




UNIVERSITY OF AUCKLAND

LIGHTING DESIGN ASSIGNMENT
2024

TONY TAVITA – BUSINESS UNIT MANAGER



A photograph of three people in a modern office environment. An older man with grey hair and a beard is pointing at a computer monitor. A woman with blonde hair tied back is looking at the monitor. A younger man with glasses and a blue shirt is also looking at the monitor. They are all wearing lanyards. The office has large windows in the background and a desk lamp is visible.

Why Lighting?

- Digital World
- Thought changers
- Remap Industry
- Connect in ways never intended

GLASS AGE CORNING 2014

- Forward thinking
- Taking glass to new digital platform
- Engage creative thinking

Digital Platform



Connectivity



Communication




Controllability

Digital Disruption



Art and Science of lighting, does it still exist?
Is it still relevant?

- Linking lighting to the digital era that exists in key sectors and developments
- LED revolutionised the traditional lighting terms
- Trusted technology
- Digital components have evolved lighting and no longer rely on coils, glass and gases to produce light
- Lighting is now a plugin to the digital network
- (Un)Smart Systems
- Risks



Where? (career)

- Built Environment – Building Services
- Engineering
- Consultancy
- Advisory
- Architectural
- Construction
- Resource and Manufacturing

How?

- Where do we start?
- Further Education
- Professional Development
- Personal Development

• ASSIGNMENT

A photograph of three people in a laboratory or workshop setting. An older man with grey hair and a beard is leaning over a desk, pointing at a computer monitor. A woman with blonde hair tied back is looking at the monitor. A younger man with glasses and a blue shirt is also looking at the monitor. On the desk, there is a transparent enclosure containing electronic components, including a circuit board and a camera lens. A desk lamp is visible in the background.

Project Background:

- ZAPA LIMITED
- Designer and Manufacturing of Cosmetic Products

ZAPA LIMITED

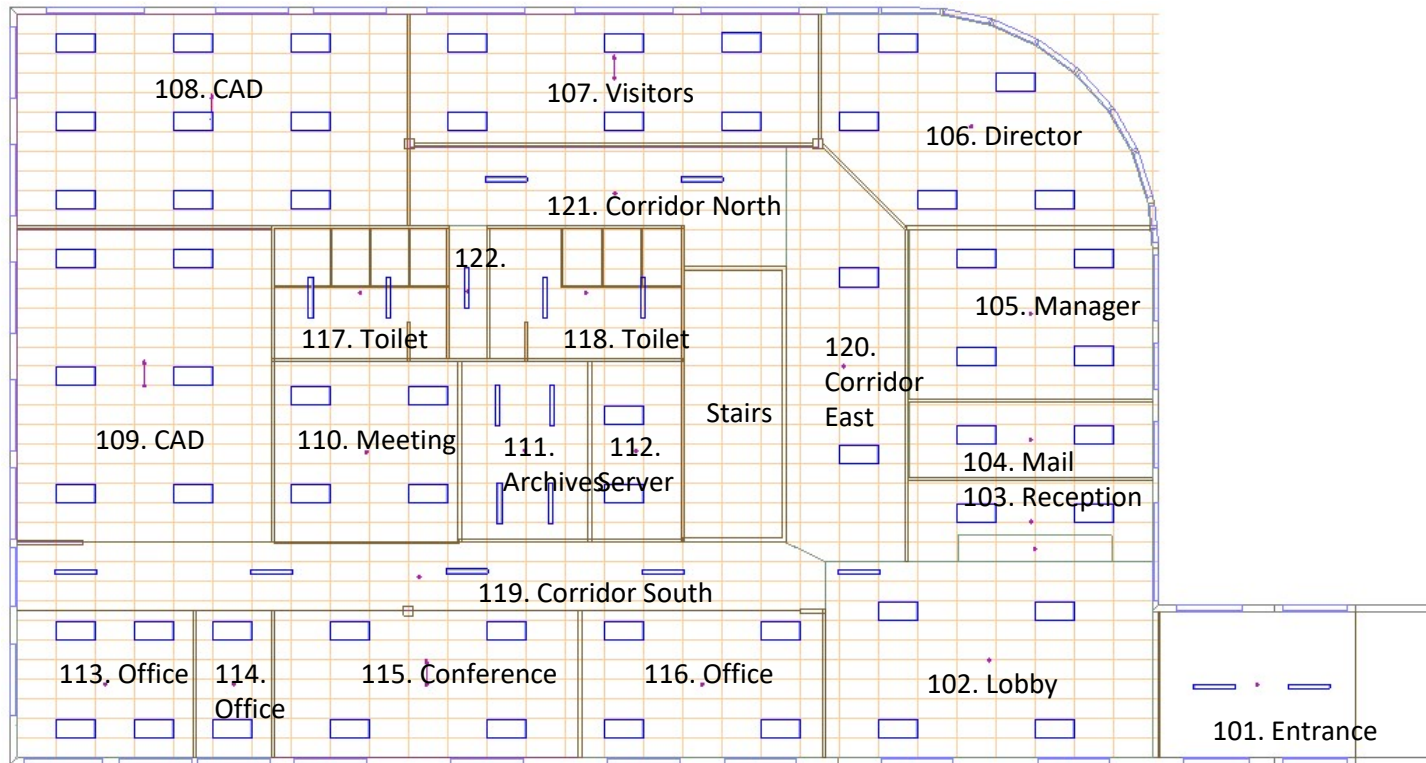
- ZAPA Limited **purchased** a two-level building in Thames
- Design engineering team to deliver:
 - Evaluation of the exiting lighting
 - Design new lighting system according to AS/NZS 1680
 - Achieve 10-year payback time
 - Design emergency lighting according to F6/F8 sections of NZ building code
 - Report on annual CO2 Emission

A photograph of three people in a laboratory or office setting. On the left, a man with grey hair and a beard, wearing a dark sweater, is leaning over a desk and pointing at a transparent electronic device. In the center, a woman with blonde hair tied back, wearing a white lab coat, is looking down at the device. On the right, a man with dark hair and glasses, wearing a blue button-down shirt, is also looking at the device. The device is a transparent box containing various electronic components like a microcontroller, capacitors, and a small camera lens. A computer monitor is visible in the background, displaying some data. The overall lighting is dim, with a desk lamp providing light on the device.

