



Appendix Q Infrastructure Report

Fast-Track Approvals Act 2024 Substantive Application

Hinuera Solar Farm

Harmony Energy NZ #6 Limited

SLR Project No.: 880.016894.00001

19 August 2026





INFRASTRUCTURE REPORT



HINUERA SOLAR FARM
HARMONY ENERGY NZ #6 LIMITED
CORNER STATE HIGHWAYS 27 & 29
HINUERA



PROJECT INFORMATION

CLIENT	Harmony Energy NZ #6 Limited
PROJECT	MM-0809 – Hinuera Solar Farm

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1. EXECUTIVE SUMMARY

Maven Matamata Limited has been engaged by Harmony Energy NZ #6 Limited (Harmony) to undertake preliminary infrastructure design, in support of a proposed Solar Farm, at the corner of State Highways 27 & 29, Hinuera.

The scope of works is covered below, in Section 2 – Introduction, however, includes civil design for the landform and earthworks, roading, stormwater management, and water reticulation.

The landform is designed to minimise the quantity of cut and fill earthworks, where possible, while also considering geotechnical, stormwater management and potential flood risks. This design has been prepared in accordance with the recommendations made by CMW Geosciences. The internal roading network is to be constructed of unsealed pavement, designed in accordance with relevant standards and Geotechnical Engineering recommendations.

Stormwater runoff is managed via an open swale drain network, with culverts or low-level water crossings for road crossings, for up to the 50-year flood event. All components of stormwater are discussed in Section 5, while the flood modelling is discussed in the supplementary 'Stormwater Management and Flood Modelling Report'.

Water supply will be provided via a reticulation network, connecting to provided water supply tanks, if needed. All components of water supply are discussed in Section 6, below.

2. INTRODUCTION

2.1. AUTHOR QUALIFICATIONS AND STATEMENT OF COMPLIANCE

Joshua Dempsey – Civil Engineer/Team Lead – Maven

I am a Civil Engineer and Team Leader at Maven. I have been employed at Maven since 2020. I hold the qualification of Bachelor of Engineering (Honours) from the University of Auckland. I am currently working towards Chartered Professional Engineer (CPEng) registration with Engineering New Zealand.

I have over 5 years of experience in stormwater design, three waters, roading, and earthworks across a diverse range of project types. I've previously lead the civil design for Tauhei solar Farm, where my primary role was to oversee the civil design and delivery including site access, internal roading networks, stormwater management, earthworks, and platform preparation for solar infrastructure.

I confirm that, in my capacity as author of this report, I have read and abide by the Environment Court of New Zealand Practice Note 2023, and in particular section 9 the Code of Conduct for Expert Witnesses.

Daniel Mackay – Civil Engineer – Maven Matamata

I am a Civil Engineer, based in the Maven Matamata office. Maven is a civil engineering consultancy specialising in land development, infrastructure design, stormwater management, and resource consenting.

I hold a New Zealand Certificate of Engineering Technology, from the New Zealand Institute of Highway Technology/Western Institute of Technology at Taranaki and throughout my ten-year career in the civil engineering and land development industry, I draw on diverse experiences within local government, civil contracting and civil consulting to provide site investigation and inspection, civil design, project management and capital works projects.

I confirm that, in my capacity as author of this report, I have read and abide by the Environment Court of New Zealand Practice Note 2023, and in particular, Section 9 of the Code of Conduct for Expert Witnesses."

2.2. SCOPE OF WORK

The Hinuera Solar Farm (HSF) proposal seeks to construct an approximately 70MW (AC) / 100MWp (DC) Solar/Battery Energy Storage System (BESS) project over an approximately 150ha site area, with exported, generated electricity to be provided to the electrical grid, via the PowerCo substation located at the corner of Lake Road and State Highway 27, Hinuera, approximately 2km South of the proposed site.

It is proposed that all infrastructure within the site is to be held in private ownership.

The purpose of this report is to provide an assessment of the earthworks and infrastructure associated with the proposed development. The information provided herein outlines the design and calculations associated with the proposed infrastructure onsite and the potential capacity to service the proposed development.

