The Institute of Asphalt Technology
Irish Branch

Use of Geogrids in Wexford

Donal McLoughlin BEng CEng

Wexford County Council

March 2019

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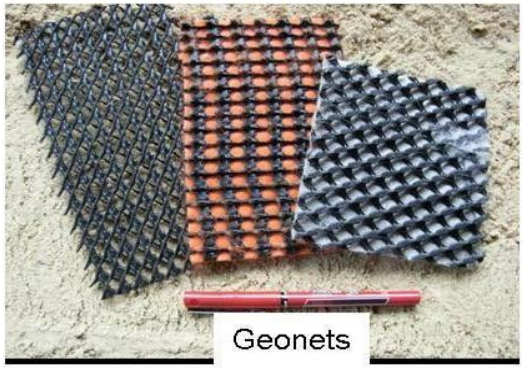
Aim

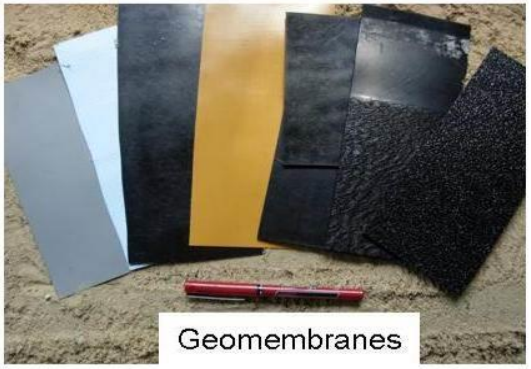
To give an insight, based on Wexford County Council's experience, into some of the practical pavement applications of geogrids from a local authority point of view.

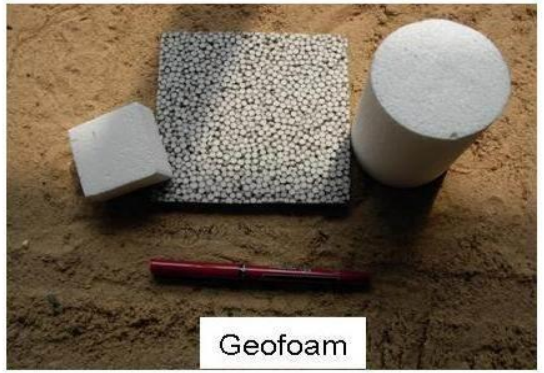
Content

- Brief Overview of Geosynthetics
  - Main types used for road construction applications.
  - Historical applications in WCC
- Case study
  - N25 Primary Road Overlay
  - Site selection
  - Design
  - Works