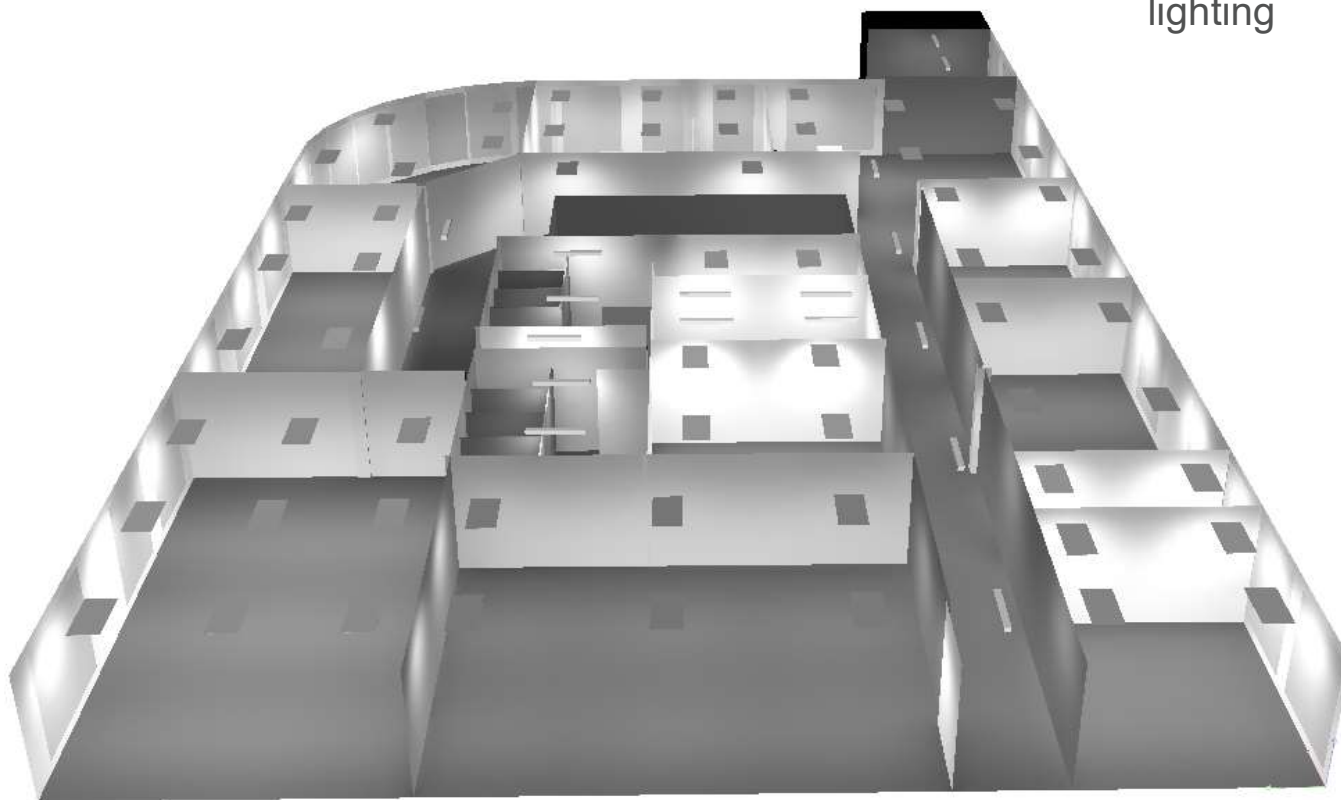
Evaluate Existing Lighting LEVEL 1

Level 1 Reflected Ceiling Plan

Evaluate the existing lighting



- Evaluate the exiting lighting



Level 1 – 3D view

- Evaluate the exiting lighting



Troffer 4 × 36W



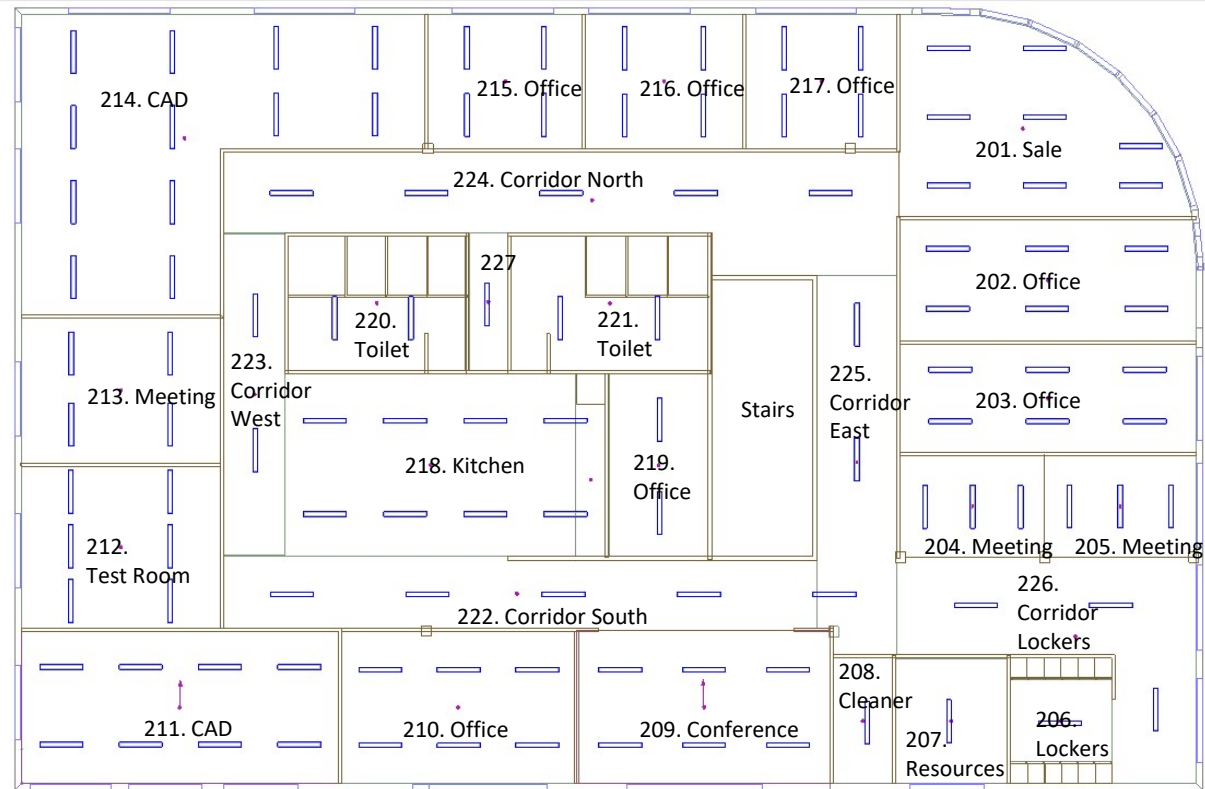
Batten 2 × 36W

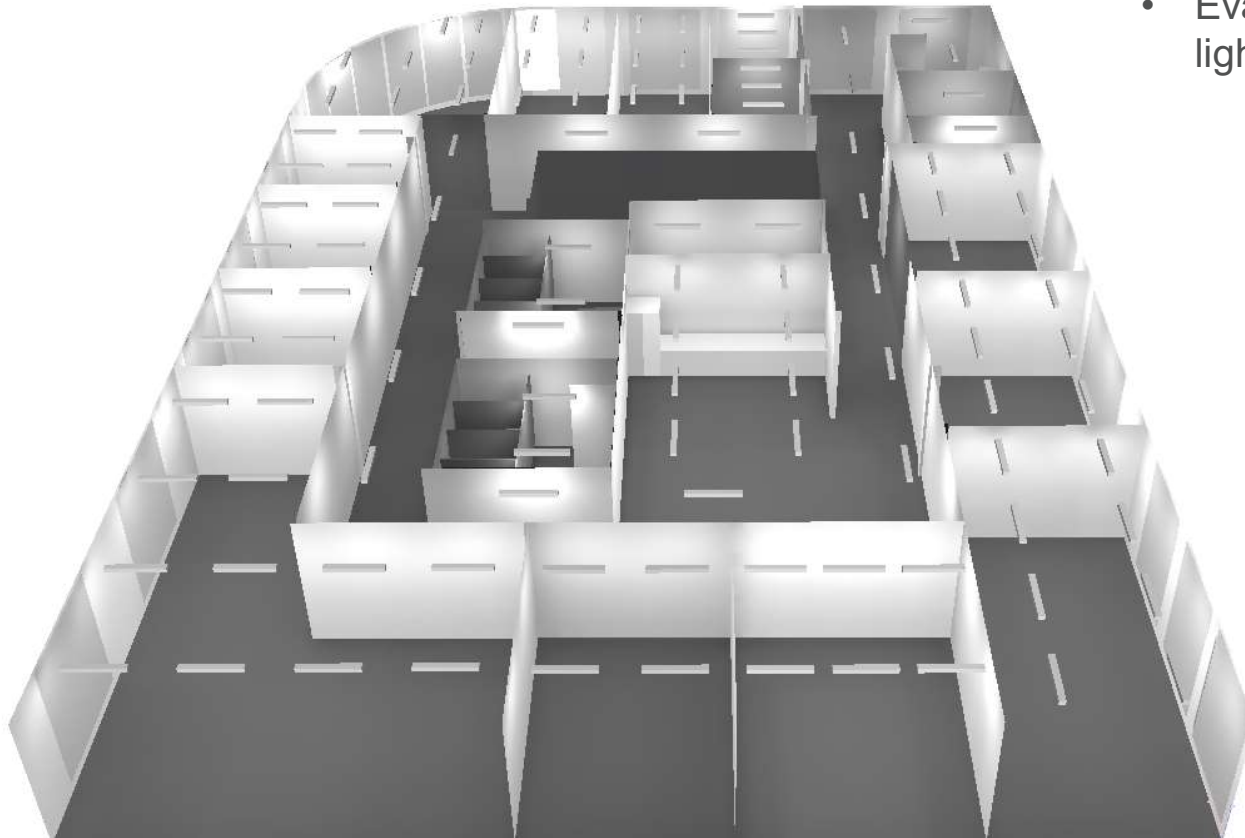
A photograph of three people in a laboratory or office setting. On the left, a man with grey hair and a beard, wearing a dark sweater, is leaning over a desk and pointing at a transparent electronic device. In the center, a woman with blonde hair tied back, wearing a white lab coat, is looking down at the device. On the right, a man with dark hair and glasses, wearing a blue button-down shirt, is also looking at the device. The device is a transparent box containing various electronic components like a microcontroller, capacitors, and a small camera lens. A computer monitor is visible in the background, displaying some data. The overall lighting is dim, with a desk lamp providing light on the work area.