Given the scale and complexity of this site, this report provides the level of detail necessary for resource consent. It is expected that additional detail will need to be provided at detailed design stage and building consent stage, though this development should require minimal Engineering Plan Approval, given the lack of infrastructure to be vested to Council.

This report is to be read in conjunction with the Engineering Drawings supplied as **Appendix A**, and any supplementary reporting or calculations, provided by Maven Matamata Limited, or directly from Harmony, or one of their consultants.

2.3. SITE DESCRIPTION

The subject site is located on the corner of State Highway 27 and State Highway 29, Hinuera, approximately 8.0km South of Matamata and 8.5km North of Tīrau, in a direct line.

The site comprises several existing lots, totalling approximately 154.53ha in area, shown in Figure 1, below, within the Rural Zone and is bounded to the North, East, South and West by State Highway 29, State Highway 27, neighbouring property and the KiwiRail Kinleith Branch railway line, respectively.

The site currently has access from State Highway 29, via existing accessways at numbers 4775 and 4739 SH29, along the Northern boundary, and from State Highway 27, via existing accessways at numbers 8270 and 8302 (two accessways) SH27, along the Eastern boundary.

The site climbs towards the East, to a peak of approximately RL101m along the Eastern boundary of 8270 and 8302 State Highway 27, with existing gradients of up to 10% in localised areas, and an overall, undulating contour from East to West, about 0.5% grade, with an overall gentle grade to the North.

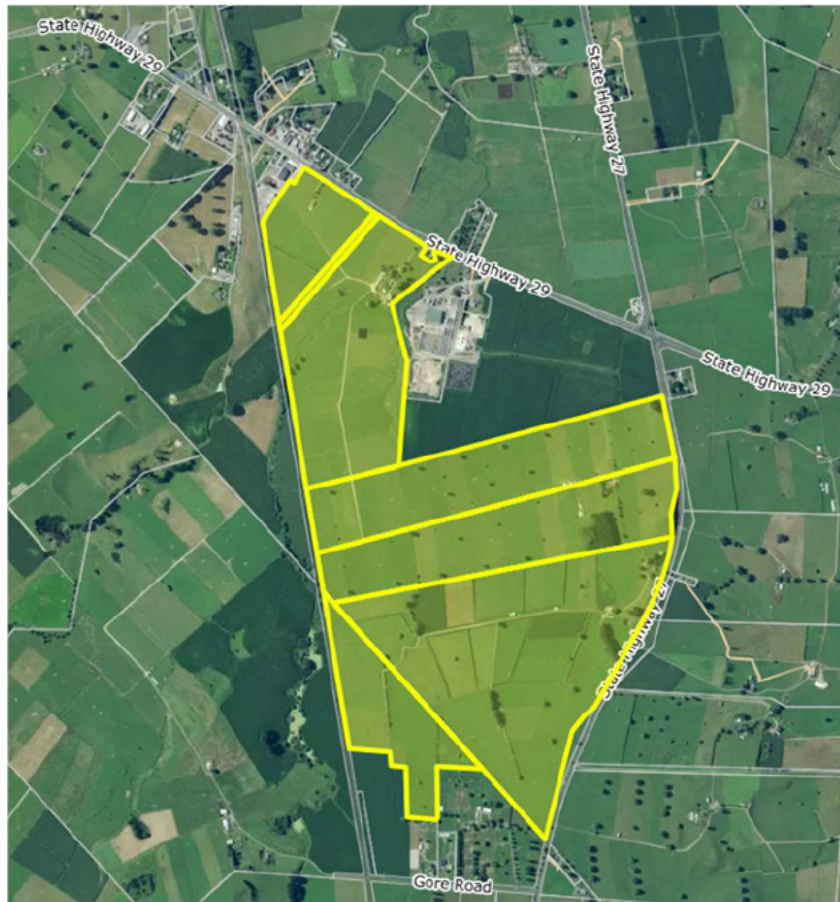


Figure 1: Site Locality Map (Source: Grip Map)

2.4. LEGAL DESCRIPTION

The site is legally described as the following:

