AIRWAYS

Auckland Air Traffic Control Tower Replacement

November 2024

AIRWAYS

Contents

1. Executive Summary

The Auckland Air Traffic Control (ATC) Tower, constructed in the mid-1960s, has reached the end of its operational life due to aging infrastructure, limited functionality and ongoing maintenance challenges. The current tower is also situated on land slated for redevelopment by Auckland International Airport Limited (Auckland Airport). Recognising these issues, Airways conducted an industry consultation in late 2022 to explore replacement options.

1.1 Initial Consultation Outcomes

The initial consultation outlined three options for replacing the current tower. After analysis and consideration, Airways on balance selected the Hybrid tower option, combining a new conventional tower for the current runway with digital capabilities for the future northern runway, and digital contingency. The intention behind this approach was to allow for a gradual transition to digital technology while maintaining operational safety and efficiency.

Airways stated that they would carry out further due diligence on digital towers by deploying and assessing the digital contingency as a primary facility before proceeding with the construction of the conventional tower. The purpose of this evaluation was to determine whether a transition to a 'Fully Digital' option would be a feasible and more advantageous approach.

1.2 Preferred option is now to proceed directly to a physical tower

Detailed analysis of the options now suggests the construction of a new 45-metre conventional ATC tower offers the most reliable, cost-effective, and lowest-risk solution for Auckland Airport's current runway operations. The investment cost of $40.6 million reflects feasibility studies and customer and stakeholder input. This approach maintains the flexibility to integrate future digital capabilities and supports long-term operational efficiency and safety.

Airways' preferred approach aligns with the current runway solution as part of the 'Hybrid tower' option selected in 2022. This solution would address the limitations of the current tower, mitigate safety risks, and provide flexibility for future digital advancements.

1.3 Key Developments and Challenges

Since the initial consultation, several key developments have influenced Airways' approach:

1. **Site Limitations**: Two potential sites were identified for the digital contingency tower, but one site's visibility constraints compromised safety and operational capacity. The other site was reserved for a future conventional tower if the digital solution proved unfeasible.
2. **Cost Implications**: The costs associated with developing a digital contingency tower to primary tower standards increased significantly, making it comparable to a full digital solution.
3. **Operational Impacts**: The construction of Pier A1 will obstruct critical views from the current contingency tower, impacting safety and requiring an alternative solution before 2026.

1.4 Other Options Considered

Airways has considered a range of options and is conscious that customers and stakeholders may have a range of views about the best approach.

Alternative options assessed are:

- **Delay Construction:** Deferring the construction of the new tower for five to six years would lead to higher replacement costs, estimated at $50.7 million, while requiring an additional $6.5 million for remedial work to extend the current tower's lifespan. This approach introduces substantial risks due to aging infrastructure, visibility constraints, and increased maintenance requirements, compromising long-term operational efficiency and safety. Additionally, the cost estimates are based on feasibility studies and could change due to location complexities.
- **Fully Digital Tower:** Implementing a fully digital tower at Auckland Airport introduces regulatory and transition risks, given the lack of proven examples in similar high-capacity environments globally. The strategic work on digital towers does not recommend single site installations, notes higher operational costs, including frequent equipment replacements and skill specialisations. Furthermore, the scale of Auckland Airport's current and projected operations exceeds any operating unit globally.
- **70-metre Conventional Tower:** Constructing a 70-metre conventional tower presents the longest implementation timeline and higher overall project costs. The proposed tower would have been designed to control both the current and future northern runway operations. However, since there is no firm timeline or established requirements for the northern runway's development, investing in this asset carries significant risks.

2. Purpose of this consultation

The purpose of this consultation is to seek feedback from customers and stakeholders on a revised option for the replacement of the current ATC tower. Considering new developments and feedback from the previous consultation, Airways has re-evaluated its approach and identified a preferred solution.

This consultation aims to:

- Provide clarity on the updated project objectives and outline the preferred approach for replacing the aging ATC tower.
- Present customers and stakeholders with a revised option and its associated impacts, costs, and benefits.
- Gather feedback to ensure the proposed solution aligns with the needs and expectations of the aviation industry and other key stakeholders.
- Offer transparency in decision-making by addressing concerns raised during the previous consultation and in light of new information.

The input gathered through this consultation will inform Airways' final decision on the replacement of the Auckland ATC Tower and the chosen implementation strategy.

3. Background

3.1 Tower

The current Auckland ATC Tower (**Current Tower**), constructed in the mid-1960s, is reaching the end of its operational life and requires replacement. Over time, the Current Tower has become increasingly outdated, physically constrained, costly to maintain, and located in an area designated for redevelopment by AIAL.

3.2 Initial Consultation

3.2.1 Options

An industry consultation was undertaken in September/October 2022 which put forward options that effectively addressed three separate issues:

1. Current Primary ATC Tower Operations
2. Future Northern Runway Operations
3. Contingency Operations

The consultation identified three options:

- **Replacement conventional tower:** A new tower structure, around 70 metres high, which would enable conventional service for both the existing runway and the proposed northern runway. Contingency would be a remote digital tower.
- **Hybrid Tower:** This is an approximate 35-metre-high conventional tower for controlling the current runway, with future digital capability for controlling the proposed northern runway. Contingency would be a remote digital tower.
- **Full Digital Solution:** Digital camera masts at the airport with controllers working positions remotely. This would provide service for the southern runway initially, with the capability and size capacity for expansion for the proposed northern runway when that is built and commissioned.