Evaluate Existing Lighting LEVEL 2

Level 2 Reflected ceiling plan

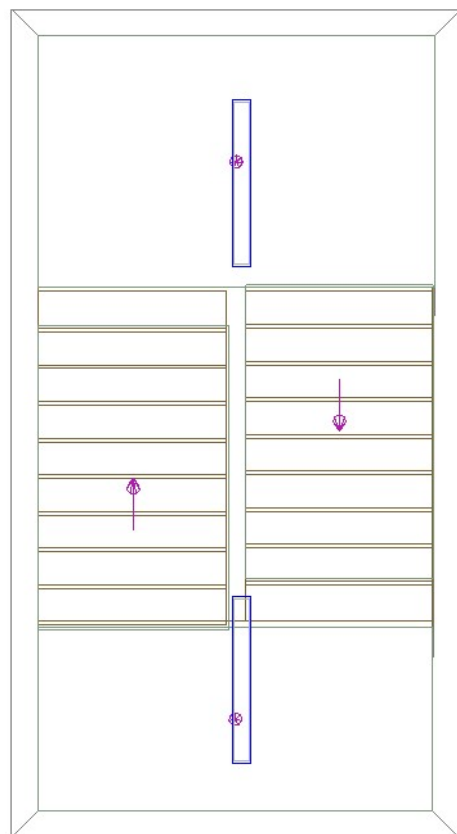
Evaluate the existing lighting





- Evaluate the exiting lighting

Level 2 – 3D view



Stairs

A photograph of three people in a modern office setting. An older man with grey hair and a beard, wearing a dark sweater, is leaning over a desk and pointing at a transparent prototype of a smart home device. A woman with blonde hair tied back, wearing a white lab coat and a blue lanyard, is looking down at the device. A younger man with glasses, wearing a blue button-down shirt and a blue lanyard, is also looking at the device. The device is a transparent box containing electronic components, including a microcontroller board and various sensors. In the background, there is a computer monitor displaying a software interface, a desk lamp, and some office equipment. The overall atmosphere is professional and collaborative.