Record of Title	Address	Legal Description	Area (ha)
SA69A/179	4775 State Highway 29, Matamata	Section 1 Block X Tapapa Survey District and Lot 1-2 Deposited Plan South Auckland 83767 and Section 11 Block X Tapapa SD	38.4035 ha
SA292/111	State Highway 27, Matamata	Lot 1 Deposited Plan 11891	25.7507 ha
SA308/1	8270 State Highway 27, Okoroire, Tirau	Lot 2 Deposited Plan 11891	25.7507 ha
647047	8302 State Highway 27, Okoroire, Tirau	Part Lot 3 Deposited Plan 11891 and Lot 2 Deposited Plan 473263 and Section 3 Block X Tapapa SD	64.6223 ha
		Total Land Area	154.53 ha

Table 1: Site Legal Description

2.5. DEVELOPMENT OUTCOMES

The proposed development seeks to construct an approximate 70MW (AC) / +100MWp (DC) Solar/BESS site.

One new vehicle accessway will be constructed, from State Highway 29, with a further, existing accessway, from State Highway 27, to be upgraded. An unsealed, internal roading network is to be constructed for construction traffic and to remain in place for maintenance access. The roading network is designed in accordance with relevant standards and Geotechnical Engineering recommendations.

The landform is designed to minimise the quantity of cut and fill earthworks, where possible, while also considering geotechnical, stormwater management and potential flood risks.

This design has been prepared in close collaboration with CMW, in accordance with their recommendations.

Stormwater runoff is managed via an open swale drain network, with culverts for road crossings, for up to the 50-year flood event. The flood modelling done to support the stormwater design is discussed in the supplementary 'Stormwater Management and Flood Modelling Report'.

Water supply will be provided via a reticulation network, connecting to provided water supply tanks, if required.

Refer to Engineering Drawings, supplied as Appendix A, for further details.

Additional detail design of the infrastructure is expected to be carried out, post lodgement of the resource consent application, and during the detailed design phase. This will include further detail on the design for landform, roading network, the proposed stormwater conveyance system and water supply.

3. EARTHWORKS

3.1. PROPOSED EARTHWORKS

Earthworks will be undertaken in accordance with NZS4431:2022, and recommendations of CMW's Geotechnical Investigation Report, dated 06 November 2025. Earthworks will include shaping of landform, internal road formation, trench excavations for services, formation of building platforms beneath structures and sediment controls.

3.1.1. GEOTECHNICAL INVESTIGATION

CMW provided preliminary feedback that considered the site to be generally suitable, for the proposed level of development, however, commented that although pile drivability is expected to be good, test piles and load capacity is recommended; the Kerepehi Fault is within the proximity of site, but is not considered an impediment to development; that the occurrence of deep-seated land instability occurring is assessed to be low; preliminary estimates of static settlements for typical floor loads exceed the Building Code and will require further analysis once building design is finalised; and liquefaction analysis results are high, resulting in specific design for foundation types.

Refer to the Geotechnical Investigation Report, within the resource consent documentation, for further information.

3.1.2. EARTHWORK SUMMARY

GENERAL

- Site topsoil, varying between depths of 200mm to 300mm, will be stockpiled onsite and respread upon the post-development grassed locations. These depths are estimates only and will be confirmed during the detailed civil design.
- The extent of topsoil strip of the permanent works (roads, inverter pads, substation) will be approximately 7.8 ha or around 5% of the site area (154.5 ha). The extent of topsoil strip of the temporary works (laydowns and site compounds) will be approximately 3.2 ha or around 2% of the site area (154.5 ha).
- Excess topsoil will be retained and used within the wider development site.
- Small area of proposed fill in the northern corner of the site to reduce ponding depths.
- All earthworks will be supervised by a Geotechnical Engineer and in accordance with NZS4431:2022, *Engineered Fill Construction for Lightweight Structures*. The cut/fill plan is attached in Engineering Drawings, supplied as Appendix A.