Types of Geosynthetics







Geosynthetic Functions & Examples

SEPARATION

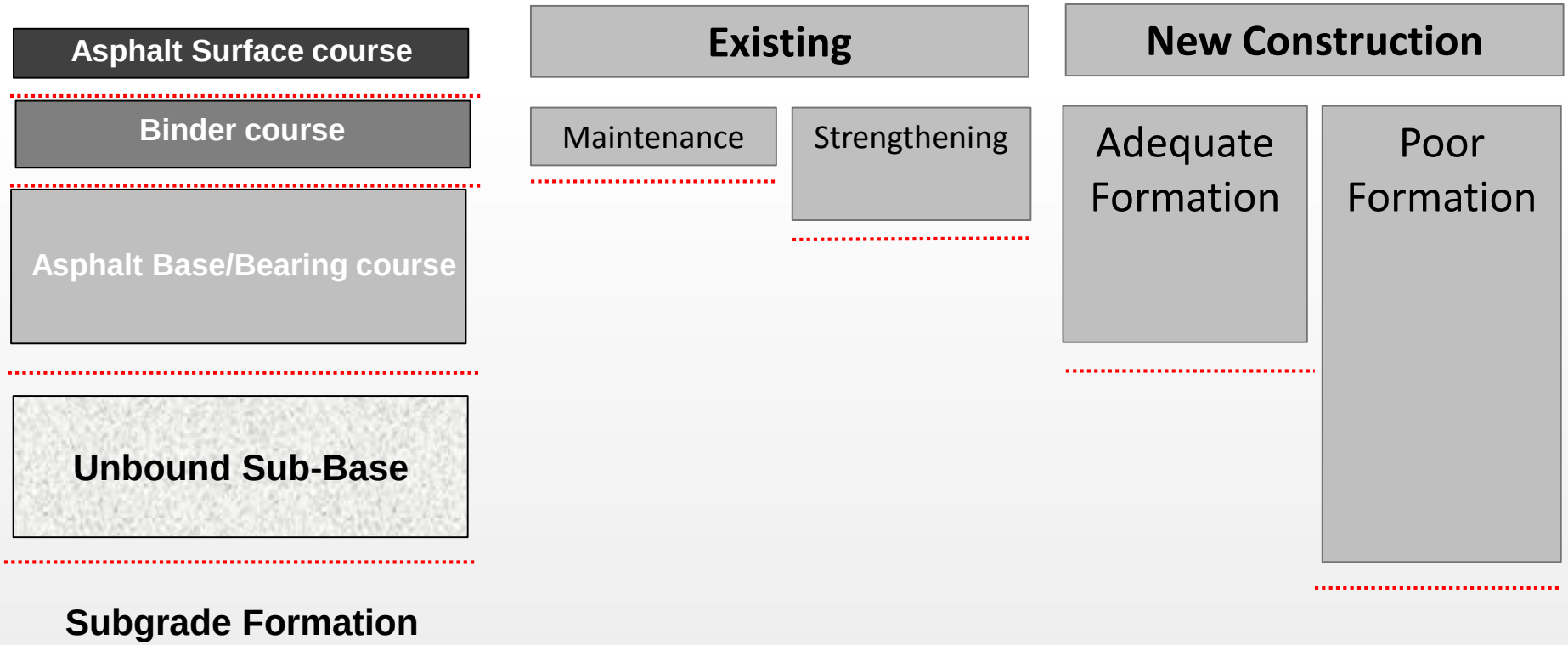
ASPHALT REINFORCEMENT

REINFORCEMENT

DRAINAGE / FILTRATION

REINFORCEMENT

Geogrids and Road Construction



Two main Types.

- Unbound Sub base reinforcement.
- Asphalt/ surface course reinforcement

Different Types of Reinforcement

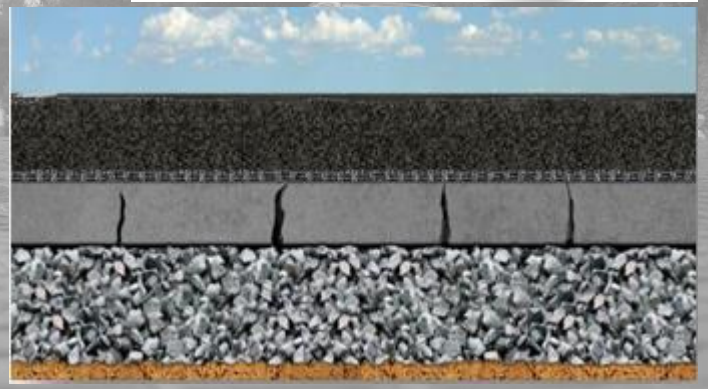
Geosynthetics for Sub-base Reinforcement

- Reduces deformations in the sub-base.
- Provides soil separation (With a backing Geotextile)
- Mitigation of settlements => extension of road service life.
- Reduces the need for large depths of construction.

