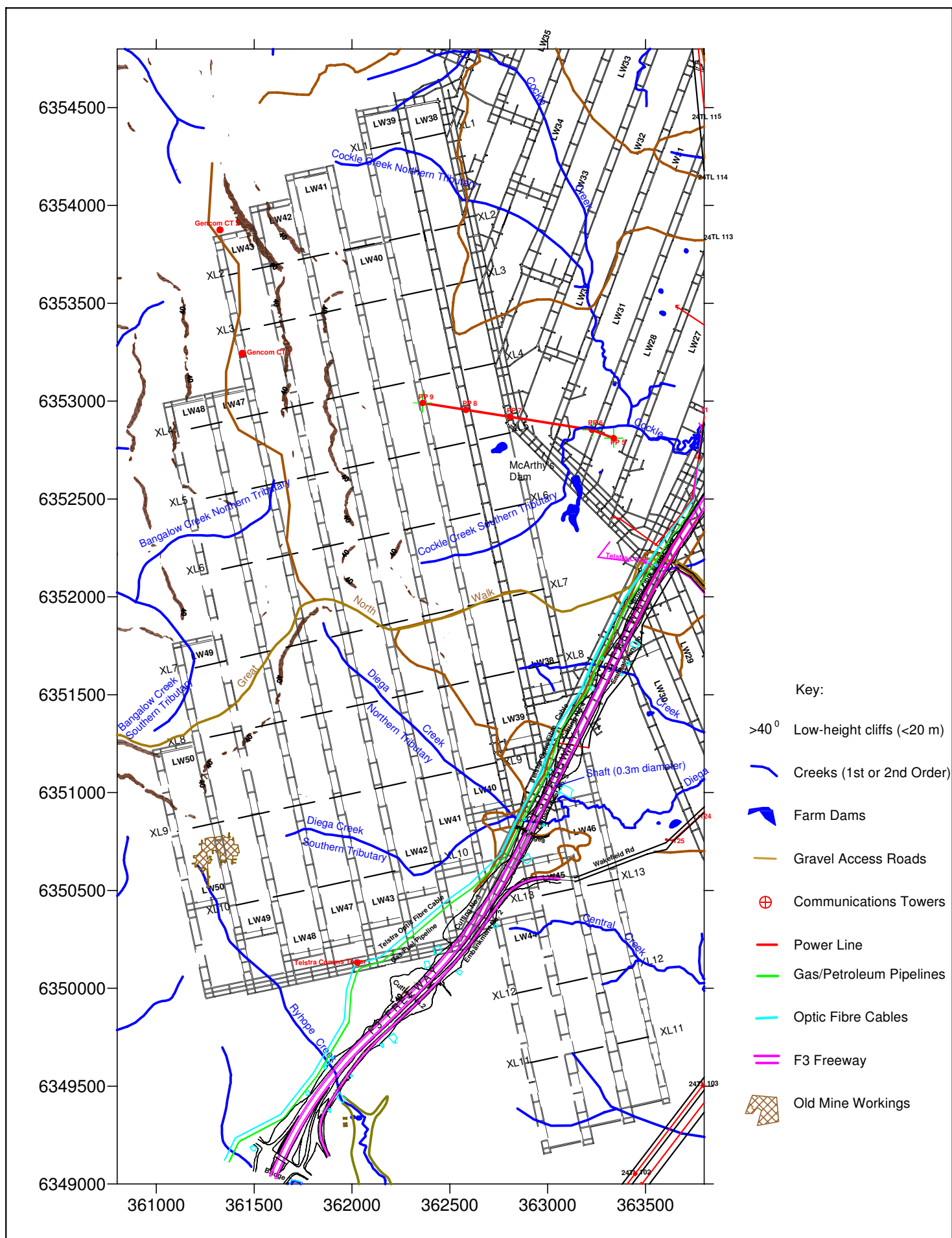




DgS

Engineer: S.Ditton
 Drawn: S.Ditton
 Date: 30.06.09

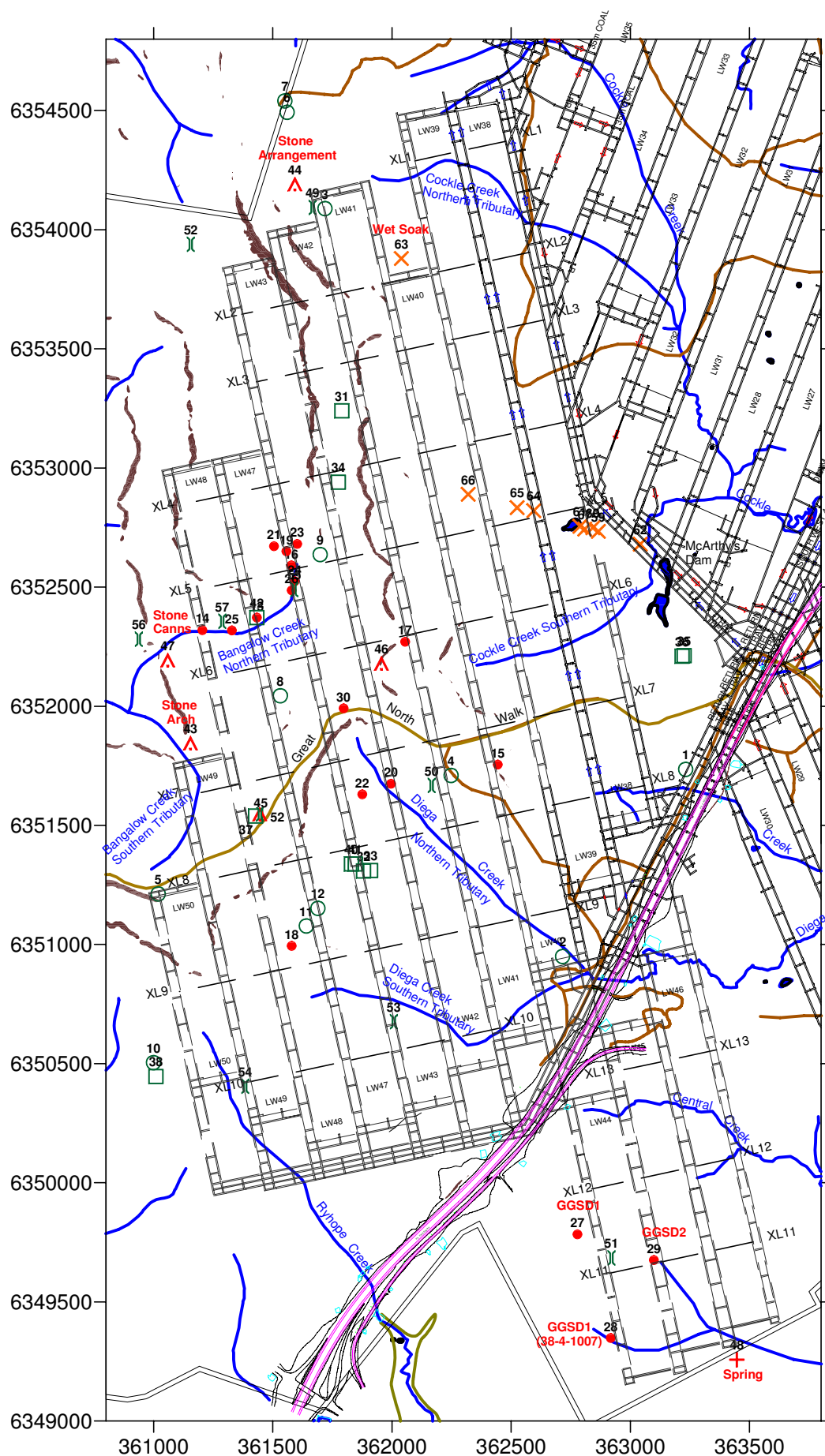
Ditton Geotechnical
 Services Pty Ltd

Client: West Wallsend Colliery
 WWD-012/1

Title: Surface Features Above the Proposed Longwall Layout

Scale: 1:25,000

Figure No: 1a



Key

- Low Level Cliffs (<20 m high)
- Artefact Scatters
- Grinding Grooves
- Individual Features
- Rock Shelter or Stone Arrangement
- Spring / Wet Soak
- Scarred Trees
- Registered Sites

Site No. & Type: (refer to text)

- 1 to 12
- 13 to 30
- 31 to 42
- 43 to 47
- 48 to 48
- 49 to 58
- 59 to 57

Sensitivity to Mining Impacts:

- High = Red symbols
- Moderate = Orange symbols
- Low = Green symbols

DgS

Engineer: S.Ditton
Drawn: S.Ditton
Date: 30.06.09

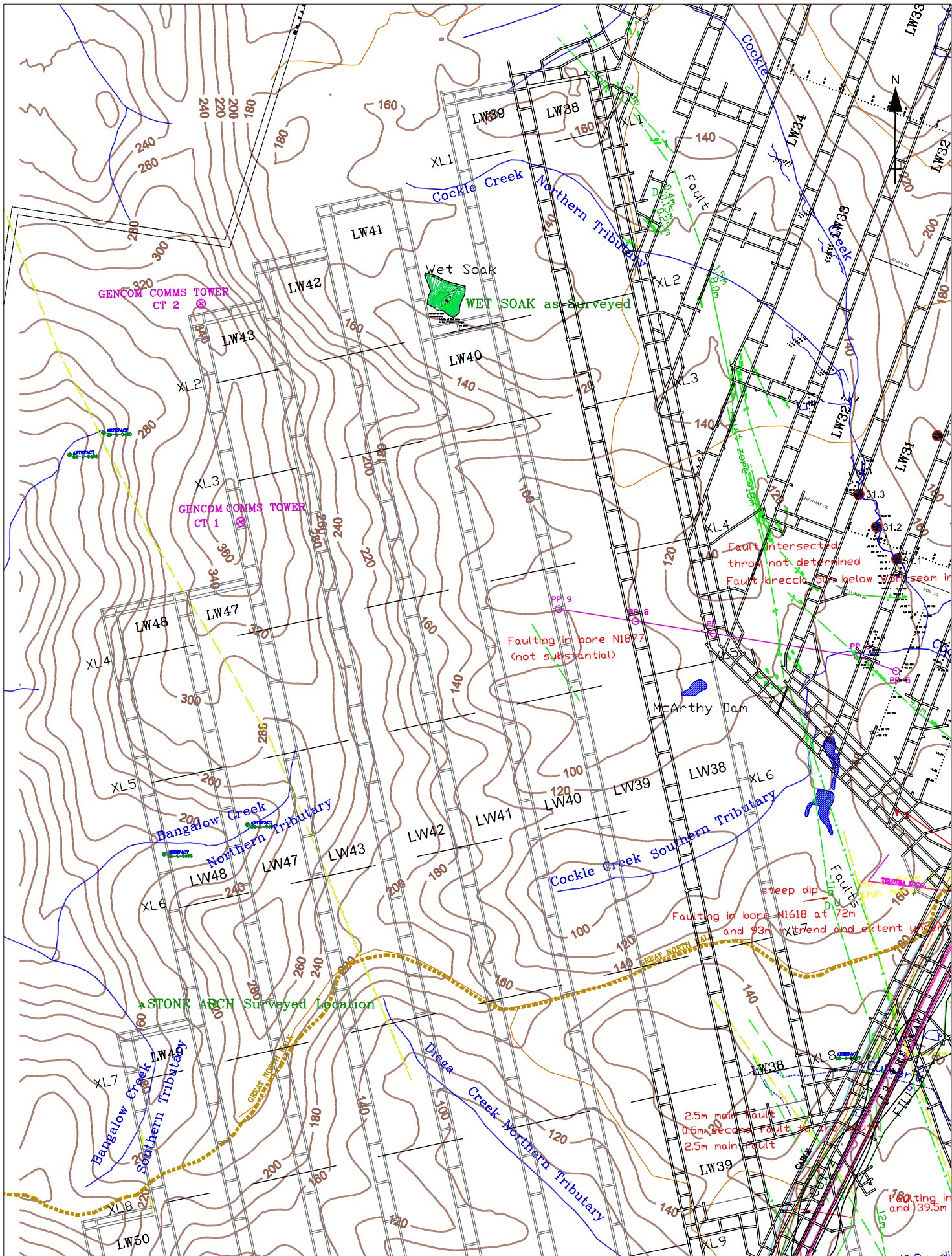
Ditton Geotechnical
Services Pty Ltd

Client: West Wallsend Colliery
WWD-012/1

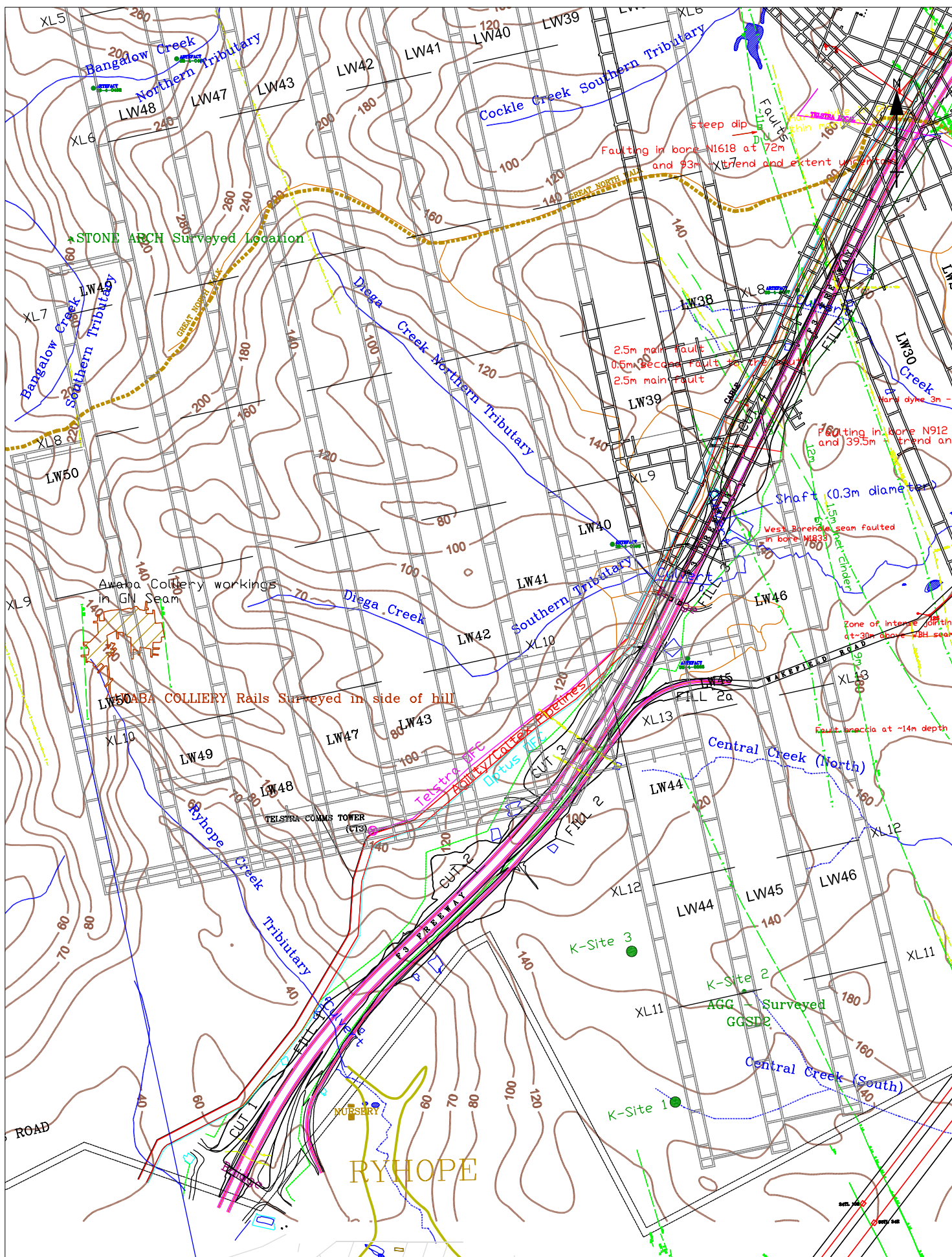
Title: Aboriginal Archaeological Sites Above the Proposed Longwall Layout

