Assignment 1 – Project Management Plan

Cloud Carbon Sense

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Date of Submission:

19/9/2025

Unit Code & Semester: FIT5057 – Semester 2, 2025

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1. Project Initiation

1.1 Business Justification

Project Overview

Monash University has set out a clear vision in its 2021-2030 Strategic Plan, focusing on using digital transformation to tackle global challenges, particularly climate change (Monash University, 2021). The Cloud Carbon Sense project supports this vision by developing a tool to monitor, analyse, and optimise the performance of Monash University's cloud computing operations, aiming to reduce the carbon footprint associated with cloud-based operations.

The system will help research and IT staff by providing real-time data and actionable insights on energy usage and the reliability of cloud resources, as well as recommendations for reducing energy consumption and carbon footprint.

Additionally, the system offers a landing page with a visual summary of Monash University's cloud services emissions status, giving students and the broader community a comprehensive understanding of the issue and raising awareness throughout the university.

Strategic Alignment

The project is designed to support the following Monash University strategies:

- Climate Change and Sustainability Response (SDGs 11 & 13): Directly supports Monash's commitment to achieving a globally sustainable future, contributing to a 15% reduction in emissions through the use of cloud computing and datacenter resources.
- Education Impact: Enhance education by integrating the platform into environmental studies and sustainability curricula, providing students with live data and case studies from their own campus.
- Digital Education (SGD 4): Accelerate digitalization goals under the Campus Digitalization Initiative with cutting-edge cloud technologies.

Opportunity Statement

Monash University currently uses a variety of digital resources to support its IT systems for students and university operations. Much of that demand is met through cloud computing services from major providers such as AWS, GCP, and Azure. In addition, Monash University also operates its own private cloud systems and data centers. These contribute significantly to energy consumption and carbon emissions at data centers. This is a long-term issue that requires the participation of many parties and resources.

The implementation of the Cloud Carbon Sense project is one of the first steps for Monash to reduce energy consumption and carbon emissions. In the long term, it can help Monash lead the way in sustainability in digital education, in line with its commitment to achieving net zero emissions and becoming a role model in the education sector.

Project Deliverables and Expected Outcomes

The main deliverables of the project include, but are not limited to:

- A real-time monitoring dashboard for energy consumption and emissions of cloud computing resources used at Monash University.

- Analytical and statistical charts that assess energy consumption and emissions over time (e.g., charts by week, month, year, semester, holiday, etc.) to help IT evaluate, analyze, and make predictions.
- Automatically recommend adjustments to save energy and reduce emissions. Calculate the performance of the recommendations
- Integrate with existing digital education tools, providing customized solutions for students, IT departments, and other Monash departments.

Expected outcomes for Monash University:

- Improve control over energy consumption and emissions of digital tools, especially cloud computing.
- Reduce the total carbon footprint of Monash's technical operations. Target a 15% reduction once the project is fully operational.
- Enhance Monash's reputation as a leader in sustainable digital education.

Ethical Considerations

Like any large organisation, the Cloud Carbon Sense project needs to pay attention to a range of ethical issues, especially to those of surveillance and the associated loss of privacy. The system's primary goal is to monitor energy usage; however, tracking the usage of cloud computing resources in real-time might infringe upon the privacy of the Monash community. There is a possibility that usage analytics, the system is able to derive in real-time, could associate certain usage patterns to people or to a particular division or faculty, thereby creating a feel of being monitored. The fear of being monitored could make users self-censor and restrict free inquiry. This is a major concern for academic institutions.

One of the issues is the equity of access to the resources. If the platforms' advice and automated recommendations limit access to high-capacity cloud resources, the automated system could propagate inequities to critical academic activities. Below the surface of the goals, there lies a sustainable development inequity that has the most reach for the goals.

Responsible implementation of the research ought to consider all policies and legal frameworks, with the primary focus being on the obtaining of user consent and transparent data governance frameworks that control how proposed information and data convergence are brought about decision-making. The team ought to practice privacy by design, audit the data regularly to ensure compliance, and respond to stakeholders' questions on the issue.

Cost–Benefit Analysis

Estimated costs

The Cloud Carbon Sense project's total estimated cost of $413,434 is strategically distributed across five primary categories, with Labour Costs dominating at $302,995 (73.3%), with nine different job positions. Cloud Infrastructure accounts for $27,143 (6.6%), split between development environments ($19,962 over 11 months) and production environments ($8,181 over 2 months). Hardware & Equipment totals $13,988 (3.4%), including six MacBook Air M4 development laptops and two Lenovo IdeaPad testing devices. Software Licenses represent $6,241 (1.5%). Finally, a Contingency Reserve of $63,066 provides an 18% buffer against project risks and unforeseen expenses, ensuring financial stability throughout the 12-month development lifecycle. To better understand how to calculate costs, see the Cost Model section.

Project Benefits

When it comes to the financial benefits of the project, the first thing to mention is the cost savings on Monash University's cloud infrastructure, through suggestions for resource optimization. Current cloud-based IT systems have a waste rate of about 27% (Flexera, 2025), so we expect to save 10% of Monash University's annual cloud computing budget through this project. This is a completely achievable number.

Additionally, using this app to measure carbon emissions will also help Monash University make informed decisions towards its Net Zero goals, such as moving the AI infrastructure in Monash's data centres to the AWS cloud, which can result in 3.2 times more energy savings and up to 97% less carbon emissions (Accenture & Amazon, 2025).

Besides the economic benefits that the project brings, it also helps to enhance the reputation of the university. Monash can become one of the first universities to achieve the Net Zero target. Furthermore, through this, it can raise student awareness of the issue of carbon emissions in particular and environmental awareness in general.

NPV and ROI

To get a clearer picture of the economic benefits, here are the estimated NPV and ROI of the project after 3 years from completion.

- The Costs (cash outflows):
  - Year 0: $413,434 for application development.
  - Year 1-2-3: $219,088, including $49,087.56 for 12-month infrastructure rental costs and $170,000 salary pay for one DevOps engineer (Hays 2024) to maintain the Cloud Carbon Sense application.
- The Benefits (cash inflows): While Monash University does not disclose its annual cloud spending, given Monash University's size, this figure is likely comparable to that of a large enterprise. According to Flexera's State of Cloud 2025 Report, nearly a third (33%) of all organizations spend more than $12 million per year on cloud computing (Flexera, 2025). Given that Monash University has both private cloud and HPC (High-Performance Computing) infrastructure, which will not need to be leased from cloud providers, we estimate Monash's public cloud spending to be $8 million. With the project delivering a 10% annual cloud cost savings, this equates to a cash inflow of $800,000.
- The Discount Rate: for a public university in Australia, a suitable number for a discount rate in an NPV calculation is 7% (real) (Harrison, 2010)

The cash flow starts at the end of period 0 (= beginning of Period 1)					
Discount rate	**7%**				
Discount factor	**1.00**	**0.93**	**0.87**	**0.82**	
Year	**0**	**1**	**2**	**3**	**TOTAL**
Benefits	$0	$800,000	$800,000	$800,000	$2,400,000
Discounted benefit	$0	$747,664	$698,751	$653,038	$2,099,453
Costs	$413,434	$219,088	$219,088	$219,088	$1,070,697
Discounted costs	$413,434	$204,755	$191,360	$178,841	$988,389
Cash flow	($413,434)	$580,912	$580,912	$580,912	$1,329,303
Discounted cash flow	($413,434)	$542,909	$507,391	$474,198	$1,111,064

Cumulative disc cash flow	($413,434)	$129,475	$636,866	$1,111,064	
NPV	**$1,111,064**				
ROI	**112.4%**				

The project demonstrates exceptional financial viability with an NPV of $1,111,064 and an ROI of 112.4%, making it a highly attractive investment for the university. The analysis uses a 7% discount rate over 4 years, with the initial development cost of $413,434 in Year 0, followed by significant annual benefits of $800,000 for three consecutive years, totaling $2.4 million in gross benefits. The ongoing operational costs of $219,088 per year (likely covering cloud infrastructure, maintenance, and support) result in a total project cost of $1,070,697 over the project lifecycle.

Conclusion

The Cloud Carbon Sense project is strategically important to Monash University. It not only helps us achieve key sustainability goals but also demonstrates our commitment to environmental responsibility and digital innovation. While the initial costs are significant, the strategic benefits - combined with the potential financial savings from reduced energy consumption - make the project a solid investment.

1.2 Project Charter

Project Description

A web-based dashboard that tracks cloud emissions from cloud computing used by Monash and provides optimisation recommendations to improve efficiency.

Project Scope

- Develop a web-based dashboard that visualizes real-time carbon emissions from Monash's cloud services (AWS, Azure, GCP)
- Implement backend integration with cloud provider APIs to retrieve energy usage and emissions data
- Build an analytic platform to display historical trends
- Design and deploy a recommendation engine for energy conservation suggestions
- Design a public dashboard for real time monitoring accessible to students and staffs

SMART Objectives

1. Achieve a 15% reduction in cloud-related emissions within 8 months
2. Implement real-time carbon emission tracking for AWS, Azure, and GCP within 9 months
3. Deliver automated recommendations with >95% accuracy by month 10
4. Launch a public-facing dashboard for student and staff awareness within 11 months

Project Duration

From 1/9/2025 to 2/9/2026 (262 **working days**)

Budget

Flexible budget: $413,434

Project Development Approach

Hybrid approach will be selected to balance structured planning with adaptive delivery. The core components such as collection, analytic and optimization engine will be completed with a waterfall approach to ensure stability. Dashboard and workshop design will be completed with an Agile approach to adapt to feedback from students and staff.

Key Stakeholders

Stakeholder	Role	Interest/Influence
Mr. Todd Boehly	CIO, Monash IT Services	Project sponsor, ensures alignment with sustainability goals
Mr. Peter Chan	Product Owner Monash Sustainability Office	Oversees delivery scope, features, and ensures project alignment with sustainability goal
Jonh Terry	Technical Expert, Monash IT Services	Provide cloud access, API integration or other technical implementation
Petr Cech	Sustainability Director Monash Sustainability Office	Define carbon reduction targets and validate environmental impact
Monash Students and Staffs	End Users	Users of dashboard

Project Success Criteria

1. $\geq$ 95% stakeholder satisfaction via post-deployment survey
2. $<$ 0.01% system downtime within the first semester of deployment
3. $\geq$ 15% cloud-related carbon emission reduction within 8 months of launch

Assumptions

1. Monash cloud data via AWS, Azure, and GCP APIs is accessible and stable during the project
2. Stakeholders (IT Technical Teams, Monash Sustainability Office) are available for testing and feedback
3. Monash systems support integration with the dashboard
4. Project team has continuous access to development tools and environments needed
5. No major changes in Monash's cloud infrastructure during the project duration

Exclusions

1. Mobile version development is not included

2. Multilingual supports are not considered
3. Integration with Non-cloud systems is out of scope
4. Direction control and modification of cloud provider infrastructure is excluded

1.3 Sponsor Memo

To: CIO / Director of IT, Monash University
From: GoGreen Consulting
Date: 9 August 2025
Subject: Proposal for Project Approval: Cloud Carbon Sense
Executive Summary:
Cloud Carbon Sense is a project that aims to develop a real-time monitoring and optimisation tool to reduce the carbon footprint of Monash University's cloud computing operations. This initiative aligns with SDGs 11, 13: Climate & Sustainability Stewardship by reducing the carbon footprint and demonstrating Monash's commitment to support climate action.
Project Description:
Cloud Carbon Sense is a dashboard-based system designed for Monash IT staff, researchers, students, and any university community. It integrates with major cloud providers (AWS, Azure, GCP) to monitor energy consumption and carbon emissions from cloud computing operations. It provides actionable insights, and recommends optimisations. The system also offers a real time dashboard to raise awareness and support educational integration.
Strategic Fit:
This project aligns with the Climate & Sustainability Stewardship pillar (SDGs 11 & 13) by targeting a 15% reduction in cloud-related emissions. It also supports Digital Education (SDG 4) by providing live sustainability data for academic use and reinforcing Monash's leadership in sustainable technology.
Scope Of Work:
1. Planning and requirements analysis
2. System and architectural design
3. Development of monitoring,analytics,and optimisation engines
4. Testing (Unit, Integration, Performance, UAT)
5. Deployment and production rollout
6. Training and handover to operational teams

Team And Methodology:
The project will follow an Agile methodology with fixed milestones. Key roles include Project Manager, Software Architect, DevOps Engineer, Frontend/Backend Developers, and QA Testers. Regular sprints and stakeholder reviews will ensure alignment and adaptability.
Budget And Timeline:
Total Estimated Budget: $413,434 (including labour, software, hardware, and contingency reserve).
Project Timeline: 12 months (1 September 2025 - 2 September 2026), with key milestones completed every 4-5 weeks.
Risks And Mitigation:

Risk	Mitigation

Integration complexity with multiple cloud platforms	Use vendor native APIs and phased integration approach
Data Privacy and Compliance	Conduct early legal review with Monash's Legal Department
Low User Adoption and Engagement	Conduct usability testing with student and staffs and obtain feedback regularly during development

Conclusion And Recommendation:

Cloud Carbon Sense presents a strategic opportunity to reduce operational costs, enhance Monash University's sustainability metrics, and reinforce its leadership in climate-conscious digital innovation. By delivering real-time insights and actionable optimisation, the system supports both operational efficiency and academic engagement. We respectfully recommend full approval to proceed with this initiative, enabling Monash to advance its commitment to the Sustainable Development Goals and set a benchmark for sustainable cloud computing in higher education.

2. Project Scope and Requirements

2.1 Requirements Traceability Matrix (RTM)

ID	Requirement Type	Requirement Description	Category	Source	Status	Assumptions
R1	Functional	The system can monitor real-time carbon emissions from AWS, Azure, and GCP cloud services across all Monash University departments	Monitoring	IT Dept	Draft	API access is granted
R2	Functional	The system can generate weekly/monthly reports about how many tons of CO2 Monash cloud services generated as a dashboard	Reporting	Client	Draft	Historical usage is accessible
R3	Functional	The system can calculate and display "total cumulative emissions" and compare it with other easy-to-understand figures.	Reporting	Client	Draft	Conversion formulas and the comparison dataset are accessible
R4	Functional	The system can generate a dashboard of "Emissions Breakdown" based on: - Cloud providers - Cloud regions - Cloud services - Monash department	Analytics	Client	Draft	
R5	Functional	The system can predict the number of tonnes of CO2 that can be generated in the next period (week/month/year) based on the current Monash cloud usage	Analytics	Client	Draft	Usage patterns are consistent
R6	Functional	The system can give recommendations for the Monash IT department to save energy and reduce emissions	Optimization	IT Dept	Draft	Optimization logic is based on an AI agent analyzing best practices
R7	Non-Functional	The system must maintain 99.9% availability (around 43.8 minutes of unexpected downtime per month)	SLA	Client	Draft	Hosted on a reliable infrastructure

						with continuous monitoring
R8	Non-Functional	Respond to dashboard queries within 2 seconds for 95% of requests	Operations	IT Dept	Draft	
R9	Non-Functional	The system must support over 50,000 users (the entire Monash community) and ~5000 concurrent connections	Scalability	Client	Draft	
R10	Functional	The system must allow users to filter emissions data by time range, cloud provider, and department	Usability	Client	Draft	Cloud usage logs contain sufficient metadata for filtering and attribution
R11	Non-Functional	The system must log all user interactions and system recommendations for audit and review	Audit	IT Dept	Draft	Logging infrastructure is in place
R12	Functional	The system must allow exporting emissions reports in PDF and CSV formats	Report	Client	Draft	The client only needs PDF and CSV for reporting
R13	Functional	Users shall have a settings page to customize their dashboard view and set preferences for receiving monthly report notifications via email.	Usability	Client	Draft	Monash email system integration is possible.
R14	Non-Functional	The system user interface must comply with Monash University's official branding and style guidelines.	Branding	IT Dept	Draft	Style guides will be provided by the university.
R15	Non-Functional	The system must be compliant with Web Content Accessibility Guidelines (WCAG) 2.1 Level AA.	Accessibility	Client	Draft	Requires formal testing and validation.
R16	Non-Functional	All user data must be stored within Australian data centres to comply with data sovereignty regulations.	Legal	IT Dept	Draft	Cloud providers have Australian regions.

2.2 Project Scope Statement

As Monash University's use of cloud computing and AI becomes an integral part of its education ecosystem(Monash University, 2025), they contribute to a growing digital carbon footprint, which stays unmeasured. This absence of transparency, which is a common issue in large organizations (Flexera, 2025), hinders the University's Net Zero goals provided in its strategic plan (Monash University, 2021). To resolve this issue, the Cloud Carbon Sense Project will deliver an IT platform dedicated to measure, track, and highlight this footprint, strengthening the Monash community to make a more sustainable digital impact.

