ROADEX

Implementing Accessibility

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Implementing Accessibility

Northern Periphery Programme
2007–2013
Innovatively investing in Europe's Northern Periphery for a sustainable and prosperous future

European Union
European Regional Development Fund

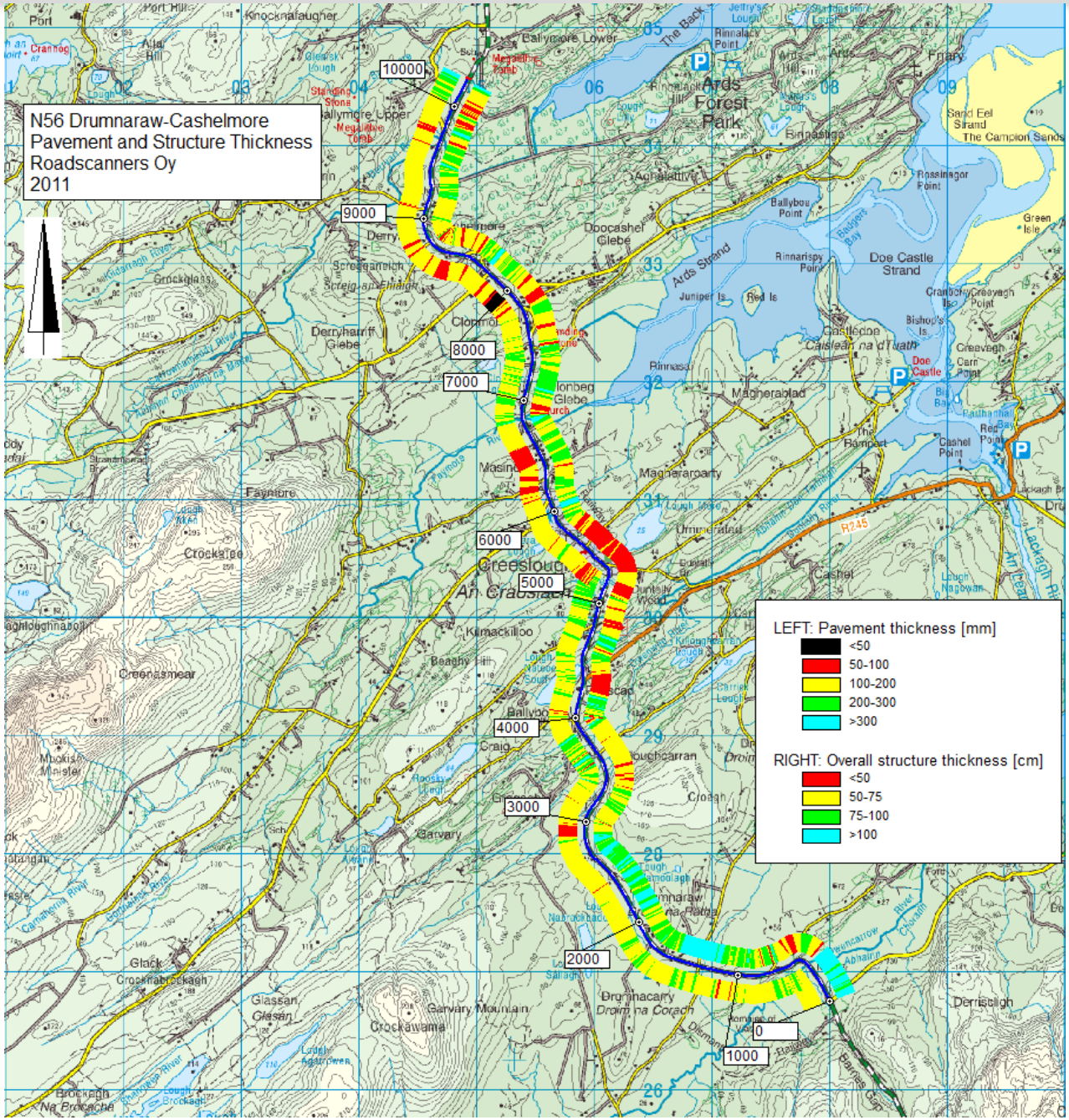
ROADEX N56 and N59 Route Risk Assesment Demonstrations

Timo Saarenketo, PhD
Roadscanners, Finland

ROADSCANNERS

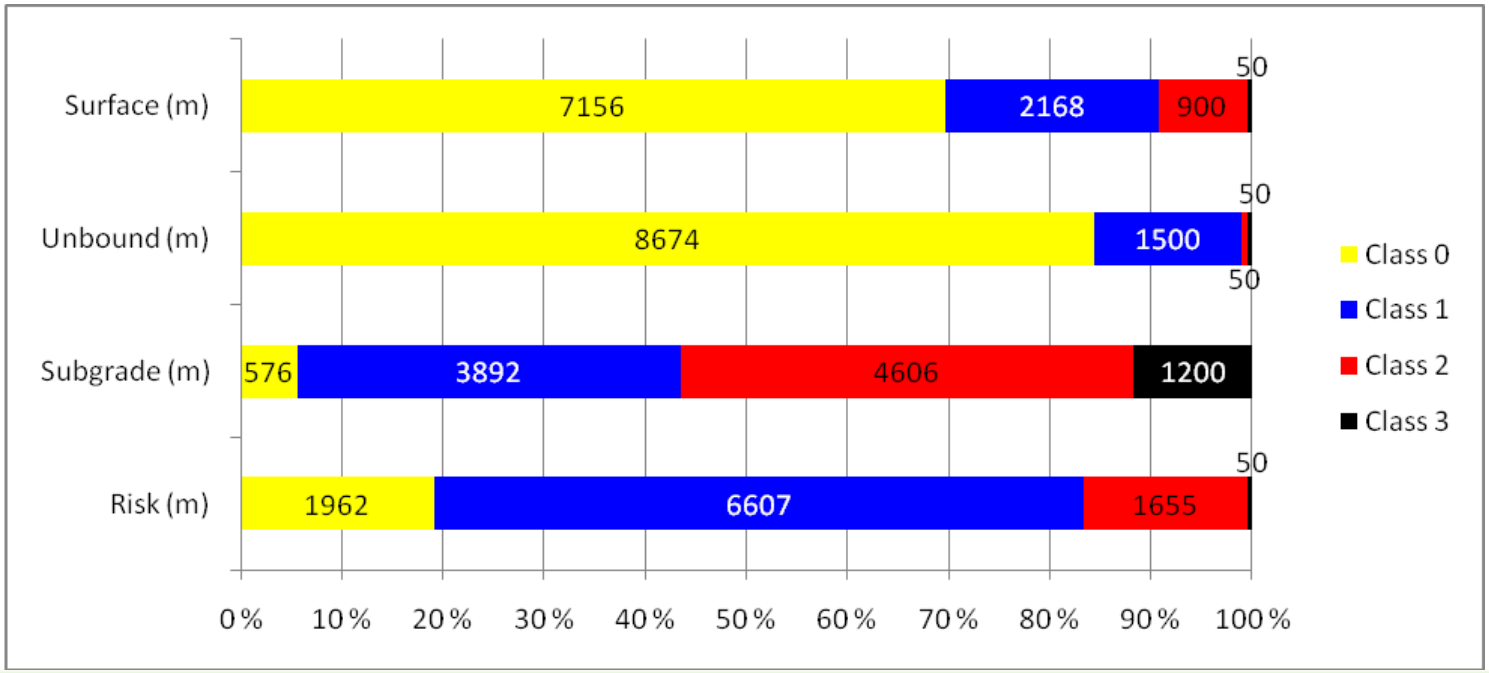
ROADEX
Implementing Accessibility

N56


N56 Drumnaraw-Cashelmore
Pavement and Structure Thickness
Roadscanners Oy
2011
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
LEFT: Pavement thickness [mm]
<50
50-100
100-200
200-300
>300
RIGHT: Overall structure thickness [cm]
<50
50-75
75-100
>100

N56

Class	Evaluation
0.	No immediate risk for major pavement failure. Local pavement cracking and an increase in rut depth may occur.
1.	Pavement failure and rutting may occur but only after continued heavy transportation. Initially these failures will focus on sites where the bound layers are deteriorating or are debonded.
2.	Pavement distress (rutting and cracking) will be seen in the road a short time after heavy transport starts, but they should not cause immediate problems for road users.
3.	Severe pavement distress will appear immediately after heavy transport is started (less than 5000 axle loads). These major damages may cause problems for road users.



ROADEX
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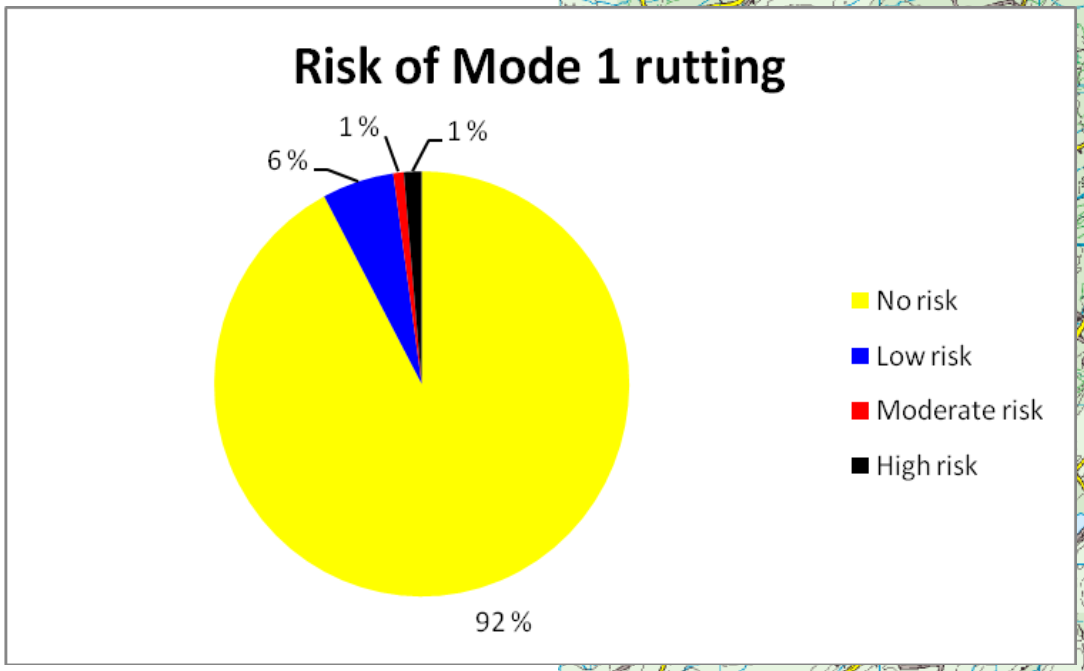
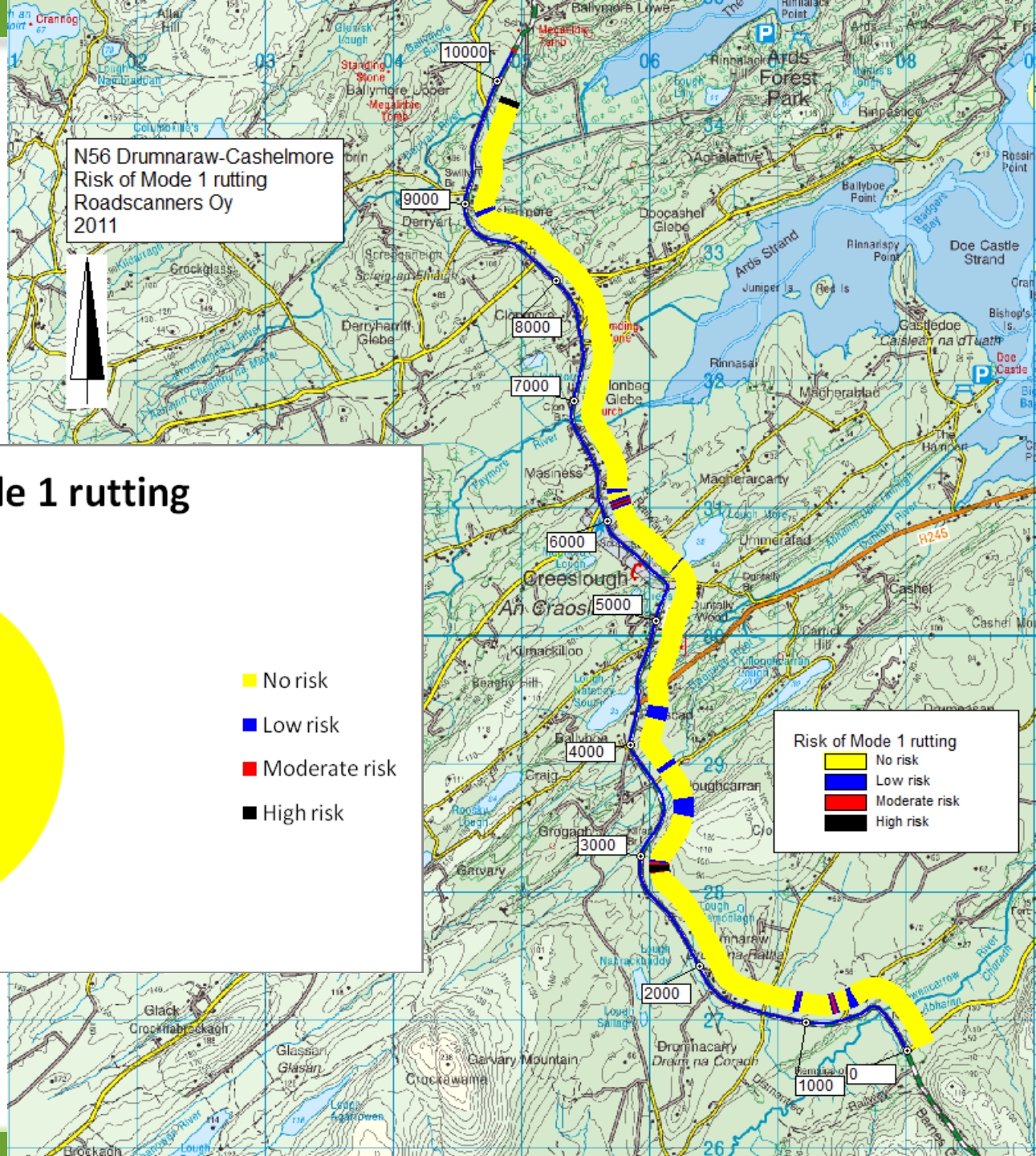
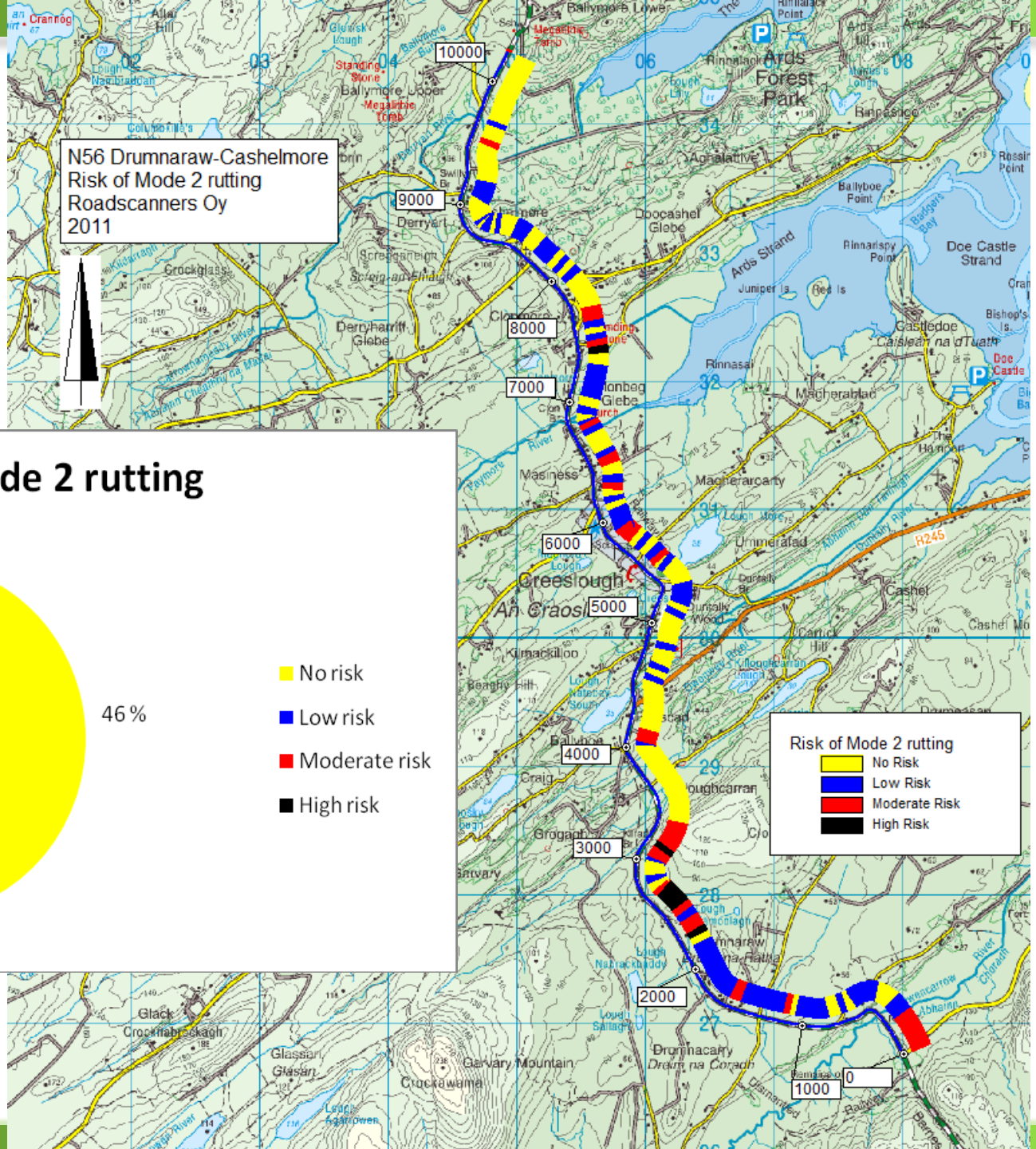
N56

