



**ENVELOPE ENGINEERING**

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# **ENGINEERING INFRASTRUCTURE REPORT**

Proposed Residential Development  
42-64 Millard Avenue, Kuripuni  
Masterton

# DOCUMENT CONTROL RECORD

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## 1.0 INTRODUCTION

This report has been prepared to provide an overview of the existing infrastructure surrounding the proposed development at 42-64 Millard Avenue, Masterton, and on the potential for this infrastructure to service the development.

This report has been prepared to support a referral application to the Minister for the Environment for referral into the Covid Fast-Track consent process. It is understood that the referral application must include details relating to the proposed servicing of the development and confirmation of whether any on-site or off-site upgrades, or additional infrastructure may be required to service the development. This Assessment seeks to satisfy these requirements.

## 2.0 PROPOSED DEVELOPMENT

The project involves the development of 42 and 64 Millard Ave, legally described as SEC 103 SO 34530 and SEC 104 SO 34530, respectively. These two lots will hereafter be referred to as “The Site” for the purposes of this report. The Site covers an area of approximately 7.29ha, is relatively flat with an average slope of less than 5% and comprises of farmland with two existing dwellings centrally located.

The proposed development involves the removal of the existing dwellings and subdividing the land into approximately 116 Residential allotments, a pocket park, and an internal road network along with a separate lot for the provision of stormwater attenuation basins. Refer to the Scheme Plan of the Proposed Subdivision included in Appendix 1. The proposal also seeks to obtain resource consent for future dwellings on the proposed allotments.

Figure 1 below shows the proposed site layout plan.



Figure 1: Site layout plan



## 3.0 WASTEWATER

### 3.1 EXISTING INFRASTRUCTURE

Wairarapa Local Maps indicates that the nearest point of connection to the existing Public Wastewater network is via a wastewater manhole (Asset ID: MML36a) located to the front of 36a Millard Avenue. All wastewater runoff from the Masterton Area is conveyed via a series of pipe networks towards a wastewater treatment facility and dispersal field to the south of Pokohiwi Road. The closest public wastewater network can be seen in Figure 2.



Figure 2: Existing public wastewater network

### 3.2 PROPOSED INFRASTRUCTURE

It is noted that Masterton District Council (MDC) have a planned Millard Avenue upgrade which involves the construction of a new public wastewater network, conveyed towards the southeast, via gravity to a proposed pump station at 41 Andrew Street. The currently designed catchment for this pump station is approximately 30.5 ha and includes the Site. The landowner has been discussing the proposed upgrades with MDC as the same upgrades will be necessary to support the subdivision of the site on the opposite side of Millard Avenue that is also owned by the landowner. Through this correspondence the landowner and MDC have agreed an additional development contribution per-lot payment for all new development benefiting from the upgrades.

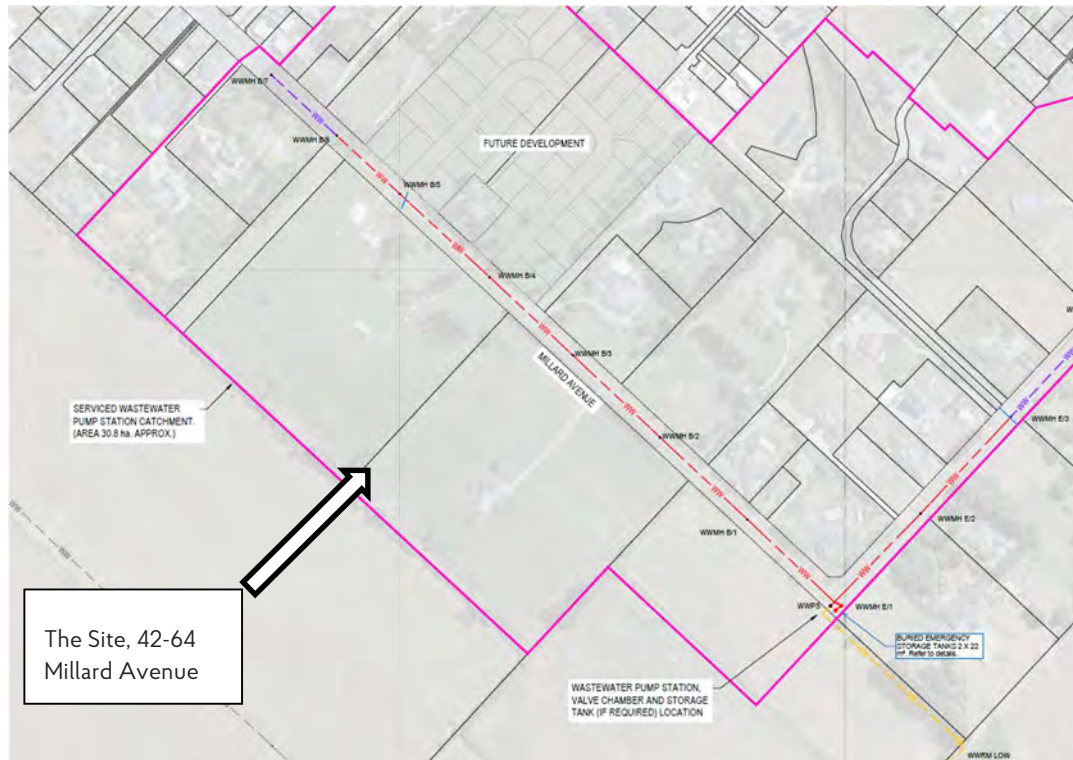
Options for wastewater discharge for the development are as follows:

1. One centralised wastewater pumping station discharging to the proposed Millard Avenue upgrade wastewater network.
2. Individual pump stations serving each allotment discharging to a new gravity network within the development and subsequently to the Millard Avenue wastewater network. This scheme could be in the form of a 'Low Pressure Sewer Network'.

It is noted that the above options assume that a single continuous gravity network is not feasible and represent the worst-case scenarios for the development. Options 1 and 2 will only be considered in the unlikely situation that the proposed development cannot automatically connect by traditional standard gravity connection to Council's new upgraded network within Millard Ave. This will be assessed during the Detailed Design stage.

Both options require the wastewater to be stored in tanks on-site and are both feasible, satisfactory design options.





**Figure 3:** Proposed Millard Ave Wastewater Upgrade

The Masterton District Council District Plan references NZS4404 as the basis for the design of all new water, wastewater, and stormwater systems. Therefore, an assessment of the proposed development has been conducted whilst adhering to this standard. The peak discharge from the proposed development is approximately 4.77 L/s. The proposed 225mm diameter pipe leading into the new pump station at 41 Andrew Street at 1.18% gradient has a capacity of approximately 50 L/s, and therefore assumed to have enough capacity to cater for the proposed development.

It is our view that the design of wastewater infrastructure can be adequately addressed through the future fast track consent. Based on the assessments undertaken to date, it is our view that no adverse effects will arise as a result of any of the proposed wastewater servicing options.

An Engineering Plan Approval will be required for all Public Wastewater works. This will be applied for during Detailed Design Stage.

## 4.0 STORMWATER

### 4.1 EXISTING INFRASTRUCTURE

Wairarapa Local Maps indicates that there is currently no piped public stormwater network servicing the Site and identified four artificial farm drains traversing through and around the Site. The extent of each drain is outlined in Figure 4. It is noted that although the majority of the Site is pervious, any surface runoff which exceeds the percolation rate of the soils will make its way into any of the four artificial farm drains described below.





Figure 4: Existing Stormwater discharge scenario (as per Lidar)

## 4.2 PROPOSED INFRASTRUCTURE

Akin to the wastewater, MDC have a plan to upgrade the stormwater network along Millard Ave. However, this does not entail the provision of a piped network along Millard Avenue rather, maintaining and upgrading the existing roadside table drains/culverts, providing catchpits to capture surface flows from the road and installing new culverts where required. It is anticipated that all surface flows that fall towards Millard Avenue will continue to be conveyed by the road-side table drains and any surface flows within the Site, which flow away from Millard Avenue, will be conveyed as they currently are, by the existing drains around the Site boundary.

Attenuation will be required to achieve hydraulic neutrality for the site and ensure that post-development peak discharges do not exceed the pre-development peak stormwater discharges. Therefore, it is proposed to construct a new piped public stormwater network within the road corridor which will discharge to two attenuation basins located at the south-eastern corner of the site prior to eventual discharge to Drain C. The proposed public pipe system will be designed to cater for the catchment in the 1 in 10-year ARI storm interval whilst the attenuation basins will be sized to attenuate for the 2, 10 and 100-year ARI storm events.

We anticipate that treatment of stormwater runoff from the new roads and hardstand areas will be required by Greater Wellington Regional Council (GWRC). Swales are considered acceptable for conveyance of flows only as it is highly likely they will not be able to meet the minimum hydraulic residence time for treatment due to the number of proposed vehicle crossings. Therefore, rain gardens are considered feasible design solutions to be integrated into the design. Treatment of stormwater from the new roofs is not typically required, provided that inert roof materials are used. These will be confirmed at Detailed Design Stage.



As the existing Drains A and B are farm drains that do not have upstream connectivity, i.e., they originate within the site, these will be removed to accommodate the proposed development.

