MEMORANDUM

To:	The Panel for the Sunfield Project
From:	Will Moore, Director – Maven Associates Limited
Date:	16 October 2025
Subject:	**Response to Watercare Comments – Sunfield Fast-track Application**

This memorandum responds to Watercare Services Limited's (WSL) comments dated 4 August 2025, which were provided following the Applicant's Substantive Application under the Fast-track Approvals Act 2024 (the "Sunfield FTAA Application". The response has been prepared by Maven Associates (Maven) to support the Sunfield FTAA Application by addressing the comments on wastewater and water aspects raised by WSL.

Executive Summary:

There has been ongoing liaison between the Applicant and Maven with WSL following an initial meeting on the 20th August 2025 and subsequent meetings on the 24th September and 15th October 2025. Through this ongoing liaison with WSL, and the technical review by Maven, the following has been established:

Water

1. Watercare have not modelled or done any capacity assessments for the full Sunfield proposal save for the area of land that is in the Future Urban Zone ("FUZ"). Watercare confirmed they have not looked at supply to the full Sunfield proposal based on their direction from Auckland Council to only consider lived zoned land and FUZ land when network planning.

2. Watercare has confirmed that water supply is available at the current bulk supply point ("BSP") at 394 Airfield Road and has *"bulk capacity for the initial stages of the FUZ land".* This would include the land within Sunfield, that is FUZ land. It was further confirmed that Watercare are planning a like for like renewal of the Airfield Road BSP along with a new water main from the 1900mmØ Hunua No.3 transmission main in Burnside Avenue to the east of the proposed Sunfield development. The timing for the planned upgrades was not known at the time of the latest meeting but Watercare have indicated they will enquire internally and respond.

3. It is not clear whether this BSP can provide sufficient potable water capacity for the full Sunfield Development or can be upgraded to meet this demand. Initial modelling by Maven confirms an upgraded BSP would be sufficient to meet the demand for the full Sunfield development, confirmation of this assumption has been requested from WSL.

Wastewater

1. Watercare has not provided any modelling data or done any capacity assessments for the Sunfield proposal save for the area of land that is in the Future Urban Zone (FUZ). Watercare confirmed they have not looked at supply to the full Sunfield proposal based on their direction from Auckland Council to only consider lived zoned land and FUZ land when network planning.

2. Watercare have shared the wastewater network modelling for two scenarios (i) the **current scenario** and (ii) the **future scenario**. The current scenario appears to be based on network inputs from 2022 and is due to be updated before the end of 2025. The future scenario contains an interim case (based on a 20-year horizon) and an ultimate case (based on a 50-year horizon).

3. The modelling inputs are driven by parameters supplied by Auckland Council and are based on population numbers, planning data for FUZ land, live zoned land as well as a recognition of infill development.

   The modelling also appears to make allowance for infiltration and network degradation. The scenarios are run using the 6 monthly ARI design storm which aligns to the conditions of the Network Discharge Consent that Watercare holds for wastewater discharges.

4. Watercare has confirmed that there is capacity in the Takanini Branch Sewer ("TBS") for the FUZ land including the land within the proposed Sunfield development that is FUZ land based on both the **current and future (interim)** models. We have been able to endorse the current scenario model with the analysis contained in Attachment A.

5. Maven has provided two options to service the full Sunfield development which use that available capacity.

WSL comments raise concerns regarding infrastructure feasibility, timing, and alignment with Auckland Council's strategic planning documents. The following sections present WSL concerns in *italic*, followed by Maven's engineering responses in blue.

Only those points requiring clarification or technical response have been addressed in this document, with the intent of focusing on matters directly relevant to the feasibility and implementation of the proposed servicing strategy.

WSL comments raise concerns regarding infrastructure feasibility, timing, and alignment with Auckland Council's strategic planning documents. The following sections present WSL concerns in *italic*, followed by Maven's engineering responses in blue.

Only those points requiring clarification or technical response have been addressed in this document, with the intent of focusing on matters directly relevant to the feasibility and implementation of the proposed servicing strategy.

<u>Water supply – FUZ land only</u>

27 As noted above, the Applicant proposes the establishment of a new potable water supply network. This will require a connection to the nearest BSP, with the Applicant's preliminary assessments identifying two suitable BSPs.

28 Both the Airfield Road BSP and Porchester Road BSP identified by the Applicant are at full capacity and cannot accommodate new connections.

29 preliminary assessment undertaken by Watercare indicates that there is sufficient capacity within the bulk water supply network to supply development of the 57 hectares of FUZ only without precluding development of existing live zoned land. However, the challenge at this location relates specifically to limitations in accessing the transmission capacity.

30 *The construction of a new BSP to access the bulk water supply available from the Waikato-1 Watermain is restricted due to the shutdown limitations for this watermain. The next scheduled shutdown will occur in late 2025 at Quarry Road. Following this, Watercare will not allow any further shutdowns of the Waikato-1 Watermain until the Waikato-2 Watermain is operational.*

31 *Following recent shutdowns on the Waikato-1 Watermain, Watercare has experienced recurring difficulties in restoring adequate storage levels in the Redoubt Reservoir Complex. An operational decision has since been made to defer all non-essential shutdowns for the Waikato-1 Watermain until the Waikato-2 Watermain is commissioned.*

32 *The Waikato-2 Watermain is a new 50km pipeline to be delivered as part of the Waikato Supply Programme which has a current estimate of $760M. The Waikato Supply Programme is partially funded within the 10 year Watercare Business Plan (currently 2025-2035). The Waikato-2 Watermain is currently in the feasibility stage, with construction anticipated to commence in 2030 and commissioning by the end of 2034. However, there is uncertainty associated with this completion date as various project stages, such as concept design and securing of designations and resource consents, have not yet been completed.*

33 *As such, while there is theoretically capacity to service the FUZ component of the Sunfield FTAA with potable water, that capacity cannot be realised without the completion of the Waikato-2 Watermain and developer funding of a new BSP from the new Waikato-2 Watermain connecting to the Sunfield FTAA. If the Application were to proceed on this basis, the cost of this infrastructure would need to be borne by the Applicant (in around 2034) and subject to an Infrastructure Funding Agreement with Watercare.*

Following WSL comments on the Sunfield FTAA Application outlined in their memo dated 4 August 2025, a meeting was held between the Applicant and WSL on 20 August 2025 to discuss the contents of WSL's memo and servicing solutions for the Sunfield development.

During the meeting, it was acknowledged that several additional service options are worthy of further investigation by WSL.

Access Options:

Notwithstanding the confirmation from WSL that:

- there is sufficient potable water capacity to provision for the development of the FUZ Land, and
- access to the potable water capacity can be achieved through a like for like replacement of the BSP at 394 Airfield Road.

1. The Applicant understands that a new BSP in the Takanini area is planned on the Waikato-1 Watermain in the near future. The Applicant contends that this BSP could serve as a connection point for the Sunfield development.

   WSL noted that constructing a new BSP on the Waikato-1 Watermain is currently constrained due to shutdown limitations as identified in their submission. The Applicant suggested a new BSP connection could be completed in the winter shutdown period of 2026 before the above limitations are instigated, this would address the servicing issue for the Sunfield development and would provide additional betterment to the surrounding area in terms of increased water supply capacity. WSL has agreed to investigate this option further and will provide confirmation in due course.

The Applicant is open to funding the cost associated with this work to ensure water supply can be provided to service the entire Sunfield development.

2. The Applicant presented an alternative solution to WSL involving the installation of a new BSP on one of the transmission mains located along Burnside Road, the mains include Hunua 1 (760mm⌀), Hunua 2 (1070mm⌀), and Hunua 3 (1900mm⌀). The alternative solution involves extending a new 450mm pipeline from the proposed BSP to the Sunfield site, with the shortest route (approximately 3km) via Clevedon-Takanini Road, Alfriston-Ardmore Road, and Airfield Road. An alternative route could be via Papakura-Clevedon Road and Old Wairoa Road.

   The Applicant understands that these Hunua transmission mains do not carry the same operational constraints as the Waikato-1 Watermain, allowing for more frequent shutdowns and potentially easier access for BSP installation. WSL acknowledged this alternative proposal and has indicated that it will investigate this option further and will provide confirmation in due course.

   The Applicant is open to funding the cost associated with this work to ensure water supply can be provided to service the entire Sunfield development.

Capacity:

WSL have confirmed that they have not yet assessed the transmission network's ability to support the full Sunfield development. During the meeting, the Applicant emphasised the importance of project timing and clarified that full capacity is not required at the commencement of the development and that a staged delivery scenario is feasible. Given the Sunfield development's projected 15-year delivery timeframe, the Applicant considers that existing capacity within the Waikato-1 or Hunua transmission lines can be used to support a staged rollout, ahead of the commissioning of the Waikato-2 Watermain.

WSL acknowledged this position and requested detailed project timing around staging to enable further capacity assessment. The Applicant has provided this information and is awaiting WSL's response.

Maven contends that additional capacity in the transmission network exists beyond what is available to service the FUZ Land. This is based on the understanding that the relevant catchment these transmission lines supply is not identified within WSL's water constraint areas, and therefore there is capacity to support sites up to their Maximum Probable Development. The Applicant notes that WSL has not provided any information to substantiate their claim of capacity constraints.

Given the fractured ownership and dispersed nature of smaller sites across the catchment and the unknown development timelines, the Applicant contends that capacity should not be reserved by WSL for developments that may occur in the future and should be able to be accessed by the Sunfield development given it is a listed project under the Fast-track Approvals Act 2024.

During recent engagement between WSL and the Applicant, WSL's Development Lead, Oliver MacKinnon, confirmed that the Sunfield development can be serviced via the Airfield Road BSP for the FUZ Land. While this BSP was previously intended for decommissioning, WSL has now indicated it will proceed with a like-for-like replacement of this BSP. The BSP located outside 394 Airfield Road currently services a 230mm water main. Maven is of the opinion that this BSP can be upgraded to a 450mm main from the Takanini No. 2 transmission main, which would provide enough capacity to service the full Sunfield development. Preliminary hydraulic analysis indicates that such an upgrade could yield approximately a 484% increase in flow capacity, assuming pressurised flow conditions and consistent pipe material. This estimate is based on the Hazen-Williams equation and reflects the influence of pipe diameter on flow performance. It is noted that WSL's design pressure range for transmission water mains is typically between 250 kPa and 1600 kPa, which supports a wide range of operational scenarios. This pressure range has been used to inform the above capacity estimate.

The confirmation from WSL that the Airfield Road BSP is available to service the Sunfield development is a significant shift from WSL's position, as detailed in their memo, which stated that the Airfield Road BSP was operating at full capacity. The new information suggests that capacity at the Airfield Road BSP is available (following an upgrade) to support the full Sunfield development. The Applicant is awaiting formal confirmation from WSL regarding:

- the maximum capacity that can be utilised from the proposed upgrade of the BSP, and
- whether the BSP can be upgraded to a 450mm connection.

While planned infrastructure such as the Waikato-2 Watermain (expected to be operational by 2034) will ultimately support long-term servicing of the area, accessing the existing transmission water supply network now and adopting a staged delivery approach is a viable water supply solution for the full Sunfield development. As noted previously, WSL has committed to investigating servicing options further, and the Applicant awaits their formal response.