Scale: 1:25,000

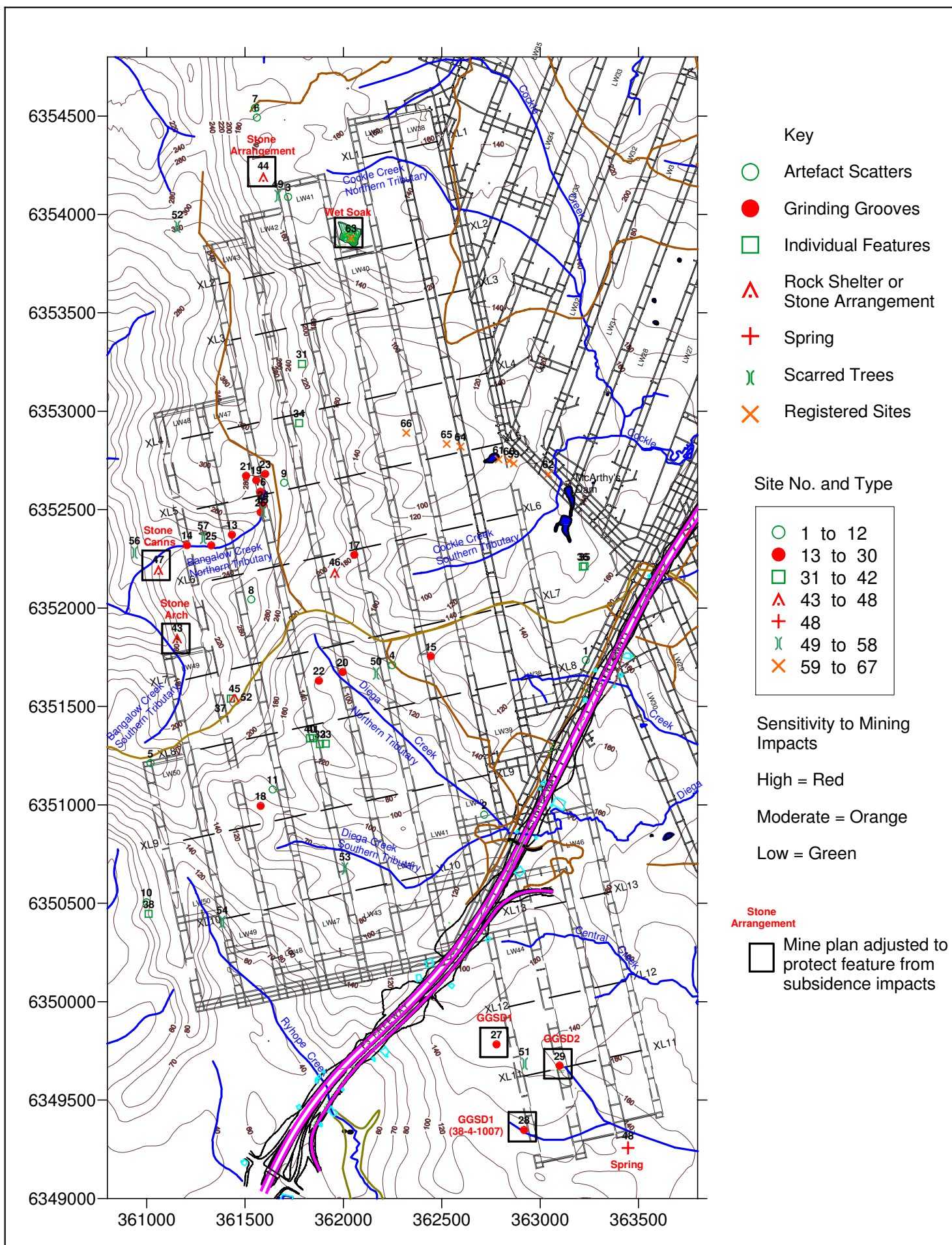
Figure No: 1b



	Engineer:	S.Ditton	Client:	West Wallsend Colliery WWD-012/1		
	Drawn:	S.Ditton				
	Date:	12.06.2009	Title:	Proposed Mine Layout, Cover Depth Contours and Surface Features in the Western Domain		
	Ditton Geotechnical Services Pty Ltd		Scale:	1:10,000	Figure No:	1c



	Engineer:	S.Ditton	Client:	West Wallsend Colliery WWD-012/1
	Drawn:	S.Ditton	Title:	Proposed Mine Layout, Cover Depth Contours and Surface Features in the Southern Domain
	Date:	12.02.2009	Scale:	1:10,000
	Ditton Geotechnical Services Pty Ltd		Figure No:	1d



DgS

Engineer: S.Ditton

Drawn: S.Ditton

Date: 02.10.08

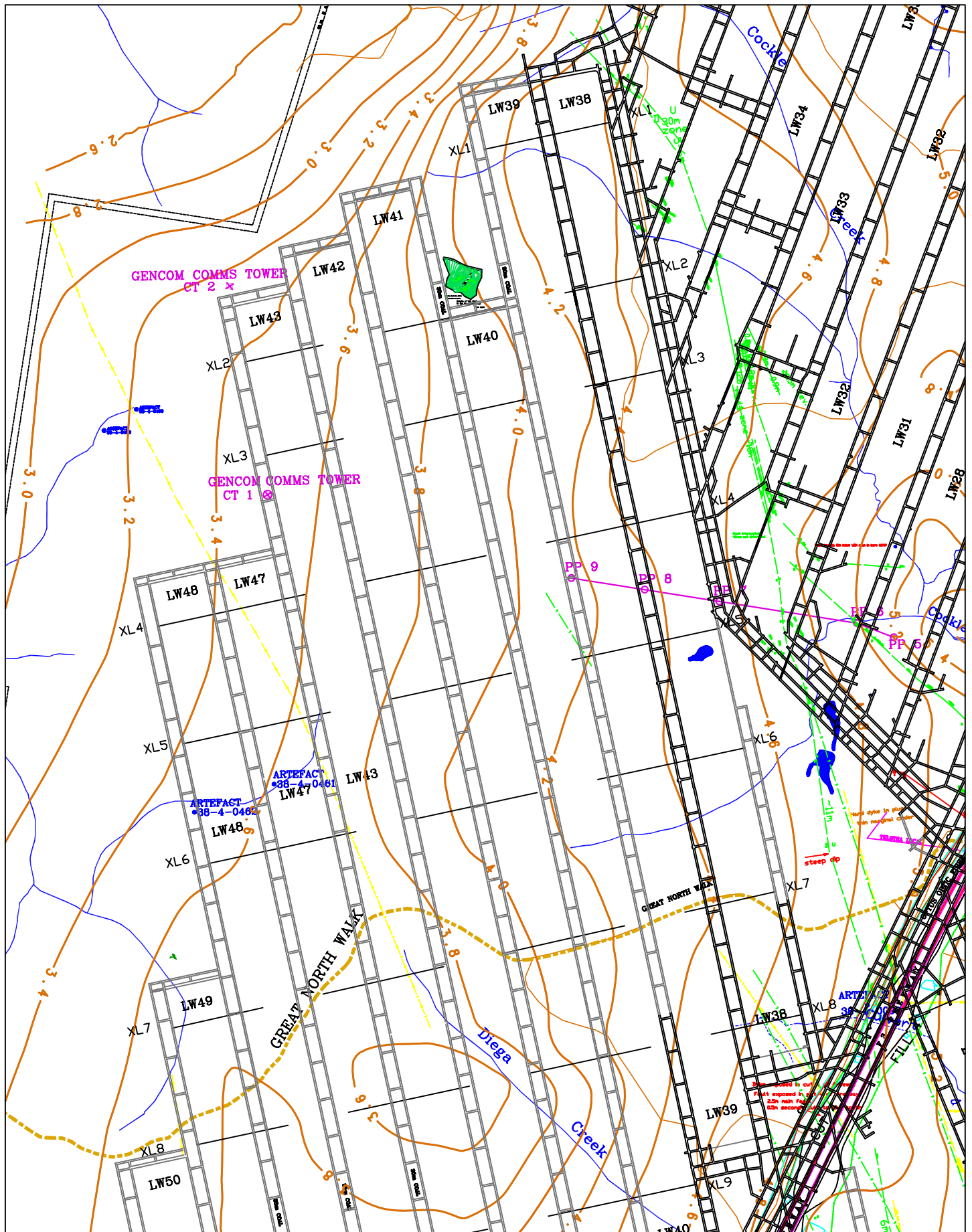
Ditton Geotechnical
Services Pty Ltd

Client: West Wallsend Colliery
WWD-012/1

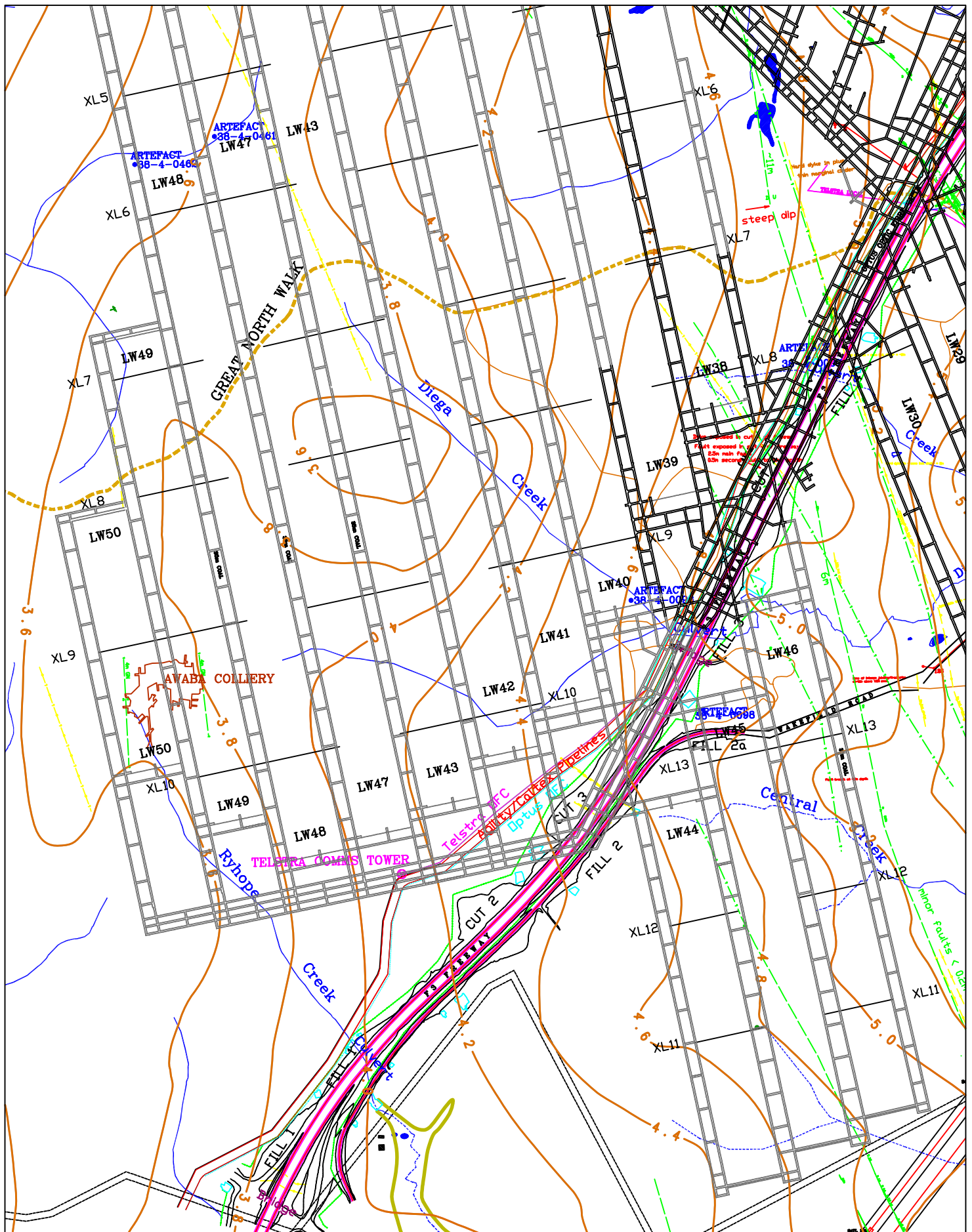
Title: Cover Depth Contours and Aboriginal Archaeological Sites above the
Proposed Longwall Panels

Scale: 1:25,000

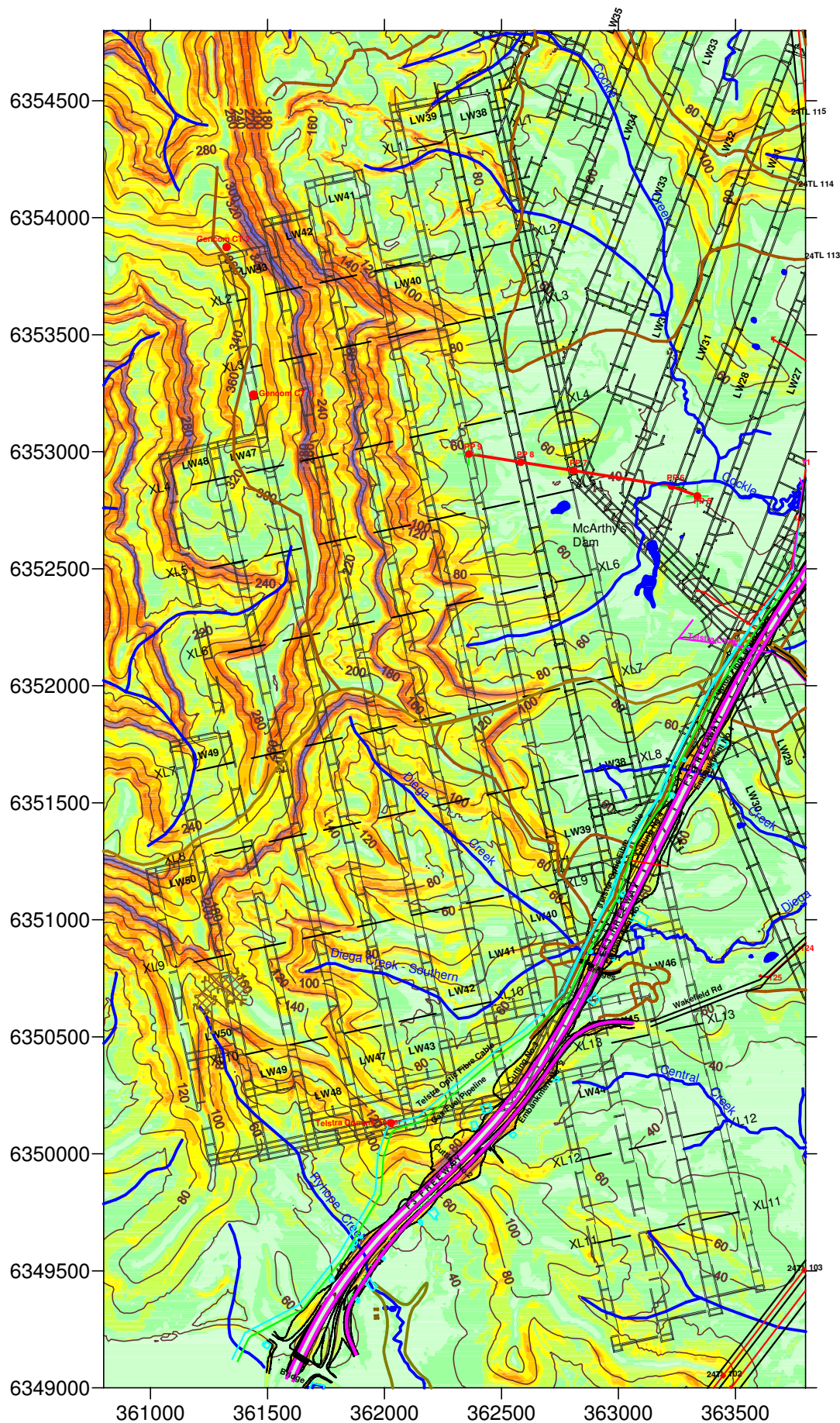
Figure No: 1e



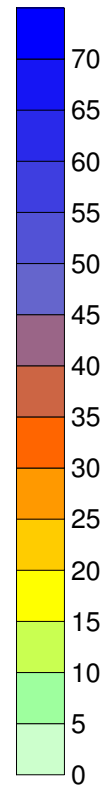
	Engineer:	S.Ditton	Client:	West Wallsend Colliery WWD-012/1	
	Drawn:	S.Ditton			
	Date:	17.09.2008	Title:	Plan Showing Proposed Longwall Panels, West Borehole Seam Thickness Contours and Surface Features in the Western Domain	
	Ditton Geotechnical Services Pty Ltd		Scale:	1:15,000	Figure No: 2a