3.2.2 Selected Option

Airways confirmed in December 2022 that it would pursue the following option:

> *Airways will proceed with its proposal to implement a **Hybrid tower** at Auckland Airport, supported by a digital contingency tower.*

3.2.3 Approach & Decision Point

Airways' initial plan was to postpone the construction of a conventional tower for the current runway until after the deployment of the digital contingency tower. This approach aimed to provide Airways with an opportunity to thoroughly evaluate the feasibility of a digital tower in Auckland, with the flexibility to transition to a full digital solution (without the construction of a Hybrid Tower) if it proved viable. If the digital tower was not deemed successful, this strategy would also allow Airways to delay the capital investment in the conventional tower for as long as possible. The decision point for this evaluation was projected for July 2024.

This was included in the Industry Consultation Response Document:

> *As stated in the Consultation Document, as our confidence and experience builds with the undertaking of the digital contingency tower validation there will be a review carried out prior to construction commencing on the Hybrid tower. This review will provide an opportunity to consider whether*
>
> *(1) to proceed with the current plan to construct the hybrid tower and digital contingency facility, or*
>
> *(2) go with a full digital primary tower facility (along with the digital contingency facility).*

4. Key Developments

Since the initial consultation in 2022, Airways has been advancing the design of the 'Hybrid tower' and the associated digital contingency tower. During this process, several key developments have impacted the feasibility of the initial plan to deploy the digital contingency first, conduct a trial, and then decide whether to proceed with the Hybrid tower or transition to a fully digital solution. This approach faced challenges related to site limitations, increased costs, and operational constraints, prompting a re-evaluation.

- **Site Limitations:** Two potential sites were identified for the Hybrid tower and digital contingency tower. However, constructing a digital mast on one of the sites introduced visibility issues that could compromise safety and operational capacity, as it obstructed key areas of the runway and other critical zones. The other site, while more suitable for visibility, needed to remain reserved for the construction of the new conventional tower, should the digital solution prove unfeasible. This limitation restricted the flexibility of the original plan and introduced significant risks to future tower development.
- **Cost Implications:** To validate the Full Digital Solution, the digital contingency tower would need to meet the same standards, significantly raising its cost. Initially, the Hybrid ATC Tower with a digital contingency tower was estimated at $45.8 million and $10.2 million, respectively. However, further design work and procurement revealed that upgrading the digital contingency tower to Full Digital specifications would increase its cost to $37 million, bringing the total close to the estimated $34.6 million for a Full Digital Solution in 2022. If the Full Digital approach proved unsuitable, a conventional ATC tower would still be needed, creating the most expensive scenario at a combined cost of $80.4 million. Current projections estimate $40.2 million for a new conventional ATC tower and $37 million for the digital contingency tower, totalling $77.2 million.
- **Operational Impacts:** The construction of new terminal infrastructure, specifically Pier A1, will obstruct visibility from the current contingency tower, rendering it inoperable due to the loss of critical runway views. This development requires Airways to act before Pier A1's impact in 2026. Given the cost, site limitations, and the complexity of deploying New Zealand's first digital tower at its largest and busiest aerodrome, it is not considered feasible to implement a digital solution within this timeframe.

For more detailed information please refer to Appendix A.

5. Preferred Option

Airways' preferred approach is to construct a new approximately 45 metre conventional ATC tower to replace the aging current tower and provide a long-term solution for Auckland Airport. This new conventional tower is intended to serve the current runway only, aligning with the Hybrid tower option selected in the previous consultation. The height has been adjusted due to the location available and Auckland Airport's infrastructure plan.

5.1 Rationale

5.1.1 Previous Approach

As outlined in Section 4 *Key Developments*, several significant factors have influenced the delivery of our proposed approach since December 2022. This has limited our ability to deploy the digital contingency first, which was a key factor in building our confidence in digital and consider changing away from the selected option for the current runway.

Additionally, Auckland Airport's current and projected capacity exceeds that of any digital tower currently in operation globally. Given the scale, it is not considered prudent for New Zealand's largest aerodrome to be the first to adopt a digital tower.

5.1.2 Current Tower

Although the current tower remains structurally sound, it has exceeded its intended lifespan through multiple extensions. Its aging infrastructure now presents significant limitations, including a confined working environment and an outdated design that hampers the integration of modern technologies, impacting the comfort and effectiveness of air traffic controllers. Additionally, ongoing construction activities around the tower are leading to restricted visibility, which not only compromises current operational efficiency but could also limit future capacity growth.

Several wellbeing concerns require increased attention, with future interventions likely to be more complex and costly to ensure compliance. These necessary efforts also carry the risk of service disruptions or performance degradation.

As the tower ages, the likelihood of unplanned maintenance increases, particularly in high-risk areas, increasing the potential for operational disruption. While current ergonomic and environmental conditions are within acceptable standards, substantial upgrades will be needed in the long term to maintain efficiency and support staff wellbeing.

A 2023 review of site options for the Hybrid tower identified that Auckland Airport's new terminal pier (Pier A1) would further impact visibility from the current tower site. In the short term, this risk can be mitigated by adjusting ATC procedures, including increased separation standards, and using technology. Auckland Airport is designing Pier A1's roofline to maximize visibility, and implementing additional measures such as controllable stop bars, intermediate hold points, and CCTV cameras to improve situational awareness. Additionally, adjustments to certain areas of responsibility are being explored to enable controllers to maintain efficient traffic movement. While these measures provide a workable short-term solution, they are not sufficient to ensure long-term operational growth.

