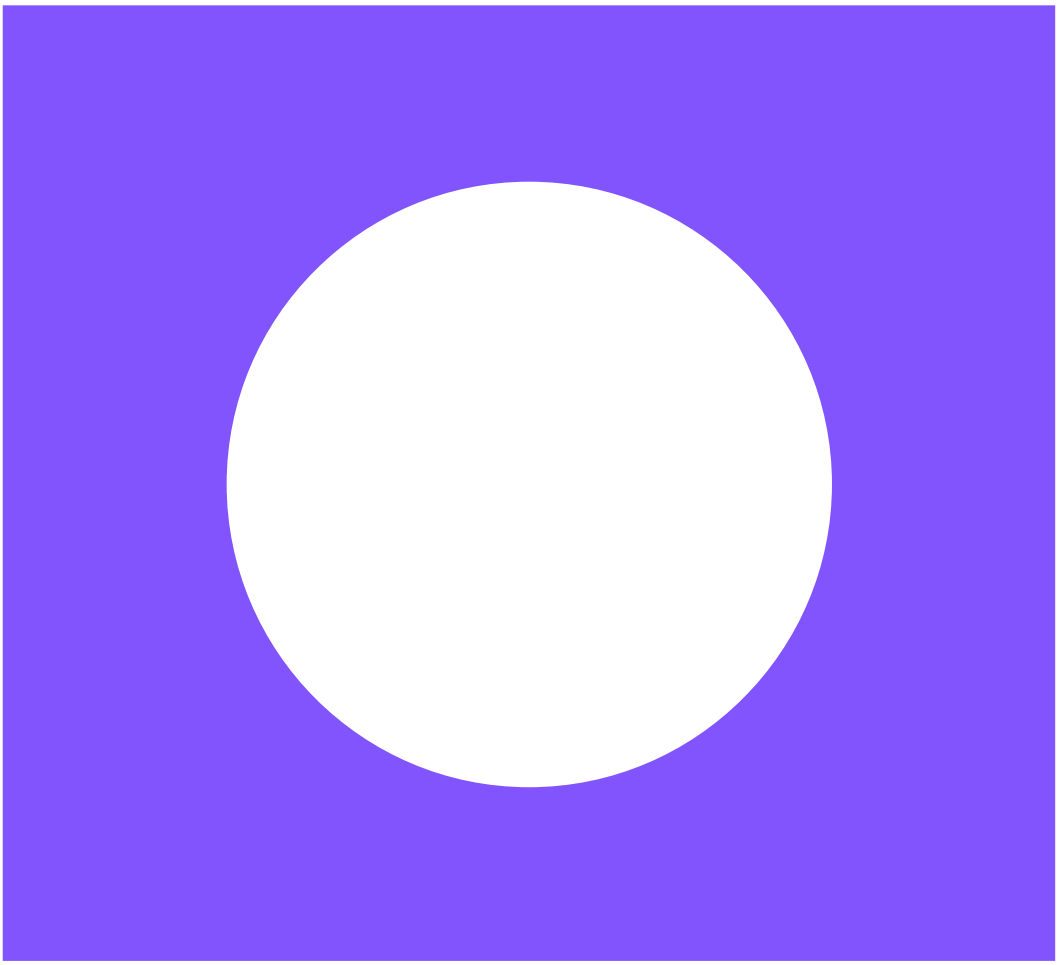
MOTT MACDONALD



Proposed Hillcrest Reservoir - Options Assessment Report

August 2026

This page left intentionally blank for pagination.

Mott MacDonald
Level 1, 30 Daldy Street
Wynyard Quarter
Auckland
1010
PO Box 91568
Victoria St West 1142
New Zealand

T +64 (0)9 375 2400
mottmac.com

IAWAI
260 Anglesea Street, Council
Building Garden Place
Hamilton, 3204

Proposed Hillcrest Reservoir - Options Assessment Report

August 2026

Mott MacDonald New Zealand Limited
Registered in New Zealand no. 3338812

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	01/07/26	Vigeshen Pather	Blair Telfer	Peter Evans	For Client Issue
B	03/07/26	Vigeshen Pather	Blair Telfer	Peter Evans	Updates to this report includes Preliminary Sunshade Studies completed and added into Report. For Client Issue
C	03/08/26	Vigeshen Pather	Blair Telfer	Peter Evans	Updates to this report includes HCC / IAWAI workshop feedback in regard to scorings, weightings and descriptor details. Updates also include overall site configuration drawings and 3D renders. For Client Issue
D	31/08/26	Vigeshen Pather	Blair Telfer	Peter Evans	Updates to report scoring and weighting, following feedback and discussion with IAWAI.

Document reference: 705100882 | 705100882-MMD-HRES-REP-001 | D

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

Contents

Executive summary 1

1 Introduction and Background 2

2 Determinants 3

2.1 Scoring 3
2.2 Weightings 3
2.2.1 Buildability 4
2.2.2 Construction Simplicity (Costs) 4
2.2.3 Reliability 4
2.2.4 Access for Maintenance 4
2.2.5 Flexibility of Operations 4
2.2.6 Seismic Performance (Resilience) 4
2.2.7 Water Quality and Efficiency 4
2.2.8 High-Level Operational Costs Considerations 4
2.2.9 Bulk Visual Impact 5
2.2.10 Ability to Mitigate Aesthetic Effects 5

3 Configuration Options 6

3.1 Option A – One Large Circular Reservoir 6
3.1.1 Configuration Advantages & Disadvantages 8
3.1.2 Pre and During Construction Considerations 9
3.1.3 Post Construction Considerations – Operations and Maintenance 11
3.1.4 Water Quality & Efficiency 14
3.1.5 High-Level Operational Cost Considerations 15
3.1.6 Bulk Visual Impact 16
3.1.7 Ability to Mitigate Aesthetic Effects 17
3.2 Option B – One Large Rectangular Reservoir 18
3.2.1 Configuration Advantages & Disadvantages 20
3.2.2 Pre and During Construction Considerations 20
3.2.3 Post Construction Considerations – Operations and Maintenance 23
3.2.4 Water Quality & Efficiency 26
3.2.5 High-Level Operational Cost Considerations 27
3.2.6 Bulk Visual Impact 28
3.2.7 Ability to Mitigate Aesthetic Effects 29
3.3 Option C – Two Rectangular Reservoirs 30
3.3.1 Configuration Advantages & Disadvantages 32
3.3.2 Pre and During Construction Considerations 33
3.3.3 Post Construction Considerations – Operations and Maintenance 35
3.3.4 Water Quality & Efficiency 38

3.3.5 High-Level Operational Cost Considerations 39
3.3.6 Bulk Visual Impact 40
3.3.7 Ability to Mitigate Aesthetic Effects 41
3.4 Option D – Two Circular Reservoirs 42
3.4.1 Configuration Advantages & Disadvantages 44
3.4.2 Pre and During Construction Considerations 45
3.4.3 Post Construction Considerations – Operations and Maintenance 47
3.4.4 Water Quality & Efficiency 50
3.4.5 High-Level Operational Cost Considerations 51
3.4.6 Bulk Visual Impact 51
3.4.7 Ability to Mitigate Aesthetic Effects 52
4 Summary 53
5 Conclusion 56
6 Recommendations 57
Appendices 58
A. Preliminary Configuration Options 59
B. 3D Configuration Option Renders by Boffa Miskell 60
C. Preliminary Sunshade Studies by Boffa Miskell 61
D. Indicative Reservoir Designs 62

Tables

Table 1: Configuration Options Scoring & Weightings 1
Table 2: Configuration Summary 53
Table 3: Configuration Options Ratings 53
Table 4: Configuration Options Scoring 54
Table 5: Configuration Options Scoring & Weightings 55

Figures

Figure 3.1.1: Option A – Concept Site Layout 6
Figure 3.1.2: Option A – 3D Render View 1 7
Figure 3.1.3: Option A – 3D Render View 2 7
Figure 3.2.1: Option B – Concept Site Layout 18
Figure 3.2.2: Option B – 3D Render View 1 19
Figure 3.2.3: Option B – 3D Render View 2 19
Figure 3.3.1: Option C – Concept Site Layout 30
Figure 3.3.2: Option C – 3D Render View 1 31
Figure 3.3.3: Option C – 3D Render View 2 31
Figure 3.4.1: Option D – Concept Site Layout 42
Figure 3.4.2: Option D – 3D Render View 1 43
Figure 3.4.3: Option D – 3D Render View 2 43

Executive summary

This report presents a high-level assessment of feasible reservoir configuration options for the proposed Hillcrest Reservoir at 111 Cambridge Road, Hillcrest, Hamilton. The assessment has been prepared to support the Notice of Requirement (NoR) process and assist Hamilton City Council / IAWAI in selecting a preferred reservoir layout for further design development and stakeholder consideration.

The proposed reservoir is required to provide approximately 12,2 ML of operational/useable storage capacity for the Hillcrest water supply zone. The assessment considers the suitability of reservoir configurations against key criteria including buildability, construction simplicity (costs), reliability, access for maintenance, flexibility of operations, water quality and efficiency, seismic performance (resilience), high-level operating costs considerations, land utilisation (usage), aesthetics and visual considerations.

The assessment recognises that the site is constrained by surrounding residential properties, limited construction access, and the need to maintain a suitable permanent access for operations and maintenance. The generally flat nature of the site provides important construction and operational advantages, including simpler earthworks, improved logistics, safer movement of construction equipment, and better flexibility for site layout, maintenance access, parking, landscaping and ancillary infrastructure.

Circular reservoirs were identified as the preferred configuration due to their superior structural efficiency, hydraulic performance, water quality outcomes, durability, and lower lifecycle maintenance requirements. Overall, they provide the strongest balance of asset performance, operational efficiency, resilience, whole-of-life value, and site functionality, and are recommended for progression through the NoR/AEE process and future design development.

The circular dual-reservoir arrangement provides operational redundancy, enabling maintenance and asset management activities without compromising supply, while improving operational flexibility, resilience, reliability, water quality, and seismic performance. Although the option requires a higher initial capital investment, the long-term benefits in supply security, maintainability, resilience, and lifecycle cost performance outweigh the additional upfront costs, making it the preferred solution for the Hillcrest Reservoir project. Option D (Two Circular Reservoirs) achieved the highest overall assessment score as can be seen in Table 1 below:

Table 1: Configuration Options Final Scoring & Weightings

CRITERIA	OPTION A CIRCULAR	OPTION B RECTANGULAR	OPTION C 2 x RECTANGULAR	OPTION D 2 x CIRCULAR	WEIGHTING
Buildability:	3.5	4	3.5	3	5
Construction Simplicity (Costs):	3	4.5	4	2.5	5
Reliability:	8	4	6	10	10
Access for Maintenance:	7	7	8	9	10
Flexibility of Operations:	10.5	10.5	12	13.5	15
Seismic Performance (Resilience)	4.5	1.5	2	5	5
Water Quality & Efficiency	20	10	10	20	20
High-Level Operational Cost Considerations	7	5	2	4	10
Bulk Visual Impact	2.5	4.5	4.5	3.5	5
Ability to Mitigate Aesthetic Effects	10.5	7.5	10.5	10.5	15
TOTAL	**76.5**	**58.5**	**62.5**	**81**	**100**

1 Introduction and Background

The recommended site for the proposed Hillcrest reservoir has been agreed at 111 Cambridge Road, Hillcrest, Hamilton and is made up of two sites; this includes the site of the existing Hillcrest Reservoir which is not currently operational and the recently demolished Hillcrest Bowling Club. The site is designated for the purposes of 'Water Supply and Storage', and the requiring authority is Hamilton City Council.

The existing designated site itself is too small for a major reservoir upgrade; therefore, the neighbouring bowling club site would be required. The site is a rear site in a block bordered by Cambridge Road, Hillcrest Road, Masters Avenue and Mansel Avenue.

The subject site is contained in two records of title with a total area of approximately 6,451m2. The subject site is surrounded by residential properties on all boundaries except for some commercial properties along the Cambridge Road frontage (early childhood centre, cafés/eateries) to the southwest of the subject site.

The proposed Hilcrest Reservoir will be one of four (4) configuration options, with each option equating to 12,2ML of operational/useable storage capacity, including preliminary arrangements for:

- Proposed PE Trunk Water Mains
- Proposed PE Bulk Mains
- Concept 3D Rendering

The four (4) configuration options considered will include the following:

- One Large Circular Reservoir
- One Large Rectangular Reservoir
- Two Rectangular Reservoirs
- Two Circular Reservoirs

The assessments that follow are the consolidated /aggregated viewpoint of the various IAWAI teams, operations, asset lifecycle, and general technical knowledge and experience. The options were assessed (scored) against consistent determinant criteria and are adjudged on their respective individual merits, not as a comparative exercise.

2 Determinants

2.1 Scoring

The assessment criteria were rated on a scale of 1 to 10, where a higher score represents a more favourable outcome against the relevant criterion. Scores were assigned based on engineering judgement, operational requirements, asset performance expectations, and whole-of-life considerations. The ratings are interpreted as follows:

Rating	Descriptor	Description
1 - 3	Low	Significant limitations or disadvantages. Performance is substantially below the preferred outcome and would likely require additional mitigation, intervention, or incur increased risk or cost.
4 - 6	Medium	Acceptable performance. Meets minimum requirements but offers a balanced mix of advantages and disadvantages without providing a clear benefit over alternatives.
7	Medium-High	Strong performance. Delivers clear advantages and aligns well with project objectives, although some limitations or trade-offs remain.
8 - 10	High	Excellent performance. Represents best practice or a preferred outcome with significant advantages, minimal drawbacks, and strong alignment with long-term project objectives.

Each assessment criterion was scored on a scale of 1 to 10, where 1 represents the least favourable outcome and 10 represents the most favourable outcome. Scores were grouped into qualitative descriptors comprising Low (1-3), Medium (4-6), Medium-High (7), and High (8-10). The ratings reflect the relative performance of each option against the assessment criteria, considering both short-term delivery requirements and long-term operational, maintenance, resilience, and lifecycle outcomes.

2.2 Weightings

The reservoir configuration options were assessed against a range of determinants that collectively reflect both short-term project delivery considerations and long-term operational outcomes. Weightings were assigned to recognise the relative importance of each criterion, with greater emphasis placed on long-term operational performance, reliability, maintainability, water quality and asset resilience. Water Quality and Efficiency was identified as the most critical determinant and assigned a weighting of 20%, followed by Flexibility of Operations at 15% and Ability to Mitigate Aesthetic Effects 15%. Reliability, Access for Maintenance, and High-Level Operational Cost Considerations were each assigned a weighting of 10%, while Buildability, Bulk Visual Impact, Construction Simplicity and Seismic Performance were weighted at 5% respectively. This weighting approach reflects the importance of selecting a reservoir configuration that provides optimum whole-of-life value rather than solely minimising initial construction cost.

2.2.1 Buildability

This criteria element considers the relative ease of construction, including site constraints, construction methodology, formwork requirements, reinforcement complexity, construction sequencing and contractor familiarity. As buildability is primarily a temporary and one-off project consideration, a lower weighting of 5% was assigned.

2.2.2 Construction Simplicity (Costs)

This criteria element assessed the relative capital cost implications and complexity associated with constructing each option. However, the assessment also recognised that these factors represent upfront costs only and do not necessarily reflect long-term asset performance. Accordingly, this criterion was assigned a weighting of 5%.

2.2.3 Reliability

This criteria element was identified as a key determinant and assigned a weighting of 10%. The assessment considered structural performance, operational redundancy, consequence of failure and long-term service reliability.

2.2.4 Access for Maintenance

This criteria element was also assigned a weighting of 10% due to its strong influence on long-term operational performance and asset lifecycle management. Assessment of this determinant considered ease of inspection, cleaning, access provisions, confined space entry requirements and the ability to undertake maintenance without compromising water supply.

2.2.5 Flexibility of Operations

This criteria element was identified as one of the most important determinants and assigned a weighting of 15%. This criterion considered operational resilience, supply continuity, storage management, water turnover control and the ability to maintain service during maintenance or emergency events. The ability to operate reservoirs independently, isolate one reservoir while maintaining service from the other and optimise water turnover was considered a significant operational advantage.

2.2.6 Seismic Performance (Resilience)

This criteria element has been assessed on the ability of each configuration to withstand earthquake loading, maintain structural integrity and continue operating following extreme events. While this criterion received a lower weighting of 5% due to the relatively low seismic risk profile of the site, resilience remained an important consideration for critical water infrastructure.

2.2.7 Water Quality and Efficiency

This criteria element was considered the most important determinant and assigned the highest weighting of 20%. This criterion assessed hydraulic performance, circulation, mixing characteristics, water age management, sediment accumulation and operational efficiency.

2.2.8 High-Level Operational Costs Considerations

This criteria element was focused on whole-of-life costs rather than initial capital expenditure and was assigned a weighting of 10%. The assessment considered maintenance requirements, operational interventions, asset longevity and risk-related costs.

2.2.9 Bulk Visual Impact

This criteria element was assigned a weighting of 5% and assessed the relative bulk visual impact and visual dominance of each option within the surrounding environment. Consideration was given to the scale, massing, height, and overall prominence of the infrastructure, as well as its visibility from surrounding residential areas, public viewpoints, and adjacent land uses.

2.2.10 Ability to Mitigate Aesthetic Effects

This criteria element was weighted at 15% in recognition of the site's proximity to surrounding residential properties and the importance of minimising visual effects. This determinant assessed the ability of each option to mitigate aesthetic effects through landscape integration, screening opportunities, architectural treatments, and visual design measures. Consideration was given to the effectiveness of these mitigation measures in reducing perceived scale, visual prominence, and overall effects on local visual amenity and landscape character.

It should be noted the sketches referenced and included in Appendix D are indicative only at this early planning stage. No specific designs or allowances have been made and shall be developed further in subsequent stages of the project.

Overall, the determinants framework ensured that the assessment balanced construction and cost considerations against the long-term operational, maintenance, water quality and resilience outcomes expected from a critical water supply asset. The applied weightings reflected the strategic importance of selecting a configuration that delivers the greatest whole-of-life value, operational reliability and service continuity for IAWAI and its customers.

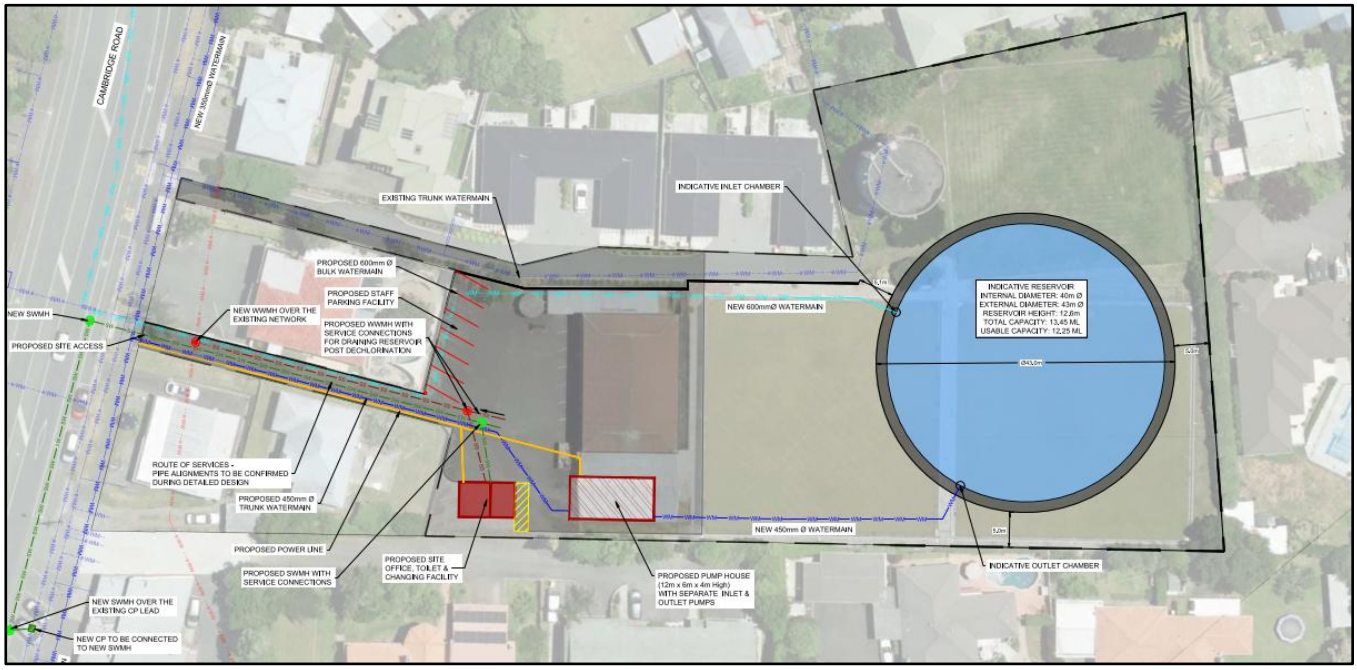
3 Configuration Options

3.1 Option A – One Large Circular Reservoir

This option utilises one large circular reservoir with internal dimensions of 40m diameter x 9.7m high with a storage capacity of 12.25ML. External footprint allows for an assumed 1,5m thick concrete reinforced wall equating to 43m diameter x 12.6m high using a pitched roof for dissipating rainfall and aesthetic considerations at angle of 5° (1.9m additional height due to pitch).

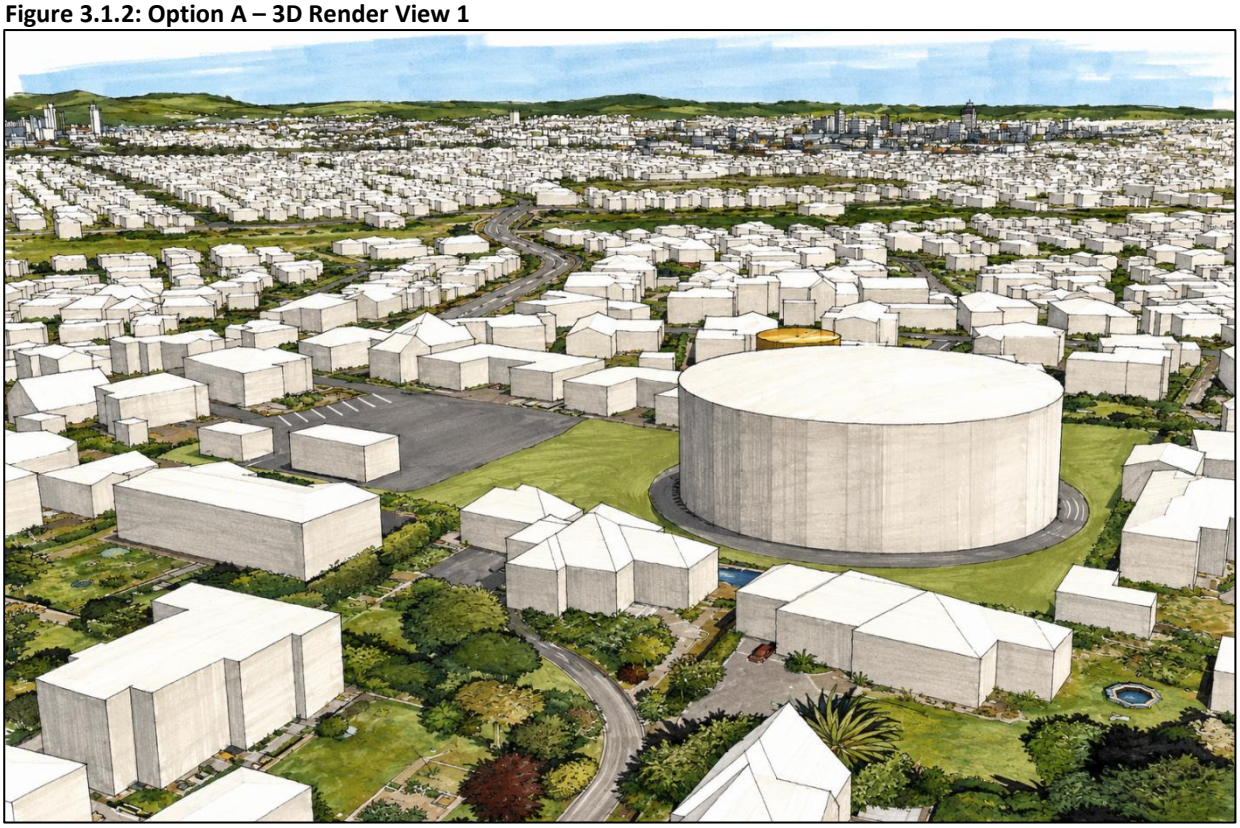
This configuration caters for a single pump and valve room with entry and exit pipes. Location, configuration and size of pump and valve room to be finalised during detailed design. Parking areas, toilets and change rooms have also been catered for with their final positions finalised during detailed design. The reservoir would fill up via a proposed 600mm diameter bulk water main which runs off Cambridge Road up the driveway, along the boundary and into the reservoir. Water from the proposed reservoir would then be pumped out into a 450mm diameter trunk water main which would run along the South-East boundary, then go down the existing driveway back onto Cambridge Road where it would tee off and tie back into the water supply networks.