	Engineer:	S.Ditton	Client:	West Wallsend Colliery WWD-012/1	
	Drawn:	S.Ditton			
	Date:	17.09.2008	Title:	Plan Showing Proposed Longwall Panels, West Borehole Seam Thickness Contours and Surface Features in the Southern Domain	
	Ditton Geotechnical Services Pty Ltd		Scale:	1:15,000	Figure No: 2b



Degrees (o)



Key:

- Pre-Mining Levels
- >45° Low-height cliffs (<20 m)
- Creeks (Schedule 1)
- Farm Dams
- Gravel Access Roads
- ⊕ Communications Towers
- Power Line
- Gas/Petroleum Pipelines
- Optic Fibre Cables
- F3 Freeway
- Old Mine Workings

DgS

Engineer: S.Ditton
 Drawn: S.Ditton
 Date: 30.06.09

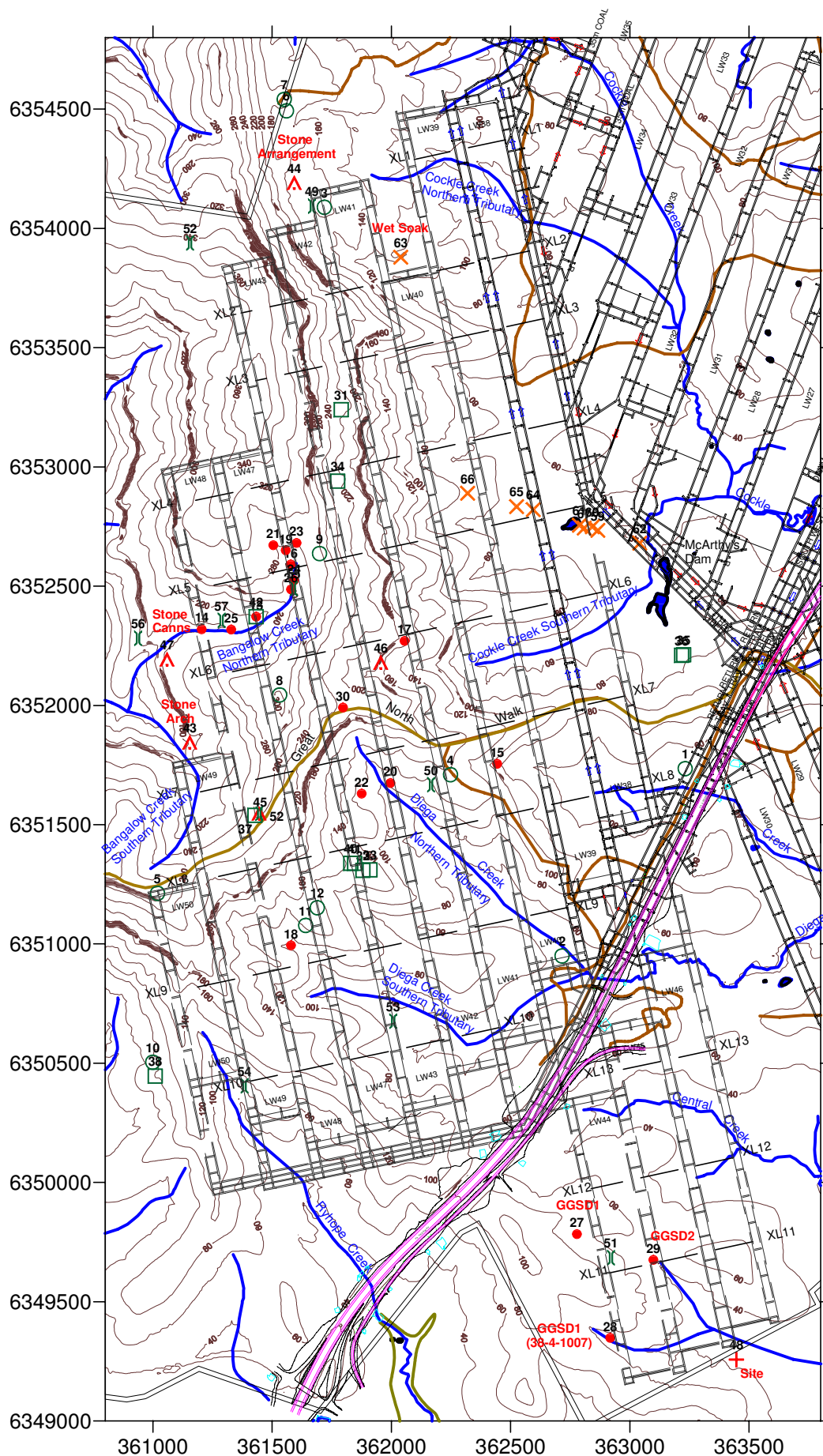
Ditton Geotechnical
 Services Pty Ltd

Client: West Wallsend Colliery
 WWD-012/1

Title: Pre-Mining Surface Topography, Slopes and Surface Features
 Above the Proposed Longwall Layout

Scale: 1:25,000

Figure No: 3a



Key

- Low Level Cliffs (<20 m high)
- Artefact Scatters
- Grinding Grooves
- Individual Features
- Rock Shelter or Stone Arrangement
- Spring / Wet Soak
- Scarred Trees
- Registered Sites

Site No. & Type: (refer to text)

- 1 to 12
- 13 to 30
- 31 to 42
- 43 to 47
- 48 to 48
- 49 to 58
- 59 to 57

Sensitivity to Mining Impacts:

High = Red symbols
Moderate = Orange symbols
Low = Green symbols

DgS

Engineer: S.Ditton
Drawn: S.Ditton
Date: 30.06.09

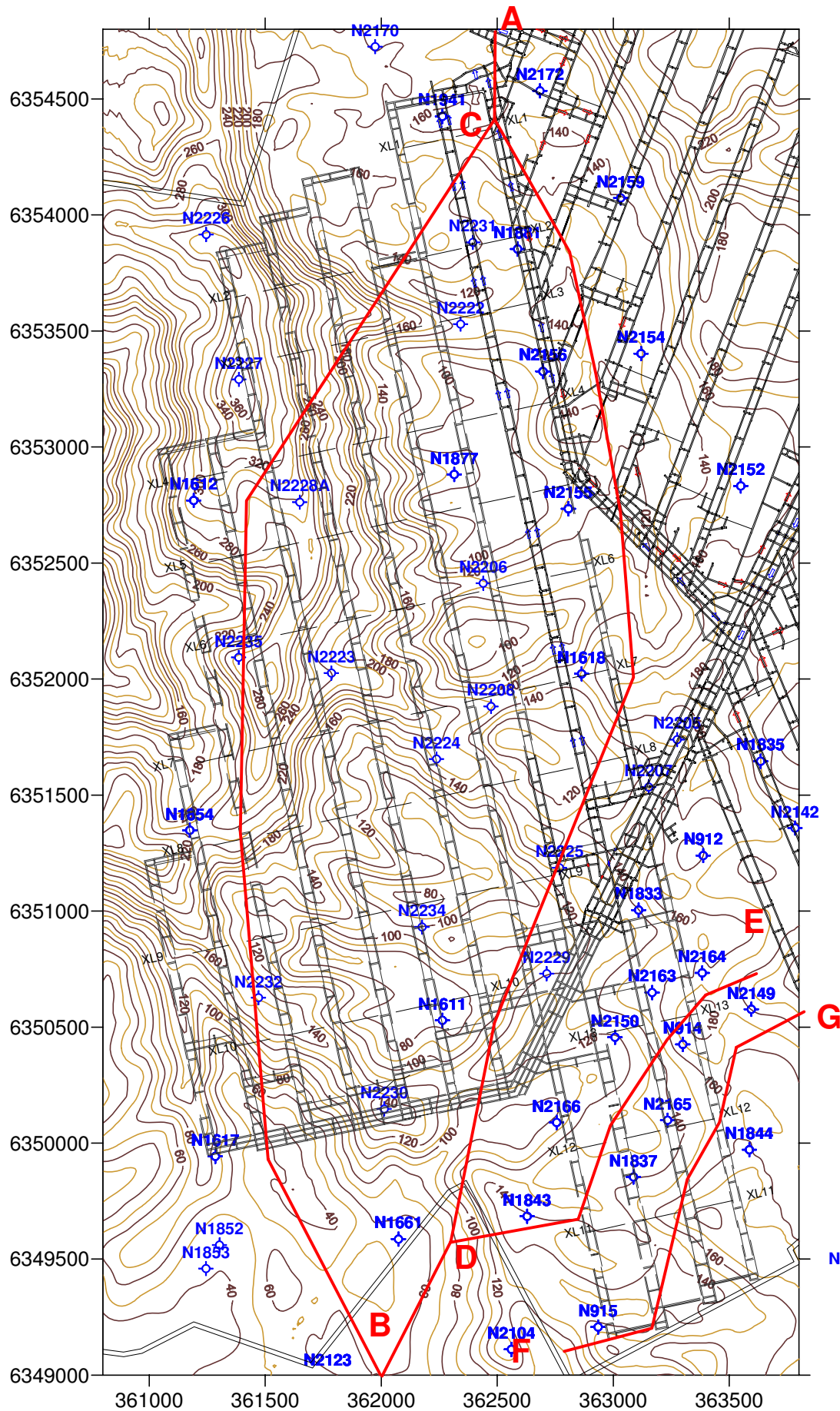
Ditton Geotechnical
Services Pty Ltd

Client: West Wallsend Colliery
WWD-012/1

Title: Aboriginal Archaeological Sites Above the Proposed Longwall Layout
with Surface Topography Contours

Scale: 1:25,000

Figure No: 3b



Key:

- ◆ Borehole Location
- N2208 Borehole No.

DgS



Engineer: S.Ditton
 Drawn: S.Ditton
 Date: 17.09.08

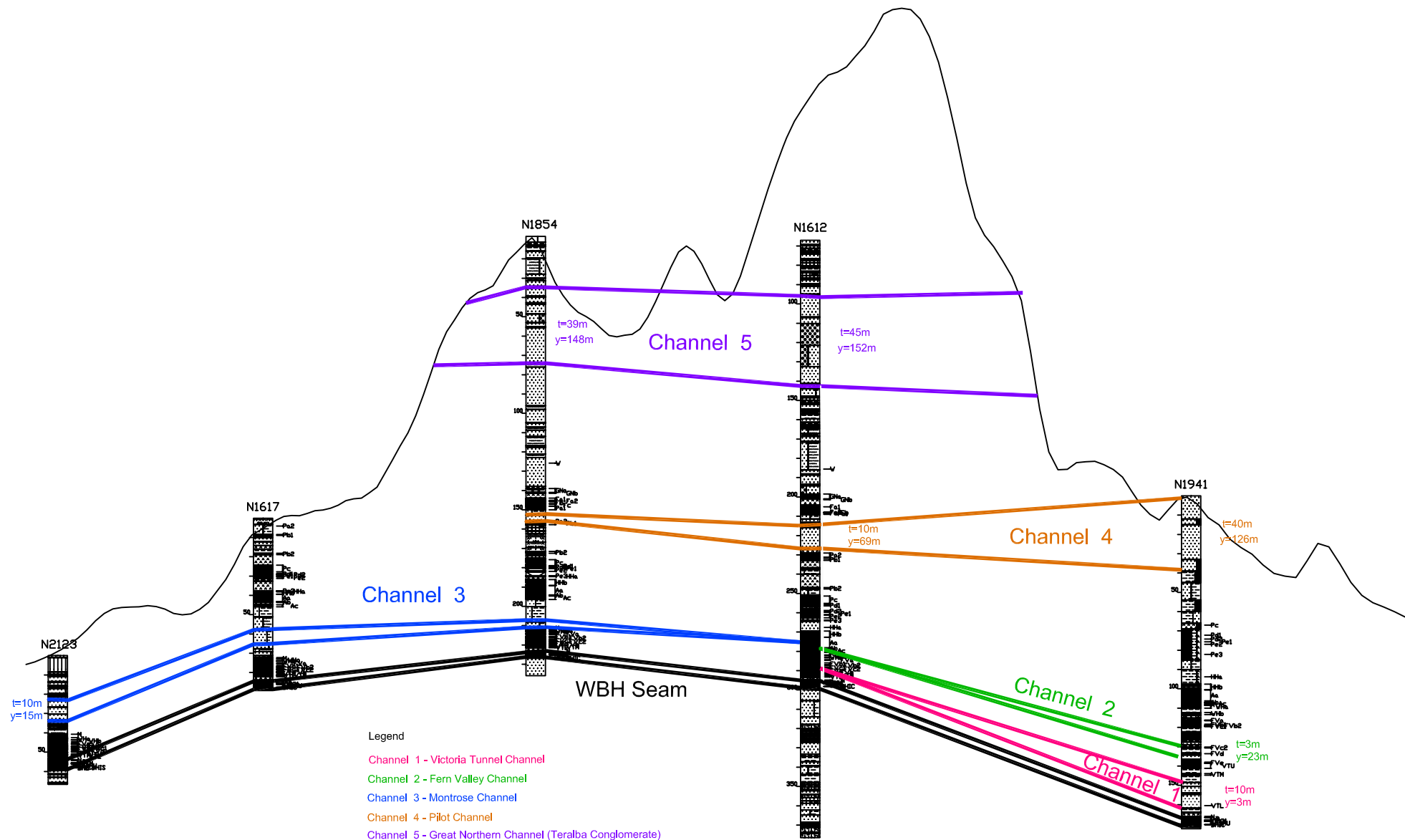
Ditton Geotechnical
 Services Pty Ltd

Client: West Wallsend Colliery
 WWD-012/1

Title: Depth of Cover Contours, Borehole Locations, Proposed Longwalls
 and Massive Lithology Section Locations in Western and Southern
 Domains