Wastewater – FUZ land only

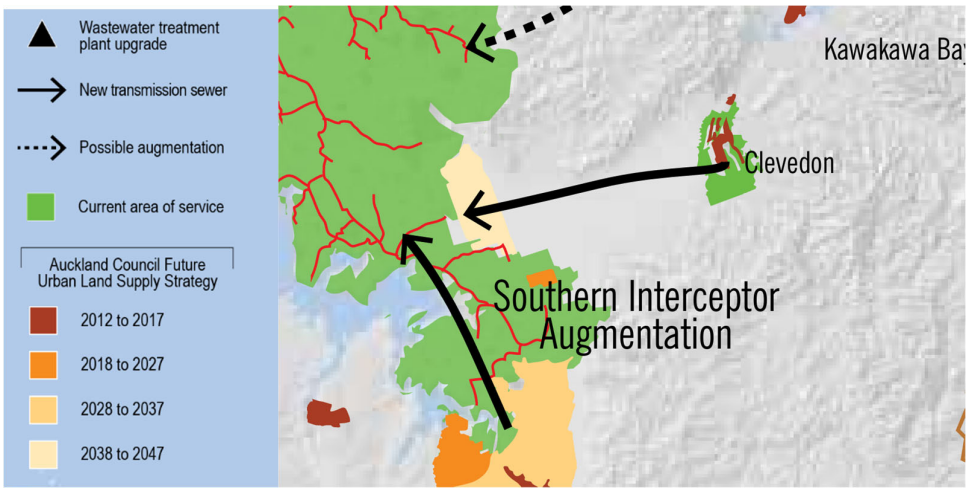
34. *Upgrades will be required to the transmission infrastructure in order to service the FUZ land within the catchment. This is not currently scheduled in the AMP as the land release is outside the 20-year AMP planning period. This assessment takes into account the potential of the proposed LPS system (addressed*

further below) to limit peak flows.

WSL advised in their memo that upgrades to the transmission infrastructure are required to service the FUZ Land. WSL has not provided any capacity modelling or confirmation of current available capacity within the existing network to support this statement.

While WSL has indicated that these upgrades fall outside the scope of its current 10–20-year Asset Management Plan (AMP), the Applicant notes that WSL's AMP (2021–2041) identifies the FUZ land within the Sunfield development land is anticipated for development between 2018 and 2027.

Furthermore, the remainder of the Sunfield development is located within WSL's current area of service. This is supported by WSL's documentation, including the "Strategic Wastewater Programmes 2022–2031" on page 61 of the AMP.



Further to this, as noted within the Sunfield FTAA Application Veolia (acting on behalf of WSL) formally confirmed that the existing WSL transmission network has sufficient capacity to accommodate the anticipated Peak Wet Weather Flow (PWWF) of 64.91 L/s from the FUZ Land. This flow is projected to be generated by the full development of the FUZ land, based on an estimated 1,550 residential units as outlined in the Awakeri Stage 3 Framework Plan. The Awakeri Stage 3 Framework Plan was created by Auckland Council to guide the final development phase of the Awakeri Wetlands project in Takanini, Auckland — with the primary purpose of enabling safe urban growth while delivering environmental, cultural, and community benefits.

As noted earlier, a meeting was held between the Application and WSL on 20 August 2025 to discuss the contents of WSL's memo. During this meeting, the Applicant emphasised the staging associated with the Sunfield development and clarified that full wastewater capacity is not required at the commencement of the development. The Sunfield development is anticipated to have a 15-year delivery timeframe, the Applicant considers that existing capacity within the transmission network can be utilised initially. WSL acknowledged this point and requested detailed project staging information to enable further capacity assessment. This information has been provided, and the Applicant is awaiting WSL's response.

Although WSL has stated that planned capacity for the full development of Sunfield is not currently available, Maven contends that capacity exists within the transmission network. This is based on:

- confirmation was provided by Violia that capacity existed,
- the relevant catchment, which is serviced by the Takanini branch sewer and the Southern Interceptor, is not identified within WSL's wastewater constraint areas.

- it is reasonable to assume that capacity exists to support sites up to their Maximum Probable Development within this catchment.

Given the fractured ownership and dispersed nature of smaller sites across the catchment and the unknown development timelines, the Applicant contends that capacity should not be reserved by WSL for developments that may not occur and should be able to be accessed by the Sunfield project. Sunfield as a listed project within the Fast-track Approvals Act 2024

Low Pressure Sewer/ Storage Proposal

As outlined within the Sunfield FTAA Application, the Applicant proposes a Low-Pressure Sewer ("LPS") system for the wastewater infrastructure solution at Sunfield as this has a number of benefits and is considered to be the best practicable option for the site constraints that exist.

One of the key benefits is the ability to optimise existing capacity by eliminating peak wet weather flows, thereby reducing pressure on the network and enabling more efficient use of existing infrastructure.

To allow WSL to maintain control of discharge from the Sunfield development to the public network, the Applicant has proposed the provision of wastewater storage on-site within a proposed public pump station. This would entail the LPS system, which would be in part private, to discharge to a public pump station with storage capacity which will allow WSL to monitor and control the wastewater discharge to the downstream public network.

In summary, the theoretical wastewater peak flow is removed when using an LPS system. WSL will be able to be store and pump sewerage from the Sunfield development into the existing network during off-peak periods. The communal storage infrastructure and pumping station could be vested in WSL to ensure optimal discharge timing.

35. *The proposal would require an extension of the Takanini branch sewer, which would include upgrades to the existing sewer line and also upgrades to the Southern Interceptor. These upgrades are not planned or funded in Watercare's 10 year AMP and would be dependent on the South-West Interceptor Duplication, which is a planned upgrade but is scheduled for delivery in the late 2030s.*

A hydraulic capacity assessment has been undertaken by Maven for the Takanini Branch Sewer, based on projected flows from the proposed Sunfield development under a LPS configuration. The analysis confirms that the existing Takanini Branch Sewer has sufficient residual capacity to accommodate LPS flows from the Sunfield development without requiring upgrades to the branch sewer. Please Refer to Appendix A – Takanini Branch Sewer Capacity Check for modelling assumptions and results.

The Applicant has committed to funding and undertaking the work required to extend a connection from the Takanini branch sewer into the Sunfield development.

In summary, the wastewater servicing for the Sunfield development can be achieved through a combination of:

- utilising the existing network capacity,
- implementing an LPS system to eliminate peak wet weather flows,
- staging the development over a 15-year timeframe, and
- providing public on-site storage and pumping station(s).

These measures collectively provide a technically sound approach to servicing the Sunfield development.

36. Watercare considers the Applicant's proposed LPS to manage the significant wastewater load to be unacceptable. Watercare's Code of Practice (**COP**) stipulates that servicing should predominantly rely on a gravity network unless specific conditions apply. The COP on page 56 under C5.3.12.3.1 states: *"A low pressure sewer system should in general be considered as limited for up to 50 dwelling units due to system risk to customer service under power failure. A combination of systems or a gravity system with pump station may be more practical."*

The Applicant acknowledges WSL's position and the general guidance provided in the COP. However, it is important to note that WSL's COP is not a regulatory document and allows for alternative solutions to be implemented where they can be justified by technical evidence and precedent. The Applicant refers to the Water New Zealand Pressure Sewer National Guidelines, which do not prescribe a maximum number of lots or properties that can be serviced by an LPS network. Instead, the guidelines emphasise the importance of appropriate design, risk mitigation, and operational management.

There are numerous examples of large-scale LPS being implemented both locally and internationally, demonstrating the viability of this technology beyond the 50-dwelling threshold. As noted below, WSL has vested and continues to operate these LPS systems

Examples in Auckland include:

- Millwater, Auckland – Over 3,000 properties serviced by LPS (vested and operated by WSL).
- Kumeu, Huapai and Riverhead, Auckland – Over 6,000 properties serviced by LPS (vested and operated by WSL).

Adjacent examples include:

- Kuaka Drive Development (adjacent to Sunfield) – 210 properties serviced by LPS (vested and operated by WSL).
- Mill Road Development (adjacent to Sunfield) – 330 properties serviced by LPS (vested and operated by WSL).

International Example:

- Southeast Water (Melbourne, Australia)– Currently operating an LPS network with 2,600 homes connected, with planned expansion to service up to 16,000 homes.

These examples demonstrate that LPS systems of the scale proposed at the Sunfield development are a solution which has been adopted and vested by WSL. Furthermore, the Water New Zealand guidelines highlight that Council ownership and management of LPS infrastructure is overwhelmingly preferred, with 12 out of 15 New Zealand authorities (included WSL) utilising this model. This supports the Applicant's proposal for WSL to vest and operate a LPS system, ensuring operational control and service reliability.

The Applicant also notes that the proposed LPS system for the Sunfield development includes design features to mitigate risks associated with power outages, including:

- emergency storage capacity within each pump chamber.
- staged discharge control to avoid peak loading.
- public pump stations and storage on-site, which WSL can operate to optimise discharge timing.

Given the dispersed nature of development across the catchment and the long lead times for gravity-based infrastructure upgrades, the LPS system offers a pragmatic and technically sound solution. It enables the Sunfield development to proceed in alignment with its 15-year delivery programme while ensuring wastewater servicing is managed responsibly.

In conclusion, the Applicant maintains that:

- the proposed LPS system is consistent with national guidelines and proven practice and has been approved and vested by WSL throughout Auckland.
- the scale of the system is supported by precedent both locally and internationally.
- risks identified by WSL can be effectively mitigated through design and operational controls.
- ownership and management by WSL ensure alignment with their service standards (as has been proven through the vesting and operation of similar LPS systems throughout Auckland of a similar scale).
- the system provides a viable solution to enable development now, while network upgrades are planned and delivered.

Whilst the LPS system is the Applicant's preferred approach and what is proposed under this Sunfield FTAA Application, an alternative wastewater solution (being a hybrid system) has been considered to ensure a robust assessment and is outlined below.

Alternative Solution - Hybrid System: An alternative solution available is a hybrid servicing solution that integrates both gravity and LPS networks. This approach involves extending a gravity network from the existing Takanini Branch Sewer into the Sunfield development, with discrete LPS catchments, based on the neighborhoods that are to be development, discharging into this gravity system. Please Refer to Appendix B – Proposed Hybrid Wastewater Network, which illustrates the schematic layout and demonstrates the feasibility of this solution.

As noted within the Sunfield FTAA Application, a full gravity solution is not feasible in this location due to the site's low elevation and flat topography which requires deep excavation and result in increased wet weather flows due to infiltration. The hybrid approach mitigates these risks by limiting the gravity network to areas with sufficient gradient and using LPS systems where topography is constrained. To further mitigate infiltration risks, the gravity network can be constructed using welded PE pipe, which is a commonly adopted practice in modern sewer infrastructure. This material selection supports WSL's objective of excluding groundwater infiltration from flow assessments. The hybrid solution ensures that wastewater flows remain within the capacity available for the FUZ Land, while offering a technically feasible and resilient alternative should the full scale LPS proposal not be preferred.

This hybrid system proposal enables smaller LPS catchments which directly addresses Watercare's concerns regarding the ongoing operation associated with large-scale LPS systems.

37. *The proposed development includes 3,854 dwellings, plus industrial, commercial, and school connections. This far exceeds the recommended LPS threshold and introduces significant operational risk. The documentation provided by the Applicant lacks adequate justification for the proposed use of an LPS over a gravity solution. Moreover, it appears unlikely that an LPS would sufficiently reduce flow from the site to negate the need for upgrading the downstream infrastructure. The LPS system is therefore highly unlikely to be accepted for vesting by Watercare.*

Justification for LPS System

As previously stated, the Applicant proposes a LPS system as the preferred wastewater servicing solution for the Sunfield development. This approach is particularly suited to the site's geotechnical constraints, including flat topography, high groundwater levels, and low-strength peat soils. These conditions make conventional gravity-based systems technically challenging, costly, environmentally disruptive and risky due to the need for deep trenching and extensive dewatering.