Different Types of Reinforcement

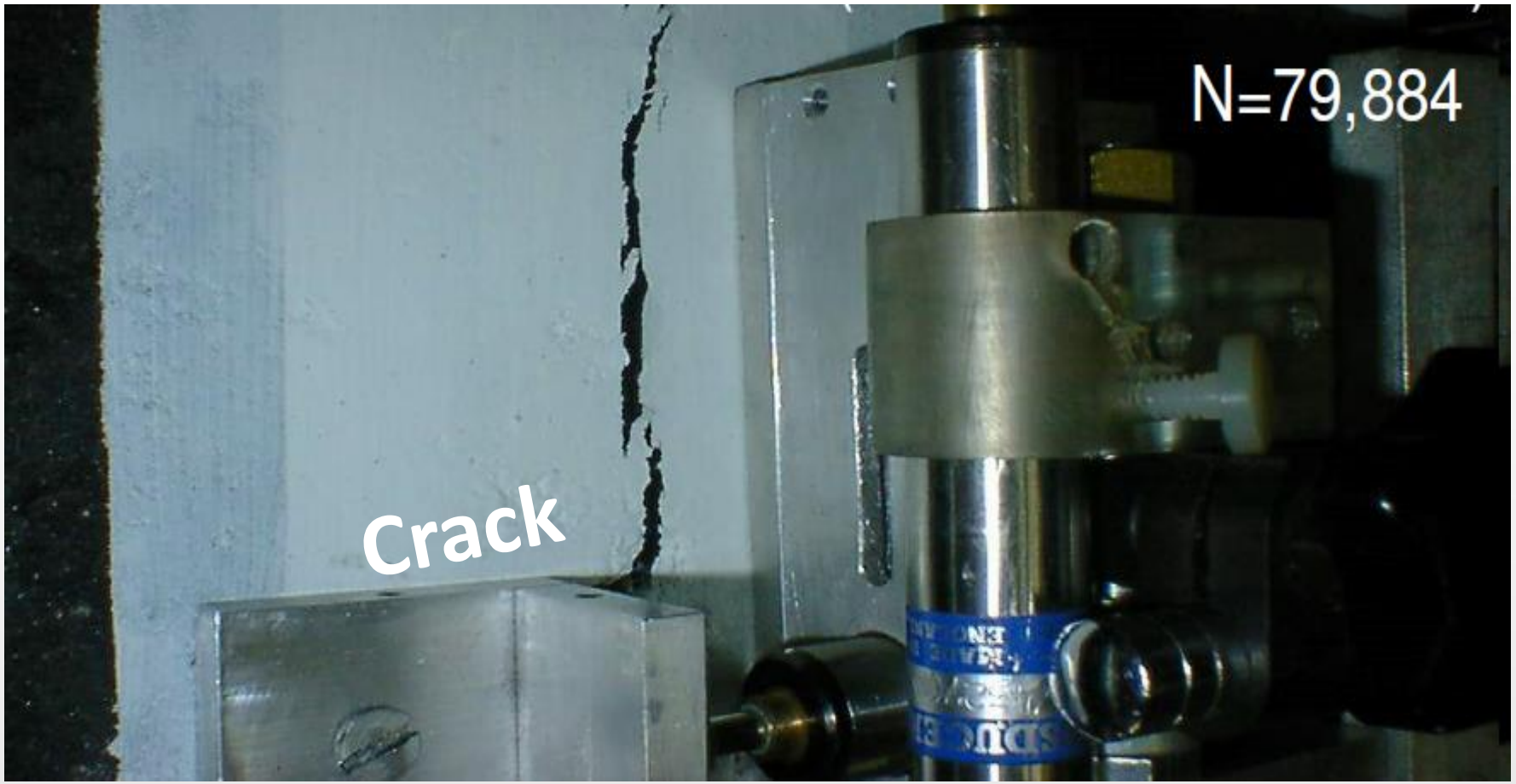
<u>Geosynthetics for Asphalt Reinforcement.</u>

- Retardation of reflection cracking.
- Extends rehabilitation intervals.



- Extends the service life of road.
- Economic solution to add strength to a road.
- Reduces maintenance costs.