Scale: 1:25,000

Figure No: 4a



Engineer: S.Ditton

Drawn: S.Ditton

Date: 27.09.2008

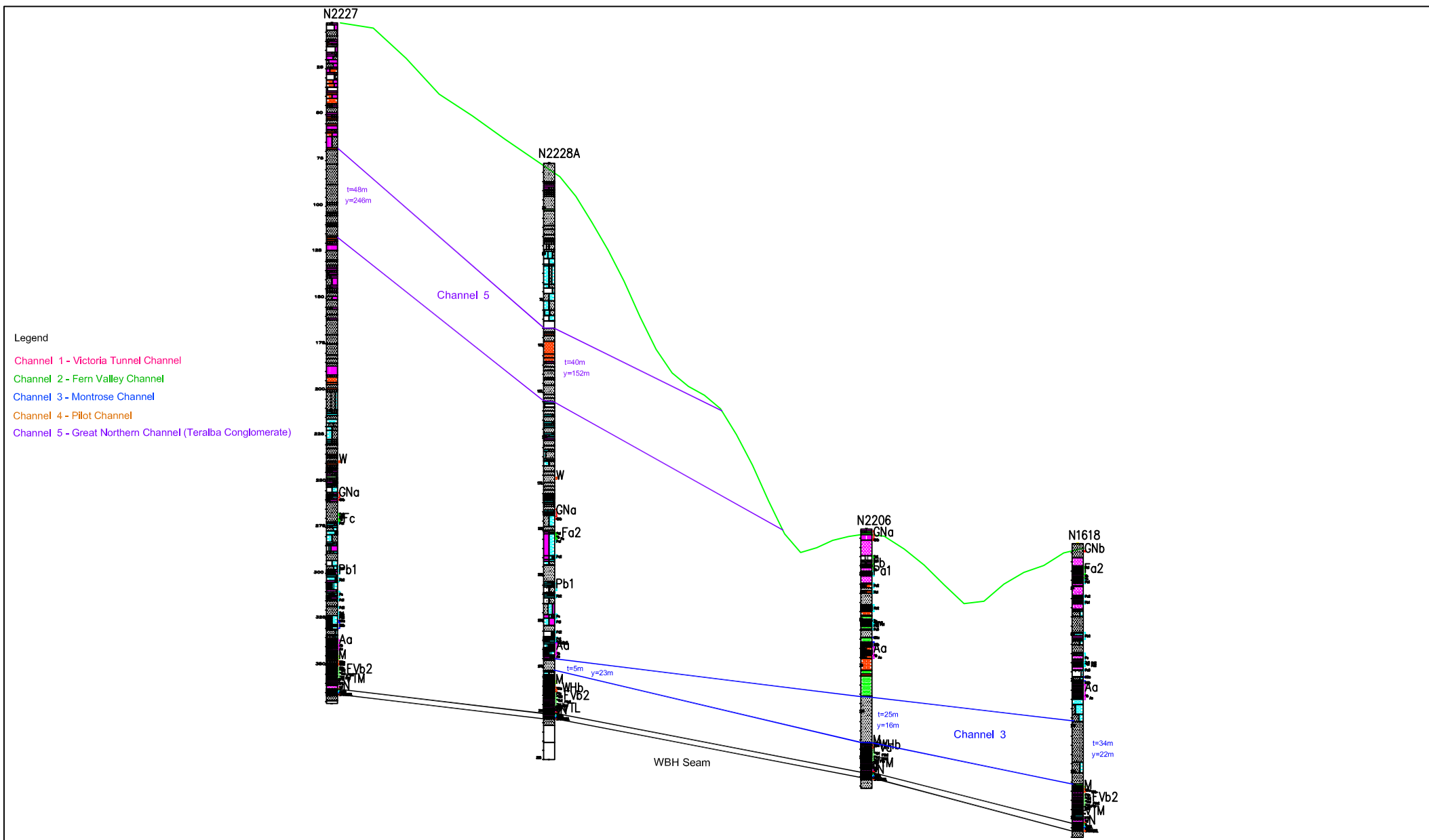
Ditton Geotechnical
Services Pty Ltd

Client: West Wallsend Colliery
WWD-012/1

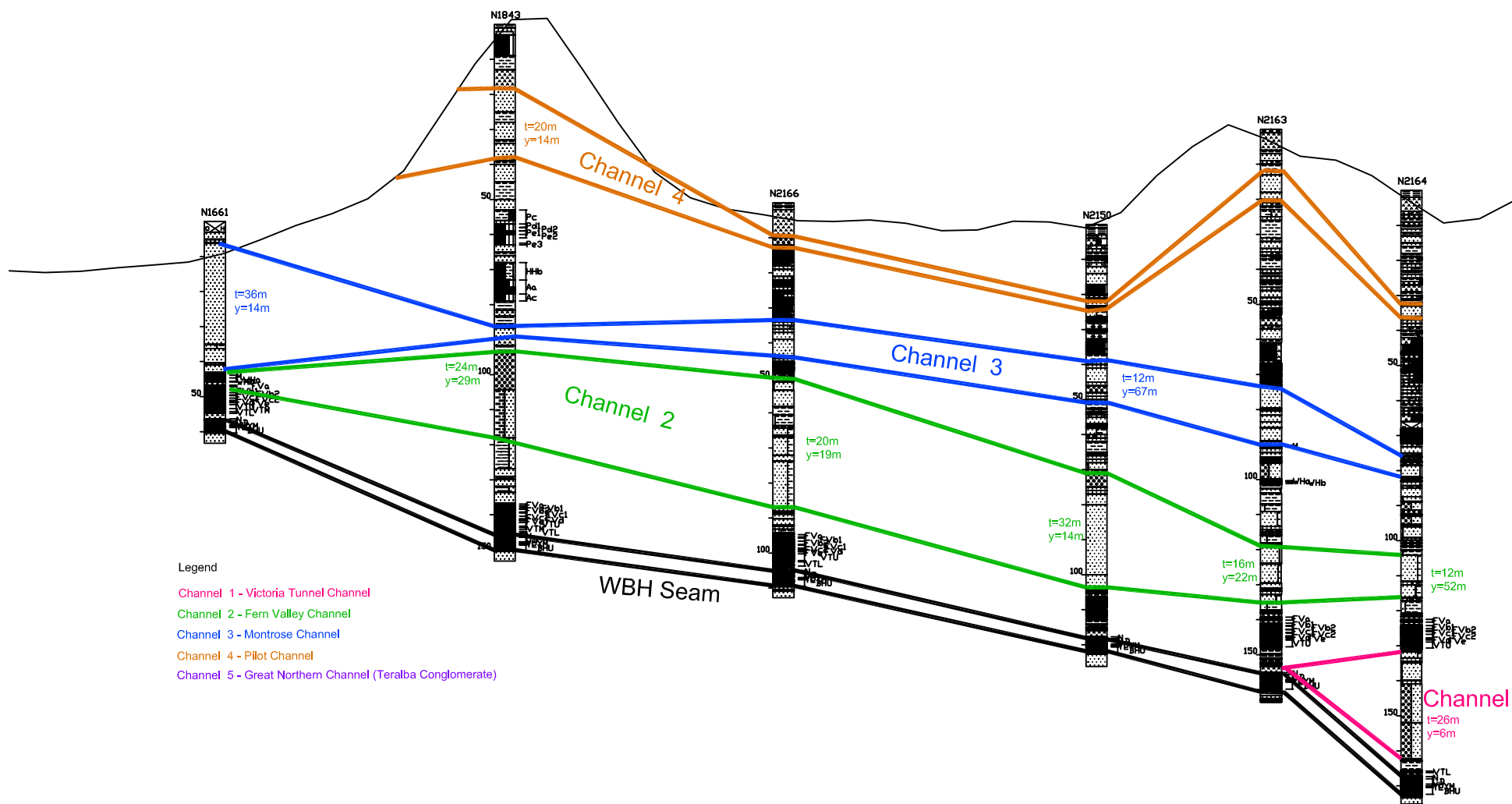
Title: Interpreted Lithological Long Section BC in Western Domain
(refer to Figure 4)

Scale: NTS

Figure No: 6



	Engineer:	S.Ditton	Client:	West Wallsend Colliery WWD-012/1		
	Drawn:	S.Ditton				
	Date:	27.09.2008	Title:	Interpreted Lithological Cross Section between AB and CB in Western Domain (refer to Figure 4)		
	Ditton Geotechnical Services Pty Ltd					
			Scale:	NTS	Figure No:	6a



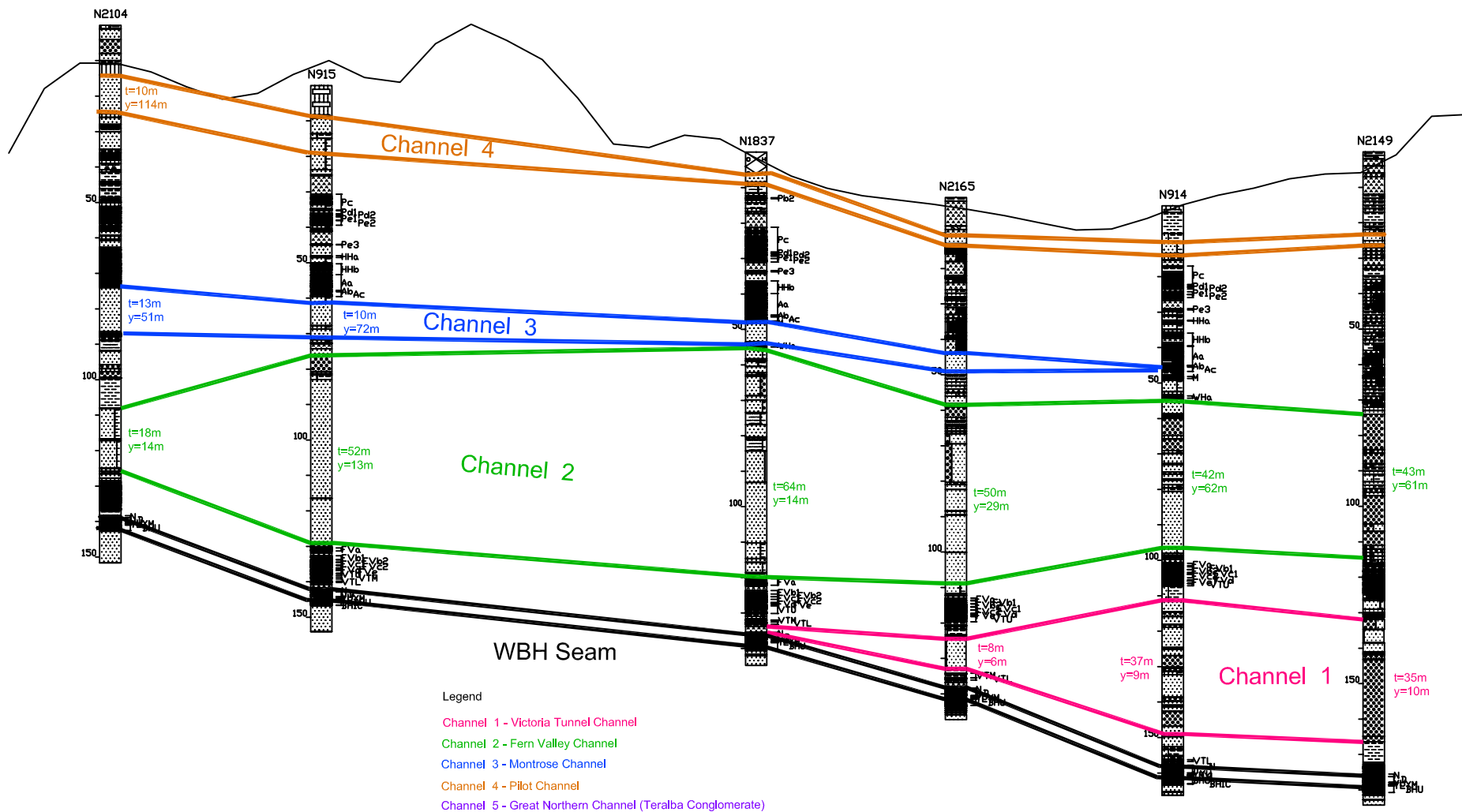
Engineer: S.Ditton
 Drawn: S.Ditton
 Date: 27.09.2008
 Ditton Geotechnical
 Services Pty Ltd

Client: West Wallsend Colliery
 WWD-012/1

Title: Interpreted Lithological Long Section DE in Southern Domain
 (refer to Figure 4)

Scale: NTS

Figure No: 7



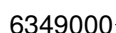
Engineer: S.Ditton
 Drawn: S.Ditton
 Date: 27.09.2008
 Ditton Geotechnical
 Services Pty Ltd

Client: West Wallsend Colliery
 WWD-012/1

Title: Interpreted Lithological Long Section FG in Southern Domain
 (refer to Figure 4)

Scale: NTS

Figure No: 8



361000

361500

362000

Client:

West Wallsend Colliery
WWD-012/1

Title:

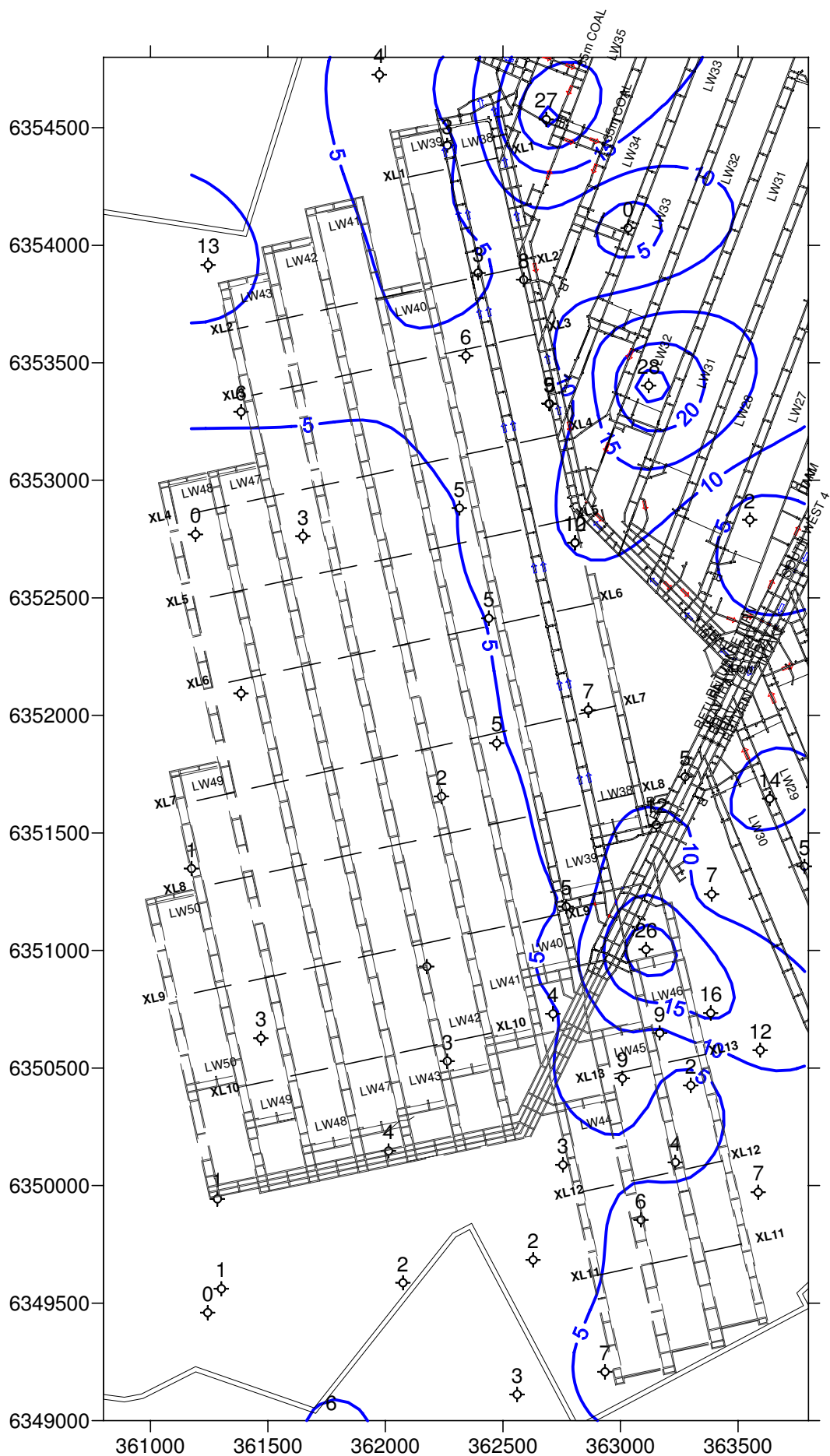
Interpreted Channel 1 (Above Young Wallsend to Victoria Tunnel Seams) Thickness Contours (m)

Scale:

1:25,000

Figure No:

9



DgS

Engineer: S.Ditton
 Drawn: S.Ditton
 Date: 17.09.08

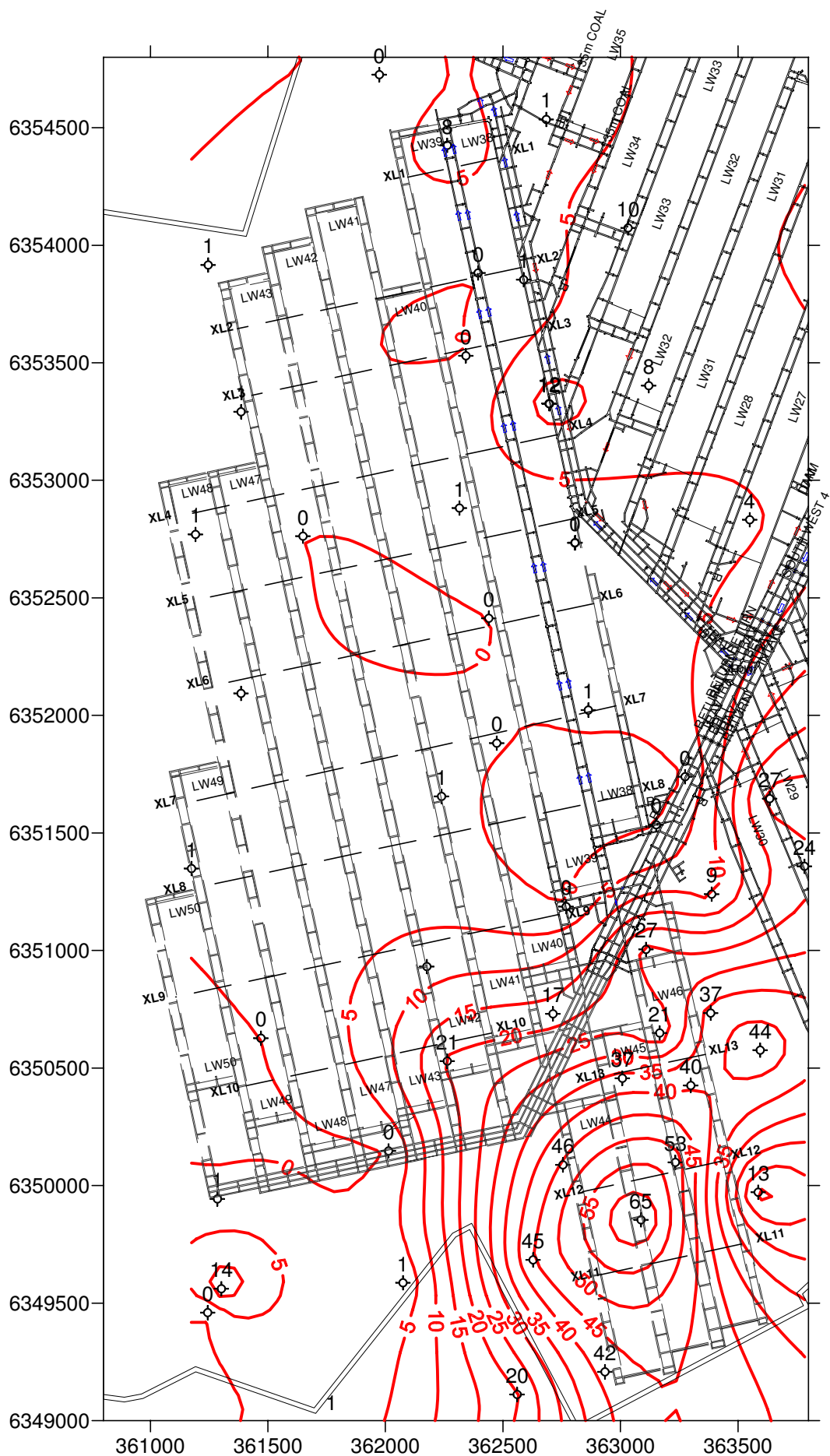
Ditton Geotechnical
 Services Pty Ltd

Client: West Wallsend Colliery
 WWD-012/1

Title: Interpreted Channel 1 (Above Young Wallsend to Victoria Tunnel
 Seams) Distance (y) above Workings Contours (m)

Scale: 1:25,000

Figure No: 10



DgS

Engineer: S.Ditton
 Drawn: S.Ditton
 Date: 17.09.08

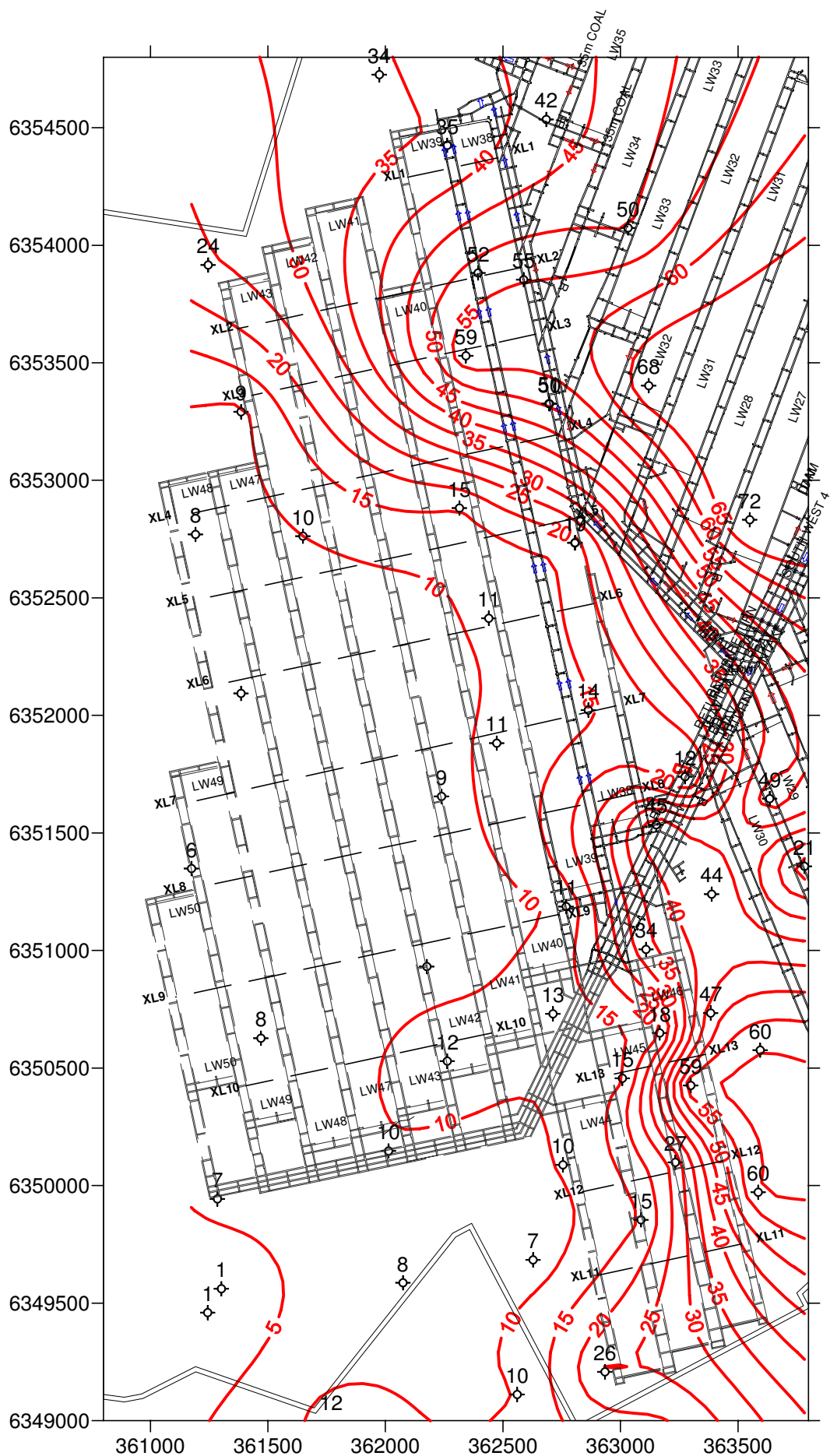
Ditton Geotechnical
 Services Pty Ltd

Client: West Wallsend Colliery
 WWD-012/1

Title: Interpreted Channel 2 (Above Fern Valley Seam) Thickness
 Contours (m)

Scale: 1:25,000

Figure No: 11



DgS

Engineer: S.Ditton
 Drawn: S.Ditton
 Date: 17.09.08

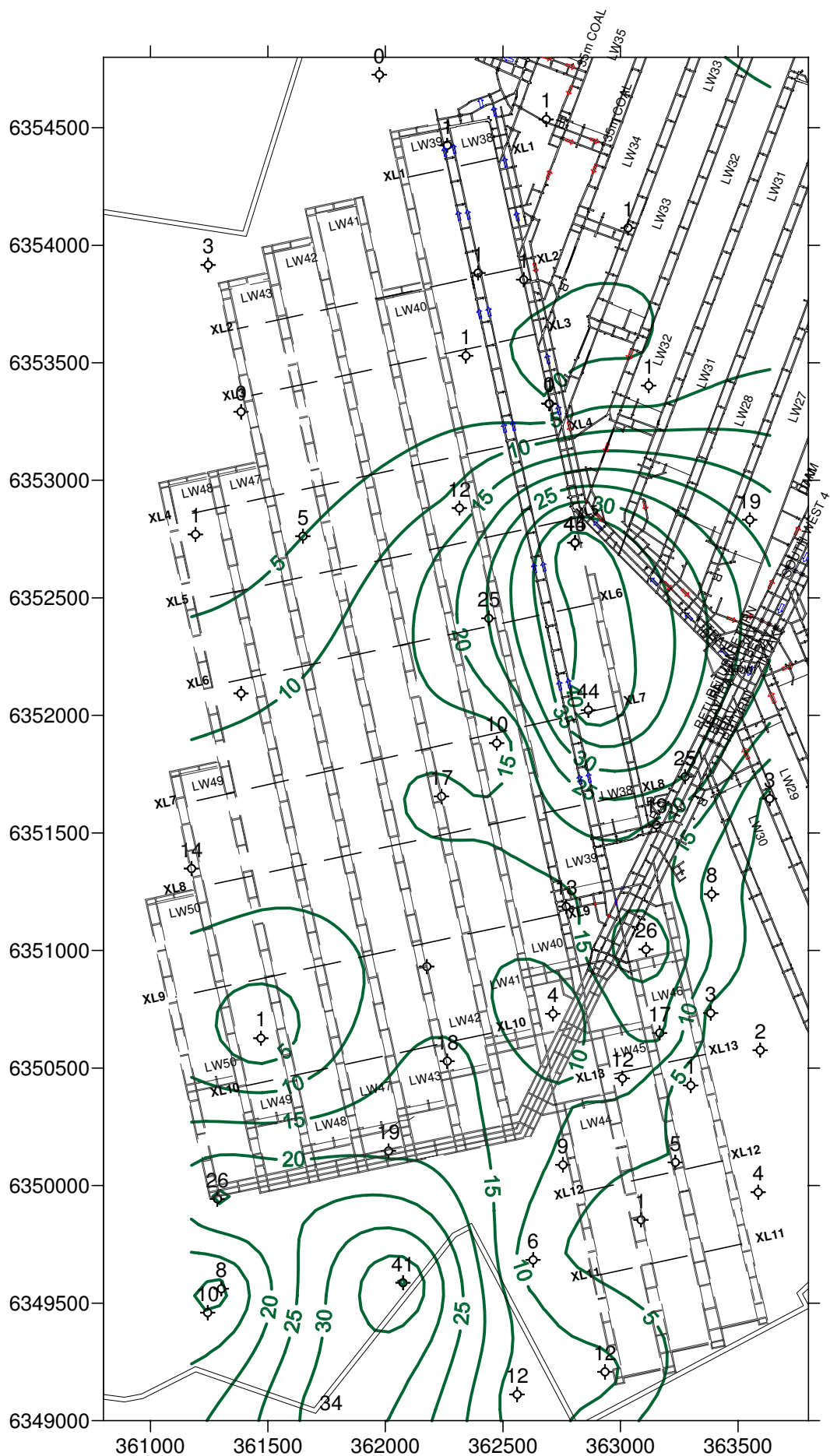
Ditton Geotechnical
 Services Pty Ltd

Client: West Wallsend Colliery
 WWD-012/1

Title: Interpreted Channel 2 (Above Fern Valley Seam) Distance (y)
 above Workings Contours (m)

Scale: 1:25,000

Figure No: 12



DgS

Engineer: S.Ditton
 Drawn: S.Ditton
 Date: 17.09.08

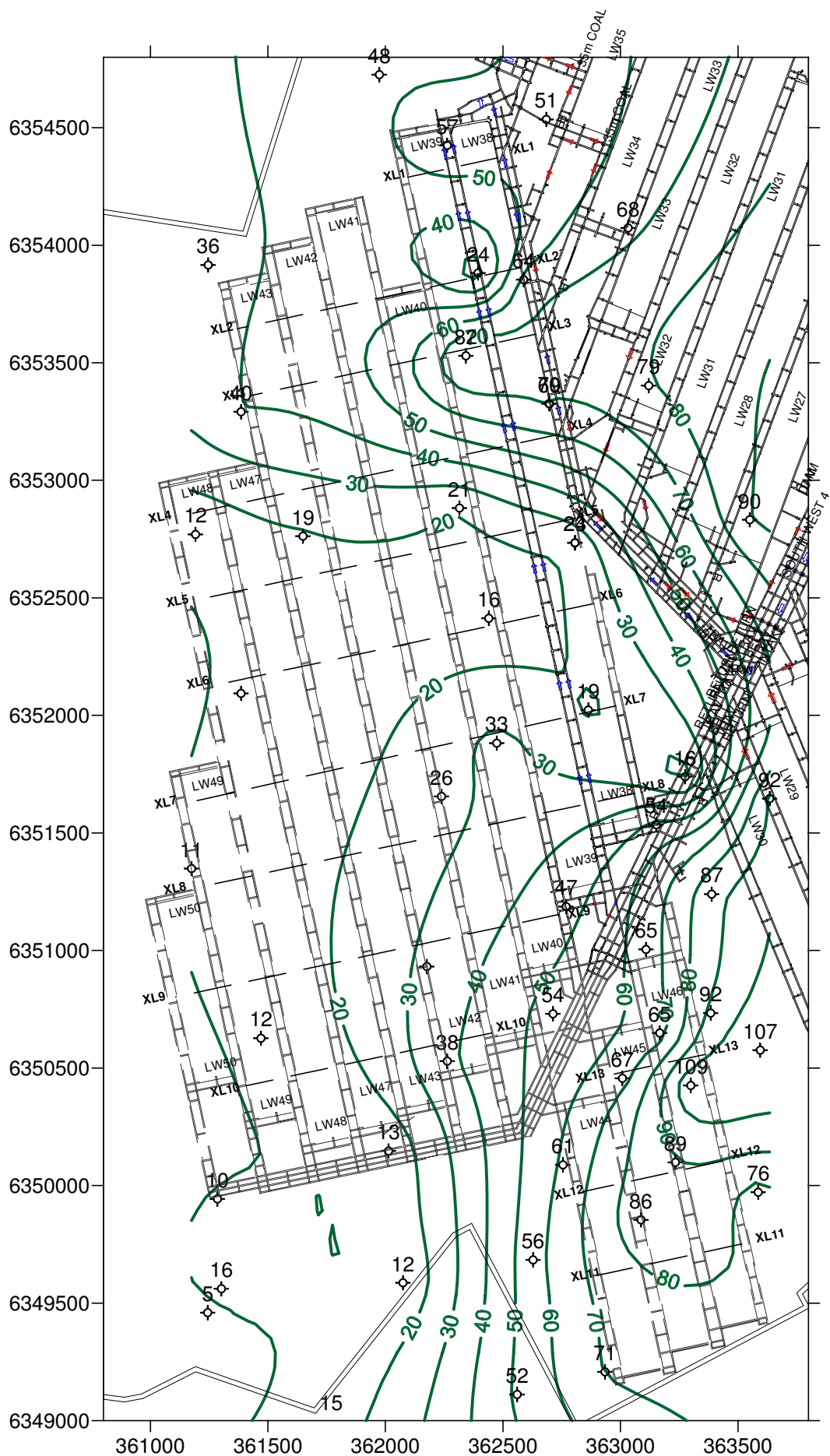
Ditton Geotechnical
 Services Pty Ltd

Client: West Wallsend Colliery
 WWD-012/1

Title: Interpreted Channel 3 (Above Montrose to Australasian Seams)
 Thickness Contours (m)