Figure 3.1.1: Option A – Concept Site Layout



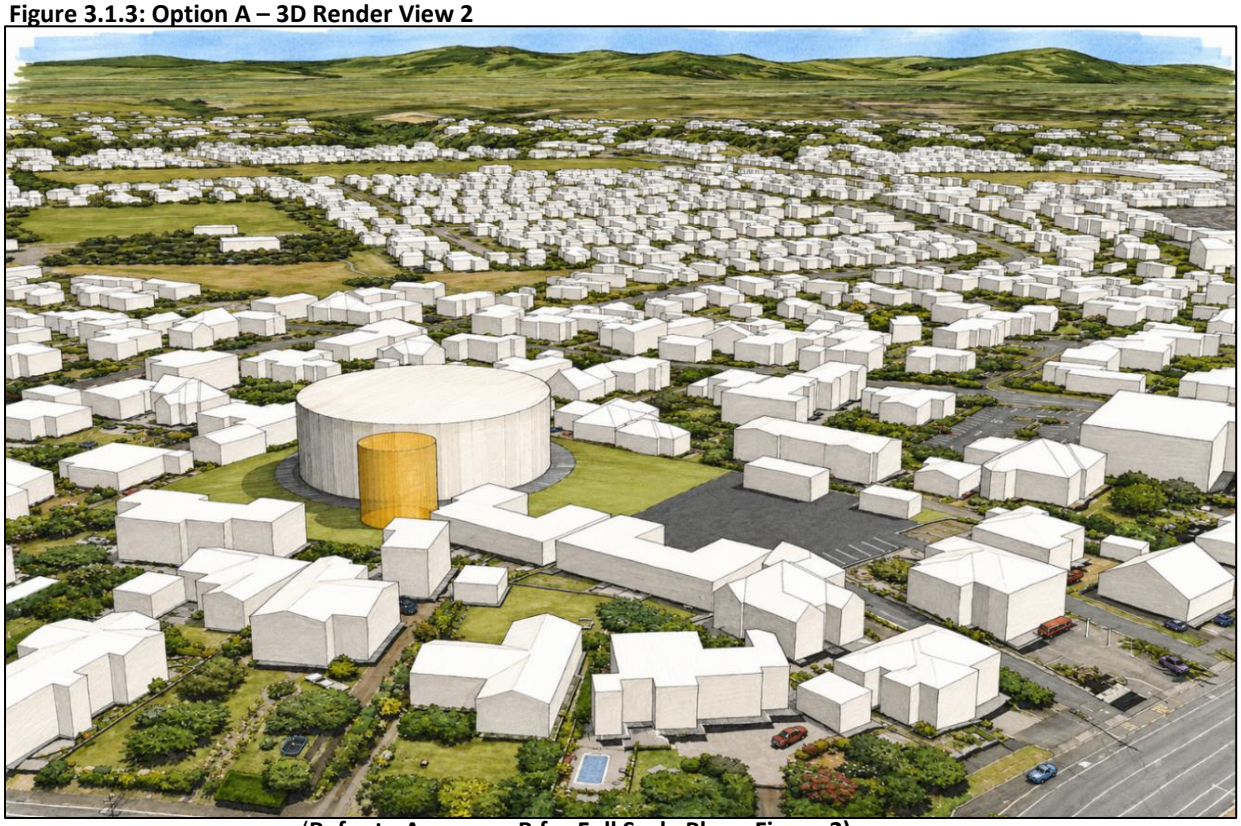
(Refer to Annexure A for Full Scale Plan - Drawing No: HRWEW-MMD-00-XX-DR-C-0130)

Figure 3.1.2: Option A – 3D Render View 1



(Refer to Annexure B for Full Scale Plan - Figure 1)

Figure 3.1.3: Option A – 3D Render View 2



(Refer to Annexure B for Full Scale Plan - Figure 2)

3.1.1 Configuration Advantages & Disadvantages

Advantages	Disadvantages
Best Structural Efficiency:	More Complex Construction:
Uniform hydrostatic pressure creates pure hoop tension.	Requires Curved formwork.
No stress concentrations which minimises cracking risks.	Skilled Labour Required
Material Efficiency:	Less efficient land utilization:
Minimum Perimeter for the volume provided.	Difficult to fit into rectangular plots
Requires less concrete and reinforcement.	
Better Watertightness:	Operational Challenges:
No corners ensure fewer leakage paths.	Any contamination event would affect the full storage reservoir volume.
	Temporary operational measures may be needed whenever reservoir maintenance is undertaken.
Hydraulically Superior:	
No Dead Zones	
Better Mixing and Circulation	
Ideal for Large Storage:	
Commonly used for Reservoirs and Digesters	
Seismic Performance:	
Uniform Stress Distribution	
Efficient Load Path (Hoop Action)	
Superior Hydrodynamic Performance	
Torsion Stability	
Better Crack Control	

3.1.2 Pre and During Construction Considerations

Temporary Access to Site:

The proposed access during construction would be from the existing driveway at 111 Cambridge Road, Hillcrest.

The site would require extensive traffic management for heavy vehicles, considering the proximity to neighbouring houses and tight geometry increase disruption to immediate residents, complexity to access planning and construction of trunk and bulk mains through multiple intersections. The effects are expected to be relatively localised but prolonged, with TMPs required for large vehicle movements and careful management of residential access.

The works would need to be carefully staged and sequenced, with some temporary measures required despite limited-service relocations and no anticipated retaining structures.

Buildability:

Score:	7/10
Score Description:	This scoring is rated a Medium-High in terms of the increased challenges to construct a curved wall due to its circular geometry requires skilled labour and custom fabrication.
Weighting:	5% / 100%
Weighting Description:	Due to this element being a temporary and once-off, the weighted points are 5% out of the accumulative total criteria weighting of 100%.

Large components may need to be dismantled and installed on site due to entrance access restrictions, this would include material delivery being split over multiple loads rather than having large items loaded and delivered at once. A methodology of Just-in-Time (JIT) would need to be adopted by the contractor to ensure the site remains safe, uncluttered, and material brought in only when it is required for installation according to the construction project programme.

A circular reservoir is generally more challenging to construct than square or rectangular alternatives, primarily due to its geometry. The most significant buildability constraint is the need for curved formwork, which requires custom fabrication, careful alignment, and more complex setup compared to standard straight shuttering. This results in slower construction progress, increased reliance on skilled labour, and higher upfront formwork costs. Reinforcement installation is also more complex, as it involves radial and circumferential (hoop) steel arrangements rather than simple orthogonal grids, increasing detailing difficulty and the risk of congestion at critical locations. Additionally, maintaining accurate geometry through precise setting out is essential, as errors can propagate around the entire circumference. These factors collectively make circular reservoirs slower and more technically demanding to build.

Construction staging and site layout also introduce challenges. The continuous circular perimeter makes it less straightforward to divide works into simple construction segments, requiring more coordinated pour sequencing and access planning. Craneage, access routes, and working areas must be carefully managed around the full circumference.

Despite these buildability challenges, circular reservoirs offer important advantages that partially offset their construction complexity. Structurally, they behave more efficiently, with hydrostatic pressure distributed uniformly as hoop stress, eliminating stress concentrations and reducing cracking risk. This results in simpler structural performance and a lower likelihood of defects such as leakage, which can reduce rework during construction and improve overall quality outcomes. They also require less material for a given storage volume due to their efficient perimeter-to-volume ratio, meaning reduced concrete and reinforcement quantities compared to rectangular alternatives.

In practical engineering terms, a circular reservoir can be described as structurally simple but geometrically complex to construct. While it is the most difficult option from a buildability perspective, it often delivers superior long-term performance, durability and water tightness. As a result, the choice typically reflects a trade-off between construction ease and lifecycle benefits, example: rectangular reservoirs are easier and faster to build, whereas circular reservoirs require more effort during construction but provide better structural efficiency and operational performance over time.

Construction Simplicity (Costs):

Score:	6/10
Score Description:	This scoring is rated a Medium in terms of the costs associated with required skilled labour and custom fabrication due to its circular geometry.
Weighting:	5% / 100%
Weighting Description:	Due to this element being a temporary and once-off, the weighted points are 5% out of the accumulative total criteria weighting of 100%.

A circular reservoir can be viewed positively as a specialised but well-established construction approach. While the curved geometry requires purpose-built formwork, this system is highly repeatable once established, allowing consistent quality and efficient progress as construction advances. The use of circular formwork enables a uniform wall profile, which supports good workmanship and reduces variability compared to more complex geometries.

The reinforcement layout, although different from typical orthogonal grids, follows clear radial and circumferential patterns that align directly with the structural behaviour of the reservoir. This results in a logical and efficient load path, making it easier for experienced crews to install reinforcement accurately and achieve a high-quality finish. The continuous geometry also lends itself well to coordinated construction sequencing, promoting a controlled and methodical build process around the structure.

From a site perspective, the circular layout encourages a well-organised construction environment. Access, material handling, and crane operations can be planned around a central focus, enabling balanced use of space and consistent working conditions around the perimeter. This can simplify coordination once the construction methodology is properly set up, particularly for larger reservoirs where repetition becomes an advantage.

Importantly, the absence of corners and complex junctions significantly simplifies critical detailing. This reduces the number of high-risk areas for leakage and cracking, making quality control more straightforward and improving overall construction outcomes. In this sense, while circular reservoirs require a higher level of upfront planning and precision, they offer a cleaner, more uniform construction solution that supports durability and long-term performance.

Overall, circular reservoirs can be described as construction-refined rather than construction-difficult, they benefit from a consistent, repetitive build process and inherently simpler structural detailing, which together enable high-quality delivery when executed with the right expertise.

3.1.3 Post Construction Considerations – Operations and Maintenance

Permanent Access to Site:

The access will be maintained permanently at 111 Cambridge Road after the reservoir is commissioned and will be used for ongoing operations and maintenance.

One of the positives of this site selection leverages the flat land area which the future reservoir would be built on, some of the immediate positives include:

- Lower cost and simpler earthworks, minimal cut/fill and reduced need for retaining structures.
- Better access and logistics, easier movement of heavy equipment, safer crane operations, and more efficient deliveries.
- Faster construction, simpler set-out, fewer constraints, and ability to run multiple work fronts.
- Improved safety, less risk from slopes, instability or difficult terrain.
- Efficient site layout, more flexibility for staging, stockpiles and site facilities.
- Simpler construction overall, especially beneficial for large structures like reservoirs.

The internal roads around the reservoir will be designed to allow for maintenance vehicles to drive through and around the reservoir with a minimum 5 meter wide access maintained. The site will include allocation of parking areas for IAWAI operations and maintenance teams as well as any sub-contractors appointed to carry out any future works on the new reservoir. The pump room and valve room will be position in the south eastern portion of the site with ease of access to IAWAI operations and maintenance teams.

Reliability:

Score:	8/10
Score Description:	This scoring is rated a High in terms of reliability due to its inherently efficient structural behaviour of its circular geometry.
Weighting:	10% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

A circular reservoir offers a high level of reliability due to its inherently efficient structural behaviour. The circular geometry allows hydrostatic pressure to be distributed uniformly around the walls as hoop stress, eliminating stress concentrations and reducing the likelihood of cracking. This results in a more robust structure with predictable performance under load, which is particularly beneficial for large-capacity reservoirs where structural integrity is critical.

The absence of corners further enhances reliability by removing common weak points found in square or rectangular reservoirs. Corners are typically areas where stresses concentrate and leakage is more likely to occur. By eliminating these, circular reservoirs provide improved water tightness and reduce the risk of defects over time. This simplifies long-term maintenance and supports consistent performance throughout the asset's life.

Circular reservoirs also perform well under varying operational and environmental conditions. Their uniform load path improves resistance to differential settlement, seismic effects, and other external forces, contributing to a more resilient structure. This makes them particularly reliable for critical infrastructure where consistent service delivery is required and failure risks must be minimised.

Overall, the reliability of a circular reservoir can be described as high and inherent to its geometry. While construction may require more precision, the resulting structure benefits from reduced cracking risk, improved water tightness, and superior long-term durability, making it a dependable option for water storage applications.

Access for Maintenance:

Score:	7/10
Score Description:	This scoring is rated a Medium-High as circular reservoirs are considered to offer a high level of maintenance accessibility.
Weighting:	10% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

One circular reservoir generally provide good maintenance access due to their simple geometry, continuous perimeter access, and absence of internal corners, which simplifies inspection, cleaning, and maintenance activities.

There is sufficient external access around the reservoir, roof access would be provided for inspection of equipment and hatches, internal confined-space access, and accessible valve chambers for inlet, outlet, overflow, and scour pipework.

Circular reservoirs also facilitate more efficient cleaning and inspection, as sediment accumulation is reduced and all internal surfaces are readily accessible.

Overall, circular reservoirs are considered to offer a high level of maintenance accessibility.

Flexibility of Operations:

Score:	7/10
Score Description:	This scoring is rated a Medium-High as circular reservoirs are considered to have key operational advantages. However, having one reservoir poses a risk when the reservoir is offline due to contamination, cleaning or general maintenance, etc there are no backup water supply storage.
Weighting:	10% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

A single-reservoir configuration offers lower upfront capital costs but provides limited operational flexibility and creates a single point of failure within the water supply system. Maintenance activities, emergency repairs, and future renewals can have a greater impact on service delivery, resulting in increased operational risk and reduced network resilience compared with a dual-reservoir arrangement.

From an operational efficiency perspective, the improved hydraulics and reduced need for intervention translate into lower ongoing effort for operators. There is typically less reliance on active management (such as flushing or mixing), and fewer operational issues to address over time. This leads to a more streamlined and reliable system, particularly important for council supply where consistent service delivery is critical.

Overall, circular reservoirs deliver high operational efficiency, characterised by superior water circulation, minimal dead zones, stable hydraulic performance, and reduced operational intervention, making them well suited for long-term, reliable water supply systems.

Seismic Performance (Resilience):

Score:	9/10
Score Description:	This scoring is rated a High as circular reservoirs are considered excellent in seismic performance and resilience.
Weighting:	5% / 100%
Weighting Description:	Due to this element being a long term, however seeing its location not being majorly affected by seismic events and on the lower importance of the criteria, the weighted points are 5% out of the accumulative total criteria weighting of 100%.

Circular reservoirs generally provide excellent seismic performance and resilience due to their symmetrical geometry, which distributes earthquake-induced forces uniformly around the structure and avoids stress concentrations associated with corners. This reduces the likelihood of cracking, structural damage, and loss of serviceability during seismic events.

The efficient structural behaviour of circular reservoirs also enables them to better resist hydrodynamic forces generated by water movement during earthquakes, supporting continued operation following a seismic event.

Overall, circular reservoirs are considered a highly resilient solution for critical water supply infrastructure, offering strong seismic performance, reduced risk of failure, and improved post-earthquake service continuity.

3.1.4 Water Quality & Efficiency

Score:	10/10
Score Description:	This scoring is rated a High due to circular reservoirs providing strong benefits in terms of both water quality and operational efficiency, largely due to their uniform geometry and hydraulic behaviour.
Weighting:	20% / 100%
Weighting Description:	Due to this element being a long term and of the highest critical importance in the criteria, the weighted points are 20% out of the accumulative total criteria weighting of 100%.

Circular reservoirs provide strong benefits in terms of both water quality and operational efficiency, largely due to their uniform geometry and hydraulic behaviour. The circular shape promotes natural and continuous circulation within the reservoir, allowing water to move evenly throughout the reservoir. This improves mixing and reduces the likelihood of stagnant zones forming, which are commonly seen in reservoirs with corners. As a result, water quality is more consistent, with better control of parameters such as temperature, chlorine residual, and overall water age.

A key advantage for water quality is the absence of corners, which eliminates dead zones where sediments and biofilm tend to accumulate. Without these areas, the risk of sludge build-up and microbial growth is significantly reduced. This leads to cleaner storage conditions and supports more efficient turnover of water, ensuring that stored water remains fresh and compliant with quality standards over time.

From an efficiency perspective, the improved hydraulic performance of circular reservoirs means that less operational intervention is required. There is typically reduced need for mechanical mixing, flushing, or complex inlet/outlet arrangements to manage flow patterns. The inherent geometry helps maintain uniform turnover and prevents stratification, allowing the reservoir to operate more efficiently with lower energy input and less active management.

Additionally, circular reservoirs contribute to long-term efficiency by minimising losses associated with poor water circulation or sediment accumulation. Cleaner internal conditions reduce the frequency of maintenance and operational disruptions, while consistent water movement improves overall system performance. This results in a more reliable and cost-effective operation over the life of the asset.

Overall, circular reservoirs deliver high water quality and operational efficiency, characterised by improved circulation, elimination of dead zones, reduced sediment build-up, and minimal need for intervention, making them an optimal choice for reliable and sustainable water storage systems.

3.1.5 High-Level Operational Cost Considerations

Score:	7/10
Score Description:	This scoring is rated a Medium-High due to circular reservoirs presenting a cost-efficient long-term solution with regards to ongoing operations.
Weighting:	10% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

From a lifecycle cost perspective, circular reservoirs perform strongly. Their improved structural efficiency and reduced cracking risk result in better water tightness and durability, which reduces the need for repairs and ongoing maintenance. Over time, this translates into lower operational and maintenance costs, making them more economical across the full life of the asset.

There are also indirect cost efficiencies associated with operation. Improved hydraulics, reduced sediment accumulation, and lower intervention requirements mean reduced operational effort and fewer maintenance cycles, contributing to overall cost savings. Additionally, for larger storage capacities, circular reservoirs are often more cost-effective due to their ability to scale efficiently without a proportional increase in structural demand.

Overall, circular reservoirs present a cost-efficient long-term solution, where slightly higher upfront construction costs are offset by reduced material usage and significantly lower maintenance and operational costs over the asset's lifespan.

3.1.6 Bulk Visual Impact

Score:	5/10
Score Description:	This scoring is rated as Medium, as circular reservoirs generally present a more compact and visually efficient form; however, their height and curved profile can create a noticeable visual presence within the landscape.
Weighting:	5% / 100%
Weighting Description:	Due to this element being a long term, the weighted points are 5% out of the accumulative total criteria weighting of 100%.

The circular reservoir benefits from a compact footprint that contains the storage volume within a single structure, reducing the spread of visible infrastructure across the site. However, its greater height, combined with the site's elevated position, increases its visibility and visual dominance when viewed from surrounding residential areas and public viewpoints.

While landscaping, cladding, and architectural treatments can help soften its appearance, the height and prominence of the structure remain key constraints. As a result, the reservoir exhibits a moderate bulk visual impact and has therefore been assigned a Medium score.

3.1.7 Ability to Mitigate Aesthetic Effects

Score:	7/10
Score Description:	This scoring is rated a Medium-High as circular reservoirs offer a visually balanced and adaptable solution, with a softer, more integrated appearance that is well suited to a wide range of environments.
Weighting:	15% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

The ability to mitigate aesthetic effects for a circular reservoir is enhanced by its simple, symmetrical form and flexibility for landscape and architectural integration.

The continuous curved walls readily accommodate mitigation measures such as landscaping, earth bunding, architectural cladding, façade treatments, and screening, creating a cohesive and visually integrated outcome. The centralised footprint also supports an organised site layout, helping to minimise visual clutter and providing space for perimeter planting and screening.

While the reservoir may remain visually prominent due to its scale, the absence of sharp edges and the consistent geometry improve the effectiveness of mitigation measures compared with more angular alternatives. Overall, the circular reservoir provides strong opportunities to mitigate aesthetic effects and achieve positive integration with the surrounding environment.

Potential mitigation measures during detailed design may include reservoir wall cladding or façade treatments, landscape planting and architectural finishes or patterns incorporated into the concrete wall surfaces.

Boffa Miskell have prepared Preliminary Sunshade Studies, please refer to Annexure C and Annexure D for General Examples of what Option A reservoir may look like.

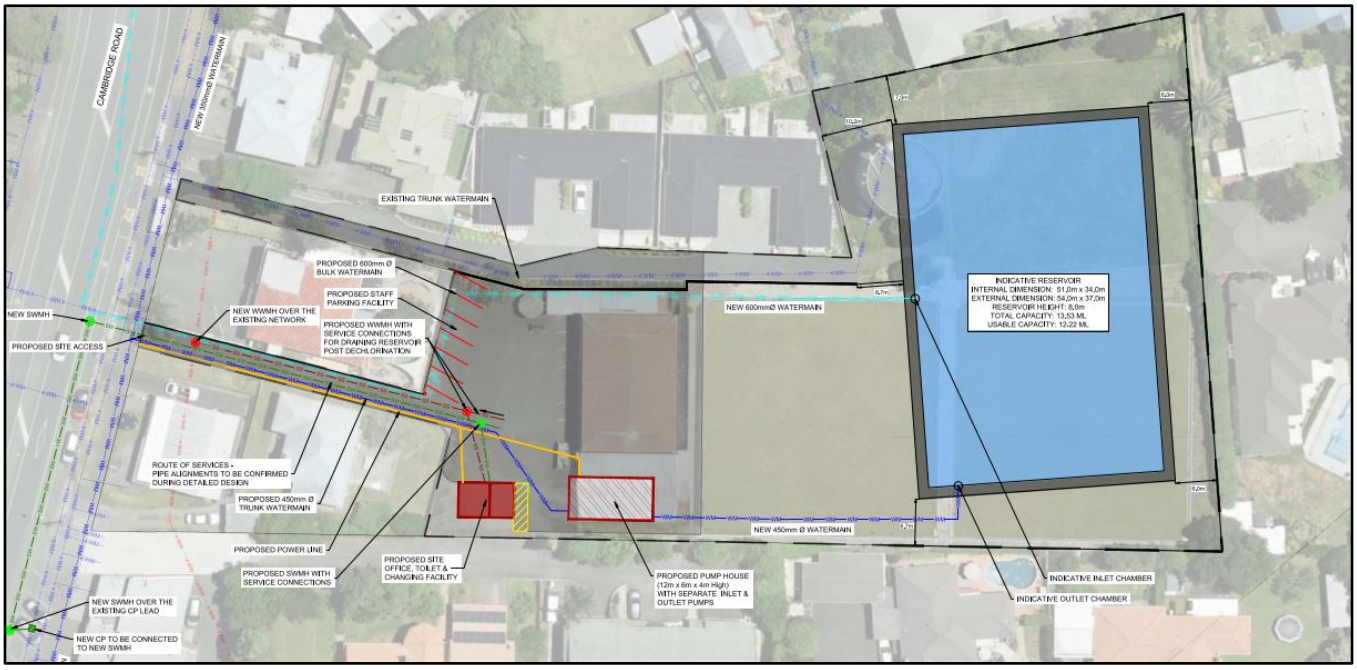
3.2 Option B – One Large Rectangular Reservoir

This option utilises one large rectangular reservoir with internal dimensions of 51.00m long x 34.00m wide x 7.05m high with a storage capacity of 12.22ML.

External footprint allows for an assumed 1.5m thick concrete reinforced wall equating to 54.00m long x 37.00m wide x 8.00m high using a flat roof.

This configuration caters for a single pump and valve room with entry and exit pipes. Location, configuration and size of pump and valve room to be finalised during detailed design. Parking areas, toilets and change rooms have also been catered for with their final positions finalised during detailed design. The reservoir would fill up via a proposed 600mm diameter bulk water main which runs off Cambridge Road up the driveway, along the boundary and into the reservoir. Water from the proposed reservoir would then be pumped out into a 450mm diameter trunk water main which would run along the South-East boundary, then go down the existing driveway back onto Cambridge Road where it would tee off and tie back into the water supply networks.

Figure 3.2.1: Option B – Concept Site Layout



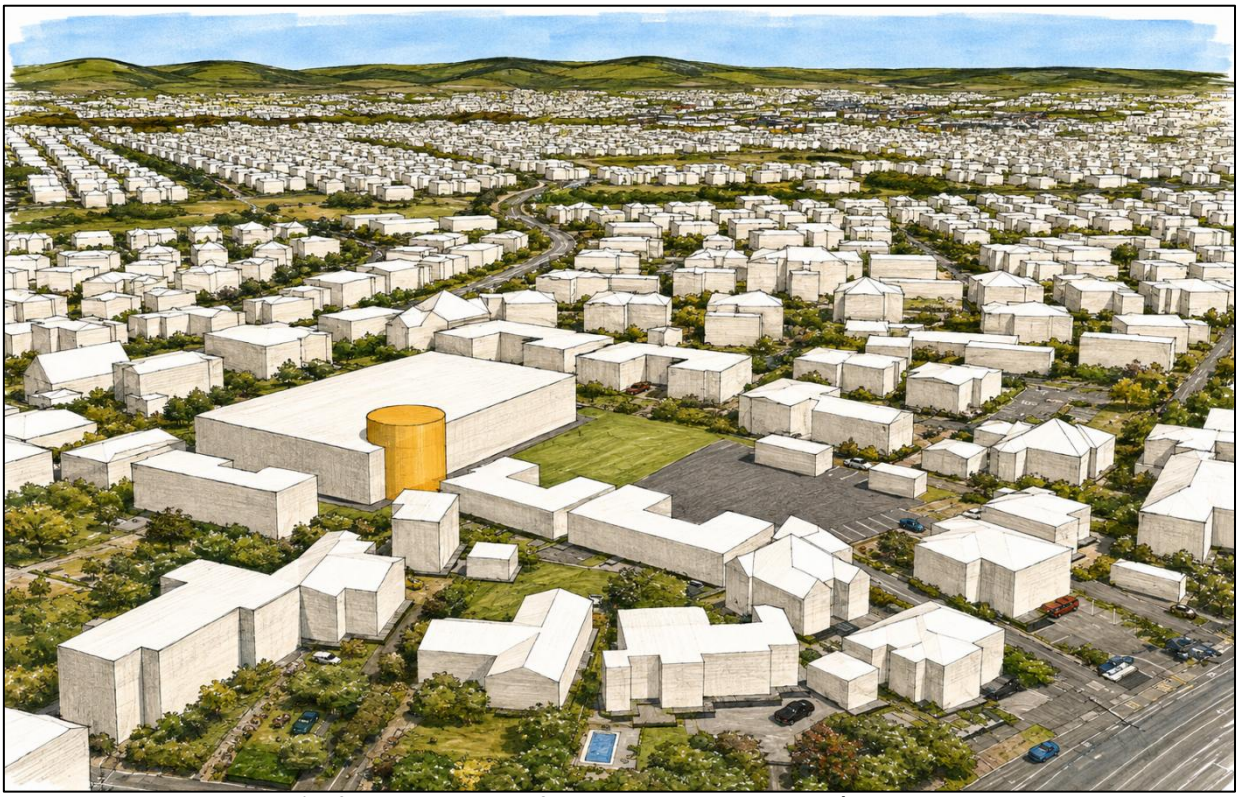
(Refer to Annexure B for Full Scale Plan - Drawing No: HRWEW-MMD-00-XX-DR-C-0131)

Figure 3.2.2: Option B – 3D Render View 1



(Refer to Annexure B for Full Scale Plan - Figure 3)

Figure 3.2.3: Option B – 3D Render View 2



(Refer to Annexure B for Full Scale Plan - Figure 4)

3.2.1 Configuration Advantages & Disadvantages

Advantages	**Disadvantages**
Most Practical Layout:	Structural Inefficiency:
Best for Long and Narrow sites	Long walls experience significant bending moments.
Easily integrates with pipelines and treatment process.	Requires thicker walls and more steel.
Very Easy Construction:	Corner Stress Issues:
Standard shuttering and reinforcement.	Similar to square reservoirs, but worse in long spans.
Efficient Compartmentalisation:	Higher Cost for Large Volume Reservoirs:
Ideal for staged treatment systems and internal chambers.	More Material as compared to circular reservoirs.
	Dead Zones:
	Corners and long edges reduce hydraulic efficiency.
	Operational Challenges:
	Any contamination event would affect the full storage reservoir volume.
	Temporary operational measures may be needed whenever reservoir maintenance is undertaken.