The LPS system offers a low-risk, practical and cost-effective alternative. It uses small-diameter pressurised pipes and grinder pumps installed at individual dwellings or clusters, significantly reducing excavation depth, groundwater infiltration risk and construction impacts. This makes it ideal for areas with poor soil stability and high-water tables.

Operationally, LPS systems provide several advantages, including reduced infiltration and inflow, and the ability to modulate discharge volumes to manage peak flows into downstream infrastructure. These features help mitigate common issues associated with gravity networks, particularly in constrained environments.

As noted above, WSL has vest and continue to operate LPS systems in developments, of a similar scale to the Sunfield development throughout Auckland, where ground conditions pose challenges to gravity-based servicing. The Sunfield development shares these characteristics, and the proposed system is designed to address the risks typically associated with gravity networks, such as construction defects due to ground consolidation and elevated peak flows due to groundwater infiltration.

As noted within the Sunfield FTAA Application, given the site-specific constraints and the proven performance of LPS systems in comparable developments, this solution is both technically sound and operationally robust for the Sunfield development.

Importantly, the proposed LPS system aligns with WSL's broader servicing principles by enabling staged development and deferring the need for immediate large-scale upgrades to trunk infrastructure. The Sunfield development is planned over a 15-year timeframe, meaning full site capacity is not required on the commencement of the development. Wastewater discharge can be scaled progressively to align with WSL's capacity requirements at each stage of development. This staged approach allows for demand to increase gradually, ensuring infrastructure is not overburdened and capacity is matched to actual development progress.

Site-Specific Challenges and Gravity Limitations

In the Papakura/Takanini area, gravity-based wastewater networks have proven to be particularly challenging during both construction and post-construction phases, with a history of defects observed due to ground instability and high-water table conditions. These issues often result in costly remediation, increased maintenance requirements, and long-term operational inefficiencies. The LPS system offers a robust alternative by significantly reducing the need for deep excavation and heavy infrastructure, thereby mitigating construction risks and minimising the likelihood of post-construction failures. Its adaptability to variable ground conditions and reduced reliance on gravity flow make it a more resilient and sustainable solution for servicing developments in geotechnically constrained environments such as the Sunfield site.

Flow Reduction and Network Capacity

A LPS system results in less discharge into downstream infrastructure compared to conventional gravity systems due to its ability to modulate flow rates and eliminate peak wet weather (infiltration) flows. Unlike gravity networks, which are prone to infiltration and inflow during rainfall events, LPS systems

use sealed, pressurised pipes and controlled pumping mechanisms that prevent excess water from entering the system. Additionally, discharge from LPS systems can be timed to occur during off-peak periods, reducing demand on downstream assets and improving overall network efficiency.

Importantly, the Applicant has designed the LPS system for the full Sunfield development to deliver a Peak flow (ADWF x 1.2) of 61.53 L/s, which is significantly below the 64.91 L/s threshold confirmed by Veolia (on behalf of WSL) as acceptable for servicing the FUZ Land.

Vesting Considerations

Given the demonstrated reduction in flow (PWWF), the suitability of the LPS system to the Sunfield developments geotechnical conditions, its alignment with precedent servicing strategies, and the Applicant's willingness to collaborate on design refinements, the LPS system represents a viable solution for wastewater servicing of the full Sunfield development.

Neighborhoods within the Sunfield development will be managed by either an Incorporated Society or a Body Corporate, which can provide oversight and management of the private LPS infrastructure within individual lots, ensuring operational accountability and ongoing maintenance. Public LPS infrastructure located in shared spaces, such as public pump stations and rising mains are proposed to remain under WSL's ownership and management. This clear delineation ensures WSL retains control over public assets while avoiding the challenges associated with privately owned infrastructure in public spaces, which can complicate access, maintenance responsibilities, and long-term service reliability.

38. *A further constraint on wastewater servicing is wastewater treatment capacity. The ability for the Mangere Wastewater Treatment Plant (WWTP) to service out of sequence and unanticipated growth is constrained by the existing resource consent which includes as a condition an average daily flow limit. The existing resource consent expires in 2032. Watercare will need to reconsent the discharge, which will need to provide for future growth in line with Council's growth forecast. This process will also confirm the discharge location and effluent quality which will inform any future upgrades. There are no upgrades, outside those planned for treating flows from the Central Interceptor, anticipated between now and the end of the existing consent. A new discharge consent will determine future scale and timing of wastewater upgrades. Additional unanticipated wastewater flows as described in this PPC may require upgrades to be brought forward, which would need to be done in accordance with the existing and future discharge consent.*

The Applicant acknowledges WSL's concerns regarding the Mangere Wastewater Treatment Plant (WWTP), particularly the limitations imposed by its current discharge consent, which includes an average daily flow limit and expires in 2032. However, the Applicant respectfully contents that the Sunfield development can be accommodated within existing and future capacity frameworks, based on several key considerations.

Firstly, the catchment areas discharging to the WWTP are not currently identified within WSL's wastewater constraint areas, indicating that a significant amount of theoretical capacity remains available. This suggests that the network is not under immediate pressure and can support additional flows, particularly when managed responsibly.

WSL has acknowledged that it is possible to regulate flows between the WWTP and the Rosedale WWTP by way of the Northern Interceptor, which has been commissioned and will be put into use in 2026.

Secondly, the volume of discharge to the WWTP is primarily driven by population growth across the catchment, not solely by new development. The Sunfield development contributes to this growth incrementally over a 15-year staged delivery programme, allowing WSL to plan and respond in

alignment with its standard infrastructure upgrade cycles. As population increases, WSL will, as is the standard practice, undertake upgrades to the WWTP and reconsent its discharge to reflect future demand and effluent quality requirements.

Finally, the Sunfield development will contribute financially through Watercare infrastructure growth charges, which are specifically designed to support upgrades to WSL's assets, including treatment facilities. This ensures that the Sunfield development contributes to the funding of necessary infrastructure improvements over its development timeline.

In summary:

- the catchment capacity is not currently constrained, and capacity exists.
- discharge volumes will increase gradually with the ongoing development growth, not abruptly.
- LPS technology reduces, and controls discharge volumes effectively and is seen as the best practicable option when compared to a conventional gravity PVC piped system.
- the development will contribute, financial through Watercare growth charges, to infrastructure upgrades.

Further Correspondence – Applicant and WSL engagement via meeting and email:

As part of further servicing discussions with WSL for the Sunfield development, the Applicant engaged with WSL's Development Lead, Oliver MacKinnon, via email correspondence on 29 September 2025. This followed an earlier meeting held on 24th September 2025 between the Applicant and WSL, where Oliver MacKinnon acted as the technical lead for WSL. As part of the email engagement, Oliver provided WSL's concerns regarding the feasibility and long-term performance of LPS systems, particularly in relation to asset ownership, operational reliability, resilience during outages, lifecycle costs, and precedent from existing networks.

WSL highlighted several technical and operational challenges observed in other LPS deployments and reiterated that LPS systems are generally considered a last-resort option. In response, Maven has reviewed these concerns and provided targeted engineering commentary to address these concerns.

The following sections present WSL's concerns in *italic*, followed by Maven's engineering responses in *blue*.

- *Asset Ownership and Maintenance – LPS systems rely on individual grinder pumps and small diameter rising mains, often located on private property. This creates blurred responsibilities for maintenance, frequent callouts, and difficulties in managing assets that sit outside the public network. There is also difficulty in locating and repairing blockages in the pressure sewer networks.*

  WSL's concern about blurred responsibilities and maintenance challenges in LPS systems reflects legacy installations, not the structured and community-supported model proposed for the Sunfield development. The key differences are:

1. **Clear Ownership Boundaries**
   At the Sunfield development, the pump unit will be privately owned and maintained by the homeowner, while WSL's responsibility is limited to boundary kits and public mains. This separation is clearly defined and supported by service agreements and design documentation.
2. **Resident Society Governance**
   Sunfield's resident society plays a central role in managing community infrastructure. It will:
   - oversee homeowner education and compliance
   - coordinate pump service schedules
   - act as a liaison between residents and WSL
   - ensure consistent standards across private properties
   - this governance model eliminates ambiguity and ensures proactive maintenance and communication.
3. **Modern Monitoring and Support**
   The LPS system will include remote monitoring and fault detection, allowing rapid identification of issues and reducing the need for reactive callouts. This addresses historical concerns about locating and repairing blockages.
4. **Simplified Public Asset Management**
   WSL's responsibility is limited to simple, accessible components—boundary kits and shallow mains—unlike gravity systems which require deep excavation, confined space entry, and complex asset tracking.

See below LPS arrangement below:

- *Operational Reliability – Each property is dependent on a mechanical pump. If a pump fails or power supply is interrupted, the property immediately loses wastewater service, which poses health and environmental risks. By comparison, gravity systems are passive and far less likely to fail.*

  WSL's concern about pump dependency and power outages in LPS systems is valid in legacy contexts but does not reflect the modern, resilient design proposed for the Sunfield development. The Key points are:

1. **Power Resilience**
   Sunfield will operate with an embedded power grid and battery backup, ensuring continuity of wastewater service during outages. This provides greater resilience than conventional gravity systems reliant on centralised pump stations.

2. **Decentralised Risk**
   LPS systems localise risk to individual properties. A single pump fault affects only one dwelling, unlike gravity systems where pump station failures can impact hundreds of homes.

3. **Modern Reliability**
   Today's grinder pumps are highly reliable, with long service intervals and remote monitoring. Faults are detected early and resolved quickly, reducing service disruption.

4. **Emergency Storage**
   Each pump unit includes buffer storage, providing time to respond during outages and preventing immediate health or environmental risks.

5. **Resident Society Oversight**
   Sunfield's resident society will manage homeowner education, pump servicing coordination, and fault reporting - ensuring consistent standards and rapid response.

- *Resilience and Response – In large-scale outages (e.g., storms, flooding, or extended power cuts), LPS systems are especially vulnerable. Watercare would face significant challenges providing emergency servicing across multiple lots, which is neither practical nor sustainable. Increasing storage beyond 24 hours to mitigate this risk can lead to further challenges. Extended residence time in the storage tanks can lead to the release of hydrogen sulphide gas, which creates odours, a hazardous environment, and potentially corrodes assets, including pipes, manholes, pump stations, and storage tanks. This issue has been observed as an issue in the Millwater low pressure network and is also likely to have contributed to the downstream network to Army Bay WWTP where pipes, manholes, pump stations, and storage tanks have deteriorated at an accelerated rate over the past 10+ years due to septicity. In the Kumeu-Huapai-Riverhead LPS network, dosing is done upstream to manage odour and corrosion, with costs between $150K-180K per year. The odour bed was decommissioned, and a carbon odour unit was installed, incurring higher maintenance costs.*

  WSL's concern about LPS vulnerability during large-scale outages and septicity risks reflects legacy installations, not the modern, actively managed, and community-supported system as proposed for the Sunfield development. The Key points are:

1. **Embedded Power and Emergency Storage**
   Sunfield will operate with an embedded power grid and battery backup, ensuring continuity of pump

operation during extended outages. Each pump unit includes buffer storage, typically sufficient for 24–48 hours, mitigating immediate health or environmental risks.