Scale: 1:25,000

Figure No: 13



DgS

Engineer: S.Ditton
 Drawn: S.Ditton
 Date: 17.09.08

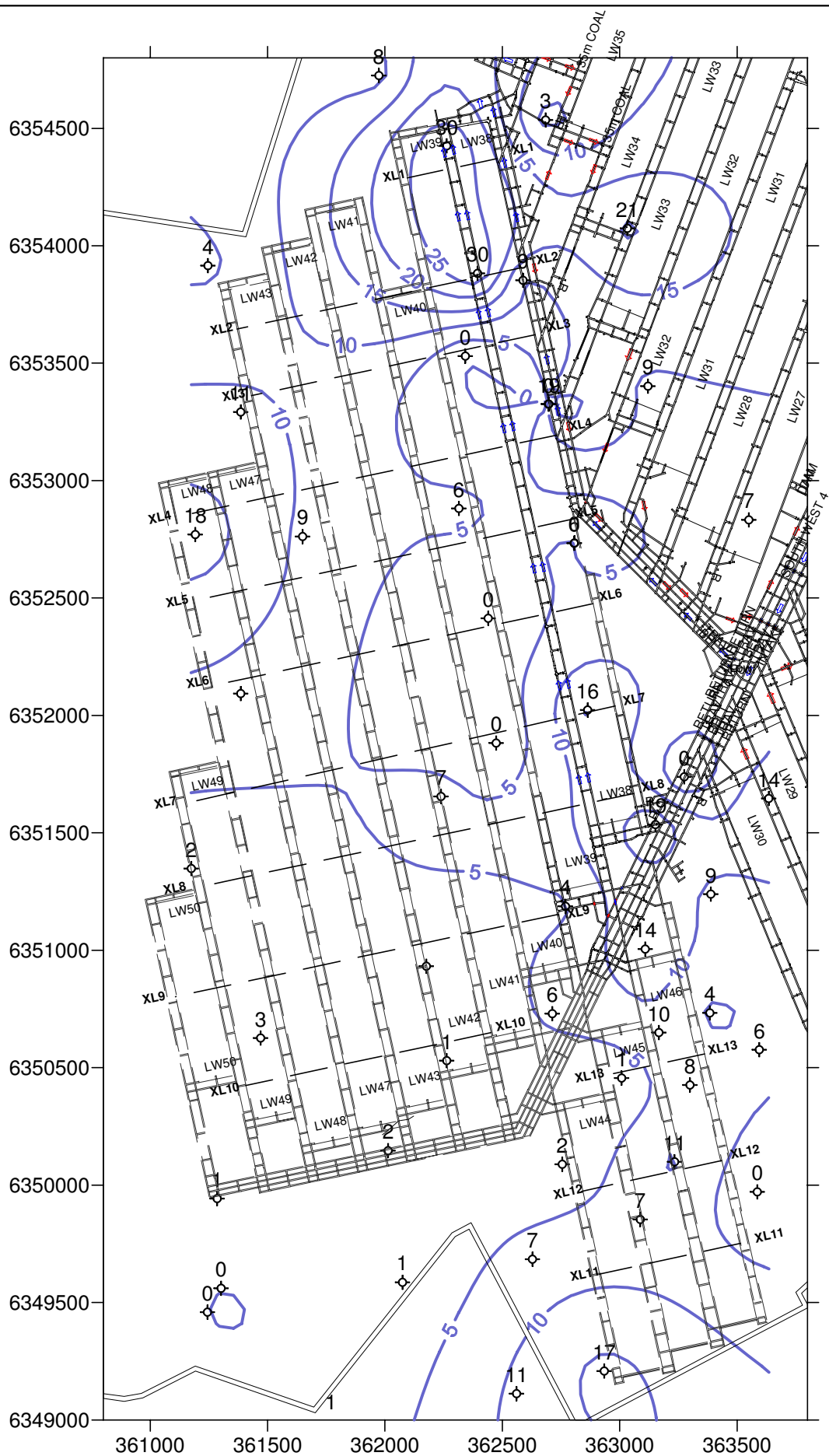
Ditton Geotechnical
 Services Pty Ltd

Client: West Wallsend Colliery
 WWD-012/1

Title: Interpreted Channel 3 (Above Montrose to Australasian Seams)
 Distance (y) above Workings Contours (m)

Scale: 1:25,000

Figure No: 14



DgS

Engineer: S.Ditton
 Drawn: S.Ditton
 Date: 17.09.08

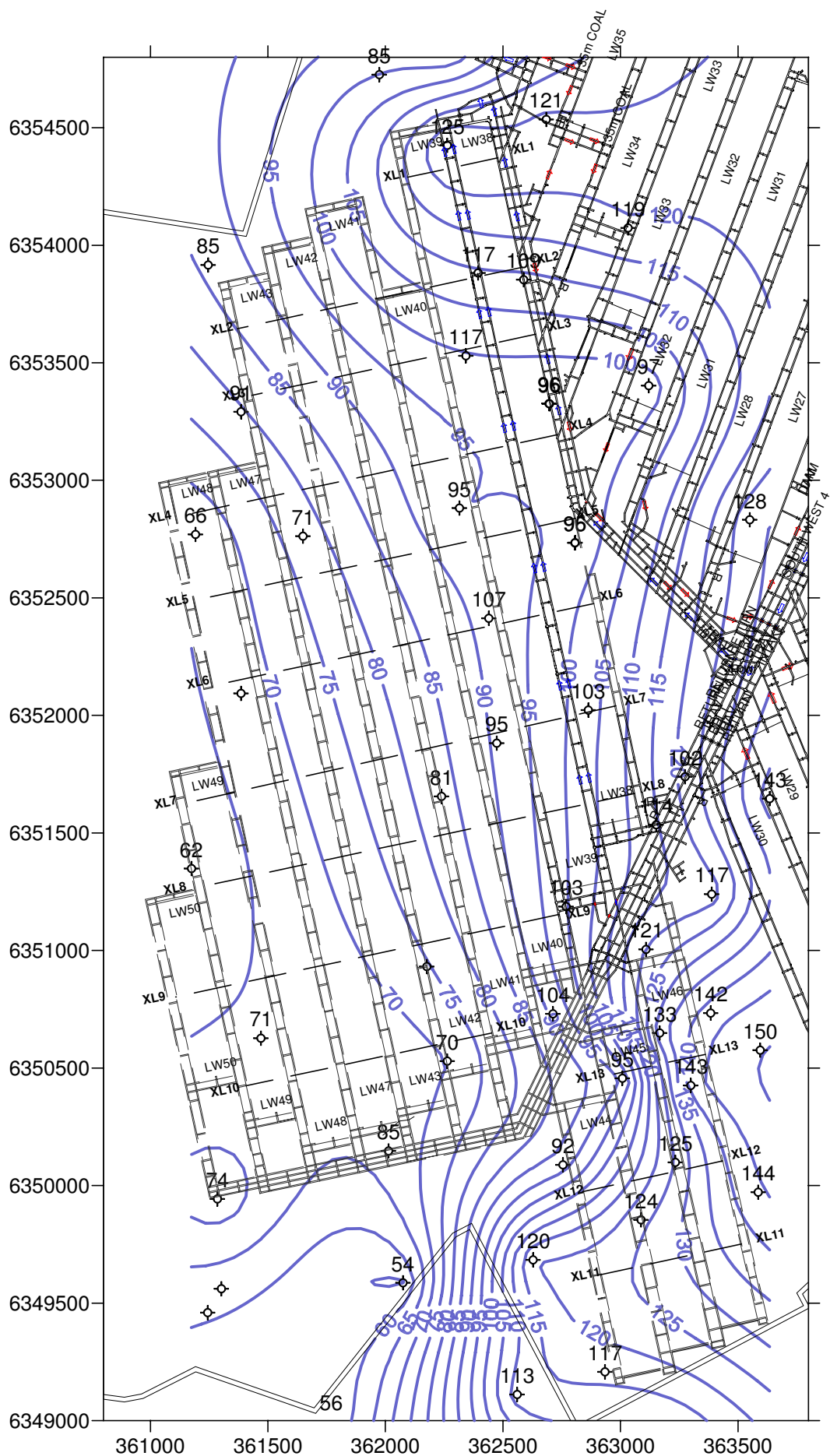
Ditton Geotechnical
 Services Pty Ltd

Client: West Wallsend Colliery
 WWD-012/1

Title: Interpreted Channel 4 (Above Pilot Seam) Thickness Contours (m)

Scale: 1:25,000

Figure No: 15



DgS

Engineer: S.Ditton
 Drawn: S.Ditton
 Date: 17.09.08

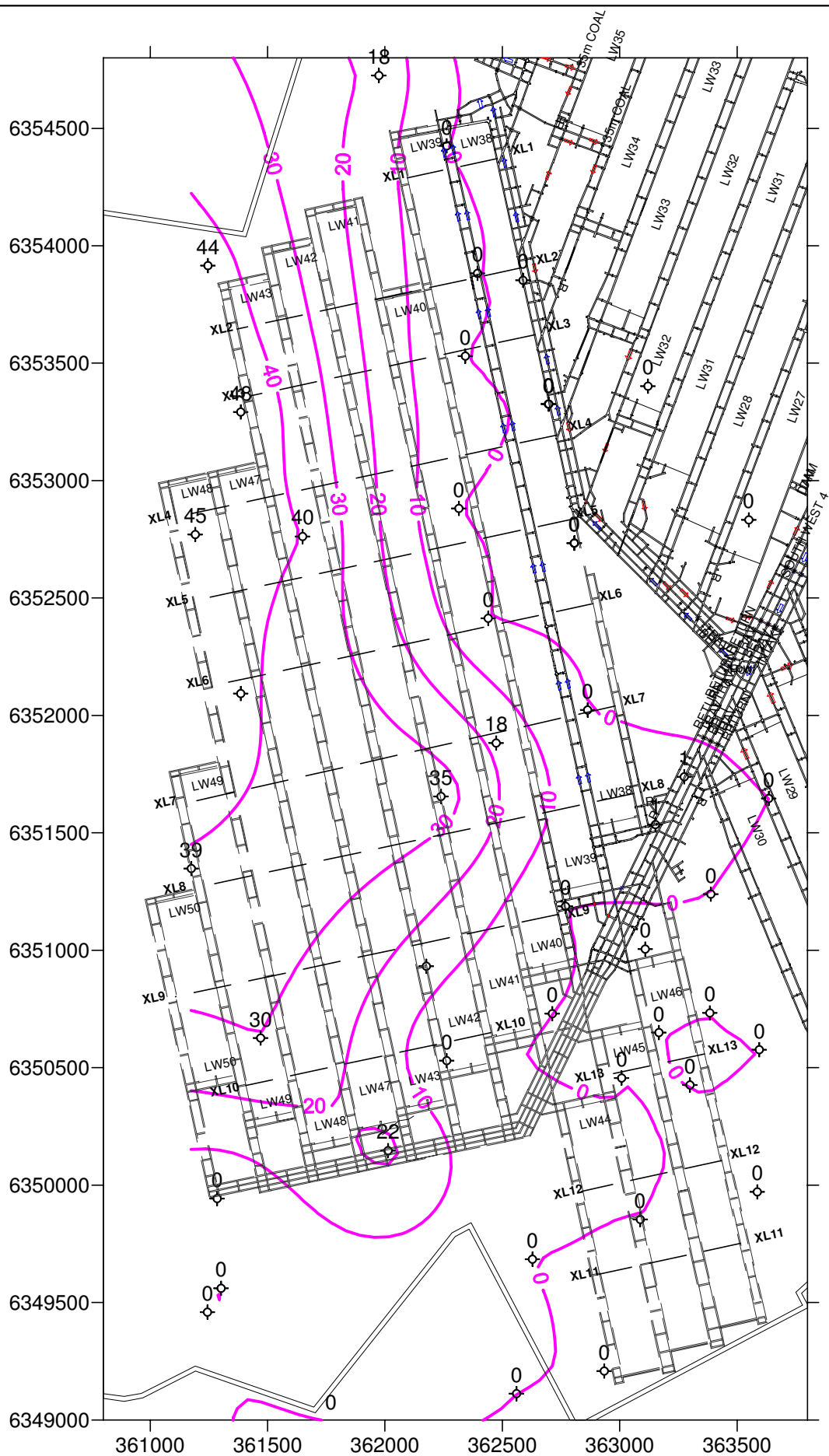
Ditton Geotechnical
 Services Pty Ltd

Client: West Wallsend Colliery
 WWD-012/1

Title: Interpreted Channel 4 (Pilot) Distance (y) above Workings
 Contours (m)

Scale: 1:25,000

Figure No: 16



DgS

Engineer: S.Ditton
 Drawn: S.Ditton
 Date: 17.09.08

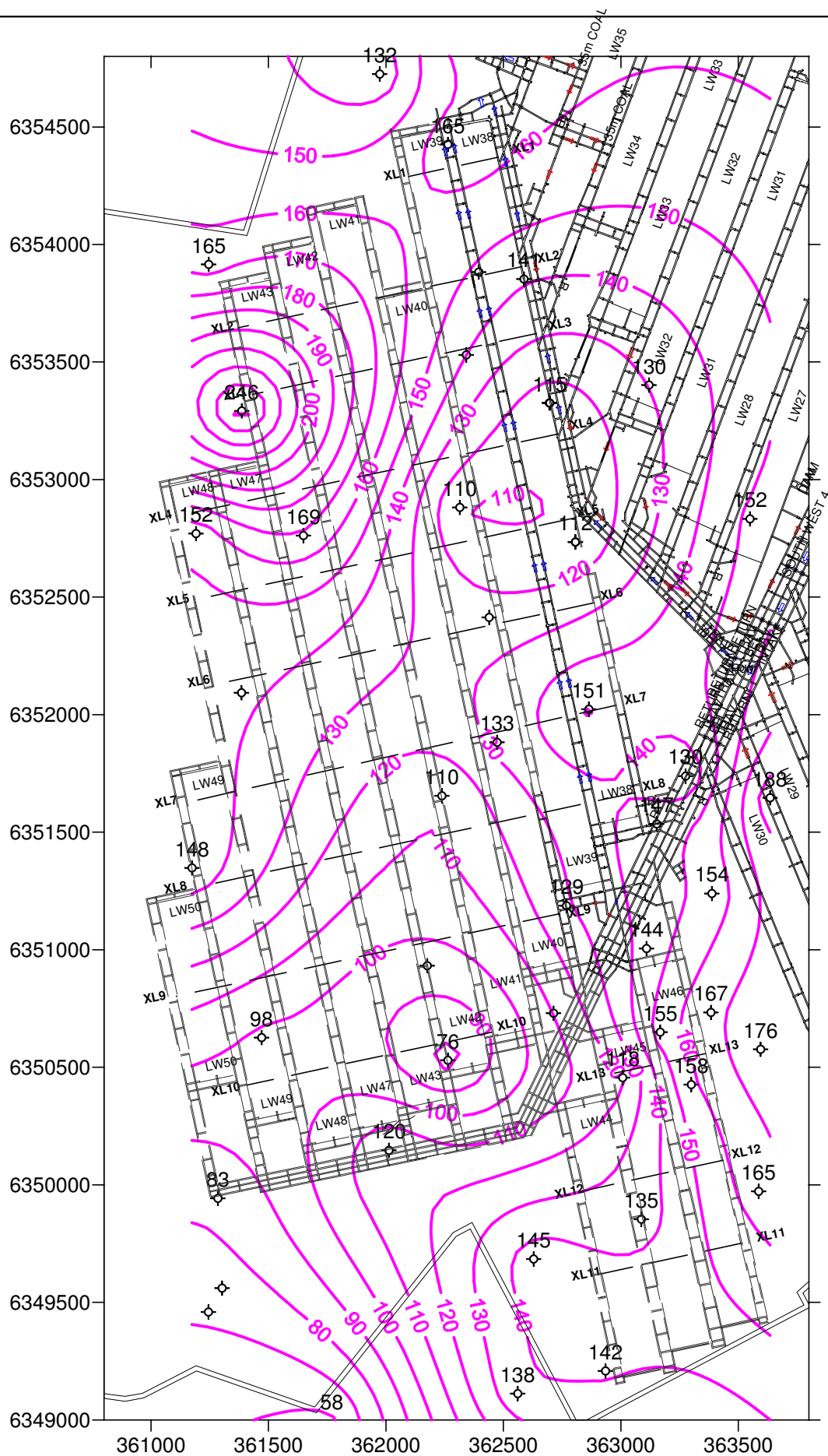
Ditton Geotechnical
 Services Pty Ltd

Client: West Wallsend Colliery
 WWD-012/1

Title: Interpreted Channel 5 (Teralba Conglomerate) Thickness Contours (m)