Considering these challenges, Airways considers that it is necessary to take a proactive approach to ensure the continued safe and efficient operation of New Zealand's largest airport.

For more detailed information please refer to Appendix B.

5.2 Cost

The option preferred by Airways proposes an investment of $40.6m in capital for the 45m New Conventional Tower. Through significant work, this cost has been reduced from the 2022 industry consultation estimates of $45.8m. This spend is spread across three pricing periods, as shown below.

The cost estimates for the proposed ATC Tower are based on feasibility work conducted by Airways in conjunction with an external Quantity Surveyor. These estimates reflect current assumptions about the site, access, and potential congestion due to other airport construction. Any adjustments will be addressed through the design and procurement processes, where the final design and construction approach will be established. Should further challenges arise, Airways intend to work closely with Auckland Airport to ensure alignment and project success.

The Auckland tower replacement is not forecast to be completed until FY29 and, as set out in the Airways Pricing Framework, would not enter our pricing asset base until then.

For more detailed information please refer to Appendix D.

5.3 Auckland Airport Interdependencies

The following key dependencies with Auckland Airport have been identified:

Defined Polygon and Site Location: Auckland Airport has actively participated in discussions with Airways since early 2022 to identify a suitable site within the defined 'Polygon'. This area was identified as the optimal location for the new tower to meet both operational and regulatory requirements, considering existing and planned construction as well as the overall airport layout. Auckland Airport is committed to maintaining the defined area as a viable and clear space during the planning and construction phases of the new ATC Tower.

Future Protection: Auckland Airport will play a key role in ensuring the long-term protection of the new tower site. As the holder of an aerodrome operator certificate, Auckland Airport will manage and prevent any construction or activity within the aerodrome or surrounding areas under its authority that could impact the operation of electronic or visual navigation aids, or air traffic service facilities. Auckland Airport is also responsible for ensuring that any tower, including a temporary one, is optimally situated to provide maximum visibility, protection from glare and noise, and is safeguarded from future developments that could compromise these conditions.

Proximity to Existing Facilities and Projects: Auckland Airport recognises that the proposed tower site is close to critical facilities, such as the Honeypot and transitional waste areas, which require continuous access. Auckland Airport is committed to maintaining this access throughout the construction period and working with Airways to minimise any potential impacts on the tower's construction progress.

Pier A1 Construction Activities: Given the ongoing construction of Pier A1, Auckland Airport will continue to manage and address any potential conflicts or interference between the Pier A1 project and the current or new ATC Tower. Auckland Airport is responsible for keeping Airways informed with regular updates on the Pier A1 construction schedule and any emerging issues that may arise.

Underground Services and Infrastructure: Auckland Airport acknowledges that the design for the proposed ATC Tower is still in its early stages, and the specific underground services required are yet to be fully detailed. Auckland Airport will work with Airways to ensure alignment in planning the necessary services and delivering the required infrastructure to support both the new tower and the existing airport facilities.

Constructability Assessment: Auckland Airport has emphasised the importance of conducting a constructability assessment once the design and construction

methods for the new ATC Tower are confirmed. The airport will facilitate this assessment to manage safety risks, staging areas, and access effectively throughout the construction phase.

Cost Implications and Risk Management: Auckland Airport acknowledges that the proximity of the proposed tower site to Pier A1 could introduce additional risks and costs, such as the potential need for off-site prefabrication. Auckland Airport remains open to providing ongoing support and sharing its experience in managing costs and risks in complex construction environments.

Collaboration on Sequencing and Techniques: Auckland Airport and Airways will continue to work closely together on the sequencing, construction techniques, and timing throughout the development and construction phases to achieve aligned and efficient project outcomes.

5.4 Conclusion

After a thorough assessment of Auckland Airport's air traffic management requirements, Airways has determined that building a new physical air traffic control (ATC) tower now is the most reliable and lowest-risk solution. The existing tower has surpassed its intended lifespan, with aging infrastructure posing significant challenges to safety, operational efficiency, and the integration of modern technologies.

As stated in Section 4 *Key Developments – Site Limitations*, there is only one suitable site for the construction of a new tower that meets the operational and regulatory requirements. This site, while accessible through Airways' current compound, shares a road that will be heavily utilised during the construction of Pier A1. Delaying the construction to mitigate this risk was considered as part of that option, as noted in the analysis of alternative options below.

While digital towers present innovative possibilities, it has now become clear that the cost of constructing a new physical tower is comparable to that of implementing a fully digital solution. Additionally, a conventional tower provides a proven, resilient option to maintain high safety standards and support the wellbeing of air traffic controllers, ensuring minimal risk and reliable service delivery.

Importantly, this approach does not preclude future advancements. Should the rest of the country transition to digital towers, the new physical tower can still serve as a mast for mounting cameras and sensors, supporting a hybrid or fully digital setup if needed. This flexibility allows Airways to adapt to evolving technologies without compromising current safety and operational efficiency.

For these reasons, Airways' preliminary view is that building a physical ATC tower offers the lowest risk, the most cost-effective, and future-proof solution to maintaining safe, efficient, and adaptable air traffic management at Auckland Airport.

6. Other Options Considered

Airways has considered a number of other options, which are summarised below to assist customers and stakeholders to understand how Airways has approached the preferred option and to enable informed feedback on our preferred option.

