

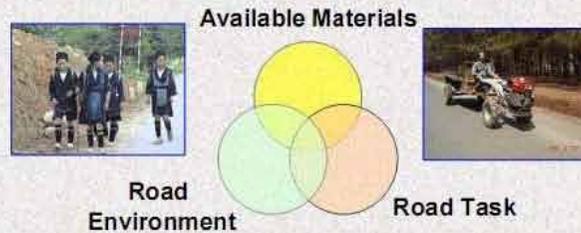
# Environmentally Optimised Design

## Its Role in Sustainable All Year Rural Access

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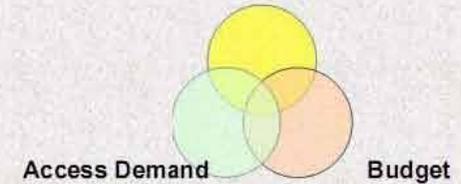


### SUSTAINABLE RURAL ROADS: The Engineering Balance



### SUSTAINABLE RURAL ROADS: The Economic Balance

#### Socio-Political Issues

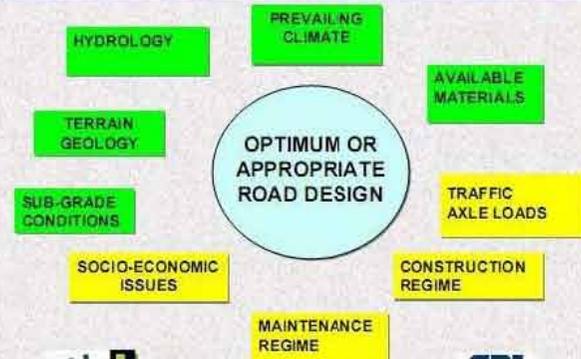


### An Appropriate Design Approach for Low Volume Rural Access

It is now appreciated that low volume rural roads tend to respond to the dominance of a range of factors, collectively know as the **“Road Environment”**



### THE ROAD ENVIRONMENT



### Regional Road Environment Issues

Variable quality construction materials  
Very limited maintenance application – particular problem with a lack of any shape preservation  
High (frequently intense rainfall)  
Construction/supervision limitations  
Over-reliance on “one-club” designs



### Environmentally Optimised Design (EOD)

Identifying and **applying** road designs that are specifically suited to the governing Road Environment factors.

This applies not only to pavement and surfacing but also to earthworks, slope protection, drainage and structure.



### EOD for Low Volume Rural Access

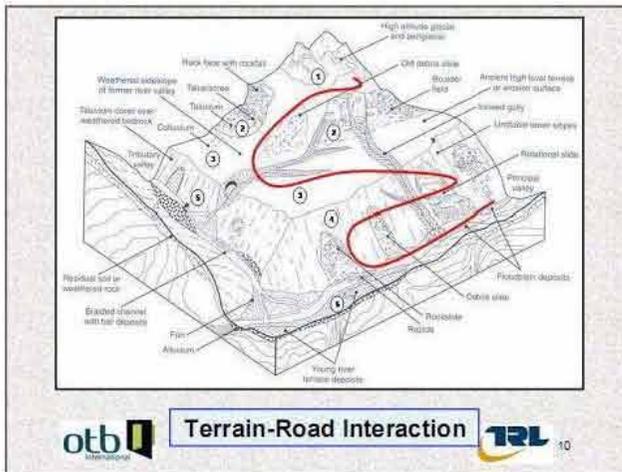
EOD can be considered as the over-arching principle for a range of practical strategies for improving or creating low volume rural access – from dealing with individual critical areas on a road link (Spot Improvements) to providing a total whole rural link design (Composite Whole Road Design)



### The EOD Spectrum

Spot improvement		Composite Roads
Strategy	Description	Impact
Composite Whole Road Design	Applying the principle of adapting designs to suit regional road environments at an individual road alignment scale.	Differing pavement, earthwork and drainage options to be selected in response to varying impacting factors along a whole road link. Hence a more focussed use of construction resources.
Spot Improvement	The appropriate improvement of specifically identified road sections either in actual need of upgrade or deemed to be at high risk of failure.	The appropriate application of limited resources to be targeted at key areas on existing earth or gravel road links to improve all year access.





### Environmentally Optimised Design (EOD)

The application of EOD principles in finding a practical and sustainable solution to the problems of rural access in the region is a currently evolving process – as recently as last week the SEACAP Practitioners Meeting (SPM) identified some key issues.

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### SPM Discussion : EOD and Spot Improvements

- Why Spot Improvements?

Objective :  
Within the context of upgrading to all year access: To solve identified and defined problems in a sustainable manner in conjunction with community concerns.

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### Key Issues: -1

- Clearly distinguish EOD (particularly Spot Improvement) applications from Routine, Periodic or Emergency Maintenance

EOD-Spots is **engineering based** – the root cause of problems are solved in an engineeringly correct manner

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### Periodic/Emergency Maintenance

Local (village) driven maintenance will address immediate concerns.

May actually cause gravel surface deterioration to earth condition rather than addressing underlying engineering problems

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### Key Issues-2

- Good engineering decision making required

Whilst the community should have a major input into identification of difficult or at risk areas, the definition of the underlying engineering problem and its solution requires engineering input.

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### Key Issues-3

- Whole alignment corridor approach

Whilst problems may show themselves as a pavement surface failure or deterioration, the root cause may be above, below or beside the pavement.

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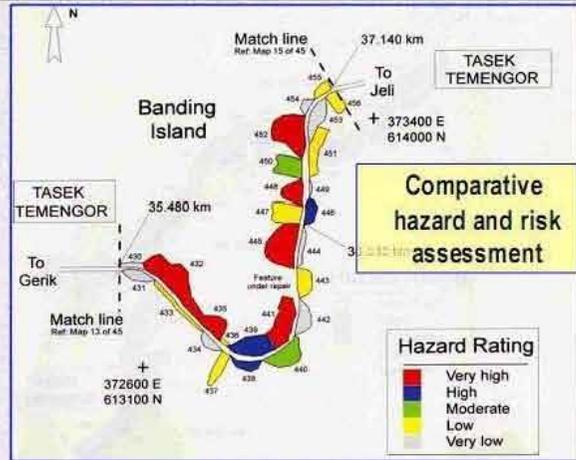
Failure to address a down-slope failure issue – 3 times !!



An embankment height issue



A drainage issue



### EOD Matrix Based on Terrain Sub-Units & Gradient

#### Road Cross Sections (To Be Developed)

Gradient (%)				
<1	Matrix of Possible Pavement, Earthwork, Slope Stabilisation & Drainage Options			
1-3				
3-6				
6-9				
>9				

### EOD : Summary

- Sustainable Rural Access
- Appropriate Design
- Targeting Resources
- Flexible Strategy

### The EOD Spectrum: Summary



The EOD Contribution