2. **Decentralised Risk Profile**
   Unlike gravity systems, where pump station failures affect hundreds of homes, LPS systems localise risk to individual properties. This decentralisation simplifies emergency response and improves overall network resilience.

3. **Proactive Septicity and Odour Management**
   The issues observed in Millwater and Army Bay were due to extended residence times and reactive dosing strategies. Sunfield will mitigate these risks through:

   - optimised network design to reduce residence time
   - upstream dosing where required
   - remote monitoring for early detection
   - use of corrosion-resistant materials (e.g., HDPE)
   - ventilation and odour control measures at key points

4. **Resident Society Oversight**
   Sunfield's resident society will coordinate pump servicing, fault reporting, and homeowner education—ensuring consistent standards and rapid response. This governance model is a key differentiator from past installations and ensures community accountability.

5. **Gravity System Vulnerabilities**
   Gravity networks are not immune to resilience challenges. Manholes and deep pipes are prone to infiltration, exfiltration, and overflow during flooding events, which can pose equal or greater environmental risks.

6. **Forward Collaboration**
   We welcome the opportunity to work with WSL's technical team to model residence time, dosing requirements, and asset resilience as part of the upcoming workshop. This will ensure the system meets performance expectations and aligns with WSL's long-term asset strategy.

- *Lifecycle Costs – Over their life, LPS systems typically cost more to operate and maintain than a conventional network. Pumps, electrical components, and controls require replacement and servicing, and costs are often underestimated at the planning stage. Moreover, reducing groundwater infiltration and rainwater inflow in pressure sewer systems are broader than system design and many important factors are building control (private property) issues which are outside the control of Watercare – including ongoing private properties inspections, community engagement and communication.*

  WSL's concern that LPS systems "typically cost more to operate and maintain than a conventional network" does not fully reflect the evolving design, ownership model, and operational efficiencies of modern LPS systems, particularly in developments like Sunfield, where:

1. **Homeowners bear the cost of pump maintenance and power**, not Watercare. This significantly reduces WSL's operational exposure.
2. **Boundary kits and public mains** are the only components maintained by Watercare, which are simpler and cheaper than gravity infrastructure (e.g., manholes).
3. **Modern LPS systems are sealed**, reducing infiltration and inflow risks. Gravity systems, by contrast, are prone to infiltration through joints and manholes, increasing treatment costs and environmental risk.
4. **Community engagement and education** are embedded in Sunfield's governance model, ensuring compliance and reducing reliance on WSL for private property inspections.
5. **Lifecycle cost modelling from NZ councils** shows pressurised networks have lower total acquisition and maintenance costs over 50 years, especially in flat or geotechnically challenging terrain.

Lifecycle Comparison – Gravity vs Pressurised Wastewater Networks

Aspect	Gravity Pipe Network	Pressurised Pipe Network
Infrastructure Components	Pipes + Manholes	Pipes + Boundary Kits
Installation Depth	Deep trenching required	Shallow trenching; flexible routing
Manhole Requirement	Required every ~40m; high cost and maintenance	Not required
Boundary Kit Requirement	Not applicable	Required at each property; low cost
Watercare's O&M Responsibility	Public network (pipes, manholes) within the public reserve.	Public network (public mains and boundary kits) within the public reserve.
Homeowner O&M Responsibility	None	Pump unit maintenance and power supply
Infiltration/Exfiltration Risk	High – through joints and manholes	Low – sealed system
Environmental Impact (Construction)	High – deep excavation, dewatering, reinstatement	Low – minimal disruption
Maintenance Frequency	High – CCTV, cleaning, infiltration control	Low – fewer access points, predictable servicing
Design Life (Pipes)	50–100 years	~50 years
Design Life (Manholes/Boundary Kits)	50+ years	~25–50 years
Total Lifecycle Cost to Council	High – capital + full O&M burden	Lower – limited O&M scope and shared responsibility

- *Standards and Precedent – Our standards are based on lessons from past experience. Where LPS has been installed, we have encountered high maintenance demand, asset management difficulties, and customer dissatisfaction. This is why we treat LPS as a last-resort option, typically only when topography, geotechnical, or cost constraints make conventional solutions infeasible.*

  WSL's position that LPS systems are a "last-resort option" based on historical challenges does not reflect the current generation of pressure sewer technology, nor the ownership and governance model proposed for the Sunfield development. While legacy LPS installations may have faced issues, the following points demonstrate why the Sunfield development's approach is fundamentally different and aligned with best practice:

1. **Technology Evolution**
   Modern LPS systems, such as those provided by E/One, include remote monitoring, fault detection, and predictive maintenance capabilities. These systems are not comparable to older installations that lacked telemetry, standardised components, or community education.

2. **Ownership Model**
   In Sunfield, homeowners are responsible for grinder pump maintenance and power, while WSL's responsibility is limited to boundary kits and public mains. This significantly reduces WSL's exposure to asset management and operational risk.

3. **Community Governance**
   Sunfield's resident society will oversee education, compliance, and engagement which ensures a consistent standard across private properties. This mitigates the risk of poor installation or maintenance practices that have historically led to dissatisfaction.

4. **Design Justification**
   The topography, geotechnical conditions (peat soils), and cost constraints in Sunfield clearly justify LPS as the preferred solution. Deep gravity systems in this context pose health and safety risks, high capital costs, and long-term settlement issues.

5. **Life Cycle cost**
   As detailed above, a pressurised wastewater network has a lower life cycle cost than a gravity system due to simpler installation, reduced maintenance, and shared responsibilities(particularly where homeowners manage pump upkeep) leaving WSL responsible only for boundary kits and public mains.

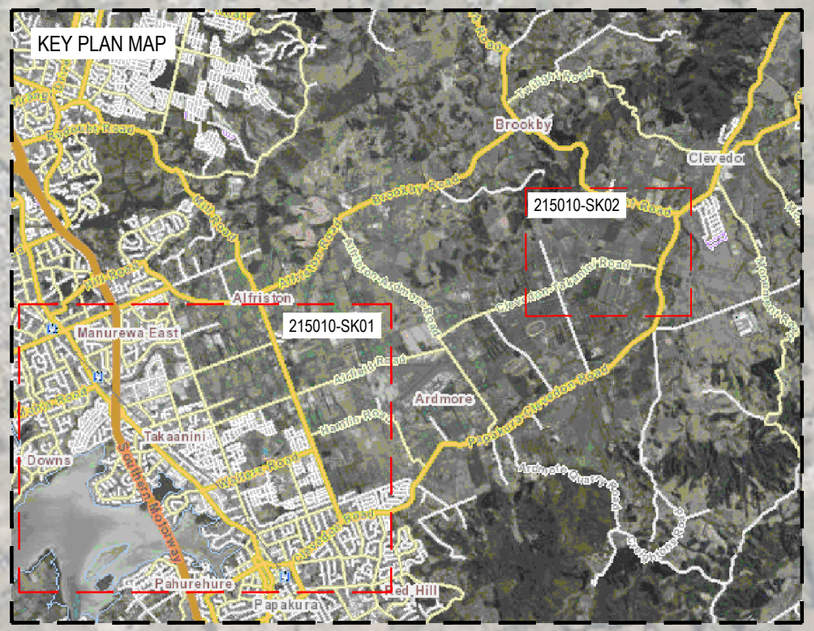
Appendices

Appendix A – Takanini Branch Sewer Capacity Check
Appendix B – Proposed Hybrid Wastewater Network.

Kind Regards,

Will Moore
DIRECTOR
BE (Civil), MIPENZ, CPEng, IntPE(NZ)
MAVEN ASSOCIATES LIMITED

Appendix A – Takanini Branch Sewer Capacity Check



EX LPS NETWORK SERVICING CLEVEDON DEVELOPMENT
(INCL. EX 450 LOTS PLUS FUTURE DEVELOPMENT OF 550 LOTS)
(PWWF: 7.5 L/s)
(REFER TO 215010-SK02)

TO SK020

ARDMORE AIRPORT

AIRFIELD ROAD

MILL ROAD

EX Ø525mm
UNDER CAPACITY
TO BE UPGRADED TO Ø600mm
ASSET ID: 196924

PORCHESTER ROAD

CHURCH

120 LOTS

228 LOTS

20 LOTS

80 LOTS

80 LOTS

184 LOTS

140 LOTS

273 LOTS

270 LOTS

116 LOTS

EXISTING Ø525mm
WASTEWATER TRANSMISSION
NETWORK

SUNFIELD
DEVELOPMENT
(LPS PWF:
61L/s)

KAURI
FLATS
SCHOOL

COSGRAVE ROAD

109 LOTS

238 LOTS

COMMERCIAL AREA

WALTERS ROAD

1264 LOTS

EXISTING Ø525mm
WASTEWATER NETWORK
CONNECTING TO EX Ø900mm
TRANSMISSION NETWORK

PORCHESTER ROAD

OLD WAIROA ROAD

525 LOTS

FOR INFORMATION

NOTES

1. EXISTING WASTEWATER NETWORK SHOWN ON THIS MAP IS BASED ON AUCKLAND COUNCIL GIS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000.

LEGEND

- EX RESIDENTIAL LOTS LPS CATCHMENT AREA
- EX RESIDENTIAL LOTS GRAVITY SYSTEM CATCHMENT AREA
- FUTURE RESIDENTIAL LOTS LPS CATCHMENT AREA
- FUTURE COMMERCIAL LOTS GRAVITY SYSTEM CATCHMENT AREA
- FUTURE RESIDENTIAL LOTS GRAVITY SYSTEM CATCHMENT AREA
- SUNFIELD FAST TRACK DEVELOPMENT SITE
- OTHER TYPE OF CATCHMENT AREA

Rev	Description	By	Date
A	FOR INFORMATION	DS	09/2025

	By	Date
Survey	-	-
Design	DS	09/2025
Drawn	DS	09/2025
Checked	TYJ	09/2025

Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

Project
PRELIMINARY SUPER-LOT CONCEPT PLAN FOR WINTON PROPERTY

Title
WIDER WASTEWATER CATCHMENT MAP PLAN

Project no.	215010
Scale	1:15000 @ A3
Cad file	215010-WASTEWATER CATCHMENT MAP.DWG
Drawing no.	215010-SK01 Rev A

DATE: 10/10/25 FILEPATH: P:\MAVEN\PROJECTS\215010 - SUNFIELD\EXCEL\WASTEWATER\250919 WIDER WW CATCHMENT ANALYSIS\2510 WASTEWATER CATCHMENT MAP.DWG

N

WEST ROAD

EX LPS NETWORK

TO SK010

CLEVEDON-TAKANINI ROAD

PAPAKURA-CLEVEDON ROAD

NORTH ROAD

CLEVEDON-KAWAKAWA ROAD

TWILIGHT ROAD

207 LOTS

MEADOW DRIVE

MOMONUMENT ROAD

1500 LOTS

FOR INFORMATION

NOTES

1. EXISTING WASTEWATER NETWORK SHOWN ON THIS MAP IS BASED ON AUCKLAND COUNCIL GIS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000.
3. PRECINCT PLANNING AREAS REFER TO ISTHMUS CLEVEDON VILLAGE DESIGN FRAMEWORK 27/11/2018