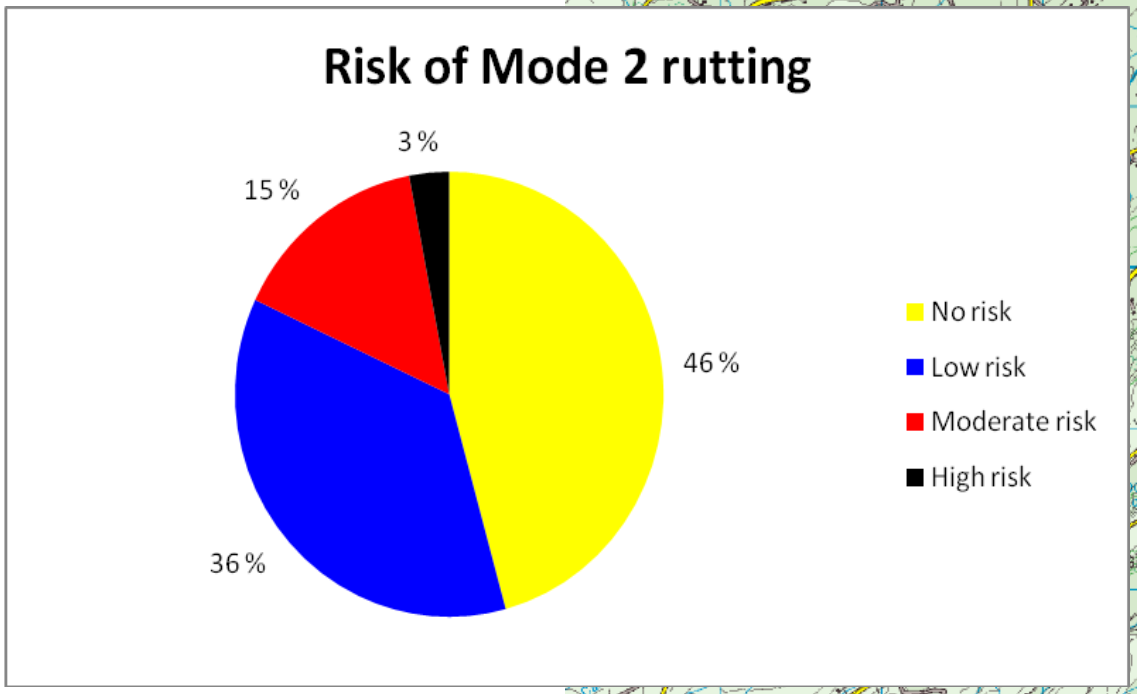




ROADEX
Implementing Accessibility

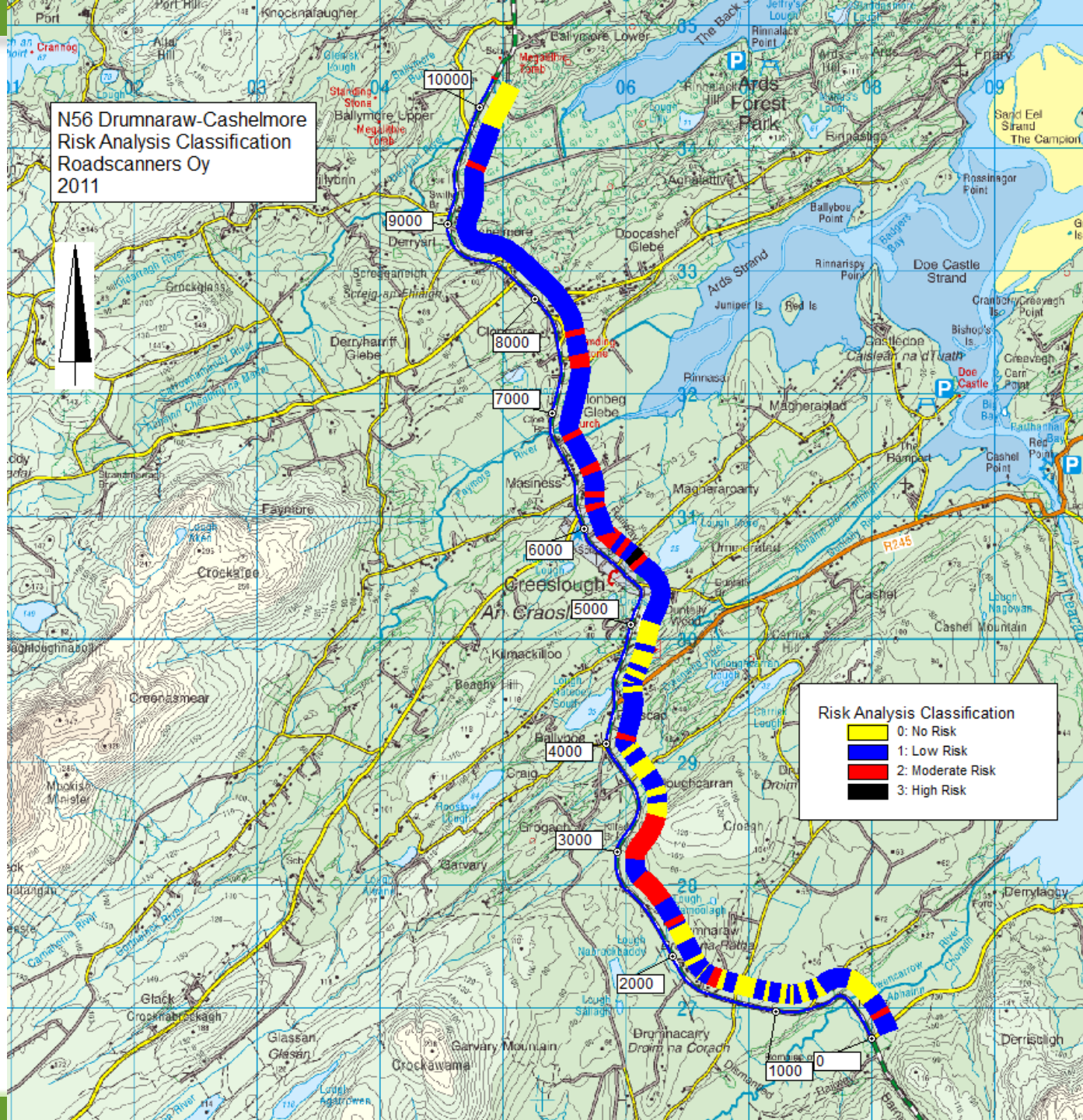
N56



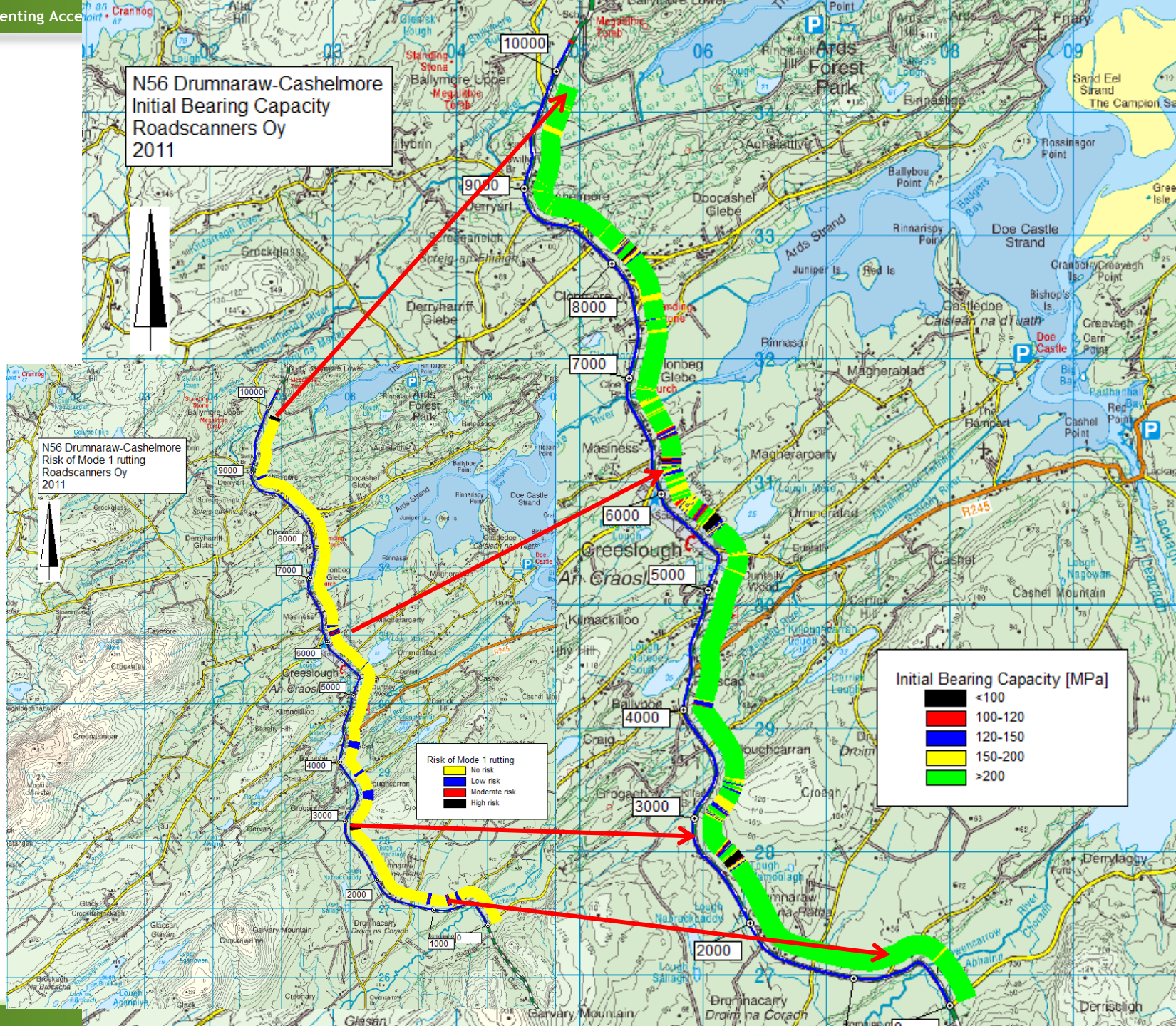


ROADEX
Implementing Accessibility

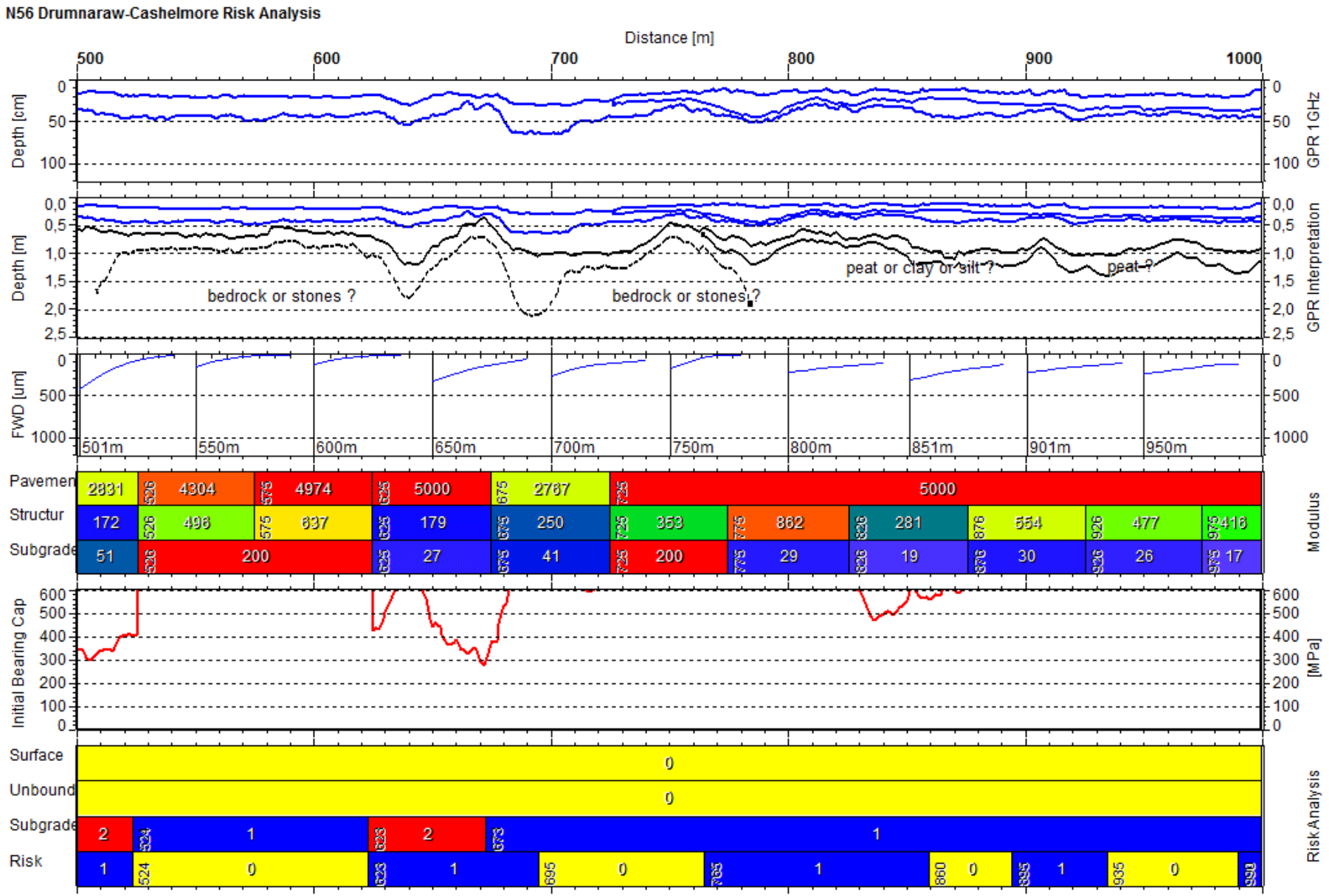
N56


N56 Drumnaraw-Cashelmore
Risk Analysis Classification
Roadscanners Oy
2011
Risk Analysis Classification
0: No Risk
1: Low Risk
2: Moderate Risk
3: High Risk
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Ballymore Lower
Ballymore Upper
Ards Forest Park
Doe Castle Strand
Castlecoe
Greeslough
An Craoslaí
Cashel
Cashel Mountain
Drumnaraw
Drumnacarry
Derrylaggy
Derrislagh
Glack
Crockabreckagh
Glassan
Garvary Mountain
Crockawame
Creenasmear
Crockatee
Faynore
Masiness
Magherarogarty
Magherablad
Kumackilloo
Ballyboe
Grogach
Garvary
Cloagh
Bouchcarran
Derryharriff Glebe
Doocashel Glebe
Ionbeg Glebe
Rinnarispy Point
Ballybou Point
Rossinagor Point
Sand Eel Strand
The Campion
Cranbody
Creevagh Point
Bishop's Is
Cashel Point
Red Point
Red Is
Juniper Is
Rinnasu
Aghalattive
Derryart
Screeganeigh
Gracklagh
Port
Port Hill
Knocknalaugher
Allar Hill
Cranog
Ardnamuckish
Ardnamuckish Minister
Glebe
Ard Hill
Friary
The Back
Ards Strand
Badgers Bay
Doe Castle
Caislean na d'Uath
The Rampart
Dunfalls Wood
Carrick Hill
Carrick Lough
Cashel Lough
Lough Nagowan
Lough Veagh
Lough Salagh
Lough Nabrockaddy
Lough Awarnil
Lough Agarrowen
Roosky Lough
Lough Mooloolagh
Lough Kiel
Lough Keel
Lough Eske
Lough Mourne
Lough Ree
Lough Ree South
Lough Ree North
Lough Ree East
Lough Ree West
Lough Ree Middle
Lough Ree Upper
Lough Ree Lower