Scale: 1:25,000

Figure No: 17



DgS

Engineer: S.Ditton
 Drawn: S.Ditton
 Date: 17.09.08

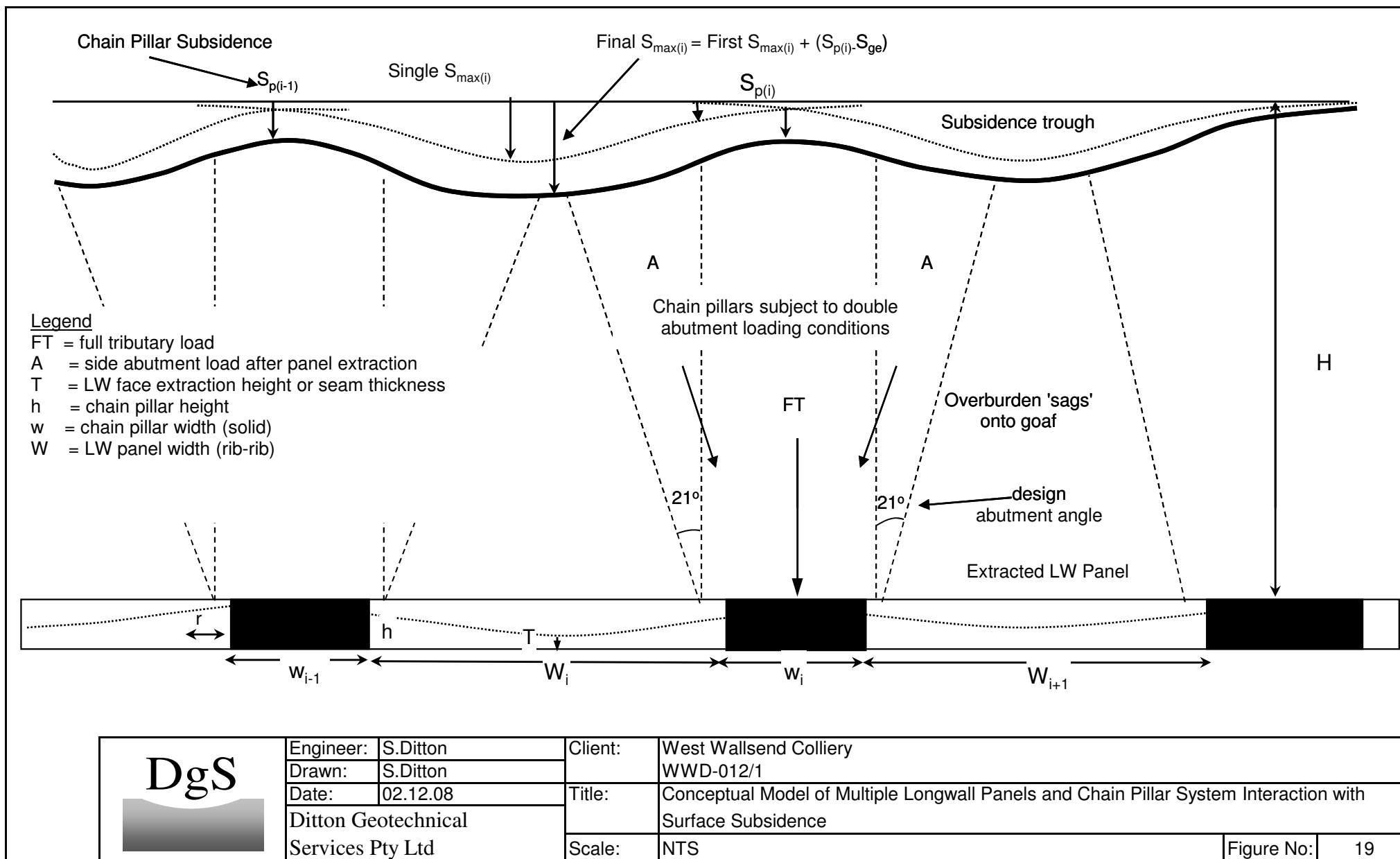
Ditton Geotechnical
 Services Pty Ltd

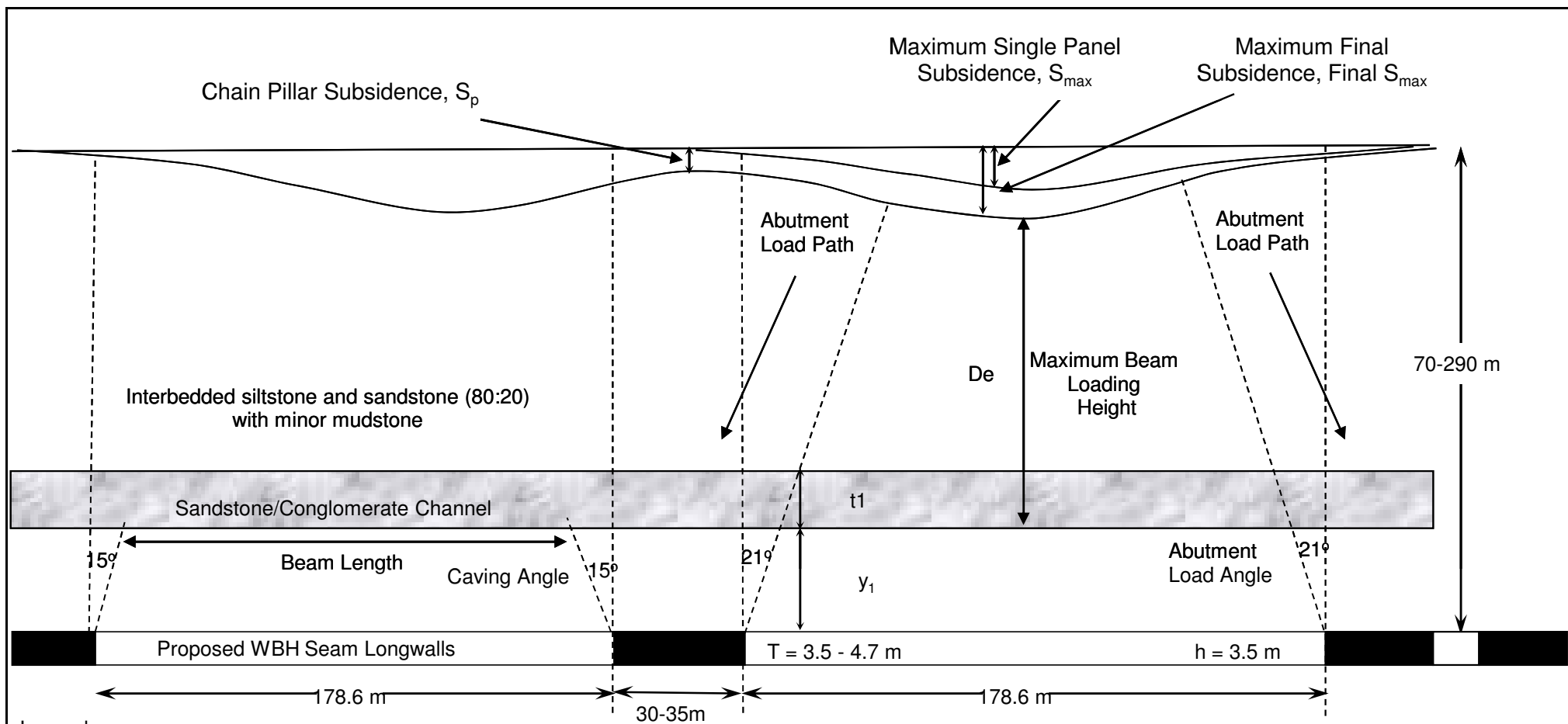
Client: West Wallsend Colliery
 WWD-012/1

Title: Interpreted Channel 5 (Great Northern/Teralba Conglomerate)
 Distance (y) above Workings Contours (m)

Scale: 1:25,000

Figure No: 18





Legend

SRP - Subsidence Reduction Potential



Massive Unit

T - Seam Thickness

h - Development Road Height

DgS



Engineer: S.Ditton

Drawn: S.Ditton

Date: 02.12.08

Ditton Geotechnical
Services Pty Ltd

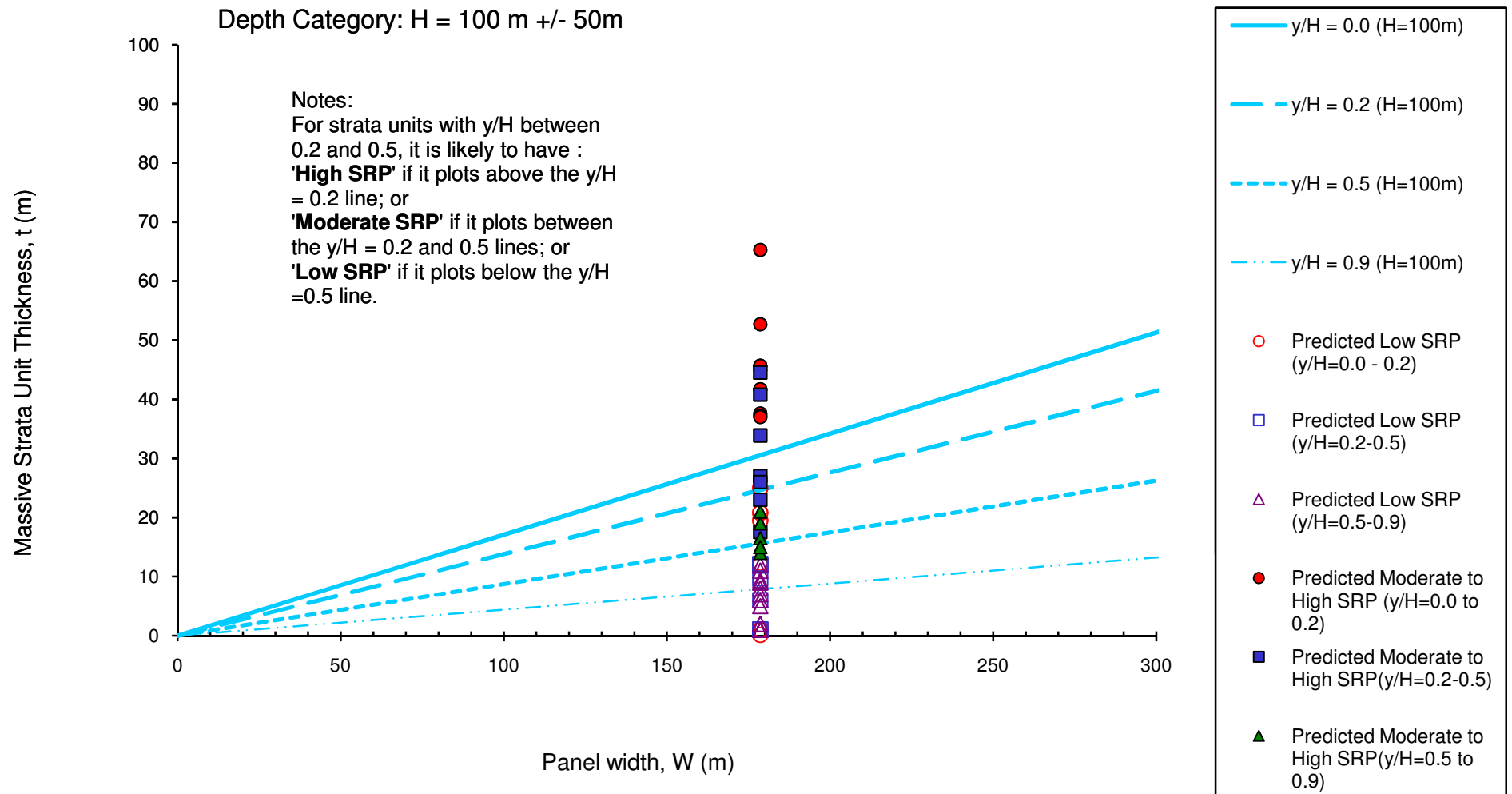
Client: West Wallsend Colliery

WWD-012/1

Title: Conceptual Model for Assessing Subsidence Reduction Potential of Massive Strata Units in Overburden

Scale: NTS

Figure No: 20



DgS



Engineer: S.Ditton

Drawn: S.Ditton

Date: 02.12.08

Ditton Geotechnical
Services Pty Ltd

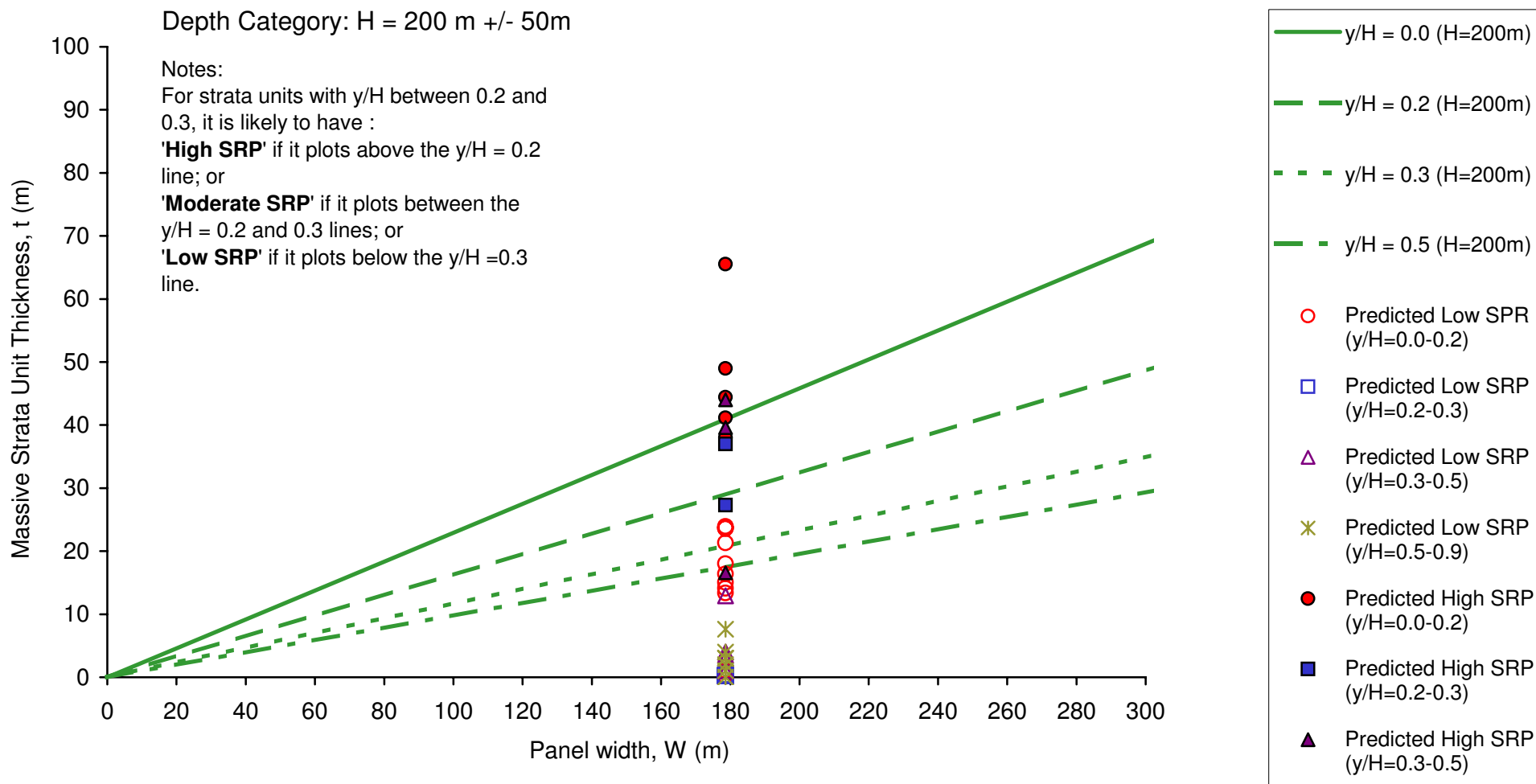
Client: West Wallsend Colliery

WWD-012/1

Title: Subsidence Reduction Potential of Massive Units Above WBH Seam for Cover Depths
from 70 to 150 m