LEGEND

- FUTURE CLEVEDON DEVELOPMENT AREA
- EXISTING CLEVEDON RESIDENTIAL AREA
- EXISTING/FUTURE CLEVEDON BUSINESS AREA

PEAK DESIGN FLOWS FROM CLEVEDON VACUUM SYSTEM:	
EXISTING RESIDENTIAL	1.55 L/s
EXISTING COMMERCIAL	3.7 L/s
EXISTING TOTAL	**5.25 L/s**
MPD RESIDENTIAL (BASED ON PRECINCT FRAMEWORK PLAN)	12.8 L/s
MPD COMMERCIAL (BASED ON PRECINCT FRAMEWORK PLAN)	6.1 L/s
MPD TOTAL (FLOW USED FOR ANALYSIS)	**18.9 L/s**

Rev	Description	By	Date
A	FOR INFORMATION	DS	09/2025

	By	Date
Survey	-	-
Design	DS	09/2025
Drawn	DS	09/2025
Checked	TYJ	09/2025

Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

Project
PRELIMINARY SUPER-LOT CONCEPT PLAN FOR WINTON PROPERTY

Title
WIDER WASTEWATER CATCHMENT MAP PLAN

Project no.	215010
Scale	1:15000 @ A3
Cad file	215010-WASTEWATER CATCHMENT MAP.DWG
Drawing no.	215010-SK02 Rev A

MAVEN ASSOCIATES	Job Number 215010	Sheet 1	Rev A
Job Title: Sunfield Development Calc Title: Existing WW Catchment Analysis	Author: DW	Date: 8-Oct	Checked: TYJ

WW Flow Calculation - Residential

Day to Second	86400	s

Design Parameters / Assumptions:				
Residential				
No. Pepole per residential lot	3		(Based on WSL CoP Table 5.1.1)	
Design flow	180		L/p/day (Based on WSL CoP Table 5.1.1)	
School				
L/Student/d	15	L/p/day		
L/Staff/d	45	L/p/day		
GRAVITY NETWORK				
PWWF peaking factor	6.7	(Based on WSL CoP Table 5.1.1)		
Kauri Flats (Primary) School (to 196929)	**Popultaion**	**PWWF (l/s)**		
number of student	340	0.40	(340 Students estimated from school website data)	
number of staff	50	0.17	(50 Staff estimated from school website data)	
	Total	**0.57**		
LOW PRESSURE SYSTEM (LPS) Sysytem				
Capacity safety factor	1.2	(Based on WSL WW CoP 5.3.12.3.3)		
	Number of residential Lots	**PWWF (l/s)**		
Sunfield Development Catchment (to 196929)		61.53	(Refer Maven Sunfield Development Wastewater Demand Calcs)	
Clevedon Existing Residential Development Catchment (to 197074)	207	1.55	(Refer to Isthmus Clevedon Village Design Framework for number of lots)	
Clevedon Future Residential Development Catchment (to 197074)	1500	11.25	Refer to Isthmus Clevedon Village Design Framework for number of lots	
Existing Catchment (to 196927)	80	0.60		
Holy Trinity Catholic Primary School	**Popultaion**	**PWWF (l/s)**		
number of student	400	0.08	(400 Students estimated from school website data)	
number of staff	30	0.02	(30 Staff estimated from school website data)	
	Total	0.10		

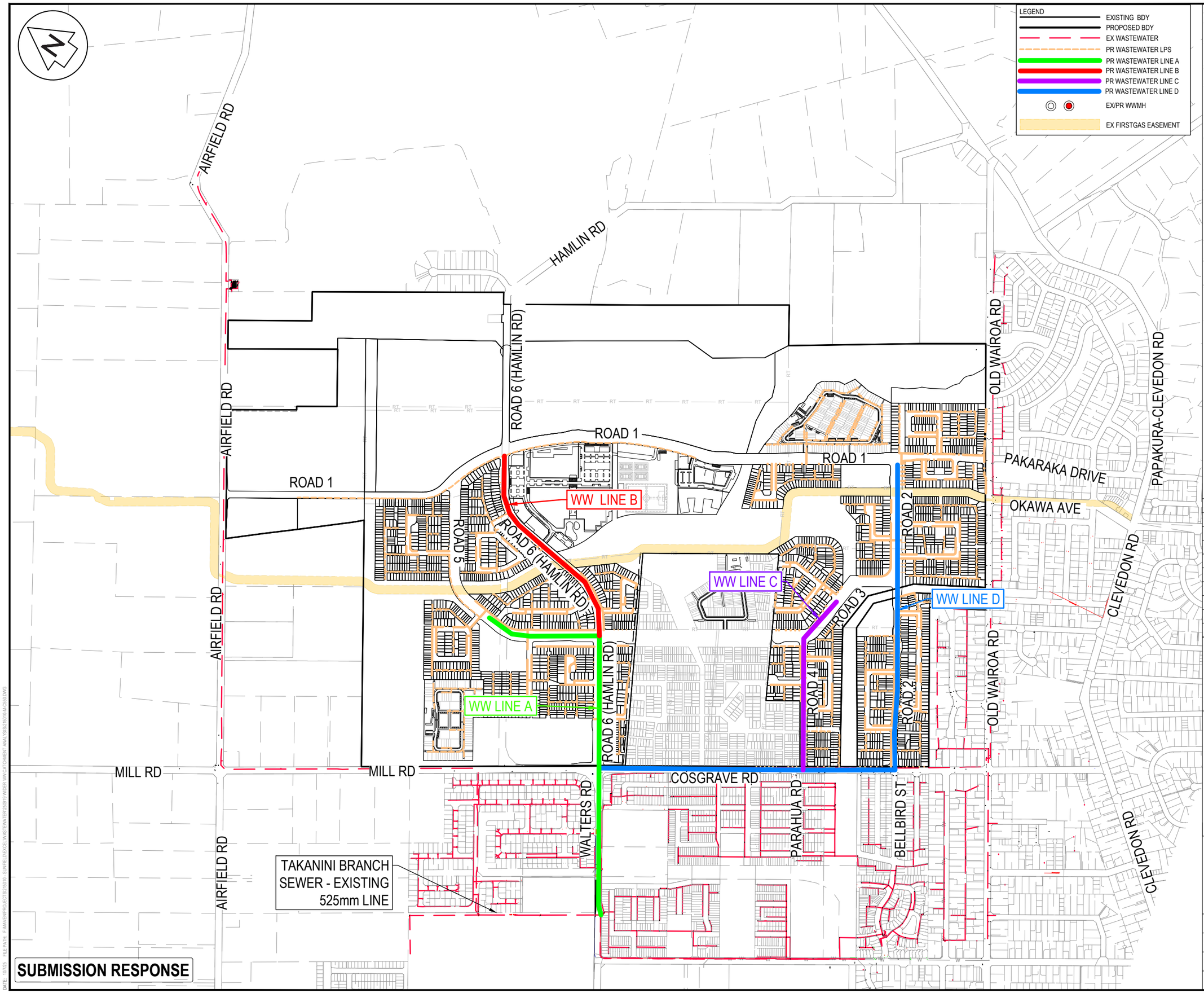
Future Dry Retail Connection (to 197071) from 1 Willow Camp Rd, 66-86 Kauri Heart Ave		
PWWF peaking factor	5.0	(Based on WSL CoP Table 5.1.3)
Catchment Area	33000	m2
Population	528	(Assumed 1 person per 50m2 net floor area)
PWWF	**1.99**	65 L/p/day (WSL CoP Table 5.1.3)

Clevedon Retail Catchment (to 197074)		
PWWF peaking factor	1.20	Assumed to be same as LPS peaking factor
Catchment Area	5.081	ha
ADWF	1	1/litres/ha/sec (Retail/Retirement Village Office)
ADWF	5.081	L/s
PWWF	**6.10**	**L/s**

ks = 1.5

Pipe ID	# of Residential Lots (Gravi	PWW Flow (Gravity)	FLOWS FROM LPS	PWWF (School/Commercial)	Cummulative Peak Flows	Pipe dia	Gradient	Capacity	Velocity	% Full	Check	Remark
		l/s	*l/s*		***l/s***	*m*	%	*l/s*	*m/s*			(Catchment Types other than cummulative gravity residential lot type)
196929	1264	52.93	61.53	0.57	**115.03**	0.525	0.18	185.02	0.85	62%	OK	Sunfield (LPS) +Upstream gravity Residential Lot Catchment
197272	0	0.00	0.00	-	**115.03**	0.525	0.17	177.39	0.82	65%	OK	
197074	798	33.42	12.80	6.10	**167.35**	0.525	0.22	203.96	0.94	82%	OK	Kauri Flats School (Gravity) I+ Clevedon+Old Wairoa Road LPS Catchment
197669	0	0.00	-	-	**167.35**	0.525	0.40	274.55	1.27	61%	OK	
196928	0	0.00	-	-	**167.35**	0.525	0.30	235.46	1.09	71%	OK	
197271	0	0.00	-	-	**167.35**	0.525	0.23	208.04	0.96	80%	OK	
197073	0	0.00	-	-	**167.35**	0.525	0.21	196.25	0.91	85%	OK	
197668	0	0.00	-	-	**167.35**	0.525	0.31	240.62	1.11	70%	OK	
196927	200	8.38	0.60	0.10	**176.42**	0.525	0.30	235.32	1.09	75%	OK	LPS - Holy Trinity Catholic Primary School
197270	228	9.55	-	-	**185.97**	0.525	0.75	374.34	1.73	50%	OK	
197072	0	0.00	-	-	**185.97**	0.525	0.47	295.02	1.36	63%	OK	
197667	140	5.86	-	s	**191.83**	0.525	0.52	312.88	1.45	61%	OK	
196926	0	0.00	-	-	**191.83**	0.525	0.44	285.65	1.32	67%	OK	
197269	0	0.00	-	-	**191.83**	0.525	0.53	314.96	1.45	61%	OK	
197071	184	7.71	-	1.99	**201.52**	0.525	0.55	320.84	1.48	63%	OK	(Gravity - residential and business zone)
197666	0	0.00	-	-	**201.52**	0.525	0.44	285.85	1.32	70%	OK	
196925	0	0.00	-	-	**201.52**	0.525	0.39	271.46	1.25	74%	OK	
197668	270	11.31	-	-	**212.83**	0.525	0.49	302.77	1.40	70%	OK	
197070	238	9.97	-	-	**222.80**	0.525	0.67	354.96	1.64	63%	OK	
197665	116	4.86	-	-	**227.65**	1.050	1.75	3552.02	4.10	6%	OK	
196924	109	4.56	-	-	**232.22**	0.525	0.08	122.02	0.56	190%	Undercapacity	Gradient on this pipe shown on GeoMaps appears to error based on very flat graident compared to rest of the network & the line prior having higher gradient.
197267	0	0.00	-	-	**232.22**	0.525	1.81	580.94	2.68	40%	OK	
197069	0	0.00	-	-	**232.22**	0.525	24.20	2126.94	9.83	11%	OK	
197664	0	0.00	-	-	**232.22**	0.525	0.70	361.64	1.67	64%	OK	
196923	0	0.00	-	-	**232.22**	0.525	0.44	286.55	1.32	81%	OK	
197266	0	0.00	-	-	**232.22**	0.525	0.49	302.20	1.40	77%	OK	
197068	0	0.00	-	-	**232.22**	0.525	0.42	279.16	1.29	83%	OK	
197663	0	0.00	-	-	**232.22**	0.525	0.66	350.38	1.62	66%	OK	
196922	0	0.00	-	-	**232.22**	0.525	0.54	316.20	1.46	73%	OK	
197265	0	0.00	-	-	**232.22**	0.525	0.32	246.11	1.14	94%	OK	
197067	0	0.00	-	-	**232.22**	0.525	0.38	265.37	1.23	88%	OK	

