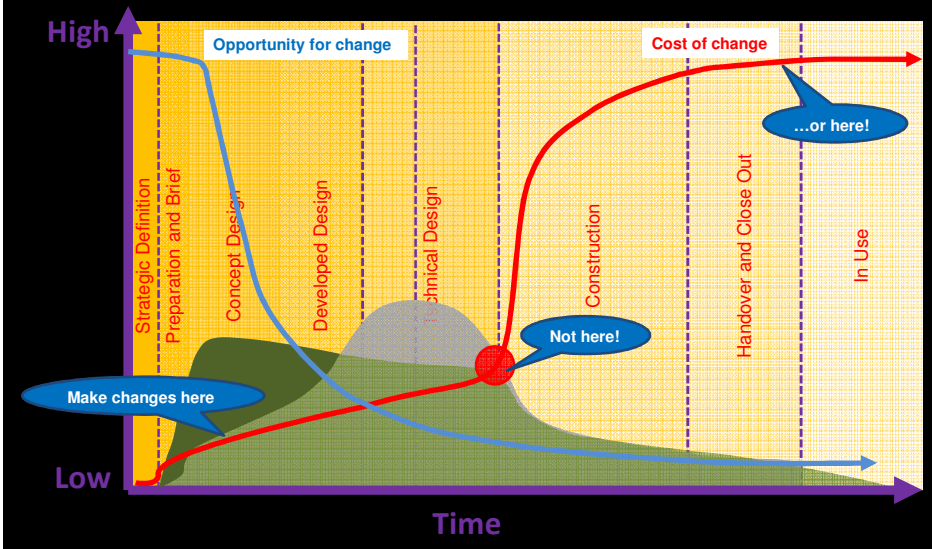
Integrated Design



Performance standards are great, but you need a tried and tested method if you want to deliver them cost effectively.

The Passivhaus Protocol™

The Secret Formula For Creating Large and Complex Passivhaus Projects

…a simple 4-step process for minimising risk and successfully building large, complex projects to the Passivhaus Standard

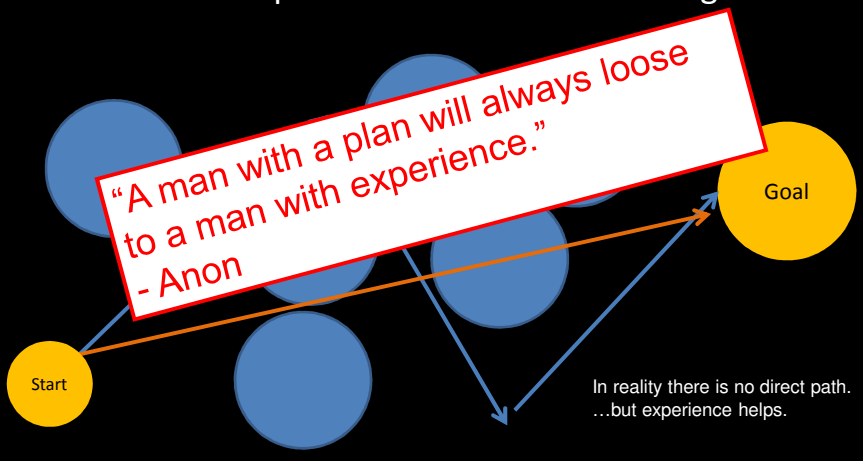
Large and Complex Passivhaus Buildings:

4 Step Passivhaus Protocol:

1. Commit to teamwork
2. Value engineer from day 1
3. Harness Passivhaus experience
4. Trigger success by using a tried and tested management protocol

The Passivhaus Protocol:

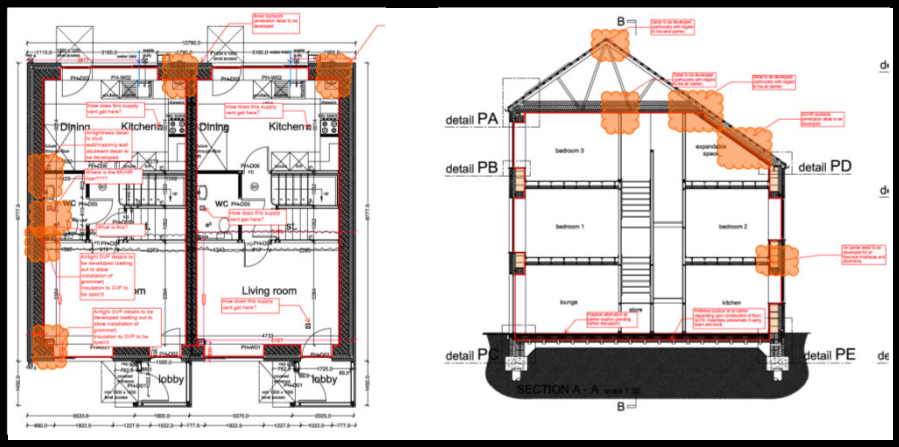
- Experienced Certified Passivhaus Designers
  - have worked on projects > 20 homes
  - or have completed non-domestic buildings



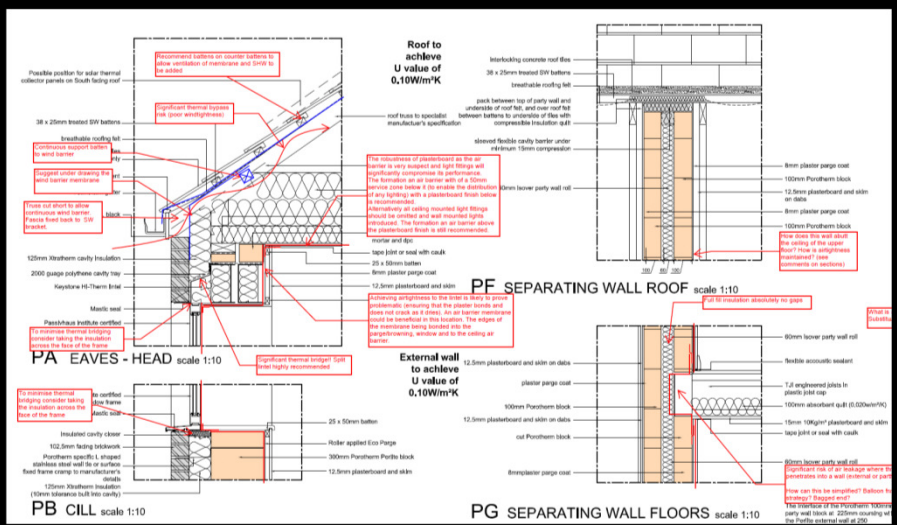
The Passivhaus Protocol:

- Services offered by Experienced Certified Passivhaus Designers
  - Change management procedure
  - Design reviews
    - form, airtightness, const. tech., services, TBs, PHPP etc.
  - Desktop buildability reviews
  - Buildability workshops
  - Tool box talks
  - Intermittent site inspections
  - Site inspection reports

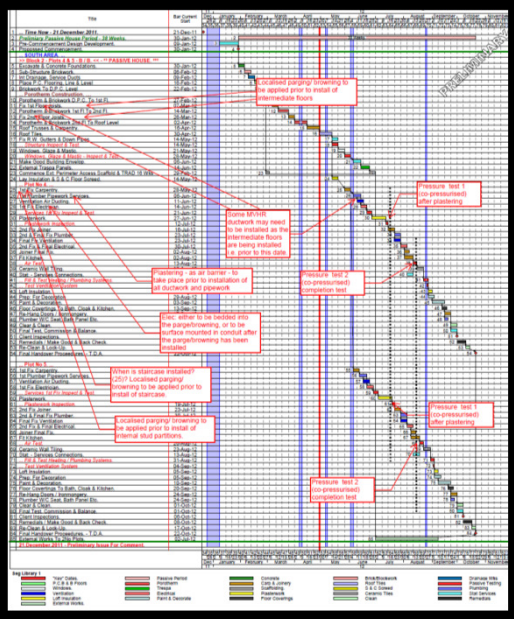
Design Reviews & Workshops:



Desktop Buildability Reviews & Workshops:



Desktop Buildability Reviews & Workshops:



Intermittent site inspections:

Training/ toolbox talks (pre-start)

- Site storage
- Workmanship
- Activities to be undertaken
- Sequencing of activities

Ductwork protected from site debris during storage.