Objectives

- Show clearly how cloud and AI activities affect the environment.
- Give the Monash community practical insights they can use to choose more sustainable options.
- Provide sustainability measures that guide key decisions at the institutional level.
- Encourage a mindset of environmental responsibility throughout the university.

Key Deliverables

Deliverable	**Functional Requirements**	**Non-Functional Requirements**	**Expected Finish Date**
1. Requirements Specification Document	1. Details all functional requirements, including monitoring and reporting features. 2. Defines all user roles and system permissions. 3. Contains a complete RTM linking each requirement to a source and test case.	1. Quantifies all non-functional targets for performance, scalability, and availability. 2. Written in clear, unambiguous language. 3. Version-controlled in the project's central repository.	30/10/2025
2. System Design Document	1. Provides a high-level system architecture diagram. 2. Details the complete database schema and logical data model. 3. Specifies the design of all system APIs, including endpoints and formats.	1. Includes a security architecture design. 2. All diagrams must use standard UML 2.0 notation. 3. The design must be scalable for the target user load.	19/01/2026
3. Implemented & Tested Software	1. Monitors emissions from specified cloud services. 2. Generates dashboard reports verified against requirements. 3. Allows users to export reports in PDF and CSV formats.	1. Maintains 99.9% availability (Giraldo et al., 2017). 2. Dashboard queries respond within 2 seconds for 95% of requests. 3. All key user actions are logged for auditing.	17/07/2026

4. Deployed Production Platform	1. Final software is deployed to the Monash production environment and is accessible to users. 2. All user accounts are configured correctly. 3. A backup and recovery plan is in place and tested.	1. The production environment has continuous performance monitoring. 2. The deployment process is documented. 3. The system passes a final security scan with no new critical vulnerabilities.	10/08/2026
5. Project Closure & Handover Package	1. Includes a comprehensive user guide and FAQ. 2. Contains all technical documentation for long-term maintenance (Washizaki et al., 2020). 3. Includes a final project report with lessons learned.	1. All documents are delivered in an accessible format. 2. The handover includes a formal knowledge transfer workshop. 3. The complete package is delivered on or before the project completion date.	02/09/2026

The project will be executed from September 1, 2025, to September 2, 2026 (a duration of 262 **working days**) with a total budget of $413,434. The main deliverables will result in a fully operational platform along with a complete handover package.

Exclusions

- Tracking of physical hardware like laptops, desktops, and on-premise servers.
- Options to balance out carbon emissions.
- Real-time data updates; data will refresh daily.
- Integration with non-Monash systems - such as Canvas.
- Automatic application of usage caps or quotas.

Constraints

- Deadline: The project must wrap up within 262 **working days**, with a finish date of September 2, 2026.
- Budget: Strict budget cap of $413,434, with costs based on industry salary data (Hays, 2024).
- Compliance: All work must meet Monash University's IT standards and Australian data privacy regulations (Office of the Australian Information Commissioner, 2024).
- Resource Availability: Progress depends on team members being available according to the project schedule.

Assumptions

- Stakeholder Engagement: Stakeholders will give approvals promptly to avoid any expansion of project scope (Al-Dbass & Al-Rousan, 2016).
- Data Access: Monash IT will ensure steady API access to cloud usage information.
- Benchmark Availability: Accepted industry benchmarks for calculating impact are on hand (Google Cloud, 2024; Microsoft Azure, 2023).
- Technical Stability: Monash IT systems are expected to remain reliable and stable.

Annotated Work Breakdown Structure (WBS) & Gantt Chart

Name	Duration	Start	Finish	Predecess...	Cost	Resource Names
⊟0.0 Cloud Carbon Sense	262.23 days	9/1/25, ...	9/2/26, ...		$302995.23	
⊟1.0 Project Management	22 days	9/1/25, ...	9/30/25,...		$21841.88	
⊟1.1. Project Initiation	11 days	9/1/25, ...	9/15/25,...		$8259.04	
1.1.1. Project Charter Development	6 days	9/1/25, ...	9/8/25, ...		$3643.68	Project Manager
1.1.2. Stakeholder Identification & Analysis	3 days	9/9/25, ...	9/11/25,...	4	$3400.80	Project Manager;Business Analyst
1.1.3. Project Kick-off Meeting	2 days	9/12/25,...	9/15/25,...	4;5	$1214.56	Project Manager
⊟1.2. Project Planning	11 days	9/16/25,...	9/30/25,...	6	$13582.84	
1.2.1. Scope Management Plan	5 days	9/16/25,...	9/22/25,...	6	$3036.40	Project Manager
1.2.2. Schedule Development	6 days	9/23/25,...	9/30/25,...	8	$3643.68	Project Manager
1.2.3. Risk Management Plan	4 days	9/23/25,...	9/26/25,...	8	$2955.44	Project Manager;Business Analyst
1.2.4. Communication Plan	6.5 days	9/16/25,...	9/24/25,...	5	$3947.32	Project Manager
⊟2.0 Requirements collection and analysis	27.25 days	9/23/25,...	10/30/2...	6	$27920.96	
⊟2.1. Requirements gathering	13.75 days	9/23/25,...	10/10/2...	6	$9236.92	
2.1.1. Investigate existing documents and systems	5.3 days	9/23/25,...	9/30/25,...	8	$2789.50	Business Analyst
2.1.2. Client Survey	6 days	9/24/25,...	10/2/25,...	11	$3157.92	Business Analyst
2.1.3. Client Interview	6.25 days	10/2/25,...	10/10/2...	15	$3289.50	Business Analyst
⊟2.2. Requirements analysis	7.5 days	10/10/2...	10/22/2...	16	$13461.40	
2.2.1. Functional requirements analysis	7.5 days	10/10/2...	10/22/2...	16	$9109.20	Business Analyst;Cloud Engineer
2.2.2. Non-functional requirements analysis	5 days	10/10/2...	10/17/2...	16;18SS	$4352.20	Cloud Engineer;Business Analyst
⊟2.3. Requirements Validation	6 days	10/22/2...	10/30/2...	18;19	$5222.64	
2.3.1. RTM Development	3 days	10/22/2...	10/27/2...	18;19	$1578.96	Business Analyst
2.3.2. Requirements Review	6 days	10/22/2...	10/30/2...	18;19	$3643.68	Project Manager
M1: Requirements Approved by Client Product Owner	0 days	10/30/2...	10/30/2...	22	$0.00	
⊟3.0 System design	57.66 days	10/30/2...	1/19/26,...	18;19;22	$70383.17	
⊟3.1. Architecture Design	17.33 days	10/30/2...	11/24/2...	18;19;22	$17307.00	
3.1.1. High-Level Architecture	8.83 days	10/30/2...	11/12/2...	22	$6792.04	Cloud Architect
3.1.2. Technology Stack Selection	5.17 days	11/12/2...	11/19/2...	26	$3976.76	Cloud Architect
3.1.3. Infrastructure Design	8.5 days	11/12/2...	11/24/2...	26	$6538.20	Cloud Architect
⊟3.2. Detailed System Design	31.17 days	11/12/2...	12/25/2...	26	$35017.05	
3.2.1. Database Design	12.67 days	11/24/2...	12/11/2...	28	$10643.00	Cloud Architect;Cloud Engineer
3.2.2. User Interface Design	20.83 days	11/12/2...	12/10/2...	26	$15062.45	Business Analyst;Full Stack Developer
3.2.3. API Design	10 days	12/11/2...	12/25/2...	30	$9311.60	Cloud Architect;Full Stack Developer
⊟3.3. Security & Compliance Design	17.66 days	12/25/2...	1/19/26,...	26	$18059.13	
3.3.1. Security Architecture	8.83 days	12/25/2...	1/7/26, ...	32	$9565.72	Cloud Architect;Cyber Security Engineer
3.3.2. Privacy & Compliance Design	8.83 days	1/7/26, ...	1/19/26,...	34	$8493.41	Business Analyst;Cloud Architect
M2: System Architecture Approved by Software Architect	0 days	1/19/26,...	1/19/26,...	35	$0.00	

The project's Work Breakdown Structure (WBS) deconstructs the scope into seven primary phases, from Project Management to Project Closure. This detailed breakdown defines the **critical path**—the sequence of dependent tasks that sets the project's total duration at 262 working days. Any delay on this path directly impacts the final delivery date.

The project plan incorporates eight key **milestones** to serve as formal checkpoints for stakeholder approval and to mark the completion of major deliverables. These significant events, such as 'M1: Requirements Approved' and 'M6: Go-Live Approved', provide clear, measurable points to track progress against the schedule and ensure project governance.

Name	Duration	Start	Finish
⊟0.0 Cloud Carbon Sense	262.23 days?	9/1/25, ...	9/2/26, ...
⊟1.0 Project Management	22 days	9/1/25, ...	9/30/25,...
⊟1.1. Project Initiation	11 days	9/1/25, ...	9/15/25,...
1.1.1. Project Charter Development	6 days	9/1/25, ...	9/8/25, ...
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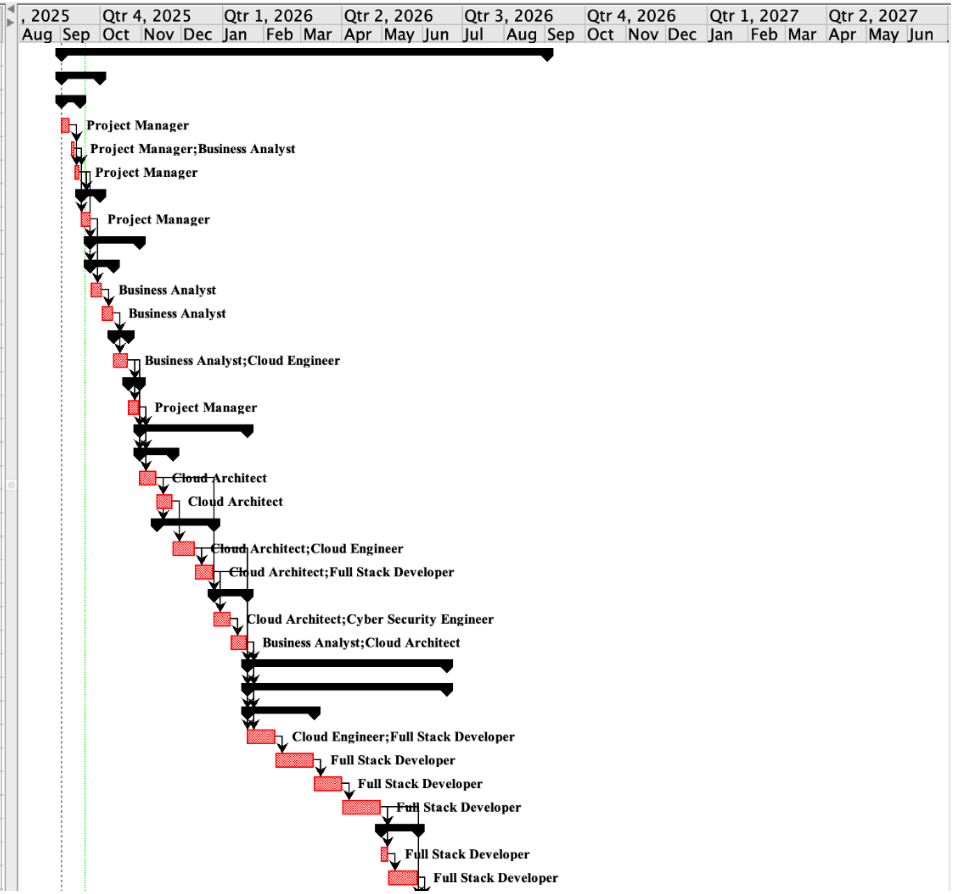
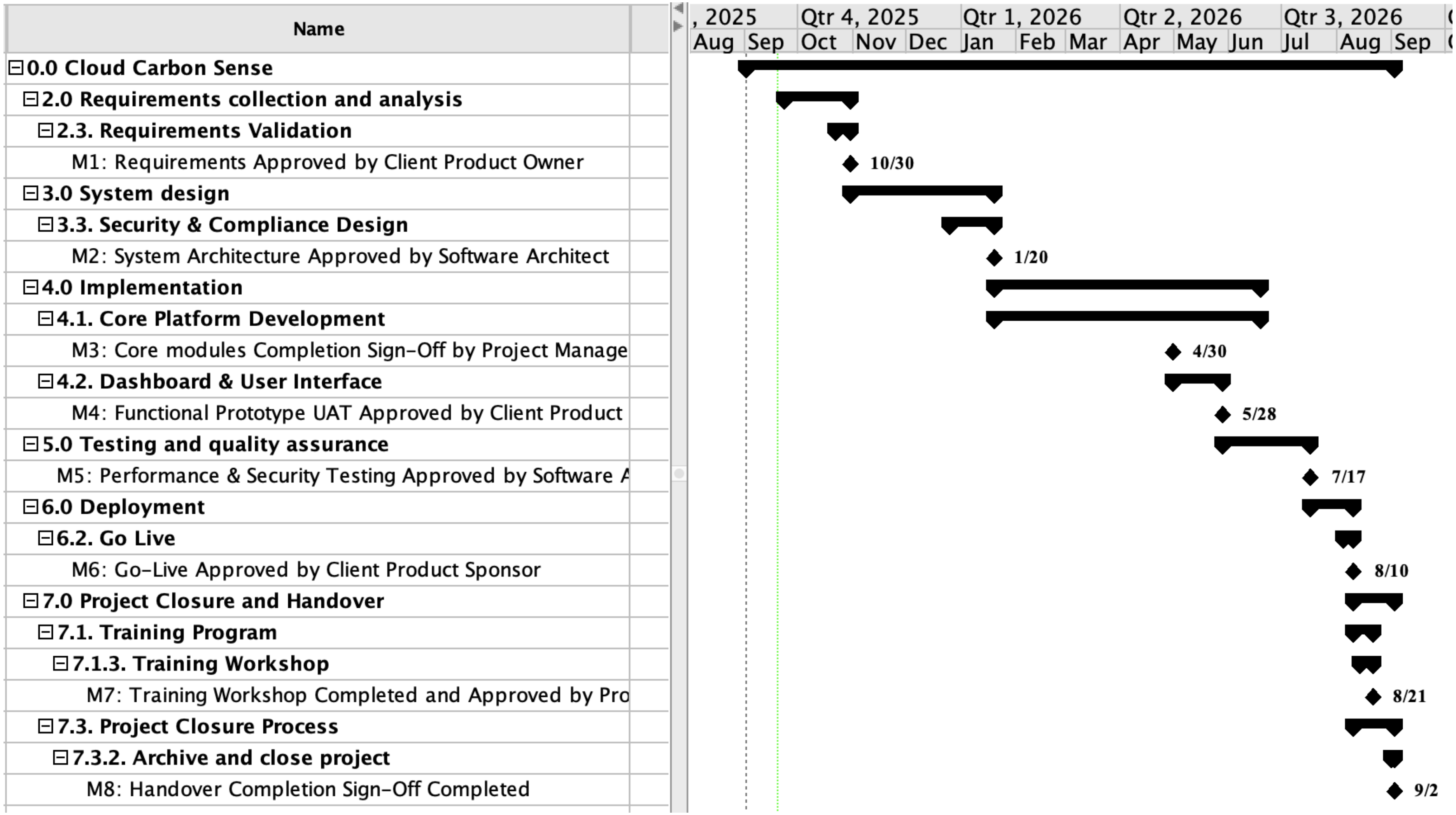
⊟1.2. Project Planning	11 days	9/16/25,...	9/30/25,...
1.2.4. Communication Plan	6.5 days	9/16/25,...	9/24/25,...
⊟2.0 Requirements collection and analysis	27.25 days	9/23/25,...	10/30/2...
⊟2.1. Requirements gathering	13.75 days	9/23/25,...	10/10/2...
2.1.2. Client Survey	6 days	9/24/25,...	10/2/25,...
2.1.3. Client Interview	6.25 days	10/2/25,...	10/10/2...
⊟2.2. Requirements analysis	7.5 days	10/10/2...	10/22/2...
2.2.1. Functional requirements analysis	7.5 days	10/10/2...	10/22/2...
⊟2.3. Requirements Validation	6 days	10/22/2...	10/30/2...
2.3.2. Requirements Review	6 days	10/22/2...	10/30/2...
⊟3.0 System design	57.66 days	10/30/2...	1/19/26,...
⊟3.1. Architecture Design	17.33 days	10/30/2...	11/24/2...
3.1.1. High-Level Architecture	8.83 days	10/30/2...	11/12/2...
3.1.3. Infrastructure Design	8.5 days	11/12/2...	11/24/2...
⊟3.2. Detailed System Design	31.17 days	11/12/2...	12/25/2...
3.2.1. Database Design	12.67 days	11/24/2...	12/11/2...
3.2.3. API Design	10 days	12/11/2...	12/25/2...
⊟3.3. Security & Compliance Design	17.66 days	12/25/2...	1/19/26,...
3.3.1. Security Architecture	8.83 days	12/25/2...	1/7/26, ...
3.3.2. Privacy & Compliance Design	8.83 days	1/7/26, ...	1/19/26,...
⊟4.0 Implementation	107.99 days	1/19/26,...	6/18/26,...
⊟4.1. Core Platform Development	107.99 days	1/19/26,...	6/18/26,...
⊟4.1.1. Collection Engine	36.66 days	1/19/26,...	3/11/26,...
4.1.1.1. Cloud Provider Integration	15.83 days	1/19/26,...	2/10/26,...
4.1.1.2. Data Processing Pipeline	20.83 days	2/10/26,...	3/11/26,...
4.1.4. Database Implement	15 days	3/11/26,...	4/1/26, ...
4.1.5. Core API Implementation	20.83 days	4/1/26, ...	4/30/26,...
⊟4.2. Dashboard & User Interface	19.83 days	4/30/26,...	5/28/26,...
4.2.1. Landing page	4 days	4/30/26,...	5/6/26, ...
4.2.3. Student Dashboards	15.83 days	5/6/26, ...	5/28/26,...