6.1 Delay Construction

Auckland Airport signalled that the land occupied by the current tower needed to be returned by 2028. However, this deadline has now been extended to 2035, creating a small window to delay construction, and the associated expenditure. However this comes with numerous challenges and risks.

6.1.1 Construction Escalation Costs

The alternative option of deferring the construction for five to six years would result in higher overall costs, as the estimated expense to replace the tower is projected to rise to $50.7 million.

For more detailed information please refer to Appendix D.

6.1.2 Tower Life Extension

An estimated additional $6.5 million would be required for remedial work on the current tower, part of which was identified during the 2023 seismic review. Additional work includes necessary refurbishments, building services upgrades, and increased maintenance to extend the tower's operational life.

The initial cost estimates are based on feasibility work and could change as further complexities are uncovered, making delay an increasingly high-risk option. Investing heavily in an asset with a limited lifespan is not a sustainable strategy, especially given the expected rise in replacement costs and maintenance needs.

For more detailed information please refer to Appendix D.

6.1.3 Tower Usability

Ongoing challenges with the tower's aging infrastructure such as restricted space, outdated design and potential visibility issues would persist, impacting operational efficiency and safety.

6.1.4 Conclusion

Considering these factors, delaying the construction of a new tower would only exacerbate risks, increase costs, and compromise Airways' ability to maintain safe and efficient operations in the long term.

6.2 Previously Considered Options

6.2.1 Conventional Tower Option (70m)

- A 70-metre conventional tower, while familiar and well-established, presents the longest implementation timeline and the highest overall project costs.
- Building a 70-metre conventional tower, capable of controlling both runways, would be investing in an asset to cater for future requirements for which there is no firm date or requirements. This would therefore carry significant risks, and also tie Airways to a solution for the northern runway when it is developed.

6.2.2 Fully Digital Tower Option

- A fully digital tower solution, although potentially cost-effective in terms of initial investment, introduces significant risks due to the lack of operational experience with digital towers at major international airports in New Zealand. The absence of proven examples in similar environments makes it challenging to ensure the safety and reliability of the service at Auckland Airport, which is the country's largest and busiest airport.
- The technology, while promising, requires substantial validation and operational trials to assess its feasibility and service performance in New Zealand's unique conditions. This lack of precedent increases the risk of scope creep, additional funding requirements and unanticipated challenges in gaining regulatory approval.
- While the initial implementation cost of a digital tower as a primary service is lower than a physical tower, ongoing operational costs are expected to be higher, with more frequent lifecycle replacements required for the digital equipment.
- There is also an unproven regulatory pathway as this would be the first digital tower implementation in New Zealand. This introduces uncertainty

around the certification process and could potentially lead to delays or additional compliance requirements.

- Compounding these risks is the limited life of the existing tower, which places a critical dependency on the timely deployment of the digital tower. Should the current tower reach the end of its operational life without a viable digital replacement in place, it could jeopardize service continuity at Auckland Airport. This urgency is heightened by risks such as the unproven regulatory pathway, which could introduce delays and compliance challenges, further pressuring the project's delivery timeline.

7. Consultation Process

Airways welcomes customer and stakeholder's views and is seeking feedback on the following questions:

Question 1	**Do you have any feedback on whether the preferred option described in this paper is the right approach?**
Question 2	**Based on the information provided, do you have any other feedback for the replacement of the tower?**

Please send your submissions by email to **submissions@airways.co.nz** by **Wednesday 4 December 2024**. All submissions will be carefully considered and will inform the final decision on the Auckland Tower replacement and implementation approach.

Airways intends that an outcome will be communicated to customers and stakeholders by no later than February 2025. A paper outlining Airways' decision will be published on the Airways website, along with all submissions.

Please ensure submissions do not contain any commercially sensitive or confidential information, as they will be made public.

Appendix A: Project History and Developments

The implementation approach outlined in the 2022 Industry Consultation Response Document planned for construction of the digital contingency tower first, followed by Airways undertaking a review of the feasibility of a Full Digital Solution prior to construction commencing on the Hybrid tower.

Having undertaken significant work and further due diligence on digital solutions and considering subsequent developments, Airways now believes that the implementation approach of constructing the digital contingency tower first, is not viable.

This is discussed in further detail below:

A.1 Site Limitations

Airways and AIAL have worked collaboratively to find suitable sites for both the Hybrid tower solution and digital contingency mast. Two locations were identified that met both Airways' and AIAL's requirements:

Site 1: suitable for either a new Hybrid tower or a digital mast; or

Site 2: suitable for a digital mast only.

Constructing a digital mast (as part of the digital contingency tower) on Site 2 first (for the purpose of evaluating a Full Digital Solution) would obstruct visibility of part of Airways' area of responsibility, including the runway, from the Current Tower. Continuing with the approach of evaluating a Full Digital Solution would likely result in potential safety and therefore capacity constraints. Furthermore, Site 2 had some compromises in visibility, that while acceptable for a digital contingency tower, were not seen as acceptable for the provision of a primary ATC service. This would increase the risk that the trial would be unsuccessful. Building a digital mast on Site 1 is impractical, as it would have prevented the construction of the Hybrid tower if the Full Digital Solution proves unsuccessful as a primary tower.