The stormwater system will be designed with the principles of Te Mana o te Wai and Water Sensitive Urban Design. This will be done by preserving vegetated areas around the property, treating stormwater runoff and providing peak flow attenuation.

It is our view that the specific design of the stormwater infrastructure can be adequately addressed through the future fast track consent. Based on the assessments undertaken to date, it is our view that no adverse effects will arise as a result of the proposed stormwater servicing works.

An Engineering Plan Approval will be required for all public stormwater works. This will be applied for during the Detailed Design Stage.

## 5.0 WATER SUPPLY

Wairarapa Local Maps indicates that the Site is not currently serviced by a public water supply network. Lots on Millard Avenue are serviced by multiple public water supply networks and their locations are noted as follows:

- There is an existing 100mm Watermain (Asset ID: PMML050) traversing the near-side berm of Millard Ave from 69 South Road to 34 Millard Avenue.
- Directly opposite the watermain is a 50mm Ridermain servicing 67 South Road to 37 Millard Avenue. A stub has been provided on the end of this line for a potential future extension (Asset ID: PRML060).
- Another public water supply network begins at 75 Millard Ave and runs south towards the end of Millard Avenue until it rotates northeast to service the entirety of Andrew Street. The diameter of this network is unknown.

Refer to Figure 5 below showing the existing public water supply network that is feasible for connection.



**Figure 5:** Existing public water supply

It is proposed to extend the 100mm diameter watermain from its point of termination at 34 Millard Ave. A public 100mm watermain will then be extended into the Site and looped with 50mm rider mains where required. New connections with new water meters will be installed directly off these new water/rider mains for each new Lot.

We are consulting with Masterton District Council to obtain confirmation that the existing water supply network has adequate capacity to cater for the proposed development.



Using table 2 of SNZ PAS 4509:2008 we believe the required firefighting water supply classification for this development is FW2. FW2 requires that one 12.5 l/s fire hydrant supply is available within 135m of the property and a second supply is available within 270m of the property. The closest fire hydrant is located outside of 36 Millard Avenue. The distance from this hydrant to the furthest lot is well over the 135m distance as required. New fire hydrants will be installed along the new watermain at adequate distance for the proposed development.

It is our view that the specific design of the water supply infrastructure can be adequately addressed through the future fast track consent.

## **6.0 ACCESS**

Current access to the site is via two gravel vehicle crossings off Millard Avenue where the existing dwellings are located.

It is proposed to construct an internal two-way public road network to service the development. The new public roads will provide access to all Lots, with the exception of lots which front Millard Avenue. These will be directly accessed via vehicle crossings off Millard Avenue. All other Lots will have a vehicle crossing located off the newly constructed roads and will be designed as part of the Building Consent/Detailed Design stage.

Road typologies will be in accordance with local Council standards for residential subdivisions and facilitate pedestrian access. The proposed main roading network will consist of a 7.2m formed carriageway for the main road. Rear access lots without main road frontage will be serviced by private/common driveways. The typical legal width for the private accessways is 3.5m (2-4 households) or 6.0m (5-10 households).

## **7.0 EARTHWORKS**

### **7.1 BULK EARTHWORKS APPROACH**

The Project requires earthworks to create building platforms, roading, associated batters, installation of infrastructure and the formation of stormwater detention basins. In total, earthworks will involve a volume of approximately 20,000m<sup>3</sup> cut to waste, 5000m<sup>3</sup> cut to fill and 65,000m<sup>3</sup> of imported fill and will be spread over an area of approximately 7.45 hectares. The works will likely have maximum cut depths of 1 metre and maximum fill depths of 2.5 metres.

It is our view that the earthworks design can be adequately addressed through the future fast track consent application with input from other consultants. Note that Geotechnical Investigations have already been undertaken for the site.

### **7.2 EROSION AND SEDIMENT CONTROL**

All works associated with the proposed earthworks are to be carried out in a manner that minimises any possible adverse effects on the environment. The main objective of sediment and erosion control is to reduce the rate of erosion and minimise the amount of sediment discharged from bare earth surfaces while providing practical measures to reduce the total amount of sediment leaving the site.

The fast-track consent will include seeking earthworks consent from both Masterton District Council and Greater Wellington Regional Council. Principles of Erosion and Sediment control that will be assessed at the fast-track consent stage include:

- Minimising disturbance – This will be achieved by undertaking comprehensively design bulk earthworks for all developable portions of the site, minimising the need for secondary earthworks on individual building platforms.
- Stage construction – Minimise the amount of area open at any given time, and the time that these areas are left un-stabilised.
- Protect receiving environments – Achieved by applying additional protection (e.g. super silt fences) and implementing work methodologies around sensitive receiving environments such as the open drains and flowpaths which border the site.
- Rapid stabilisation – Stabilisation of disturbed areas via hydroseeding or mulching as soon as practicable.