3.2.2 Pre and During Construction Considerations

Temporary Access to Site:

The proposed access during construction would be from the existing driveway at 111 Cambridge Road, Hillcrest.

The site would require extensive traffic management for heavy vehicles, considering the proximity to neighbouring houses and tight geometry increase disruption to immediate residents, complexity to access planning and construction of trunk and bulk mains through multiple intersections. The effects are expected to be relatively localised but prolonged, with TMPs required for large vehicle movements and careful management of residential access.

The works would need to be carefully staged and sequenced, with some temporary measures required despite limited-service relocations and no anticipated retaining structures.

Buildability:

Score:	8/10
Score Description:	This scoring is rated a High in terms of the simple geometry and well-established construction methods.
Weighting:	5% / 100%
Weighting Description:	Due to this element being a temporary and once-off, the weighted points are 5% out of the accumulative total criteria weighting of 100%.

Large components may need to be dismantled and installed on site due to entrance access restrictions, this would include material delivery being split over multiple loads rather than having large items loaded and delivered at once. A methodology of Just-in-Time (JIT) would need to be adopted by the contractor to ensure the site remains safe, uncluttered, and material brought in only when it is required for installation as to the construction project programme.

The buildability of a rectangular reservoir is generally considered high, driven by its simple geometry and well-established construction methods. The use of straight walls enables standard formwork systems, allowing for quick setup, repetition, and efficient installation. This results in faster construction progress, reduced complexity, and strong contractor familiarity, making rectangular reservoirs one of the most practical options from a constructability perspective.

Reinforcement detailing is also straightforward, typically arranged in orthogonal grids that align with standard construction practices. This simplifies fabrication and installation, reduces the need for specialised labour, and improves overall productivity on site. In addition, the linear layout allows for flexible construction sequencing, making it easier to stage work, introduce construction joints, and manage pour cycles effectively.

From a site perspective, rectangular reservoirs integrate efficiently within most land parcels, particularly those with square or rectangular boundaries. Their shape allows for optimal use of available space and simplifies the arrangement of access, laydown areas, and ancillary infrastructure. This contributes to a well-managed construction environment and supports efficient site logistics.

However, while buildability is strong, additional attention is required at corners and wall intersections, where reinforcement congestion and detailing can become more complex. These areas demand careful execution to ensure structural integrity and water tightness.

Overall, rectangular reservoirs offer a highly buildable and construction-efficient solution, characterized by simple geometry, standard construction techniques, flexible sequencing, and strong alignment with typical contractor capabilities.

Construction Simplicity:

Score:	9/10
Score Description:	This scoring is rated a High in terms of the costs associated with its simple geometry and well-established construction methods.
Weighting:	5% / 100%
Weighting Description:	Due to this element being a temporary and once-off, the weighted points are 5% out of the accumulative total criteria weighting of 100%.

The construction simplicity of a rectangular reservoir is generally regarded as high, owing to its straightforward geometry and established construction practices. In addition, the linear configuration facilitates flexible construction sequencing, making it easier to stage works, incorporate construction joints, and manage pour cycles effectively.

From a site and logistics perspective, rectangular reservoirs are highly practical. Their shape integrates well with typical site boundaries, particularly rectangular land parcels, and allows for efficient use of space. This simplifies site layout, access planning, and the positioning of ancillary infrastructure, contributing to a well-organised construction environment.

While some additional care is required at corners where reinforcement detailing and water tightness must be carefully managed, these are well understood aspects of construction and can be effectively addressed through standard detailing and quality control.

Overall, rectangular reservoirs provide a highly construction-simple and efficient solution, characterized by standardised methods, ease of sequencing, and strong compatibility with typical site conditions. They also require additional columns to support the roof structure due to the nature of the long spans.

3.2.3 Post Construction Considerations – Operations and Maintenance

Permanent Access to Site:

The access will be maintained permanently at 111 Cambridge Road after the reservoir is commissioned and will be used for ongoing operations and maintenance.

One of the positives of this site selection leverages the flat land area which the future reservoir would be built on, some of the immediate positives include:

- Lower cost and simpler earthworks, minimal cut/fill and reduced need for retaining structures.
- Better access and logistics, easier movement of heavy equipment, safer crane operations, and more efficient deliveries.
- Faster construction, simpler set-out, fewer constraints, and ability to run multiple work fronts.
- Improved safety, less risk from slopes, instability or difficult terrain.
- Efficient site layout, more flexibility for staging, stockpiles and site facilities.
- Simpler construction overall, especially beneficial for large structures like reservoirs.

The internal roads around the reservoir will be designed to allow for maintenance vehicles to drive through and around the reservoir with a minimum 6 meter wide access maintained. The site will include allocation of parking areas for IAWAI operations and maintenance teams as well as any sub-contractors appointed to carry out any future works on the new reservoir. The pump room and valve room will be position in the Southeastern portion of the site with ease of access to IAWAI operations and maintenance teams.

Reliability:

Score:	4/10
Score Description:	This scoring is rated a Low-Medium in terms of reliability due requiring more attention to issue such as cracking, leakage, contamination and general maintenance.
Weighting:	10% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria’s, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

The reliability of a rectangular reservoir is generally considered moderate, with performance largely dependent on detailing and construction quality. The straightforward geometry enables consistent construction and predictable behaviour in many areas of the structure, particularly along the straight wall sections, where loads are well understood and managed through conventional reinforced concrete design approaches.
However, rectangular reservoirs inherently experience uneven stress distribution, particularly at corners and wall intersections. These areas are subject to higher stress concentrations, increasing the likelihood of cracking and potential leakage if not carefully detailed and constructed. As a result, additional reinforcement, crack control measures, and high-quality workmanship are required to maintain long-term reliability.

In terms of durability, the larger wall spans typical of rectangular reservoirs can lead to increased bending moments, which may contribute to greater structural demand and long-term performance considerations. This can result in a higher reliance on ongoing inspection and maintenance to ensure water tightness and structural integrity over the asset's life.

Overall, rectangular reservoirs provide a reliable solution when designed and constructed to a high standard, but they are more dependent on careful detailing, particularly at corners and joints compared to circular reservoirs. With appropriate design controls and quality assurance during construction, they can achieve satisfactory long-term performance, albeit with a greater emphasis on crack management and maintenance.

Access for Maintenance:

Score:	7/10
Score Description:	This scoring is rated a Medium-High as rectangular reservoirs generally provide good maintenance access.
Weighting:	10% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

Rectangular reservoirs generally provide good maintenance access, straight walls simplify external inspections and repair activities, while multiple access points, walkways, and valve chambers can be incorporated into the design to facilitate operational and maintenance activities.

However, compared with circular reservoirs, rectangular reservoirs have internal corners, longer wall-to-floor interfaces, and potentially larger roof areas that require additional inspection and cleaning. Sediment and debris can accumulate in corners, increasing maintenance effort over the asset life.

Flexibility of Operations:

Score:	7/10
Score Description:	This scoring is rated a Medium-High as rectangular reservoirs have good operational advantages. However, having one reservoir poses a risk when the reservoir is offline due to contamination, cleaning or general maintenance, etc there are no backup water supply storage.
Weighting:	10% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

A single-reservoir configuration offers lower upfront capital costs but provides limited operational flexibility and creates a single point of failure within the water supply system. Maintenance activities, emergency repairs, and future renewals can have a greater impact on service delivery, resulting in increased operational risk and reduced network resilience compared with a dual-reservoir arrangement.

The operational requirements of a rectangular reservoir are generally higher and more management-intensive, reflecting its hydraulic behaviour and geometric characteristics. A key requirement is the need to manage non-uniform water circulation. Rectangular reservoirs tend to create stagnant zones, particularly in corners and along long walls, which can reduce mixing efficiency and affect water quality. As a result, operational measures such as careful inlet/outlet configuration, periodic flushing, or even mechanical mixing may be required to maintain adequate turnover and prevent stratification.

Rectangular reservoirs also require more active management of water age and quality. Due to less efficient circulation, there is a greater risk of uneven turnover, which may lead to variations in chlorine residuals and localised deterioration in water quality. Operators may therefore need to implement more frequent monitoring and operational interventions to maintain consistent performance across the reservoir.

From a structural operations standpoint, there is an increased need for inspection and monitoring. Corners and wall junctions are more susceptible to cracking and leakage, requiring regular inspection regimes to identify defects early and maintain serviceability. Long wall spans can also contribute to greater structural demand, reinforcing the need for proactive asset management. However, rectangular reservoirs offer advantages in operational flexibility. Their geometry allows for easier compartmentalization and integration with treatment processes, making them well suited to systems where staged operation, isolation, or process control is required. This flexibility can be beneficial in complex or space-constrained sites.

Overall, rectangular reservoirs require a higher level of operational input, including active hydraulic management, more frequent monitoring, and targeted interventions. While they provide flexibility in layout and operation, maintaining optimal performance typically involves greater ongoing operational effort compared to circular configurations.

Seismic Performance (Resilience):

Score:	3/10
Score Description:	This scoring is rated a Low as rectangular reservoirs experience sever seismic impacts and adversely affects their performance and resilience.
Weighting:	5% / 100%
Weighting Description:	Due to this element being a long term, however seeing its location not being majorly affected by seismic events and on the lower importance of the criteria, the weighted points are 5% out of the accumulative total criteria weighting of 100%.

Rectangular reservoirs can achieve average/good seismic performance when designed to modern seismic standards. However, they experience more complex structural behaviour than circular reservoirs due to stress concentrations at corners and wall intersections. These areas typically require additional reinforcement and detailing to manage earthquake-induced forces and reduce the risk of localised cracking.

Overall, rectangular reservoirs are a robust and can be resilient solution for water storage infrastructure, although circular reservoirs generally provide superior seismic efficiency and performance due to their more uniform distribution of seismic forces and absence of corners.

3.2.4 Water Quality & Efficiency

Score:	5/10
Score Description:	This scoring is rated a Medium as water quality and efficiency in a rectangular reservoir are generally moderate, with performance influenced by geometry and hydraulic behaviour.
Weighting:	20% / 100%
Weighting Description:	Due to this element being a long term and of the highest critical importance in the criteria, the weighted points are 20% out of the accumulative total criteria weighting of 100%.

Water quality and efficiency in a rectangular reservoir are generally moderate, with performance influenced by geometry and hydraulic behaviour.

A key limitation is the tendency for non-uniform flow patterns, particularly in corners and along long wall sections. These areas can create stagnant or low-velocity zones, which reduce mixing efficiency and lead to uneven water turnover. As a result, water quality parameters such as chlorine residual and temperature can vary within the reservoir, requiring closer operational control.

Rectangular reservoirs are also more prone to sediment accumulation, as corners and edges function as natural collection points for sludge, debris, and biofilm. This can negatively impact water quality over time and necessitates more frequent operational measures such as flushing or cleaning to maintain acceptable conditions.

From an efficiency perspective, the less effective natural circulation often requires additional operational input. This may include optimised inlet and outlet configurations, periodic flushing regimes, or in some cases, mechanical mixing to improve water movement and prevent stratification. These interventions increase operational effort compared to more hydraulically efficient configurations.

Overall, rectangular reservoirs can achieve acceptable water quality and efficiency with appropriate design and operational management. However, they typically require greater intervention and monitoring to maintain consistent performance, with lower inherent hydraulic efficiency compared to circular reservoirs due to the presence of corners and elongated flow paths.

3.2.5 High-Level Operational Cost Considerations

Score:	5/10
Score Description:	This scoring is rated a Medium due to rectangular reservoirs having higher lifecycle cost profile with regards to ongoing operations.
Weighting:	10% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

Over the lifecycle of the asset, rectangular reservoirs generally incur higher maintenance and operational costs. The presence of corners and joints increases the likelihood of cracking and leakage, leading to ongoing repair requirements such as crack injection, resealing, and waterproofing maintenance. In addition, poorer hydraulic performance can necessitate more frequent cleaning and operational intervention, further increasing whole-of-life costs.

Rectangular reservoirs can, however, offer cost advantages in certain applications. Their compatibility with rectangular sites can reduce earthworks and land acquisition costs, and their ability to be easily compartmentalised can improve operational flexibility without requiring additional reservoirs. These factors can provide indirect cost benefits depending on site constraints and project requirements.

Overall, rectangular reservoirs present a lower initial construction cost but higher lifecycle cost profile, where savings in simplicity and speed are balanced by increased material usage and ongoing maintenance requirements.

3.2.6 Bulk Visual Impact

Score:	9/10
Score Description:	This scoring is rated as High, as rectangular reservoirs typically have a lower profile and can be more effectively integrated into the surrounding landscape, reducing visual dominance and perceived bulk. Their linear form and ability to follow site contours can minimise visual intrusion and lessen impacts on local visual amenity.
Weighting:	5% / 100%
Weighting Description:	Due to this element being a long term, the weighted points are 5% out of the accumulative total criteria weighting of 100%.

The rectangular reservoir achieves a High score for bulk visual impact due to its lower profile and reduced height compared with an equivalent circular reservoir. By distributing the storage volume across a broader footprint, the reservoir presents a less visually dominant form, particularly when viewed from surrounding residential areas and public viewpoints. Its regular geometry also allows for effective integration of landscaping, screening, earth bunding, and architectural treatments that further reduce perceived scale and visual prominence.

Overall, the lower height, reduced visual dominance, and strong opportunities for mitigation result in a lower bulk visual impact and a more compatible fit within the surrounding landscape.

3.2.7 Ability to Mitigate Aesthetic Effects

Score:	5/10
Score Description:	This scoring is rated a Medium as rectangular reservoirs appear more massive or imposing, especially when long wall lengths are visible. This can exacerbate shading and visual intrusion for nearby properties where separation distances are limited.
Weighting:	15% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

The ability to mitigate aesthetic effects for a rectangular reservoir is influenced by its scale, geometry, and the opportunities available for visual screening and landscape integration. While the regular geometry readily accommodates mitigation measures such as landscaping, earth bunding, architectural cladding, façade treatments, and planting, the long wall lengths and overall scale can create a visually prominent structure.

Where separation distances to neighbouring properties are limited, the reservoir may increase shading effects and visual intrusion, reducing the effectiveness of mitigation measures and resulting in a more imposing presence. The linear form supports a well-organised site layout and enables screening and ancillary infrastructure to be integrated effectively.

However, some visual prominence may remain, particularly where screening opportunities are constrained. Overall, the reservoir provides good opportunities for aesthetic mitigation, although its scale and potential shading effects remain key limitations.

Potential mitigation measures during detailed design may include reservoir wall cladding or façade treatments, landscape planting and architectural finishes or patterns incorporated into the concrete wall surfaces.

Boffa Miskell have prepared Preliminary Sunshade Studies, please refer to Annexure C and Annexure D for General Examples of what Option B reservoir may look like.

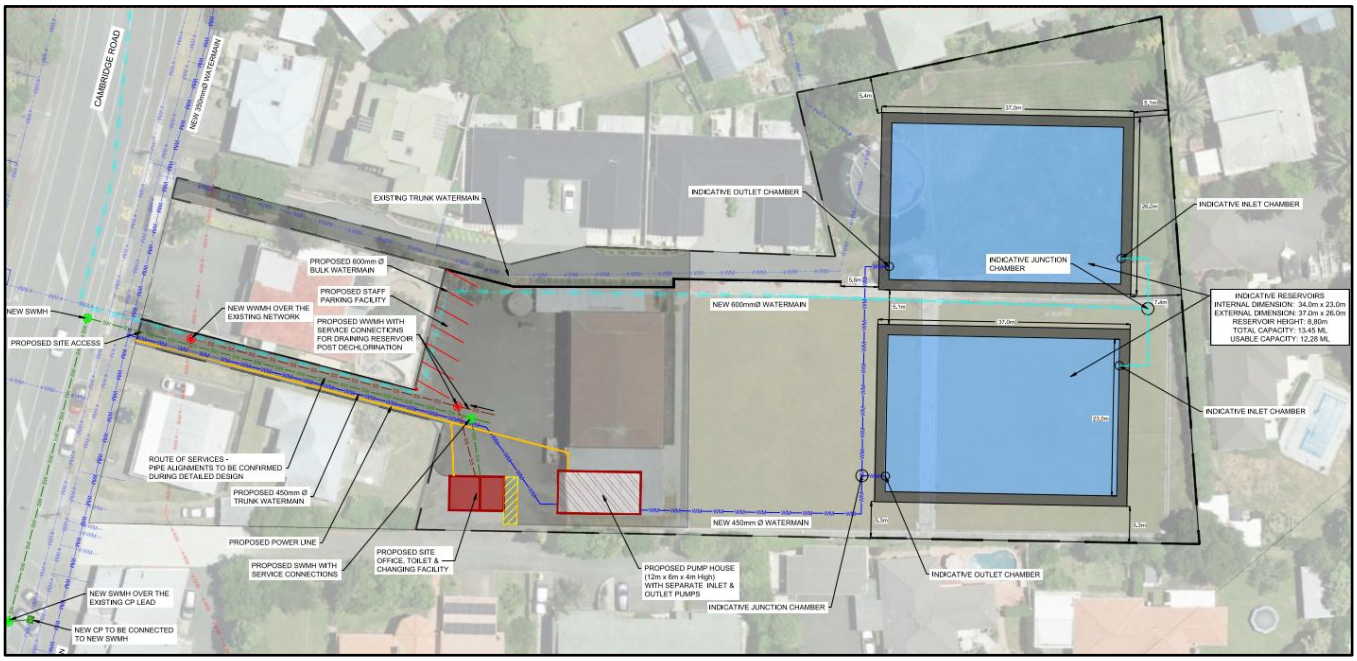
3.3 Option C – Two Rectangular Reservoirs

This option utilises the use of 2 rectangular reservoirs, each having the same internal dimensions of 34.00m long x 23.00m wide x 7.85m high with a combined storage capacity of 12.28ML.

External footprint allows for an assumed 1.5m thick concrete reinforced wall equating to 37.00m long x 26.00m wide x 8.80m high using a flat roof.

This configuration caters for a single pump and valve room with entry and exit pipes. Location, configuration and size of pump and valve room to be finalised during detailed design. Parking areas, toilets and change rooms have also been catered for with their final positions finalised during detailed design. The reservoir would fill up via a proposed 600mm diameter bulk water main which runs off Cambridge Road up the driveway, along the boundary and into the reservoirs. Water from the proposed reservoirs would then be pumped out into a 450mm diameter trunk water main which would run along the South-East boundary, then go down the existing driveway back onto Cambridge Road where it would tee off and tie back into the water supply networks.

Figure 3.3.1: Option C – Concept Site Layout



(Refer to Annexure A for Full Scale Plan - Drawing No: HRWEW-MMD-00-XX-DR-C-0132)

Figure 3.3.2: Option C – 3D Render View 1



(Refer to Annexure B for Full Scale Plan - Figure 5)

Figure 3.3.3: Option C – 3D Render View 2



(Refer to Annexure B for Full Scale Plan - Figure 6)

3.3.1 Configuration Advantages & Disadvantages

Advantages	Disadvantages
Operational Flexibility:	2 x Reservoirs are More Expensive:
Ease of taking one reservoir offline for cleaning/maintenance.	Duplicate Walls, total higher perimeter.
Can maintain a supply continuously.	Duplicate Pipework and Valves
No full system shutdown	
Reliability and Risk:	Stress concentration at corners:
If one fails (Crack, contamination, seismic damage) the system can still function.	High risk of cracking and leakage
Easier to manage crack repairs and joint resealing.	
Seismic Performance:	Less structurally efficient:
Smaller Reservoirs ensure lower seismic forces effect	Walls subjected to bending and direct tension
Lower Sloshing impact	
Reduces risk of total system failure	Higher Material usage:
Uniform Stress Distribution	More reinforcement required for corners
Efficient Load Path (Hoop Action)	
Superior Hydrodynamic Performance	Maintenance issues:
Torsion Stability	Corners can accumulate sediments and debris
Hydraulic and Water Quality	Seismic Performance:
Better control of Turnover and mixing.	Directional Stiffness Imbalance
Isolate sediment issues.	High Bending stresses
	High Tensile stresses
Simple Construction:	Severe Corner Effects - Crack initiation under seismic loading
Straight walls, easy formwork and reinforcement layout.	Sloshing Problems
Efficient use of space:	
Fits well into urban/ grid layouts	
Good for Compartmentalisation:	
Easy to divide into chambers	

3.3.2 Pre and During Construction Considerations

Temporary Access to Site:

The proposed access during construction would be from the existing driveway at 111 Cambridge Road, Hillcrest.

The site would require extensive traffic management for heavy vehicles, considering the proximity to neighbouring houses and tight geometry increase disruption to immediate residents, complexity to access planning and construction of trunk and bulk mains through multiple intersections. The effects are expected to be relatively localised but prolonged, with TMPs required for large vehicle movements and careful management of residential access.

The works would need to be carefully staged and sequenced, with some temporary measures required despite limited-service relocations and no anticipated retaining structures.

Buildability:

Score:	7/10
Score Description:	This scoring is rated a Medium-High in terms of the simple geometry and well-established construction methods. Taking into account there are two reservoirs that would need to be planned and constructed adds further complexity.
Weighting:	5% / 100%
Weighting Description:	Due to this element being a temporary and once-off, the weighted points are 5% out of the accumulative total criteria weighting of 100%.

Large components may need to be dismantled and installed on site due to entrance access restrictions, this would include material delivery being split over multiple loads rather than having large items loaded and delivered at once. A methodology of Just-in-Time (JIT) would need to be adopted by the contractor to ensure the site remains safe and uncluttered and material brought in only when it is required for installation as to the construction project programme.

Constructing two rectangular reservoirs introduces additional complexity due to duplication of elements. Each reservoir requires its own foundations, walls, and potentially separate mechanical and hydraulic connections, which increases the extent of works and coordination requirements.

Construction sequencing becomes more involved, particularly if the reservoirs are built concurrently or need to share space for access, crane operations, and laydown areas. This can extend the programme and increase site management demands.

However, two reservoirs offer advantages in terms of staging and constructability flexibility. The works can be sequenced, either constructed one after the other or partially overlapping, allowing better management of resources and site constraints. Smaller individual structures are also easier to handle from a structural and construction perspective, with reduced wall lengths and lower stresses, which can simplify formwork and reinforcement installation in each reservoir.

There can also be practical benefits where site constraints exist. For example, constructing two smaller reservoirs may provide greater flexibility for working within confined sites, maintaining access routes, or managing construction around existing infrastructure or neighbouring properties.

Overall, two rectangular reservoirs introduce more complexity and duration, but provide greater flexibility in staging and site management, which can be advantageous depending on project constraints and construction strategy.

Construction Simplicity:

Score:	8/10
Score Description:	This scoring is rated a High in terms of the costs associated with its simple geometry and well-established construction methods. Although, two reservoirs required to be planned and constructed adds further associated costs.
Weighting:	5% / 100%
Weighting Description:	Due to this element being a temporary and once-off, the weighted points are 5% out of the accumulative total criteria weighting of 100%.

Constructing two rectangular reservoirs introduces additional complexity, although each individual reservoir maintains simple geometry and standard construction methods, the need to duplicate structural elements, services, and construction activities increases the overall effort. This includes multiple foundations, walls, and pipe connections, as well as more complex site coordination for access, craneage, and sequencing.

Two reservoirs can, however, offer advantages in terms of construction staging and flexibility. Works can be phased or sequenced, which may assist in managing site constraints or resource allocation. Smaller reservoir sizes can also be easier to handle in isolation. However, these benefits are generally outweighed by the added coordination and longer overall programme.

Overall, one large rectangular reservoir provides greater construction simplicity, with a more efficient and cohesive build process. Two rectangular reservoirs retain simplicity at the individual reservoir level but introduce additional complexity at the project level due to duplication and coordination requirements.

3.3.3 Post Construction Considerations – Operations and Maintenance

The access will be maintained permanently at 111 Cambridge Road after the reservoir is commissioned and will be used for ongoing operations and maintenance.

One of the positives of this site selection leverages the flat land area which the future reservoir would be built on, some of the immediate positives include:

- Lower cost and simpler earthworks, minimal cut/fill and reduced need for retaining structures.
- Better access and logistics, easier movement of heavy equipment, safer crane operations, and more efficient deliveries.
- Faster construction, simpler set-out, fewer constraints, and ability to run multiple work fronts.
- Improved safety, less risk from slopes, instability or difficult terrain.
- Efficient site layout, more flexibility for staging, stockpiles and site facilities.
- Simpler construction overall, especially beneficial for large structures like reservoirs.

The internal roads around the reservoirs will be designed to allow for maintenance vehicles to drive through and around the reservoirs including between the two reservoirs with a minimum 5 meter wide access maintained. The site will include allocation of parking areas for IAWAI operations and maintenance teams as well as any sub-contractors appointed to carry out any future works on the new reservoirs. The pump room and valve room will be position in the south eastern portion of the site with ease of access to IAWAI operations and maintenance teams.

Reliability:

Score:	6/10
Score Description:	This scoring is rated a Medium in terms of reliability due having two reservoirs provides you with added confidence that one reservoir will always be able to operate if the other one is taken offline for maintenance, repairs, etc. However, rectangular reservoirs do require attention to issue such as cracking, leakage, contamination and general maintenance.
Weighting:	10% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

A configuration with two rectangular reservoirs generally offers substantially higher reliability at a system level. The key advantage is redundancy, if one reservoir experiences an issue such as cracking, leakage, contamination, or requires maintenance, the second reservoir can remain operational and continue supplying water. This reduces the risk of service interruption and ensures continuity of supply, which is particularly important for municipal systems and critical infrastructure.

In addition, two smaller reservoirs reduce the overall system risk exposure. Structural and operational risks are effectively distributed across two assets rather than concentrated in a single structure. This also improves resilience under extreme conditions, such as seismic events, where smaller reservoirs are subjected to lower forces and the likelihood of total system failure is reduced.

By contrast, one large rectangular reservoir introduces a single point of failure. Any significant issue, whether structural (cracking or leakage), operational, or water quality-related can impact the entire storage system. Maintenance activities also require either full shutdown or reliance on alternative storage, increasing operational risk and potential service disruption.

Overall, two rectangular reservoirs provide a more reliable and resilient solution, offering redundancy, reduced consequence of failure, and improved system robustness. In contrast, one large rectangular reservoir is inherently less reliable at a system level, due to its single point of failure and higher consequence risk, despite being simpler from a construction standpoint.