Appendix B – Proposed Hybrid Wastewater Network



WASTEWATER NOTES

1. ALL WORKS AND MATERIALS TO COMPLY WITH WATERCARE SERVICES LIMITED CODE OF PRACTICE.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM (NZVD) 2016.
3. ALL PRIVATE DRAINAGE WORKS TO COMPLY WITH THE NEW ZEALAND BUILDING CODE.
4. ALL DRAINAGE WORKS SHALL BE CARRIED OUT UNDER THE SUPERVISION OF A REGISTERED DRAIN LAYER AND IN ACCORDANCE WITH CURRENT HEALTH AND SAFETY PRACTICES. WHERE REQUIRED, DRAINAGE WORKS ARE TO BE UNDERTAKEN BY AN APPROVED LICENSED CONTRACTOR (A.L.C.)
5. ALL ORDINARY TRENCH BACKFILL SHALL COMPRISE SUITABLE EARTHFILL FREE OF TOPSOIL/ORGANICS AND SHALL BE WELL COMPACTED IN LAYERS NOT EXCEEDING 200mm TO ACHIEVE MINIMUM SHEAR STRENGTHS OF 100 kPa / MAX. 10% AIR VOIDS OR AS PER THE EARTHWORKS SPECIFICATION.
6. ALL PIPE CROSSINGS UNDER CARRIAGEWAYS/ TRAFFIC AREAS TO BE HARDFILL BACKFILLED WITH APPROVED GAP65 TO 1.0m BEYOND EXTENT CARRIAGEWAY. TRENCH HARDFILL BACKFILL TO BE WELL COMPACTED TO ACHIEVE MIN. CLEGG HAMMER CIV = 25.
7. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NZVD 2016
8. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
9. PIPE BEDDING: 0 - 10% GRANULAR BEDDING,10 - 20% WEAK CONCRETE BEDDING.GREATER THAN 20% WEAK CONCRETE BEDDING (7MPA PLUS ANTI SCOUR BLOCKS AT 6M CRS).
10. EACH CONNECTION SHALL BE MARKED BY A 50MMX50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.

Rev	Description	By	Date
A	SUBMISSION RESPONSE	DS	10/2025

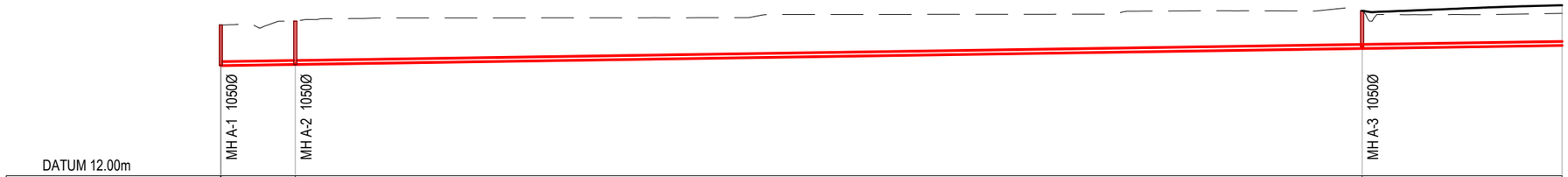
	By	Date
Survey	SURVEYWORX	02/2021
Design	DS	10/2025
Drawn	DS	10/2025
Checked	JP	10/2025

Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

Project
SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

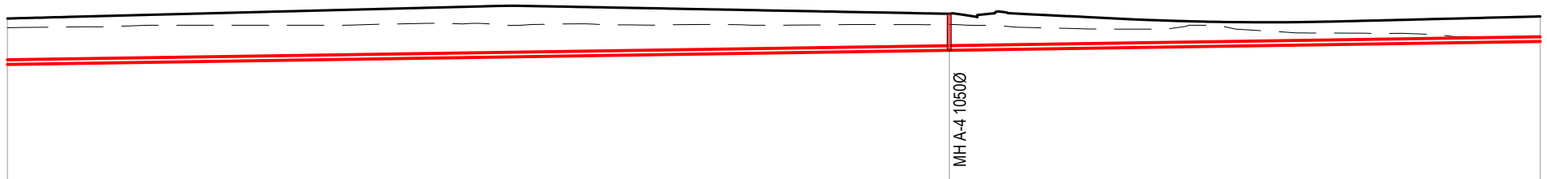
Title
PRELIMINARY OVERVIEW WASTEWATER GRAVITY NETWORK PLAN

Project no.	215010		
Scale	1:10000 @ A3		
Cad file	215010-M-C550.DWG		
Drawing no.	C550	Rev	A



DATUM 12.00m						
EXISTING LEVELS	23.23	23.51			24.28	24.09
DESIGN LEVELS					24.28	24.69
PIPE INVERT	20.20	20.28	20.28		21.48	21.48 22.62
PIPE DEPTH INVERT (m)	3.03	3.23	3.23		2.80	2.80
PIPE / GRADE	300mm uPVC SN16 27.76m @ 0.30%		300mm uPVC SN16 397.68m @ 0.30%			300mm uPVC SN16 381.78m @ 0.30%
CHAINAGE	0.00	27.76			425.45	500.00

PROP WASTEWATER LONGSECTION LINE A (A1-A3)
SCALE: HORI 1:2000 VERT 1:400



DATUM 14.00m						
EXISTING LEVELS	24.09			24.31		23.45
DESIGN LEVELS	24.69			25.00		24.83
PIPE INVERT	21.48			22.62	22.62	23.22
PIPE DEPTH INVERT (m)				2.38	2.38	
PIPE / GRADE	300mm uPVC SN16 381.78m @ 0.30%					300mm uPVC SN16 200.95m @ 0.30%
CHAINAGE	500.00			807.23		1000.00

PROP WASTEWATER LONGSECTION LINE A (A3-A4)
SCALE: HORI 1:2000 VERT 1:400

SUBMISSION RESPONSE

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
4. PIPE BEDDING: 0 - 10% GRANULAR BEDDING,10 - 20% WEAK CONCRETE BEDDING.GREATER THAN 20% WEAK CONCRETE BEDDING (7MPA PLUS ANTI SCOUR BLOCKS AT 6M CRS).
5. EACH CONNECTION SHALL BE MARKED BY A 50MMX50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
6. APPROVED HARDFILL IS TO BE USED IN BACKFILLING OF ALL ROAD CROSSINGS AND VEHICLE CROSSINGS TO COUNCIL STANDARDS.
7. HEAVY DUTY MANHOLE LIDS AND FRAMES TO BE USED IN TRAFFICKED AREAS, ALL MANHOLES SHALL HAVE STAINLESS GRATES INSTALLED.
8. ALL MANHOLES ARE TO BE 1050MMØ PRE CAST CONCRETE UNLESS SHOWN OTHERWISE.
9. ALL LINES ARE TO BE MIN. 150MMØ PVC CLASS SN16 UNLESS SHOWN OTHERWISE.
10. ALL LOT CONNECTION TO BE MIN. 100mmØ PVC CLASS SN16 UNLESS SHOWN OTHERWISE.
11. 150MMØ PIPES THAT DO NOT TERMINATE IN A MANHOLE MUST BE TERMINATED WITH A 100MMØ ON A 150MMØ LUNDEN JUNCTION AND BLANK CAP.
12. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.

LEGEND

EX GROUND LEVEL
PR GROUND LEVEL

Rev	Description	By	Date
A	SUBMISSION RESPONSE	DS	10/2025

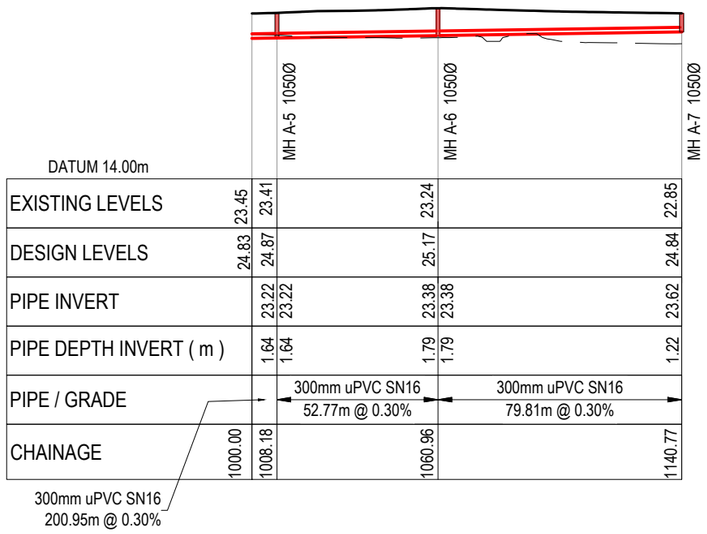
	By	Date
Survey	SURVEYWORX	02/2021
Design	DS	10/2025
Drawn	DS	10/2025
Checked	JP	10/2025

Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

Project
ADMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED WASTEWATER

Title
PROPOSED WASTEWATER LONGSECTIONS

Project no.	215010
Scale	AS SHOWN
Cad file	215010-M-C550.DWG
Drawing no.	C551 Rev A



DATUM 14.00m				
EXISTING LEVELS	23.45	23.41	23.24	22.85
DESIGN LEVELS	24.83	24.87	25.17	24.84
PIPE INVERT	23.22	23.22	23.38	23.62
PIPE DEPTH INVERT (m)	1.64	1.64	1.79	1.22
PIPE / GRADE		300mm uPVC SN16 52.77m @ 0.30%	300mm uPVC SN16 79.81m @ 0.30%	
CHAINAGE	1000.00	1008.18	1060.96	1140.77

300mm uPVC SN16
200.95m @ 0.30%

PROP WASTEWATER LONGSECTION LINE A (A4-A7)
SCALE: HORI 1:2000 VERT 1:400

SUBMISSION RESPONSE

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
4. PIPE BEDDING: 0 - 10% GRANULAR BEDDING,10 - 20% WEAK CONCRETE BEDDING.GREATER THAN 20% WEAK CONCRETE BEDDING (7MPA PLUS ANTI SCOUR BLOCKS AT 6M CRS).
5. EACH CONNECTION SHALL BE MARKED BY A 50MMX50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
6. APPROVED HARDFILL IS TO BE USED IN BACKFILLING OF ALL ROAD CROSSINGS AND VEHICLE CROSSINGS TO COUNCIL STANDARDS.
7. HEAVY DUTY MANHOLE LIDS AND FRAMES TO BE USED IN TRAFFICKED AREAS, ALL MANHOLES SHALL HAVE STAINLESS GRATES INSTALLED.
8. ALL MANHOLES ARE TO BE 1050MMØ PRE CAST CONCRETE UNLESS SHOWN OTHERWISE.
9. ALL LINES ARE TO BE MIN. 150MMØ PVC CLASS SN16 UNLESS SHOWN OTHERWISE.
10. ALL LOT CONNECTION TO BE MIN. 100mmØ PVC CLASS SN16 UNLESS SHOWN OTHERWISE.
11. 150MMØ PIPES THAT DO NOT TERMINATE IN A MANHOLE MUST BE TERMINATED WITH A 100MMØ ON A 150MMØ LUNDEN JUNCTION AND BLANK CAP.
12. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.