Typical Pavement Crack (Without Reinforcement)
Dynamic Fatigue Tests



Typical Pavement Crack (With Reinforcement)
Dynamic Fatigue tests

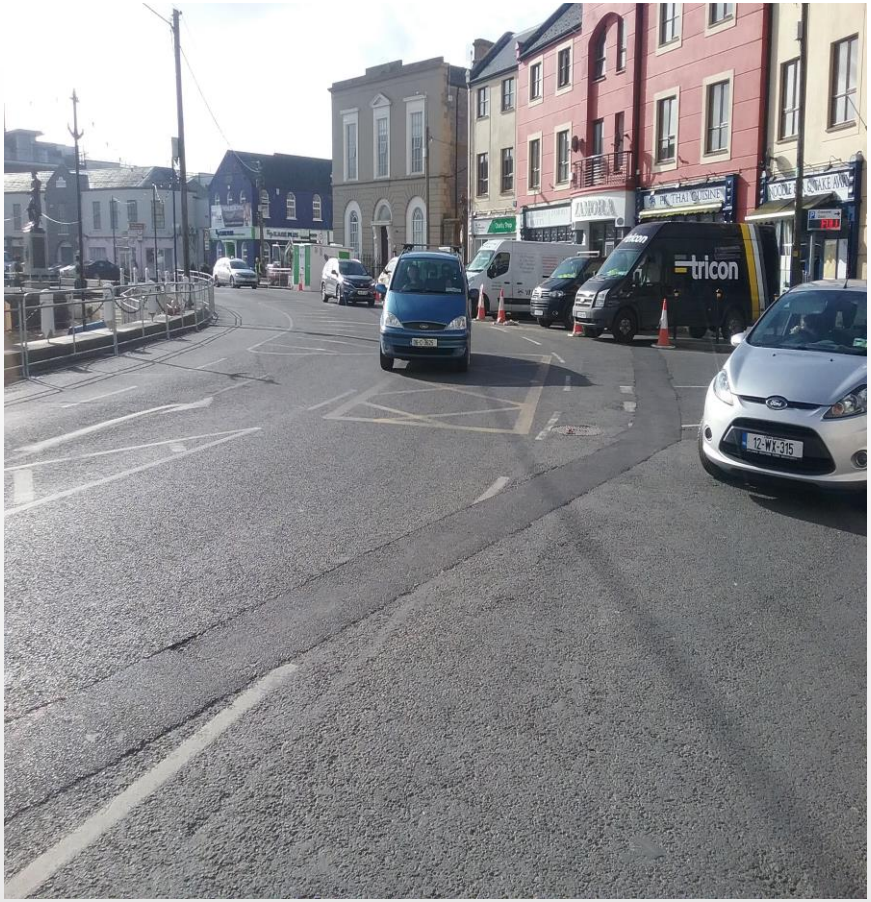
Wexford Co. Co. Experience

Sub-Base Reinforcement Application

R702 Rehabilitation/ Water Main Rehabilitation

Wexford Co. Co. Experience

Asphalt Reinforcement Application



2009 **2019**

R730 Wexford Quay

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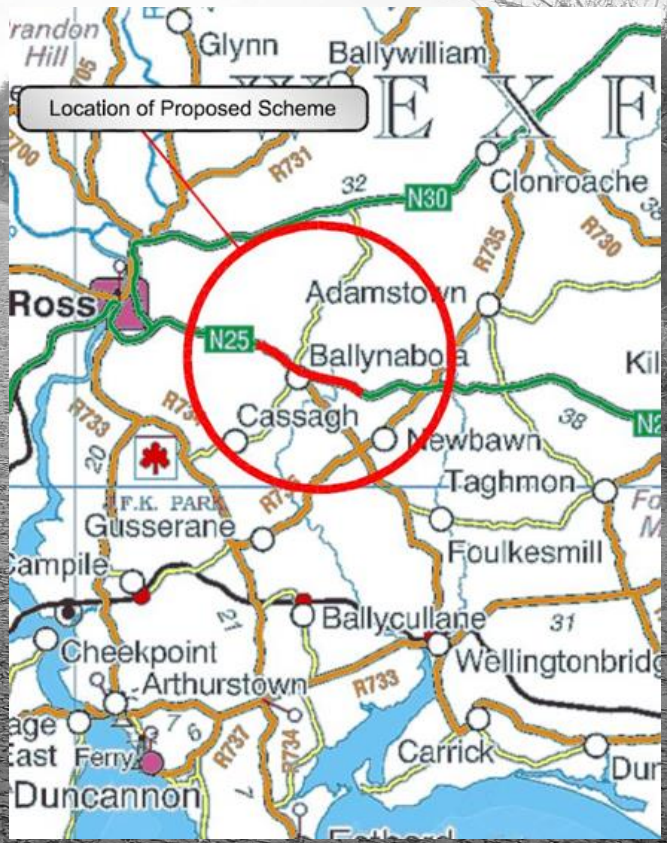
Case study

N25 Ballynabola to Raheenvarren Pavement Scheme

N25 Site Specific Information

- National Primary Road
- Single Carriageway with hard shoulders
- AADT = 8000
- %HGV = 7.8
- Pavement Deteriorating (2014/2015)