N56

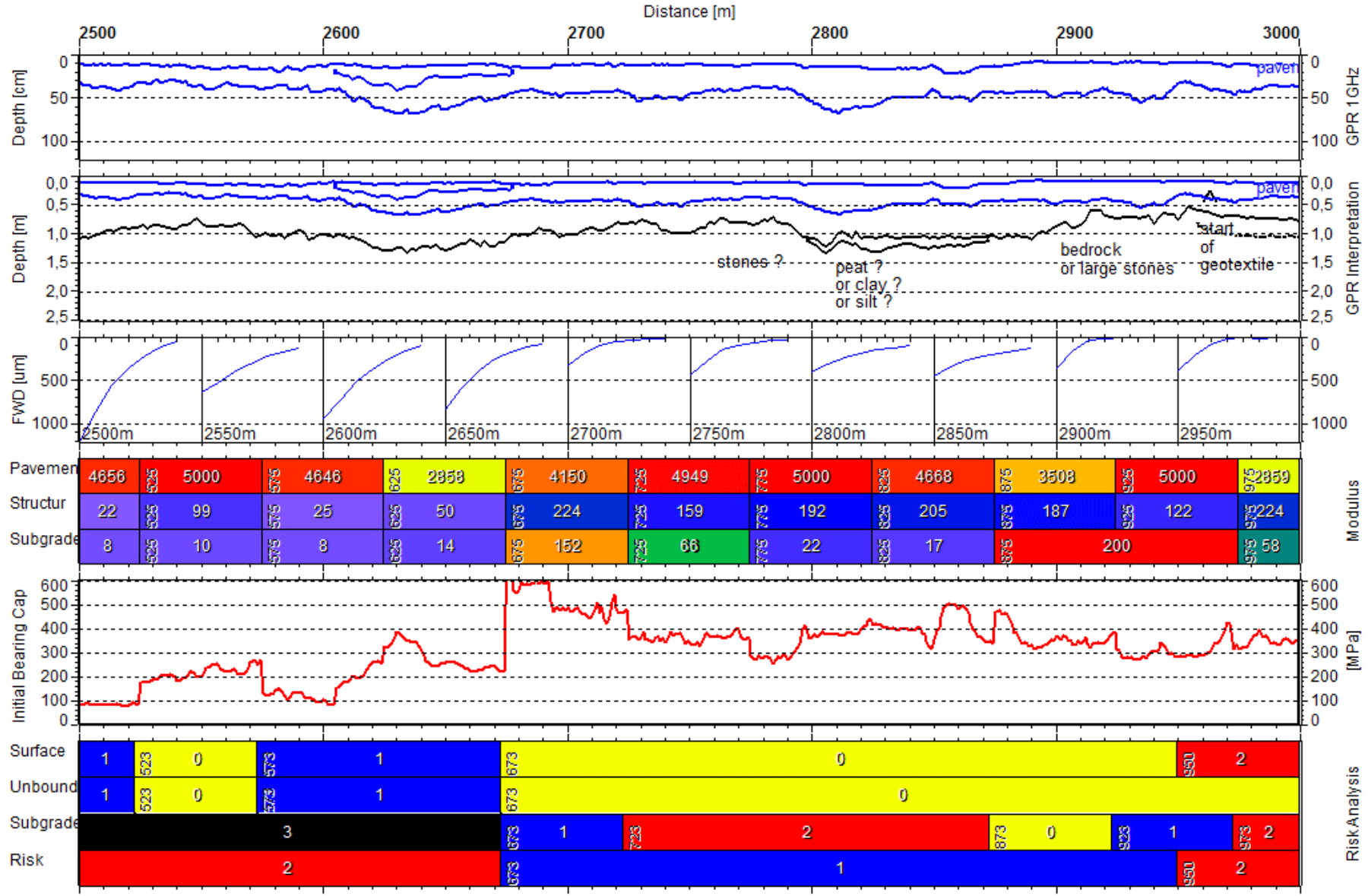


ROADEX
Implementing Accessibility



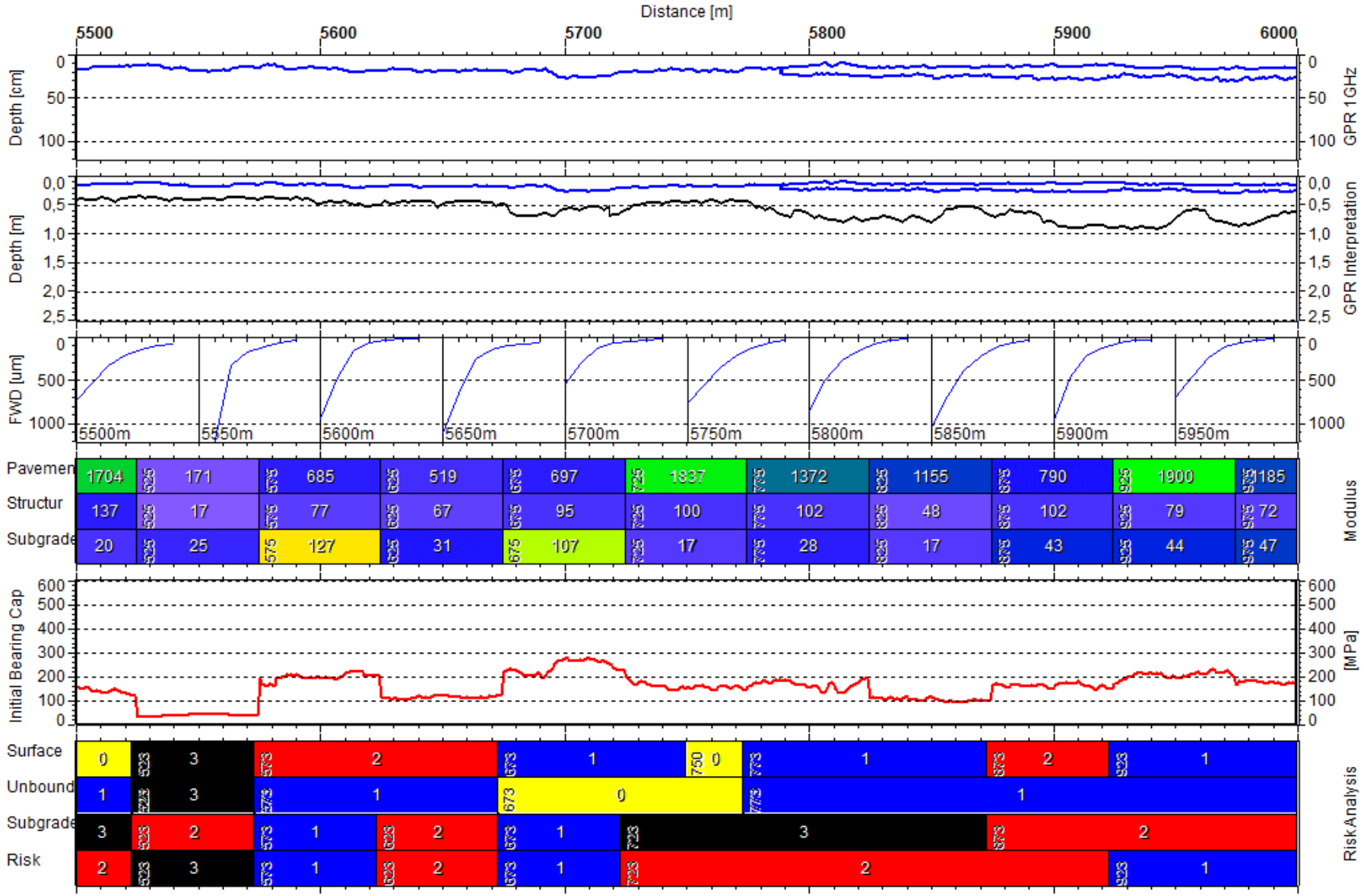
Roadscanners Oy / 2011

N56 Drumnaraw-Cashelmore Risk Analysis

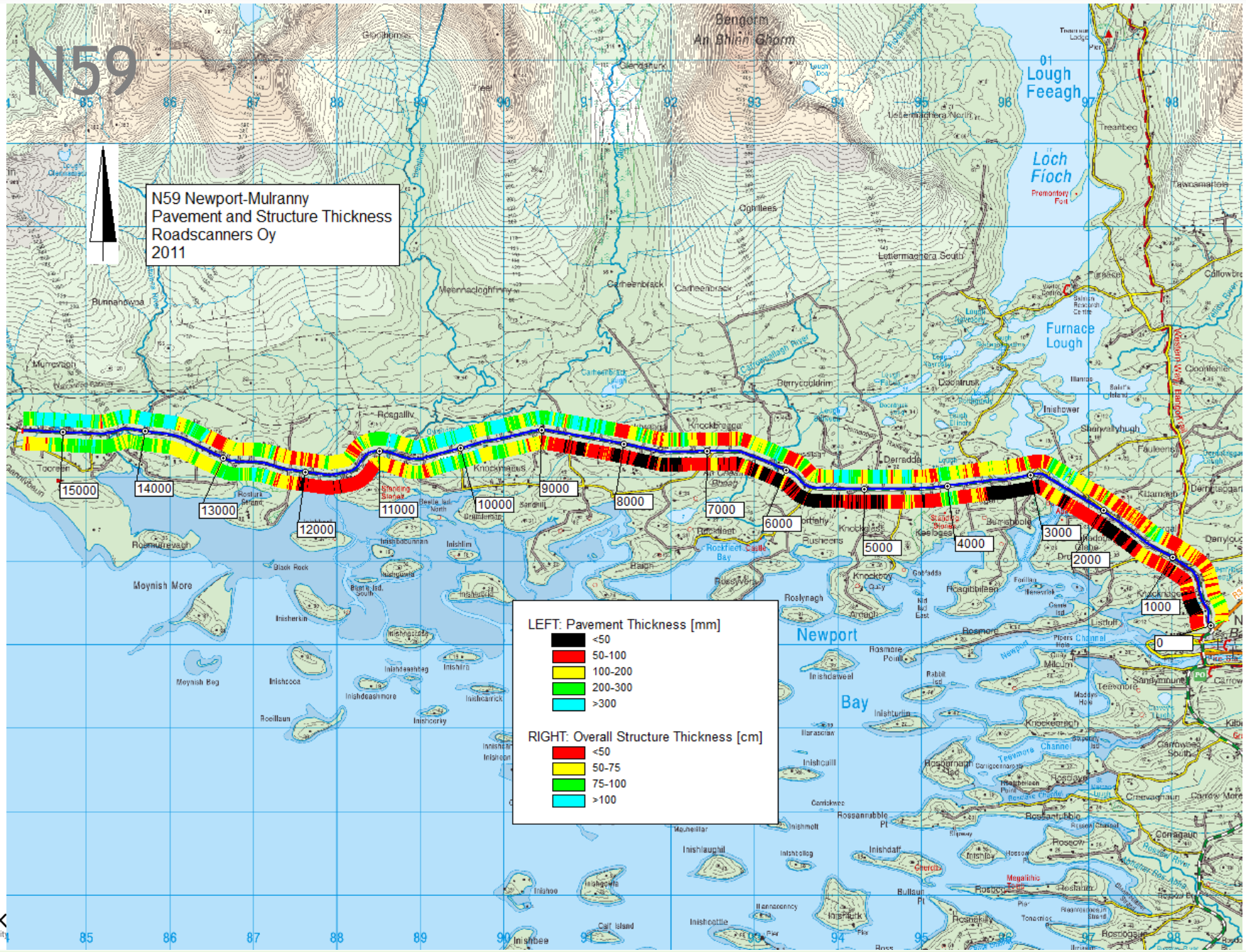


Roadscanners Oy / 2011

N56 Drumnaraw-Cashelmore Risk Analysis



Roadscanners Oy / 2011



ROADEX
Implementing Accessibility

N59

Class	Evaluation
0.	No immediate risk for major pavement failure. Local pavement cracking and an increase in rut depth may occur.
1.	Pavement failure and rutting may occur but only after continued heavy transportation. Initially these failures will focus on sites where the bound layers are deteriorating or are debonded.
2.	Pavement distress (rutting and cracking) will be seen in the road a short time after heavy transport starts, but they should not cause immediate problems for road users.
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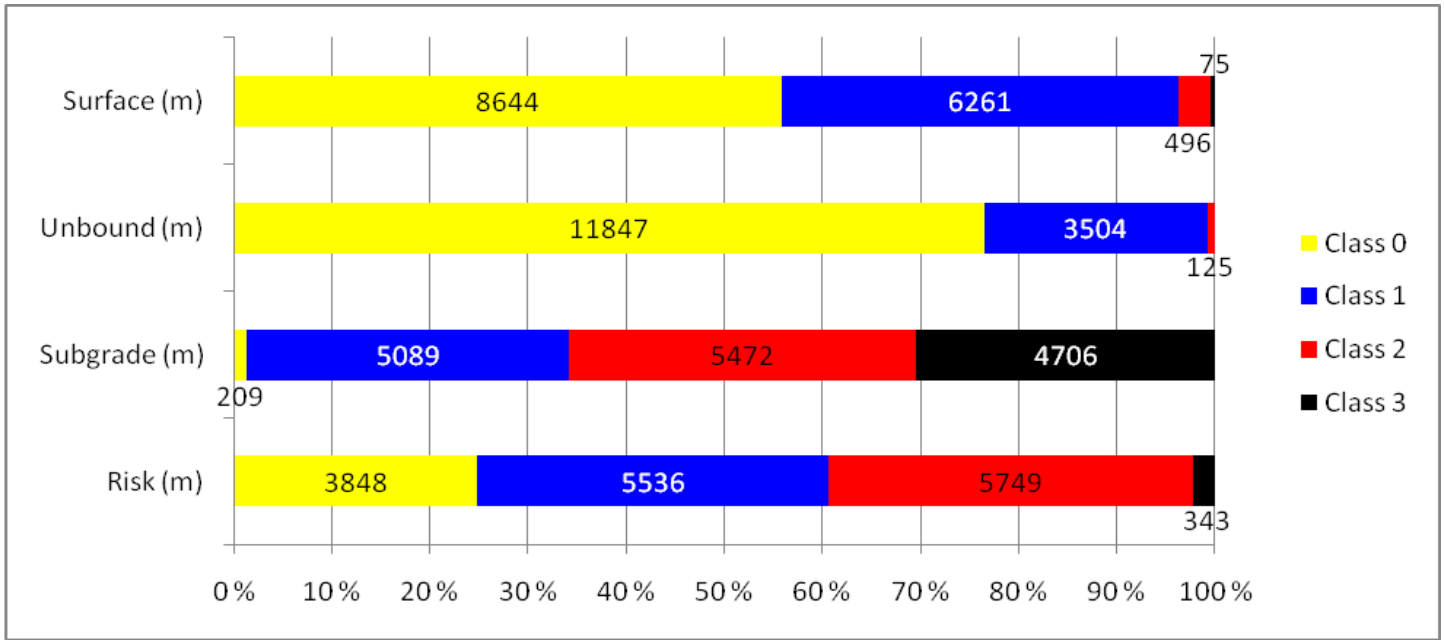
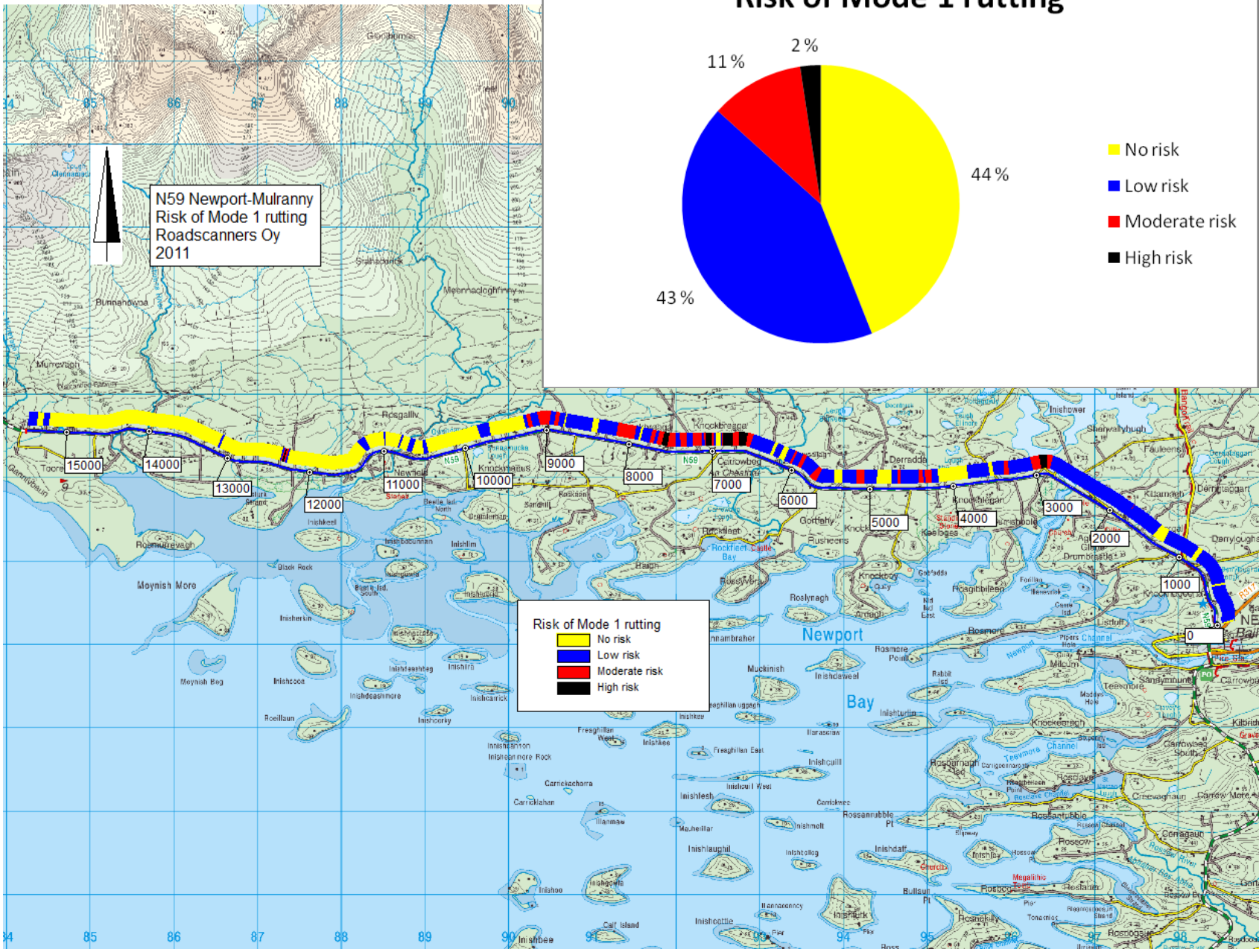