BUILDING PLATFORMS

- Building platforms will be formed by cut and fill operations in areas deemed appropriate by the Geotechnical Engineer.
- The earthworks will be monitored and certified by the Geotechnical Engineer and buildings in these locations are expected to be supported by concrete slab foundations and by specific design of the Geotechnical Engineer.
- Cut/fill slopes or batters are to be constructed in a manner to reduce the effects of erosion of susceptible materials, via appropriate gradients. Refinement of the landform design will occur during detailed design.
- Building Platform for critical infrastructure, including the substation, O&M building, and PCUs, will be elevated above the 100-year flood level freeboard requirements.

INTERNAL ROADS AND HARDSTAND AREAS

- Internal roads to be elevated approximately 200mm above the existing ground.
- Permanent hardstand surfaces will be refined meet the 20-year flood level, while temporary construction hardstand surfaces meet the 10-year flood level
- Earthworks volumes based on a 6.0m wide road profile as per principles requirements

The cut to fill volumes are based on a comparison between the existing, topsoil-stripped ground and proposed subgrade. The preliminary earthwork volumes are summarised in Table 2, below:

Facility	Area of Disturbance (m ²)	Topsoil Removal – 250mm (m ³)	Earthworks Cut/Fill (m ³)
Roading Network (Modelled, excl. Entrances)	58,442	14,611	30,122 (Fill)
Construction Laydown (Assumed, EGL +200mm)	22,405	5,602	10,082 (Fill)
Contractor's Camp (Assumed, EGL +200mm)	11,515	2,879	5,182 (Fill)
O&M Compound (Assumed, EGL +200mm)	559	140	252 (Fill)
Warehouse Compound (Assumed, EGL +200mm)	921	231	414 (Fill)
Switching Station (Assumed, EGL +200mm)	282	71	127 (Fill)
Inverter Loop & Pads (Assumed, EGL +200mm)	19,247	4,812	8,370 (Fill)
Northern Fill Area (Assumed, EGL +300mm)	2,296	574	745 (Fill)
Trenches	18,861	4,715	15,842 (Cut)

Table 2: Earthworks Volumes

Notes:

- i. **Volumes for the fence pole foundation, CCTV foundations and trench are excluded from these volumes.**
- ii. **No bulking factor has been applied**
- iii. **Topsoil to be stockpiled then respread around site**

Refer to the Geotechnical Investigation Report, within the resource consent documentation, for further information on geotechnical recommendations and foundation design.

3.2. EROSION AND SEDIMENT CONTROL

Proposed erosion and sediment control measures will be installed in accordance with the Waikato Regional Council's (WRC) *Erosion and Sediment Control Guidelines for Land Disturbing Activities*. A separate draft Erosion and Sediment Control Plan is provided supplementary to this report, to support the associated Regional resource consent, and should be read in conjunction with this report.

Erosion and sediment control measures will be installed on-site and approved by the Engineer, prior to the commencement of works. All control measures are required to be maintained for the duration of the construction works. The site will be progressively stabilised with grass seed and metal, as finished levels are achieved. Erosion and sediment control measures will only be removed once the site is fully stabilised.

4. TRANSPORTATION

4.1. DESIGN STANDARDS

All transportation accessways are designed in accordance with the Regional Infrastructure Technical Specifications (RITS) New Zealand Transport Authority (NZTA) and Austroads guidelines.

4.2. PROPOSED ACCESS

Two new vehicle accessways will be constructed, one each from State Highway 27 and 29, with a further, existing accessway, from State Highway 27, to be upgraded.

The first proposed accessway, from State Highway 29, will provide access to the Northern aspect of the site, connecting to State Highway 29 at the Eastern point of 4775 State Highway 29. The second proposed accessway, from State Highway 27, will provide access to the Southern aspect of the site and the site compound, connecting to State Highway 27 at the Southern point of 8302 State Highway 27. The existing, to be upgraded accessway, from State Highway 27, will provide access to the Southern aspect of the site, connecting to State Highway 27 at the current Southern vehicle crossing location of 8302 State Highway 27. All three accessways will be provided with appropriate turning curves and road widening for a 26.0m B-Double truck, derived from AutoCAD vehicle tracking software and NZTA Diagram E, respectively.