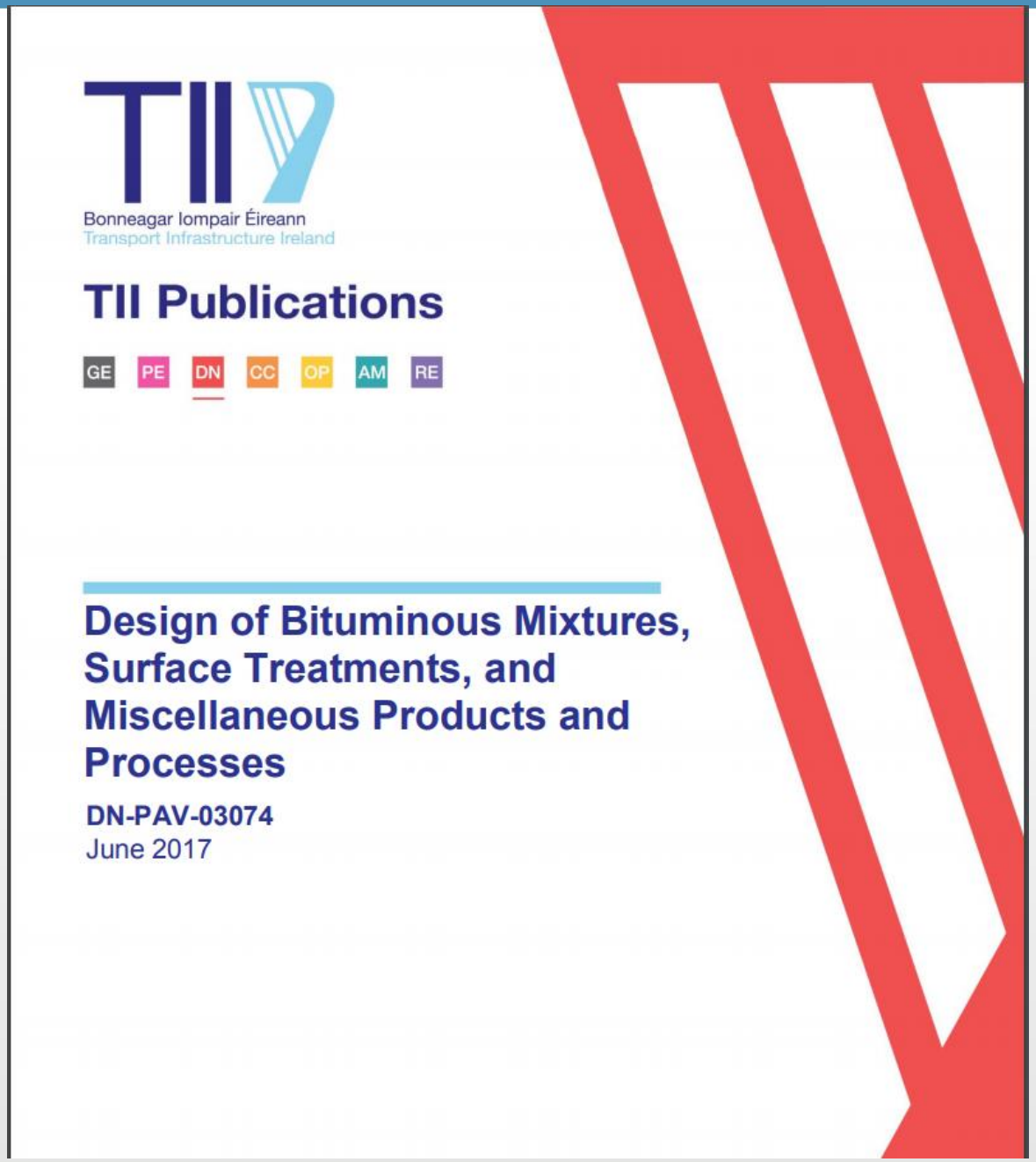
Existing Pavement Condition : Rutting in wheel Track

Existing Pavement Condition : Cracking

Existing Hard Shoulder Failure

TII Pavement Management System

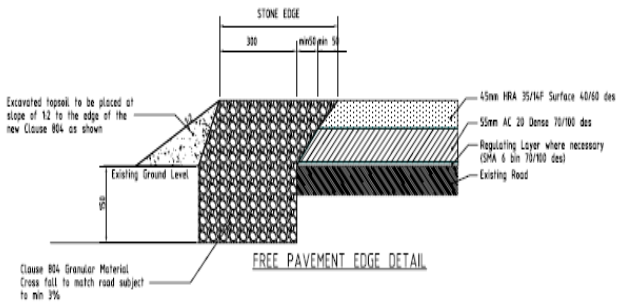
- TII Asset Management Survey (2015 Red Flag).
  - Wheel track rutting
  - Cracking
  - Loss of skid resistance
- Identified the condition of the carriageway as Fair / Poor
- Local Authority survey work / interventions also backed up survey results.
- TII recommended that preliminary investigations be carried out, with a view to demonstrating the need for a proposed pavement scheme.