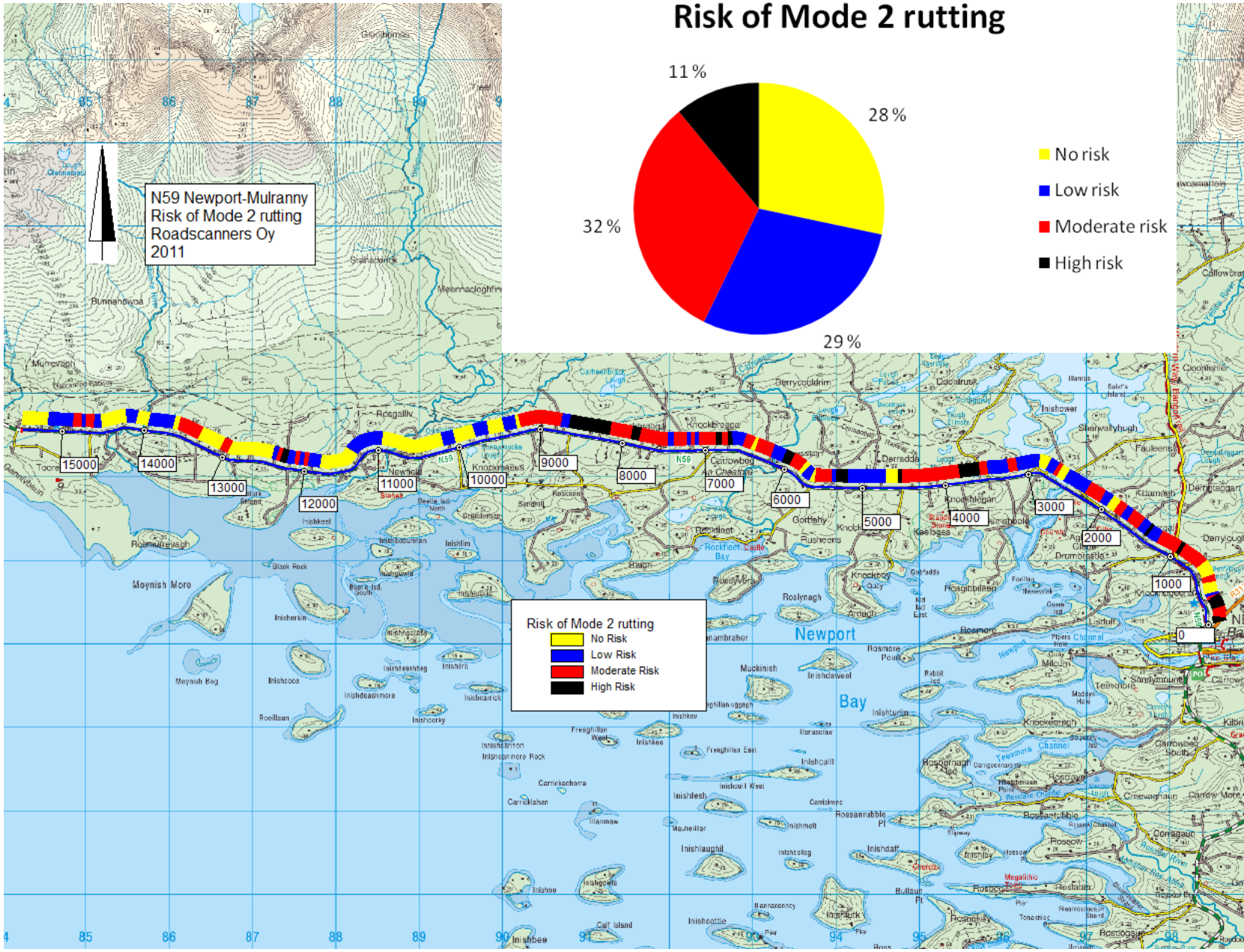
ROADEX
Implementing Accessibility

N59



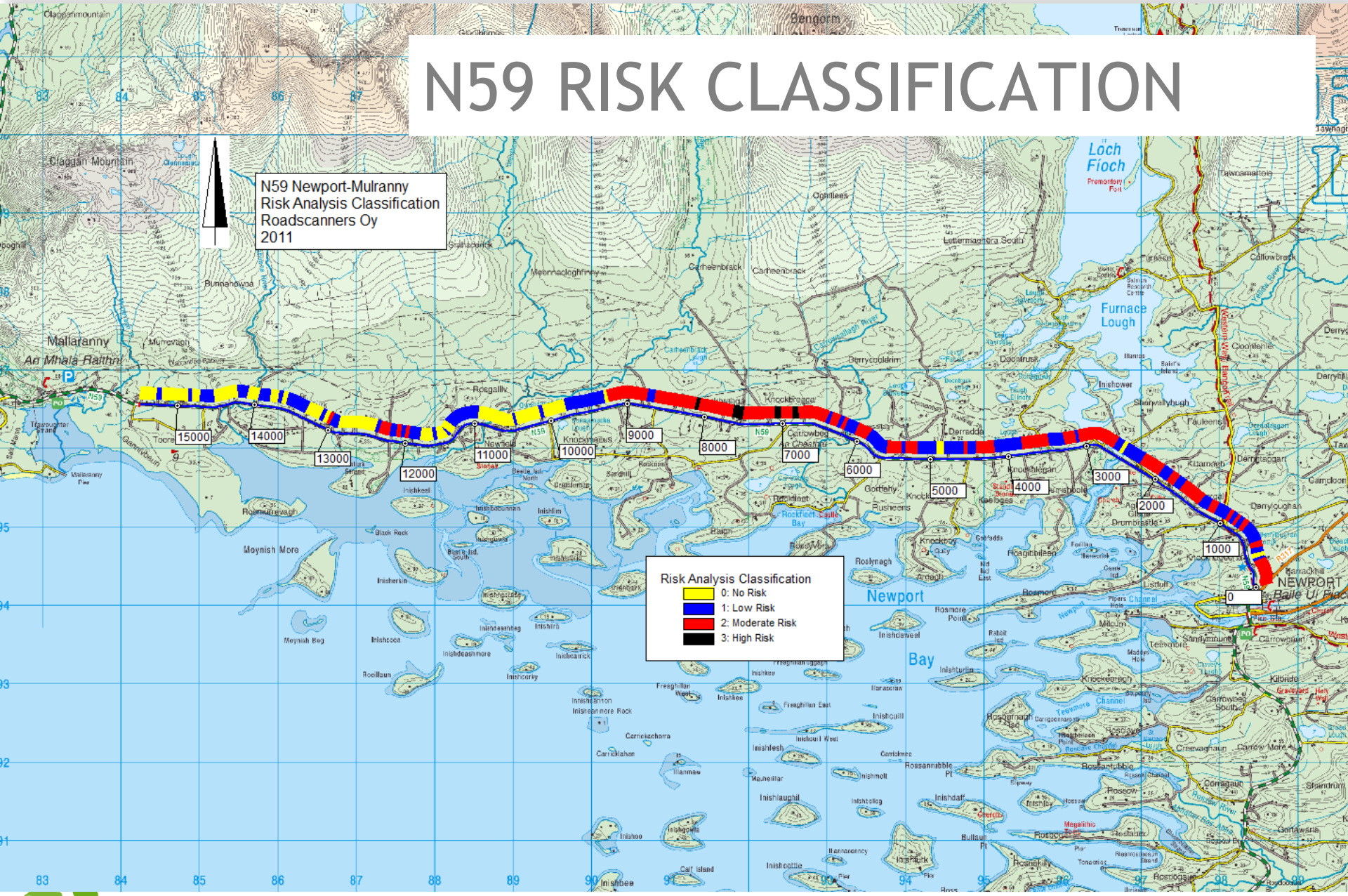
ROADEX
Implementing Accessibility

N59

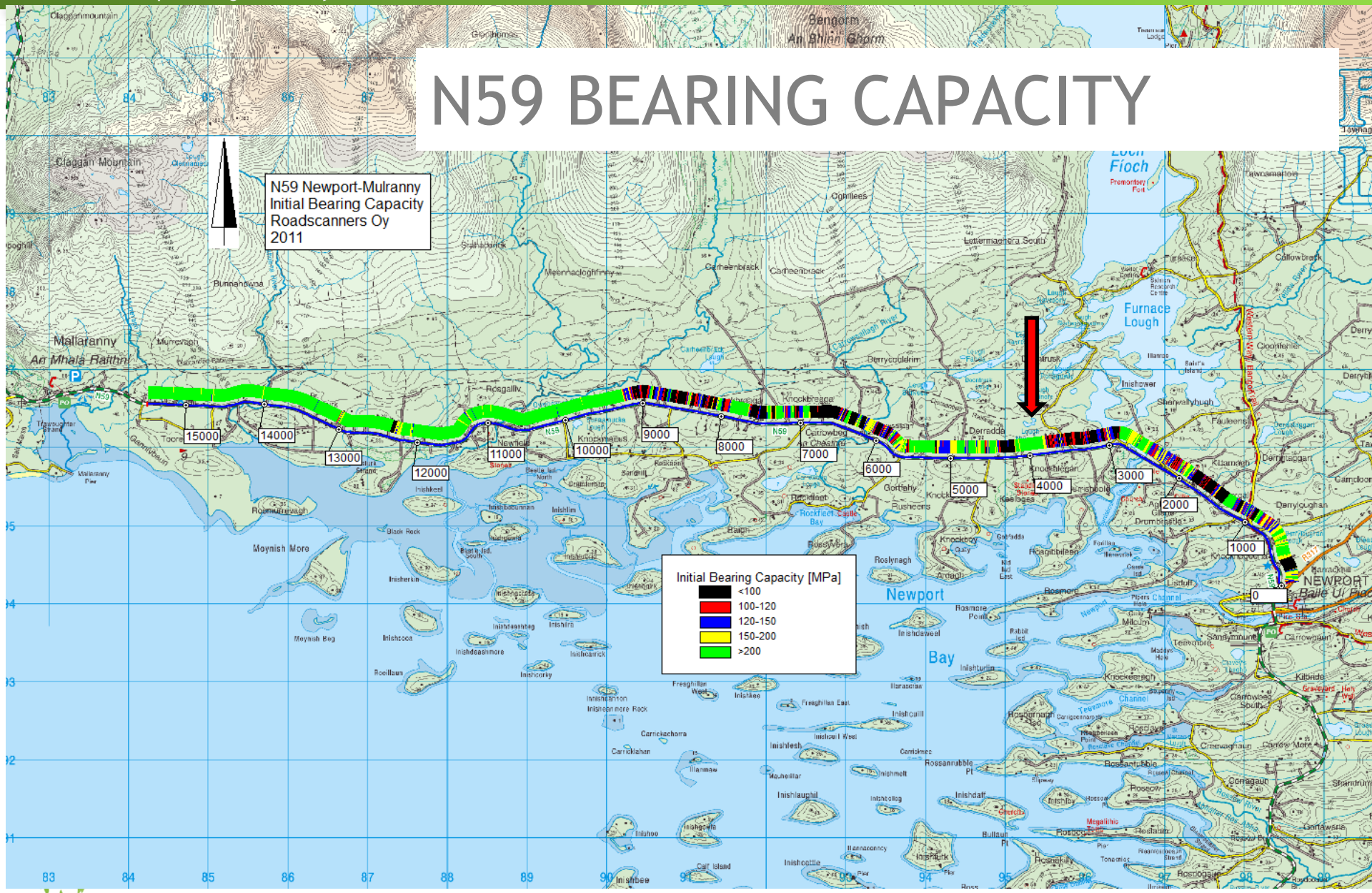


ROADEX
Implementing Accessibility

N59 RISK CLASSIFICATION



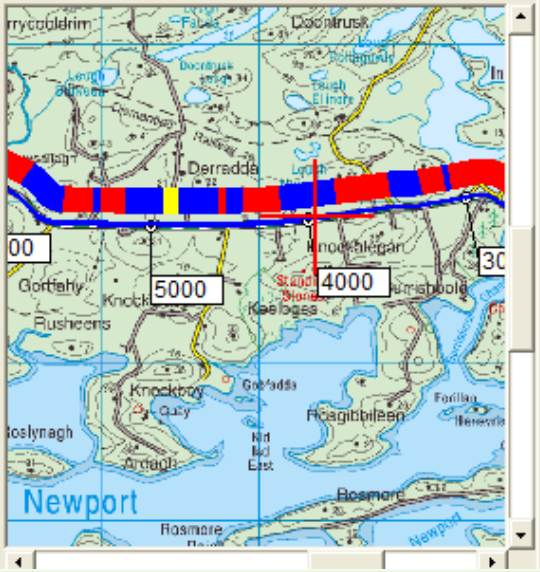
N59 BEARING CAPACITY

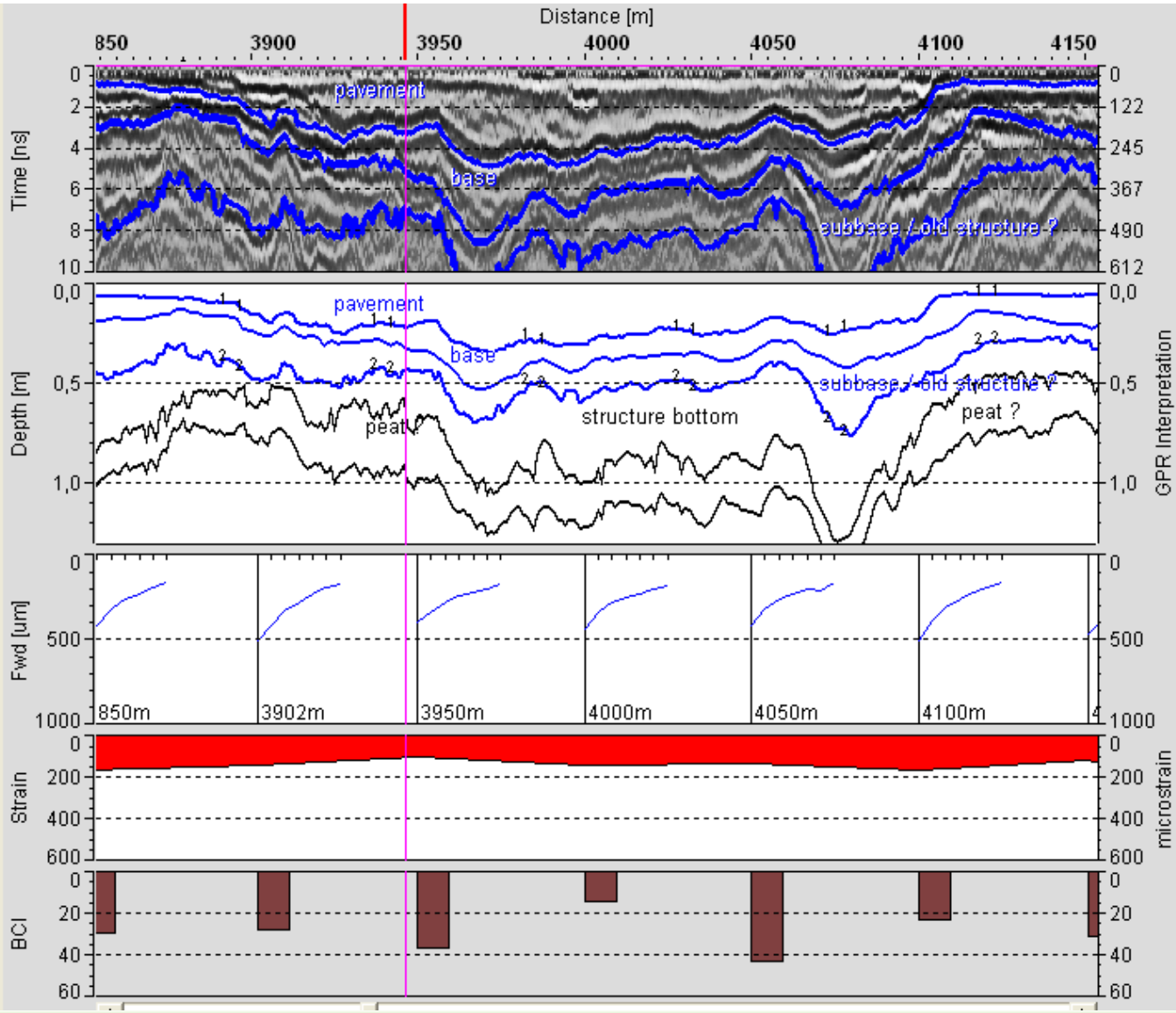


ROADEX
Implementing Accessibility

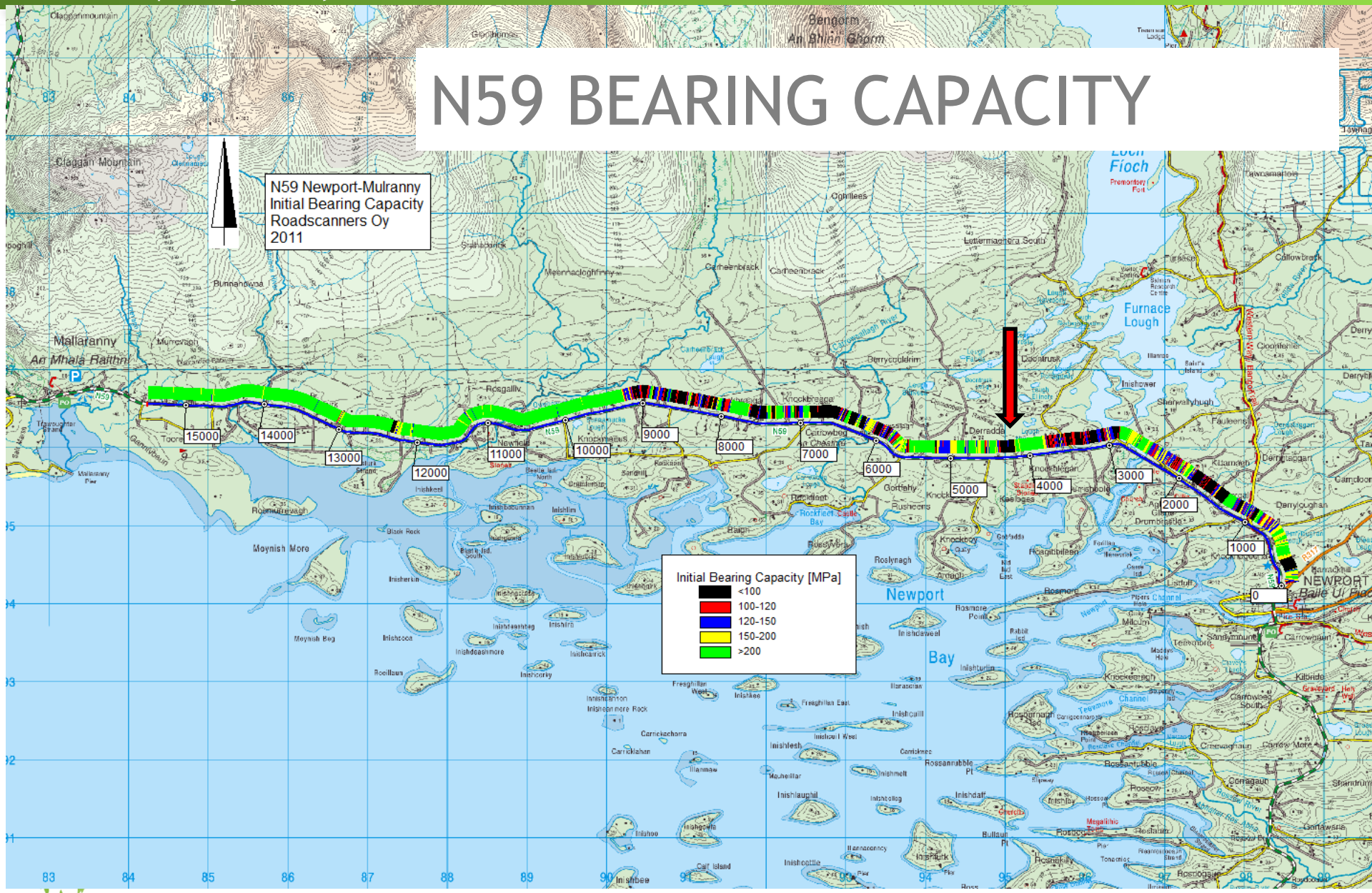
N59: 3945 m

Paused
05:45
3946,56m


5000
4000
Newport


Distance [m]
850
3900
3950
4000
4050
4100
4150
Time [ns]
pavement
base
subbase / old structure ?
Depth [m]
structure bottom
peat
peat ?
GPR Interpretation
Fwd [um]
850m
3902m
3950m
4000m
4050m
4100m
Strain
microstrain
BCI