For detailed snapshots of WBS, Gantt Chart, Critical path and Milestones, please refer to section 8. Appendices. (8.1 Work Breakdown Structure, 8.2 Gantt Chart, 8.3 Milestones & 8.4 Critical path)

3. Project Schedule

To implement the project, the Project team has built a detailed WBS attached in the appendix 8.1 Work Breakdown Structure and a Gantt chart in appendix 8.2 Gantt Chart. Here are some key points:

- In the first phase, **Project Initiation**, the Project Manager takes the lead. Their focus is on the initial planning, developing the project charter, defining the scope, and creating the risk management plan.
- Next, in the **Requirements & Analysis** phase, the Project Manager is joined by our Business Analyst. Together, they are responsible for gathering and documenting all stakeholder requirements.
- Once the requirements are clear, we move into **System Design**. This phase is driven by the Cloud Architect, who designs the entire cloud architecture for the platform.
- The fourth and largest phase is **Implementation**. This is where our core technical team—the Cloud Data Engineers, Data Analysts, and Full Stack Developers—will build, code, and integrate all the components of Cloud Carbon Sense.
- Following the main development, we move into the fifth phase: **Testing and Quality Assurance**. This is where our Automation Testers and QA team take over. They will conduct rigorous testing to ensure the platform is bug-free and meets all user requirements.
- Finally, the remaining phases of the project are focused on **training** the end-users—like IT staff and educators—and the official handover of the completed platform to the Monash IT team for ongoing operation.

Following the project timeline are 8 important milestones. All of these milestones are carefully evaluated according to the SMART criteria. Including:

- M1: Requirements Approved by Client Product Owner – Oct 30, 2025
- M2: System Architecture Approved by Software Architect – Jan 19, 2026
- M3: Core Modules Completion Sign-Off by Project Manager – Apr 30, 2026
- M4: Functional Prototype UAT Approved by Client Product Owner – May 28, 2026
- M5: Performance & Security Testing Approved by Software Architect – Jul 9, 2026
- M6: Go-Live Approved by Client Product Sponsor – Jul 31, 2026
- M7: Training Workshop Completed and Approved by Project Manager – Aug 13, 2026
- M8: Handover Completion Sign-Off – Aug 21, 2026

4. Cost Planning

4.1 Cost Model

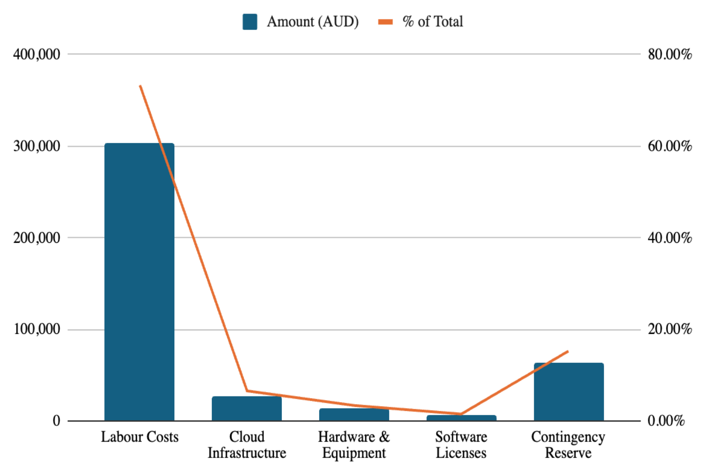
Below is the cost model of the project. The Cloud Carbon Sense project is estimated at $413,434 over 12 months (September 2025 - September 2026), with labour costs representing $302,995 (73.29% of total budget).

Control Account	Units/ Hours	Cost/Unit or Hr	Subtotal	Sum of Control Account	% of Total
1. Project Management					
Labour Costs					
1.1 Project Manager	364	$76	$27,631	$27,631	6.68%
2. Hardware					
2.1 MacBook Air, development laptop	6	$2,099	$12,594		
2.2 Lenovo IdeaPad, Testing Device	2	$497	$994		
2.3 Network Equipment	0	$0	$0	$13,588	3.29%
3. Software Development (Implementation, Deployment, Testing & Handover)					
Labour Costs (Cloud Carbon Sense)					
3.1 Full Stack Developer	1721.2	$68	$117,592		
3.2 Business Analyst	581.68	$66	$38,269		
3.3 Automation Test Analyst	448	$61	$27,207		
3.4 Cloud Engineer	444	$86	$38,197		
3.5 Cloud Architect	320	$96	$30,768		
3.6 DevOps Engineer	120	$86	$10,324		
3.7 Penetration Tester	80	$91	$7,287		
3.8 Cyber Security Engineer	70.64	$81	$5,720	$275,364	66.60%
Software Licence					
3.9 JetBrains IntelliJ Ultimate (1 year)	6	$599	$3,594		
3.10 Figma Pro Licence (12 months)	1	$660	$660		
3.11 Project Libre	1	$0	$0		
3.12 Burp Suite Pro (1 year)	1	$475	$475		
3.13 Apache Jmeter	1	$0	$0		
3.14 Grafana Community Edition	1	$0	$0		
3.15 CI/CD (GitHub Enterprise) (12 months)	6	$252	$1,512	$6,241	1.51%
Cloud Infrastructure					
3.16 Google Cloud Infrastructure for Dev/Staging environment (11 months)	11	$1,724	$18,962		
3.17 Google Cloud Infrastructure for production environment (2 months)	2	$4,091	$8,181	$27,143	6.57%
4. Facilities					
4.1 Testing Room hire	1	$100	$100		
4.2 App Support Training	1	$300	$300	$400	0.10%
5. Contingency Reserve (18% of total estimates)			$63,066	$63,066	15.25%
Total				$413,434	100.00%

When breaking down the labour cost by category, the largest percentage is the Development Team with nearly 39% of Full Stack developers, followed by roles related to cloud computing. At the lowest percentage are project management-related jobs at less than 10% of total labor costs. This is understandable since software development-related tasks take up a large portion of the WBS, and the majority of development work is handled by full-stack developers. If you want to know the detailed labor costs for each project item, please see the Appendix 8.1 Work Breakdown Structure.

Category	Resources	Total Hours	Total Cost ($)	% of Labour	Justification
Project Management	Project Manager	364	27,631	9.12%	Essential coordination across university departments and external stakeholders
Development Team	Full Stack Developer	1,721.20	117,592	38.82%	Core system development, including complex carbon calculation algorithms
Business Analysis	Business Analyst	581.68	38,269	12.63%	Comprehensive requirements across multiple user groups and departments
Cloud Infrastructure	Cloud Engineer, Cloud Architect, DevOps	884	79,289	26.18%	Scalable, secure cloud deployment for university-wide access
Quality & Security	Test Analyst, Penetration Tester, Security Engineer	598.64	40,214	13.27%	Enterprise-grade testing and security compliance

With other types of costs (except contingency reserve), the majority is allocated to the cost of renting Cloud infrastructure for application development and deployment ($27,143, equivalent to 6.57% of total costs), followed by costs for Hardware, software license, and facilities, totaling about 5%. The project team's plan will prioritize development on the Cloud, so the Hardware cost is mainly used to purchase laptop equipment for the development team.



It is expected that 18% of the total budget ($63,066) will be used as a reserve for the following reasons:

Technical Complexity Risks - 12% Contingency

- Multi-Cloud Integration Risk (5%): Cloud services from multiple parties may change, causing the architecture to change, and additional work for the development team.
- Real-Time Analytics Performance (2%): Real-time monitoring is difficult, especially as the number of systems monitored for emissions increases, which poses risks during actual development and takes time to process.

- Custom Carbon Calculation Algorithms (2%): Algorithms may need to be changed to meet global standards
- Third-Party API Availability (2%): Changes to the API will most likely require changes to integrated systems.
- Security Requirement Changes (1%): New cybersecurity framework requirements may require changes to the system.

Organizational & Requirements Risks - 6% Contingency

- Stakeholder Requirement Changes (3%): Strategic changes may occur, e.g., prioritizing resources for certain high-priority projects.
- Regulatory Compliance Evolution (1%): Macro-policy changes may impact the project.
- Vendor Service Changes (2%): Service provider pricing changes may occur, especially when cloud infrastructure is paid monthly, and software licenses are also paid monthly.

4.2 Estimation Approach & Methodology

Cost Estimation Framework

The Cloud Carbon Sense project cost model uses a bottom-up estimating approach, using the Work Breakdown Structure (WBS) method, ensuring comprehensive coverage of all project activities and deliverables. This methodology provides detailed cost visibility across seven key work packages: Requirements Analysis, System Design, Implementation, Testing & Quality Assurance, Deployment, and Training & Delivery.

The estimating methodology incorporates three-point estimating techniques, where complex activities are broken down into discrete tasks with defined effort allocations. Labor costs are calculated using current market prices from the Hays Salary Guide FY24-25, ensuring alignment with Australian technology industry standards. Infrastructure costs use a scaled cloud pricing model, reflecting actual usage patterns rather than fixed capacity allocations.

In addition, the project team also uses Analogous Estimation when referencing past project costs for project management component tasks.

Resource Allocation Strategy

Resource planning follows a skills-based allocation model, where specialized expertise is associated with specific project phases and deliverables. The allocation for the Full Stack Developer position (1,721.2 hours) reflects the complexity of carbon accounting algorithms, predictive analytics tools, and multi-user dashboard development. Cloud infrastructure specialists (884 hours total) ensure secure, scalable deployments across Monash University's diverse operating environments.

Key Assumptions & Justifications

Labour Rate Assumptions

Market Rate Selection: All labour rates derive from the Hays Salary Guide FY24-25 for Melbourne, Victoria, converted to hourly rates using the Australian standard 38-hour work week. No contractor premium was applied, assuming a permanent hire model for the 12-month engagement period. In other words:

Hourly Rate = (Annual Salary × 1,000) ÷ (52 weeks × 38 hours)

Role-Specific Justifications:

Role	Annual Salary (Typical)	Hourly Rate (AUD)	Justification
Cloud Architect	190	96.15	High-level technical design
Cloud Engineer	170	86.03	Implementation and development
DevOps Engineer	170	86.03	CI/CD and automation
Project Manager	150	75.91	Mid-level PM
Business Analyst	130	65.79	Requirements and process analysis
Cyber Security Engineer	160	80.97	Design and implement a security architect
Penetration Tester	180	91.09	Security testing
Full Stack Developer	135	68.32	Develop software components
Automation Test Analyst	120	60.73	Software testing

Technical Architecture Assumptions

Google Cloud Platform Selection: Infrastructure costs assume Google Cloud as the primary platform, justified by existing Monash Google Workspace integration, educational sector pricing advantages, and compliance with university data governance requirements. Monthly cloud costs ($4,090 for production environment, $1,724 for development environment) are calculated using current GCP pricing with auto-scaling configurations optimized for university operational patterns.

Development Environment: MacBook Air M4 specifications support complex algorithm development and machine learning model training required for carbon prediction analytics. Six development units accommodate the full development team with redundancy for parallel development streams.

Project Scope & Complexity Factors

Multi-Stakeholder Integration: Business Analyst allocation (581.68 hours) accounts for requirements gathering across multiple university departments, each with distinct operational carbon footprints and reporting needs. This extensive stakeholder engagement ensures comprehensive system adoption and accurate carbon tracking across diverse university operations.

Security & Compliance Requirements: Combined security expertise (218.64 hours across three specialists) addresses university data protection obligations, external carbon reporting compliance, and integration with existing Monash IT security frameworks. This investment prevents costly compliance failures and ensures audit readiness.

Quality Assurance Investment: Testing allocation (448 hours) reflects the mission-critical nature of carbon reporting accuracy, where data integrity directly impacts university sustainability commitments and external regulatory reporting.

Cost Structure Analysis

The $413,434 total investment demonstrates optimal resource allocation with 73.3% dedicated to specialized labour and 11.5% to technology infrastructure. This ratio reflects the knowledge-intensive nature of carbon analytics development while maintaining cost-effective infrastructure utilization through cloud-native architecture. This investment aligns with Monash University's Net Zero 2030 commitment and represents foundational infrastructure for comprehensive carbon management across all university operations.

4.3 The Cost Baseline

Overall, the project shows relatively balanced quarterly cost allocations.

Quarter	Period	Amount	Percentage	Phase
Q1	Sep 2025 - Nov 2025	113,475.37	27.45%	Planning & Design
Q2	Dec 2025 - Feb 2026	82,668.60	20.00%	Core Development
Q3	Mar 2026 - May 2026	106,277.54	25.71%	Implementation & Testing
Q4	Jun 2026 - Aug 2026	111,012.15	26.85%	Deployment & Handover
		413,433.66	100.00%	

When looking at the monthly cost allocation table for each category below, we can clearly see that the Cloud Carbon Sense project's $413,434 cost demonstrates strategic allocation across a 12-month timeline, with cloud infrastructure costs totaling $28,143, distributed as follows:

- $1,724/month for development environments (Months 2-12) and $4,091/month for production environments (last two months).
- The cost structure is labor-intensive at 73.3% ($302,995), with front-loaded Business Analyst utilization in early months, consistent Full Stack Developer engagement throughout, and back-loaded Cloud Engineer involvement for deployment phases.
- Hardware costs of $13,988 are strategically timed with MacBooks procured in Month 1 and testing equipment in Month 3
- 18% contingency reserve ($63,066 at $5,256/month) provides an adequate buffer for the highest-risk periods during deployment (Months 10-11) when dual cloud environments are running simultaneously.
- The baseline effectively balances resource utilization, with Month 6 showing optimal cost efficiency ($20,080) during API development, while Months 1, 9-11 require enhanced monitoring due to concentrated spending and operational complexity.