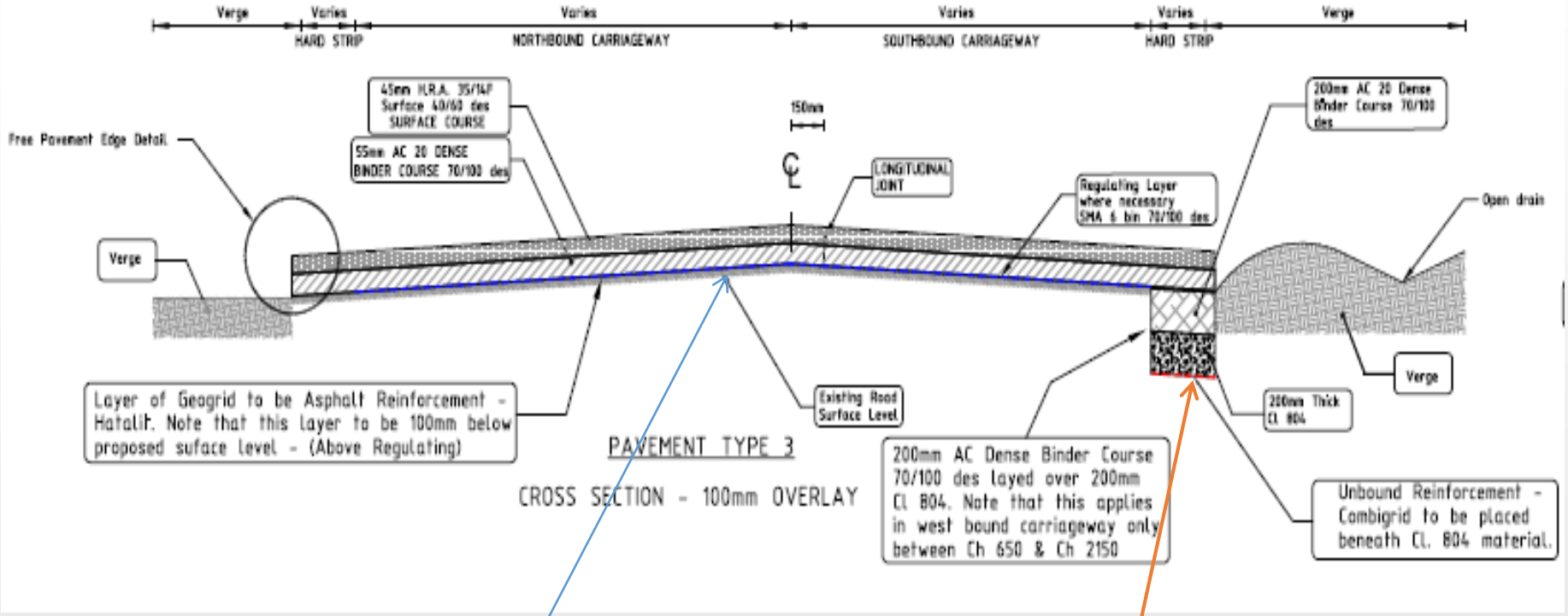

Bonneagar Iompair Éireann
Transport Infrastructure Ireland
TII Publications
GE PE DN CC OP AM RE
Design of Bituminous Mixtures, Surface Treatments, and Miscellaneous Products and Processes
DN-PAV-03074
June 2017

Recommended Solution

- Main Carriageway
  - Sectional repair of compromised pavement to a depth of 200mm
  - Overlay existing pavement with 55mm Binder Course & 45mm HRA
  - Install Asphalt Reinforcement to upper Layers to prevent future cracking & extend the life of the pavement
- Hard Shoulder
  - Cold mill Hard Shoulder to Sub-base level & install geo-composite reinforcement (Geogrid + Geotextile)

Cross Section





Asphalt Reinforcement

Sub base reinforcement

Reinforcement

- Sub-Base Reinforcement
  - Reinforcement, filtration, separation (All in one)
  - Easy to install
  - Good resistance against installation damage
- Asphalt Reinforcement
  - Flexible and easy to install
  - Bitumen coated polyester (suitable for fine milled surface)
  - Good resistance against installation damage

Extent of the Works

- Total length of works 3.6 km
- Application of Asphalt Reinforcement over affected area
- Application of Unbound Reinforcement in Hard Shoulder
- Contract awarded to Roadstone Ltd.
- Contract value - €2 million.