Access for Maintenance:

Score:	8/10
Score Description:	This scoring is rated a High as rectangular reservoirs generally provide good maintenance access. Having 2 rectangular reservoirs at smaller sizes as compared to having one large rectangular reservoir adds to the accessibility element during maintenance.
Weighting:	10% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

Rectangular reservoirs generally provide good maintenance access, straight walls simplify external inspections and repair activities, while multiple access points, walkways, and valve chambers can be incorporated into the design to facilitate operational and maintenance activities.

However, compared with circular reservoirs, rectangular reservoirs have internal corners, longer wall-to-floor interfaces, and potentially larger roof areas that require additional inspection and cleaning. Sediment and debris can accumulate in corners, increasing maintenance effort over the asset life.

By having two rectangular reservoirs, maintenance can be undertaken on one reservoir while the other remains operational, significantly improving maintainability, operational flexibility, and security of supply.

Flexibility of Operations:

Score:	8/10
Score Description:	This scoring is rated a High as rectangular reservoirs are considered to have good operational advantages. Having 2 reservoir benefits the operations flexibility in the sense that if one is taken offline the other can remain active with backup water supply storage keeping constant supply into the network.
Weighting:	10% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

A configuration with two rectangular reservoirs generally requires a higher level of operational coordination but delivers significantly greater flexibility. Operators can manage storage dynamically by alternating between reservoirs, allowing one reservoir to be taken offline for cleaning, inspection, or repair while maintaining continuous supply from the other. This enables better control of water turnover, improves resilience during outages, and reduces the operational impact of maintenance activities.

Two reservoirs also support more effective demand management and system control. Flows can be balanced between reservoirs, and storage can be operated in stages to respond to fluctuations in demand. This improves operational efficiency and allows for more controlled water age management compared to a single large reservoir.

Operationally, a single large reservoir may require more careful management of water quality and turnover, as larger volumes and longer flow paths can increase the risk of uneven circulation and water age variation. In contrast, smaller reservoirs in a dual-reservoir setup can be operated more actively to maintain consistent turnover.

Overall, two rectangular reservoirs provide superior operational flexibility, resilience, and control, albeit with increased system complexity and coordination requirements. A single large rectangular reservoir offers simpler operation, but with reduced flexibility and a higher risk of operational disruption due to its dependence on a single asset.

Seismic Performance (Resilience):

Score:	4/10
Score Description:	This scoring is rated a Low as rectangular reservoirs experience sever seismic impacts and adversely affects their performance and resilience. Having two smaller rectangular reservoirs does add an advantage if one is offline, the other can remain operational.
Weighting:	5% / 100%
Weighting Description:	Due to this element being a long term, however seeing its location not being majorly affected by seismic events and on the lower importance of the criteria, the weighted points are 5% out of the accumulative total criteria weighting of 100%.

Rectangular reservoirs can achieve average/good seismic performance when designed to modern seismic standards. However, they experience more complex structural behaviour than circular reservoirs due to stress concentrations at corners and wall intersections. These areas typically require additional reinforcement and detailing to manage earthquake-induced forces and reduce the risk of localised cracking.

By having two separate reservoirs, the resilience is further enhanced through redundancy, allowing one reservoir to remain operational if the other is damaged, undergoing inspection, or requires repair.

Overall, rectangular reservoirs are a robust and can be resilient solution for water storage infrastructure, although circular reservoirs generally provide superior seismic efficiency and performance due to their more uniform distribution of seismic forces and absence of corners.

3.3.4 Water Quality & Efficiency

Score:	5/10
Score Description:	This scoring is rated a Medium as water quality and efficiency in a rectangular reservoir are generally moderate, with performance influenced by geometry and hydraulic behaviour.
Weighting:	20% / 100%
Weighting Description:	Due to this element being a long term and of the highest critical importance in the criteria, the weighted points are 20% out of the accumulative total criteria weighting of 100%.

Two rectangular reservoirs generally provide better water quality control and operational efficiency compared to a single large rectangular reservoir. Splitting the total storage into two reservoirs enables improved management of water turnover, allowing each reservoir to be operated independently or alternately. This supports more consistent water age, improved chlorine residual control, and the ability to isolate one reservoir for cleaning or water quality management while maintaining supply from the other.

In contrast, a single large rectangular reservoir is more prone to inefficient circulation and uneven water quality due to longer flow paths and larger internal areas. This increases the likelihood of stagnant zones, particularly in corners and along long walls, which can lead to variation in water age, reduced mixing efficiency, and increased sediment accumulation.

Overall, two rectangular reservoirs offer enhanced water quality performance and operational efficiency through better turnover control, reduced stagnation risk, and improved flexibility, whereas a single large rectangular reservoir typically requires greater operational intervention to achieve consistent performance.

3.3.5 High-Level Operational Cost Considerations

Score:	2/10
Score Description:	This scoring is rated a Low due to rectangular reservoirs having higher lifecycle cost profile with regards to ongoing operations. Having 2 smaller reservoirs do add to the ongoing operational expenses.
Weighting:	10% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

From a lifecycle perspective, two reservoirs can provide cost efficiencies over time. The ability to operate reservoirs independently reduces operational disruption during maintenance, avoids full system shutdowns, and allows maintenance activities to be distributed more effectively. This can reduce long-term maintenance costs and operational risk, particularly for larger reservoirs where structural and water quality issues are more pronounced.

Additionally, two smaller reservoirs reduce the consequences of failure and can improve overall system resilience, which may translate into lower risk-related costs over the asset's life. In contrast, a single large reservoir concentrates risk, meaning that any major issue can lead to more significant operational and financial impacts.

Overall, one large rectangular reservoir offers a lower initial cost solution, while two rectangular reservoirs provide a more resilient and potentially cost-efficient option over the long term, particularly when operational continuity and risk reduction are prioritised.

3.3.6 Bulk Visual Impact

Score:	9/10
Score Description:	This scoring is rated as High, as two rectangular reservoirs reduce overall visual dominance by breaking the storage volume into smaller, lower-profile structures, resulting in a less imposing visual presence and lower bulk visual impact.
Weighting:	5% / 100%
Weighting Description:	Due to this element being a long term, the weighted points are 5% out of the accumulative total criteria weighting of 100%.

The two rectangular reservoirs achieve a High score for bulk visual impact as the storage volume is distributed across two lower-profile structures, reducing apparent height, bulk, and visual dominance compared with a single large reservoir or circular reservoir configuration.

The lower reservoir height is particularly beneficial given the elevated site location, reducing visibility from surrounding residential areas and public viewpoints. The separation between the reservoirs also creates opportunities for landscaping, screening, and architectural treatments that further soften the visual appearance and integrate the infrastructure into the surrounding environment.

Overall, the reduced height, lower visual prominence, and strong mitigation opportunities result in a lower bulk visual impact and a more favourable visual outcome.

3.3.7 Ability to Mitigate Aesthetic Effects

Score:	7/10
Score Description:	This scoring is rated a Medium-High as rectangular reservoirs appear more massive or imposing, especially when long wall lengths are visible. This can exacerbate shading and visual intrusion for nearby properties where separation distances are limited. However, having 2 smaller rectangular reservoirs can provide a more balanced and adaptable visual outcome.
Weighting:	15% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

Two rectangular reservoirs provide strong opportunities to mitigate aesthetic effects by breaking the storage volume into smaller, lower-profile structures and creating space for landscaping, screening, and visual separation between the reservoirs.

The distributed layout allows visual impacts to be softened through planting, earth bunding, architectural cladding, and other design treatments, while reducing the prominence of any single structure.
Although additional infrastructure requires careful coordination to avoid visual clutter, the flexibility afforded by the layout enables a high degree of landscape integration and visual mitigation.

Overall, two rectangular reservoirs offer an effective platform for mitigating aesthetic effects and minimising impacts on surrounding visual amenity.

Potential mitigation measures during detailed design may include reservoir wall cladding or façade treatments, landscape planting and architectural finishes or patterns incorporated into the concrete wall surfaces.

Boffa Miskell have prepared Preliminary Sunshade Studies, please refer to Annexure C and Annexure D for General Examples of what Option C reservoirs may look like.

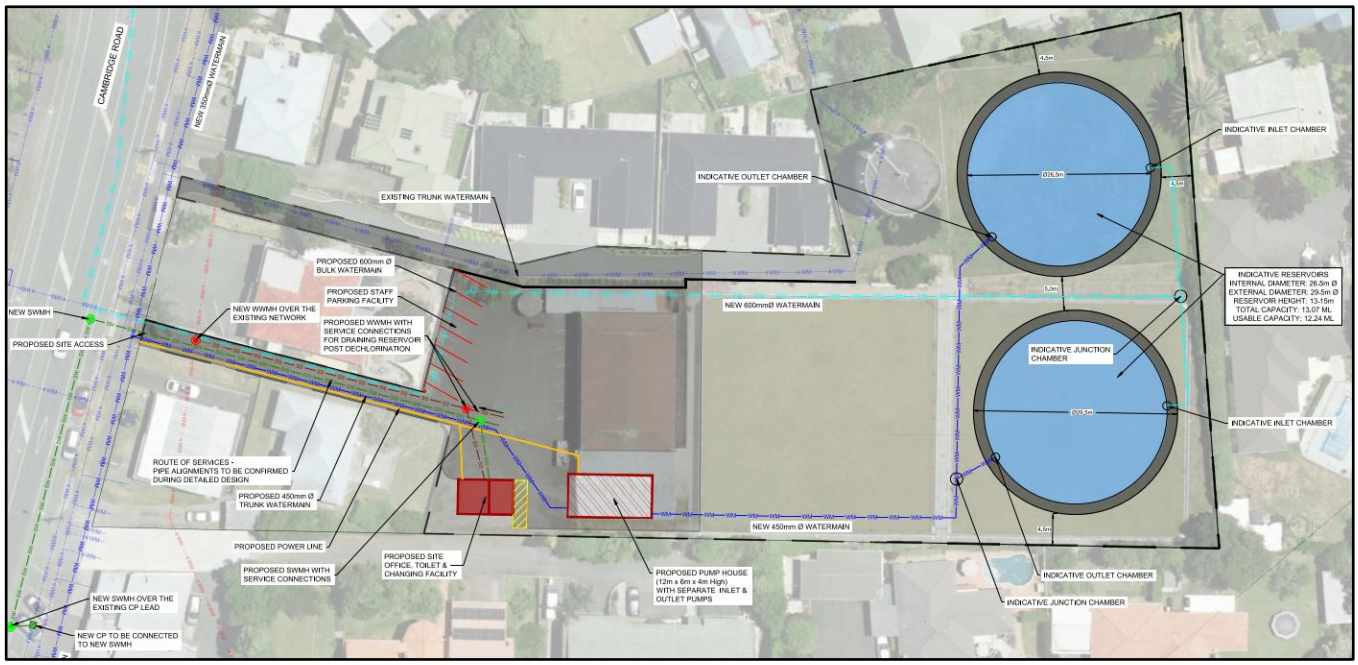
3.4 Option D – Two Circular Reservoirs

This option utilises the use of 2 circular reservoirs, each having the same internal dimensions of 26.50m diameter x 11.10m high with a combined storage capacity of 12.24ML.

External footprint allows for an assumed 1.5m thick concrete reinforced wall equating to 29,50m diameter x 13.15m high using a pitched roof for dissipating rainfall and aesthetic considerations at angle of 5° (1.3m additional height due to roof pitch).

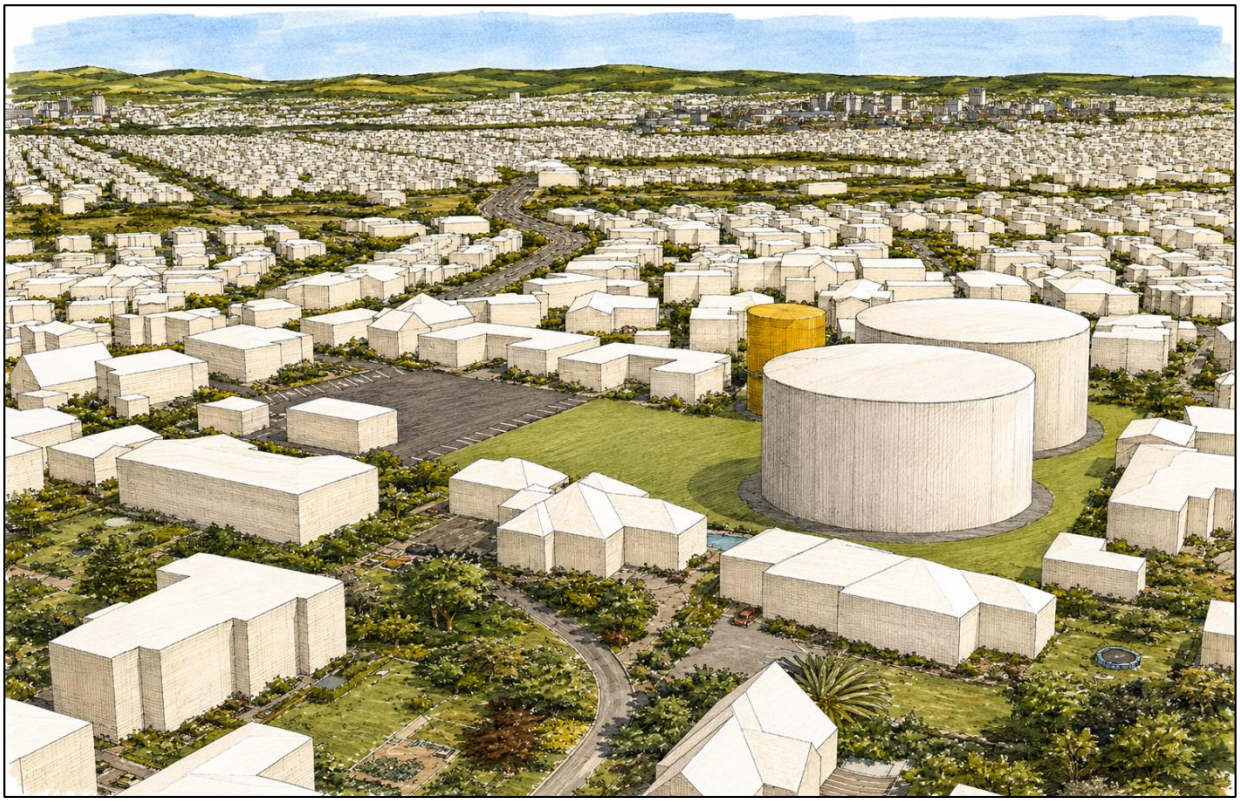
This configuration caters for a single pump and valve room with entry and exit pipes. Location, configuration and size of pump and valve room to be finalised during detailed design. Parking areas, toilets and change rooms have also been catered for with their final positions finalised during detailed design. The reservoir would fill up via a proposed 600mm diameter bulk water main which runs off Cambridge Road up the driveway, along the boundary and into the reservoirs. Water from the proposed reservoirs would then be pumped out into a 450mm diameter trunk water main which would run along the South-East boundary, then go down the existing driveway back onto Cambridge Road where it would tee off and tie back into the water supply networks.

Figure 3.4.1: Option D – Concept Site Layout



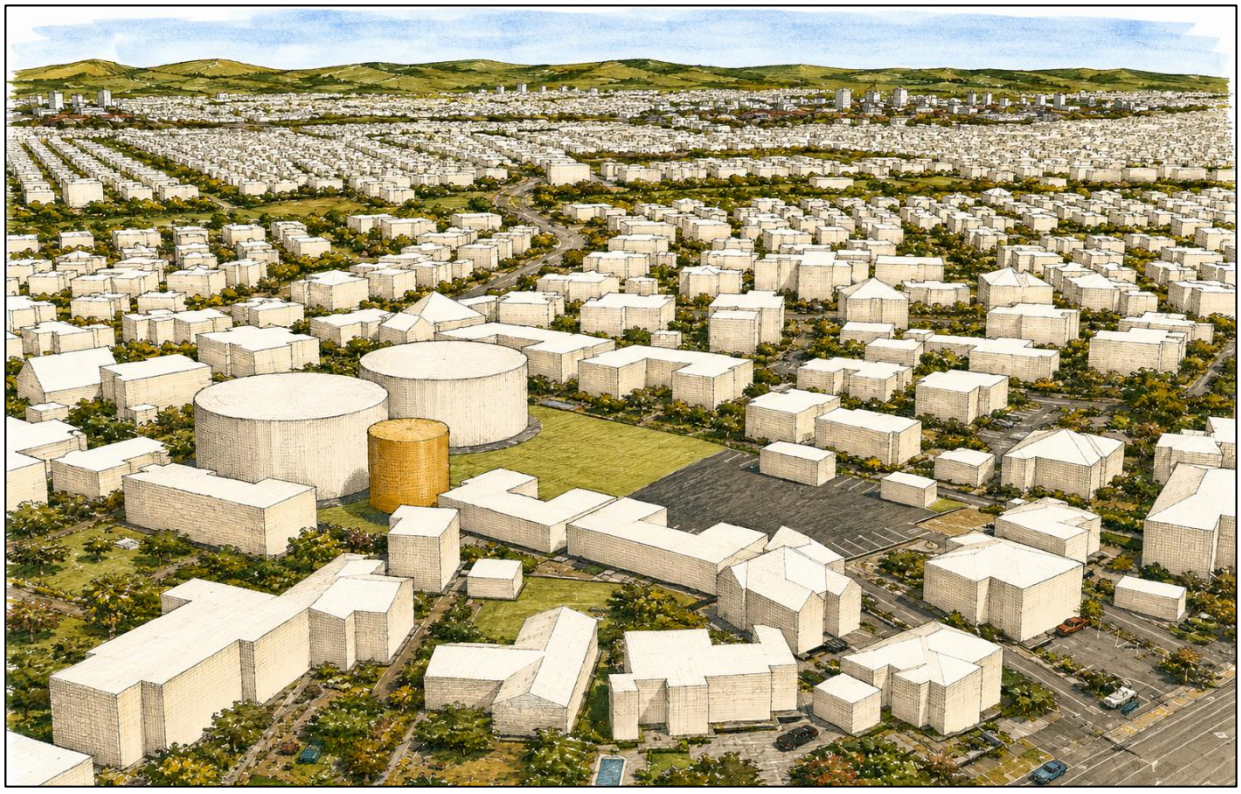
(Refer to Annexure A for Full Scale Plan - Drawing No: HRWEW-MMD-00-XX-DR-C-0134)

Figure 3.4.2: Option D – 3D Renders View 1



(Refer to Annexure B for Full Scale Plan - Figure 7)

Figure 3.4.3: Option D – 3D Renders View 2



(Refer to Annexure B for Full Scale Plan - Figure 8)

3.4.1 Configuration Advantages & Disadvantages

Advantages	Disadvantages
Operational Flexibility:	2 x reservoirs are More Expensive:
Ease of taking one reservoir offline for cleaning/maintenance.	Duplicate Walls, total higher perimeter.
Can maintain a supply continuously.	Duplicate Pipework and Valves
Easier Inspection Access	
No full system shutdown	More Complex Construction:
	Requires Curved formwork.
Reliability and Risk:	Skilled Labour Required
If one fails (Crack, contamination, seismic damage) the system can still function.	
Seismic Performance:	
Smaller Reservoirs ensure lower seismic forces effect	
Reduces risk of total system failure	
Hydraulic and Water Quality	
Better control of Turnover and mixing.	
Can Isolate stagnation issues.	
Best Structural Efficiency:	
Uniform hydrostatic pressure creates pure hoop tension.	
No stress concentrations which minuses cracking risks.	
Material Efficiency:	
Minimum Perimeter for the volume provided.	
Requires less concrete and reinforcement.	
Better Water- Tightness:	
No corners ensure fewer leakage paths.	
Hydraulically Superior:	
No Dead Zones	
Better Mixing and Circulation	

3.4.2 Pre and During Construction Considerations

Temporary Access to Site:

The proposed access during construction would be from the existing driveway at 111 Cambridge Road, Hillcrest.

The site would require extensive traffic management for heavy vehicles, considering the proximity to neighbouring houses and tight geometry increase disruption to immediate residents, complexity to access planning and construction of trunk and bulk mains through multiple intersections. The effects are expected to be relatively localised but prolonged, with TMPs required for large vehicle movements and careful management of residential access.

The works would need to be carefully staged and sequenced, with some temporary measures required despite limited-service relocations and no anticipated retaining structures.

Buildability:

Score:	6/10
Score Description:	This scoring is rated a Medium in terms of the increased challenges to construct a curved wall due to its circular geometry requires skilled labour and custom fabrication. As well as the fact that two reservoirs would need to be planned and constructed adds further complexity.
Weighting:	5% / 100%
Weighting Description:	Due to this element being a temporary and once-off, the weighted points are 5% out of the accumulative total criteria weighting of 100%.

Large components may need to be dismantled and installed on site due to entrance access restrictions, this would include material delivery being split over multiple loads rather than having large items loaded and delivered at once. A methodology of Just-in-Time (JIT) would need to be adopted by the contractor to ensure the site remains safe and uncluttered and material brought in only when it is required for installation as to the construction project programme.

Constructing one large circular reservoir is generally more efficient from a buildability perspective. It involves a single footprint, one set of foundations, and a continuous construction sequence, which simplifies coordination of formwork, reinforcement, and resources. Although circular reservoirs require specialised curved formwork, this system becomes highly efficient and repeatable once established, resulting in a more streamlined construction process overall.

In contrast, constructing two circular reservoirs introduces additional complexity due to duplication of structural elements and construction activities. Each reservoir requires its own formwork setup, reinforcement, foundations, and pipe connections, increasing the overall construction effort, programme duration, and coordination requirements.

However, two circular reservoirs provide benefits in terms of construction staging and site flexibility. Works can be phased, either sequentially or partially overlapping, allowing better management of resources, site constraints, and access requirements. Smaller individual reservoirs may also be more manageable in terms of formwork handling and geometry control.

Overall, one large circular reservoir offers greater construction efficiency and simplicity at the project level, while two circular reservoirs introduce additional coordination and cost, but provide greater flexibility in staging and site management where required.

Construction Simplicity (Costs):

Score:	5/10
Score Description:	This scoring is rated a Medium in terms of the costs associated with required skilled labour and custom fabrication due to its circular geometry, and the fact that two reservoirs would need to be planned and constructed adds further associated costs.
Weighting:	5% / 100%
Weighting Description:	Due to this element being a temporary and once-off, the weighted points are 5% out of the accumulative total criteria weighting of 100%.

The construction simplicity of one large circular reservoir is generally higher than that of two smaller circular reservoirs, primarily due to reduced duplication and a more streamlined build process.

Constructing two circular reservoirs introduces additional complexity at the project level. While each individual reservoir follows the same standardised and repeatable construction method, the need to replicate formwork systems, reinforcement installation, and construction activities effectively doubles key tasks. This increases coordination requirements, extends programme duration and adds complexity to site logistics and resource management.

However, two reservoirs can provide greater flexibility in construction staging, allowing works to be sequenced or phased to suit site constraints and resource availability. Smaller individual reservoirs may also be easier to manage in isolation, particularly in constrained sites or where access is limited.

Overall, one large circular reservoir offers greater construction simplicity, with a more efficient and streamlined build process, while two circular reservoirs introduce additional complexity due to duplication, albeit with some benefits in staging flexibility and site management.

3.4.3 Post Construction Considerations – Operations and Maintenance

The access will be maintained permanently at 111 Cambridge Road after the reservoir is commissioned and will be used for ongoing operations and maintenance.

One of the positives of this site selection leverages the flat land area which the future reservoir would be built on, some of the immediate positives include:

- Lower cost and simpler earthworks, minimal cut/fill and reduced need for retaining structures.
- Better access and logistics, easier movement of heavy equipment, safer crane operations, and more efficient deliveries.
- Faster construction, simpler set-out, fewer constraints, and ability to run multiple work fronts.
- Improved safety, less risk from slopes, instability or difficult terrain.
- Efficient site layout, more flexibility for staging, stockpiles and site facilities.
- Simpler construction overall, especially beneficial for large structures like reservoirs.

The internal roads around the reservoirs will be designed to allow for maintenance vehicles to drive through and around the reservoirs including between the two reservoirs with a minimum 4,5 meter wide access maintained.

The site will include allocation of parking areas for IAWAI operations and maintenance teams as well as any sub-contractors appointed to carry out any future works on the new reservoirs.

The pump room and valve room will be positioned in the south eastern portion of the site with ease of access to IAWAI operations and maintenance teams.

Reliability:

Score:	10/10
Score Description:	This scoring is rated a High in terms of reliability due to its inherently efficient structural behaviour of its circular geometry. Having two reservoirs provides you with added confidence that one reservoir will always be able to operate if the other one is taken offline for maintenance, repairs, etc.
Weighting:	10% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

The reliability of two circular reservoirs are generally superior compared to one large circular reservoir, primarily due to system-level redundancy and risk distribution.

With two reservoirs, the system benefits from operational redundancy, allowing one reservoir to remain in service if the other is taken offline for maintenance, repair, or in response to an operational issue. This significantly enhances continuity of supply and reduces the risk of total system outages. In contrast, a single large reservoir represents a single point of failure, where any structural, operational, or water quality issue can affect the entire storage capacity.

Two smaller circular reservoirs also improve resilience under extreme conditions, such as seismic events, as loads and risks are distributed across separate structures. This reduces the likelihood and consequence of system-wide failure. Additionally, maintenance and inspection activities can be carried out more effectively in smaller, isolated reservoirs, further supporting long-term reliability.

Overall, two circular reservoirs provide a more resilient and reliable solution, offering redundancy and reduced consequence of failure, whereas one large circular reservoir, while structurally efficient, carries higher system risk due to its single-asset dependency.

Access for Maintenance:

Score:	9/10
Score Description:	This scoring is rated a High as circular reservoirs are considered to offer a high level of maintenance accessibility. Having 2 circular reservoirs at smaller sizes as compared to having one large circular reservoir adds to the accessibility element during maintenance.
Weighting:	10% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

Two circular reservoir generally provide good maintenance access due to their simple geometry, continuous perimeter access, and absence of internal corners, which simplifies inspection, cleaning, and maintenance activities. By having two circular reservoirs, maintenance can be undertaken on one reservoir while the other remains operational, significantly improving maintainability, operational flexibility, and security of supply.

There is sufficient external access around the reservoir, roof access would be provided for inspection of equipment and hatches, internal confined-space access, and accessible valve chambers for inlet, outlet, overflow, and scour pipework.

