

Category 3: Excellence in Sustainability and Innovation

Wollar Solar Farm – Stabilisation Design Optimisation

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HIWAY

2024 AustStab Awards of Excellence

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Overview and Objectives

- Develop an alternative more sustainable design while reducing cost and time of construction
- Beneficially treat and reuse unsuitable material on site
- Eliminate the disposal of unsuitable material to landfill
- Minimise imported quarry materials
- Reduce overall carbon footprint on the project



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The Wollar Solar Farm Project

- The Wollar Solar Farm is situated in the Central-West Orana REZ Zone and once completed will comprise 660,000 modules, have a capacity to power 104,926 households and offset 515,564t of CO² emissions each year
- The project is being constructed by SEPD with A1 Earthworx completing the earthworks contract
- Hiway was contacted to develop innovative methods to reduce the carbon footprint during construction

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Context of the Initiative

- Approx 70,000m² of internal access roads 4m wide required treatment
- Existing design entailed 700mm excavation, 300mm select fill, 300mm DGS40 and 100mm DGB40
- Hiway alternative design reduced excavation to 300mm followed by lime stabilising 400mm at 4% with a single layer 300mm DGS40 Basecourse (which had already been stockpiled on site) to obtain equivalent pavement life

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Challenges Encountered During Implementation

- Lack of mechanistic design completed by client led to back calculations to build conforming design model
- Convincing client designers that our alternative design was sufficient and offering superior design life
- Majority of existing subgrade CBR 1-2 requiring purpose built off road spreaders to spread the lime without becoming stranded
- Reducing lime dust during construction in order not to interfere with some modules already in place
- Sufficient water supply on site to keep up with daily demand of approx. 500,000L during construction due to hot and windy conditions

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Key Points of Interest

- Removal of 28,000m³ of unsuitable material to waste was eliminated
- Carting away 50,400t equivalent to 1575 truck and dog loads to landfill was eliminated
- Saved on importing additional 28,000m³ of quarried material
- Carting to site 67,200t of quarry material equivalent to 2100 truck and dog loads was eliminated
- Total 3675 truck and dog movements removed from marginally constructed local roads

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Evidence of Success



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Design Analysis

Wollar Solar Farm Stabilisation Design Pavement Option

Back Calculated Design Traffic: ESA = 2.0 x 10E+03, ESA/HVAG = 1.048

Material	Design Modulus (Mpa)	Conforming Design (mm)	Alternative Design (mm)
DGB40	300	100	
DGS40	200	300	300
Select Fill	150	300	0
Stabilised Subgrade	150	0	400
Design Subgrade CBR	<2%	Semi-infinite	Semi-infinite

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Evidence in Practice

- 70,000m² of solar farm access roads treated
- Only approx. 50m² failed proof roll, which performed following treatment with additional 4% of lime
- Treated sections withstood excess Moxy movements prior to basecourse being placed
- 10 day construction window substantially reduced interruptions to other contractors on site utilising the tracks
- Substantial carbon footprint reduction to a sustainable renewables project

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Supporting Pictures



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