The internal roading network will comprise of unsealed 5.0m or 6.0m wide carriageways, with 0.55m wide shoulders and roadside table drains, elevated approximately 200mm above the existing ground level and designed assuming a subgrade strength of CBR 3.

Subgrade testing, prior to construction, will confirm subgrade strength to determine final road pavement depths and any localised undercut areas. Grades and cross-falls have been designed in accordance with RITS.

The internal roading network will be provided with appropriate turning curves and road widening for a 26.0m B-Double truck, derived from AutoCAD vehicle tracking software, for construction.

FENZ advised the turning circles for an aerial appliance should be applied. Appropriate turning heads have been allowed for at the end of dead-end rounds and have been sized to accommodate the 8.5m rigid truck which was used to represent an “12,000L tanker, 24 tonne vehicle weight, 8.5m long”. Similarly, the loop roads around the BESS infrastructure at the end of Road 03 and Road 10 have been widened to 5m to accommodate for these vehicles.

4.3. PAVEMENTS

The design philosophy for the road is to provide a fit for purpose solar farm access road that sits above ground with general longitudinal smoothing, suitable pavement depths, and positive drainage.

The pavement thickness has been designed to accommodate heavy vehicle movements. The proposed construction will involve stripping of 250mm of topsoil. Geofabric (Bidim A29 or similar approved) and geogrid (TX160 or similar approved) will be required where subgrade is unsuitable. The pavement thickness will be confirmed during detailed design, but will consist of approximately 250mm GAP65 sub-base and 150mm AP40 basecourse. A typical roading section is shown below:

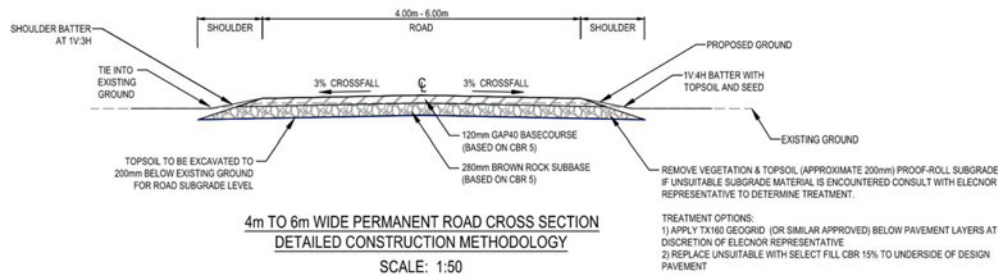


Figure 2: Typical Roding Section

5. STORMWATER

5.1. DESIGN STANDARDS

Stormwater systems must protect infrastructure, preserve downstream water quality, and comply with regional hydrological and environmental requirements. The stormwater design philosophy is to provide a fit for purpose stormwater management system that causes no increase in off-site flooding and minimises the ponding levels on-site to protect critical infrastructure for the design life of the solar farm.

To comply with the above requirements, critical infrastructure, including the substation, O&M building, and PCUs, will be elevated above the 100-year flood level freeboard requirements. The principal requirements are that permanent access roads, pavements and hardstand surfaces meet the 20-year flood level, while temporary construction access roads, pavements and hardstand surfaces meet the 10-year flood level.

5.2. PROPOSED STORMWATER

The proposed stormwater would consist of culvert and swales to manage stormwater and minimise the ponding levels on-site. There are 3 major culverts (2 proposed and 1 existing) located within the tributary stream which will need to comply with the Resource Management (National Environmental Standards for Freshwater) Regulations and the relevant provisions of the Waikato Regional Plan. Based on the catchment for these three culverts the existing culvert has a catchment greater than 500ha. The two proposed culverts both have catchments of greater than 100ha, but less than 500ha. The internal drainage will consist of approximately 26 additional internal culverts of varying sizes (to be confirmed at detailed design stage). The additional culverts will be located within the existing farm drains and are required to allow for increased flow and minimise additional ponding created by the additions of new roads.