LEGEND

EX GROUND LEVEL
PR GROUND LEVEL

Rev	Description	By	Date
A	SUBMISSION RESPONSE	DS	10/2025

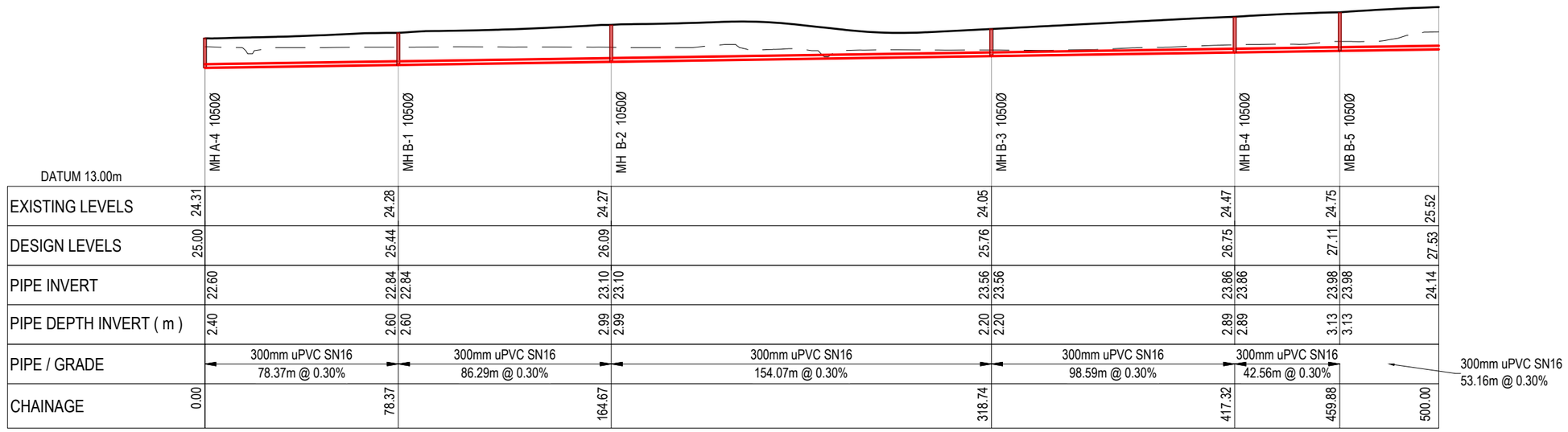
	By	Date
Survey	SURVEYWORX	02/2021
Design	DS	10/2025
Drawn	DS	10/2025
Checked	JP	10/2025

Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

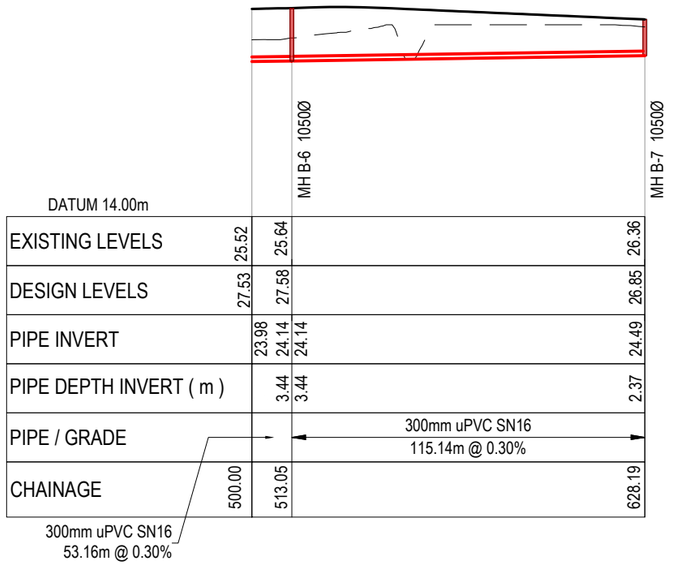
Project
ADMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED WASTEWATER

Title
PROPOSED WASTEWATER LONGSECTIONS

Project no.	215010		
Scale	AS SHOWN		
Cad file	215010-M-C550.DWG		
Drawing no.	C552	Rev	A



PROPOSED WASTEWATER LONGSECTION LINE B (A4-B5)
SCALE: HORI 1:2000 VERT 1:400



PROPOSED WASTERWATER LONGSECTION LINE B (B5-B7)
SCALE: HORI 1:2000 VERT 1:400

SUBMISSION RESPONSE

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
4. PIPE BEDDING: 0 - 10% GRANULAR BEDDING,10 - 20% WEAK CONCRETE BEDDING.GREATER THAN 20% WEAK CONCRETE BEDDING (7MPA PLUS ANTI SCOUR BLOCKS AT 6M CRS).
5. EACH CONNECTION SHALL BE MARKED BY A 50MMX50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
6. APPROVED HARDFILL IS TO BE USED IN BACKFILLING OF ALL ROAD CROSSINGS AND VEHICLE CROSSINGS TO COUNCIL STANDARDS.
7. HEAVY DUTY MANHOLE LIDS AND FRAMES TO BE USED IN TRAFFICKED AREAS, ALL MANHOLES SHALL HAVE STAINLESS GRATES INSTALLED.
8. ALL MANHOLES ARE TO BE 1050MMØ PRE CAST CONCRETE UNLESS SHOWN OTHERWISE.
9. ALL LINES ARE TO BE MIN. 150MMØ PVC CLASS SN16 UNLESS SHOWN OTHERWISE.
10. ALL LOT CONNECTION TO BE MIN. 100mmØ PVC CLASS SN16 UNLESS SHOWN OTHERWISE.
11. 150MMØ PIPES THAT DO NOT TERMINATE IN A MANHOLE MUST BE TERMINATED WITH A 100MMØ ON A 150MMØ LUNDEN JUNCTION AND BLANK CAP.
12. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.

LEGEND
EX GROUND LEVEL
PR GROUND LEVEL

Rev	Description	By	Date
A	SUBMISSION RESPONSE	DS	10/2025

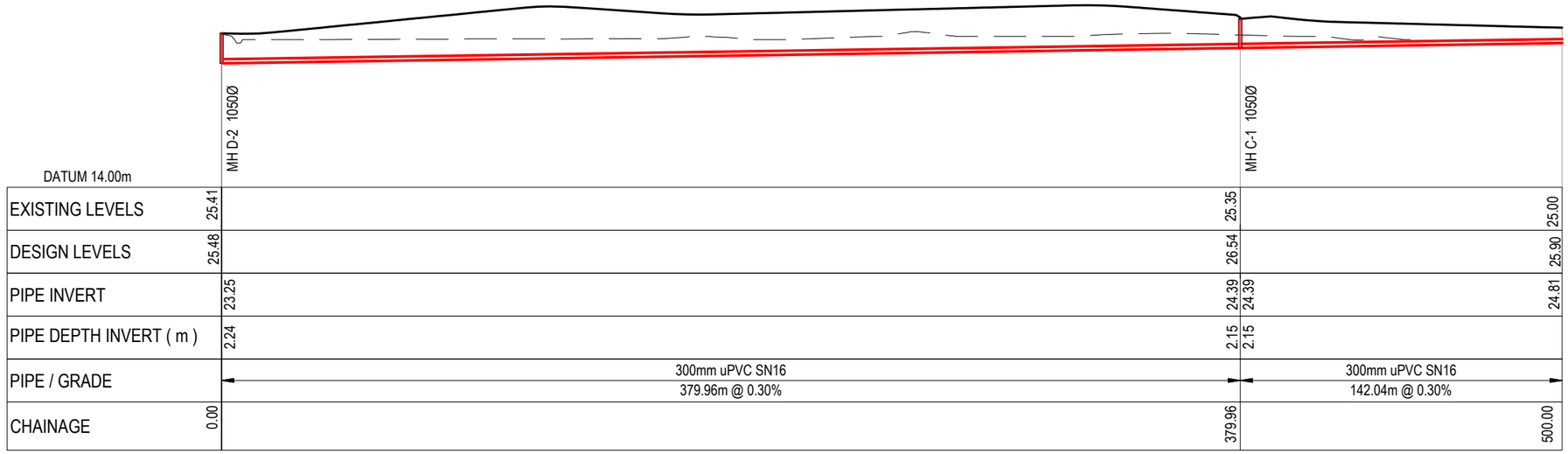
	By	Date
Survey	SURVEYWORX	02/2021
Design	DS	10/2025
Drawn	DS	10/2025
Checked	JP	10/2025

Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

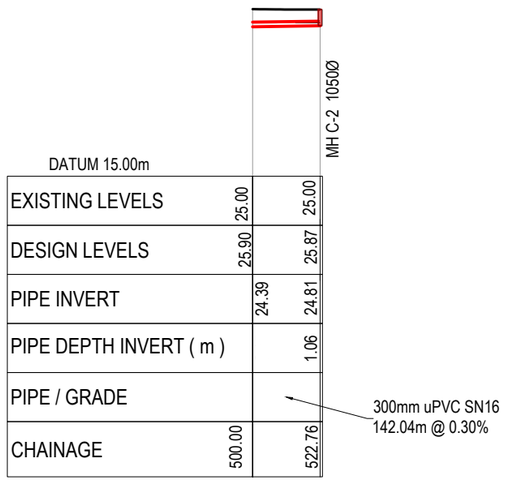
Project
ADMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED WASTEWATER

Title
PROPOSED WASTEWATER LONGSECTIONS

Project no.	215010
Scale	AS SHOWN
Cad file	215010-M-C550.DWG
Drawing no.	C553 Rev A



PROP WASTEWATER LONGSECTION LINE C (D2-C1)
SCALE: HORI 1:2000 VERT 1:400



PROP WASTEWATER LONGSECTION LINE C (C1-C2)
SCALE: HORI 1:2000 VERT 1:400

SUBMISSION RESPONSE

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
4. PIPE BEDDING: 0 - 10% GRANULAR BEDDING,10 - 20% WEAK CONCRETE BEDDING.GREATER THAN 20% WEAK CONCRETE BEDDING (7MPA PLUS ANTI SCOUR BLOCKS AT 6M CRS).
5. EACH CONNECTION SHALL BE MARKED BY A 50MMX50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
6. APPROVED HARDFILL IS TO BE USED IN BACKFILLING OF ALL ROAD CROSSINGS AND VEHICLE CROSSINGS TO COUNCIL STANDARDS.
7. HEAVY DUTY MANHOLE LIDS AND FRAMES TO BE USED IN TRAFFICKED AREAS, ALL MANHOLES SHALL HAVE STAINLESS GRATES INSTALLED.
8. ALL MANHOLES ARE TO BE 1050MMØ PRE CAST CONCRETE UNLESS SHOWN OTHERWISE.
9. ALL LINES ARE TO BE MIN. 150MMØ PVC CLASS SN16 UNLESS SHOWN OTHERWISE.
10. ALL LOT CONNECTION TO BE MIN. 100mmØ PVC CLASS SN16 UNLESS SHOWN OTHERWISE.
11. 150MMØ PIPES THAT DO NOT TERMINATE IN A MANHOLE MUST BE TERMINATED WITH A 100MMØ ON A 150MMØ LUNDEN JUNCTION AND BLANK CAP.
12. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.