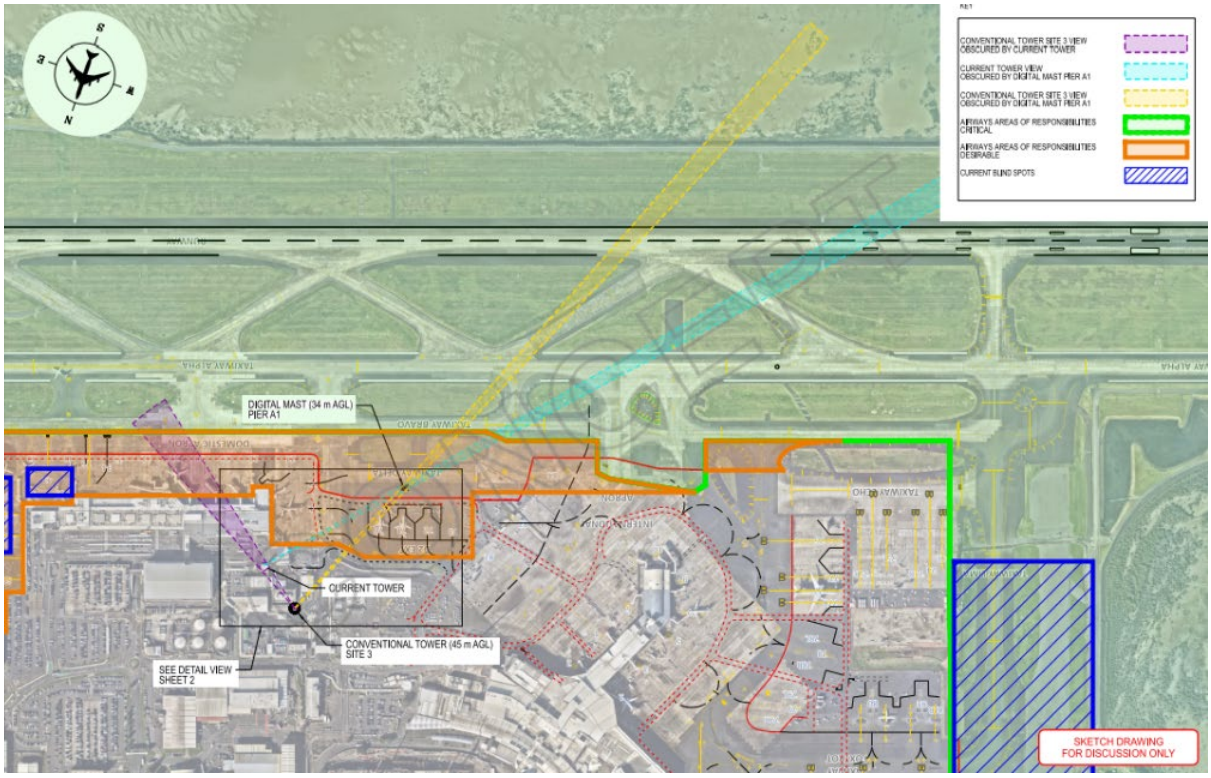

Figure 1 - Obstructions between site options

A.2 Cost Implications

To gain the assurances required for the Full Digital Solution, the digital contingency tower would need to meet the same requirements as a Full Digital Solution.

During the 2022 industry consultation, Airways identified the cost for a Hybrid ATC tower with digital contingency as:

- Hybrid ATC tower - $45.8 million
- Digital contingency - $10.2 million

Through various Request for Proposal procurements and design work, including factoring that any digital contingency tower would need to be provisioned as a Full Digital Solution, the cost of the digital contingency tower would increase from $10.2 million to approximately $37 million to prove the Full Digital Solution. This cost is in line with the cost estimate of a Full Digital Solution detailed in the 2022 industry consultation as:

- Full Digital Solution $34.6 million
- Digital contingency - $5.5 million

If the Full Digital Solution was then assessed to be unsuitable for a primary ATC service delivery, or to support the planned growth of traffic, a new conventional ATC Tower would still be required to be built. This would result in the costliest solution (New Conventional ATC Tower and Full Digital Solution)

- Hybrid ATC tower - $45.8 million
- Digital contingency $34.6 million (Built to 'primary' Full Digital Solution specifications)

Total: $80.4 million

Based on the updated cost as at today's date, this would now be reflected as:

- New Conventional ATC Tower - $40.2 million
- Digital contingency - $37.0 million (Built to 'primary' Full Digital Solution specifications)

Total: $77.2 million

A.3 New Terminal Pier (Pier A1) Impacts (Contingency Tower)

The 2023 review of site options for the Hybrid tower facilities identified that AIAL's new terminal pier (Pier A1) would impact visibility from both the Hybrid tower site and current contingency tower site. The impacts on the Current Tower site are detailed in Appendix B Current Tower Visibility. Despite working collaboratively with Auckland Airport to find a solution, the mitigations which can be achieved to reduce impact for the Current Tower do not address the more severe impacts on the current contingency tower site arrangements.

Airways' contingency tower, which is co-located in AIAL's apron tower, will have its visibility significantly impacted by the new Pier A1, as it will obstruct visibility of approximately one third of the runway. Due to the timing of construction of Pier A1, besides the logistical and financial constraints, it is not seen as viable for Airways to develop and deploy the digital contingency tower solution and gain the required approvals before the new Pier A1 is constructed and obstructs visibility.

Airways is exploring deploying a mobile contingency tower as a temporary solution while a longer-term solution is developed. This future solution may include the use of digital technologies for contingency. This mobile tower is delivered by a separate initiative and will then be deployed elsewhere in the country.