Circular reservoirs also facilitate more efficient cleaning and inspection, as sediment accumulation is reduced and all internal surfaces are readily accessible.

Overall, circular reservoirs are considered to offer a high level of maintenance accessibility.

Flexibility of Operations:

Score:	9/10
Score Description:	This scoring is rated a High as circular reservoirs are considered to have key operational advantages. Having 2 reservoir benefits the operations flexibility in the sense that if one is taken offline the other can remain active with backup water supply storage keeping constant supply into the network.
Weighting:	10% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

A circular dual-reservoir configuration provides significantly greater operational flexibility, allowing reservoirs to be operated independently or alternately. This enables continuous supply during maintenance, improved control of water turnover, and better management of system demand. It also reduces operational risk, as one reservoir can remain in service if the other is offline.

In contrast, a single large circular reservoir offers simpler day-to-day operation, with a single system to manage. However, this simplicity comes with reduced flexibility, as the reservoir functions as a single operational unit. Maintenance, operational disruptions, or water quality issues can affect the entire storage system, requiring more careful planning and alternative supply arrangements.

Overall, two circular reservoirs provide superior operational performance, with enhanced flexibility, resilience, and control, whereas one large circular reservoir offers simplicity but with greater operational dependency and risk.

Seismic Performance (Resilience):

Score:	10/10
Score Description:	This scoring is rated a High as circular reservoirs are considered excellent in seismic performance and resilience. Having two smaller circular reservoirs is an added advantage if one is offline, the other can remain operational.
Weighting:	5% / 100%
Weighting Description:	Due to this element being a long term, however seeing its location not being majorly affected by seismic events and on the lower importance of the criteria, the weighted points are 5% out of the accumulative total criteria weighting of 100%.

Circular reservoirs generally provide excellent seismic performance and resilience due to their symmetrical geometry, which distributes earthquake-induced forces uniformly around the structure and avoids stress concentrations associated with corners. This reduces the likelihood of cracking, structural damage, and loss of serviceability during seismic events.

The efficient structural behaviour of circular reservoirs also enables them to better resist hydrodynamic forces generated by water movement during earthquakes, supporting continued operation following a seismic event. By having two separate reservoirs, the resilience is further enhanced through redundancy, allowing one reservoir to remain operational if the other is damaged, undergoing inspection, or requires repair.

Overall, circular reservoirs are considered a highly resilient solution for critical water supply infrastructure, offering strong seismic performance, reduced risk of failure, and improved post-earthquake service continuity.

3.4.4 Water Quality & Efficiency

Score:	10/10
Score Description:	This scoring is rated a High due to circular reservoirs providing strong benefits in terms of both water quality and operational efficiency, largely due to their uniform geometry and hydraulic behaviour.
Weighting:	20% / 100%
Weighting Description:	Due to this element being a long term and of the highest critical importance in the criteria, the weighted points are 20% out of the accumulative total criteria weighting of 100%.

Two circular reservoirs generally provide enhanced water quality management and operational efficiency compared to a single large circular reservoir, primarily due to improved control and flexibility.

With two reservoirs, operators can alternate or independently operate each reservoir, enabling more effective control of water turnover, water age, and chlorine residuals. This improves consistency in water quality and allows one reservoir to be isolated for cleaning or maintenance while maintaining continuous supply from the other.

While a single large circular reservoir already benefits from excellent hydraulic performance, including uniform circulation, minimal dead zones, and efficient mixing its operation is constrained to a single system. Any water quality issue or maintenance requirement affects the entire storage volume, limiting flexibility in managing turnover and intervention.

Overall, two circular reservoirs offer superior operational efficiency and water quality control, through improved turnover management and flexibility. A single large circular reservoir remains highly efficient hydraulically, but with reduced operational adaptability compared to a dual-reservoir configuration.

3.4.5 High-Level Operational Cost Considerations

Score:	4/10
Score Description:	This scoring is rated a Medium, having 2 smaller reservoirs do add to the ongoing operational expenses.
Weighting:	10% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

From a lifecycle perspective, two reservoirs can provide cost advantages over time. The ability to operate reservoirs independently allows for maintenance without full system shutdown, reducing operational disruption and associated costs. In addition, improved resilience and reduced consequences of failure can lower risk-related costs and improve long-term asset performance.

While two reservoirs provide reduced operational disruption, improved system resilience, and lower risk-related costs by enabling one reservoir to remain in service during maintenance or unplanned outages, they also incur higher ongoing operational and maintenance costs than a single reservoir due to the duplication of assets, equipment, inspections, and lifecycle renewals.

Overall, a single large circular reservoir represents the most cost-effective solution, while two circular reservoirs deliver superior resilience and security of supply where operational continuity is a priority.

3.4.6 Bulk Visual Impact

Score:	7/10
Score Description:	This scoring is rated as Medium-High, as two circular reservoirs distribute the overall storage volume across separate structures, reducing the apparent bulk and visual dominance of any single reservoir. While the combined infrastructure remains visually prominent, the separation of the reservoirs can help break up the massing and reduce the perceived scale and visual impact when viewed from surrounding areas.
Weighting:	5% / 100%
Weighting Description:	Due to this element being a long term, the weighted points are 5% out of the accumulative total criteria weighting of 100%.

The two circular reservoirs distribute the storage volume across separate structures, reducing the apparent bulk and visual dominance of any single reservoir. The separation between reservoirs also provides opportunities for landscaping, screening, and architectural treatments that can soften views and improve visual integration.

However, the reservoirs remain relatively tall structures and, when combined with the elevated site location, are likely to remain visible from surrounding residential areas and public viewpoints.

While the split configuration reduces perceived mass compared with a single large reservoir, the height and prominence of the structures continue to contribute to a noticeable visual presence. Accordingly, this option has been assigned a Medium-High score for bulk visual impact.

3.4.7 Ability to Mitigate Aesthetic Effects

Score:	7/10
Score Description:	This scoring is rated as Medium-High, as two circular reservoirs provide strong opportunities to mitigate aesthetic effects through landscaping, screening, architectural cladding, and visual integration measures. The separation of the reservoirs reduces the apparent scale of the development and creates additional space for landscape treatment.
Weighting:	15% / 100%
Weighting Description:	Due to this element being a long term and one of the important criteria's, the weighted points are 10% out of the accumulative total criteria weighting of 100%.

Two circular reservoirs provide good opportunities to mitigate aesthetic effects by creating space for landscaping, screening, architectural cladding, and visual separation between structures.

The split configuration reduces the apparent mass of the development and allows visual breaks that improve integration with the surrounding environment.

However, the increased height of the individual reservoirs, resulting from their smaller footprint, makes them more difficult to screen effectively than lower-profile alternatives.

Overall, while the configuration offers strong mitigation opportunities through site design and landscape treatment, the taller reservoir height limits the effectiveness of these measures and remains a key visual constraint.

Potential mitigation measures during detailed design may include reservoir wall cladding or façade treatments, landscape planting and architectural finishes or patterns incorporated into the concrete wall surfaces.

Boffa Miskell have prepared Preliminary Sunshade Studies, please refer to Annexure C and Annexure D for General Examples of what Option D reservoirs may look like

4 Summary

The table below provides a summary of the configuration comparison with their relative dimensions.

Table 2: Configuration Summary

OPTIONS	CRITERIA		
	RESERVOIR FOOTPRINT (m²)	EXTERNAL HEIGHT (m)	OPERATIONAL / USEABLE VOLUME CAPACITY (ML)
OPTION A - CIRCULAR	1,452	12,60	12,25
OPTION B - RECTANGULAR	1,998	8,00	12,22
OPTION C - 2 x RECTANGULAR	1,924	8,80	12,28
OPTION D - 2 x CIRCULAR	1,367	13,15	12,24

The four configuration options have been assessed across key criteria's, including advantages and disadvantages, preliminary planning, construction and post-construction considerations, temporary and permanent access requirements, ongoing and future operational and maintenance considerations, high-level costs, water quality and efficiency, bulk visual impact, overall aesthetics and stakeholder considerations.

While each option presents both benefits and drawbacks, alignment with IAWAI's long-term objectives required the selection of a single preferred option that delivers the greatest overall value to the city and its customers.

Other possibilities of configuration options and shapes were dismissed due to their non-feasible characteristics in long-term lifespan and cost considerations.

Each configuration has been assessed against the key criteria's and are provided in the table below, using a Low, Medium, and High scale, with "High" being the best.

Table 3: Configuration Options Ratings

CRITERIA	OPTION A CIRCULAR	OPTION B RECTANGULAR	OPTION C 2 x RECTANGULAR	OPTION D 2 x CIRCULAR
Buildability:	Medium-High	High	Medium-High	Medium
Construction Simplicity (Costs):	Medium	High	High	Medium
Reliability:	High	Medium	Medium	High
Access for Maintenance:	Medium-High	Medium-High	High	High
Flexibility of Operations:	Medium-High	Medium-High	High	High
Seismic Performance (Resilience)	High	Low	Low	High
Water Quality & Efficiency	High	Medium	Medium	High
High-Level Operating Cost Considerations	Medium - High	Medium	Low	Medium
Bulk Visual Impact	Medium	High	High	Medium-High
Ability to Mitigate Aesthetic Effects	Medium-High	Medium	Medium-High	Medium-High

A simple score per each criteria have been assessed by Low, Medium and High, these provided in summary below out of a total of 100, each assessment criterion was scored on a scale of 1 to 10, where 1 represents the least favourable outcome and 10 represents the most favourable outcome. Scores were grouped into qualitative descriptors comprising Low (1-3), Medium (4-6), Medium-High (7), and High (8-10). The ratings reflect the relative performance of each option against the assessment criteria, considering both short-term delivery requirements and long-term operational, maintenance, resilience, and lifecycle outcomes.

Table 4: Configuration Options Scoring

CRITERIA	OPTION A CIRCULAR	OPTION B RECTANGULAR	OPTION C 2 x RECTANGULAR	OPTION D 2 x CIRCULAR
Buildability:	7	8	7	6
Construction Simplicity (Costs):	6	9	8	5
Reliability:	8	4	6	10
Access for Maintenance:	7	7	8	9
Flexibility of Operations:	7	7	8	9
Seismic Performance (Resilience)	9	3	4	10
Water Quality & Efficiency	10	5	5	10
High-Level Operational Cost Considerations	7	5	2	4
Bulk Visual Impact	5	9	9	7
Ability to Mitigate Aesthetic Effects	7	5	7	7
TOTAL	**73**	**62**	**64**	**77**

A further weighting has been applied to reflect the relative importance of short-term and long-term considerations, the key factors influencing reservoir purpose and functionality, and non-tangible criteria. The weighting assigned to each assessment criterion is provided in the final column and has been applied to each row, with the total weighting equating 100%.

Table 5: Configuration Options Final Scoring & Weightings

CRITERIA	OPTION A CIRCULAR	OPTION B RECTANGULAR	OPTION C 2 x RECTANGULAR	OPTION D 2 x CIRCULAR	WEIGHTING
Buildability:	3.5	4	3.5	3	5
Construction Simplicity (Costs):	3	4.5	4	2.5	5
Reliability:	8	4	6	10	10
Access for Maintenance:	7	7	8	9	10
Flexibility of Operations:	10.5	10.5	12	13.5	15
Seismic Performance (Resilience)	4.5	1.5	2	5	5
Water Quality & Efficiency	20	10	10	20	20
High-Level Operational Cost Considerations	7	5	2	4	10
Bulk Visual Impact	2.5	4.5	4.5	3.5	5
Ability to Mitigate Aesthetic Effects	10.5	7.5	10.5	10.5	15
TOTAL	**76.5**	**58.5**	**62.5**	**81**	**100**

Based on the overall assessment, Options A & D clearly score the highest and these two configurations have both been shortlisted from the initial four configurations.

5 Conclusion

In conclusion circular reservoirs operate best in the long run and has the best water mixing and recirculation characteristics for greater quality of water output. This option provides the best performance when operated with continuous in/out flow. A circular reservoir configuration has been identified as the preferred approach by IAWAI / Hamilton City Council stakeholders.

While the two reservoir arrangement results in a higher initial capital cost due to additional pipework, valves, instrumentation, and civil works, it provides significant long-term operational and resilience benefits. Given the critical function of the reservoir within the water supply network, the improved reliability, operational efficiency, and redundancy provided by two circular reservoirs outweigh the additional upfront capital investment, making this the preferred long-term solution.

Furthermore, from a maintenance perspective being circular, IAWAI would spend a lower amount to maintain and operate the reservoir in the long run and would see cost savings as opposed to selecting a large single rectangular reservoir (Option B) or 2 smaller rectangular reservoirs (Option C) having a high maintenance cost for maintaining leaks and cracks.

Regarding the design life considerations of options A & D, while construction complexity can be slightly higher, this is typically offset by lower long-term maintenance costs, greater durability and service life.

Lastly, options A & D provides the best overall aesthetics and visual considerations as there are no sharp edges and they can blend within the environment, making it more appealing to the residents that would partially have views of the reservoirs. This arrangement also maintains the right of way access and caters for the setbacks required from boundaries and safe working space around the reservoirs for maintenance teams.

6 Recommendations

Option D – two circular reservoirs is the recommended option to proceed forward with, from the considered overall assessment.

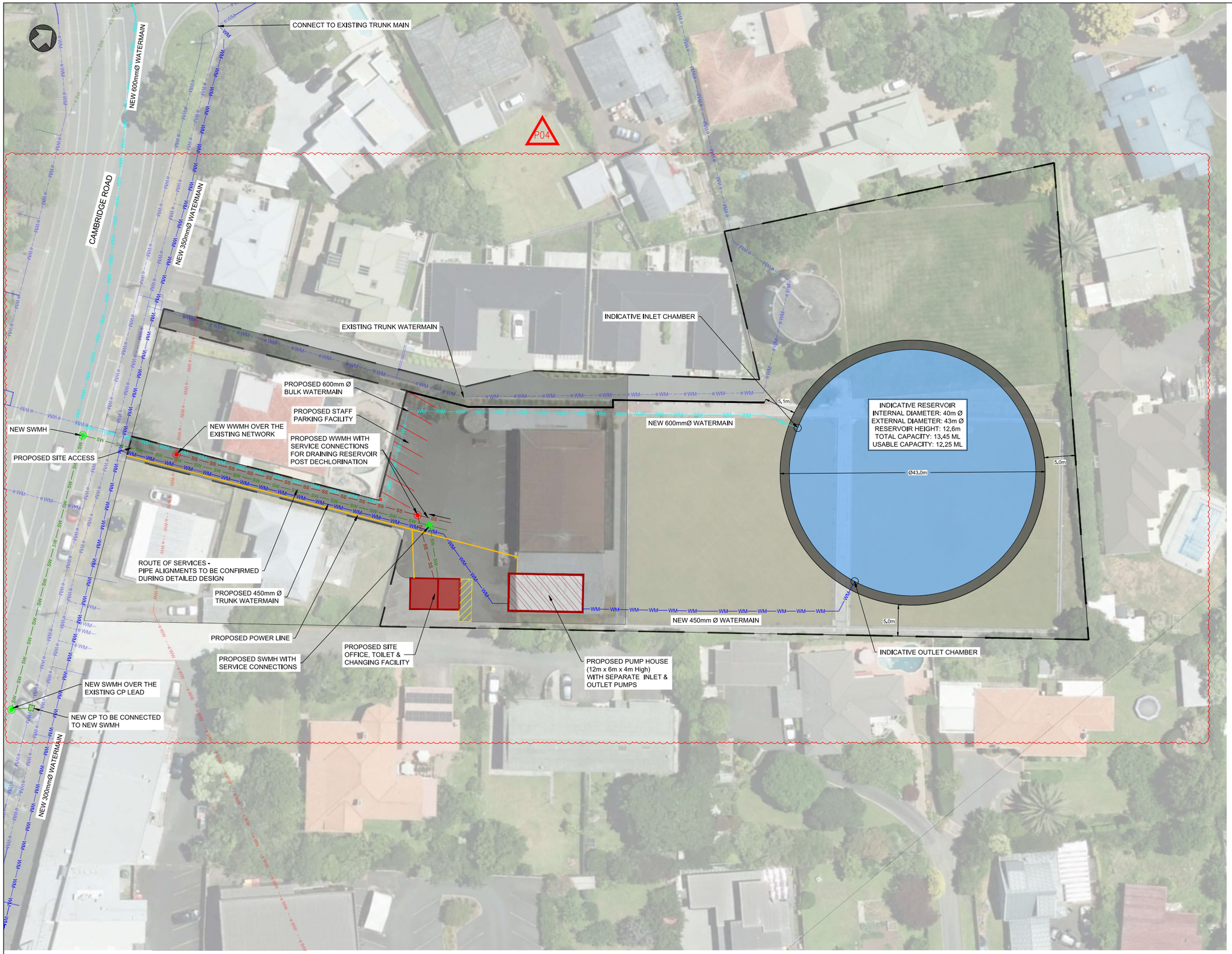
The two reservoir configuration offers enhanced security of supply, operational flexibility, maintainability, and asset resilience by allowing one reservoir to be taken offline for cleaning and routine maintenance whilst the other reservoir remains in operation having a 50% usable capacity which would assist in providing a constant supply to the residents in the area. This gives a greater flexibility to the IAWAI operations teams. In additional the circular reservoir allows simplified inspections and cleaning regimes.

It is recommended that the NoR and AEE process continue on the basis of two circular reservoirs. It is however noted, that a single circular reservoir option may be preferred, as more information is discovered, as the project investigation and design proceeds.

Appendices

A. Preliminary Configuration Options
B. 3D Configuration Option Renders by Boffa Miskell
C. Preliminary Sunshade Studies by Boffa Miskell
D. Indicative Reservoir Designs

A. Preliminary Configuration Options



1:300 0 15m 30m

© Mott MacDonald New Zealand

This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

C:\Users\sin120259\Mott MacDonald\Hillcrest Res & WM Early Stage Support - Proposal Project - Do\Develop\4. Long List to Short List\CAD\Hillcrest
RAG Model - Shortlist.dwg Aug 28, 2026 - 4:24PM sin120259

Notes

Key to symbols

LEGEND

- EXISTING WASTEWATER
- EXISTING STORMWATER
- EXISTING WATER
- PROPOSED COMMON SERVICE TRENCH
- PROPOSED PE TRUNK WATER MAIN
- PROPOSED PE BULK WATER MAIN
- PROPOSED STORMWATER
- PROPOSED WASTEWATER
- VEHICLE ACCESS ROAD
- CONCEPT RESERVOIR FOOTPRINT
- PROPERTY BOUNDARY

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P04	26/08/2026	JBS	REVISED LOCATION - BULK WATERMAIN	VP	BT
P03	31/07/2026	JBS	CLIENT'S LOGO REPLACED	VP	BT
P02	27/07/2026	JBS	CONCEPT FOR CLIENT REVIEW	VP	BT
P01	18/06/2026	JBS	CONCEPT FOR CLIENT REVIEW	VP	BT

Status Stamp

REFERENCE SKETCH

MOTT MACDONALD
Level 1
30 Daldy Street
Wynyard Quarter
Auckland 1010
New Zealand
T +64 (0)9 375 2400
W www.mottmac.com

Client

IAWAI

Title

HILLCREST RESERVOIR & WATERMAIN
111 CAMBRIDGE ROAD, HAMILTON
OPTION A - CONCEPT SITE LAYOUT

Designed	J.SINGH	JBS	Eng check	V.PATHER	VP
Drawn	J.SINGH	JBS	Coordination	P.EVANS	PE
Dwg check	V.PATHER	VP	Approved	B.TELFER	BT

MMD Project Number	Scale at A1	Security
705100882	1:300	STD

Suitability Description	Suit. Code
NOT FOR CONSTRUCTION	S1

Drawing Number	Revision
HRWEW-MMD-00-XX-DR-C-0130	P04



1:300 0 15m 30m

© Mott MacDonald New Zealand

This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

C:\Users\sin120259\Mott MacDonald\Hillcrest Res & WM Early Stage Support - Proposal Project - Do\Develop\4. Long List to Short List\CAD\Hillcrest
RAG Model - Shortlist.dwg Aug 28, 2026 - 4:25PM sin120259

Notes

Key to symbols

LEGEND

- EXISTING WASTEWATER
- EXISTING STORMWATER
- EXISTING WATER
- PROPOSED COMMON SERVICE TRENCH
- PROPOSED PE TRUNK WATER MAIN
- PROPOSED PE BULK WATER MAIN
- PROPOSED STORMWATER
- PROPOSED WASTEWATER
- VEHICLE ACCESS ROAD
- CONCEPT RESERVOIR FOOTPRINT
- PROPERTY BOUNDARY

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P04	26/08/2026	JBS	REVISED LOCATION - BULK WATERMAIN	VP	BT
P03	31/07/2026	JBS	CLIENT'S LOGO REPLACED	VP	BT
P02	27/07/2026	JBS	CONCEPT FOR CLIENT REVIEW	VP	BT
P01	18/06/2026	JBS	CONCEPT FOR CLIENT REVIEW	VP	BT

Status Stamp

REFERENCE SKETCH

MOTT MACDONALD
Level 1
30 Daldy Street
Wynyard Quarter
Auckland 1010
New Zealand
T +64 (0)9 375 2400
W www.mottmac.com

Client

IAWAI

Title

HILLCREST RESERVOIR & WATERMAIN
111 CAMBRIDGE ROAD, HAMILTON
OPTION B - CONCEPT SITE LAYOUT

Designed	J.SINGH	JBS	Eng check	V.PATHER	VP
Drawn	J.SINGH	JBS	Coordination	P.EVANS	PE
Dwg check	V.PATHER	VP	Approved	B.TELFER	BT

MMD Project Number	Scale at A1	Security
705100882	1:300	STD

Suitability Description	Suit. Code
NOT FOR CONSTRUCTION	S1

Drawing Number	Revision
HRWEW-MMD-00-XX-DR-C-0131	P04



1:300 0 15m 30m

© Mott MacDonald New Zealand

This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

C:\Users\sin120259\Mott MacDonald\Hillcrest Res & WM Early Stage Support - Proposal Project - Do\Develop\4. Long List to Short List\CAD\Hillcrest
RAG Model - Shortlist.dwg Aug 28, 2026 - 4:26PM sin120259

Notes

Key to symbols

LEGEND

- EXISTING WASTEWATER
- EXISTING STORMWATER
- EXISTING WATER
- PROPOSED COMMON SERVICE TRENCH
- PROPOSED PE TRUNK WATER MAIN
- PROPOSED PE BULK WATER MAIN
- PROPOSED STORMWATER
- PROPOSED WASTEWATER
- VEHICLE ACCESS ROAD
- CONCEPT RESERVOIR FOOTPRINT
- PROPERTY BOUNDARY

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P04	26/08/2026	JBS	REVISED LOCATION - BULK WATERMAIN	VP	BT
P03	31/07/2026	JBS	CLIENT'S LOGO REPLACED	VP	BT
P02	27/07/2026	JBS	CONCEPT FOR CLIENT REVIEW	VP	BT
P01	18/06/2026	JBS	CONCEPT FOR CLIENT REVIEW	VP	BT

Status Stamp

REFERENCE SKETCH

MOTT MACDONALD
Level 1
30 Daldy Street
Wynyard Quarter
Auckland 1010
New Zealand
T +64 (0)9 375 2400
W www.mottmac.com

Client

IAWAI

Title

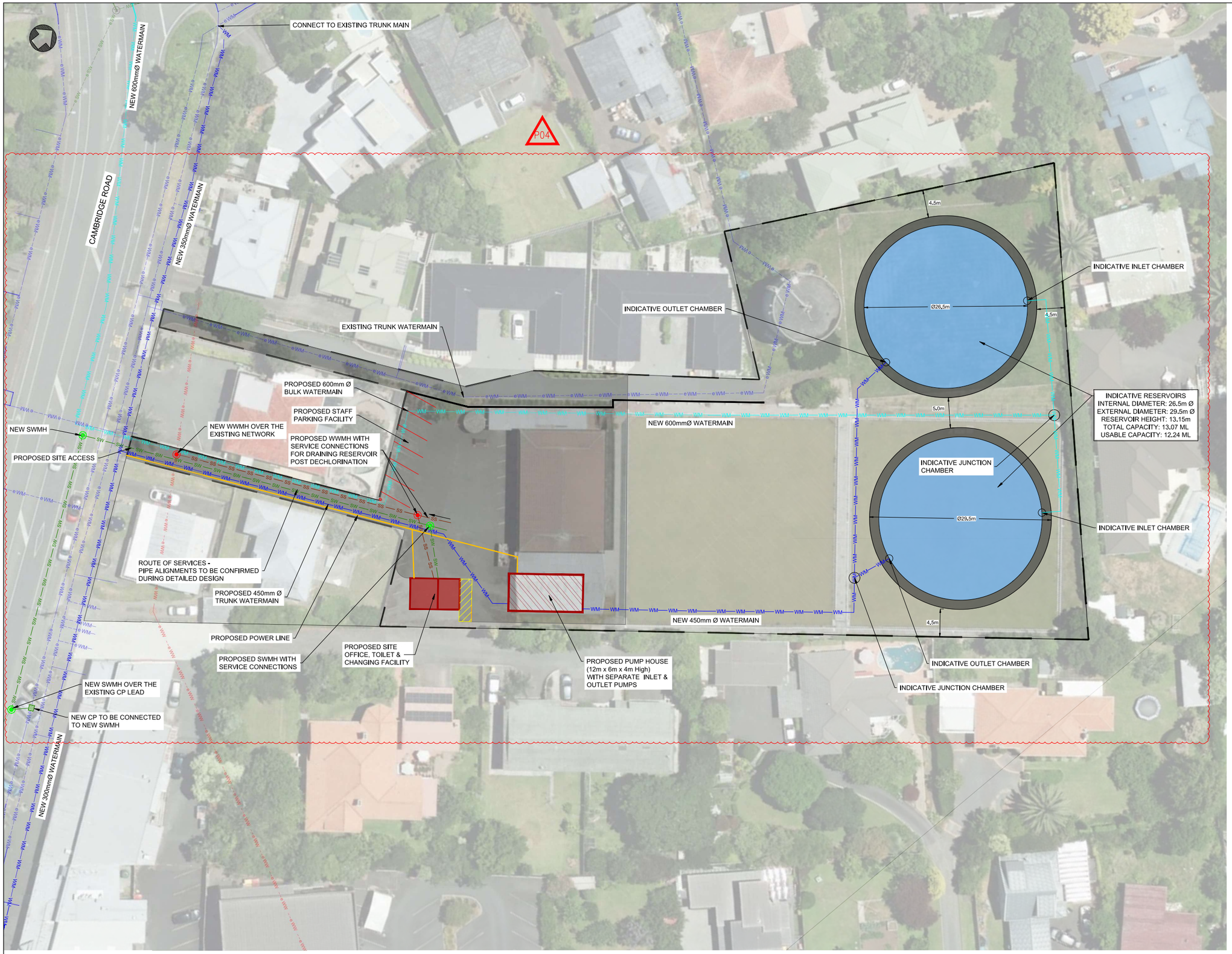
HILLCREST RESERVOIR & WATERMAIN
111 CAMBRIDGE ROAD, HAMILTON
OPTION C - CONCEPT SITE LAYOUT