Concept Design Workshop

Design Thinking



Requirements for cylindrical illuminance

Good visual communication and recognition requires a sufficient level of brightness on objects and, above all, on people's faces.

- Facial recognition
- Express emotions
- Inspire
- Collaboration
- Perspective on environment



Requirements for contrast lighting

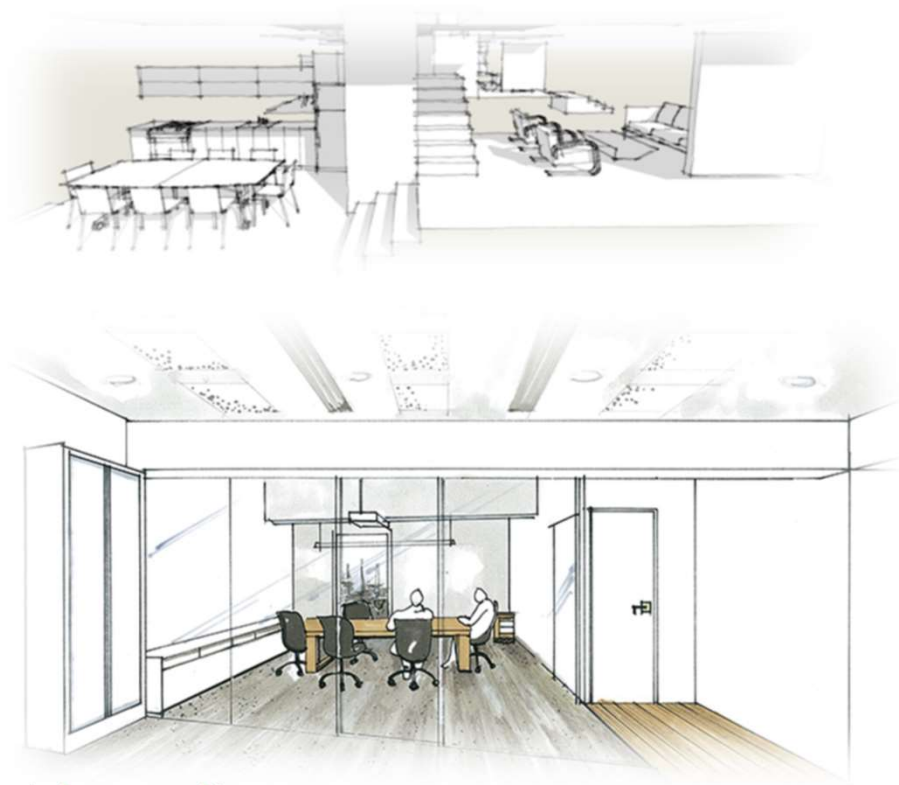
- For visual comfort
- Assist with focal points

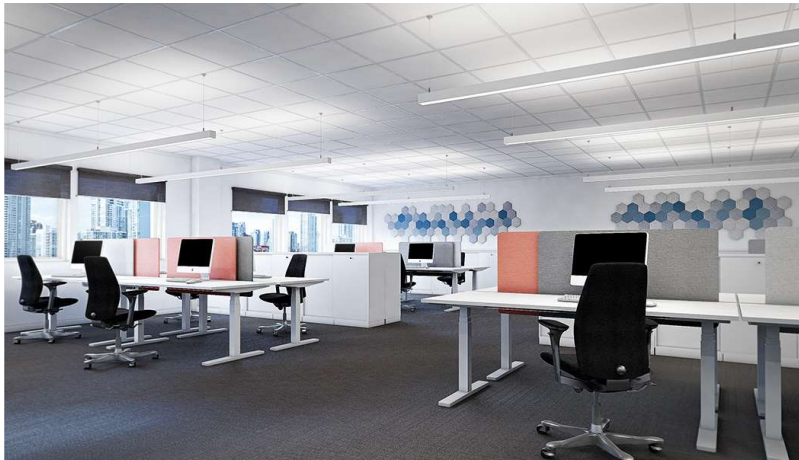


Requirements for good colour rendering

- For visual experience
- performing a visual task and assessing colours
- colours on surfaces, objects and skin should be reproduced in a natural and accurate way.
- affects our safety and well-being
- colour rendering Ra index work task under EN 12464-1

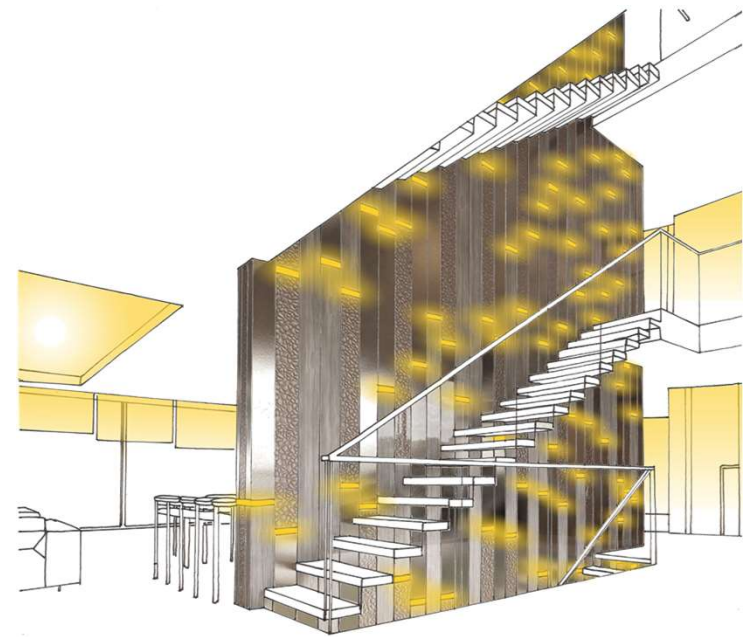
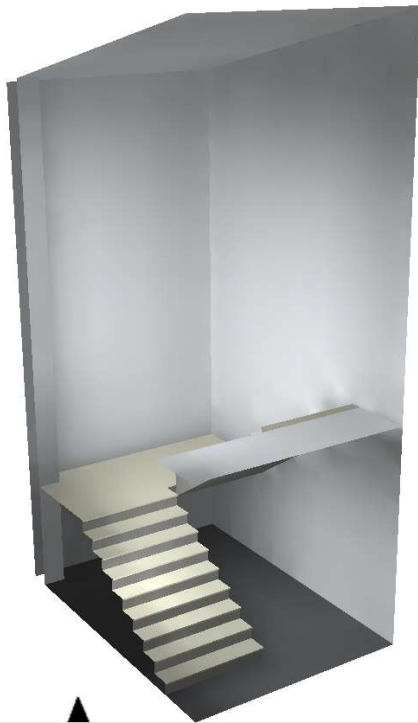
Concept