The image below highlights the areas that will no longer be visible from the Airways contingency tower following the construction of Pier A1.

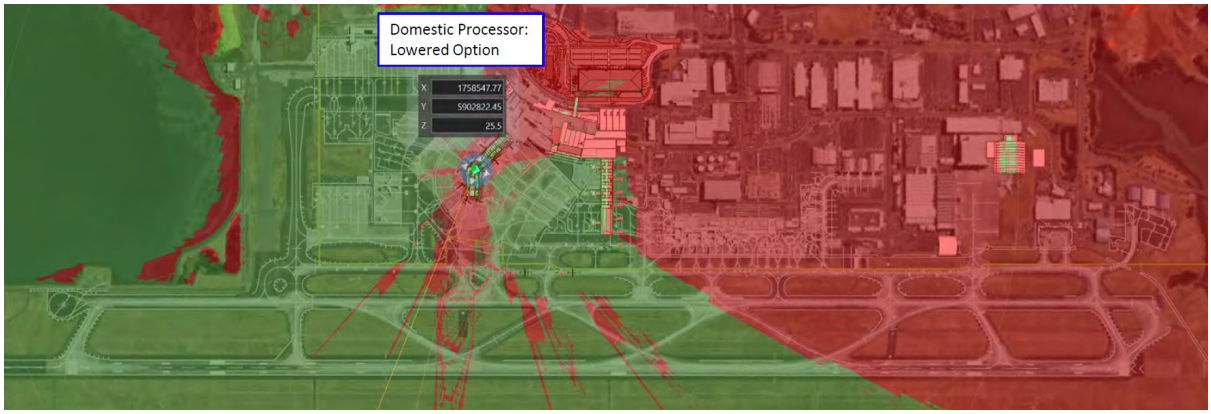

Figure 2 - Visibility from Apron Tower post Pier A1 Construction

Appendix B: Current Tower Visibility

The 2023 review of site options for the Hybrid tower identified that AIAL's new terminal pier (Pier A1) would impact visibility from the Current Tower site. In the short term, this risk can be mitigated by adjusting ATC procedures, including increased separation standards, and using technology. AIAL is designing Pier A1's roofline to provide the maximum visibility, and implementing changes such as additional controllable stop bars, intermediate hold points, and CCTV cameras to improve situational awareness. Additionally, requests have been made to adjust certain areas of responsibility to enable controllers to maintain efficient traffic movement.

While these measures offer a workable solution today, Airways does not want to constrain future growth due to potential air traffic management limitations.

B.1 Viewsheds – Current Tower

The image below highlights the areas that will no longer be visible from the Current Tower (red) following the construction of Pier A1. Please note that these images are indicative only.

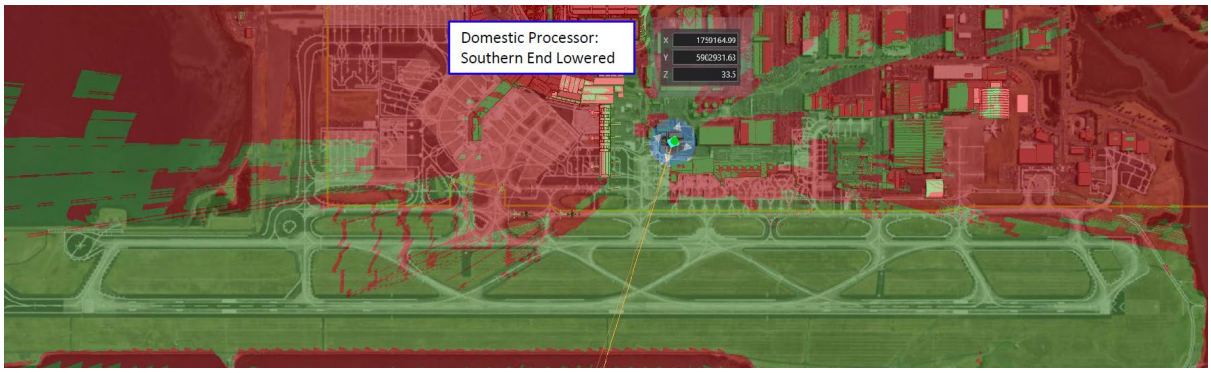

Figure 3 - Visibility from current ATC Tower post Pier A1 Construction

B.2 Viewsheds – New Conventional ATC 45m Tower

The image below highlights the areas that will be visible from the New Conventional ATC Tower, assuming a 45m height, following the construction of Pier A1. Please note that these images are indicative only.