WBS	Units/Hours	Rate/Unit	Subtotal	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	# Total
1. LABOUR COSTS																
1.1 Project Manager	364 hrs	$76/hr	$27,631	12,449.24	1,214.56	1,214.56	1,214.56	1,214.56	1,214.56	1,214.56	1,214.56	1,214.56	1,214.56	1,214.56	3,036.40	27631
1.2 Full Stack Developer	1,721.2 hrs	$68/hr	$117,592	-	-	4,099.20	5,465.60	2,732.80	7,247.39	19,911.18	24,048.64	32,574.98	21,386.89	125.71	-	117592
1.3 Business Analyst	581.68 hrs	$66/hr	$38,269	7,263.22	12,236.94	6,800.05	4,163.19	4,647.41	-	-	-	-	-	-	3,157.92	38269
1.4 Automation Test Analyst	448 hrs	$61/hr	$27,207	-	-	-	-	-	-	-	-	1,719.87	17,490.24	6,053.57	1,943.36	27207
1.5 Cloud Engineer	444 hrs	$86/hr	$38,197	-	6,882.40	3,042.02	5,677.98	6,256.10	4,638.74	-	-	3,441.20	5,505.92	2,752.96	-	38197
1.6 Cloud Architect	320 hrs	$96/hr	$30,768	-	1,346.10	17,883.90	7,499.70	4,038.30	-	-	-	-	-	-	-	30768
1.7 DevOps Engineer	120 hrs	$86/hr	$10,324	-	-	-	-	-	-	-	-	-	3,971.14	2,064.72	4,287.74	10324
1.8 Penetration Tester	80 hrs	$91/hr	$7,287	-	-	-	-	-	-	-	-	-	-	7,287.20	-	7287
1.9 Cyber Security Engineer	70.64 hrs	$81/hr	$5,720	-	-	-	3,076.86	2,642.86	-	-	-	-	-	-	-	5720
2. HARDWARE & EQUIPMENT																
2.1 MacBook Air M4 (Development)	6 units	$2,099	$12,594	12,594.00	-	-	-	-	-	-	-	-	-	-	-	12594
2.2 Lenovo IdeaPad (Testing)	2 units	$497	$994	-	-	994.00	-	-	-	-	-	-	-	-	-	994
3. SOFTWARE LICENSES																
3.1 JetBrains IntelliJ Ultimate	6 licenses	$599	$3,594	3,594.00	-	-	-	-	-	-	-	-	-	-	-	3594
3.2 GitHub Enterprise	6 users	$252	$1,512	1,512.00	-	-	-	-	-	-	-	-	-	-	-	1512
3.3 Other Software Tools	-	-	$1,135	1,135.00	-	-	-	-	-	-	-	-	-	-	-	1135
4. CLOUD INFRASTRUCTURE																
4.1 Google Cloud Production	2 months	$4,091/month	$8,181	-	-	-	-	-	-	-	-	-	-	4,090.63	4,090.63	8181
4.2 Google Cloud Development	11 months	$1,724/month	$20,686	-	1,723.82	1,723.82	1,723.82	1,723.82	1,723.82	1,723.82	1,723.82	1,723.82	1,723.82	1,723.82	1,723.82	18962
5. TRAINING & FACILITIES																
5.1 Testing Room hire	1 room	$100	$3,000	-	-	-	-	-	-	-	-	-	-	100.00	-	100
5.2 App Support Training	1 package	$300	$100	-	-	-	-	-	-	-	-	-	-	-	300.00	300
6. CONTINGENCY RESERVE																
6.1 Risk Contingency (18%)	-	-	$63,066	5,255.51	5,255.51	5,255.51	5,255.51	5,255.51	5,255.51	5,255.51	5,255.51	5,255.51	5,255.51	5,255.51	5,255.51	63066
MONTHLY TOTALS			**$413,434**	**43,802.97**	**28,659.33**	**41,013.07**	**34,077.22**	**28,511.36**	**20,080.02**	**28,105.07**	**32,242.53**	**45,929.94**	**56,548.09**	**30,668.68**	**23,795.38**	**413434**
CUMULATIVE TOTALS				**43,802.97**	**72,462.30**	**113,475.37**	**147,552.59**	**176,063.95**	**196,143.97**	**224,249.04**	**256,491.57**	**302,421.51**	**358,969.60**	**389,638.28**	**413,433.66**	
% OF TOTAL BUDGET				**10.59**	**6.93**	**9.92**	**8.24**	**6.90**	**4.86**	**6.80**	**7.80**	**11.11**	**13.68**	**7.42**	**5.76**	**100**

Spending patterns reveal three peak periods:
- Month 1 ($43,803), driven by team ramp-up and hardware procurement of 6 MacBook Air M4 and software licenses;
- Month 9 ($45,930) for intensive testing phases
- Month 10 ($56,548) for production deployment preparation.

Key Milestones:
- Month 1: Project Charter Approval - Budget: $43,803
- Month 3: Design Sign-off - Cumulative: $113,475
- Month 6: Development Phase 50% - Cumulative: $196,144
- Month 9: Testing Complete - Cumulative: $302,422
- Month 12: Project Closure - Total: $413,434

To track estimated costs and actual costs, the Project team will use the following metrics:
- PV (Planned Value) vs AC (Actual Cost)
- CPI (Cost Performance Index) and SPI (Schedule Performance Index).

Time reviews are performed bi-weekly, flash reports are generated during high-spend periods (Months 1, 9, 10), and monthly reports are generated during steady-state development phases. Below are evaluated components and KPI:
- Resource Utilization: Track actual vs planned hours for each role
- Phase Completion: Measure deliverable progress against spending
- Burn Rate Analysis: Monitor monthly spend against the baseline curve
- Forecast to Complete: Update remaining budget projections

Key Performance Indicators (KPI):
- Monthly budget variance (±10% tolerance)
- Cumulative cost variance
- Resource allocation efficiency
- Phase completion percentage vs cost consumption

To detect any potential budget overruns, the Project Manager will closely monitor metrics and take action based on:
- Green: <5% variance from baseline
- Yellow: 5-10% variance (requires action plan)
- Red: >10% variance (escalation required)

In the event that corrective actions are required, the project team will evaluate one or more of the following options: reallocating resources between phases, using contingency funds, adjusting the project scope, or negotiating with the supplier.

4.4 Memo To Sponsor about the Cost Model

To: CIO / Director of IT, Monash University
From: GoGreen Consulting
Date: 10 September 2025
Subject: Cost Model for Cloud Carbon Sense

Cloud Carbon Sense is a monitoring system that reduces Monash University's carbon emissions from cloud computing. By promoting an energy-efficient digital infrastructure, Monash's sustainability objectives can be satisfied.

The cost model outlines the financial framework for the project. It demonstrates how our project satisfies the sustainability goals within budget. The total cost of the project is estimated

to be $413,434, covering all phases from planning to development, testing, deployment, and handover.
The model was developed through comprehensive analysis. Supplier quotes were used to estimate the cost for software and cloud services. We also referenced historical data from similar IT projects and conducted task level estimations based on the Work Breakdown Structure. Ensuring an accurate and reliable budget estimation.

Key Cost Items:
Labour Costs ($302,995): Team salaries across all phases including requirements analysis, design, development, testing, and deployment
Software Licenses ($6,241): Analytics tools, cloud API access, and development software
Cloud Infrastructure ($27,143): Hosting and data processing expenses across AWS, Azure, and GCP platforms
Training & Handover ($400): Workshops for end-users and administrators
Project Management ($27,631): Project monitoring, reporting, and coordination activities

Contingency:
A contingency allowance of $63,066 (~18% of total budget) has been established based on our risk assessment. It addresses potential integration challenges with multiple cloud platforms and accommodates scope adjustments during the development.
The cost model demonstrates a realistic and well-structured financial plan that aligns with Climate & Sustainability Stewardship (SDGs 11, 13). Establishing a solid foundation for effective budget management throughout project execution. This cost model ensures a successful delivery of significant sustainability benefits to Monash University.

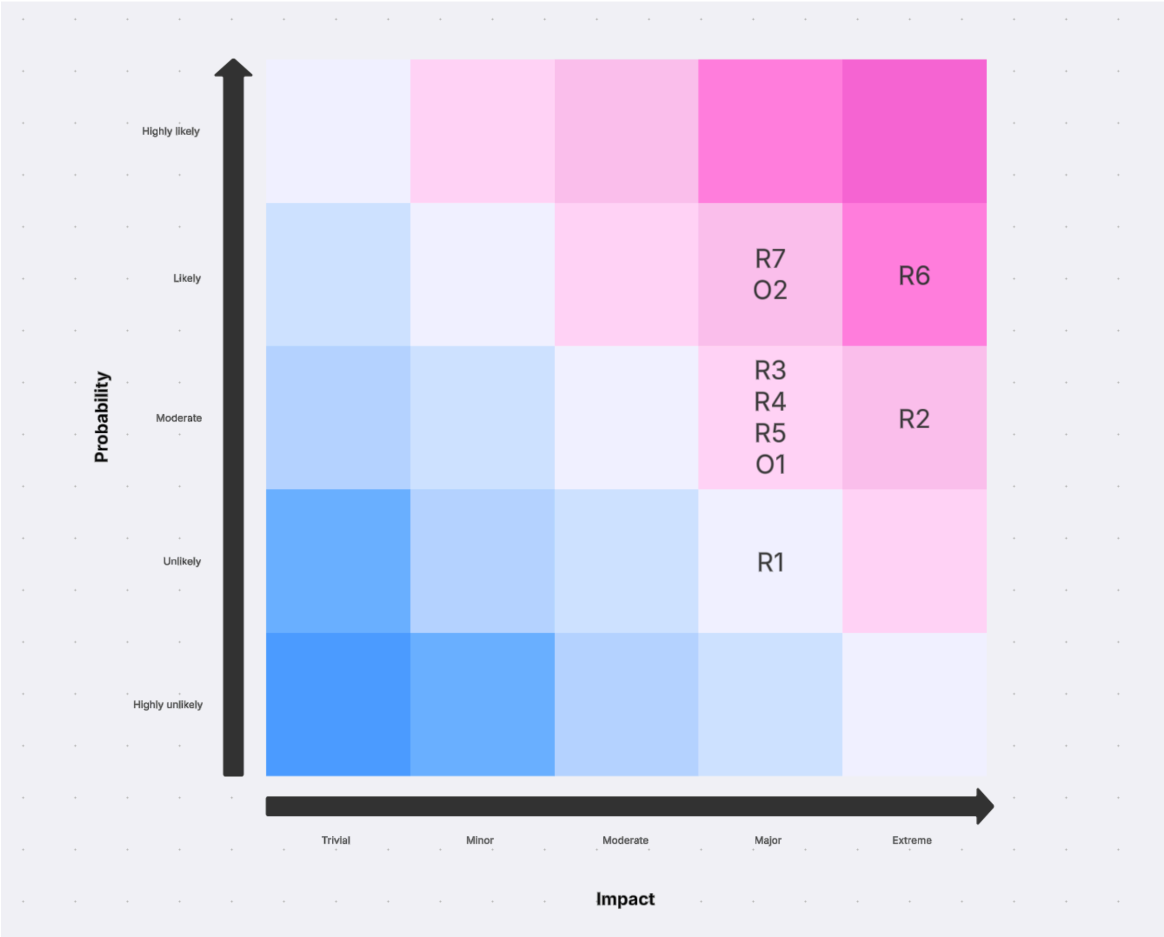
5. Governance

5.1 Risk Register

ID	Risk / Opportunity	Likelihood (1–5)	Impact (1–5)	Score	Justification
R1	Multi-cloud API incompatibility or changes leading to integration failures	4	4	16	The project's core functionality depends on the stability of external APIs from AWS, Azure, and GCP. These APIs are outside our control and subject to change, which could break data ingestion pipelines, require significant redevelopment, and delay the project timeline.
R2	Performance issues in real-time data processing and analytics engine	3	5	15	Processing and calculating carbon emissions across thousands of cloud resources in near-real-time is computationally intensive. Performance bottlenecks could lead to delayed data updates and a poor user experience, undermining the platform's value and adoption.
R3	Budget overrun due to underestimated technical complexity	3	4	12	Even with a fixed budget cap and contingency reserve, hidden complexities in multi-cloud integration, performance tuning, or security compliance could require more specialised labour hours or cloud resources than anticipated, threatening the budget.
R4	Key stakeholder requirements change significantly mid-development	3	4	12	Evolving sustainability strategies or new reporting demands from different university departments (IT, research, facilities) could lead to scope creep, requiring rework and potentially delaying the project and increasing costs.

R5	Inaccurate carbon calculations due to flawed algorithms or data	3	4	12	The platform's credibility hinges on the accuracy of its carbon calculation algorithms and the quality of data from cloud providers and grid intensity sources. Initial miscalibrations or unverified assumptions could lead to erroneous reporting and loss of stakeholder trust.
R6	Data privacy or security breach exposing sensitive cloud metadata	2	5	10	Under the Privacy Act 1988 and OAIC's Notifiable Data Breach scheme, major breaches must be reported. The platform will access metadata about university cloud workloads. A breach, while unlikely, could expose sensitive IT architecture information and result in significant reputational damage.
R7	Vendor pricing change for cloud infrastructure or software licenses	2	4	8	Google Cloud Platform pricing structures or software license fees (e.g., GitHub Enterprise, JetBrains) could change during the project's 12-month lifecycle, increasing operational costs beyond the allocated budget.
O1	High adoption leads to expansion and official endorsement	3	4	12	If the platform proves successful and gains widespread adoption across Monash, it could become the official sustainability tool, leading to additional funding, integration with more systems, and potential commercialization opportunities.
O2	Algorithm accuracy exceeds expectations, enhancing Monash's reputation	2	4	8	If the custom carbon calculation algorithms are highly accurate and validated, CloudCarbonSense could enhance Monash University's reputation as a leader in sustainable technology and research, attracting partnerships and grants.

Probability–Impact Matrix



Risk–Owner Matrix

ID	Risk / Opportunity	Monitoring Owner
R1	Multi-cloud API incompatibility or changes leading to integration failures	Cloud Architect
R2	Performance issues in real-time data processing and analytics engine	Cloud Engineer
R3	Budget overrun due to underestimated technical complexity	Project Manager
R4	Key stakeholder requirements change significantly mid-development	Business Analyst
R5	Inaccurate carbon calculations due to flawed algorithms or poor data quality	Project Manager
R6	Data privacy / security breach	Cyber Security Engineer

R7	Vendor pricing change for cloud infrastructure or software licenses	Project Manager
O1	High adoption leads to expansion and official endorsement	Project Manager
O2	Algorithm accuracy exceeds expectations, enhancing Monash's reputation	Full Stack Developer

Risk Management Strategy

The CloudCarbonSense project adopts a proactive, data-driven, and collaborative risk management approach. Risks are continuously identified, analyzed, and prioritized using the quantitative risk register and probability-impact matrix, and are managed through clear ownership and systematic monitoring aligned with agile development practices.

Monitoring and Governance

Clear Ownership: Each risk and opportunity has a clearly assigned monitoring owner (see Risk-Owner Matrix), ensuring accountability and expertise-based management.
Regular Reviews: Risks will be reviewed bi-weekly during project sprint stand-up meetings and formally at monthly steering committee meetings.
Escalation Protocol: High-priority risks (score ≥ 12, compliance-related, or impacting critical path) must be escalated immediately to the Project Sponsor and IT Governance Committee.
Integrated Tools: Risk tracking is integrated into our Jira project management system, with automatic reminders for risk owners.

Mitigation and Response Strategies

- R1 (Multi-cloud API integration failures) → Mitigate by developing robust API wrappers with fallback mechanisms; Transfer by negotiating SLA guarantees with cloud providers and maintaining multi-vendor compatibility.
- R2 (Real-time analytics performance issues) → Mitigate through early performance prototyping, scalable microservices architecture, and continuous load testing; Accept that some performance tuning will be ongoing.
- R3 (Budget overrun due to technical complexity) → Mitigate with rigorous burn rate monitoring against the $413K baseline; utilize the 18% contingency reserve ($63K) for unforeseen technical challenges.
- R4 (Stakeholder requirements change) → Mitigate by implementing agile change control processes with bi-weekly stakeholder demos; Avoid scope creep through formal change request approvals.
- R5 (Inaccurate carbon calculations) → Mitigate by validating algorithms against academic research and industry standards; establish a peer review process with Monash sustainability experts.
- R6 (Data privacy/security breach) → Avoid through strict compliance with Privacy Act 1988 and Monash IT policies; Mitigate with end-to-end encryption, regular penetration testing, and privacy-by-design architecture.

- R7 (Vendor pricing change) → Transfer by locking in annual pricing commitments where possible; Accept minor fluctuations within the contingency budget.
- O1 (High adoption leads to expansion) → Exploit by proactively showcasing success metrics to university leadership and preparing scalability plans for wider deployment.
- O2 (Algorithm enhances reputation) → Enhance by collaborating with Monash research departments to publish findings and present at sustainability conferences.

Communication and Collaboration

- Risk register maintained in GitHub repository
- Monthly reporting to steering committee
- Stakeholder workshops conducted quarterly
- Automated alerts for high-priority risks
- Open risk log accessible via SharePoint
- Immediate escalation path for critical issues

5.2 Quality Management Plan

This plan outlines the quality objectives, standards, and metrics to ensure the "Cloud Carbon Sense" project meets stakeholder expectations. Quality will be managed proactively throughout the project lifecycle by integrating specific activities in each phase.

i. Accuracy of Environmental Calculations

- Quality Objective: To ensure that all calculations for carbon, water, and energy consumption are accurate, reliable, and based on scientifically accepted standards.
- Applicable Standards:
    - GHG Protocol Corporate Accounting and Reporting Standard
    - ISO 14064-1: Greenhouse gases
- Quality Metrics:
    - The calculation engine's results must have a variance of less than 5% when compared against pre-validated benchmark calculations.
    - 100% of the data sources and emission factors used in calculations must be documented and traceable to their origin.
- Quality Activities by Phase:
    - Requirements: Accuracy targets will be formally defined in the Requirements Specification Document.
    - System Design: The calculation logic and data sources will be detailed in the System Design Document.
    - Implementation: The Analytics Engine code will undergo mandatory peer reviews to verify logic.
    - Testing: Specific data validation and calculation accuracy tests will be executed against a known baseline during the Testing phase.

ii. System Reliability and Availability

- Quality Objective: To ensure the platform is stable and consistently available for all users.
- Applicable Standards:
  - ITIL Framework for service level management
  - ISO/IEC 25010: System and software quality models
- Quality Metrics:
  - The production platform will achieve 99.5% uptime during standard university business hours.
  - The mean time to recovery (MTTR) for any critical system failure must be less than 4 hours.
- Quality Activities by Phase:
  - Requirements: Uptime and MTTR metrics will be defined as non-functional requirements.
  - System Design: The system architecture will be designed for reliability, incorporating redundancy and robust error handling.
  - Implementation: Developers will implement comprehensive logging and health-check endpoints.
  - Testing: Load testing will be conducted to identify and resolve performance bottlenecks before deployment.
  - Deployment: System health and uptime will be actively monitored post-go-live.

iii. Usability and Accessibility

- Quality Objective: To deliver a platform that is intuitive, easy to use, and accessible to all members of the Monash community, in line with WCAG 2.1 AA standards.
- Applicable Standards:
  - Web Content Accessibility Guidelines (WCAG) 2.1, Level AA
  - ISO 9241-11:2018: Ergonomics of human-system interaction
- Quality Metrics:
  - The platform must pass an external WCAG 2.1 AA compliance audit before final deployment.
  - Achieve a score of 80 or higher on a System Usability Scale (SUS) survey conducted during User Acceptance Testing.
- Quality Activities by Phase:
  - System Design: User-centered design principles will be applied to create UI/UX prototypes, which will be validated with a user focus group.
  - Implementation: Frontend development will adhere to accessibility best practices.
  - Testing: Formal usability testing will be conducted with a representative user group, and an external accessibility audit will be performed.

iv. Data Security and Privacy

- Quality Objective: To protect all user data, ensure anonymity, and comply with all relevant data protection regulations and Monash University policies.