- Perimeter controls – Installation of perimeter controls for the diversion of clean water around the earthworks extent and separating this from sediment-laden water generated within the site.
- Employ sediment retention devices – Sediment retention ponds or Decanting earth bunds (DEB) with rainfall activated chemical dosing systems will allow for the deposition of transported sediment through settlement. The provision of these ponds/DEBs also provide a degree of attenuation, thereby reducing downstream channel erosion effects.

The construction would be programmed as far as possible so that road works would be carried out during the summer earthwork's season. The above ground building work could continue through the winter months and the external earthworks associated with the drainage, pavements and landscaping taking place near the end of the construction stage.

During the earthworks operations, the placement of fill within the development shall be observed by a suitably experienced geotechnical engineer. On completion of the earthworks, a Geotechnical Completion Report (GCR) will be prepared by the Geotechnical Engineer. This report will certify the adequacy of the fill placement and also make recommendations of bearing strengths for foundation design purposes and pavement subgrade strength.

These are fundamental elements of good practice that should be common to all sites and limit the opportunity for erosion/sediment runoff. The GWRC guideline document "Erosion and Sediment Control Guide for Land Disturbing Activities in the Wellington Region" details control measures and is widely used as the appropriate standard for management of erosion and sediment control in the Wellington Region.

It is our view that the erosion and sediment control design can be adequately addressed through the future fast track consent application to ensure that the potential adverse effects can be managed and mitigated to an acceptable level.

### 7.2.1 CONSTRUCTION PHASE OVERLAND FLOWPATHS

Internal overland flow paths will vary throughout the construction and appropriate sediment controls will be put in place to ensure that sediment laden water does not leave the site. Any overland flowpaths which would carry silt laden water will be directed towards the proposed treatment devices at the low part of the site. Any overland flowpaths carrying cleanwater will be diverted around the earthworks area and directed towards the low point of the site to the existing public stormwater network. All overland flowpaths will be stabilised with either vegetation (where flatter grades permit) or with more robust measures, such as Geotech cloth liners or armoured rock rip rap, where steeper grades or flow velocity dictate the need for this.

## 8.0 UTILITY SERVICES

Existing PowerCo data, provided by BeforeUDig, shows that the Site is currently not serviced by an underground power cable. The topographic survey identified a power pole adjacent to the existing vehicle crossing at 51 Millard Avenue. It is envisaged that a new transformer will be required to provide power for the proposed development. All power reticulation will be in accordance with the New Zealand Building Code and the network supplier's requirements.

Existing Chorus data, provided by BeforeUDig, indicates that there is an existing underground telecommunications cable running the length of the near-side berm/road reserve of Millard Avenue. The diameter of this network is not known. Telecommunication supply for the development will be connected from the existing supply on the street. All telecommunication reticulation will be in accordance with the New Zealand Building Code and the network supplier's requirements. Chorus has yet to confirm that there is adequate capacity in the area for the proposed development, however we do not foresee any problems with servicing the proposed development for communications.

Reticulated gas is not considered a core infrastructure requirement for new developments. If required PowerCo will be contacted to service to the development.



## 9.0 SUMMARY

This report has been prepared to provide an overview of the existing infrastructure surrounding the site at 42 and 64 Millard Avenue, and on the potential for this infrastructure to service the development to support a fast-track consent application with the Ministry for the Environment.

The future fast track consent application will include a detailed Infrastructure Report that provides full details of the proposed servicing of the project including calculations and in-depth technical drawings. In addition, a Stormwater Management Plan will outline how stormwater will be appropriately managed on-site.

In summary, it is our view that the site can be developed and adequately serviced subject to further engineering design, and that this can be addressed through the future fast track consent application. Furthermore, the off-site infrastructure upgrades have already been agreed with MDC and a mechanism in which to contribute to the necessary infrastructure. Ultimately, the provision of servicing will not give rise to adverse effects and there appear to be no impediments to implementing the proposed development based on the draft development programme accompanying the fast-track referral application.

## 10.0 LIMITATIONS

This report is for the use of DMST International Ltd and should not be used or relied upon by any other person or entity or for any other project.

This report has been prepared for the particular project described to us and its extent is limited to the scope of work agreed between the client and Envelope Engineering Limited. No responsibility is accepted by Envelope Engineering Limited or its directors, servants, agents, staff or employees for the accuracy of information provided by third parties and/or the use of any part of this report in any other context or for any other purposes.



# APPENDICES

**APPENDIX 1**  
**CIVIL ENGINEERING DRAWINGS**

**APPENDIX 2**  
**COUNCIL NETWORK UPGRADES**