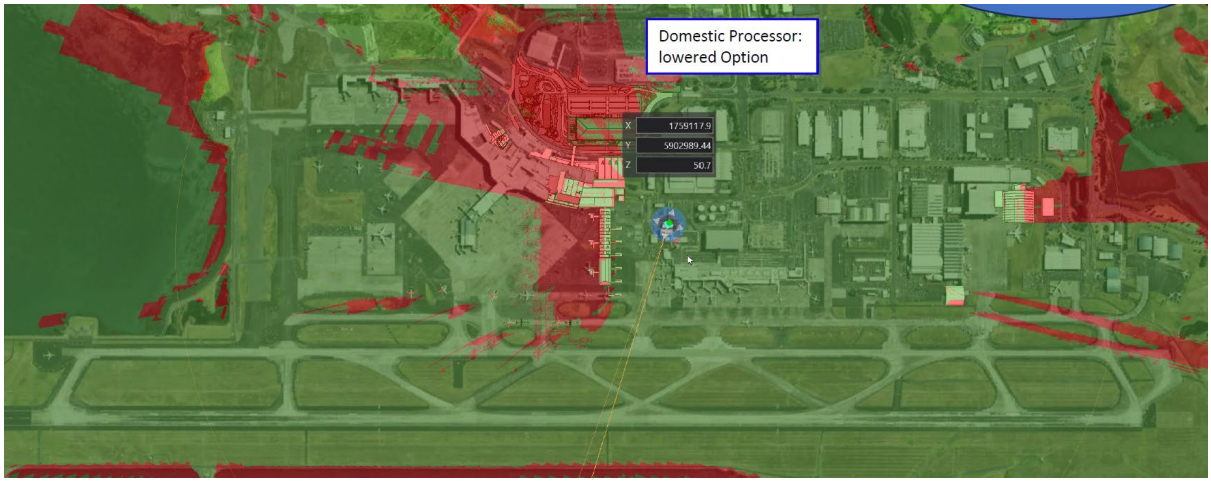

Figure 4 - Visibility from new ATC Tower post Pier A1 Construction

Appendix C: New Conventional Tower Location

C.1 Proposed location of New Conventional ATC Tower

The location of the proposed New Conventional ATC Tower is depicted below. Please note that this is for illustrative purposes only.

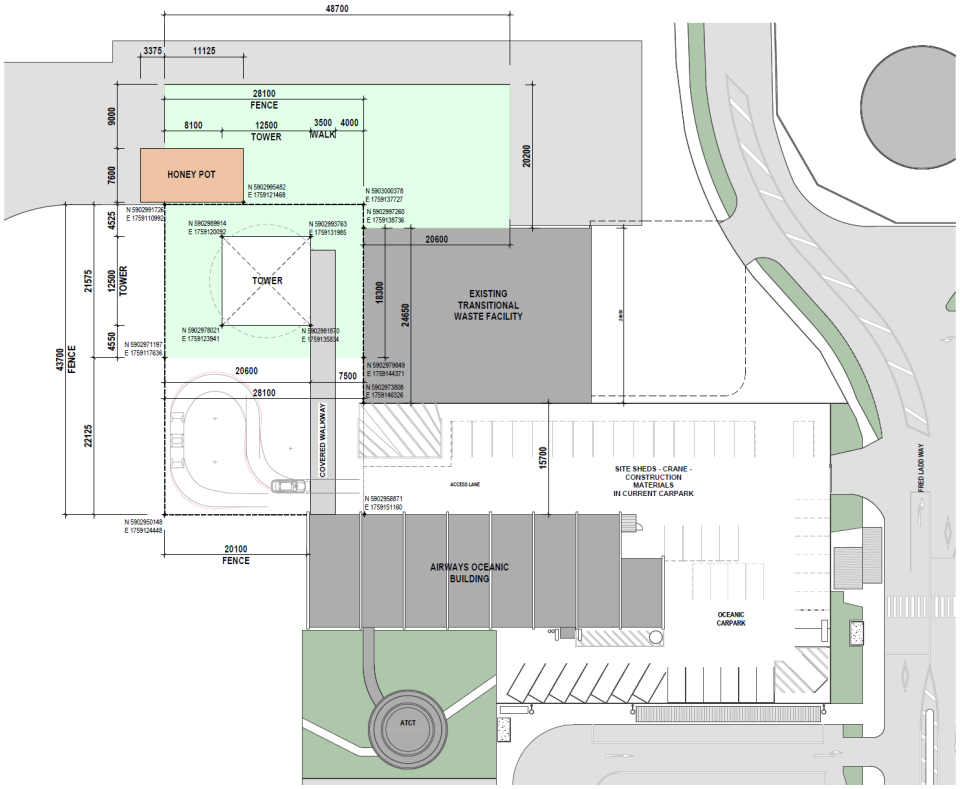

Figure 5 - Site Layout

Appendix D: Cost Forecast

The option preferred by Airways proposes an investment of $40.6m in capital for the 45m New Conventional Tower. Through significant work, this cost has been reduced from the 2022 industry consultation estimates of $45.8m. This spend is spread across three pricing periods, as shown below.

The cost estimates for the proposed ATC Tower are based on feasibility work conducted by Airways in conjunction with an external Quantity Surveyor. These estimates reflect current assumptions about the site, access, and potential congestion due to other airport construction. Any adjustments will be addressed through the design and procurement processes, where the final design and construction approach will be established. Should further challenges arise, Airways intend to work closely with Auckland Airport to ensure alignment and project success.

D.1 Option 1

Table 1 - Option 1 estimated cost by FY

$m	FY23	FY24	FY25	FY26	FY27	FY28	FY29	Total project
Auckland replacement primary tower	0.0	1.2	2.6	3.7	15.5	16.4	1.2	**40.6**
Previous Consultation	2.8	4.5	16.1	22.4	0.0	0.0	0.0	**45.8**
Variance	(2.8)	(3.3)	(13.5)	(18.7)	15.5	16.4	1.2	**-5.2**
Transition & operating costs	0.0	0.0	0.0	0.0	0.0	0.0	1.2	**1.2**

Table 2 - Option 1 estimated cost by pricing period

$m	Pricing period			Total project
	2023-2025	2026-2028	2029-2031	
Auckland replacement primary tower	3.8	35.6	1.2	**40.6**
Previous Consultation	23.4	22.4	0	**45.8**
Variance	(19.6)	13.2	1.2	**-5.2**
Transition & operating costs	0.0	0.0	1.2	**1.2**

D.2 Option 2

The alternative option involves the deferral of the construction of the New Conventional ATC Tower for 5-6 years, resulting in an increase in cost, in addition to investing more capital in the Current Tower.