- Applicable Standards:
  - ISO/IEC 27001: Information security management
  - Monash University Data Protection and Privacy Policy
- Quality Metrics:
  - Zero critical or high-severity vulnerabilities detected in a third-party penetration test conducted before launch.
  - A formal Privacy Impact Assessment (PIA) must be completed and signed off with 100% compliance.
- Quality Activities by Phase:
  - System Design: A comprehensive Security and Compliance Design will be created, detailing data encryption, access controls, and anonymisation techniques.
  - Implementation: The team will follow secure coding practices to prevent common vulnerabilities (e.g., OWASP Top 10).
  - Testing: The Testing phase will include vulnerability scanning and a formal third-party penetration test.

v. Maintainability and Code Quality

- Quality Objective: To ensure the platform's source code is well-structured, documented, and easy for the Monash IT team to maintain and update post-project.
- Applicable Standards:
  - ISO/IEC 25010: System and software quality models
  - Monash IT Internal Coding Standards
- Quality Metrics:
  - Achieve a minimum of 85% code coverage from automated unit tests.
  - All new code must pass a static code analysis check with zero critical errors before being merged into the main branch.
- Quality Activities by Phase:
  - Implementation: Development will adhere to a strict code review process and utilize static analysis tools to ensure quality.
  - Testing: Code coverage will be measured and reported as part of the unit and component testing activities.
  - Project Closure and Handover: All technical documentation, including architecture diagrams and setup guides, will be compiled and delivered in the Handover Package.

5.3 Stakeholder Register and Communication Matrix

This stakeholder register was created by categorizing people into three groups: Internal employees (Project Manager, Project Sponsors, Technical staff), External consultants (UI/UX Designer, Test/QA Manager), and other stakeholders who aren't part of the project team (users, legal departments). The stakeholders were identified and then ranked in order of importance following the Power-Interest Grid, Salience Model, and SEAM frameworks.

STAKEHOLDER REGISTER

NO	NAME	TITLE	ROLE IN PROJECT	CONTACT
1	Thomas Tuchel	Project Manager GoGreen Consulting (Our Firm)	Project Manager Involved in all decision making processes, communication channels, bridge for the entire project	t.tuchel@gogreen.com +61 402898989
2	Peter Chan	Product Owner Monash Sustainability Office	Product Owner Oversees delivery scope, features, and ensures project alignment with sustainability goal	p.chan@staff.monash.edu +61 413555388
3	Todd Boehly	Chief Information Officer Monash IT Services	Project sponsor, strategic oversight, resource approval	t.boehly@staff.monash.edu +61 404667788
4	Petr Cech	Sustainability Director Monash Sustainability Office	Project sponsor, define carbon reduction targets, and validate environmental impact.	p.cech@staff.monash.edu +61 403123123
5	John Terry	Cloud Infrastructure Manager Monash IT Services	Technical implementation, system integration, and daily operations	j.terry@staff.monash.edu +61 404112233
6	Ngolo Kante	**[External consultant]** Head of QA Department	Test/QA Manager Ensure product functionality and quality	kan.kute@greeenleaf.com +61 402123123

		GreenLeaf Outsourcing		
7	Nicolas Jackson	**[External consultant]** Head of User Experience Department GreenLeaf Outsourcing	UI/UX Designer Include in the design the user interface, and review user feedback with the team.	j97.nicol@greeenleaf.com +61 401567890
8	Cole Palmer	**[Not in project team]** Monash University Student Association	User (Regular) Conduct usability testing sessions for regular role; create user guides/tutorials	palmer@student.monash.edu +61 405998877
9	Fernaldo Torres	**[Not in project team]** IT Staff Monash University	User (IT Staff) Conduct usability testing sessions for admin role; create user guides/tutorials	f.torres@staff.monash.edu +61 404678967
10	Matt Liu	**[Not in project team]** Head of General Counsel Office Monash University	Legal Counsel Guaranteeing that the product adheres to current laws and Monash's policies and regulations.	matt.liu@staff.monash.edu +61 404678998

COMMUNICATION MATRIX

Communication Type	Objective of Communication	Medium	Frequency	Audience	Owner	Deliverable	Format
Extraordinary project update	The Business Development team uses a specific type of communication to manage potential changes to a project's scope, stakeholders, and requirements that were established at the beginning of the project. This process ensures that any proposed changes are carefully considered and communicated to all relevant parties.	Meeting Email	As needed	Product Owner Technical team Monash IT Services Dept Product Tester/QA group	Project Manager Business Development team	High-level changes involve big decisions about the project's scope, stakeholders, or business requirements. Detailed instructions are then given to each team, explaining how to implement those high-level changes. This can include taking on new tasks, handing off work, or following up on the new scope.	PowerPoint slides, PDF
Status meeting	To stay on top of each stakeholder's work and quickly address any issues or decisions, a video conference will be held every two weeks. This meeting will be used to provide updates and make decisions as needed.	Conference Report	Fortnightly	Product Owner Technical team Monash IT Services Dept Product Tester/QA	Project Manager Business Development team	Work Progress: A summary of what each team has accomplished. Future Goals: What each team needs to deliver and achieve in the coming week. Issue Resolution: Any decisions made to solve potential problems.	PowerPoint slides, PDF

				group UI/UX Designer			
Issue Reporting / Risk Escalation	To solve technical issues and appropriately evaluate risks	Email Instant messaging	As needed	Business Development team Monash IT Services Dept Technical team (internal)	Technical team	The technical team will hold internal discussions to address technical issues and collaborate on solutions. For risk assessment, the business development team will decide after consulting with both the technical team and Monash.	Verbal summary, spreadsheet
Training / Onboarding	Give clients/users the knowledge and directions they need to know every feature.	Meeting Email	As needed	Clients/Users	Technical team (BA)	Users can thoroughly understand the functions of the system and their roles, thereby being able to use the product smoothly.	Verbal summary, PowerPoint slides, PDF
Performance Feedback	During the Go Live phase, it's essential to monitor and evaluate how well the system is working. The goal is to collect feedback that will help you make improvements.	Meeting Email	Weekly	Product Owner Business Development team	Business Development team (internal) Technical team	System performance insights, tester feedback, and technical observations	Spreadsheet, PowerPoint slides, PDF

STAKEHOLDER ANALYSIS

NAME	POWER LEVEL	INTEREST LEVEL	CURRENT Engagement	Engagement Strategy	Conflict Management Approach
Cole Palmer (Regular User)	Medium	High	Supporting	During Deployment: The Project team works with Cole Palmer on a quarterly basis to identify client needs and make product improvements. The team will also give clients early access to data and define the system's design together. During Go Live Operations: To improve both user experience and performance, involve clients in all milestone reviews and testing. The team will also keep clients informed through regular communication, including weekly status updates, monthly progress reports, and quarterly review meetings.	To make sure the system meets user expectations, the project team will have early and ongoing discussions with Cole Palmer. If any usability problems or unfulfilled needs are discovered, they will be fixed with user experience reviews and design changes before being escalated. However, these plans will be adjusted with the following in mind: - Since clients are the main source of income, their satisfaction is extremely important. The project team must be responsive and adaptive to any client feedback on the system's user interface, user experience, and functions. - The project will only accept technical feedback selectively to ensure the project's scope and technical integrity are not compromised.

Fernaldo Torres (Admin User)	High	High	Supporting	Similar to Cole Palmer (Regular User), but Fernando Torres will be required to perform the following additional tasks: - Provide feedback and edit functionalities related to cloud resource management and optimization during the project implementation phase. - Require users to monitor and evaluate the correctness of the optimization function when running on a real environment during the Go Live phase	Similar to Cole Palmer (Regular User)
Matt Liu (Legal Counsel)	High	Medium	Neutral	Engage with legal counsel early in key decisions about data handling, user privacy, and regulatory compliance. Afterward, send Matt Liu a brief monthly report on the portal's functions, performance, and data collection. Schedule formal consultations with legal counsel at each project milestone to proactively manage legal risks and confirm all compliance requirements are met.	If potential risks or non-compliance issues arise from the project, a formal meeting will be held immediately. The project team, including the Project Manager, will meet with the Legal Department to discuss and resolve the matter. The agenda for this meeting must be in writing and signed by all attendees. If a solution cannot be found, the issue will be escalated to the Board of Directors of Monash University for a final decision and risk evaluation.

6. Reflections

6.1 Group Reflection

Our team had eight weeks to collaborate on developing a Project Management Plan to address IT-related issues. In the beginning, we adopted a leaderless structure to promote autonomy and equal participation. However, this resulted in a difficulty reaching consensus, prolonging our discussions and slowing down our progress. Without a clear decision-maker, meetings often became unfocused and repetitive. To address this, Cong was elected as our team leader. He is responsible for setting agendas, work divisions, facilitating meetings, and making final decisions, which significantly improved our workflow and helped us move forward efficiently and with clarity.

We also implemented a support system where each task had a primary owner and a backup. If the primary member faced delays, the supporter would step in to assist or take over. This ensured continuity and fairness across the project lifecycle. To maintain transparency, we agreed that any member who received support would take on additional responsibilities in future tasks. This approach fostered accountability and trust and helped balance contributions across the team.

Our communication was managed through weekly meetings for major topics requiring consensus, WhatsApp for quick updates, and Google Docs comments for contextual feedback. This multi-channel strategy allowed us to tailor communication to urgency and content type, improving responsiveness and reducing misunderstandings. It also helped us stay connected despite our different schedules and workloads.

The most persistent challenge was scheduling conflicts due to our varied academic commitments. We felt frustrated and anxious during the early phase, as the lack of structure made it hard to progress. After leadership and support roles were defined, we felt more confident and motivated. The clarity in responsibilities reduced stress and fostered a sense of reliability and cohesion.

Our initial inefficiencies are caused by unclear roles and decision paralysis. Electing a leader centralized accountability and improved coordination. These strategies collectively enhanced collaboration and deliverable quality. We learned that structure, mutual support, and flexible communication are essential for effective teamwork. Conflict resolution is smoother when escalation paths are predefined and respected.

In future projects, we will advocate for early leadership assignments and use a team contract to formalize expectations. We'll also propose a shared calendar and continue using layered communication tools. These steps will help foster a more resilient, inclusive, and productive team environment.

6.2 Individual Reflections

Tsz Ching James Chiang (35719176)

I am responsible for the presentation in demonstration, completion in the project charter, memo to sponsor regarding cost model, milestones, and Gantt chart. The completion of these tasks has deepened my understanding of stakeholder alignment, resource justification, and milestone planning. I learned how to clarify scope, communicate cost structures, and visualize the scope, time, and cost of a project through Gantt Chart.

Initially, I felt a mix of pressure and uncertainty. These tasks required precision and accountability, especially when presenting our plan with external stakeholders. However, as I progressed, I gained confidence in simplifying complex planning concepts into clear, actionable documents. Presenting our work reinforced my ability to output key ideas under time constraints and answering any questions from our clients enhanced my ability to communicate under pressure.

Reflecting on our project, I have contributed meaningfully to the team. My work helped anchor the team's direction and ensured our milestones were reasonable. I would assign myself an **A** grade for providing a consistent effort into the project. Similarly, our team deserves an **A+** grade for demonstrating a strong adaptability by adjusting our collaboration depending on our strength and schedules throughout the project.

This assignment has sharpened my analytical thinking ability when defining the project charter and stakeholders. And it made me realize the importance of defining a comprehensive project planning to ensure a smooth implementation and to cope with risk. Moving forward, I plan to refine my skills in project scoping and milestone definition by consulting the mentors. In addition, I'll continue practicing my ability in project management by applying it in real life projects. Aiming to become a more confident and strategic project planner.

Cong Duc Nguyen (35480025)

In this group project, I played a significant role in both planning and execution. I divided the assignment into manageable tasks and delegated responsibilities based on each team member's strengths. I also ensured the group followed set deadlines and reminded members when delays occurred. In terms of content, I completed the financial components (Cost Model, Cost Baseline, Cost–Benefit Analysis) and led the creation of the RTM and WBS. Additionally, I was the main writer for the Business Justification, Stakeholder Register, and Communication Matrix.

Taking a leadership role in organizing the workload improved the team's coordination and task clarity. Managing the financial aspects enhanced my analytical and Excel skills, while leading several written components gave me confidence in communicating in English—a language I'm still developing proficiency in.

The project was a valuable learning experience. It highlighted the importance of early planning and regular communication. Although I had prior project experience, this group task, done in English, stretched my abilities in new ways. As a team, we collaborated well, and we eventually delivered a cohesive project.

In future projects, I aim to improve in delegating responsibilities to reduce my own workload and to continue building my academic writing skills in English.

I would assign myself an A+ for consistent effort, leadership, and high-quality contributions. I would give the team a A for overall performance, adaptability, and strong collaboration.

Bhavesh Singh (35103256)

My primary contribution was shaping this project's technical vision and acting as its main presenter. Leveraging my cloud experience, I proposed the "Cloud Carbon Sense" concept and was responsible for presenting our initial pitch and Gantt chart demonstration, serving as the project's 'face' to stakeholders. My key deliverables included authoring the Scope Statement, developing the Quality Management Plan, and compiling the project schedule in ProjectLibre.

As the project's originator, I felt a strong sense of ownership and pressure to translate a complex technical idea into a clear, achievable plan. The experience of presenting our work was rewarding, as it solidified our team's collective vision and built my confidence.

The most significant learning opportunity was separating my technical expertise from the formal role of a planner. A key challenge was defining strict boundaries in the scope statement, which taught me the critical difference between what is technically possible and what is in scope. This process highlighted that a crucial skill is translating complex ideas into structured, measurable artifacts like a scope statement and quality plan.

This project solidified my understanding of how crucial formal project management is to a technical idea's success. For my contributions, I would assign myself an **A.** For our collective resilience and high-quality final output, I would assign our team an **A+**, as the result wouldn’t have been as strong without the entire team’s effort. Moving forward, I will focus on refining my requirements-gathering skills to better bridge the gap between technical and non-technical stakeholders.

Rongze Ma (35286288)

My primary contributions included collaborating with teammates on project selection and drafting a memo along with a summary for senior Monash executives. This involved preparing key sections for project initiation, such as Executive Summary, Project Description, and Strategic Fit. I also co-developed the Requirements Traceability Matrix (RTM) with the team.

Regarding the Gantt chart, I worked with James to identify at least eight milestones. In preparation for the presentation, I developed content for the oral delivery and formulated critical questions to enhance our performance during the presentation.

For my individual tasks, I composed an initial draft of the memo, which was then reviewed by James. Additionally, I took charge of risk management by conducting risk identification, analysis, prioritization, and strategies.

For self-evaluation,I would assign myself an A grade for my contribution.Although sometimes I can’t clearly understand the content of our online meeting, I always ask other teammates to make sense after meeting.Finally, I effectively manage my several critical components of the assignments while maintaining strong collaboration with team.This experience allowed me to strengthen my skills in project documentation and analytical thinking, though I also recognized the importance of cleared early-stage communication to streamline workflows. I aim to further develop my abilities in proactive planning and cross-functional coordination to deliver even more efficient and cohesive outcomes in future projects.

I would assign our team an A+ grade for overall performance. Each member demonstrated commitment, professionalism, and responsiveness throughout the project. We effectively leveraged each strengths and integrated individual work into the final deliverable.The team showed adaptability in addressing challenges and a shared dedication to meeting quality standards and deadlines.