Designed	J.SINGH	JBS	Eng check	V.PATHER	VP
Drawn	J.SINGH	JBS	Coordination	P.EVANS	PE
Dwg check	V.PATHER	VP	Approved	B.TELFER	BT

MMD Project Number	Scale at A1	Security
705100882	1:300	STD

Suitability Description	Suit. Code
NOT FOR CONSTRUCTION	S1

Drawing Number	Revision
HRWEW-MMD-00-XX-DR-C-0132	P04



1:300 0 15m 30m

© Mott MacDonald New Zealand

This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

C:\Users\sin120259\Mott MacDonald\Hillcrest Res & WM Early Stage Support - Proposal Project - Do\Develop\4. Long List to Short List\CAD\Hillcrest
RAG Model - Shortlist.dwg Aug 28, 2026 - 4:26PM sin120259

Notes

Key to symbols

LEGEND

- EXISTING WASTEWATER
- EXISTING STORMWATER
- EXISTING WATER
- PROPOSED COMMON SERVICE TRENCH
- PROPOSED PE TRUNK WATER MAIN
- PROPOSED PE BULK WATER MAIN
- PROPOSED STORMWATER
- PROPOSED WASTEWATER
- VEHICLE ACCESS ROAD
- CONCEPT RESERVOIR FOOTPRINT
- PROPERTY BOUNDARY

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P04	26/08/2026	JBS	REVISED LOCATION - BULK WATERMAIN	VP	BT
P03	31/07/2026	JBS	CLIENT'S LOGO REPLACED	VP	BT
P02	27/07/2026	JBS	CONCEPT FOR CLIENT REVIEW	VP	BT
P01	18/06/2026	JBS	CONCEPT FOR CLIENT REVIEW	VP	BT

Status Stamp

REFERENCE SKETCH

MOTT MACDONALD

Level 1
30 Daldy Street
Wynyard Quarter
Auckland 1010
New Zealand
T +64 (0)9 375 2400

W www.mottmac.com

Client

IAWAI

Title

HILLCREST RESERVOIR & WATERMAIN
111 CAMBRIDGE ROAD, HAMILTON
OPTION D - CONCEPT SITE LAYOUT

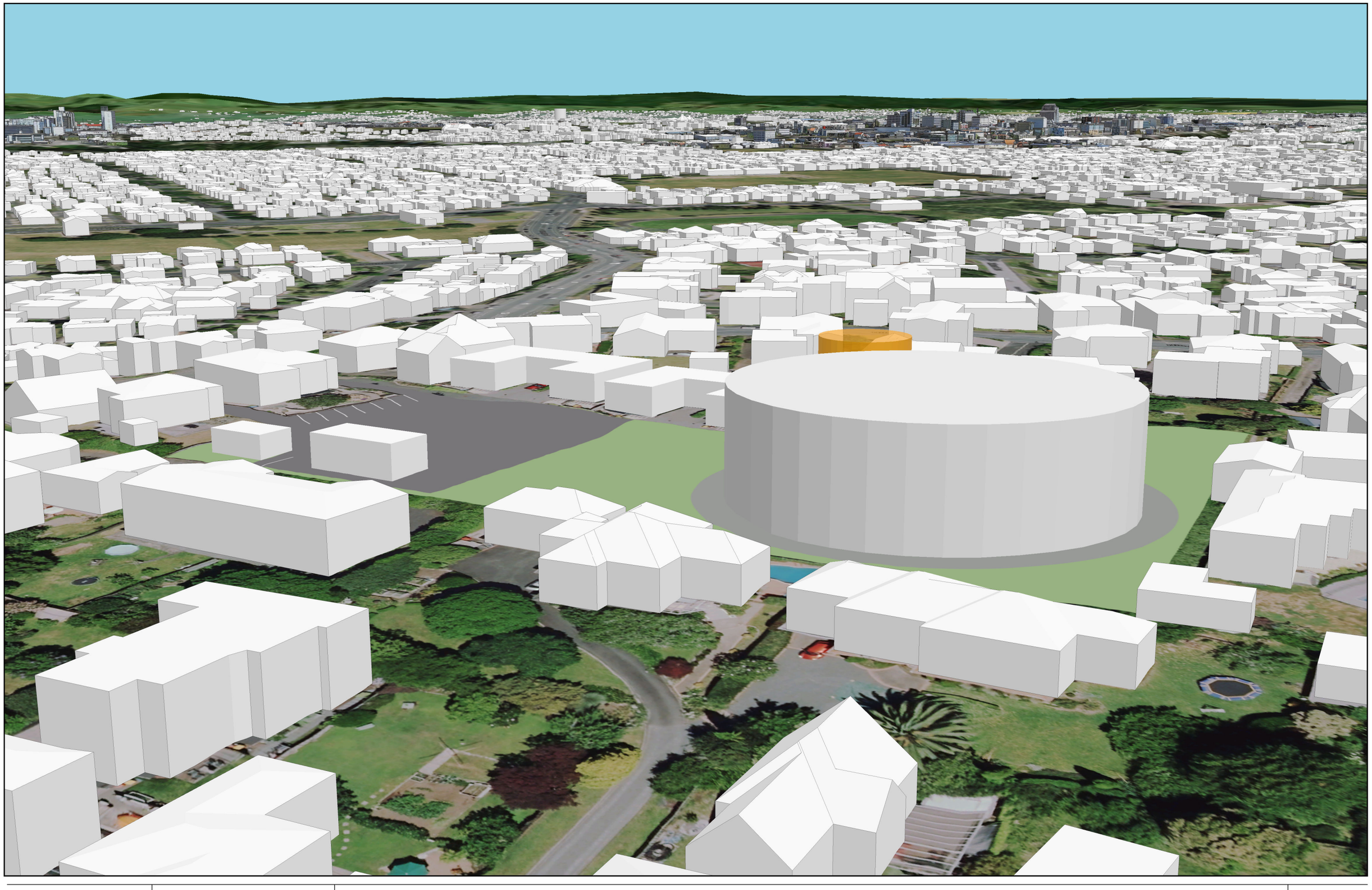
Designed	J.SINGH	JBS	Eng check	V.PATHER	VP
Drawn	J.SINGH	JBS	Coordination	P.EVANS	PE
Dwg check	V.PATHER	VP	Approved	B.TELFER	BT

MMD Project Number	Scale at A1	Security
705100882	1:300	STD

Suitability Description	Suit. Code
NOT FOR CONSTRUCTION	S1

Drawing Number	Revision
HRWEW-MMD-00-XX-DR-C-0133	P04

B. 3D Configuration Option Renders by Boffa Miskell



Boffa Miskell

www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the instructions of our Client, in accordance with the agreed scope of work. If it is intended to support an application under the Fast-track Approvals Act 2024 it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

HILLCREST RESERVOIR

Option 1 - One Large Circular Reservoir - Toward CBD

Date: 31 August 2026 | Revision: 0

Plan prepared for Hamilton City Council by Boffa Miskell Limited

Project Manager: Morne.Hugo@boffamiskell.co.nz | Drawn: DHi | Checked: BCl

Figure 3



Boffa Miskell

www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the instructions of our Client, in accordance with the agreed scope of work. If it is intended to support an application under the Fast-track Approvals Act 2024 it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

HILLCREST RESERVOIR

Option 1 - One Large Circular Reservoir - Toward Hillcrest Park

Date: 31 August 2026 | Revision: 0

Plan prepared for Hamilton City Council by Boffa Miskell Limited

Project Manager: Morne.Hugo@boffamiskell.co.nz | Drawn: DHi | Checked: BCl

Figure 4



Boffa Miskell

www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the instructions of our Client, in accordance with the agreed scope of work. If it is intended to support an application under the Fast-track Approvals Act 2024 it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

HILLCREST RESERVOIR

Option 2 - One Large Rectangular Reservoir - Toward CBD

Date: 31 August 2026 | Revision: 0

Plan prepared for Hamilton City Council by Boffa Miskell Limited

Project Manager: Morne.Hugo@boffamiskell.co.nz | Drawn: DHi | Checked: BCl

Figure 5



Boffa Miskell

www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the instructions of our Client, in accordance with the agreed scope of work. If it is intended to support an application under the Fast-track Approvals Act 2024 it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

HILLCREST RESERVOIR

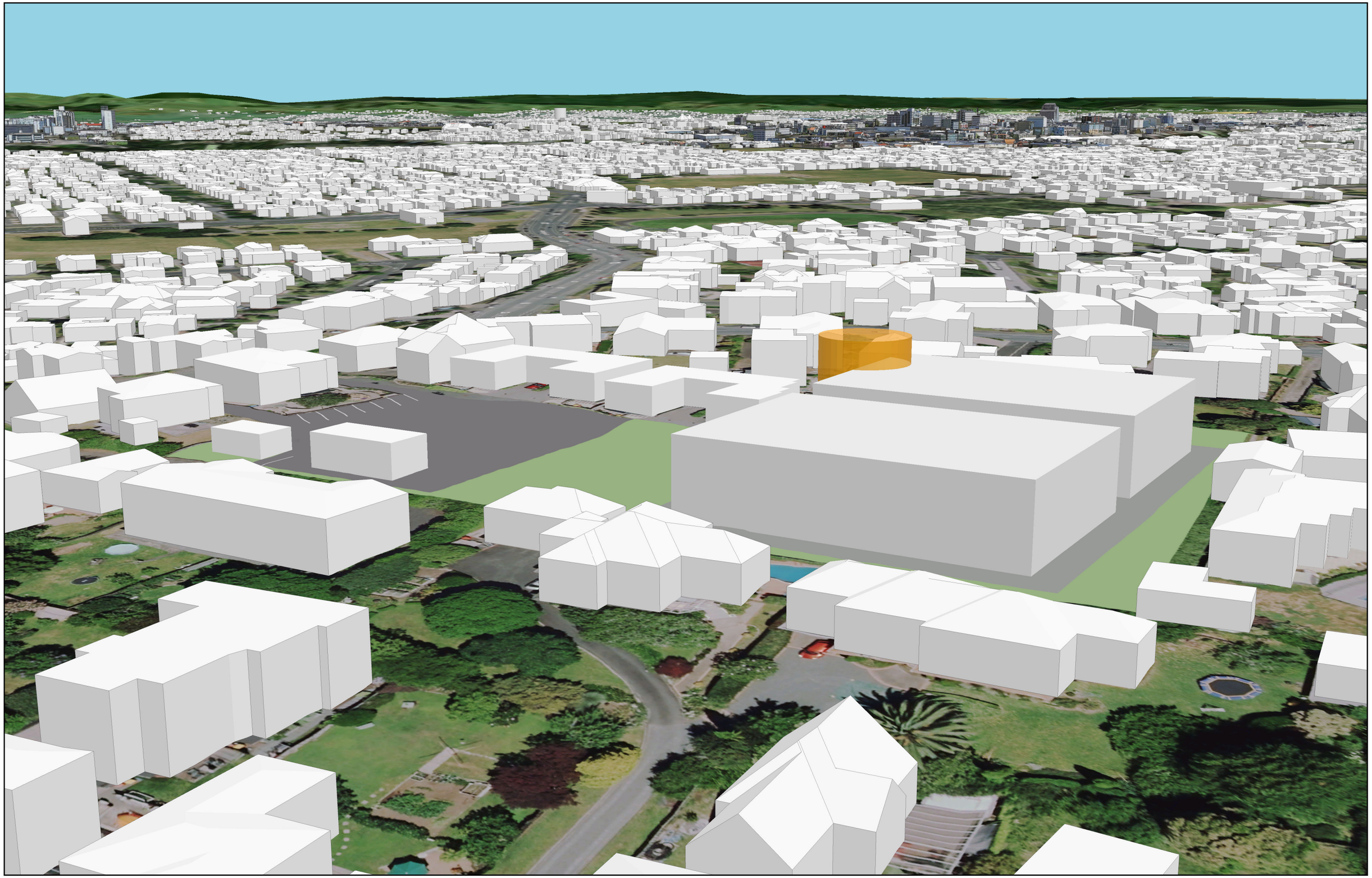
Option 2 - One Large Rectangular Reservoir - Toward Hillcrest Park

Date: 31 August 2026 | Revision: 0

Plan prepared for Hamilton City Council by Boffa Miskell Limited

Project Manager: Morne.Hugo@boffamiskell.co.nz | Drawn: DHi | Checked: BCl

Figure 6



Boffa Miskell

www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the instructions of our Client, in accordance with the agreed scope of work. If it is intended to support an application under the Fast-track Approvals Act 2024 it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

HILLCREST RESERVOIR

Option 3 - Two Rectangular Reservoir - Toward CBD

Date: 31 August 2026 | Revision: 0

Plan prepared for Hamilton City Council by Boffa Miskell Limited

Project Manager: Morne.Hugo@boffamiskell.co.nz | Drawn: DHi | Checked: BCl

Figure 7



Boffa Miskell

www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the instructions of our Client, in accordance with the agreed scope of work. If it is intended to support an application under the Fast-track Approvals Act 2024 it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

HILLCREST RESERVOIR

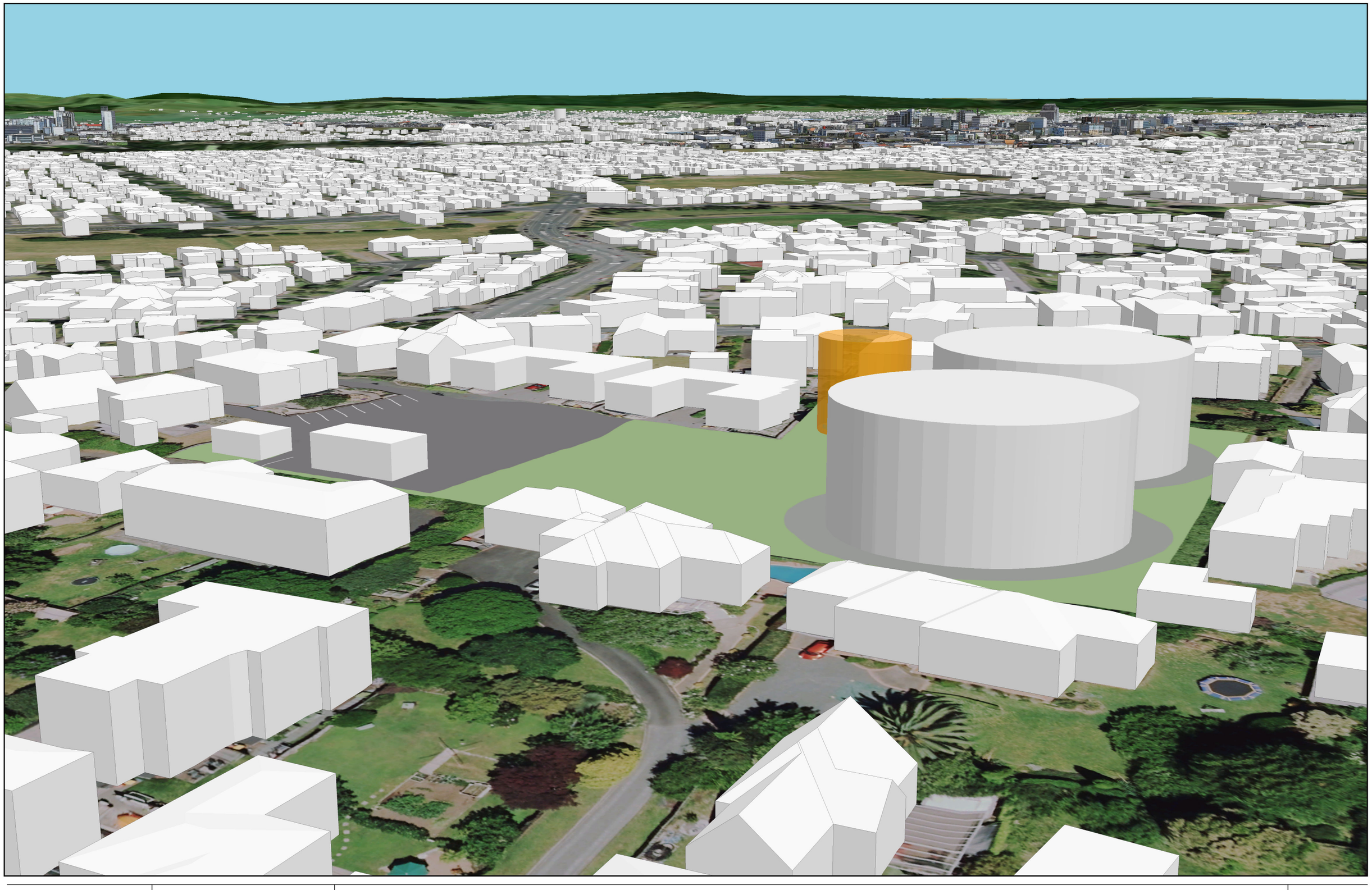
Option 3 - Two Rectangular Reservoir - Toward Hillcrest Park

Date: 31 August 2026 | Revision: 0

Plan prepared for Hamilton City Council by Boffa Miskell Limited

Project Manager: Morne.Hugo@boffamiskell.co.nz | Drawn: DHi | Checked: BCI

Figure 8



Boffa Miskell

www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the instructions of our Client, in accordance with the agreed scope of work. If it is intended to support an application under the Fast-track Approvals Act 2024 it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

HILLCREST RESERVOIR

Option 4 - Two Circular Reservoir - Toward CBD

Date: 31 August 2026 | Revision: 0

Plan prepared for Hamilton City Council by Boffa Miskell Limited

Project Manager: Morne.Hugo@boffamiskell.co.nz | Drawn: DHi | Checked: BCl

Figure 9



Boffa Miskell

www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the instructions of our Client, in accordance with the agreed scope of work. If it is intended to support an application under the Fast-track Approvals Act 2024 it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

HILLCREST RESERVOIR

Option 4 - Two Circular Reservoir - Toward Hillcrest Park

Date: 31 August 2026 | Revision: 0

Plan prepared for Hamilton City Council by Boffa Miskell Limited

Project Manager: Morne.Hugo@boffamiskell.co.nz | Drawn: DHi | Checked: BCI

Figure 10

C. Preliminary Sunshade Studies by Boffa Miskell

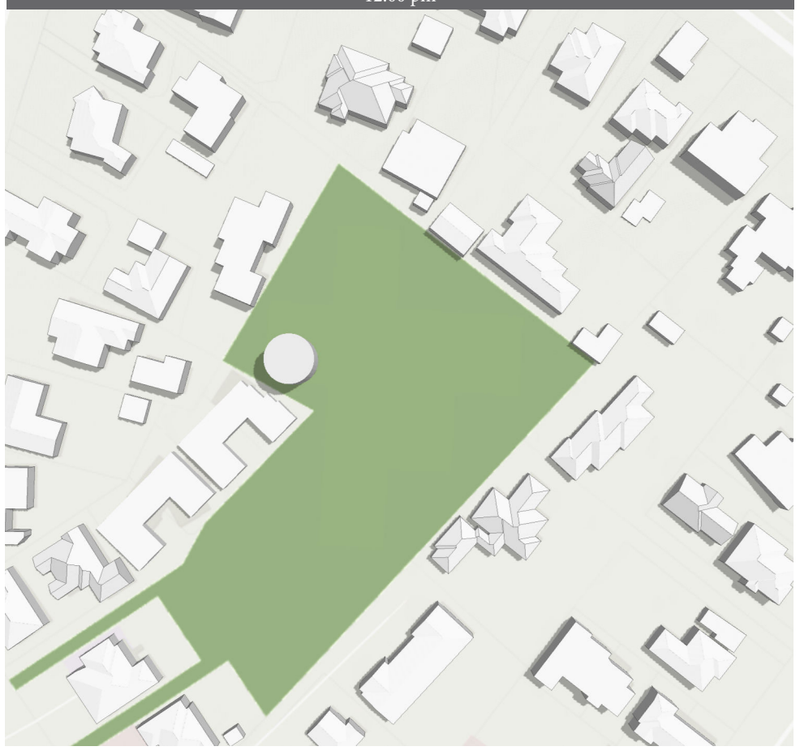
9:00 am

12:00 pm

3:00 pm

Summer Solstice



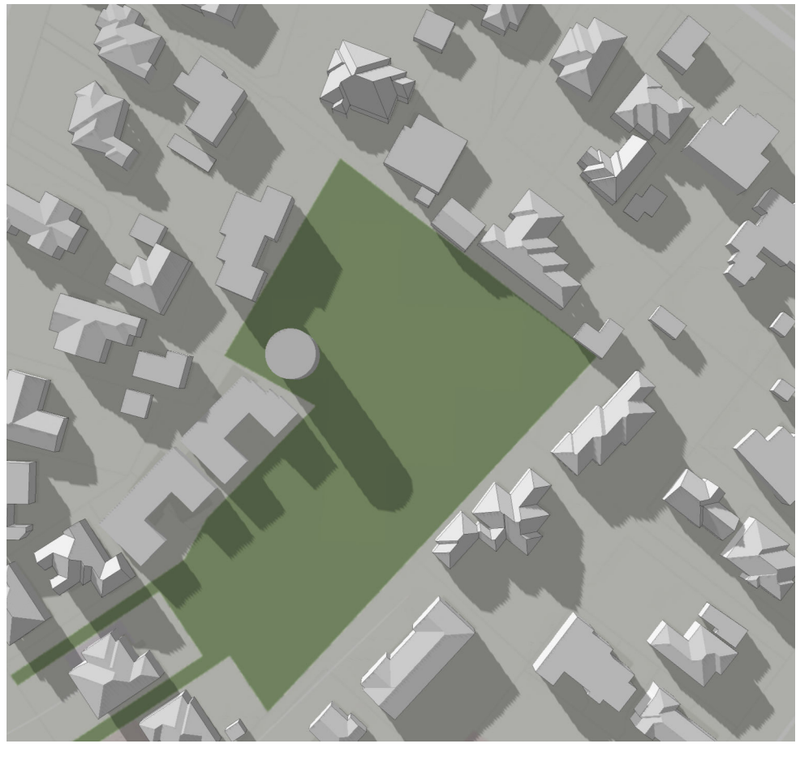




Winter Solstice







Boffa Miskell

www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the instructions of our Client, in accordance with the agreed scope of work. If it is intended to support the Client's application under the Fast-track Approvals Act 2024 and it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

Notes

Winter Solstice taken as 21 June 2026
Summer Solstice taken as 22 December 2026
Autumnal Equinox taken as March 21 2026
Spring Equinoc taken as 23 September 2026
All times given as NZST

HILLCREST RESERVOIR

Existing Situation - Shadow Study - Solstices

Date: 13 August 2026 Revision: 0

Plan prepared for Hamilton City Council by Boffa Miskell Limited

Project Manager: Morné.Hugo@boffamiskell.co.nz | Drawn: DHi | Checked: BCl

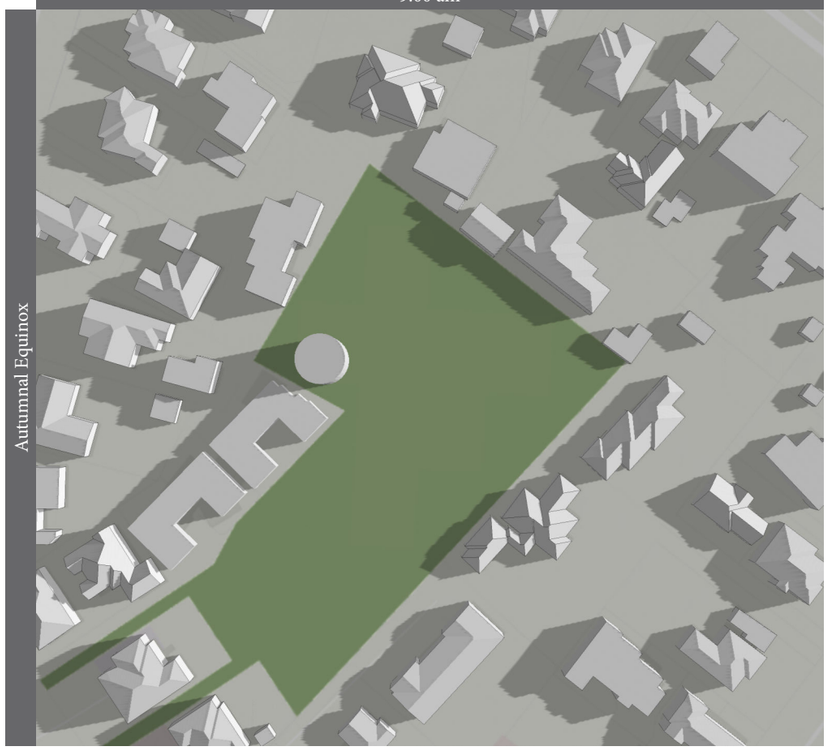
Figure 1

9:00 am

12:00 pm

3:00 pm

Autumnal Equinox







Spring Equinox







Boffa Miskell

www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the instructions of our Client, in accordance with the agreed scope of work. If it is intended to support the Client's application under the Fast-track Approvals Act 2024 and it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

Notes

Winter Solstice taken as 21 June 2026
Summer Solstice taken as 22 December 2026
Autumnal Equinox taken as March 21 2026
Spring Equinoc taken as 23 September 2026
All times given as NZST