The estimates include known additional work identified through the seismic review conducted in 2023.

Due to the extended life, additional work, such as refurbishment, building services equipment, etc. will likely require increased maintenance and/or replacement.

It is important to note that the initial costs are based on feasibility work only and may be subject to change due to the complexities of the location and access.

Table 3 - Option 2 estimated cost by pricing period

	Pricing period				Total project
$m	2023-2025	2026-2028	2029-2031	2032-2034	
Life Extension Cost	0.0	6.5	0.0	0.0	**6.5**
Auckland replacement primary tower	1.2	0.0	8.1	41.4	**50.7**
Previous Consultation	23.4	22.4	0	0.0	**45.8**
Variance	(19.6)	15.9	1.2	0.0	**11.4**
Transition & operating costs	0.0	0.0	1.2	0.0	**1.2**

Inflation Assumptions

Construction has been accounted for at an average annual increase of 3.7% based on external advice.

Inflationary increases for labour and other external costs have been accounted for in line with LCI/CPI.

Appendix E: Consultation Feedback and Updated Responses

Through the 2022 Industry Consultation, several responses were received. The following section examines these and provides an update to address the feedback considering the proposed change in approach:

Preference for Full Digital Solution

Feedback Source: Air New Zealand, IATA, Virgin Australia, AIAL, Qantas, BARNZ

Response from Consultation Document: The preference for a Full Digital Solution was acknowledged, with stakeholders highlighting its potential cost savings and alignment with future technological advancements.

Resolution/Explanation: To adequately evaluate as a primary service at Auckland Airport, the solution would cost circa $37m. If unsuccessful, this would result in the most expensive option and potentially limit future runway capacity. Furthermore, the cost to construct a physical tower has been able to be reduced despite its increase in height to $40.6m. Additionally, Auckland Airport's current and projected capacity exceeds that of any digital tower currently in operation globally. Given the scale, it is not considered prudent for New Zealand's largest aerodrome to be the first to adopt a digital tower.

Safety and Operational Risks of Hybrid Solution

Feedback Source: NZALPA

Feedback: NZALPA expressed concerns about the Hybrid tower's safety and 'fit for purpose' operations.

Resolution/Explanation: The concern raised was in relation to the digital components (Northern & Contingency) of the Hybrid tower. The options put forward in this document are for the development of the New Conventional Tower. Therefore, Airways consider that these concerns for a primary solution have been addressed. This consultation does not consider the solution for contingency or northern runway, nor does it consider committing Airways to requiring additional technologies to maintain the current level of service.

Conventional Tower Preferred by NZALPA

Feedback Source: NZALPA

Feedback: NZALPA preferred a conventional tower to be built to replace the Current Tower, expressing concerns about the hybrid and digital solutions' safety and regulatory compliance.

Resolution/Explanation: The 'Conventional Tower' as defined in the industry consultation was a circa 70 metre Tower capable of operating both runways.

This solution would require the tower to be significantly further back from the current runway to provide sufficient visibility of the future northern runway, which potentially could result in even greater dependency on digital solutions.

The preferred option will deliver an approximately 45 metre New Conventional Tower. The options for digital contingency and the solution for the Northern Runway will be considered under a broader Digital Aerodrome Services strategy to be developed. This is not considered part of this consultation.

Support for Hybrid Tower

Feedback Source: NZAA and some staff

Feedback: NZAA were supportive in principle of the Hybrid tower approach and willing to engage further on strategy development in the digital domain. Some staff noted low buy-in for options other than the conventional tower but found a digital contingency tower acceptable under certain conditions.

Resolution/Explanation: This feedback is in alignment with the preferred approach, and industry stakeholders have been involved in the development of the Digital Aerodrome Services strategy.

Extend Current Tower

Feedback Source: Air New Zealand, BARNZ and another airline

Feedback: Air New Zealand requested further engagement with AIAL to look at a lease extension to provide additional time to investigate the possibility of a Full Digital Solution implementation prior to committing to a physical tower build.

Resolution/Explanation: Airways have engaged with AIAL and performed engineering assessments of the structure. It is possible to continue to use the Current Tower until 2035, when the land is required for AIAL's development of Pier A2.

Airways conducted Digital Aerodrome Services workshops with industry partners, facilitated by a third party. Based on their insights, Airways is now considering a future strategy for digital aerodrome services, but it is unlikely Airways would move to digital services for main trunk in the foreseeable future.

In addition, the combination of financial, logistical, timing, and operational concerns detailed in this document, mean it is not seen as viable for Airways to deploy a digital tower for use as the primary service at Auckland. For those reasons, Airways does not consider that deferring the construction of a new physical tower to further investigate a Full Digital Solution is the right approach, but welcome any further feedback on this question.

Staff Shortages

Feedback Source: NZALPA

Feedback: NZALPA noted insufficient staff to proceed with any option.

Resolution/Explanation: The requirement to replace the Current Tower is driven by external factors, as well as a strong view from Auckland Tower staff. The proposed New Conventional Tower is viewed as the lowest impacting option to staff in relation to training, procedure development, etc.