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8. Appendices

8.1 Work Breakdown Structure

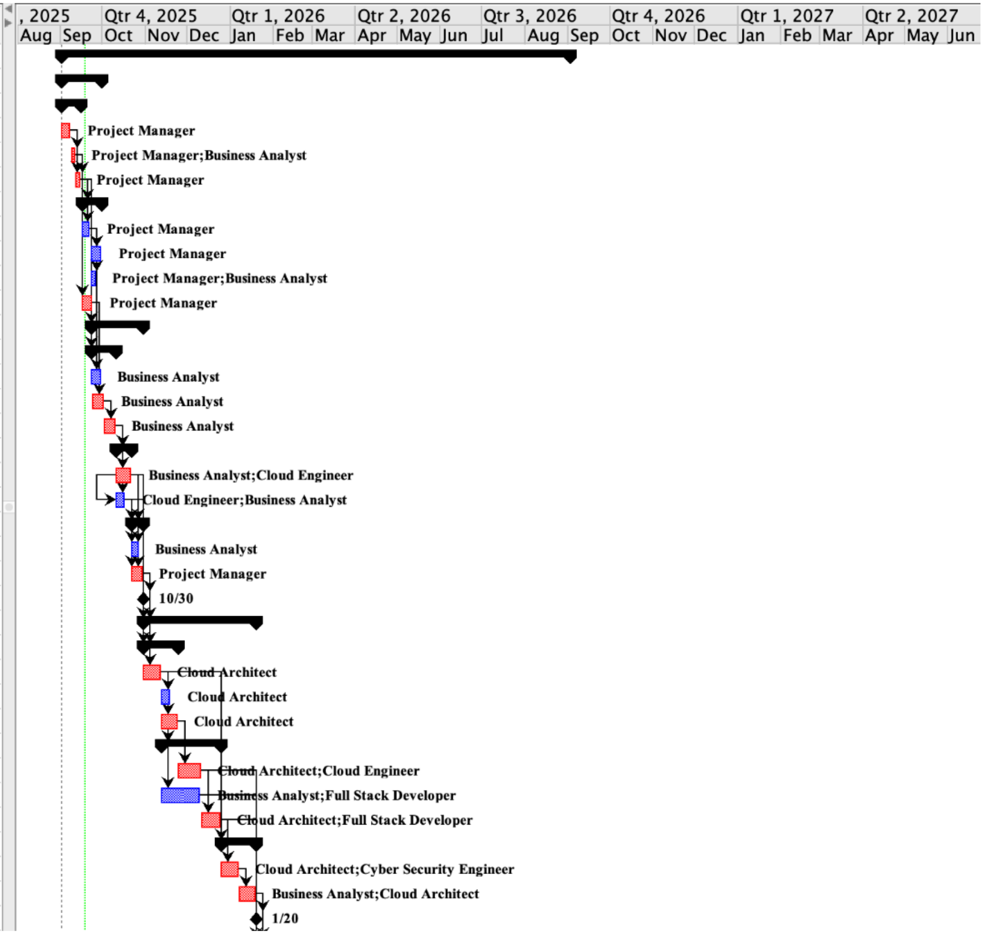
Name	Duration	Start	Finish	Predecess...	Cost	Resource Names
⊟0.0 Cloud Carbon Sense	262.23 days	**9/1/25, ...**	**9/2/26, ...**		**$302995.23**	
⊟1.0 Project Management	22 days	**9/1/25, ...**	**9/30/25,...**		**$21841.88**	
⊟1.1. Project Initiation	11 days	**9/1/25, ...**	**9/15/25,...**		**$8259.04**	
1.1.1. Project Charter Development	6 days	9/1/25, ...	9/8/25, ...		$3643.68	Project Manager
1.1.2. Stakeholder Identification & Analysis	3 days	9/9/25, ...	9/11/25,...	4	$3400.80	Project Manager;Business Analyst
1.1.3. Project Kick-off Meeting	2 days	9/12/25,...	9/15/25,...	4;5	$1214.56	Project Manager
⊟1.2. Project Planning	11 days	**9/16/25,...**	**9/30/25,...**	**6**	**$13582.84**	
1.2.1. Scope Management Plan	5 days	9/16/25,...	9/22/25,...	6	$3036.40	Project Manager
1.2.2. Schedule Development	6 days	9/23/25,...	9/30/25,...	8	$3643.68	Project Manager
1.2.3. Risk Management Plan	4 days	9/23/25,...	9/26/25,...	8	$2955.44	Project Manager;Business Analyst
1.2.4. Communication Plan	6.5 days	9/16/25,...	9/24/25,...	5	$3947.32	Project Manager
⊟2.0 Requirements collection and analysis	27.25 days	**9/23/25,...**	**10/30/2...**	**6**	**$27920.96**	
⊟2.1. Requirements gathering	13.75 days	**9/23/25,...**	**10/10/2...**	**6**	**$9236.92**	
2.1.1. Investigate existing documents and systems	5.3 days	9/23/25,...	9/30/25,...	8	$2789.50	Business Analyst
2.1.2. Client Survey	6 days	9/24/25,...	10/2/25,...	11	$3157.92	Business Analyst
2.1.3. Client Interview	6.25 days	10/2/25,...	10/10/2...	15	$3289.50	Business Analyst
⊟2.2. Requirements analysis	7.5 days	**10/10/2...**	**10/22/2...**	**16**	**$13461.40**	
2.2.1. Functional requirements analysis	7.5 days	10/10/2...	10/22/2...	16	$9109.20	Business Analyst;Cloud Engineer
2.2.2. Non-functional requirements analysis	5 days	10/10/2...	10/17/2...	16;18SS	$4352.20	Cloud Engineer;Business Analyst
⊟2.3. Requirements Validation	6 days	**10/22/2...**	**10/30/2...**	**18;19**	**$5222.64**	
2.3.1. RTM Development	3 days	10/22/2...	10/27/2...	18;19	$1578.96	Business Analyst
2.3.2. Requirements Review	6 days	10/22/2...	10/30/2...	18;19	$3643.68	Project Manager
M1: Requirements Approved by Client Product Owner	0 days	10/30/2...	10/30/2...	22	$0.00	
⊟3.0 System design	57.66 days	**10/30/2...**	**1/19/26,...**	**18;19;22**	**$70383.17**	
⊟3.1. Architecture Design	17.33 days	**10/30/2...**	**11/24/2...**	**18;19;22**	**$17307.00**	
3.1.1. High-Level Architecture	8.83 days	10/30/2...	11/12/2...	22	$6792.04	Cloud Architect
3.1.2. Technology Stack Selection	5.17 days	11/12/2...	11/19/2...	26	$3976.76	Cloud Architect
3.1.3. Infrastructure Design	8.5 days	11/12/2...	11/24/2...	26	$6538.20	Cloud Architect
⊟3.2. Detailed System Design	31.17 days	**11/12/2...**	**12/25/2...**	**26**	**$35017.05**	
3.2.1. Database Design	12.67 days	11/24/2...	12/11/2...	28	$10643.00	Cloud Architect;Cloud Engineer
3.2.2. User Interface Design	20.83 days	11/12/2...	12/10/2...	26	$15062.45	Business Analyst;Full Stack Developer
3.2.3. API Design	10 days	12/11/2...	12/25/2...	30	$9311.60	Cloud Architect;Full Stack Developer
⊟3.3. Security & Compliance Design	17.66 days	**12/25/2...**	**1/19/26,...**	**26**	**$18059.13**	
3.3.1. Security Architecture	8.83 days	12/25/2...	1/7/26, ...	32	$9565.72	Cloud Architect;Cyber Security Engineer
3.3.2. Privacy & Compliance Design	8.83 days	1/7/26, ...	1/19/26,...	34	$8493.41	Business Analyst;Cloud Architect
M2: System Architecture Approved by Software Architect	0 days	1/19/26,...	1/19/26,...	35	$0.00	

Name	Duration	Start	Finish	Predecess...	Cost	Resource Names
⊟4.0 Implementation	107.99 days	1/19/26,...	6/18/26,...	30;31;32;...	$106513.38	
⊟4.1. Core Platform Development	107.99 days	1/19/26,...	6/18/26,...	30;31;32;...	$87023.05	
⊟4.1.1. Collection Engine	36.66 days	1/19/26,...	3/11/26,...	30;31;32;...	$25012.48	
4.1.1.1. Cloud Provider Integration	15.83 days	1/19/26,...	2/10/26,...	30;31;3...	$13627.64	Cloud Engineer;Full Stack Developer
4.1.1.2. Data Processing Pipeline	20.83 days	2/10/26,...	3/11/26,...	40	$11384.84	Full Stack Developer
⊟4.1.2. Analytics Engine	42 days	3/11/26,...	5/8/26, ...	41	$22955.52	
4.1.2.1. Carbon Calculation Module	26.67 days	3/11/26,...	4/17/26,...	41	$14576.76	Full Stack Developer
4.1.2.2. Predictive Analytics Module	15.33 days	4/17/26,...	5/8/26, ...	43	$8378.76	Full Stack Developer
⊟4.1.3. Optimization Engine	29.33 days	5/8/26, ...	6/18/26,...	44	$19471.80	
4.1.3.1. Optimization Option Calculation	15 days	5/8/26, ...	5/29/26,...	44	$11639.60	Cloud Engineer;Full Stack Developer
4.1.3.2. Recommendations Module	14.33 days	5/29/26,...	6/18/26,...	46	$7832.20	Full Stack Developer
4.1.4. Database Implement	15 days	3/11/26,...	4/1/26, ...	41	$8198.40	Full Stack Developer
4.1.5. Core API Implementation	20.83 days	4/1/26, ...	4/30/26,...	48	$11384.84	Full Stack Developer
M3: Core modules Completion Sign-Off by Project Manage	0 days	4/30/26,...	4/30/26,...	49	$0.00	
⊟4.2. Dashboard & User Interface	19.83 days	4/30/26,...	5/28/26,...	49	$19490.33	
4.2.1. Landing page	4 days	4/30/26,...	5/6/26, ...	49	$2186.24	Full Stack Developer
4.2.2. Department and operational Dashboards	15.83 days	5/6/26, ...	5/28/26,...	52	$8652.04	Full Stack Developer
4.2.3. Student Dashboards	15.83 days	5/6/26, ...	5/28/26,...	52	$8652.04	Full Stack Developer
M4: Functional Prototype UAT Approved by Client Product	0 days	5/28/26,...	5/28/26,...	54	$0.00	
⊟5.0 Testing and quality assurance	36 days	5/28/26,...	7/17/26,...	49;54	$52530.56	
⊟5.1. Unit & Component Testing	10 days	5/28/26,...	6/11/26,...	49	$17915.20	
5.1.1. Backend Component Testing	10 days	5/28/26,...	6/11/26,...	49	$7591.20	Automation Test Analyst;Full Stack Developer
5.1.2. Frontend Component Testing	10 days	5/28/26,...	6/11/26,...	54	$10324.00	Full Stack Developer;Automation Test Analyst
⊟5.2. Integration Testing	14 days	6/11/26,...	7/1/26, ...	58;59	$14453.60	
5.2.1. Internal System Integration	8 days	6/11/26,...	6/23/26,...	58;59	$8259.20	Full Stack Developer;Automation Test Analyst
5.2.2. External System Integration	6 days	6/23/26,...	7/1/26, ...	61	$6194.40	Full Stack Developer;Automation Test Analyst
⊟5.3. Performance & Security Testing	18 days	6/23/26,...	7/17/26,...	61	$20161.76	
5.3.1. Load & Performance Testing	6 days	6/23/26,...	7/1/26, ...	61	$4129.44	DevOps Engineer
⊟5.3.2. Security Testing	10 days	7/1/26, ...	7/15/26,...	64	$7287.20	
5.3.2.1. Vulnerability scanning	4 days	7/1/26, ...	7/7/26, ...	64	$2914.88	Penetration Tester
5.3.2.2. Web and API Pentest	6 days	7/7/26, ...	7/15/26,...	66	$4372.32	Penetration Tester
⊟5.3.3. User Acceptance Testing	18 days	6/23/26,...	7/17/26,...	61	$8745.12	
5.3.3.1. UAT Planning	10 days	6/23/26,...	7/7/26, ...	61	$4858.40	Automation Test Analyst
5.3.3.2. Execution	8 days	7/7/26, ...	7/17/26,...	69	$3886.72	Automation Test Analyst
M5: Performance & Security Testing Approved by Software /	0 days	7/17/26,...	7/17/26,...	70	$0.00	

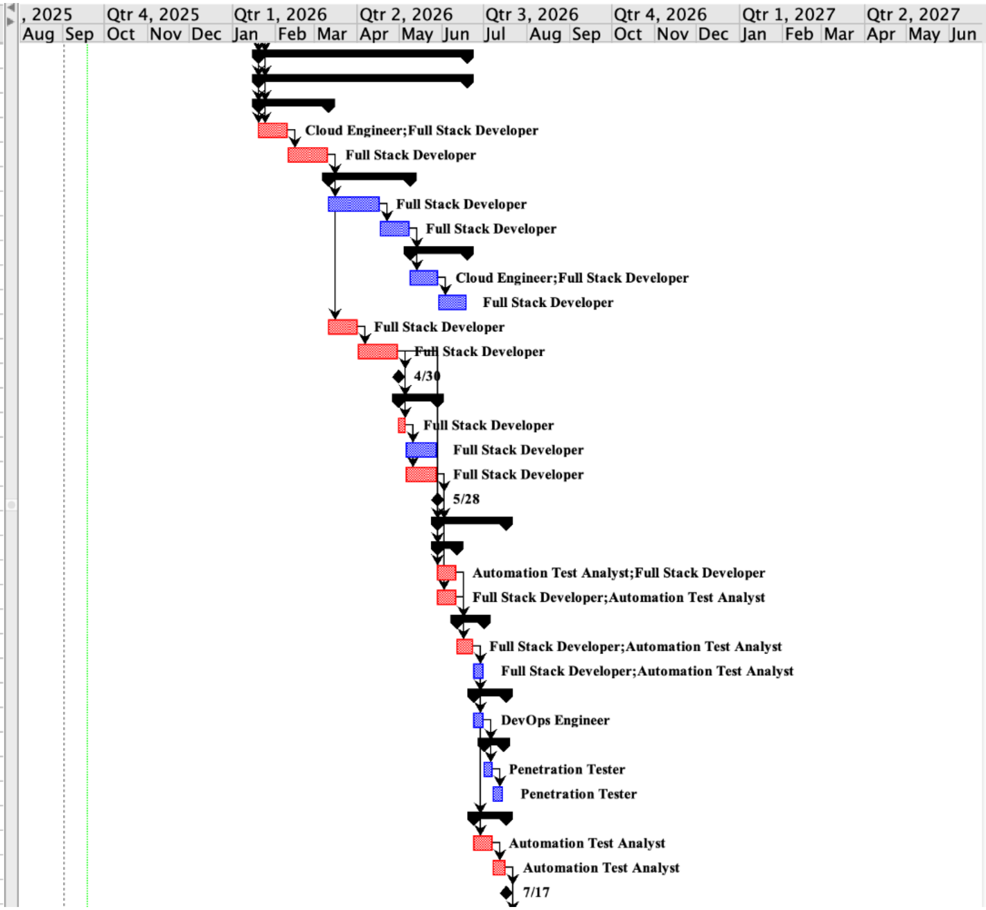
Name	Duration	Start	Finish	Predecess...	Cost	Resource Names
⊟6.0 Deployment	16 days	**7/17/26,...**	**8/10/26,...**	**70**	$10202.24	
⊟6.1. Production Environment Setup	12 days	**7/17/26,...**	**8/4/26, ...**	**70**	$8258.88	
6.1.1. Infrastructure Provisioning	8 days	7/17/26,...	7/29/26,...	70	$5505.92	Cloud Engineer
6.1.2. Application Deployment	4 days	7/29/26,...	8/4/26, ...	74	$2752.96	DevOps Engineer
⊟6.2. Go Live	4 days	**8/4/26, ...**	**8/10/26,...**	**75**	$1943.36	
6.2.1. Final test in production environment	4 days	8/4/26, ...	8/10/26,...	75	$1943.36	Automation Test Analyst
M6: Go-Live Approved by Client Product Sponsor	0 days	8/10/26,...	8/10/26,...	77	$0.00	
⊟7.0 Project Closure and Handover	17 days?	**8/10/26,...**	**9/2/26, ...**	**77**	$13603.04	
⊟7.1. Training Program	9 days	**8/10/26,...**	**8/21/26,...**	**77**	$5222.64	
7.1.1. Training Documents Creation	3 days	8/10/26,...	8/13/26,...	77	$1578.96	Business Analyst
7.1.2. Training Program Design	1 day	8/13/26,...	8/14/26,...	81	$526.32	Business Analyst
⊟7.1.3. Training Workshop	5 days	**8/14/26,...**	**8/21/26,...**	**82**	$3117.36	
7.1.3.1. Administration workshop	3 days	8/14/26,...	8/19/26,...	82	$2064.72	Cloud Engineer
7.1.3.2. User workshop	2 days	8/19/26,...	8/21/26,...	84	$1052.64	Business Analyst
M7: Training Workshop Completed and Approved by Pr(	0 days	8/21/26,...	8/21/26,...	85	$0.00	
⊟7.2. Handover Program	6 days?	**8/21/26,...**	**8/31/26,...**	**84;85**	$4129.44	
7.2.1. Transfer owner (system, accounts)	1 day	8/21/26,...	8/24/26,...	85	$688.24	Cloud Engineer
7.2.2. Production Support 24/7 (in 1 week)	5 days?	8/24/26,...	8/31/26,...	88	$3441.20	DevOps Engineer
⊟7.3. Project Closure Process	17 days	**8/10/26,...**	**9/2/26, ...**	**77**	$4250.96	
⊟7.3.1. Prepare project closure documents	5 days	**8/10/26,...**	**8/17/26,...**	**77**	$3036.40	
7.3.1.1. Project report covering objectives, deliverables	2 days	8/10/26,...	8/12/26,...	77	$1214.56	Project Manager
7.3.1.2. Project lessons learned and best practices	2 days	8/12/26,...	8/14/26,...	92	$1214.56	Project Manager
7.3.1.3. Financial closure report	1 day	8/14/26,...	8/17/26,...	93	$607.28	Project Manager
⊟7.3.2. Archive and close project	2 days	**8/31/26,...**	**9/2/26, ...**	**89;94**	$1214.56	
7.3.2.1. Archive all project artefacts, testing results, anc	1 day	8/31/26,...	9/1/26, ...	89;94	$607.28	Project Manager
7.3.2.2. Release project resources and formally close th	1 day	9/1/26, ...	9/2/26, ...	96	$607.28	Project Manager
M8: Handover Completion Sign-Off Completed	0 days	9/2/26, ...	9/2/26, ...	97	$0.00	