HILLCREST RESERVOIR

Existing Situation - Shadow Study - Equinoxes

Date: 13 August 2026 Revision: 0

Plan prepared for Hamilton City Council by Boffa Miskell Limited

Project Manager: Morné.Hugo@boffamiskell.co.nz | Drawn: DHi | Checked: BCl

Figure 2

9:00 am

12:00 pm

3:00 pm

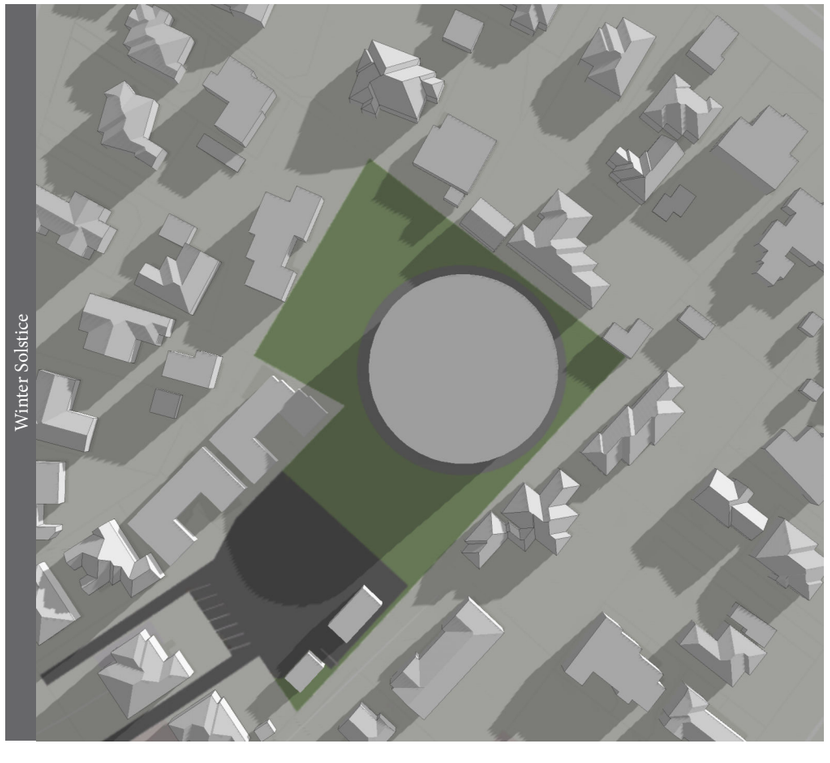
Summer Solstice

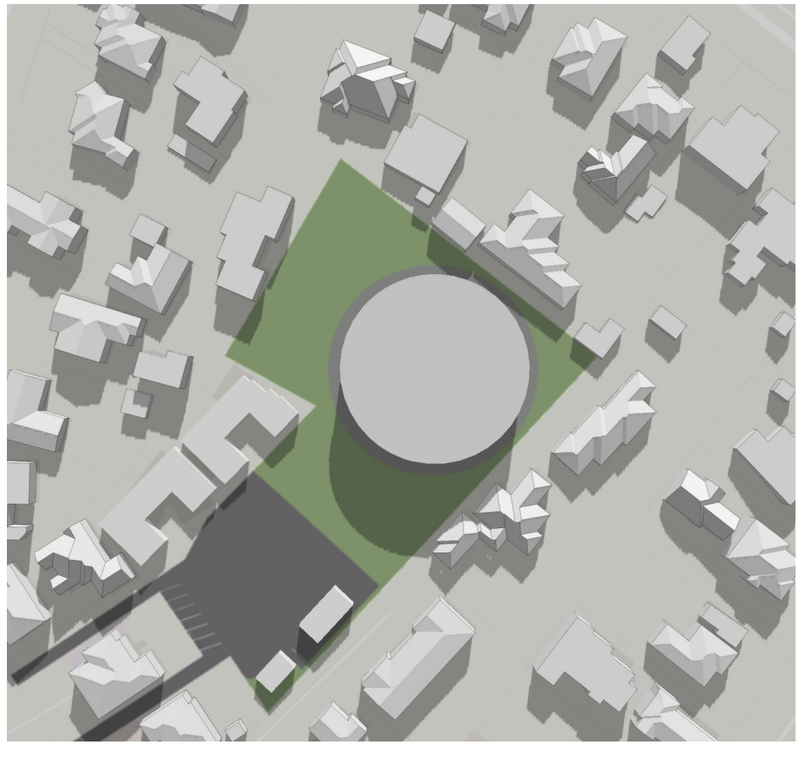


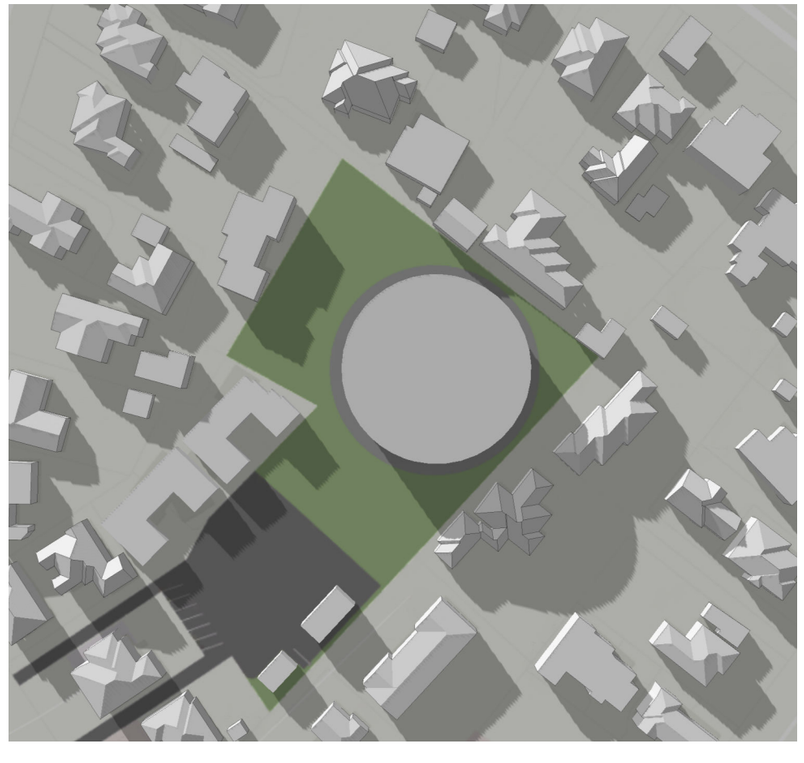




Winter Solstice







Boffa Miskell

www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the instructions of our Client, in accordance with the agreed scope of work. If it is intended to support the Client's application under the Fast-track Approvals Act 2024 and it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

Notes

Winter Solstice taken as 21 June 2026
Summer Solstice taken as 22 December 2026
Autumnal Equinox taken as March 21 2026
Spring Equinoc taken as 23 September 2026
All times given as NZST

HILLCREST RESERVOIR

Option 1 - One Large Circular Reservoir - Shadow Study - Solstices

Date: 13 August 2026 Revision: 0

Plan prepared for Hamilton City Council by Boffa Miskell Limited

Project Manager: Morné.Hugo@boffamiskell.co.nz | Drawn: DHi | Checked: BCl

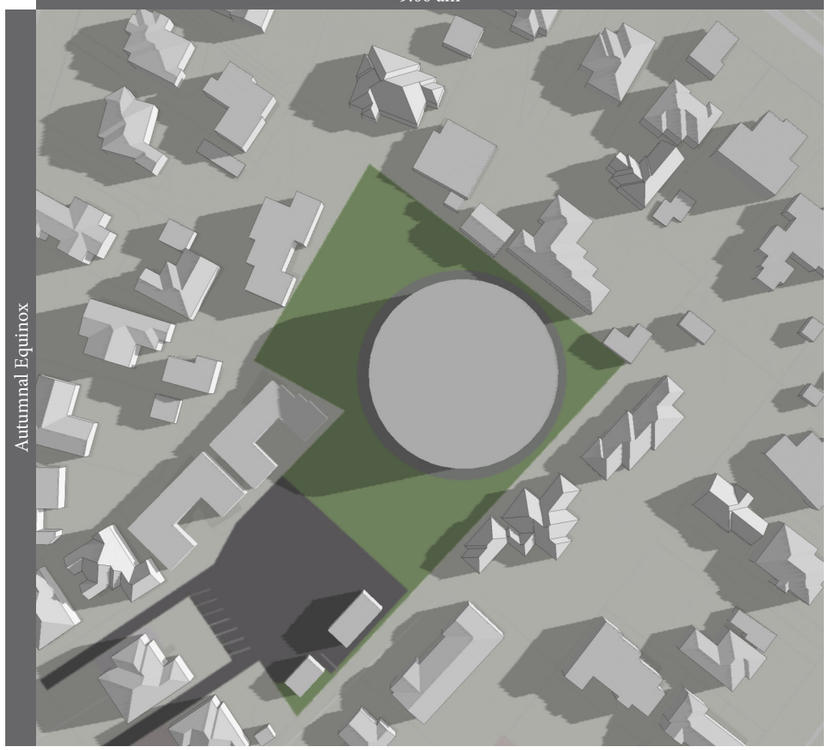
Figure 3

9:00 am

12:00 pm

3:00 pm

Autumnal Equinox



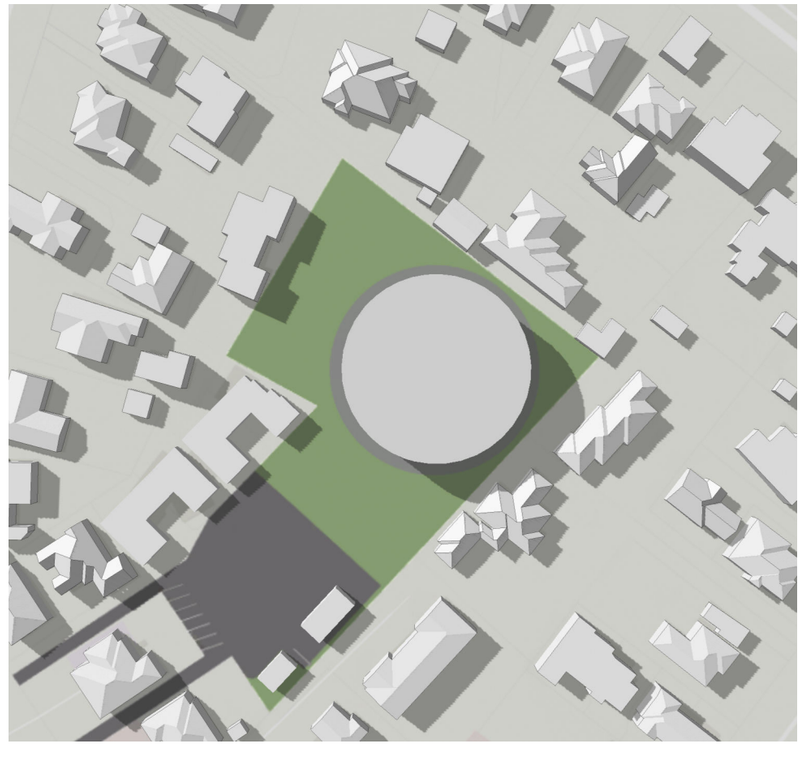




Spring Equinox







Boffa Miskell

www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the instructions of our Client, in accordance with the agreed scope of work. If it is intended to support the Client's application under the Fast-track Approvals Act 2024 and it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

Notes

Winter Solstice taken as 21 June 2026
Summer Solstice taken as 22 December 2026
Autumnal Equinox taken as March 21 2026
Spring Equinoc taken as 23 September 2026
All times given as NZST

HILLCREST RESERVOIR

Option 1 - One Large Circular Reservoir - Shadow Study - Equinoxes

Date: 13 August 2026 Revision: 0

Plan prepared for Hamilton City Council by Boffa Miskell Limited

Project Manager: Morné.Hugo@boffamiskell.co.nz | Drawn: DHi | Checked: BCl

Figure 4

9:00 am

12:00 pm

3:00 pm

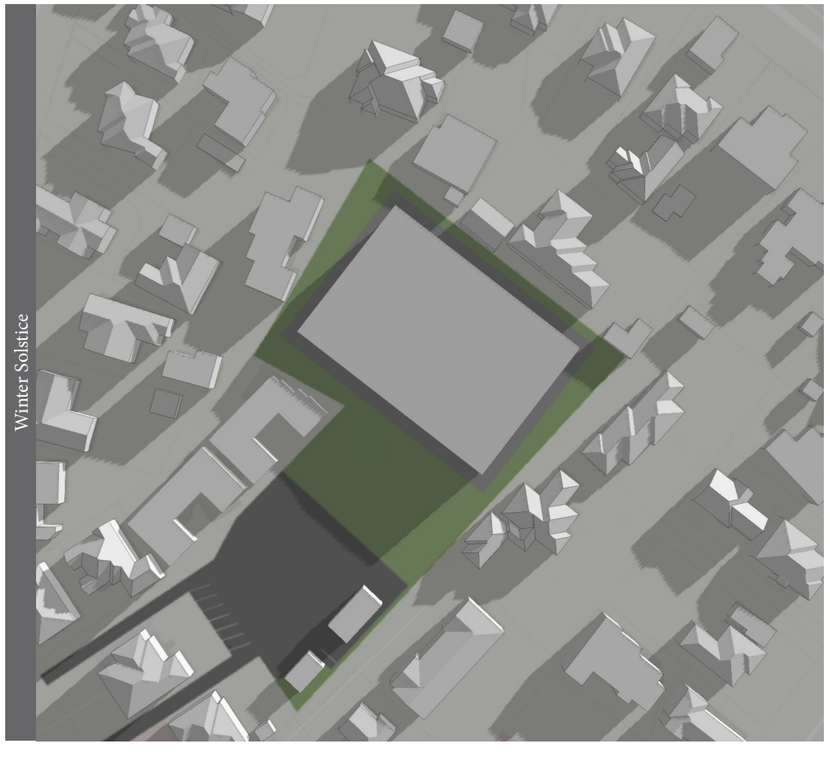
Summer Solstice

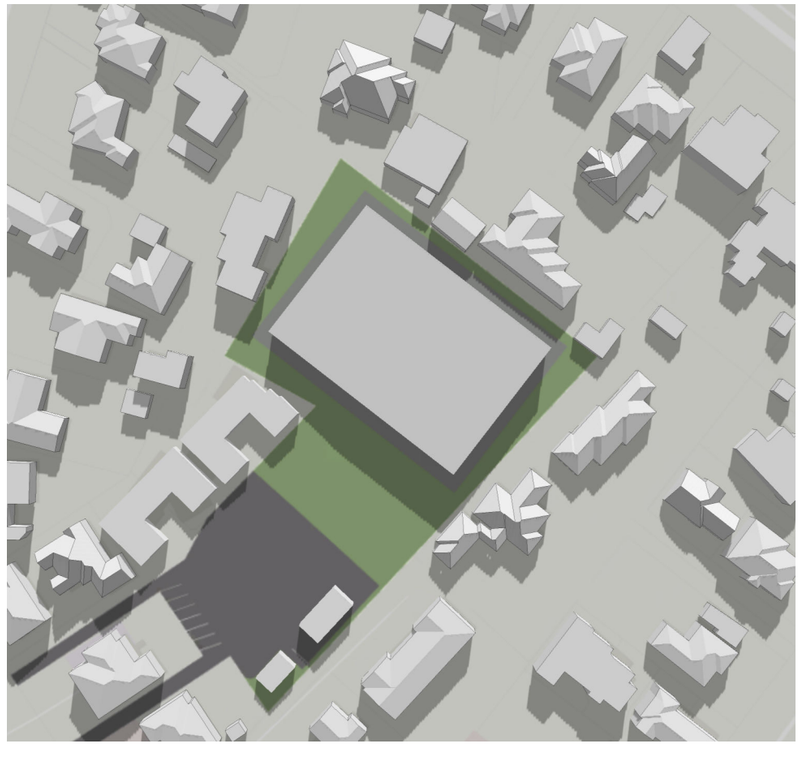


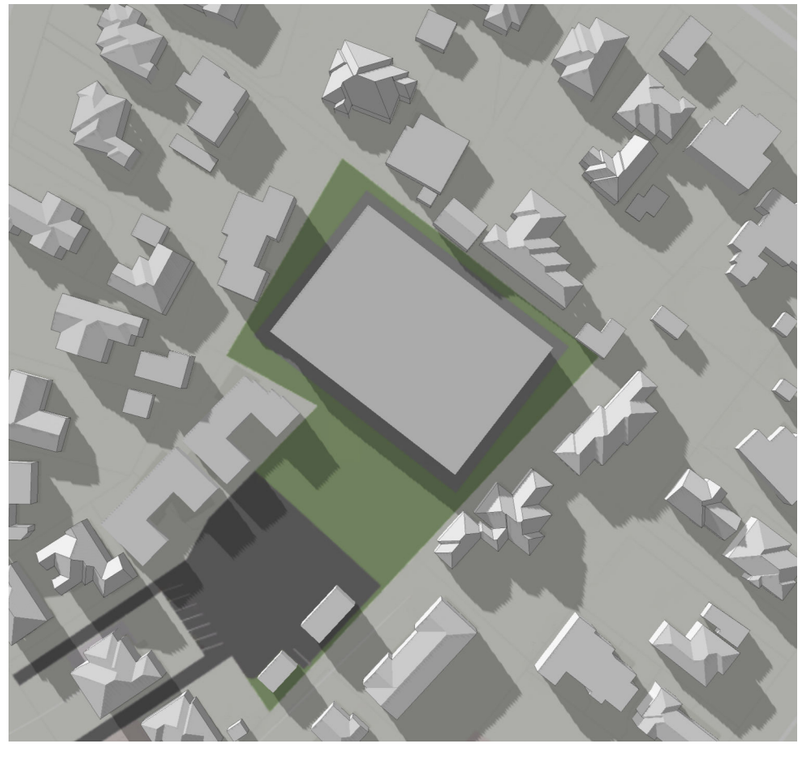




Winter Solstice







Boffa Miskell

www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the instructions of our Client, in accordance with the agreed scope of work. If it is intended to support the Client's application under the Fast-track Approvals Act 2024 and it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

Notes

Winter Solstice taken as 21 June 2026
Summer Solstice taken as 22 December 2026
Autumnal Equinox taken as March 21 2026
Spring Equinoc taken as 23 September 2026
All times given as NZST

HILLCREST RESERVOIR

Option 2 - One Large Rectanglar Reservoir - Shadow Study - Solstices

Date: 13 August 2026 Revision: 0

Plan prepared for Hamilton City Council by Boffa Miskell Limited

Project Manager: Morné.Hugo@boffamiskell.co.nz | Drawn: DHi | Checked: BCl

Figure 5

9:00 am

12:00 pm

3:00 pm

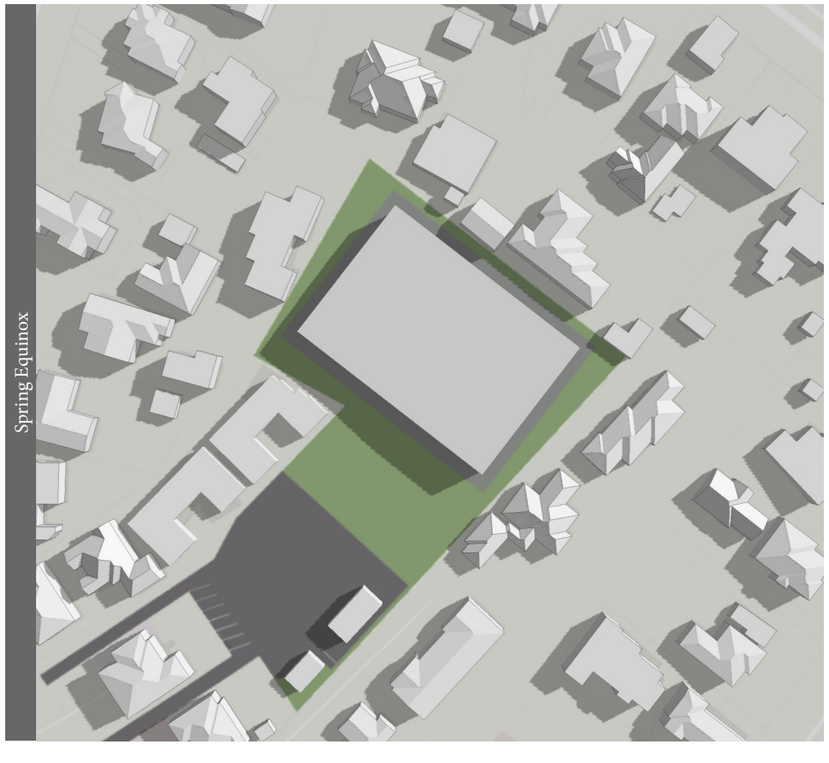
Autumnal Equinox



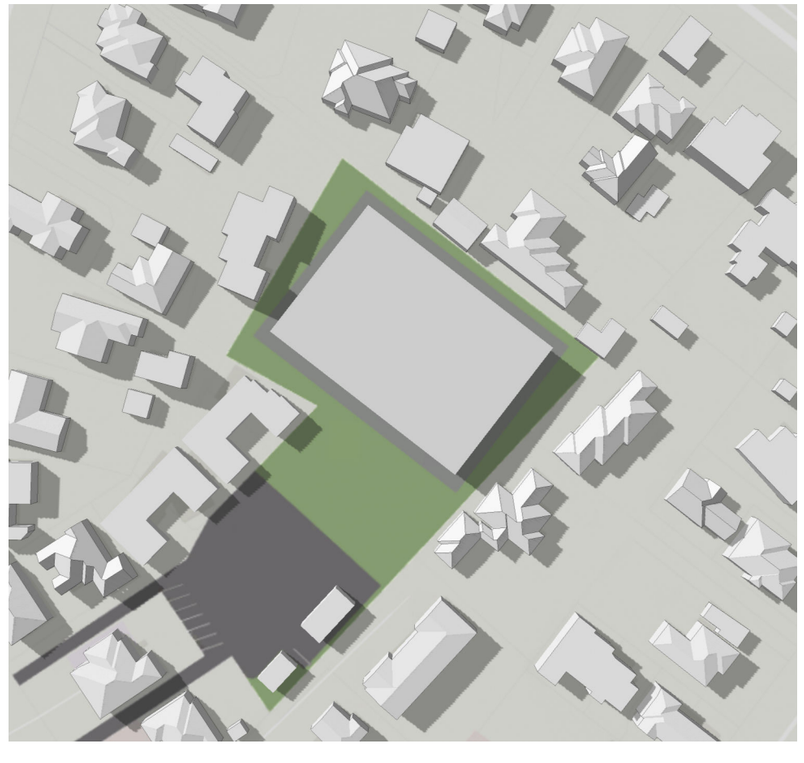




Spring Equinox







Boffa Miskell

www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the instructions of our Client, in accordance with the agreed scope of work. If it is intended to support the Client's application under the Fast-track Approvals Act 2024 and it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

Notes

Winter Solstice taken as 21 June 2026
Summer Solstice taken as 22 December 2026
Autumnal Equinox taken as March 21 2026
Spring Equinoc taken as 23 September 2026
All times given as NZST