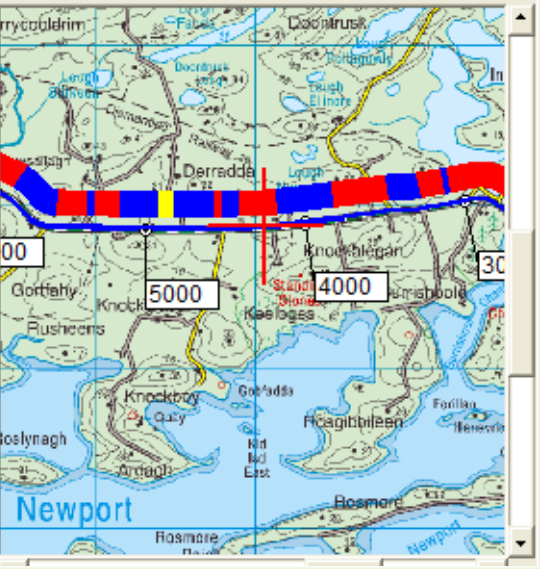
N59 BEARING CAPACITY

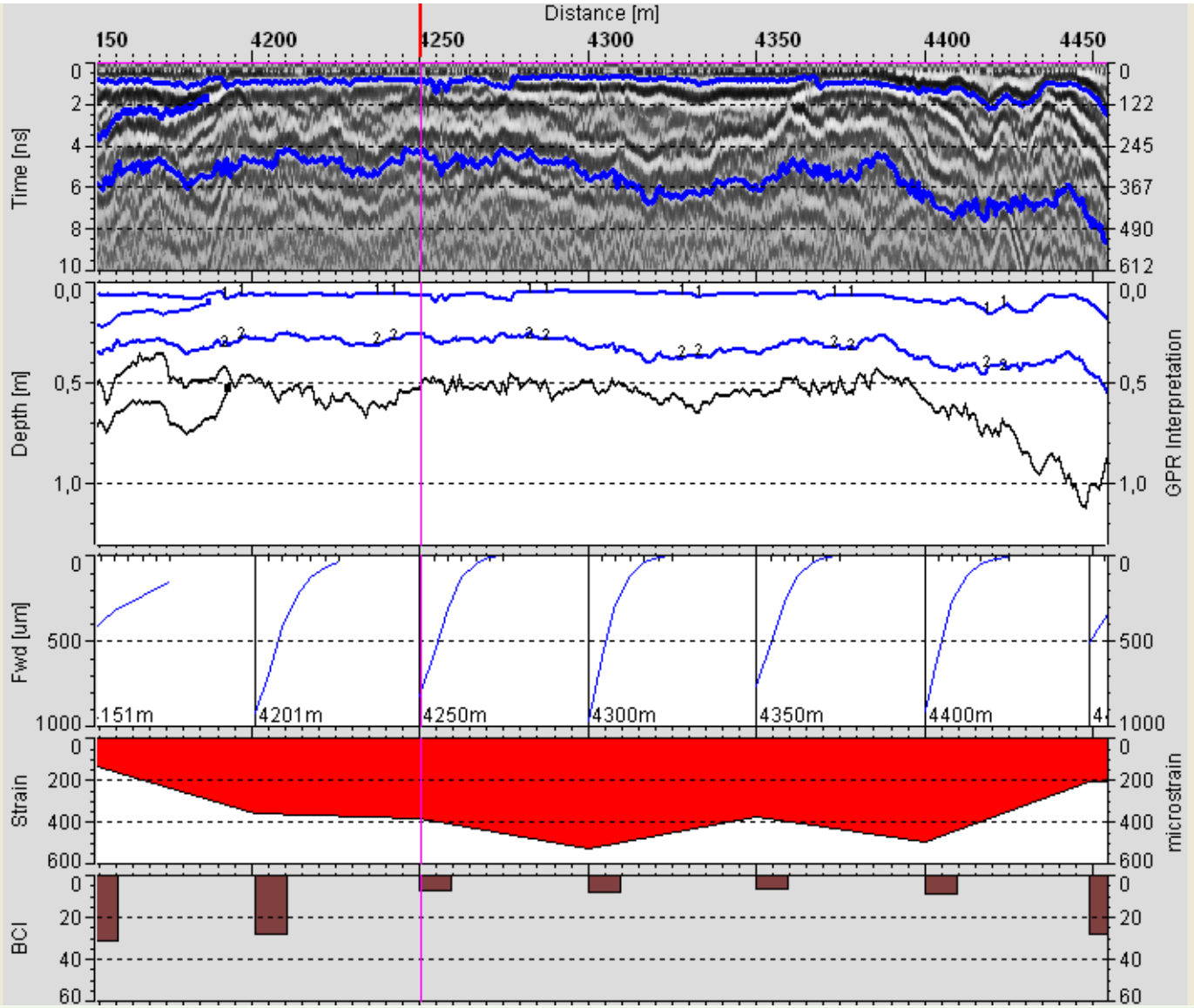


ROADEX
Implementing Accessibility

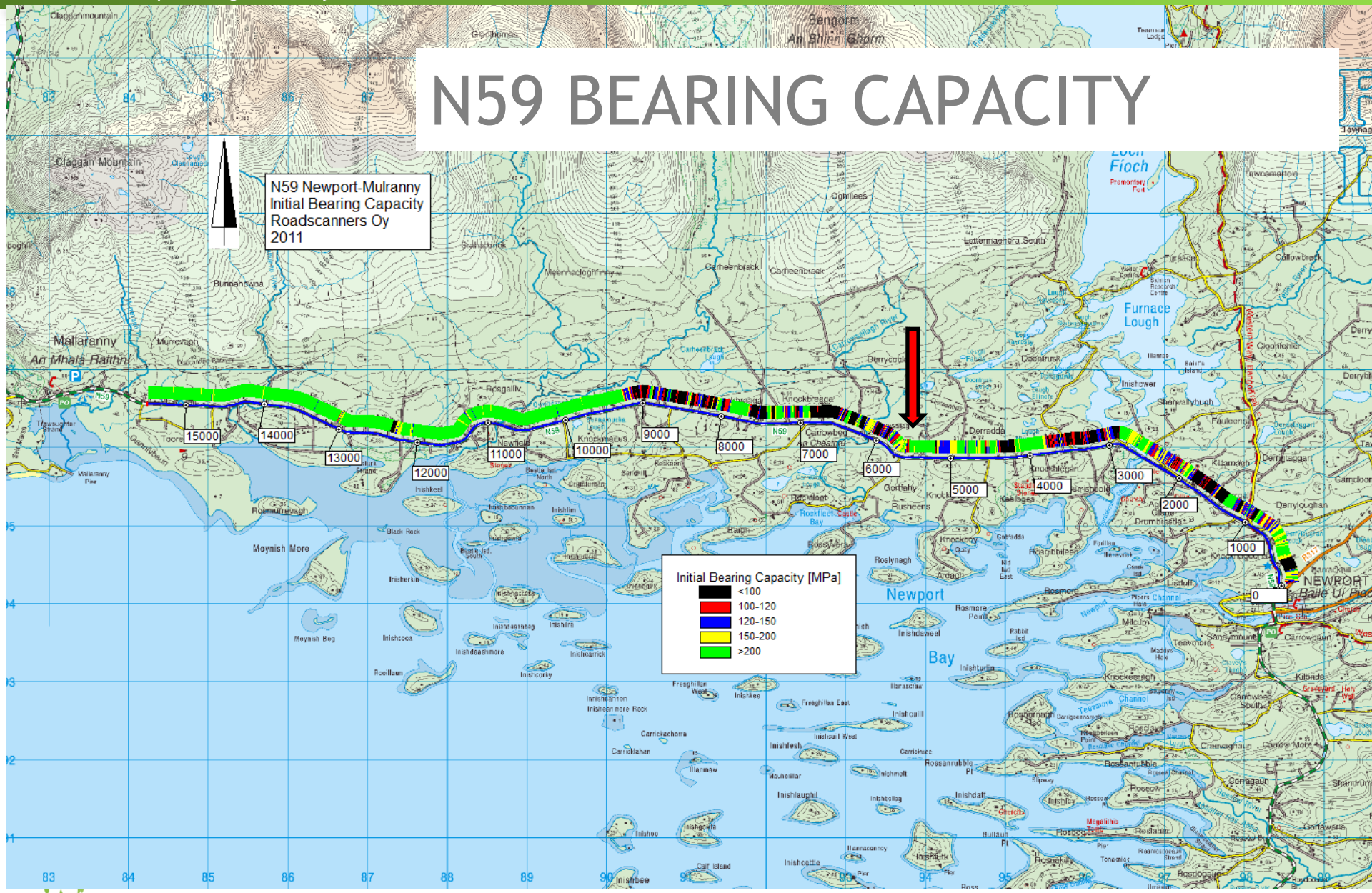
N59: 4250 m

Paused
06:05
4250,20m


Derradda
Knockbegan
Gortahy
Rusheens
Keeloges
Knockboy
Roagibbleen
Rosmore
Newport
5000
4000


Distance [m]
150
4200
4250
4300
4350
4400
4450
Time [ns]
Depth [m]
GPR Interpretation
Fwd [um]
151m
4201m
4250m
4300m
4350m
4400m
Strain
microstrain
BCI

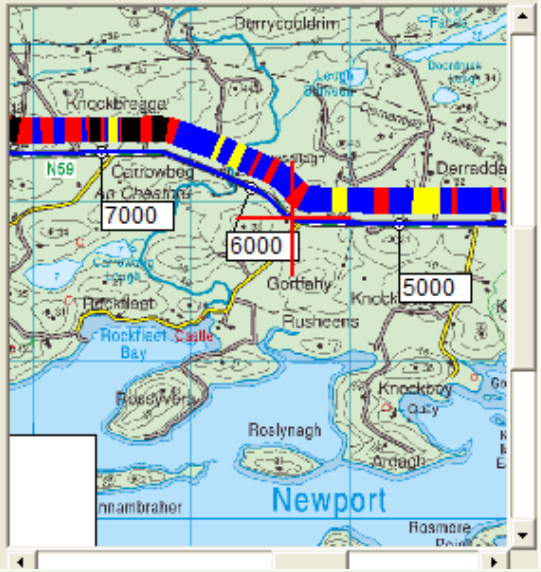
N59 BEARING CAPACITY

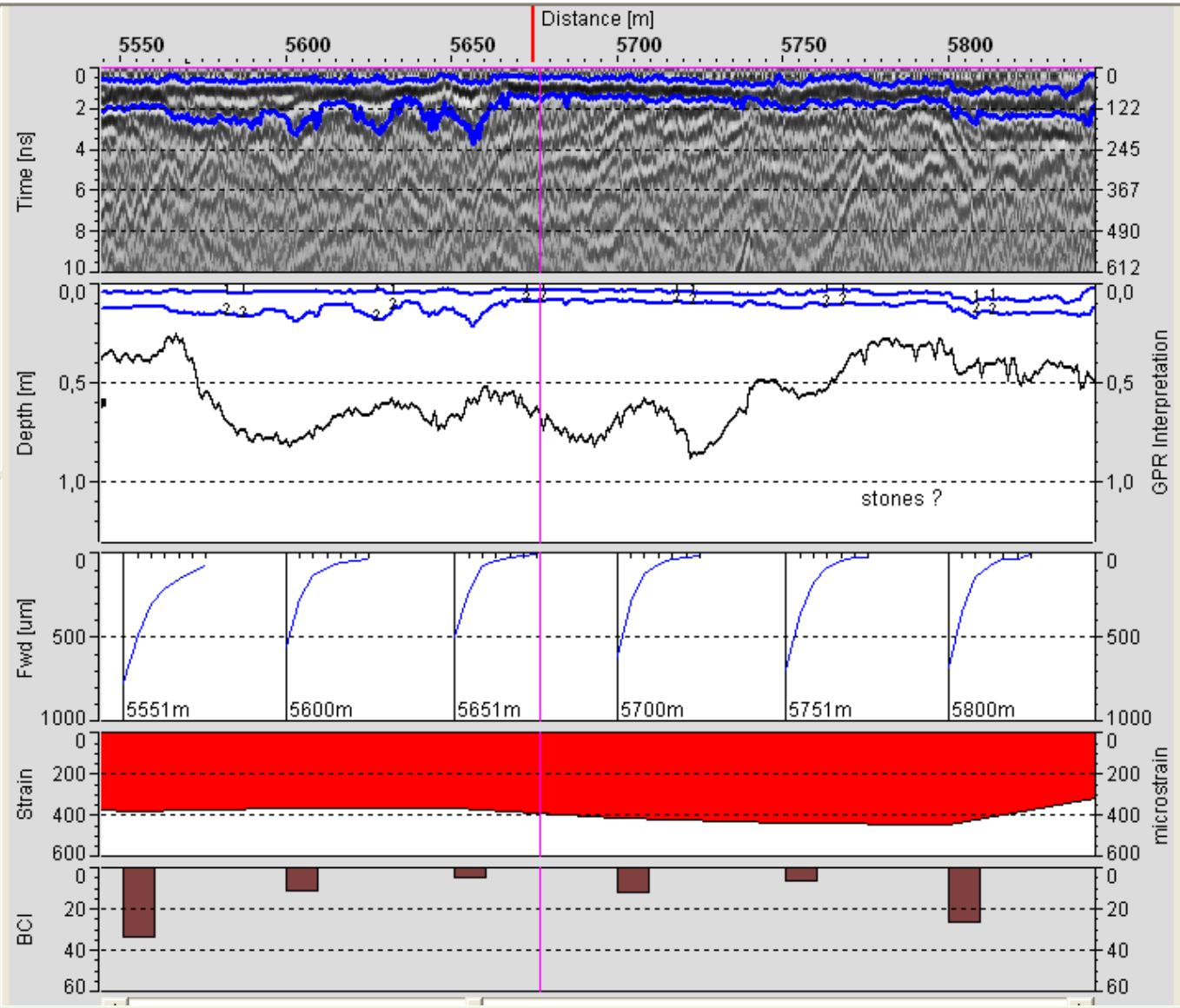


ROADEX
Implementing Accessibility

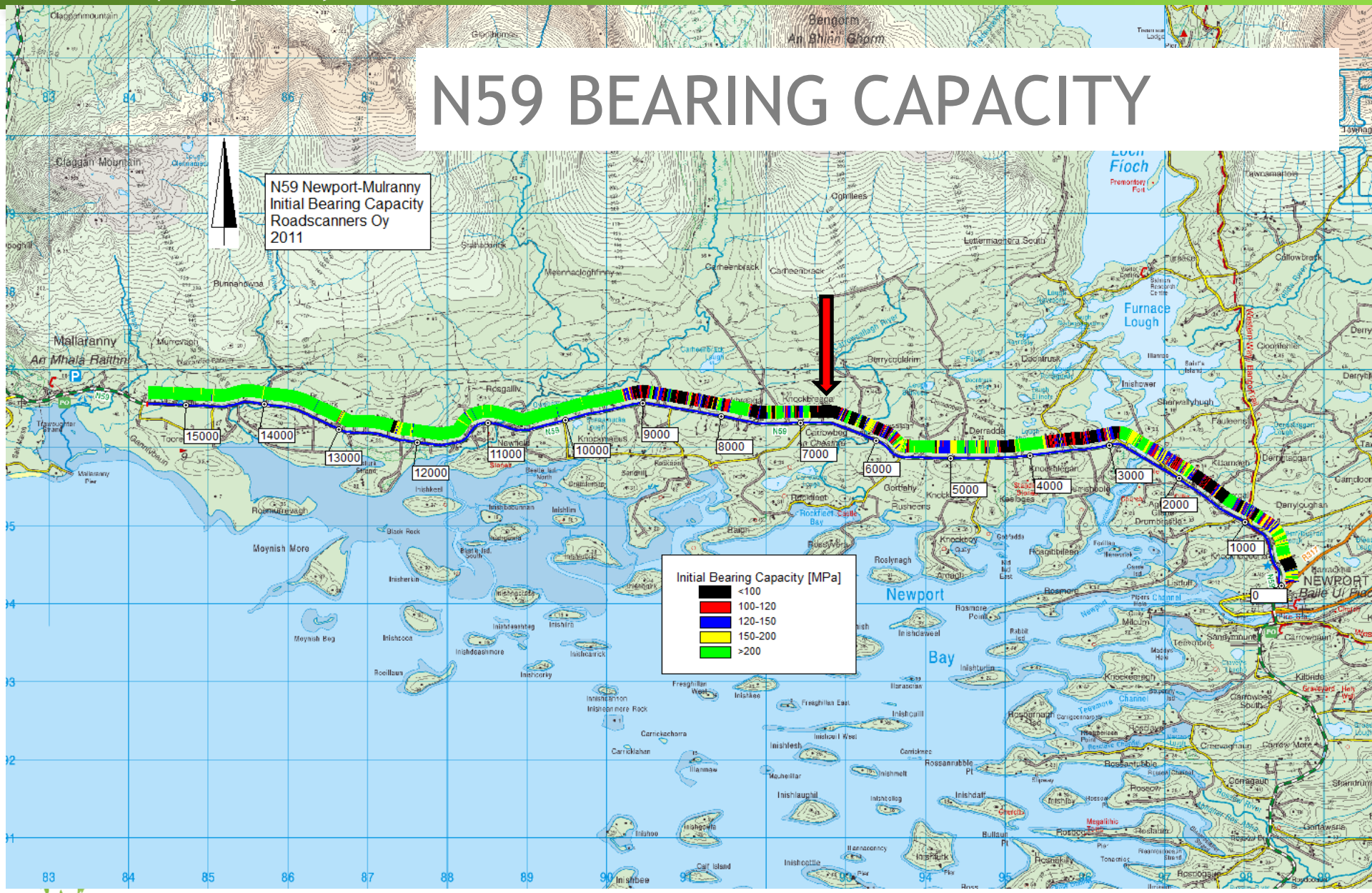
N59: 5670 m

Paused
0/:42
5674,84m


Berrycoldrim
Knocklireagh
N59
Carrowbeg
An Cheathrú
Derradda
7000
6000
5000
Gortlahy
Rockfleet
Rockfleet Castle
Bay
Rushcons
Knockboy
Roslynagh
Ardagh
Newport
Rosmore


Distance [m]
5550
5600
5650
5700
5750
5800
Time [ns]
0
2
4
6
8
10
0
122
245
367
490
612
Depth [m]
0,0
0,5
1,0
stones ?
GPR Interpretation
Fwd [um]
0
500
1000
5551m
5600m
5651m
5700m
5751m
5800m
Strain
0
200
400
600
microstrain
BCI
0
20
40
60