8.2 Gantt Chart

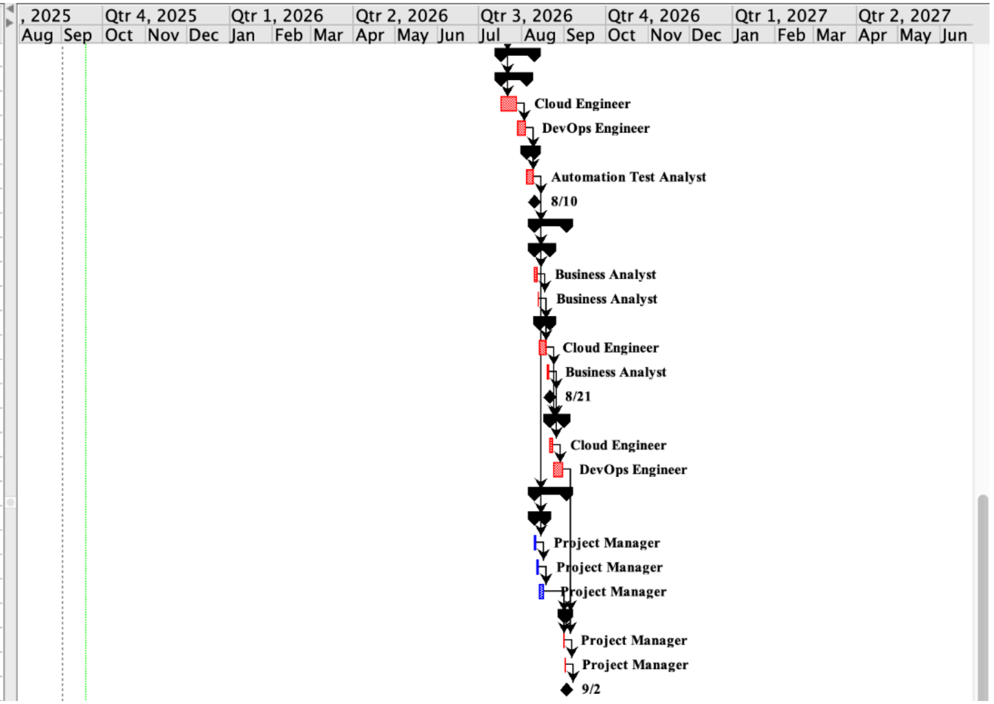
Name	Duration	Start	Finish	Predecess...
⊟0.0 Cloud Carbon Sense	262.23 days	9/1/25, ...	9/2/26, ...	
⊟1.0 Project Management	22 days	9/1/25, ...	9/30/25,...	
⊟1.1. Project Initiation	11 days	9/1/25, ...	9/15/25,...	
1.1.1. Project Charter Development	6 days	9/1/25, ...	9/8/25, ...	
1.1.2. Stakeholder Identification & Analysis	3 days	9/9/25, ...	9/11/25,...	4
1.1.3. Project Kick-off Meeting	2 days	9/12/25,...	9/15/25,...	4;5
⊟1.2. Project Planning	11 days	9/16/25,...	9/30/25,...	6
1.2.1. Scope Management Plan	5 days	9/16/25,...	9/22/25,...	6
1.2.2. Schedule Development	6 days	9/23/25,...	9/30/25,...	8
1.2.3. Risk Management Plan	4 days	9/23/25,...	9/26/25,...	8
1.2.4. Communication Plan	6.5 days	9/16/25,...	9/24/25,...	5
⊟2.0 Requirements collection and analysis	27.25 days	9/23/25,...	10/30/2...	6
⊟2.1. Requirements gathering	13.75 days	9/23/25,...	10/10/2...	6
2.1.1. Investigate existing documents and systems	5.3 days	9/23/25,...	9/30/25,...	8
2.1.2. Client Survey	6 days	9/24/25,...	10/2/25,...	11
2.1.3. Client Interview	6.25 days	10/2/25,...	10/10/2...	15
⊟2.2. Requirements analysis	7.5 days	10/10/2...	10/22/2...	16
2.2.1. Functional requirements analysis	7.5 days	10/10/2...	10/22/2...	16
2.2.2. Non-functional requirements analysis	5 days	10/10/2...	10/17/2...	16;18SS
⊟2.3. Requirements Validation	6 days	10/22/2...	10/30/2...	18;19
2.3.1. RTM Development	3 days	10/22/2...	10/27/2...	18;19
2.3.2. Requirements Review	6 days	10/22/2...	10/30/2...	18;19
M1: Requirements Approved by Client Product Owner	0 days	10/30/2...	10/30/2...	22
⊟3.0 System design	57.66 days	10/30/2...	1/19/26,...	18;19;22
⊟3.1. Architecture Design	17.33 days	10/30/2...	11/24/2...	18;19;22
3.1.1. High-Level Architecture	8.83 days	10/30/2...	11/12/2...	22
3.1.2. Technology Stack Selection	5.17 days	11/12/2...	11/19/2...	26
3.1.3. Infrastructure Design	8.5 days	11/12/2...	11/24/2...	26
⊟3.2. Detailed System Design	31.17 days	11/12/2...	12/25/2...	26
3.2.1. Database Design	12.67 days	11/24/2...	12/11/2...	28
3.2.2. User Interface Design	20.83 days	11/12/2...	12/10/2...	26
3.2.3. API Design	10 days	12/11/2...	12/25/2...	30
⊟3.3. Security & Compliance Design	17.66 days	12/25/2...	1/19/26,...	26
3.3.1. Security Architecture	8.83 days	12/25/2...	1/7/26, ...	32
3.3.2. Privacy & Compliance Design	8.83 days	1/7/26, ...	1/19/26,...	34
M2: System Architecture Approved by Software Architect	0 days	1/19/26,...	1/19/26,...	35



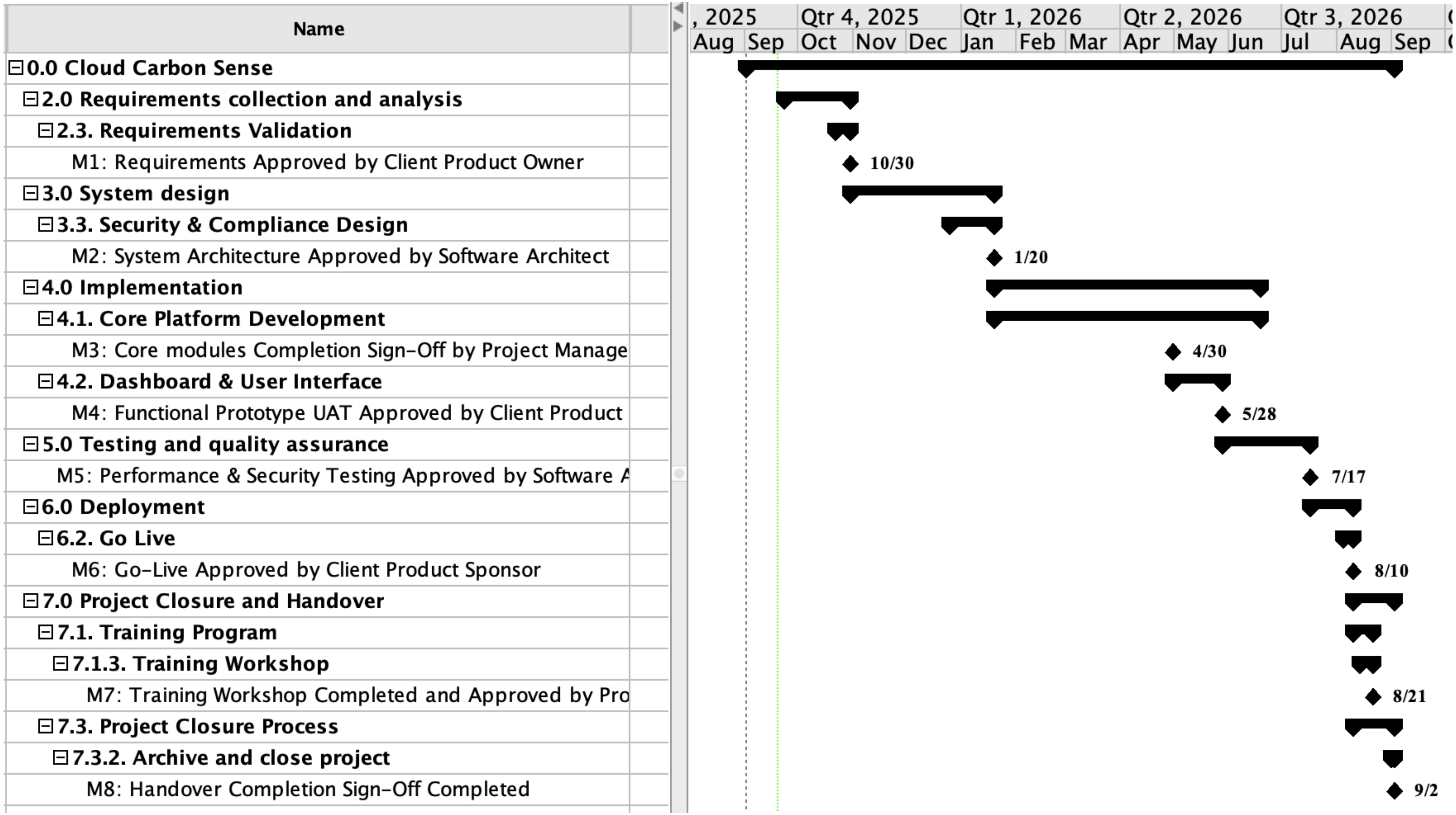
Name	Duration	Start	Finish	Predecess...
⊟4.0 Implementation	107.99 days	1/19/26,...	6/18/26,...	30;31;32;...
⊟4.1. Core Platform Development	107.99 days	1/19/26,...	6/18/26,...	30;31;32;...
⊟4.1.1. Collection Engine	36.66 days	1/19/26,...	3/11/26,...	30;31;32;...
4.1.1.1. Cloud Provider Integration	15.83 days	1/19/26,...	2/10/26,...	30;31;3...
4.1.1.2. Data Processing Pipeline	20.83 days	2/10/26,...	3/11/26,...	40
⊟4.1.2. Analytics Engine	42 days	3/11/26,...	5/8/26, ...	41
4.1.2.1. Carbon Calculation Module	26.67 days	3/11/26,...	4/17/26,...	41
4.1.2.2. Predictive Analytics Module	15.33 days	4/17/26,...	5/8/26, ...	43
⊟4.1.3. Optimization Engine	29.33 days	5/8/26, ...	6/18/26,...	44
4.1.3.1. Optimization Option Calculation	15 days	5/8/26, ...	5/29/26,...	44
4.1.3.2. Recommendations Module	14.33 days	5/29/26,...	6/18/26,...	46
4.1.4. Database Implement	15 days	3/11/26,...	4/1/26, ...	41
4.1.5. Core API Implementation	20.83 days	4/1/26, ...	4/30/26,...	48
M3: Core modules Completion Sign-Off by Project Managei	0 days	4/30/26,...	4/30/26,...	49
⊟4.2. Dashboard & User Interface	19.83 days	4/30/26,...	5/28/26,...	49
4.2.1. Landing page	4 days	4/30/26,...	5/6/26, ...	49
4.2.2. Department and operational Dashboards	15.83 days	5/6/26, ...	5/28/26,...	52
4.2.3. Student Dashboards	15.83 days	5/6/26, ...	5/28/26,...	52
M4: Functional Prototype UAT Approved by Client Product (	0 days	5/28/26,...	5/28/26,...	54
⊟5.0 Testing and quality assurance	36 days	5/28/26,...	7/17/26,...	49;54
⊟5.1. Unit & Component Testing	10 days	5/28/26,...	6/11/26,...	49
5.1.1. Backend Component Testing	10 days	5/28/26,...	6/11/26,...	49
5.1.2. Frontend Component Testing	10 days	5/28/26,...	6/11/26,...	54
⊟5.2. Integration Testing	14 days	6/11/26,...	7/1/26, ...	58;59
5.2.1. Internal System Integration	8 days	6/11/26,...	6/23/26,...	58;59
5.2.2. External System Integration	6 days	6/23/26,...	7/1/26, ...	61
⊟5.3. Performance & Security Testing	18 days	6/23/26,...	7/17/26,...	61
5.3.1. Load & Performance Testing	6 days	6/23/26,...	7/1/26, ...	61
⊟5.3.2. Security Testing	10 days	7/1/26, ...	7/15/26,...	64
5.3.2.1. Vulnerability scanning	4 days	7/1/26, ...	7/7/26, ...	64
5.3.2.2. Web and API Pentest	6 days	7/7/26, ...	7/15/26,...	66
⊟5.3.3. User Acceptance Testing	18 days	6/23/26,...	7/17/26,...	61
5.3.3.1. UAT Planning	10 days	6/23/26,...	7/7/26, ...	61
5.3.3.2. Execution	8 days	7/7/26, ...	7/17/26,...	69
M5: Performance & Security Testing Approved by Software A	0 days	7/17/26,...	7/17/26,...	70



Name	Duration	Start	Finish	Predecess...
⊟6.0 Deployment	16 days	**7/17/26,...**	**8/10/26,...**	**70**
⊟6.1. Production Environment Setup	12 days	**7/17/26,...**	**8/4/26, ...**	**70**
6.1.1. Infrastructure Provisioning	8 days	7/17/26,...	7/29/26,...	70
6.1.2. Application Deployment	4 days	7/29/26,...	8/4/26, ...	74
⊟6.2. Go Live	4 days	**8/4/26, ...**	**8/10/26,...**	**75**
6.2.1. Final test in production environment	4 days	8/4/26, ...	8/10/26,...	75
M6: Go-Live Approved by Client Product Sponsor	0 days	8/10/26,...	8/10/26,...	77
⊟7.0 Project Closure and Handover	17 days?	**8/10/26,...**	**9/2/26, ...**	**77**
⊟7.1. Training Program	9 days	**8/10/26,...**	**8/21/26,...**	**77**
7.1.1. Training Documents Creation	3 days	8/10/26,...	8/13/26,...	77
7.1.2. Training Program Design	1 day	8/13/26,...	8/14/26,...	81
⊟7.1.3. Training Workshop	5 days	**8/14/26,...**	**8/21/26,...**	**82**
7.1.3.1. Administration workshop	3 days	8/14/26,...	8/19/26,...	82
7.1.3.2. User workshop	2 days	8/19/26,...	8/21/26,...	84
M7: Training Workshop Completed and Approved by Pro	0 days	8/21/26,...	8/21/26,...	85
⊟7.2. Handover Program	6 days?	**8/21/26,...**	**8/31/26,...**	**84;85**
7.2.1. Transfer owner (system, accounts)	1 day	8/21/26,...	8/24/26,...	85
7.2.2. Production Support 24/7 (in 1 week)	5 days?	8/24/26,...	8/31/26,...	88
⊟7.3. Project Closure Process	17 days	**8/10/26,...**	**9/2/26, ...**	**77**
⊟7.3.1. Prepare project closure documents	5 days	**8/10/26,...**	**8/17/26,...**	**77**
7.3.1.1. Project report covering objectives, deliverables,	2 days	8/10/26,...	8/12/26,...	77
7.3.1.2. Project lessons learned and best practices	2 days	8/12/26,...	8/14/26,...	92
7.3.1.3. Financial closure report	1 day	8/14/26,...	8/17/26,...	93
⊟7.3.2. Archive and close project	2 days	**8/31/26,...**	**9/2/26, ...**	**89;94**
7.3.2.1. Archive all project artefacts, testing results, and	1 day	8/31/26,...	9/1/26, ...	89;94
7.3.2.2. Release project resources and formally close the	1 day	9/1/26, ...	9/2/26, ...	96
M8: Handover Completion Sign-Off Completed	0 days	9/2/26, ...	9/2/26, ...	97