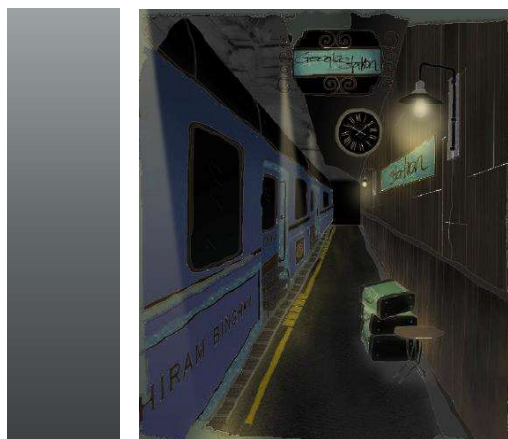
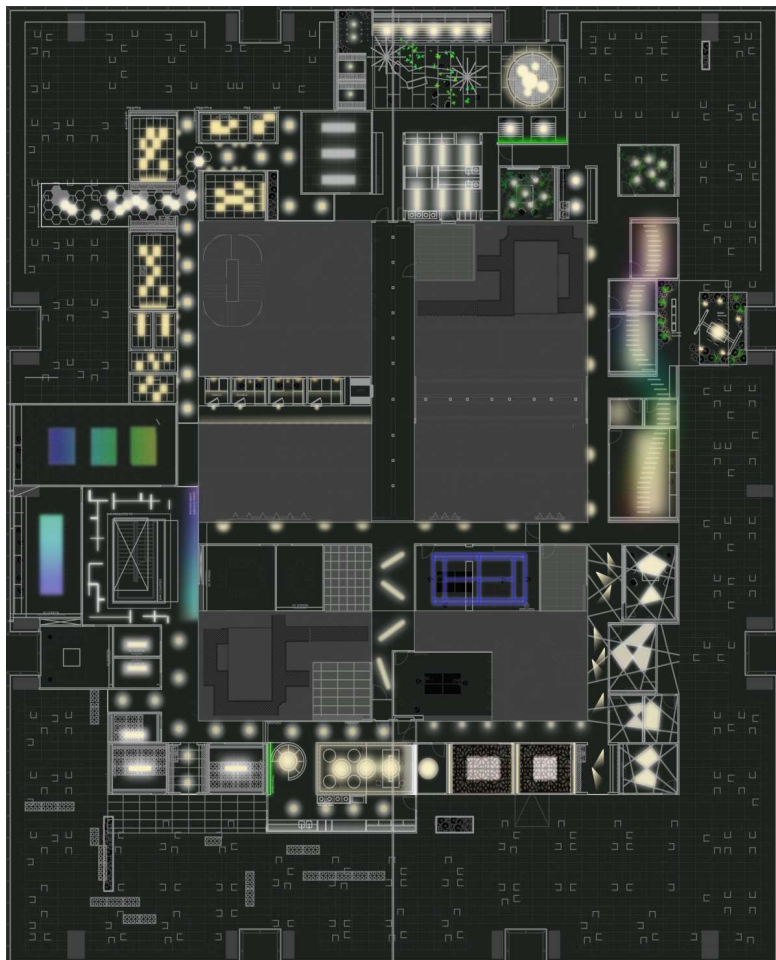






Stairs:

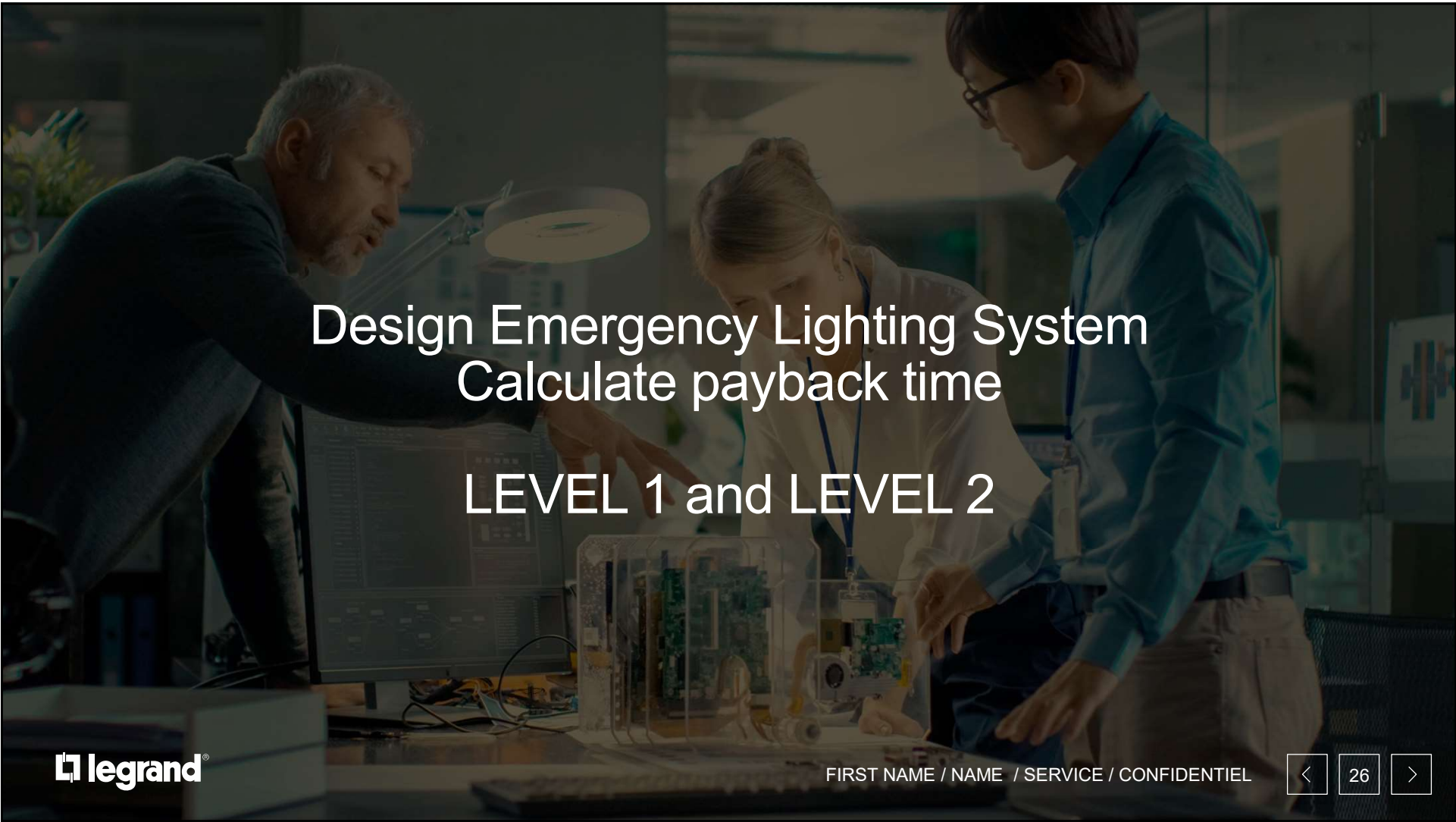




A background image showing three people (two men and one woman) in a laboratory or office setting, working together on a project. They are gathered around a table with various electronic components and equipment. The image is dimly lit, with a focus on the people and their work.

Design Parameters

- Maintained Illuminance as per Table D1 of AS/NZS 1680.2.1, and Table E1 of AS/NZS 1680.2.2.
- Light Loss Factor (LLF) as recommended by the manufacturer. Otherwise refer to AS/NZS 1680.4.
- Minimum uniformity to be as per Table 3.2 of AS/NZS 1680.1.
- Surfaces reflectance: ceiling 70%, walls 50%, floor 20%, windows 10%.

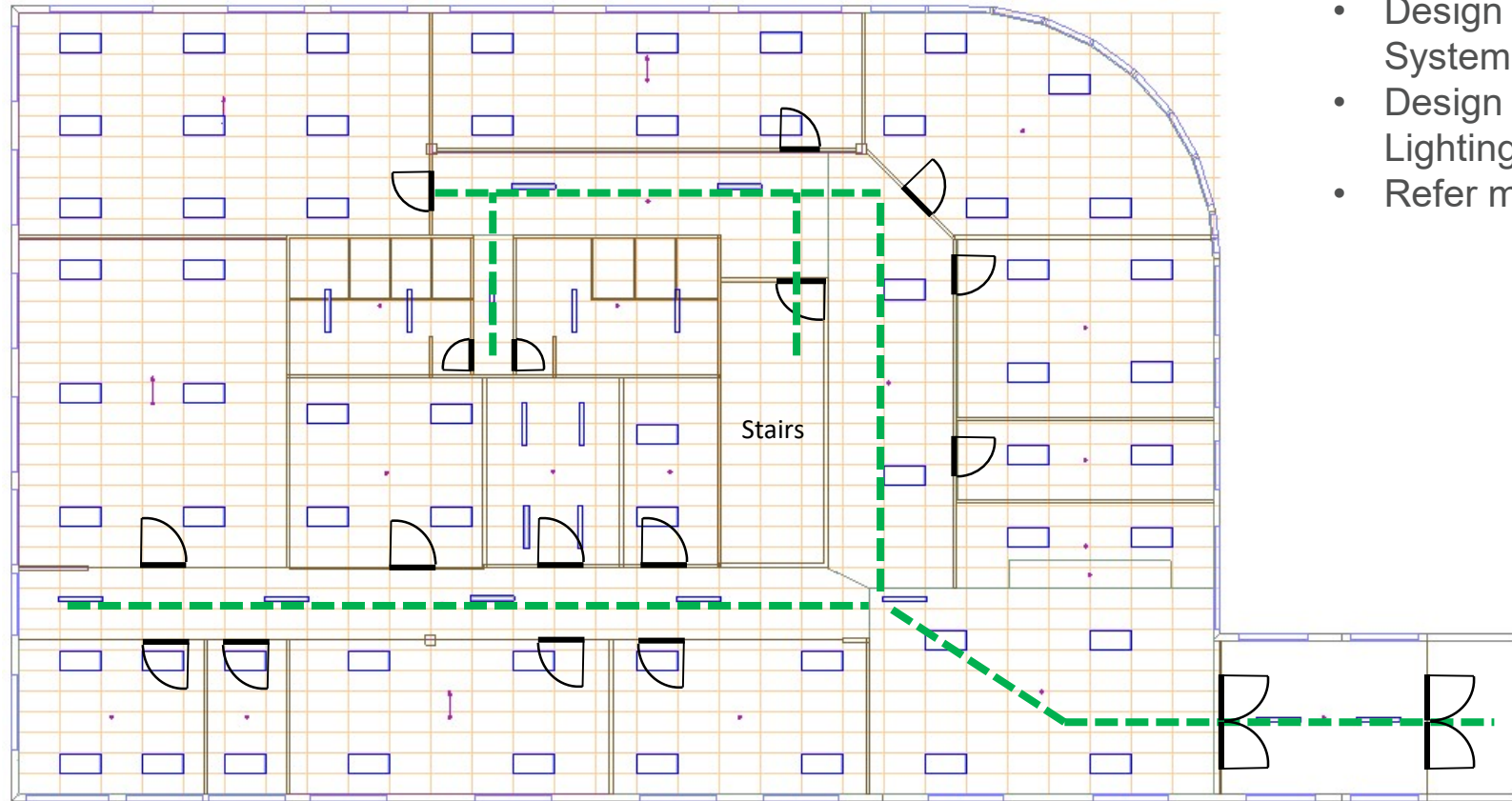
A photograph of three people (two men and one woman) in a laboratory or office setting, working together on a project. They are gathered around a desk with various electronic components and a computer monitor. One man is pointing at a component on the desk, while the others look on. The background is slightly blurred, showing office equipment and a lamp.