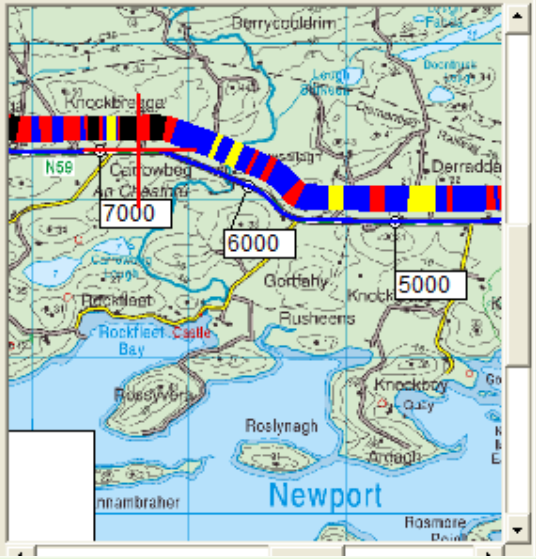
N59 BEARING CAPACITY

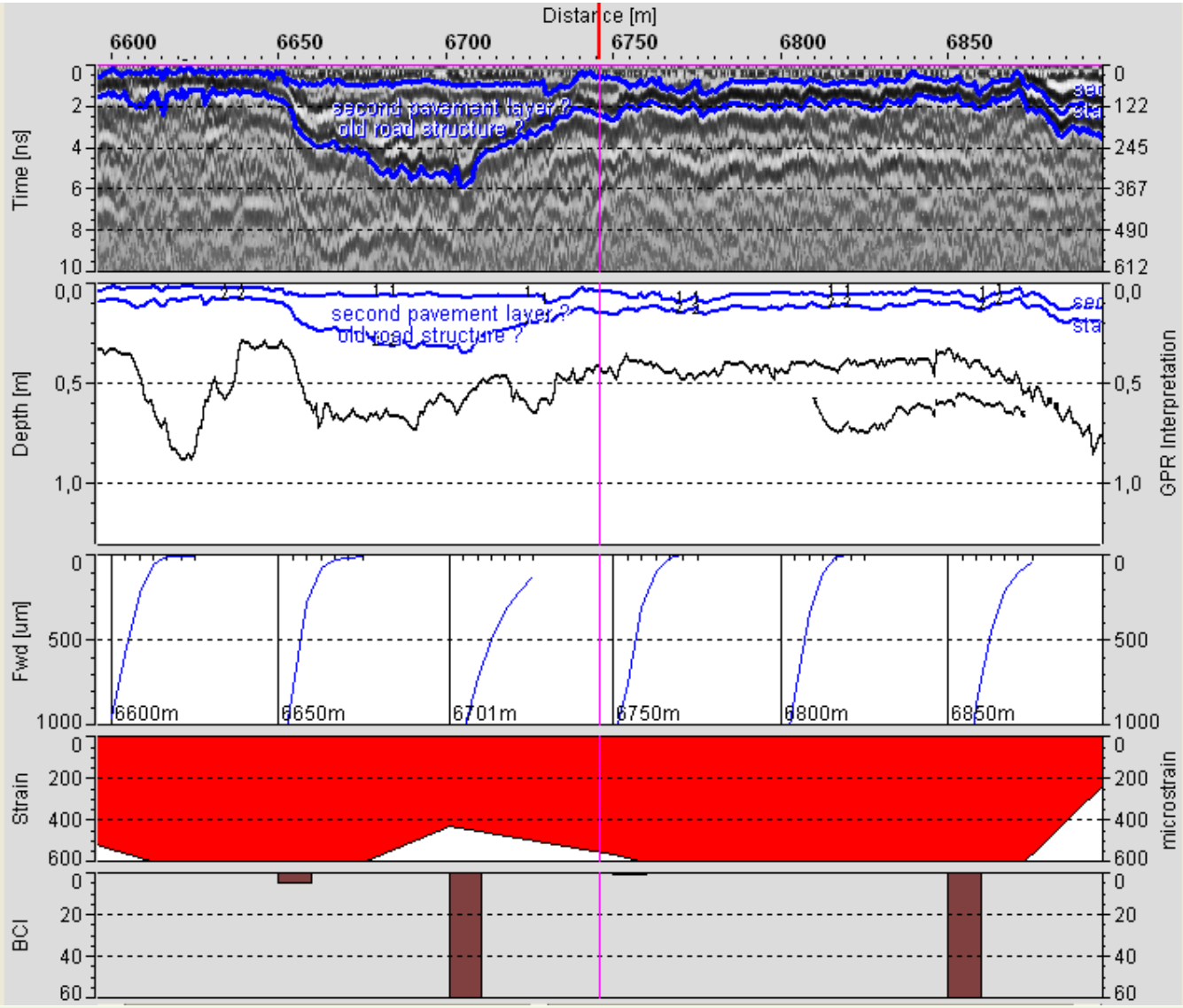


ROADEX
Implementing Accessibility

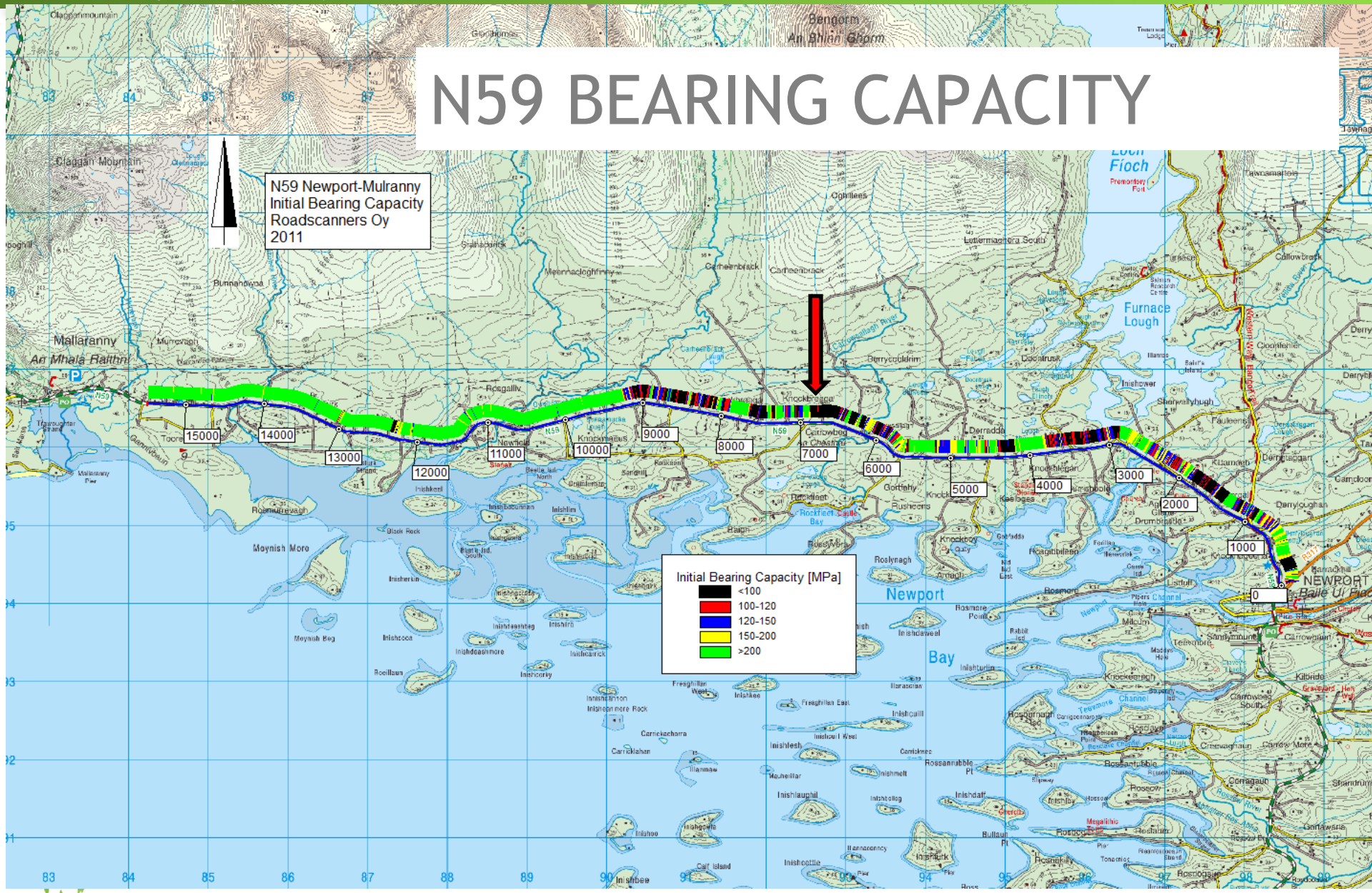
N59: 6745 m

Paused
09:06
6745,60m


Berrycooldrim
Knockbrege
N59
Carrowbeg
An Cheathrú
Derradda
7000
6000
5000
Gortahy
Rushcons
Rockfleet Castle
Bay
Knockboy
Roslynagh
Newport
Rosmore


Distance [m]
6600
6650
6700
6750
6800
6850
Time [ns]
second pavement layer ?
old road structure ?
Depth [m]
GPR Interpretation
Fwd [um]
6600m
6650m
6701m
6750m
6800m
6850m
Strain
microstrain
BCI

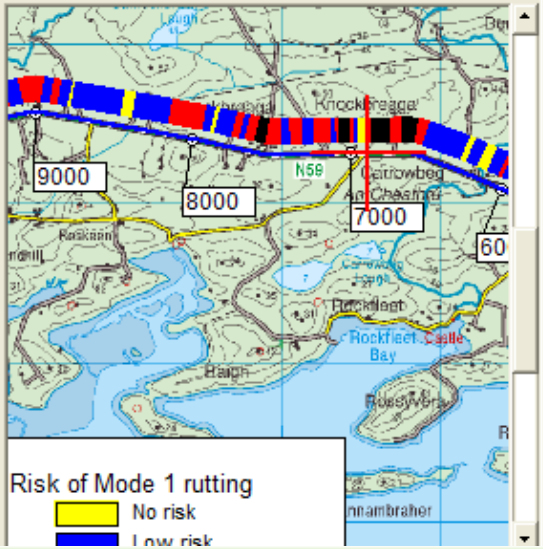
N59 BEARING CAPACITY

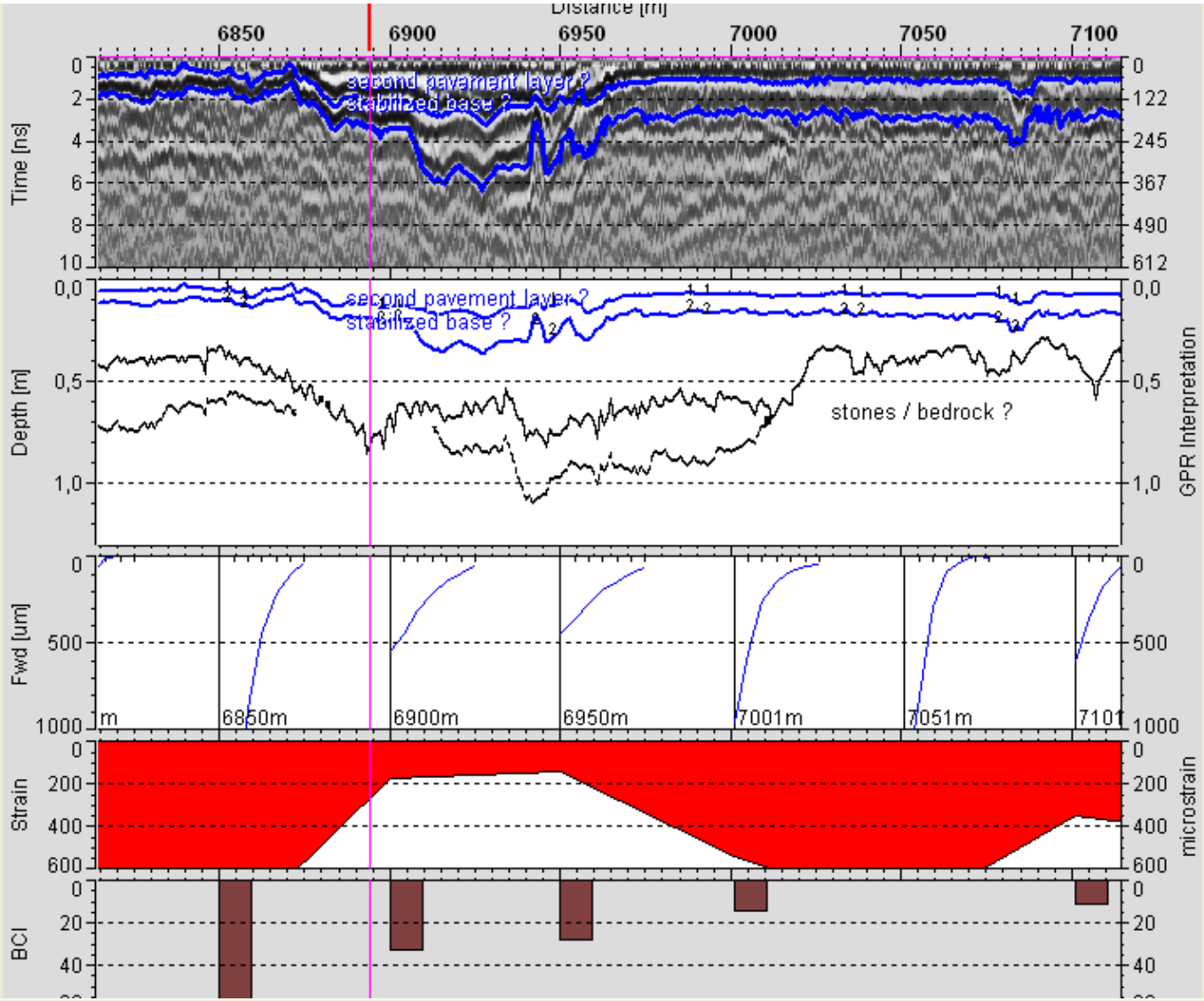


ROADEX
Implementing Accessibility

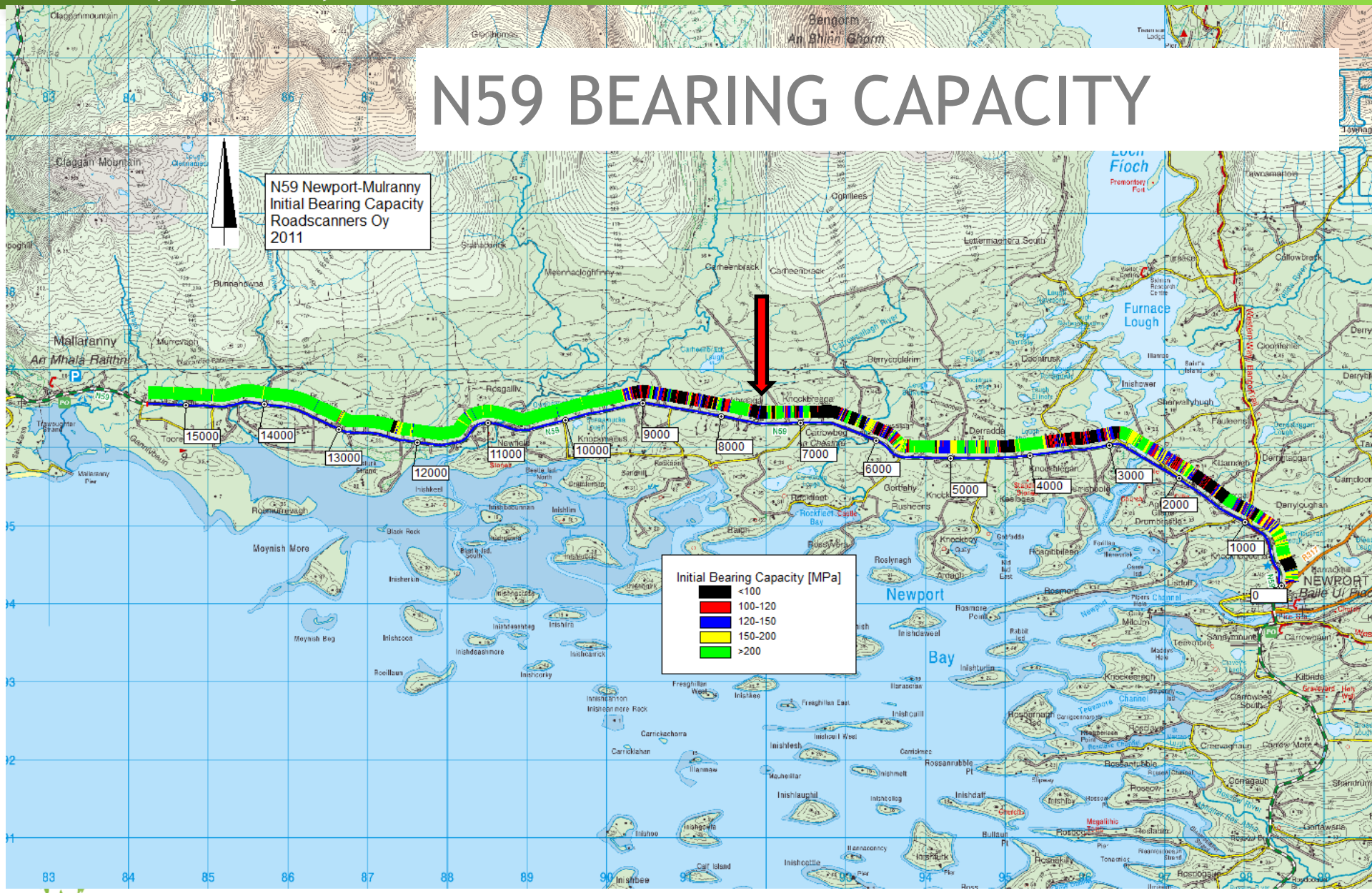
N59: 6895 m

Paused
09:18
6894,20m


9000
8000
7000
N59
Risk of Mode 1 rutting
No risk
Low risk


Distance [m]
6850
6900
6950
7000
7050
7100
Time [ns]
second pavement layer ?
stabilized base ?
Depth [m]
stones / bedrock ?
GPR Interpretation
Fwd [um]
6850m
6900m
6950m
7001m
7051m
Strain
microstrain
BCI