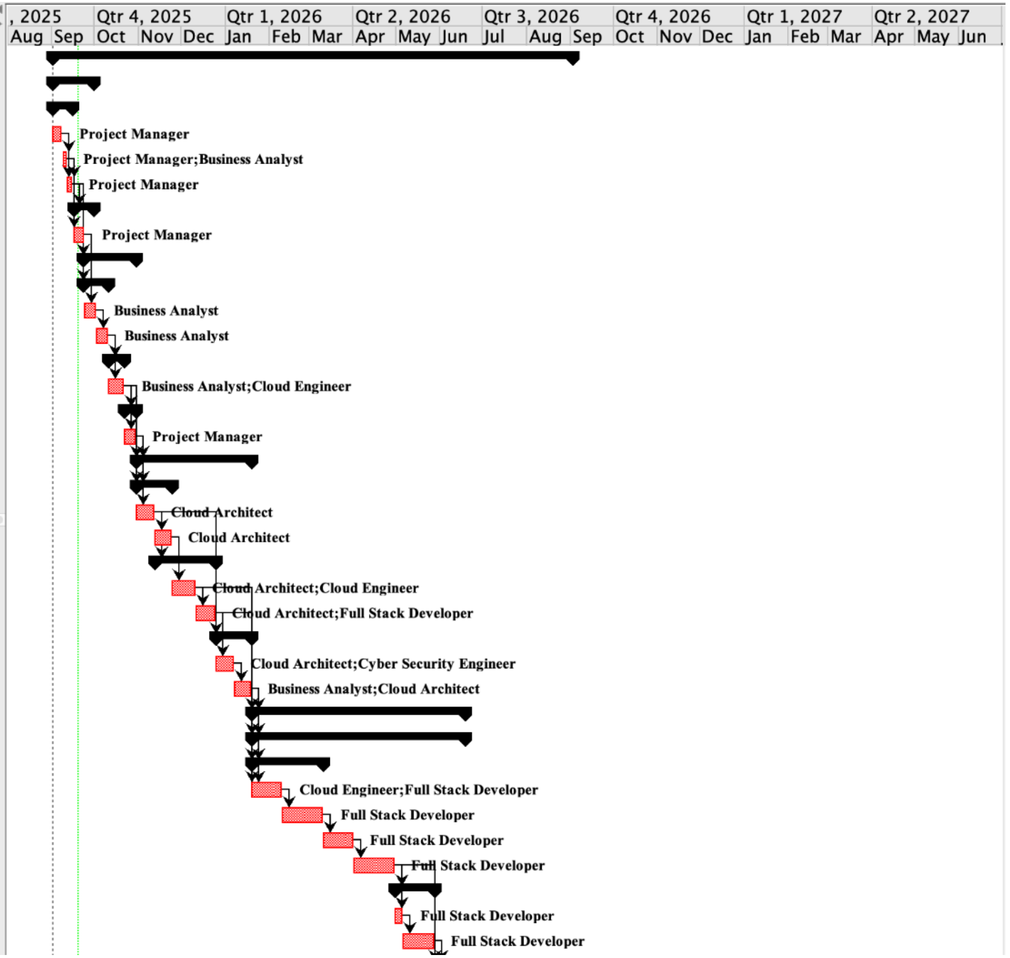


8.3 Milestones

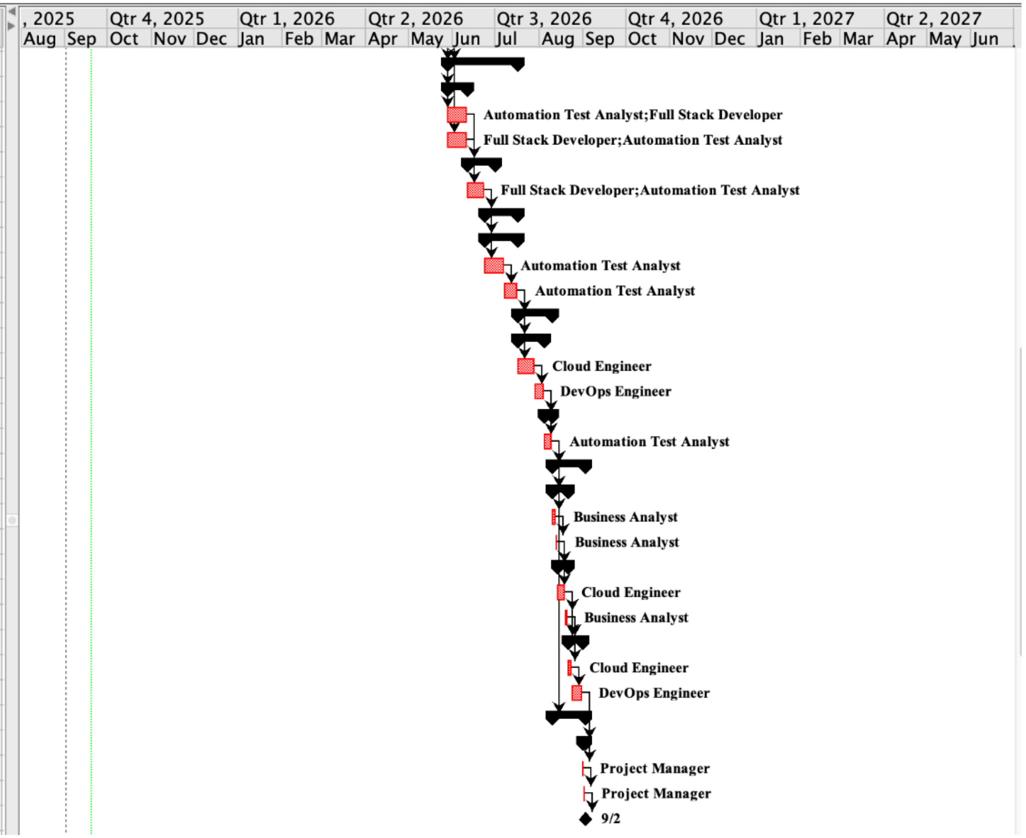


8.4 Critical path

Name	Duration	Start	Finish
⊟0.0 Cloud Carbon Sense	262.23 days?	9/1/25, ...	9/2/26, ...
⊟1.0 Project Management	22 days	9/1/25, ...	9/30/25,...
⊟1.1. Project Initiation	11 days	9/1/25, ...	9/15/25,...
1.1.1. Project Charter Development	6 days	9/1/25, ...	9/8/25, ...
1.1.2. Stakeholder Identification & Analysis	3 days	9/9/25, ...	9/11/25,...
1.1.3. Project Kick-off Meeting	2 days	9/12/25,...	9/15/25,...
⊟1.2. Project Planning	11 days	9/16/25,...	9/30/25,...
1.2.4. Communication Plan	6.5 days	9/16/25,...	9/24/25,...
⊟2.0 Requirements collection and analysis	27.25 days	9/23/25,...	10/30/2...
⊟2.1. Requirements gathering	13.75 days	9/23/25,...	10/10/2...
2.1.2. Client Survey	6 days	9/24/25,...	10/2/25,...
2.1.3. Client Interview	6.25 days	10/2/25,...	10/10/2...
⊟2.2. Requirements analysis	7.5 days	10/10/2...	10/22/2...
2.2.1. Functional requirements analysis	7.5 days	10/10/2...	10/22/2...
⊟2.3. Requirements Validation	6 days	10/22/2...	10/30/2...
2.3.2. Requirements Review	6 days	10/22/2...	10/30/2...
⊟3.0 System design	57.66 days	10/30/2...	1/19/26,...
⊟3.1. Architecture Design	17.33 days	10/30/2...	11/24/2...
3.1.1. High-Level Architecture	8.83 days	10/30/2...	11/12/2...
3.1.3. Infrastructure Design	8.5 days	11/12/2...	11/24/2...
⊟3.2. Detailed System Design	31.17 days	11/12/2...	12/25/2...
3.2.1. Database Design	12.67 days	11/24/2...	12/11/2...
3.2.3. API Design	10 days	12/11/2...	12/25/2...
⊟3.3. Security & Compliance Design	17.66 days	12/25/2...	1/19/26,...
3.3.1. Security Architecture	8.83 days	12/25/2...	1/7/26, ...
3.3.2. Privacy & Compliance Design	8.83 days	1/7/26, ...	1/19/26,...
⊟4.0 Implementation	107.99 days	1/19/26,...	6/18/26,...
⊟4.1. Core Platform Development	107.99 days	1/19/26,...	6/18/26,...
⊟4.1.1. Collection Engine	36.66 days	1/19/26,...	3/11/26,...
4.1.1.1. Cloud Provider Integration	15.83 days	1/19/26,...	2/10/26,...
4.1.1.2. Data Processing Pipeline	20.83 days	2/10/26,...	3/11/26,...
4.1.4. Database Implement	15 days	3/11/26,...	4/1/26, ...
4.1.5. Core API Implementation	20.83 days	4/1/26, ...	4/30/26,...
⊟4.2. Dashboard & User Interface	19.83 days	4/30/26,...	5/28/26,...
4.2.1. Landing page	4 days	4/30/26,...	5/6/26, ...
4.2.3. Student Dashboards	15.83 days	5/6/26, ...	5/28/26,...



Name	Duration	Start	Finish
⊟5.0 Testing and quality assurance	36 days	5/28/26,...	7/17/26,...
⊟5.1. Unit & Component Testing	10 days	5/28/26,...	6/11/26,...
5.1.1. Backend Component Testing	10 days	5/28/26,...	6/11/26,...
5.1.2. Frontend Component Testing	10 days	5/28/26,...	6/11/26,...
⊟5.2. Integration Testing	14 days	6/11/26,...	7/1/26, ...
5.2.1. Internal System Integration	8 days	6/11/26,...	6/23/26,...
⊟5.3. Performance & Security Testing	18 days	6/23/26,...	7/17/26,...
⊟5.3.3. User Acceptance Testing	18 days	6/23/26,...	7/17/26,...
5.3.3.1. UAT Planning	10 days	6/23/26,...	7/7/26, ...
5.3.3.2. Execution	8 days	7/7/26, ...	7/17/26,...
⊟6.0 Deployment	16 days	7/17/26,...	8/10/26,...
⊟6.1. Production Environment Setup	12 days	7/17/26,...	8/4/26, ...
6.1.1. Infrastructure Provisioning	8 days	7/17/26,...	7/29/26,...
6.1.2. Application Deployment	4 days	7/29/26,...	8/4/26, ...
⊟6.2. Go Live	4 days	8/4/26, ...	8/10/26,...
6.2.1. Final test in production environment	4 days	8/4/26, ...	8/10/26,...
⊟7.0 Project Closure and Handover	17 days?	8/10/26,...	9/2/26, ...
⊟7.1. Training Program	9 days	8/10/26,...	8/21/26,...
7.1.1. Training Documents Creation	3 days	8/10/26,...	8/13/26,...
7.1.2. Training Program Design	1 day	8/13/26,...	8/14/26,...
⊟7.1.3. Training Workshop	5 days	8/14/26,...	8/21/26,...
7.1.3.1. Administration workshop	3 days	8/14/26,...	8/19/26,...
7.1.3.2. User workshop	2 days	8/19/26,...	8/21/26,...
⊟7.2. Handover Program	6 days?	8/21/26,...	8/31/26,...
7.2.1. Transfer owner (system, accounts)	1 day	8/21/26,...	8/24/26,...
7.2.2. Production Support 24/7 (in 1 week)	5 days?	8/24/26,...	8/31/26,...
⊟7.3. Project Closure Process	17 days	8/10/26,...	9/2/26, ...
⊟7.3.2. Archive and close project	2 days	8/31/26,...	9/2/26, ...
7.3.2.1. Archive all project artefacts, testing results, an	1 day	8/31/26,...	9/1/26, ...
7.3.2.2. Release project resources and formally close t	1 day	9/1/26, ...	9/2/26, ...
M8: Handover Completion Sign-Off Completed	0 days	9/2/26, ...	9/2/26, ...



9. Team Working Agreement

Team Name: GoGreen

Team Number: 1311

Applied Class/Tutor Name: Applied 13 / Dr Monoar Hossain & Dr Anthony Wong & Liza Khwaja

Date Agreement Created: 15/08/2025

9.1 Team Member Details and Assigned Roles

(Use roles like Facilitator, Scheduler, Recorder, QA Lead)

Name	Student ID	Role	Preferred Contact
Cong Duc Nguyen	35480025	Scheduler	0402898998
Rongze Ma	35286288	Recorder	0414610720
Tsz Chiang James	35719176	QA Lead	0413559384
Bhavesh Singh	35103256	Facilitator	0433239169

9.2 Shared Team Purpose and Objectives

Our common goal is to come up with a high-quality project proposal that meets the requirements of this assignment. As a team, we value learning and applying knowledge from the Project Management course not only to complete the assignment but also to apply it in practice in the IT industry later.

We hope to take advantage of each member's individual strengths to build a complete, professional project proposal, fully applying the equipped knowledge and achieving the highest possible results.

9.3 Ways of Working (Working Methods)

We agree to collaborate using:

- Google Workspace is the primary platform for messaging, file storage, and team meetings.
- Google Meet / Zoom or in-person meetings as needed to review key points or have in-depth discussions.
- Weekly team meetings on Monday 12 pm. Ad hoc meetings can be scheduled based on workload.
- Google Sheets to divide and track work, responsibilities, and deadlines.
- Version management via Google Docs with sequential naming ("Project_Charter_James_v1.docx").
- Backup plans include assigning at least 2 people to each task (1 primary and 1 backup). The goal is to complete the sub-team's work if someone is unavailable, with 48 hours' notice if possible.

9.4 Communication Management

Communication will be managed through the following channels:

- Primary Communication: WhatsApp group chat for quick updates.
- Secondary Communication: University email (for formal document reviews and submissions).
- Expected response time: 12–24 hours maximum for task-related chats.
- If a team member is unresponsive for more than 2 days without notice, we will escalate to the team leader.
- Key deadlines and deliverables will be followed using Trello reminders, and any missed updates must be flagged during weekly meetings.

9.5 Conflict Management and Escalation

To manage conflict, we agree to:

- Openly discuss issues in the weekly meeting instead of letting them build up.
- Use closed-loop feedback: listen, confirm understanding, and then respond.
- Unacceptable behaviors include: blaming, ignoring messages, and taking credit for others' work.
- The escalation path will begin with peer resolution. If unresolved, the issue will be escalated to the Team Leader. If further action is needed, we'll consult the class tutor.

9.6 Team Values and Ground Rules

Agreed behaviors include:

- Respect deadlines for assigned tasks. Proactively communicate at least 24 hours in advance if a task cannot be completed on time.
- Join meetings on time (join Meeting 5 minutes in advance)
- Prepare documents for meetings in advance and send them to other teammates at least 15 minutes in advance to keep the meeting focused and effective.
- Share your progress at least once in the meeting.
- Give and receive feedback respectfully and constructively.
- Avoid multitasking in team meetings and stay on topic.
- Respect each team member's individual working style and strengths.

9.7 Risk and Commitment Assessment

Known Risks:

- Illness or emergencies affecting availability
- Workload clashes from other units
- Miscommunication due to tech/platform lags

Backup Plans:

- Assign a deputy member per task to monitor deadlines.
- All members commit to stepping in when needed with sufficient notice.

Commitment:

- Each member has reviewed the workload and agreed to attend meetings, meet deadlines, and contribute to the final draft equally. Our goal is to divide the tasks fairly by skill and interest, and support each other when priorities shift unexpectedly.

9.8 Leadership and Decision-Making Model

Team Leader: Cong Duc Nguyen

Responsibilities: Set weekly meeting agendas, manage task board deadlines, ensure document version control, and interface with the tutor if required.
Decision-Making Style: We will use consensus for major project decisions. If a tie or disagreement occurs, the team leader facilitates with input from all before deciding on the best path forward.

9.9 Stakeholder Awareness (External Dependencies)

Key stakeholders include:

- Applied Tutors/Lecturers: provide clarifying and evaluative feedback. We expect consultative interactions, particularly to validate assumptions and receive feedback.
- Monash Teaching Team.
- Students in the same Applied class, in the same subject.

9.10 Agreement Sign-Off

We agree to this working model and will review it as needed. Breaches will be managed as a team or escalated to the tutor if unresolved.

Name	Signature	Date
Cong Duc Nguyen	[illegible]	11/08/2025
Rongze Ma	Rongze Ma	11/08/2025
Tsz Ching James Chiang	James Chiang	11/8/2025
Bhavesh Singh	[illegible]	11/08/2025

10. GenAI Declaration

We confirm that this is our original work. We have used ChatGPT solely to help improve the clarity and expression of our writing.