LEGEND
EX GROUND LEVEL
PR GROUND LEVEL

Rev	Description	By	Date
A	SUBMISSION RESPONSE	DS	10/2025

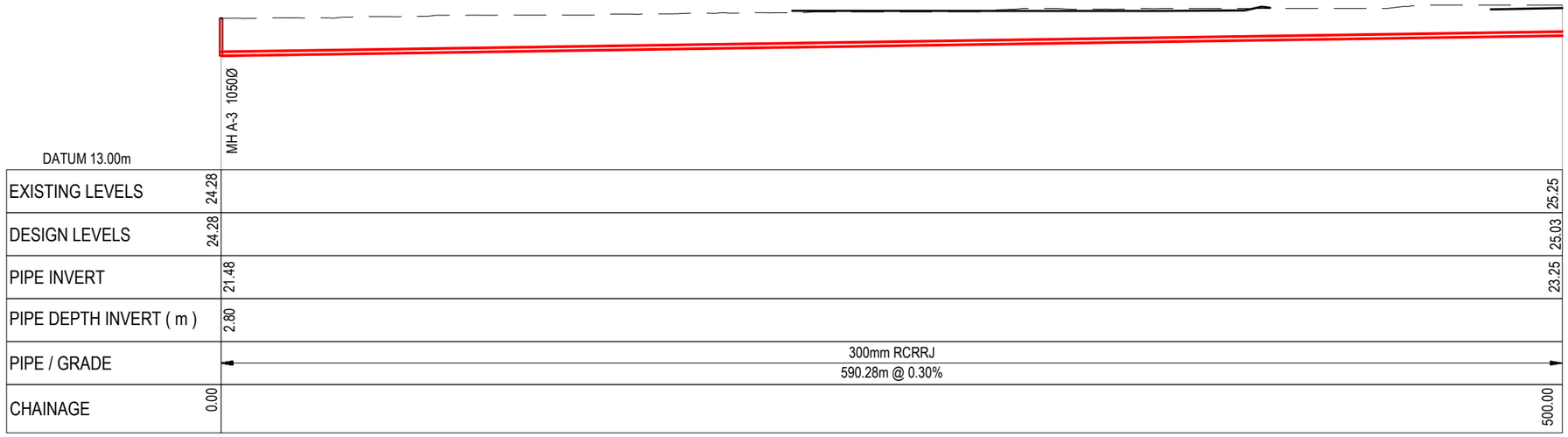
	By	Date
Survey	SURVEYWORX	02/2021
Design	DS	10/2025
Drawn	DS	10/2025
Checked	JP	10/2025

Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

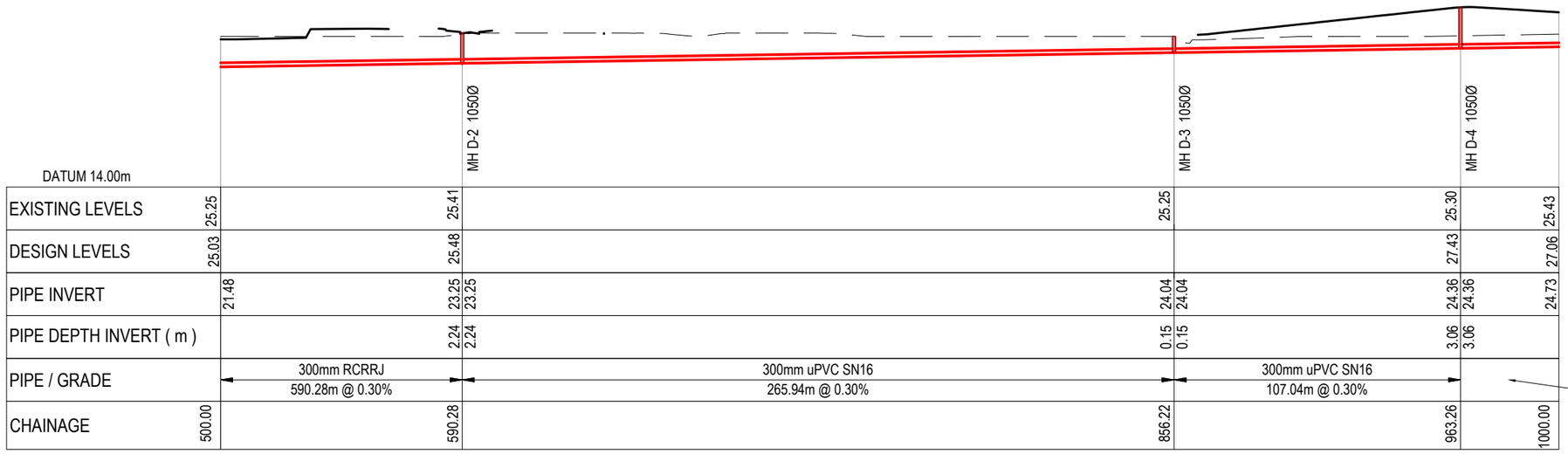
Project
ADMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED WASTEWATER

Title
PROPOSED WASTEWATER LONGSECTIONS

Project no.	215010		
Scale	AS SHOWN		
Cad file	215010-M-C550.DWG		
Drawing no.	C554	Rev	A



PROP WASTEWATER LONGSECTION LINE D (A3-D2)
SCALE: HORI 1:2000 VERT 1:400



PROP WASTEWATER LONGSECTION LINE D (D2-D4)
SCALE: HORI 1:2000 VERT 1:400

SUBMISSION RESPONSE

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
4. PIPE BEDDING: 0 - 10% GRANULAR BEDDING,10 - 20% WEAK CONCRETE BEDDING.GREATER THAN 20% WEAK CONCRETE BEDDING (7MPA PLUS ANTI SCOUR BLOCKS AT 6M CRS).
5. EACH CONNECTION SHALL BE MARKED BY A 50MMX50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
6. APPROVED HARDFILL IS TO BE USED IN BACKFILLING OF ALL ROAD CROSSINGS AND VEHICLE CROSSINGS TO COUNCIL STANDARDS.
7. HEAVY DUTY MANHOLE LIDS AND FRAMES TO BE USED IN TRAFFICKED AREAS, ALL MANHOLES SHALL HAVE STAINLESS GRATES INSTALLED.
8. ALL MANHOLES ARE TO BE 1050MMØ PRE CAST CONCRETE UNLESS SHOWN OTHERWISE.
9. ALL LINES ARE TO BE MIN. 150MMØ PVC CLASS SN16 UNLESS SHOWN OTHERWISE.
10. ALL LOT CONNECTION TO BE MIN. 100mmØ PVC CLASS SN16 UNLESS SHOWN OTHERWISE.
11. 150MMØ PIPES THAT DO NOT TERMINATE IN A MANHOLE MUST BE TERMINATED WITH A 100MMØ ON A 150MMØ LUNDEN JUNCTION AND BLANK CAP.
12. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.

LEGEND

EX GROUND LEVEL
PR GROUND LEVEL

Rev	Description	By	Date
A	SUBMISSION RESPONSE	DS	10/2025

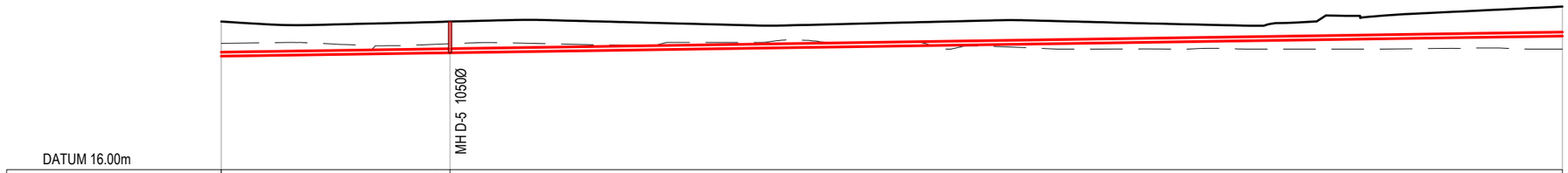
	By	Date
Survey	SURVEYWORX	02/2021
Design	DS	10/2025
Drawn	DS	10/2025
Checked	JP	10/2025

Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

Project
ADMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED WASTEWATER

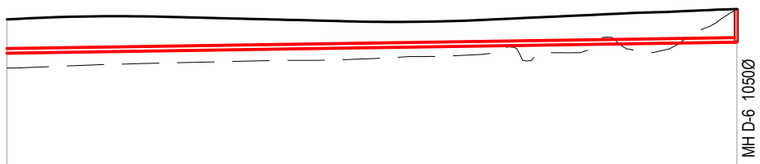
Title
PROPOSED WASTEWATER LONGSECTIONS

Project no.	215010		
Scale	AS SHOWN		
Cad file	215010-M-C550.DWG		
Drawing no.	C555	Rev	A



DATUM 16.00m				
EXISTING LEVELS	25.43	25.40		25.00
DESIGN LEVELS	27.06	27.06		28.18
PIPE INVERT	24.36	24.73	24.73	26.69
PIPE DEPTH INVERT (m)		2.33	2.33	
PIPE / GRADE		300mm uPVC SN16 122.05m @ 0.30%		300mm uPVC SN16 652.62m @ 0.30%
CHAINAGE	1000.00	1085.31		1500.00

PROP WASTEWATER LONGSECTION LINE D (D4-D5)
SCALE: HORI 1:2000 VERT 1:400



DATUM 18.00m			
EXISTING LEVELS	25.00		28.86
DESIGN LEVELS	28.18		28.85
PIPE INVERT	24.73		26.69
PIPE DEPTH INVERT (m)			2.16
PIPE / GRADE		300mm uPVC SN16 652.62m @ 0.30%	
CHAINAGE	1500.00		1738.14

PROP WASTEWATER LONGSECTION LINE D (D5-D6)
SCALE: HORI 1:2000 VERT 1:400

SUBMISSION RESPONSE

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
4. PIPE BEDDING: 0 - 10% GRANULAR BEDDING,10 - 20% WEAK CONCRETE BEDDING.GREATER THAN 20% WEAK CONCRETE BEDDING (7MPA PLUS ANTI SCOUR BLOCKS AT 6M CRS).
5. EACH CONNECTION SHALL BE MARKED BY A 50MMX50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
6. APPROVED HARDFILL IS TO BE USED IN BACKFILLING OF ALL ROAD CROSSINGS AND VEHICLE CROSSINGS TO COUNCIL STANDARDS.
7. HEAVY DUTY MANHOLE LIDS AND FRAMES TO BE USED IN TRAFFICKED AREAS, ALL MANHOLES SHALL HAVE STAINLESS GRATES INSTALLED.
8. ALL MANHOLES ARE TO BE 1050MMØ PRE CAST CONCRETE UNLESS SHOWN OTHERWISE.
9. ALL LINES ARE TO BE MIN. 150MMØ PVC CLASS SN16 UNLESS SHOWN OTHERWISE.
10. ALL LOT CONNECTION TO BE MIN. 100mmØ PVC CLASS SN16 UNLESS SHOWN OTHERWISE.
11. 150MMØ PIPES THAT DO NOT TERMINATE IN A MANHOLE MUST BE TERMINATED WITH A 100MMØ ON A 150MMØ LUNDEN JUNCTION AND BLANK CAP.
12. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.

LEGEND

EX GROUND LEVEL

PR GROUND LEVEL

Rev	Description	By	Date
A	SUBMISSION RESPONSE	DS	10/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	DS	10/2025
Drawn	DS	10/2025
Checked	JP	10/2025

Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

Project
ADMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED WASTEWATER

Title
PROPOSED WASTEWATER LONGSECTIONS

Project no.	215010		
Scale	AS SHOWN		
Cad file	215010-M-C550.DWG		
Drawing no.	C556	Rev	A