HILLCREST RESERVOIR

Option 2 - One Large Rectanglar Reservoir - Shadow Study - Equinoxes

Date: 13 August 2026 Revision: 0

Plan prepared for Hamilton City Council by Boffa Miskell Limited

Project Manager: Morné.Hugo@boffamiskell.co.nz | Drawn: DHi | Checked: BCl

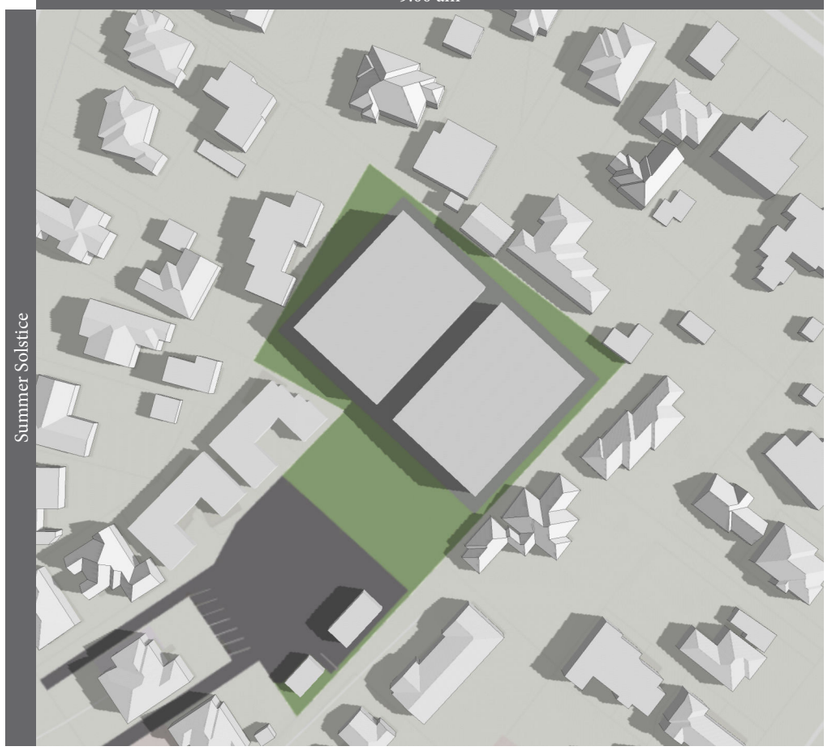
Figure 6

9:00 am

12:00 pm

3:00 pm

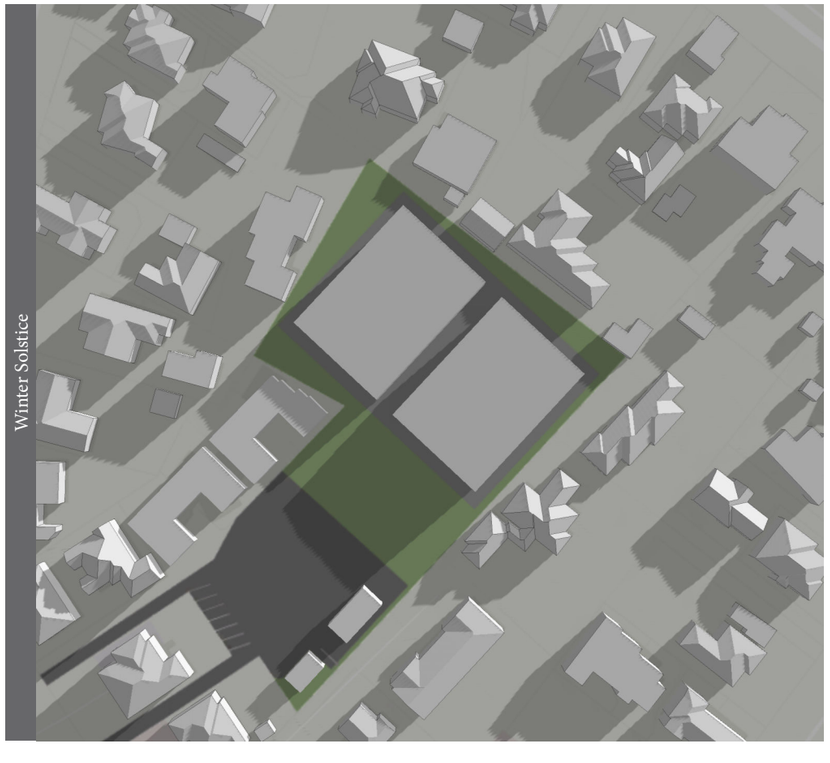
Summer Solstice

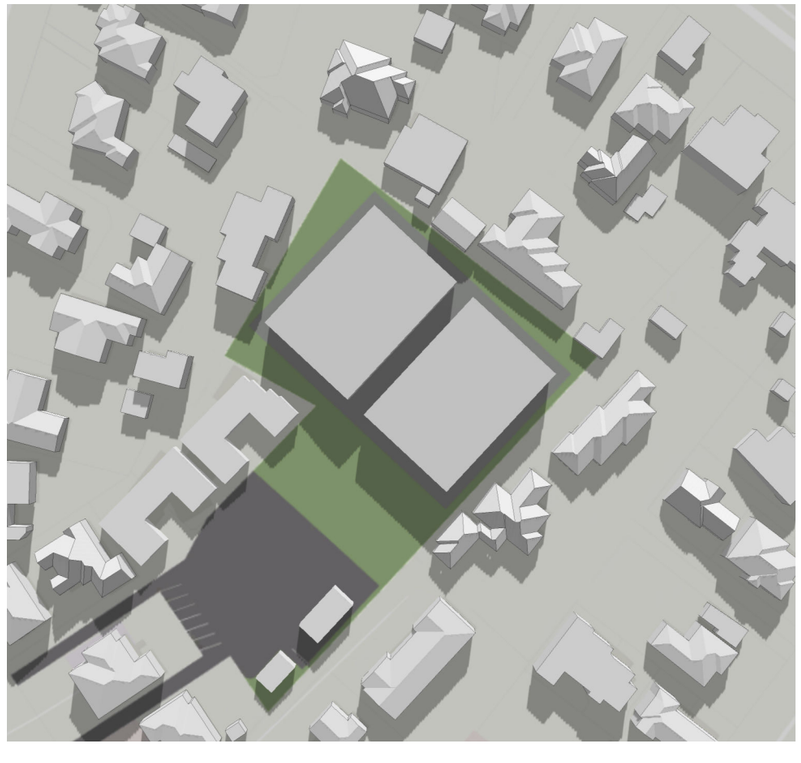


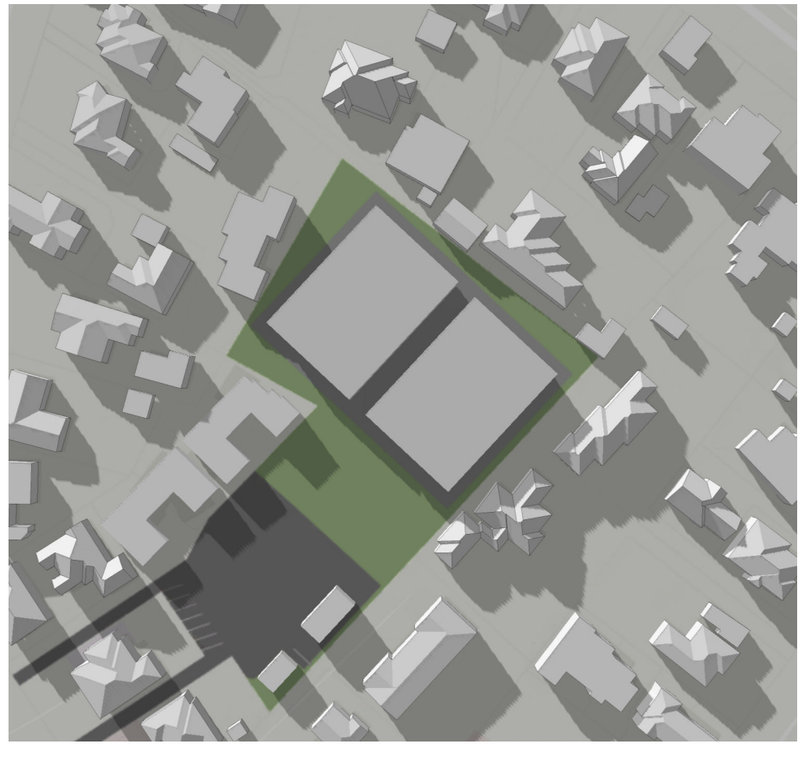




Winter Solstice







Boffa Miskell

www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the instructions of our Client, in accordance with the agreed scope of work. If it is intended to support the Client's application under the Fast-track Approvals Act 2024 and it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

Notes

Winter Solstice taken as 21 June 2026
Summer Solstice taken as 22 December 2026
Autumnal Equinox taken as March 21 2026
Spring Equinoc taken as 23 September 2026
All times given as NZST

HILLCREST RESERVOIR

Option 3 - Two Rectangular Reservoir - Shadow Study - Solstices

Date: 13 August 2026 Revision: 0

Plan prepared for Hamilton City Council by Boffa Miskell Limited

Project Manager: Morné.Hugo@boffamiskell.co.nz | Drawn: DHi | Checked: BCl

Figure 7

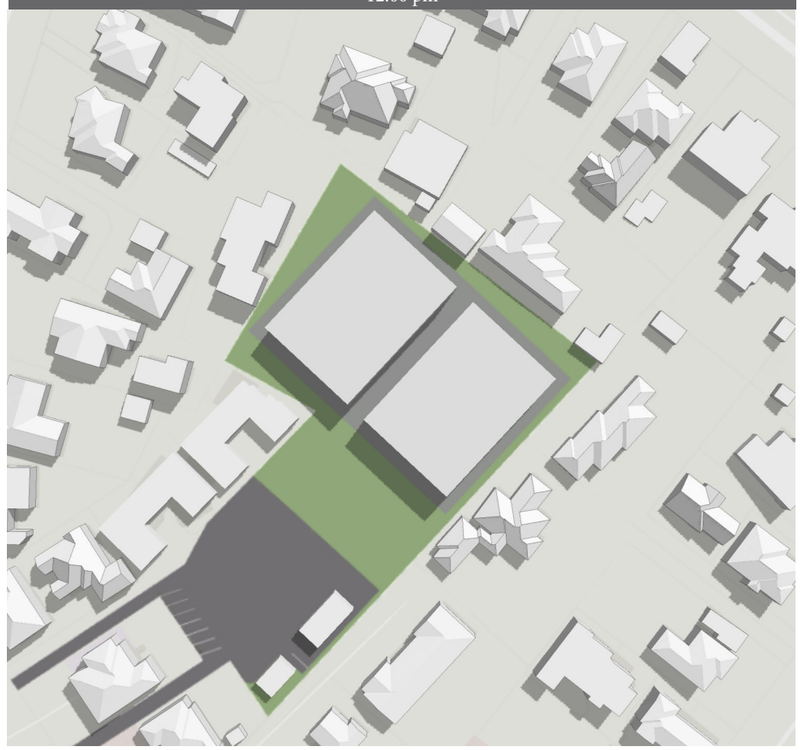
9:00 am

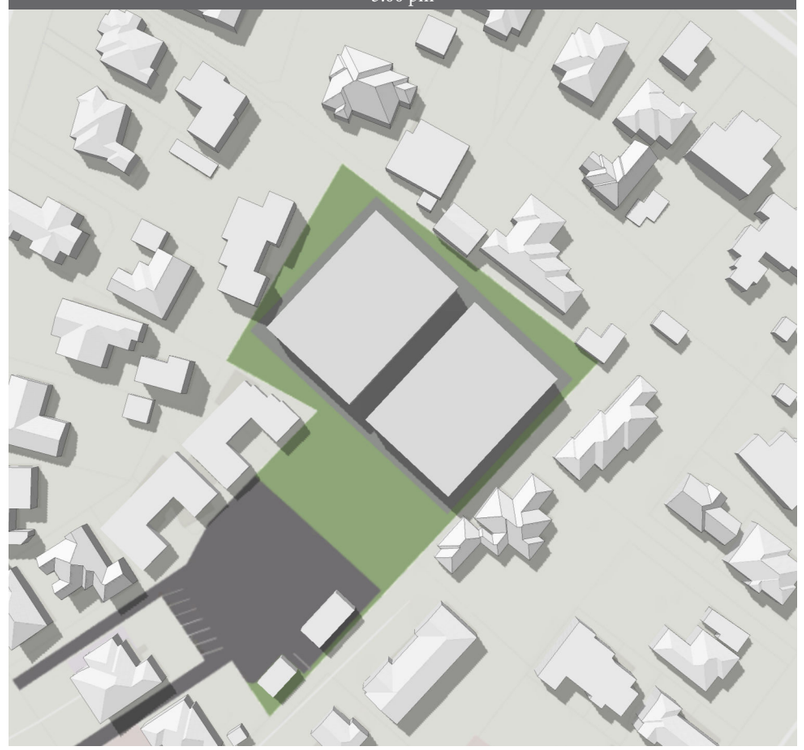
12:00 pm

3:00 pm

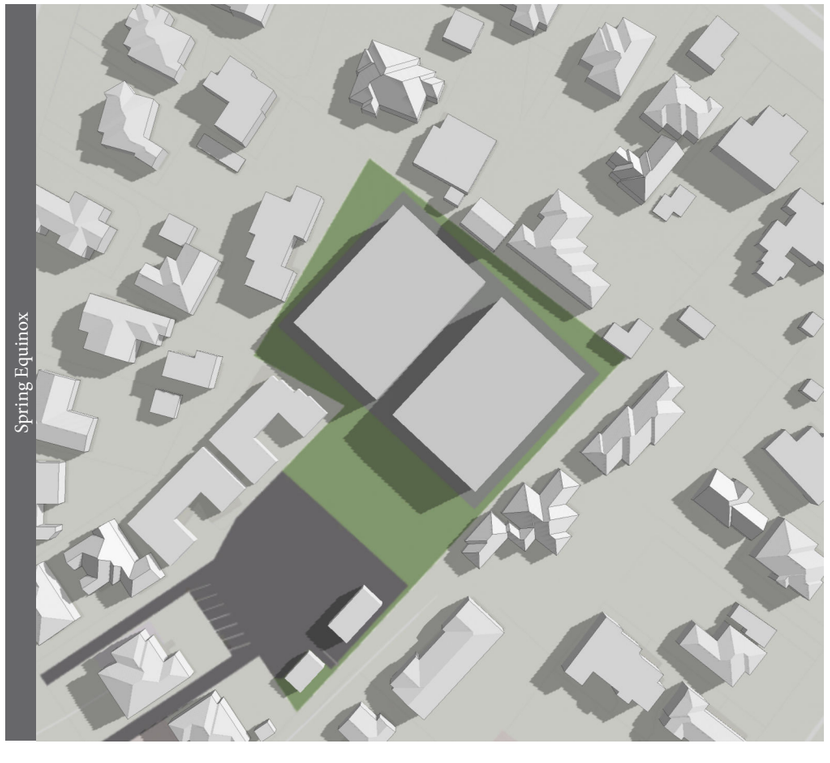
Autumnal Equinox



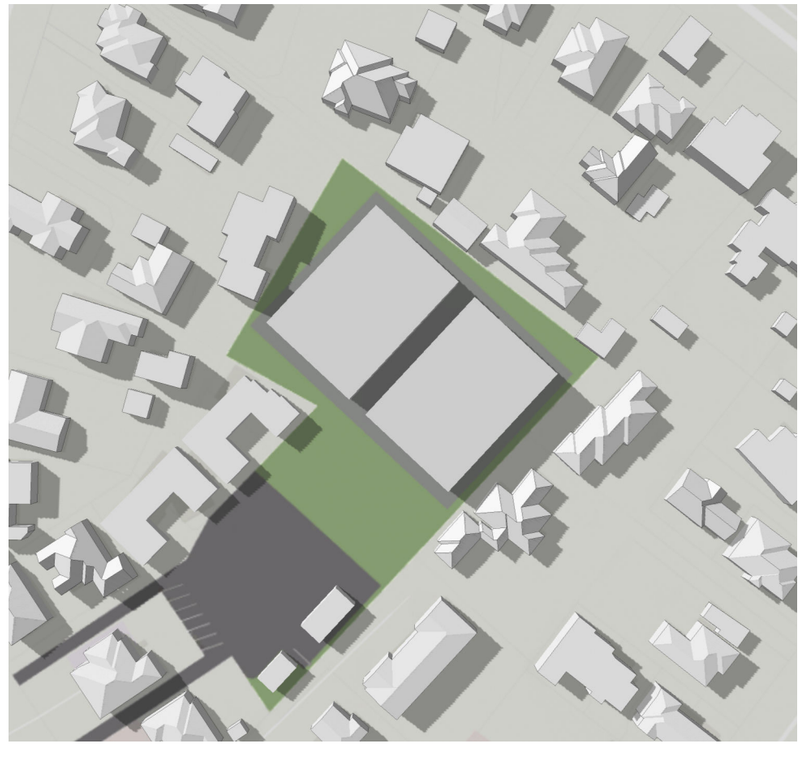




Spring Equinox







Boffa Miskell

www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the instructions of our Client, in accordance with the agreed scope of work. If it is intended to support the Client's application under the Fast-track Approvals Act 2024 and it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

Notes

Winter Solstice taken as 21 June 2026
Summer Solstice taken as 22 December 2026
Autumnal Equinox taken as March 21 2026
Spring Equinoc taken as 23 September 2026
All times given as NZST

HILLCREST RESERVOIR

Option 3 - Two Rectangular Reservoir - Shadow Study - Equinoxes

Date: 13 August 2026 Revision: 0

Plan prepared for Hamilton City Council by Boffa Miskell Limited

Project Manager: Morné.Hugo@boffamiskell.co.nz | Drawn: DHi | Checked: BCl

Figure 8



Boffa Miskell

www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the instructions of our Client, in accordance with the agreed scope of work. If it is intended to support the Client's application under the Fast-track Approvals Act 2024 and it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

Notes

Winter Solstice taken as 21 June 2026
Summer Solstice taken as 22 December 2026
Autumnal Equinox taken as March 21 2026
Spring Equinoc taken as 23 September 2026
All times given as NZST

HILLCREST RESERVOIR

Option 4 - Two Circular Reservoir - Shadow Study - Solstices

Date: 13 August 2026 Revision: 0

Plan prepared for Hamilton City Council by Boffa Miskell Limited

Project Manager: Morné.Hugo@boffamiskell.co.nz | Drawn: DHi | Checked: BCl

Figure 9

9:00 am

12:00 pm

3:00 pm

Autumnal Equinox







Spring Equinox







Boffa Miskell

www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the instructions of our Client, in accordance with the agreed scope of work. If it is intended to support the Client's application under the Fast-track Approvals Act 2024 and it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While Boffa Miskell Limited has exercised due care in preparing this plan, it does not accept liability for any use of the plan beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

Notes

Winter Solstice taken as 21 June 2026
Summer Solstice taken as 22 December 2026
Autumnal Equinox taken as March 21 2026
Spring Equinoc taken as 23 September 2026
All times given as NZST

HILLCREST RESERVOIR

Option 4 - Two Circular Reservoir - Shadow Study - Equinoxes

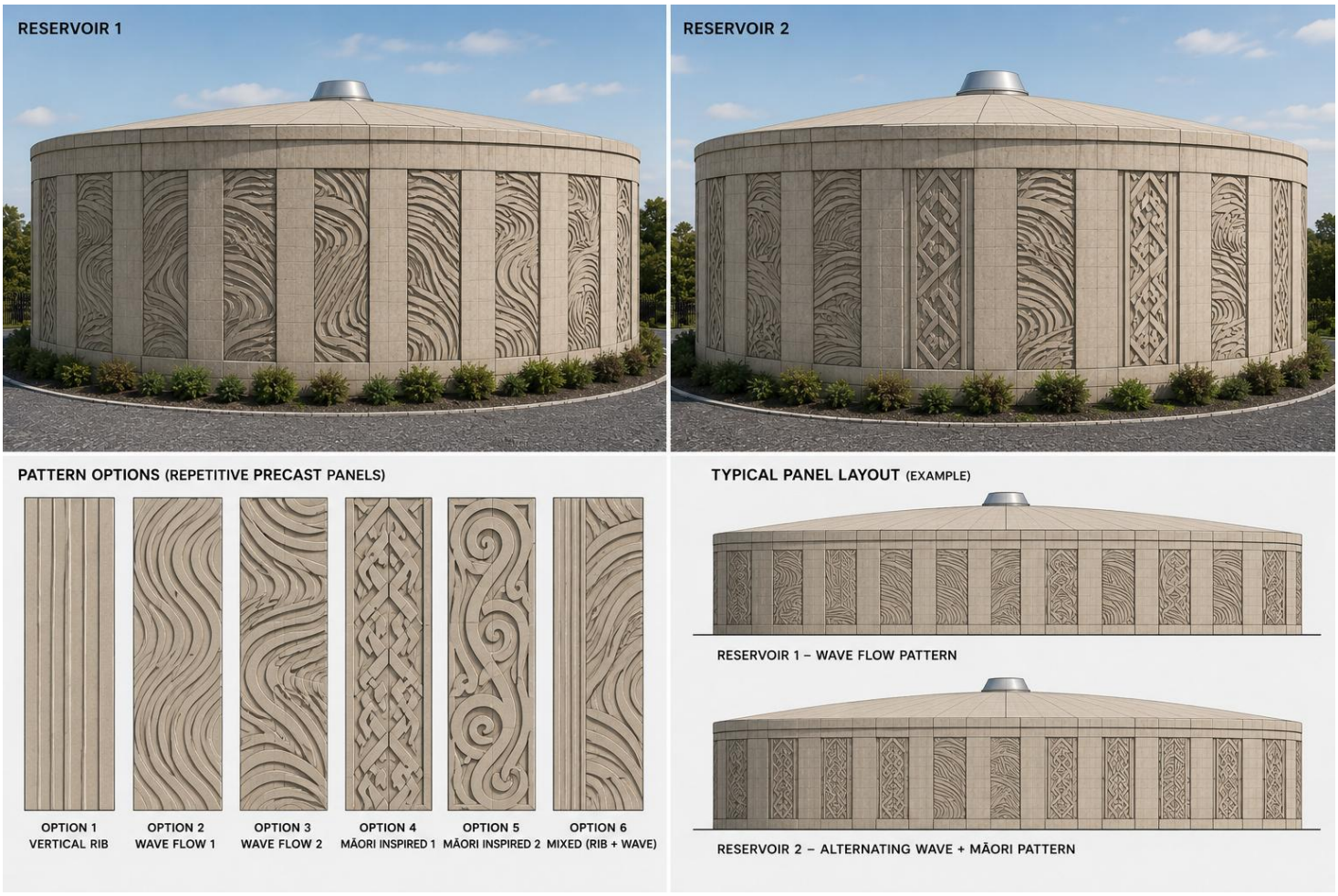
Date: 13 August 2026 Revision: 0

Plan prepared for Hamilton City Council by Boffa Miskell Limited

Project Manager: Morné.Hugo@boffamiskell.co.nz | Drawn: DHi | Checked: BCl

Figure 10

D. Indicative Reservoir Designs


RESERVOIR 1
RESERVOIR 2
PATTERN OPTIONS (REPETITIVE PRECAST PANELS)
OPTION 1
VERTICAL RIB
OPTION 2
WAVE FLOW 1
OPTION 3
WAVE FLOW 2
OPTION 4
MĀORI INSPIRED 1
OPTION 5
MĀORI INSPIRED 2
OPTION 6
MIXED (RIB + WAVE)
TYPICAL PANEL LAYOUT (EXAMPLE)
RESERVOIR 1 – WAVE FLOW PATTERN
RESERVOIR 2 – ALTERNATING WAVE + MĀORI PATTERN







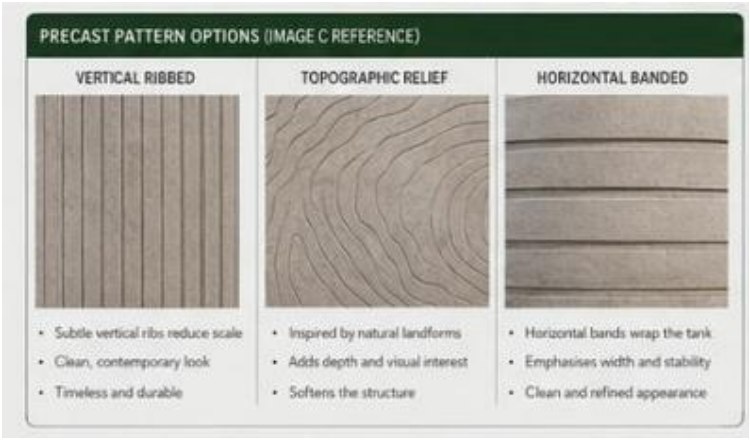


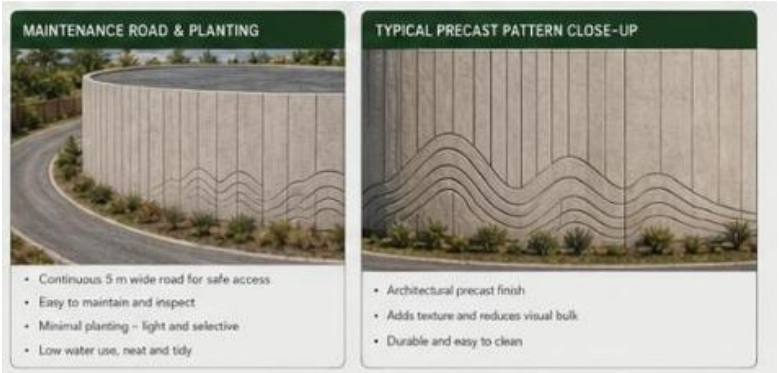


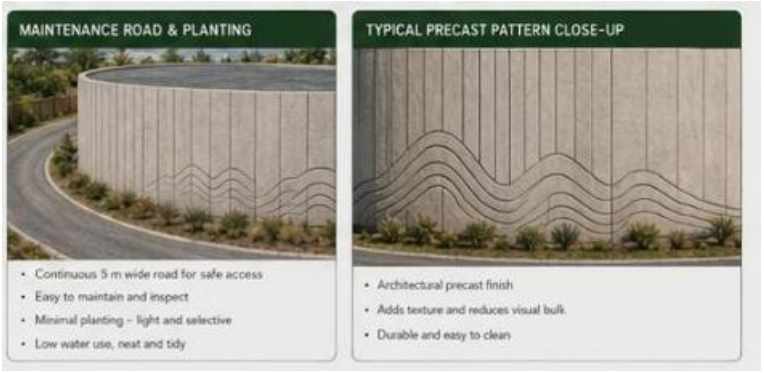



1 VERTICAL TIMBER BATTEN WRAP
Vertical timber batten screen applied to the lower portion of the reservoir wall, breaking down scale and adding warmth while maintaining ventilation.
• Reduces visual bulk
• Warmer appearence
• Allows ventilation
• Can be targeted to most visible sides
TYPICAL BATTEN
45x45 mm (TYP.)
GAP 40–60 mm
2 FREESTANDING SLATTED TIMBER SCREEN WITH PLANTING
Timber slatted screen set forward of the reservoir with a planted buffer to create depth, soften the view and support biodiversity.
• Adds landscape depth
• Neighbour-friendly
• Planting softens view
• Freestanding for flexibility & access
HORIZONTAL SLATTED SCREEN
90x19 mm (TYP.)
GAP 25–30 mm
MATERIAL PALETTE (INDICATIVE)
NATURAL TIMBER (UNTREATED LOOK)
OILED TIMBER (WARM TONE)
WEATHERED TIMBER (SILVER GREY)
STEEL POSTS (MATT COLOUR)
TIMBER DETAIL INSPIRATION


3 CURVED TIMBER COLONNADE / PERGOLA STYLE SCREEN
Architectural timber colonnade creates a distinctive ring element at the reservoir base, adding rhythm, shadow and amenity.
• Architectural quality
• Creates depth & shadow
• Warm, timeless look
• Ventilation maintained
TIMBER COLUMNS
140x140 mm (TYP.)
SPACING 1.4–1.8 m
4 TIMBER SCREEN FENCING AROUND BOUNDARY AND UTILITY BUILDINGS
Coordinated timber screen fencing around the compound and screening applied to pump house, inlet and outlet chambers for a consistent look.
• Consistent materiality
• Screens utilities & boundary
• Enhances privacy
• Integrates with planting
VERTICAL FENCE BATTENS 70x19 mm
GAP 20–30 mm
WHY TIMBER SCREENING?
WARMER APPEARANCE
REDUCES VISUAL BULK
NEIGHBOUR FRIENDLY
COMBINES WITH PLANTING
ALLOWS VENTILATION
TARGETED TO VISIBLE SIDES
NOTE
Final screening design will consider durability, maintenance access, ventilation, CPTED principles, fire performance and compliance with relevant standards and council requirements.


PRECAST PATTERN OPTIONS (IMAGE C REFERENCE)
VERTICAL RIBBED
• Subtle vertical ribs reduce scale
• Clean, contemporary look
• Timeless and durable
TOPOGRAPHIC RELIEF
• Inspired by natural landforms
• Adds depth and visual interest
• Softens the structure
HORIZONTAL BANDED
• Horizontal bands wrap the tank
• Emphasises width and stability
• Clean and refined appearance


MAINTENANCE ROAD & PLANTING
• Continuous 5 m wide road for safe access
• Easy to maintain and inspect
• Minimal planting – light and selective
• Low water use, neat and tidy
TYPICAL PRECAST PATTERN CLOSE-UP
• Architectural precast finish
• Adds texture and reduces visual bulk
• Durable and easy to clean


MAINTENANCE ROAD & PLANTING
• Continuous 5 m wide road for safe access
• Easy to maintain and inspect
• Minimal planting – light and selective
• Low water use, neat and tidy
TYPICAL PRECAST PATTERN CLOSE-UP
• Architectural precast finish
• Adds texture and reduces visual bulk
• Durable and easy to clean