Design Emergency Lighting System Calculate payback time LEVEL 1 and LEVEL 2

A photograph of three people (two men and one woman) in a modern office environment, leaning over a desk and working on a project. They are looking at a computer monitor and some electronic components on the desk. The image is dimly lit, with a focus on the people and their work. The text is overlaid on the image.

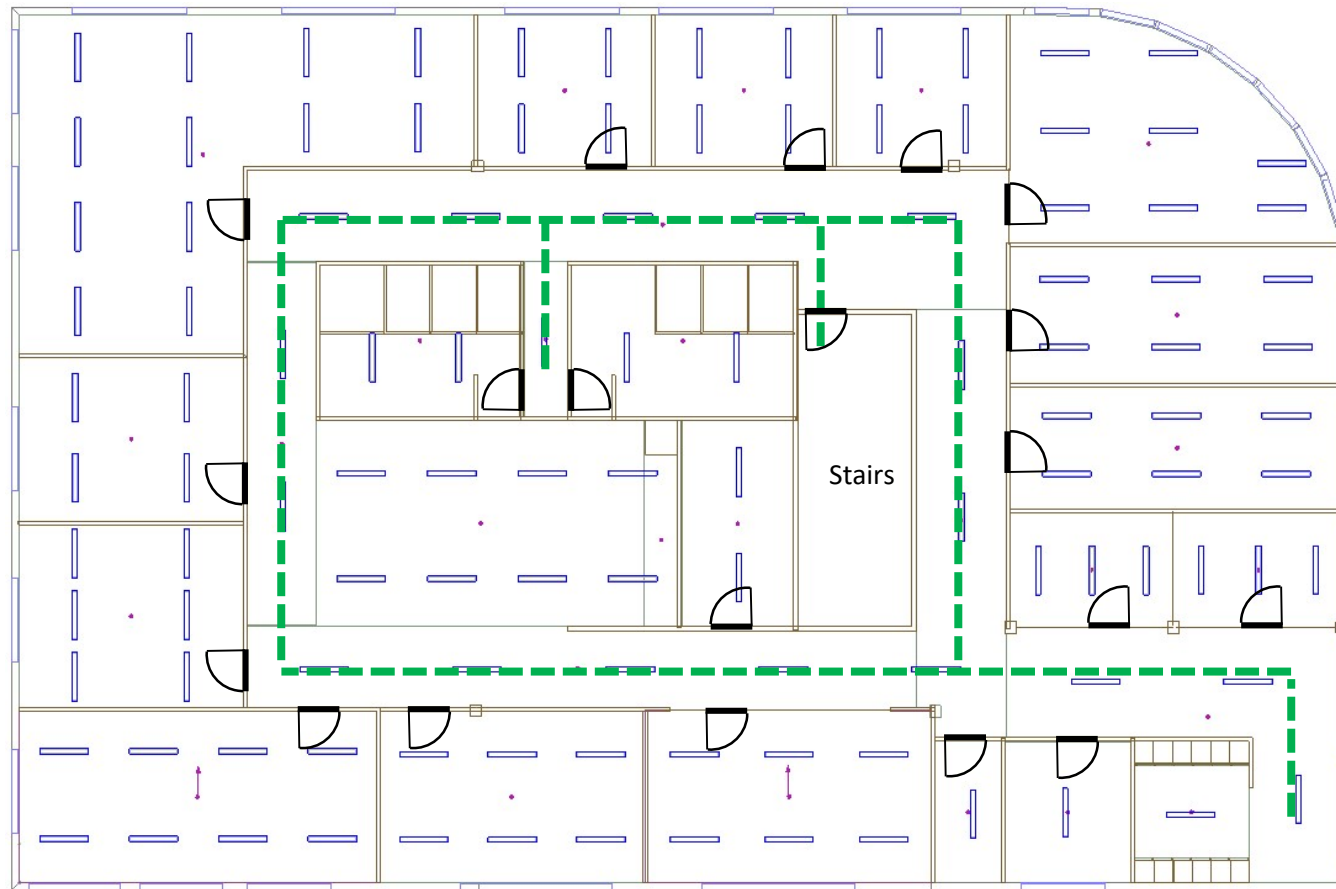
Emergency Lighting System LEVEL 1

Design emergency lighting according to F6/F8
sections of NZ building code



- Design new Lighting System
- Design Emergency Lighting
- Refer model

Level 1



- Design new Lighting System
- Design Emergency Lighting
- Refer model

Level 2

A dimly lit office scene where three people are gathered around a desk. On the left, a man with grey hair and a beard, wearing a dark sweater, is pointing at a transparent electronic device. In the center, a woman with blonde hair tied back, wearing a white shirt and a blue lanyard, is looking down at the device. On the right, a man with dark hair and glasses, wearing a blue shirt and a blue lanyard, is also looking at the device. The device is a transparent rectangular box containing various electronic components like a circuit board, a small camera, and some wiring. A computer monitor is visible in the background, displaying some data. The overall atmosphere is professional and focused on technology.

Emergency Lighting System

AS/NZS 2293.1:2018
Incorporating Amendment No. 1

AS/NZS 2293.2:2019

AS/NZS 2293.3:2018
Incorporating Amendment No. 1

Australian/New Zealand Standard

Emergency lighting and exit signs for buildings

Part 1: System design, installation and operation

- Minimum requirements
- Guideline

Australian/New Zealand Standard

Emergency lighting and exit signs for buildings

Part 2: Routine service and maintenance

Australian/New Zealand Standard

Emergency lighting and exit signs for buildings

Part 3: Emergency luminaires and exit signs



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Acceptable Solutions and Verification Methods

For New Zealand Building Code Clause
F6 Visibility in Escape Routes



MINISTRY OF BUSINESS,
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HĪKINA WHAKATUTUKI

Acceptable Solutions and Verification Methods

For New Zealand Building Code Clause
F8 Signs



MANDATORY

Specified System & Performance Standard (Performance standard required if new or altered)			Inspection, maintenance & reporting procedures (Tick relevant-standard)		Existing system No change	New	Altered
4	Emergency lighting systems		<input checked="" type="checkbox"/> AS/NZS 2293.2:1995 <input type="checkbox"/> NZS 6104:1981 <input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Performance Standard:	Acceptable Solution F6/AS1 (Amendment 4: 1 January 2017) Clauses 1.3.1, 1.5.1 (b-c) & 1.6.1(c).					