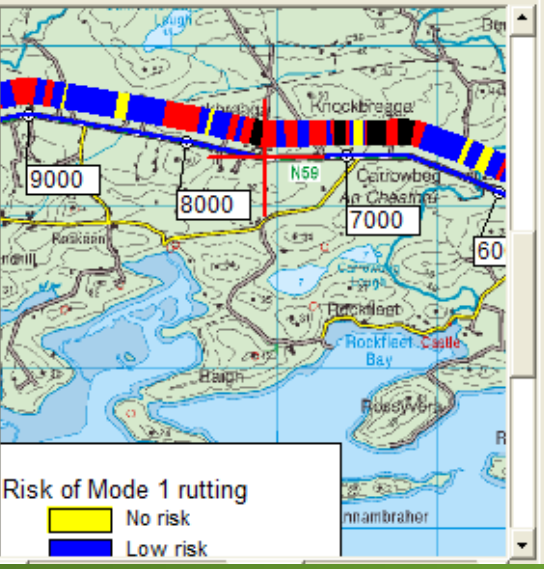
N59 BEARING CAPACITY

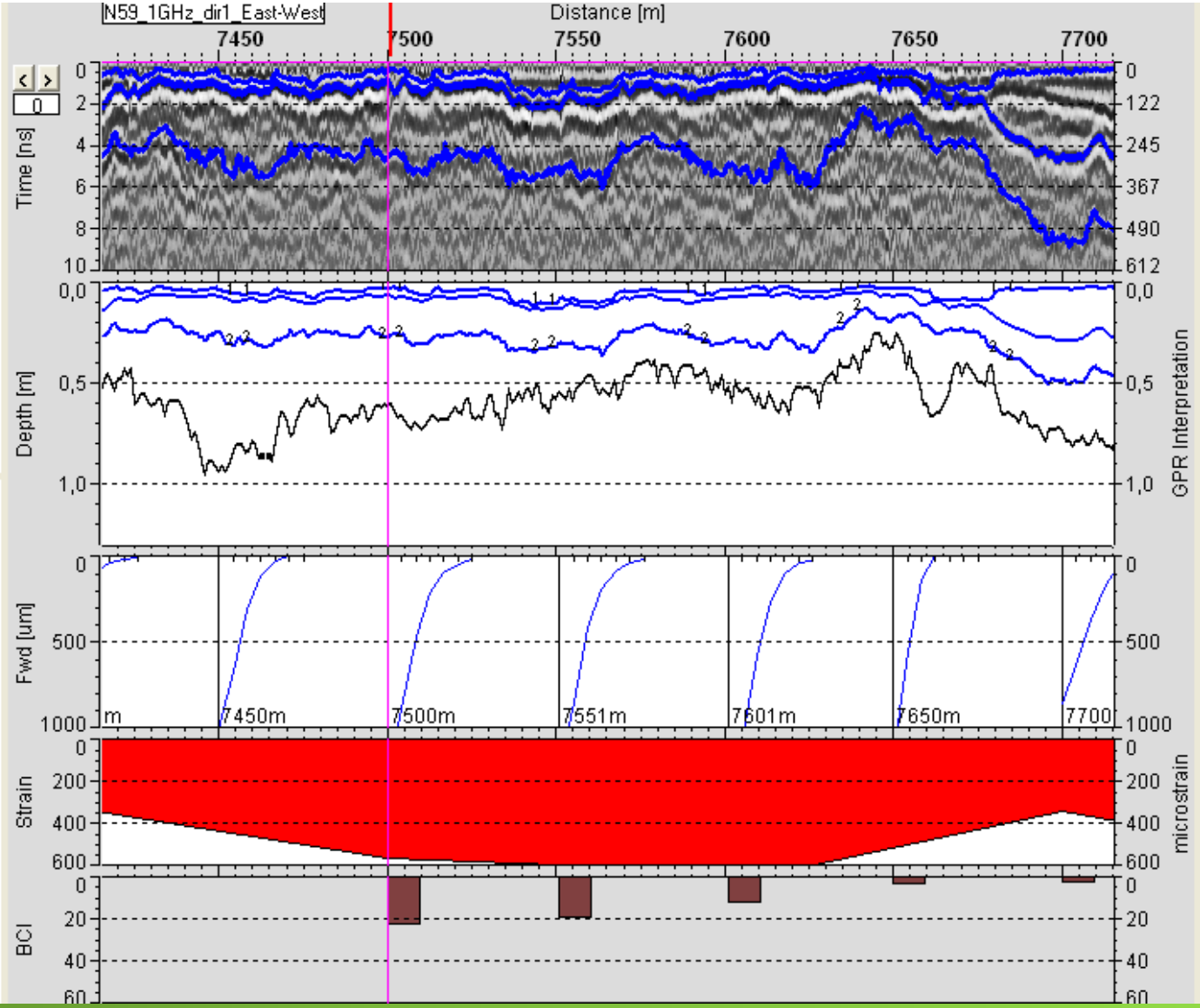


ROADEX
Implementing Accessibility

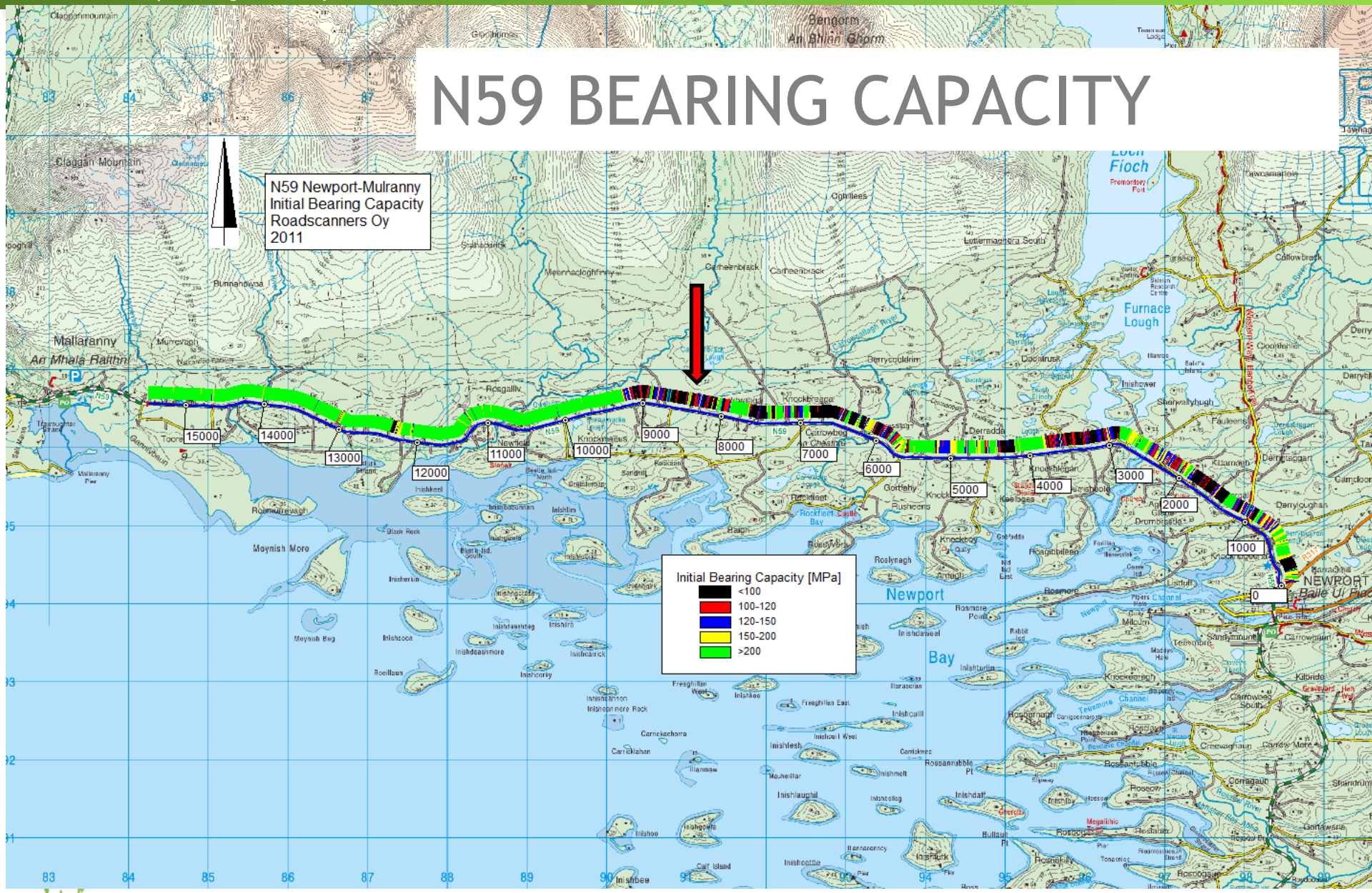
N59: 7500 m

Paused
10:08
7501,00m


9000
8000
7000
N59
Knocklegage
Cairrowbeg
An Cheathrú
Rockfleet
Rockfleet Castle
Bay
Baigh
Risk of Mode 1 rutting
No risk
Low risk


N59_1GHz_dir1_East-West
Distance [m]
7450
7500
7550
7600
7650
7700
Time [ns]
Depth [m]
GPR Interpretation
Fwd [um]
7450m
7500m
7551m
7601m
7650m
7700
Strain
microstrain
BCI

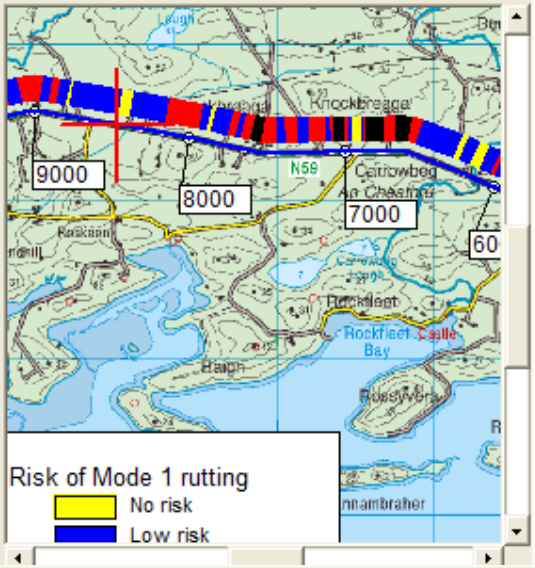
N59 BEARING CAPACITY

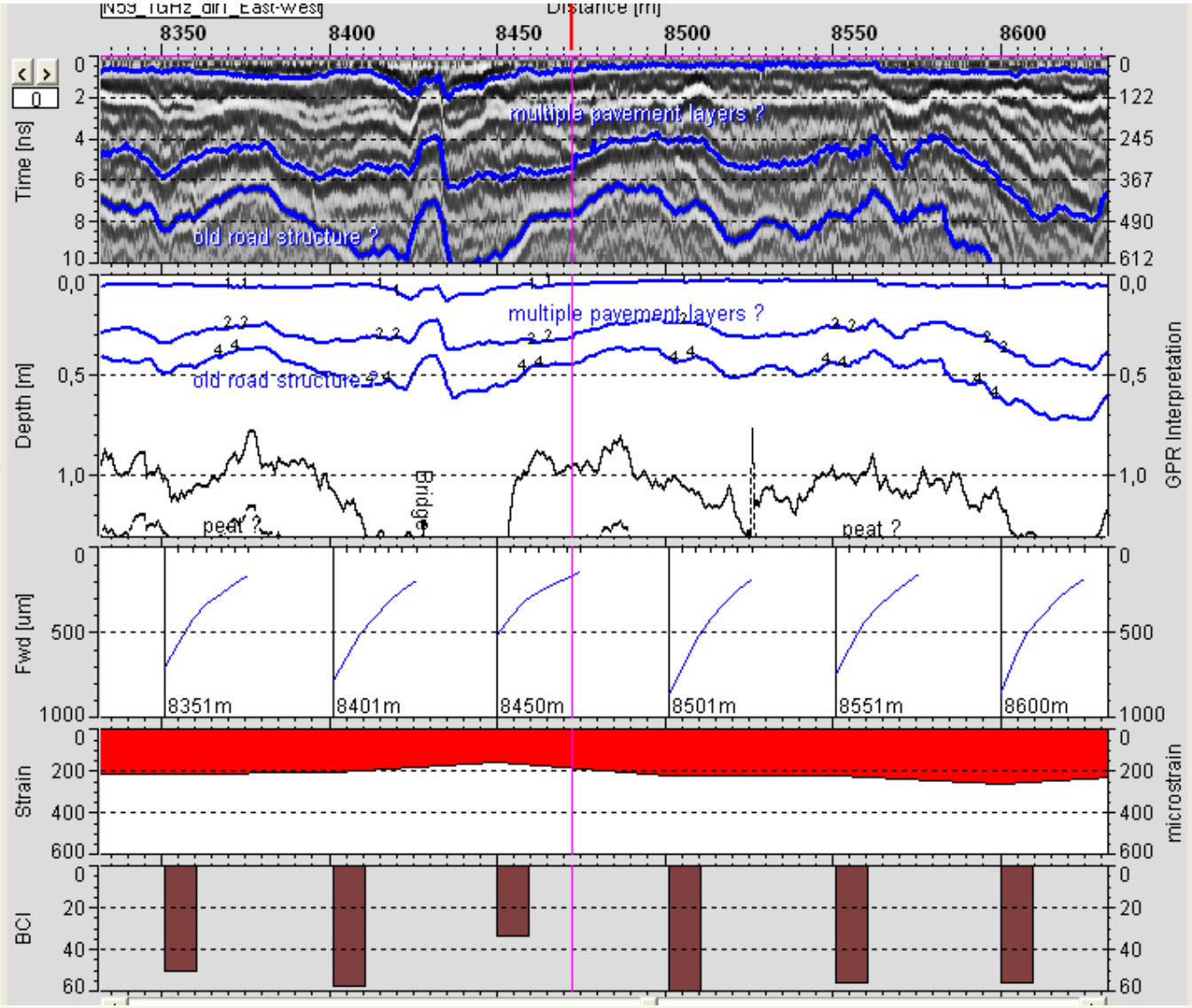


ROADEX
Implementing Accessibility

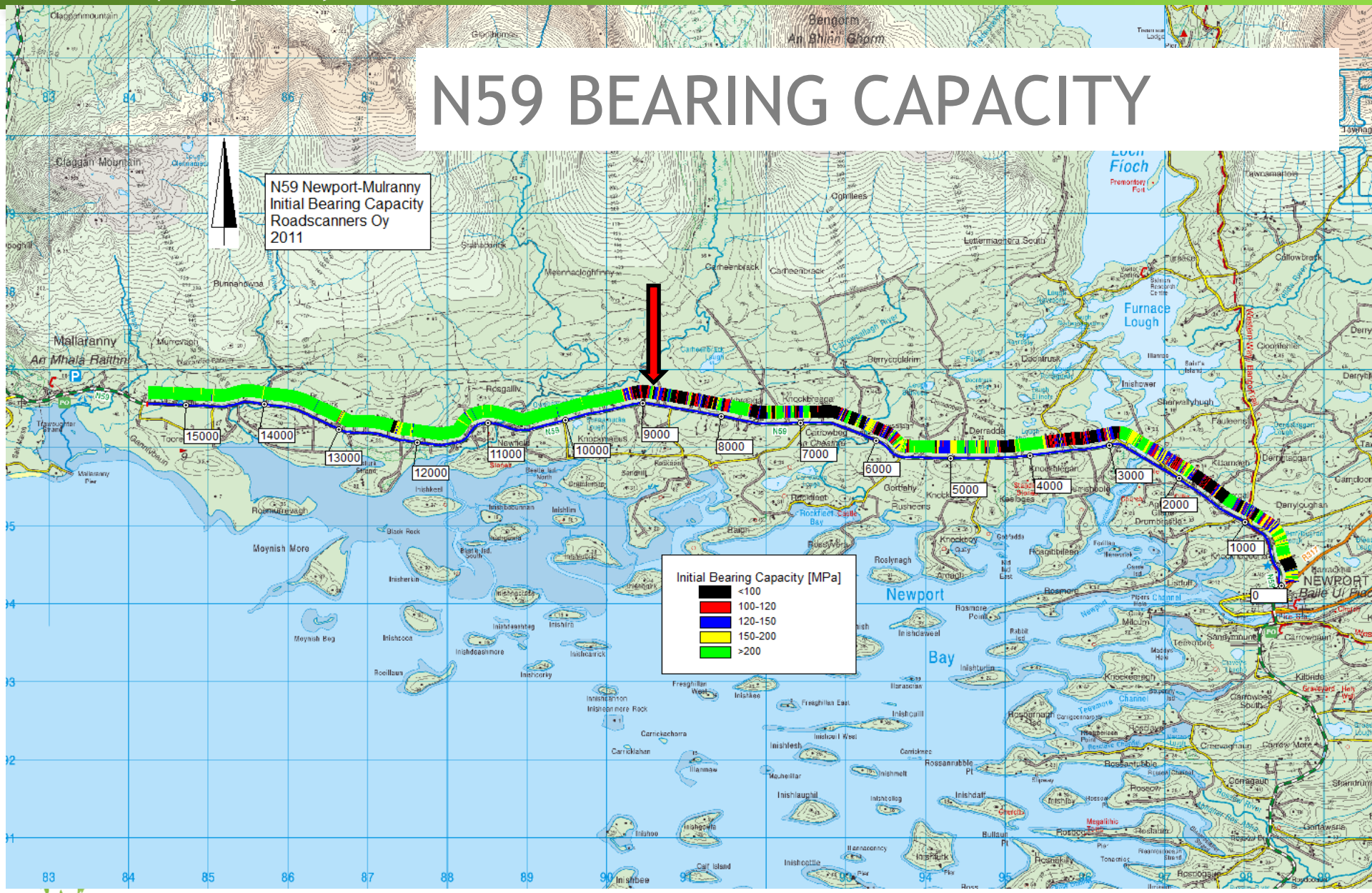
N59: 8470 m

Paused
11:40
8472,36m


9000
8000
7000
60
N59
Knocklegagh
Carrowbeg
An Cheathrú
Rockfleet
Rockfleet Castle
Bay
Rossyvera
Ballyconneely
Risk of Mode 1 rutting
No risk
Low risk


N59_1GHz_dir1_East-West
Distance [m]
8350
8400
8450
8500
8550
8600
Time [ns]
multiple pavement layers ?
old road structure ?
Depth [m]
multiple pavement layers ?
old road structure ?
peat ?
Bridge
peat ?
GPR Interpretation
Fwd [um]
8351m
8401m
8450m
8501m
8551m
8600m
Strain
microstrain
BCI