Insulation installation - materials & workmanship

- Walls, Roof, Floor, Windows
- Junctions
- Services

Check construction tollerances. Insulation is encapsulated tightly between internal and external leaf to avoid thermal bypass.

Windtightness - materials & workmanship

- Primary wind barrier system
- Window Installation
- Service penetrations

Intermittent site inspections:

Airtightness - materials & workmanship

- Primary air barrier system
- Window Installation
- Service penetrations

Air barrier installed in a manner that allows easy inspection and remediation during construction.

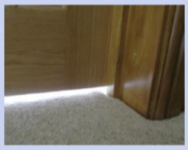
Services - materials & workmanship

- MVHR unit installation
- MVHR ductwork & silencers
- DHW
- Pipes and plumbing
- Heat sources
- Controls

Ductwork protected from site debris during instalation.

Builders Work

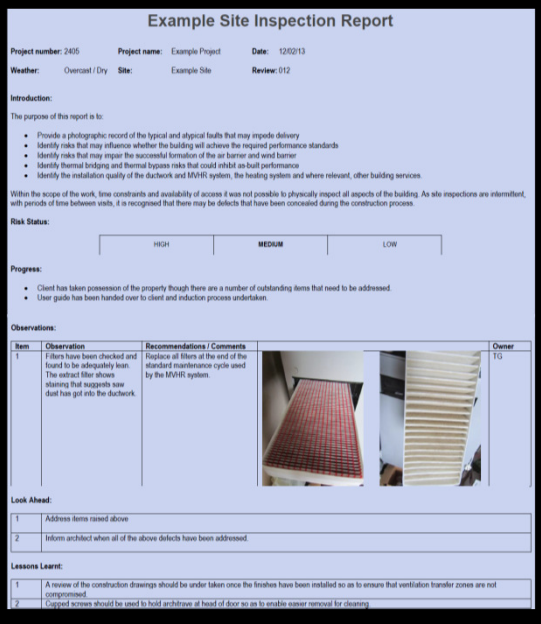
- Joinery (door over/undercuts etc)



Air transfer provision is checked against design drawings and specification.

Practical completion (summary report)

Site inspection reports:



Example Site Inspection Report

Project number: 2405 **Project name:** Example Project **Date:** 12/02/13

Weather: Overcast / Dry **Site:** Example Site **Review:** 012

Introduction:

The purpose of this report is to:

- Provide a photographic record of the typical and atypical faults that may impede delivery
- Identify risks that may influence whether the building will achieve the required performance standards
- Identify risks that may impair the successful formation of the air barrier and wind barrier
- Identify thermal bridging and thermal bypass risks that could inhibit as-built performance
- Identify the installation quality of the ductwork and MVHR system, the heating system and where relevant, other building services.

Within the scope of the work, time constraints and availability of access it was not possible to physically inspect all aspects of the building. As site inspections are intermittent, with periods of time between visits, it is recognised that there may be defects that have been concealed during the construction process.

Risk Status:

HIGH	MEDIUM	LOW

Progress:

- Client has taken possession of the property though there are a number of outstanding items that need to be addressed.
- User guide has been handed over to client and induction process undertaken.

Observations:

Item	Observation	Recommendations / Comments		Owner
1	Filters have been checked and found to be adequately lean. The extract filter shows staining that suggests saw dust has got into the ductwork.	Replace all filters at the end of the standard maintenance cycle used by the MVHR system.		TG

Look Ahead:

1	Address items raised above
2	Inform architect when all of the above defects have been addressed.

Lessons Learnt:

1	A review of the construction drawings should be under taken once the finishes have been installed so as to ensure that ventilation transfer zones are not compromised.
2	Cupped screws should be used to hold architrave at head of door so as to enable easier removal for cleaning.

L E A P
Lovingly Engineered Architectural Process