5.3. STORMWATER MANAGEMENT AND FLOOD MODELLING REPORT

The accompanying Stormwater Management and Flood Modelling Report should be read in conjunction with this report, and primarily addresses the site flood behaviour, hydraulic assessment, and flood mitigation measures for the development.

The solar panel arrays are elevated structures and do not require dedicated stormwater treatment infrastructure. Runoff from panel surfaces will discharge directly to the underlying permeable ground and in significant events continue as overland sheet flow, consistent with existing rural catchment conditions.

Runoff from associated hardstand and access areas will be addressed at detailed design stage, with collection, conveyance, and any required treatment designed in accordance with RITS stormwater requirements. Where needed, stormwater from impermeable surfaces may be conveyed via local drainage features to adjacent land or existing farm drains, subject to final grading and hydraulic design.

5.4. CULVERTS

As part of the preliminary design, overland flow path and locations of proposed culverts have been identified. The culvert locations were determined based on the existing low points in the terrain, and locations to ensure continuity of stream and farm drain flows where a road is intersecting the flow passage. Drainage system will be designed and sized to consider the 50-year flood event.

Given the loads on the culverts under roads during construction, RCRRJ Class 4 pipe for heavy-duty applications have been used. Minimum cover for the Culverts under the entranceways and all internal culverts should have minimum 450mm cover (from the pipe crown (top of pipe) to the finished surface).

Culvert size and invert levels shall be designed to accommodate the required hydraulic capacity, provide for fish passage in accordance with NES-Freshwater requirements, and minimise disruption to existing flow regimes.

Refer the Erosion and Sediment Control Plan (ESCP) Report for additional details on the culvert installation methodology.

6. WATER SUPPLY

6.1. DESIGN STANDARDS

The RITS Water Supply Design Standard sets out design and construction standards for water reticulation, potable water supply and firefighting supply, in accordance with SNZPAS 4509:2008 (NZ Fire Service Fire Fighting Water Supply Code of Practice). An estimate of water demand for the proposed development will be calculated at detailed design stage but is exempt from the methodology described in RITS section 6.2.3, due to being a Rural Area Design, under 6.2.3.2.

It is noted that the water supply to inverter stations will be completed at detailed design stage if required.

6.2. EXISTING WATER SUPPLY

From Matamata-Piako District Council (MPDC) GIS there is public water supply to the site located in the northern corner. Part of the site at 4775 State Highway 29 is service by a 150mmØ uPVC water main. The rest of the site does not appear to be serviced by public water supply.

7. OTHER SERVICES

Medium Voltage (MV) and Earthing provisions are beyond Maven's scope, however an indicative service trench design is included within the Engineering Plan set.

There is no gas reticulation included in the new development.

8. CONCLUSIONS

Based on this Infrastructure Memo, the proposed development can be accommodated at the subject site with less than minor effects on the existing infrastructure and stormwater receiving environment.

It is considered that the proposed infrastructure design included within this report adequately services the proposed development and that the proposed roading, stormwater, and water supply solutions are consistent with RITS and the NZ Building Code.

Based on the information presented above, it is believed the site is suitable for the proposed development.

9. LIMITATIONS

This report is based on information that has been provided to Maven Matamata Limited, from the Client, or by third parties. The report has been prepared strictly on the basis that the information that has been provided is accurate, complete, and adequate. To the extent that any information is inaccurate, incomplete, or inadequate, Maven Matamata Limited takes no responsibility, and disclaims all liability whatsoever, for any loss or damage that results from any conclusions, based on information that has been provided to Maven Matamata Limited.

Maven Matamata Limited reserves the right to review our report, should there be items missed, or further information is presented to us.

We have prepared this report in accordance with the 'scope of works' and our terms of engagement. The information contained in this report has been prepared by Maven Matamata Limited at the request of the Client and is exclusively for their use and reliance.

This report should not be used in any way other than the intended purpose, as outlined in the scope of works, and no responsibility or liability to any third party is accepted for any loss or damage whatsoever arising out of the use of, or reliance on, this report, by any third party.



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APPENDIX A – ENGINEERING DRAWINGS