Specified System	Emergency lighting systems
Description:	SS 4 Emergency lighting systems
Type	Non maintained LED Emergency Exit Signs & Recessed LED Emergency Satellites
Make/Model:	Legrad G2 LED Slide Connect & Legrad 685102LI
Location	Exit signs on exit doors to both levels, Emergency Satellites to ground floor and safe path stairs (refer emergency plans recorded on building consent BCO10234567)
Performance Standard:	Acceptable Solution F6/AS1 (Amendment 4: 1 January 2017) Clauses 1.3.1, 1.5.1 (b-c) & 1.6.1(c).
Inspections Procedure:	In accordance with AS/NZS 2293.2:1995 Emergency evacuation lighting for buildings – Part 2: Inspection and maintenance Six Monthly by competent and qualified personnel Annual inspections by Independent Qualified Persons (IQP)
Interface testing	The emergency lighting system is not interfaced with any other specified system.
Maintenance Procedure:	Planned preventative maintenance and responsive maintenance should be carried out in accordance with AS/NZS 2293.2:1995 Emergency evacuation lighting for buildings – Part 2: Inspection and maintenance By competent and qualified personnel
Reporting:	All (Hard/Soft Copy) records must be kept and maintained confirming inspections and maintenance, as applicable to this Specified System, have been carried out by the individuals responsible for inspecting and maintaining the systems or features (including but not limited to Owners, Service Technicians and Independent Qualified Persons) for a period of 2 years.

Risk Management

- **FIRE REPORT**

- Fire engineer
- Escape paths
- Egress routes
- Final exits
- *Compliance schedule*
- *Risk Category*

- **EVACUATION PLAN**

- *Fire engineer*
- *Client H&S*
- *Induction*
- *Assembly points*

Producer Statement Council Authority

- PS 1 – Design
- PS 2 – Design review
- PS 3 – Construction (often used by the installers of proprietary systems)
- PS 4 – Construction review.

Dealing with PANIC

- Predicting how people will react
- Visual impairment
- Obstruction
- Guidelines based on system failure
- Predicting infrastructure
- Assuming reaction

SUMMARY:

- ZAPA Limited **purchased** a two-level building in Thames
- Design engineering team to deliver:
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Project Details

- Office hours: 12 hours a day, 5.5 day per week, 50 weeks per year.
- Net energy price: \$0.25 / kWh
- LED luminaire price: \$300
- Emergency luminaire price: \$250
- CO₂ emission: 0.25kg/kWh

CIC Guidelines

Concept Phase

- User requirements (individual/project)
- Budget estimate
- Ease of maintenance
- Codes and compliance

Developed Design Phase

- Finalisation of concept design
- Baseline lighting layout
- Lighting calculations
- Preliminary energy consumption calculations
- Emergency Lighting

Detailed Design Phase

- Refinement of documentation
- Lighting details
- Customisation of luminaires if necessary
- Coordination with other building services
- Confirm budget and code compliance

Tender Documentation Phase

- Finalisation of all aspects of design
- Finalisation of lighting control
- Extensive coordination with other building services
- Submission of illumination level calculations for review

Tender Construction

- Clarification and evaluation
- Review of submittals to preserve integrity of the design
- Site visits
- RFIs
- Commissioning of system

Suppliers

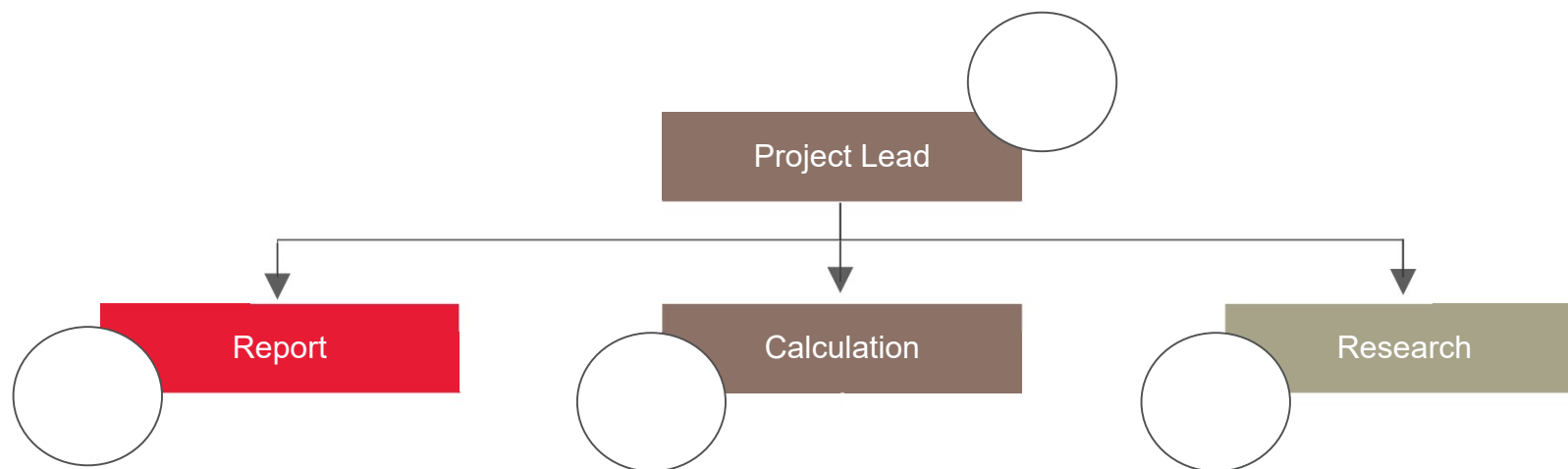
- ETAP
<http://www.etaplighting.com>



- Legrand
<http://www.legrand.co.nz>



Project Team



Thank you
for your attention

Q&A

GOOD LUCK