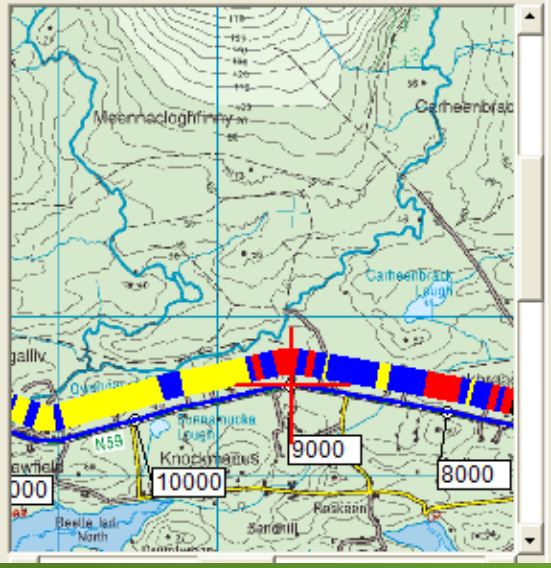
N59 BEARING CAPACITY

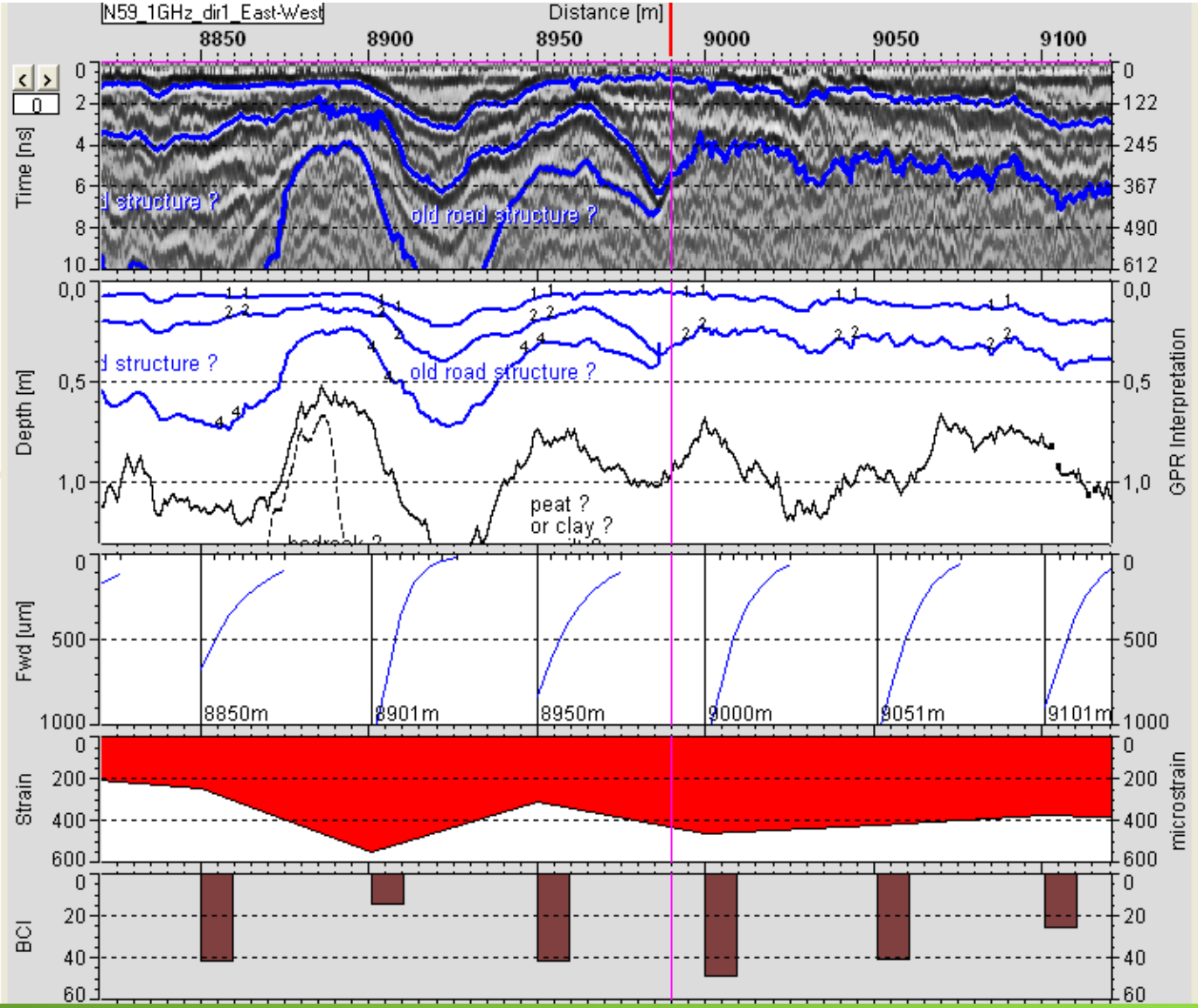


ROADEX
Implementing Accessibility

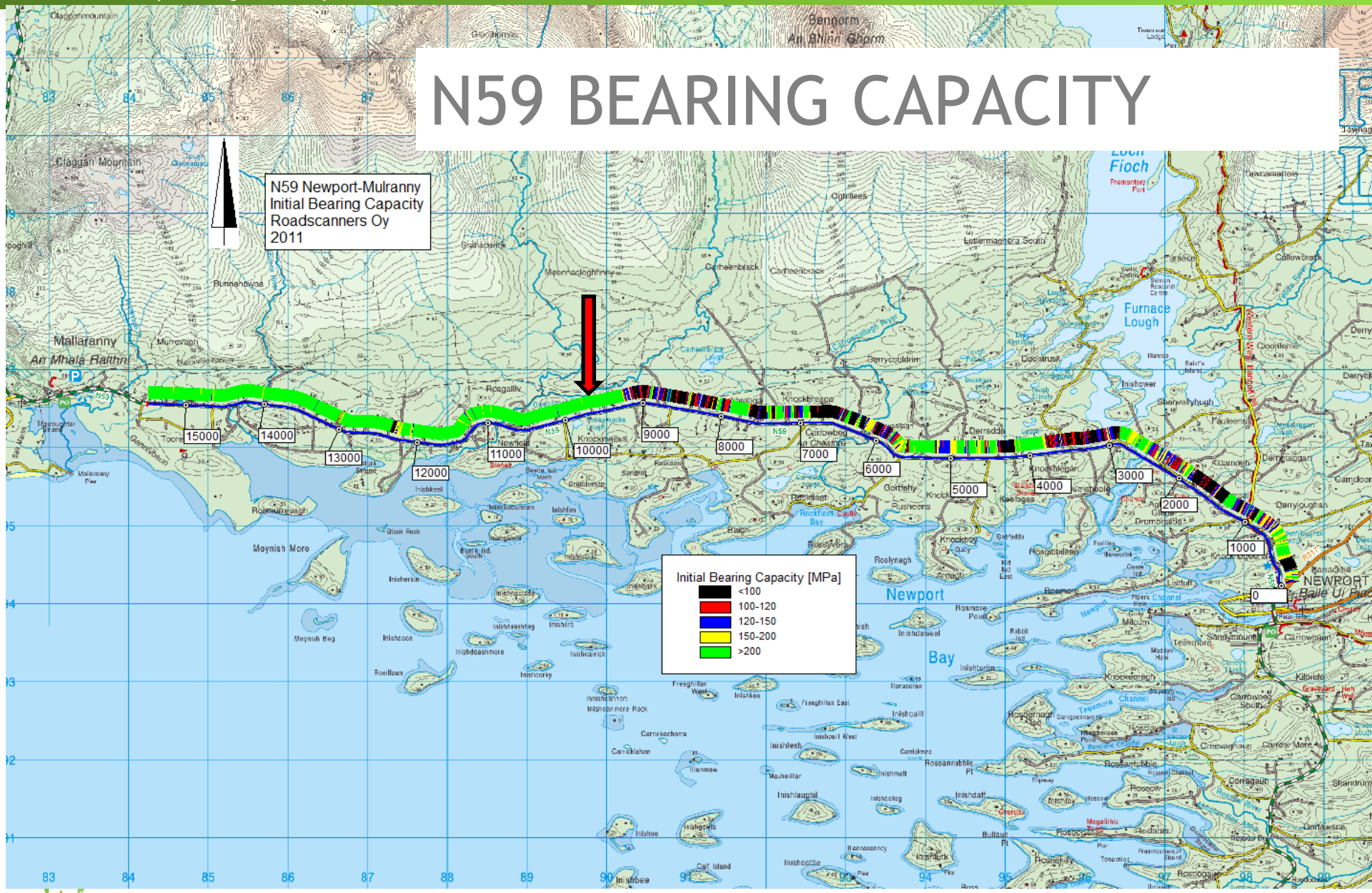
N59: 8990 m

Paused
12:18
8990,12m


9000
10000
8000
N59


N59_1GHz_dir1_East-West
Distance [m]
8850
8900
8950
9000
9050
9100
Time [ns]
d structure ?
old road structure ?
Depth [m]
d structure ?
old road structure ?
peat ?
or clay ?
GPR Interpretation
Fwd [um]
8850m
8901m
8950m
9000m
9051m
9101m
Strain
microstrain
BCI

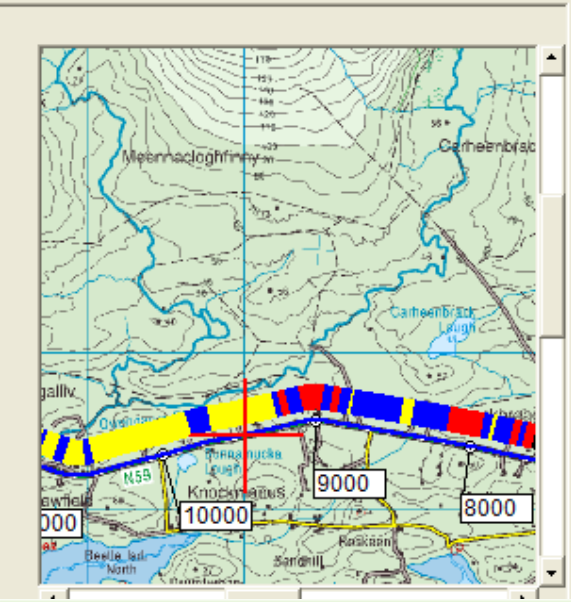
N59 BEARING CAPACITY

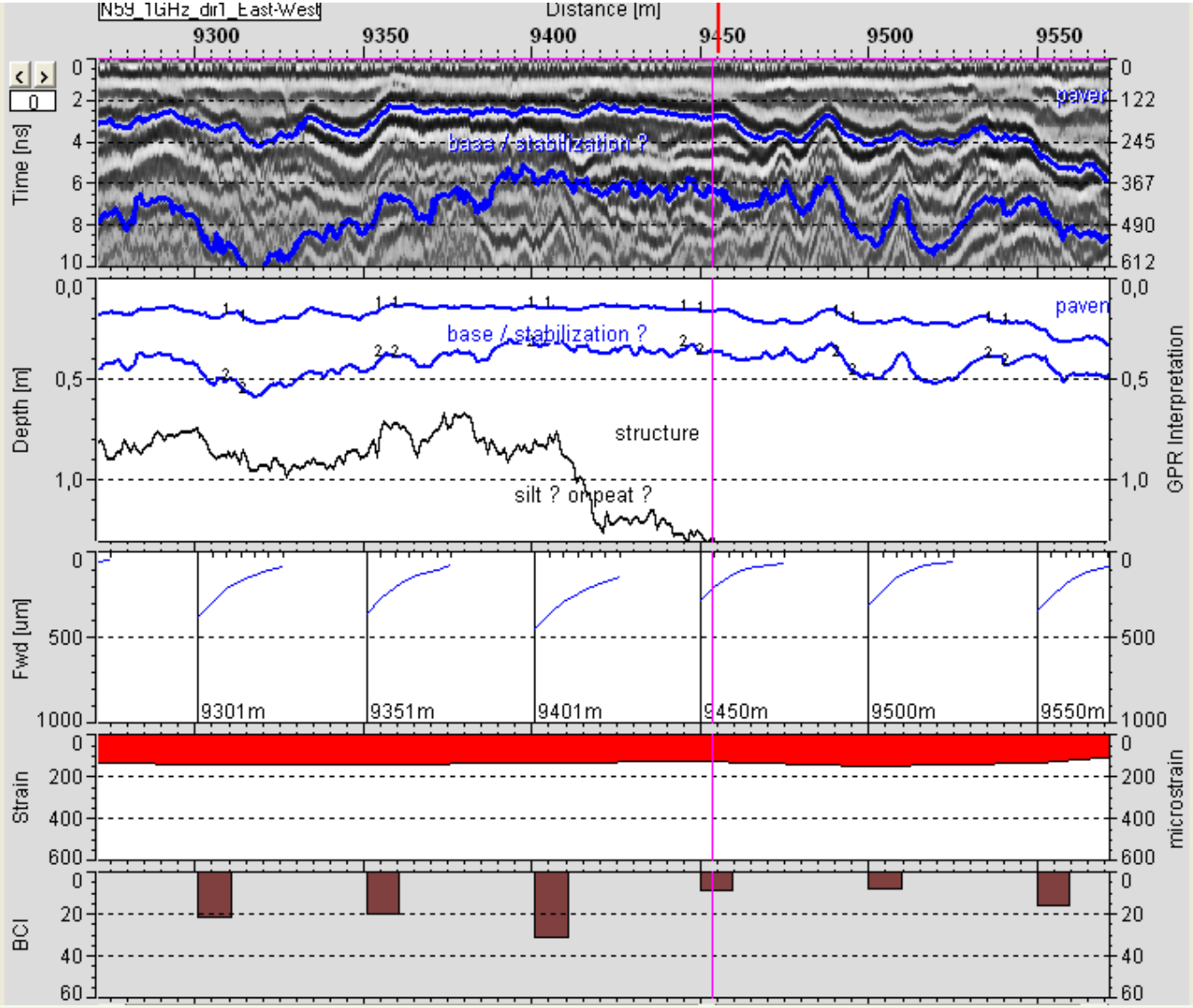


ROADEX
Implementing Accessibility

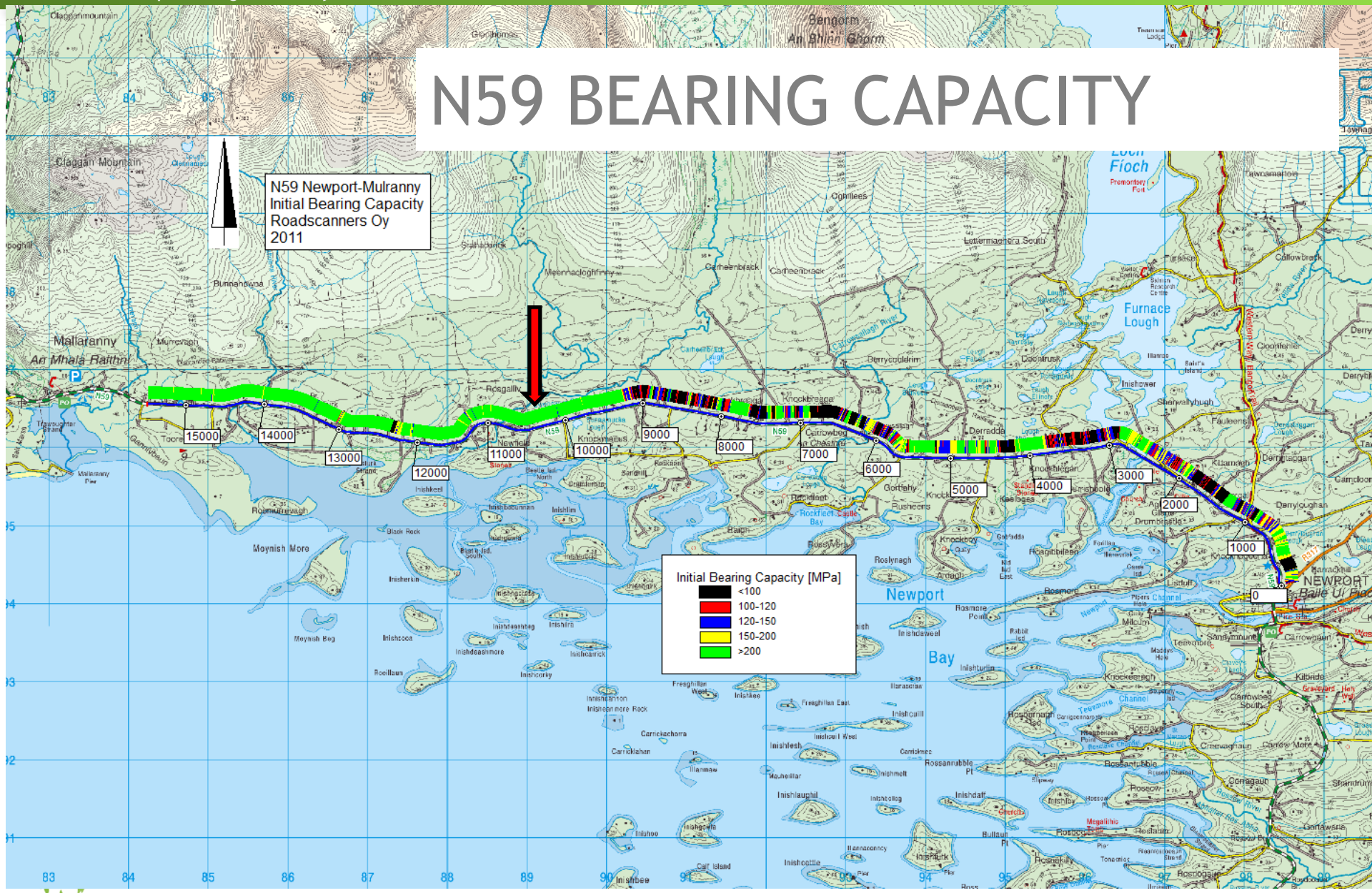
N59: 9450 m

Paused
12:49
9455,28m


9000
10000
8000


[N59_1GHz_dir1_East-West]
Distance [m]
9300
9350
9400
9450
9500
9550
Time [ns]
paver
base / stabilization ?
Depth [m]
structure
silt ? or peat ?
GPR Interpretation
Fwd [um]
9301m
9351m
9401m
9450m
9500m
9550m
Strain
microstrain
BCI

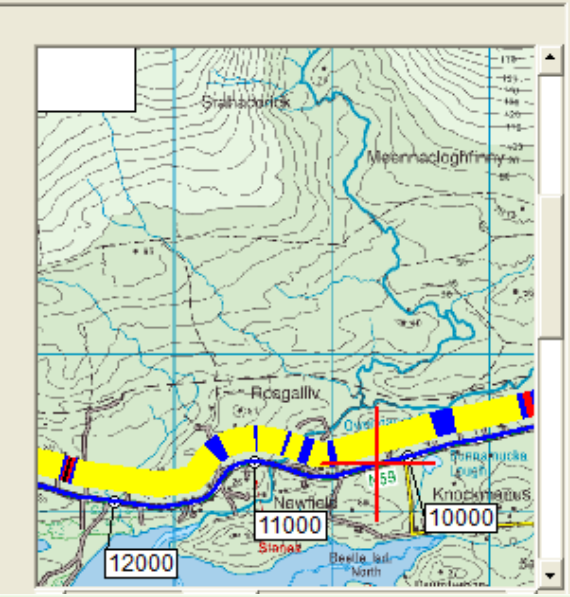
N59 BEARING CAPACITY

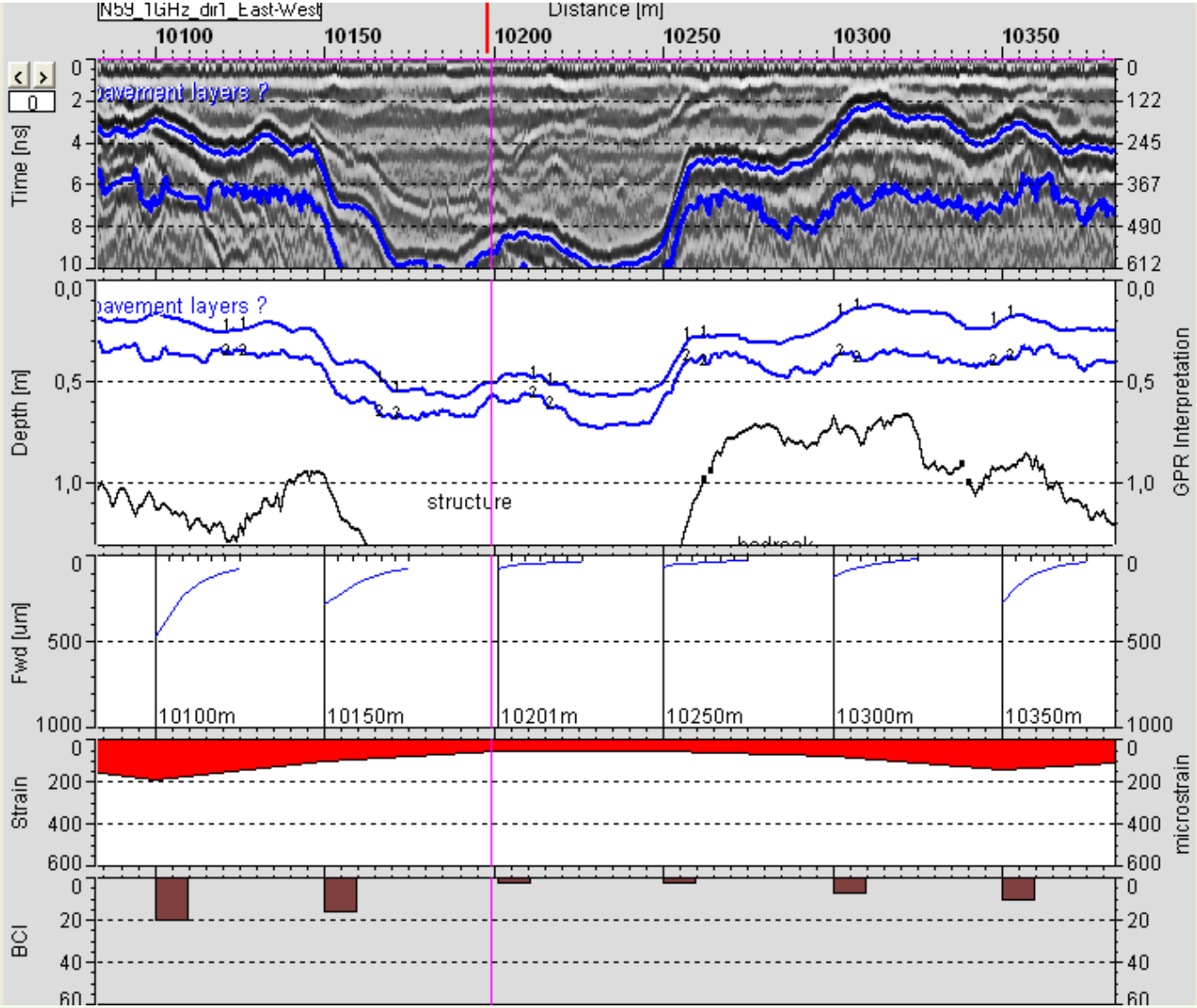


ROADEX
Implementing Accessibility

N59: 10200 m

Paused
13:38
10198,12m


Ballybarrick
Meenacloghfinny
Rosgalliv
Newfield
Knockmatus
N59
11000
10000
12000
Belle Isle North


N59_1GHz_dir1_East-West
Distance [m]
10100
10150
10200
10250
10300
10350
Time [ns]
pavement layers ?
Depth [m]
GPR Interpretation
structure
bedrock
Fwd [um]
10100m
10150m
10201m
10250m
10300m
10350m
Strain
microstrain
BCI

Thank You!

ROADEX
Implementing Accessibility