Works Programme Summer 2017

1. Sectional repair of main carriageway
2. Excavate and repair WBHS. Including unbound reinforcement.
3. Pavement overlay Main Carriageway. Install Asphalt reinforcement on affected sections.

Hard shoulder Rehabilitation.

Asphalt Reinforcement – Bond Coating

Asphalt Reinforcement – Laying Process

Main Carriageway

Asphalt Reinforcement – Rolling

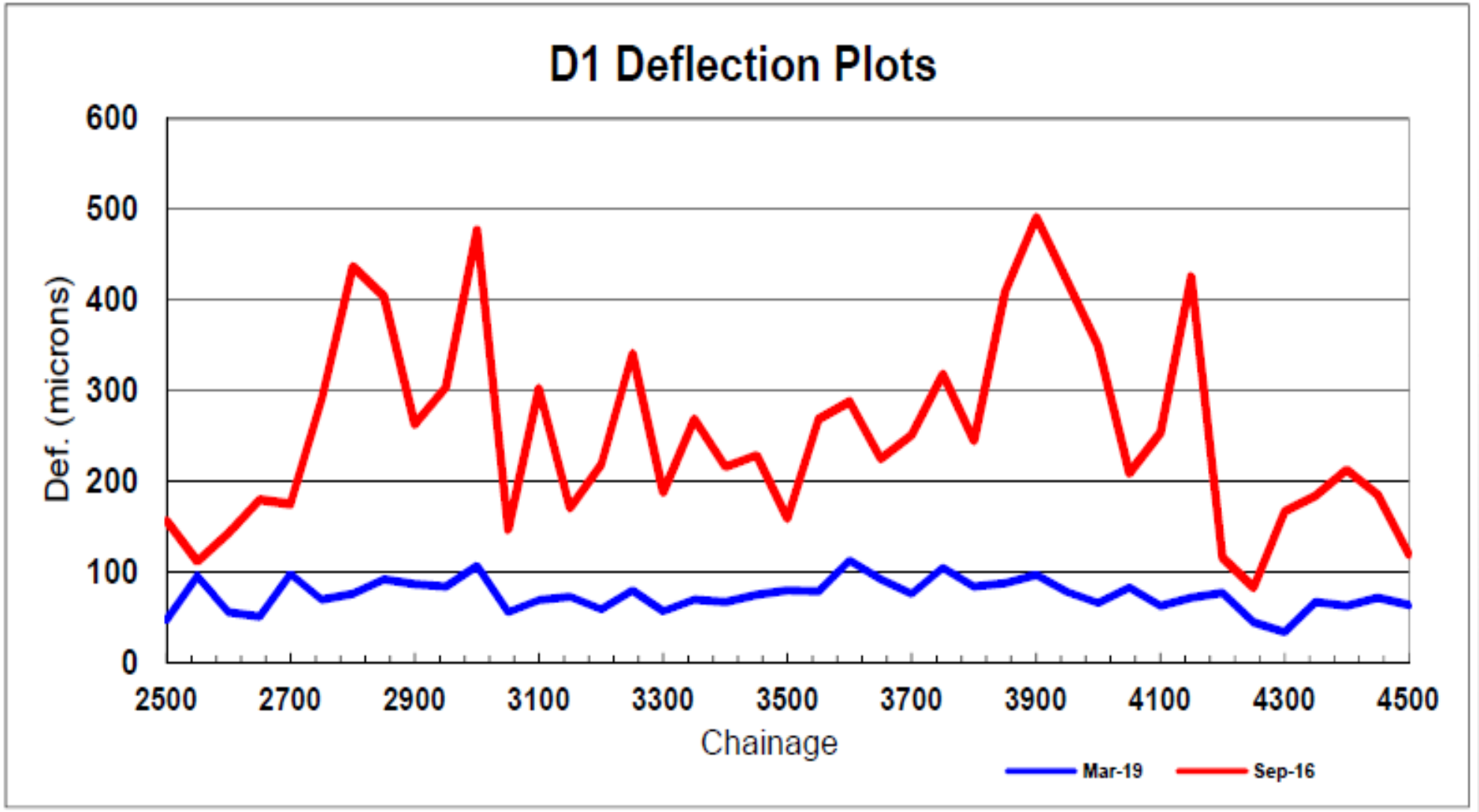
- Ultra light Weight nonwoven Backing
- Tensile Strength 50 Kn/m
- Bitumen content of Coating > 60%

Combination of bitumen coating grid & bond coat emulsion provided an extremely strong bond between the asphalt layers & geogrid

Asphalt Reinforcement – Paving

Completed Scheme

Completed Scheme



Completed Scheme

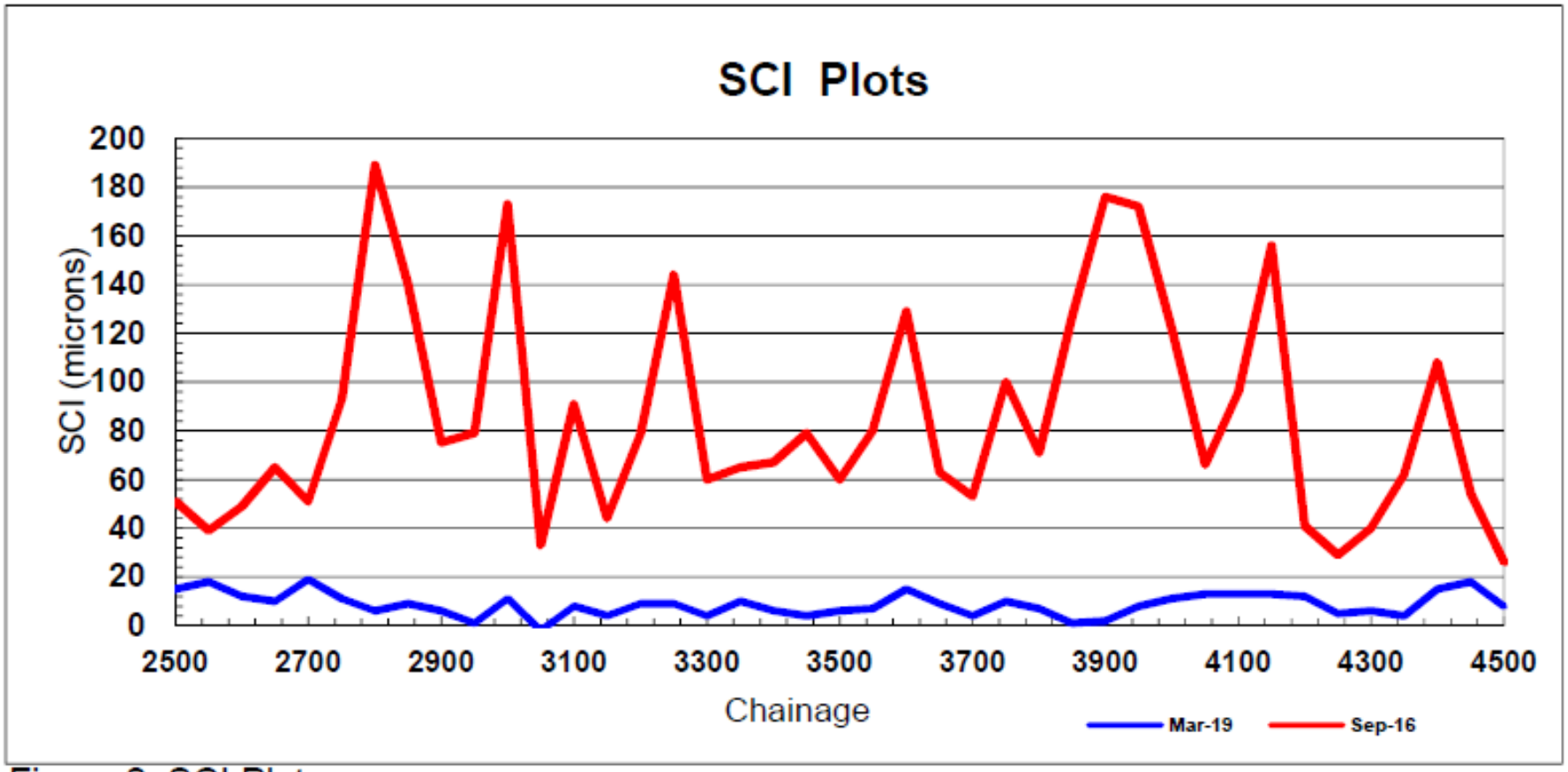


Figure 2: SCI Plots

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Thank You

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