Scale: NTS

Figure No: 21a



DgS



Engineer: S.Ditton

Drawn: S.Ditton

Date: 07.03.08

Ditton Geotechnical
Services Pty Ltd

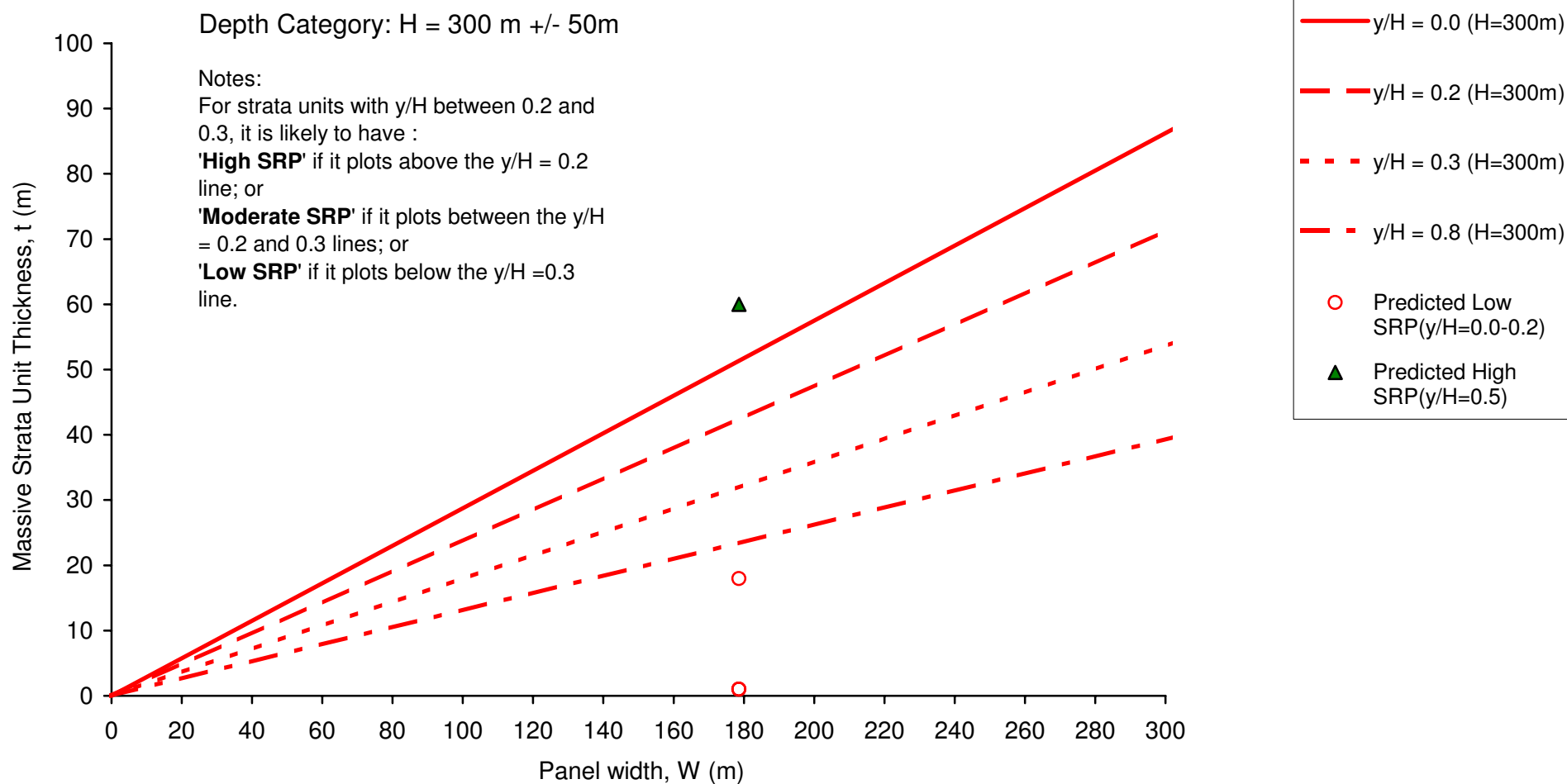
Client: West Wallsend Colliery

WWD-012/1

Title: Subsidence Reduction Potential of Massive Units Above WBH Seam for Cover Depths
between 150 m and 250 m

Scale: NTS

Figure No: 21b



DgS



Engineer: S.Ditton

Drawn: S.Ditton

Date: 02.12.08

Ditton Geotechnical
Services Pty Ltd

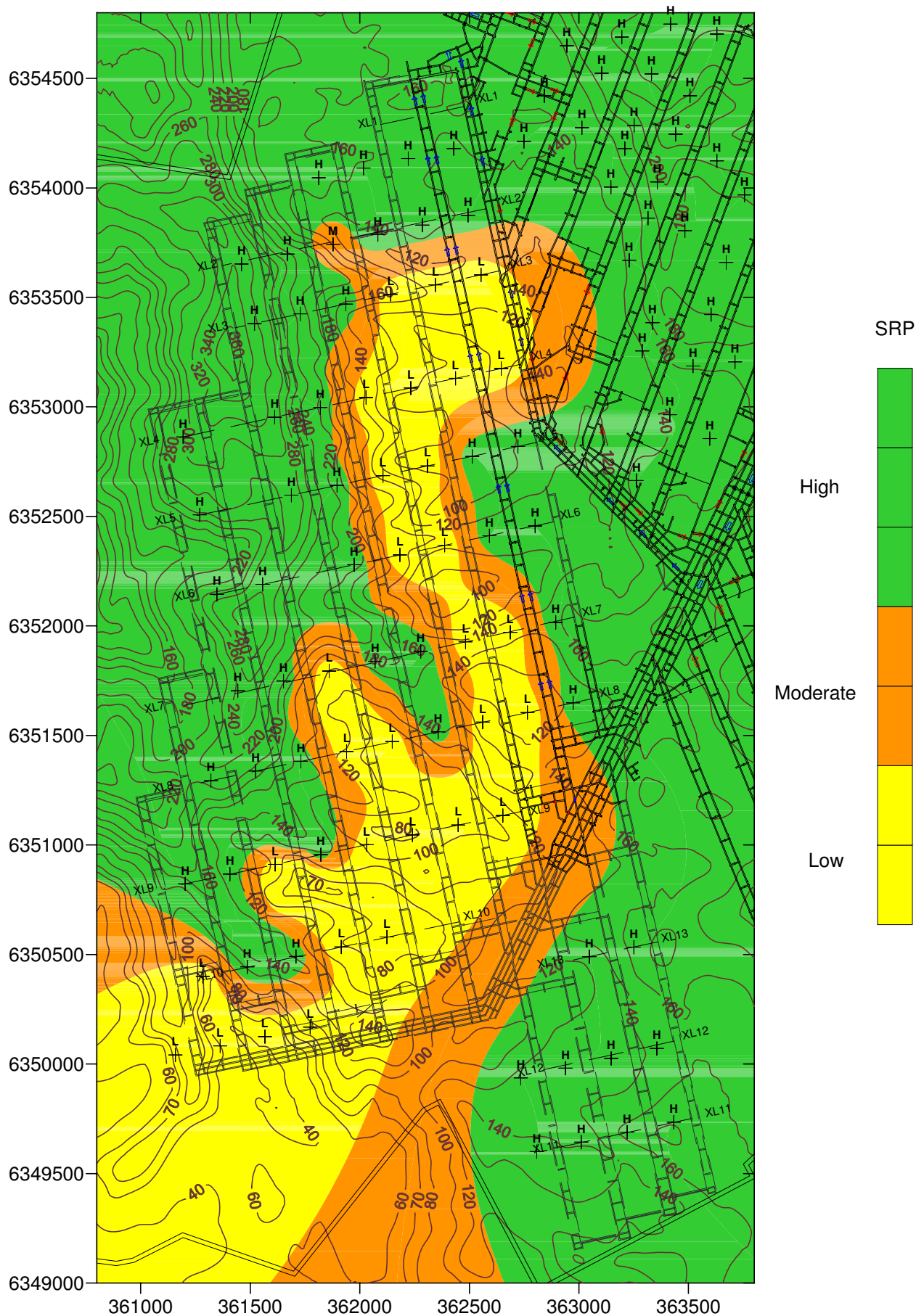
Client: West Wallsend Colliery

WWD-012/1

Title: Subsidence Reduction Potential of Massive Units Above WBH Seam for Cover Depths
from 250 m to 480 m

Scale: NTS

Figure No: 21c



DgS



Engineer: S.Ditton
 Drawn: S.Ditton
 Date: 17.01.10

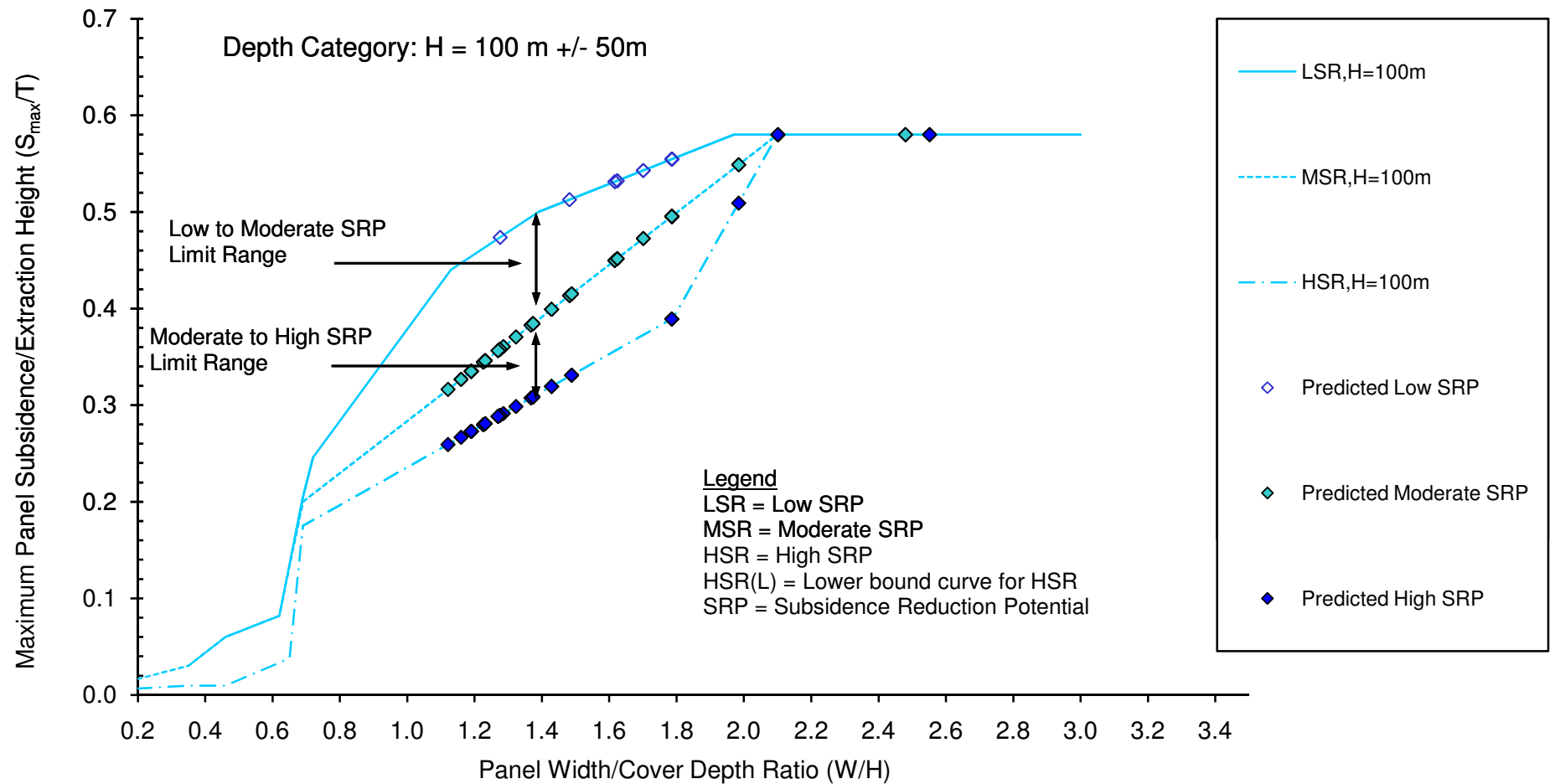
Ditton Geotechnical
 Services Pty Ltd

Client: West Wallsend Colliery
 WWD-012/1

Title: Subsidence Reduction Potential and Depth of Cover Contours Over the
 Proposed Longwalls in Western and Southern Domains

Scale: 1:25,000

Figure No: 22



DgS



Engineer: S.Ditton

Drawn: S.Ditton

Date: 02.12.08

Ditton Geotechnical
Services Pty Ltd

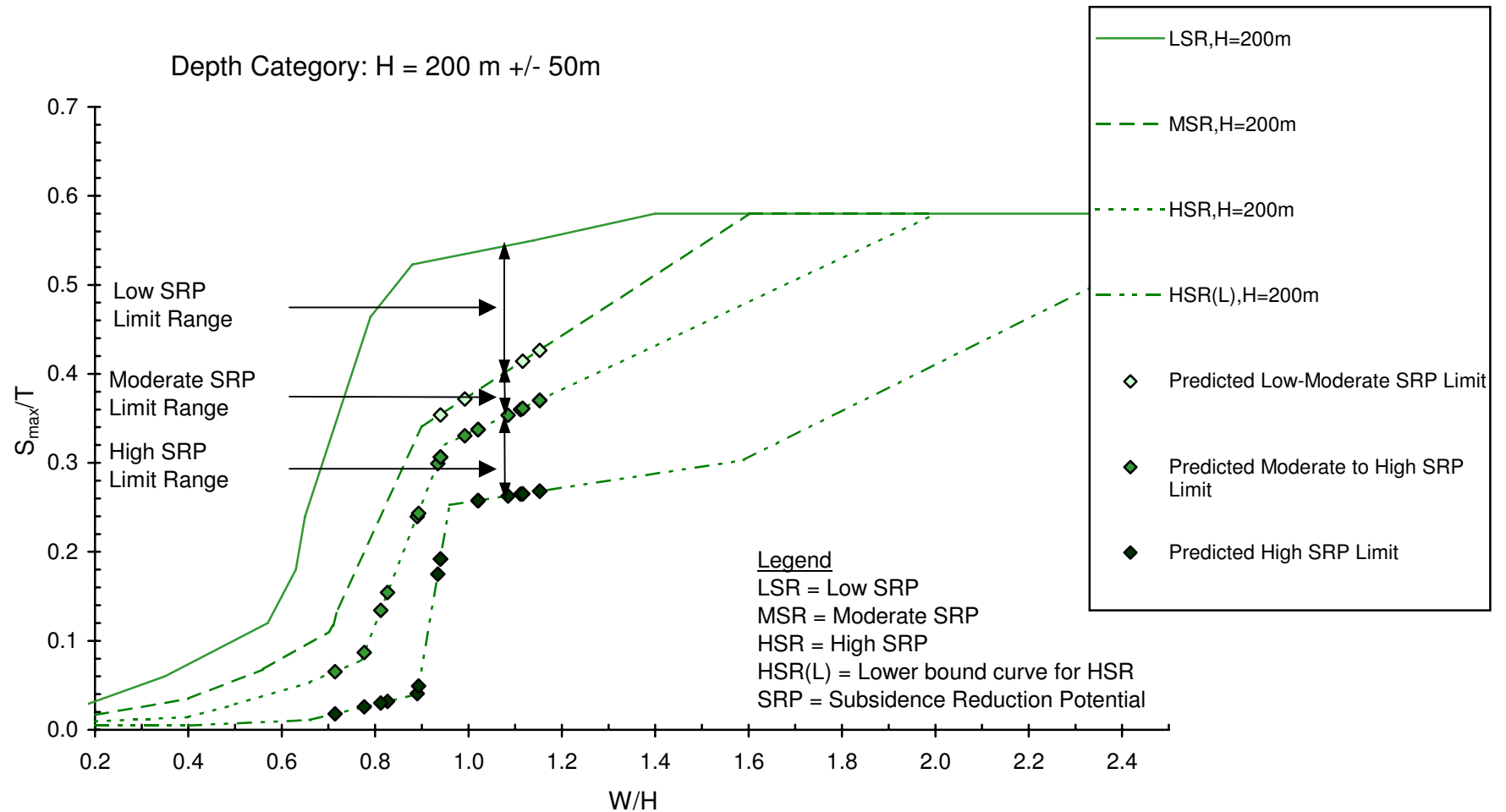
Client: West Wallsend Colliery

WWD-012/1

Title: Predicted Maximum Single Panel Subsidence for Longwalls in Western and Southern
Domains with Cover Depths from 70 m to 150 m

Scale: NTS

Figure No: 23a



DgS



Engineer: S.Ditton

Drawn: S.Ditton

Date: 02.12.08

Ditton Geotechnical
Services Pty Ltd

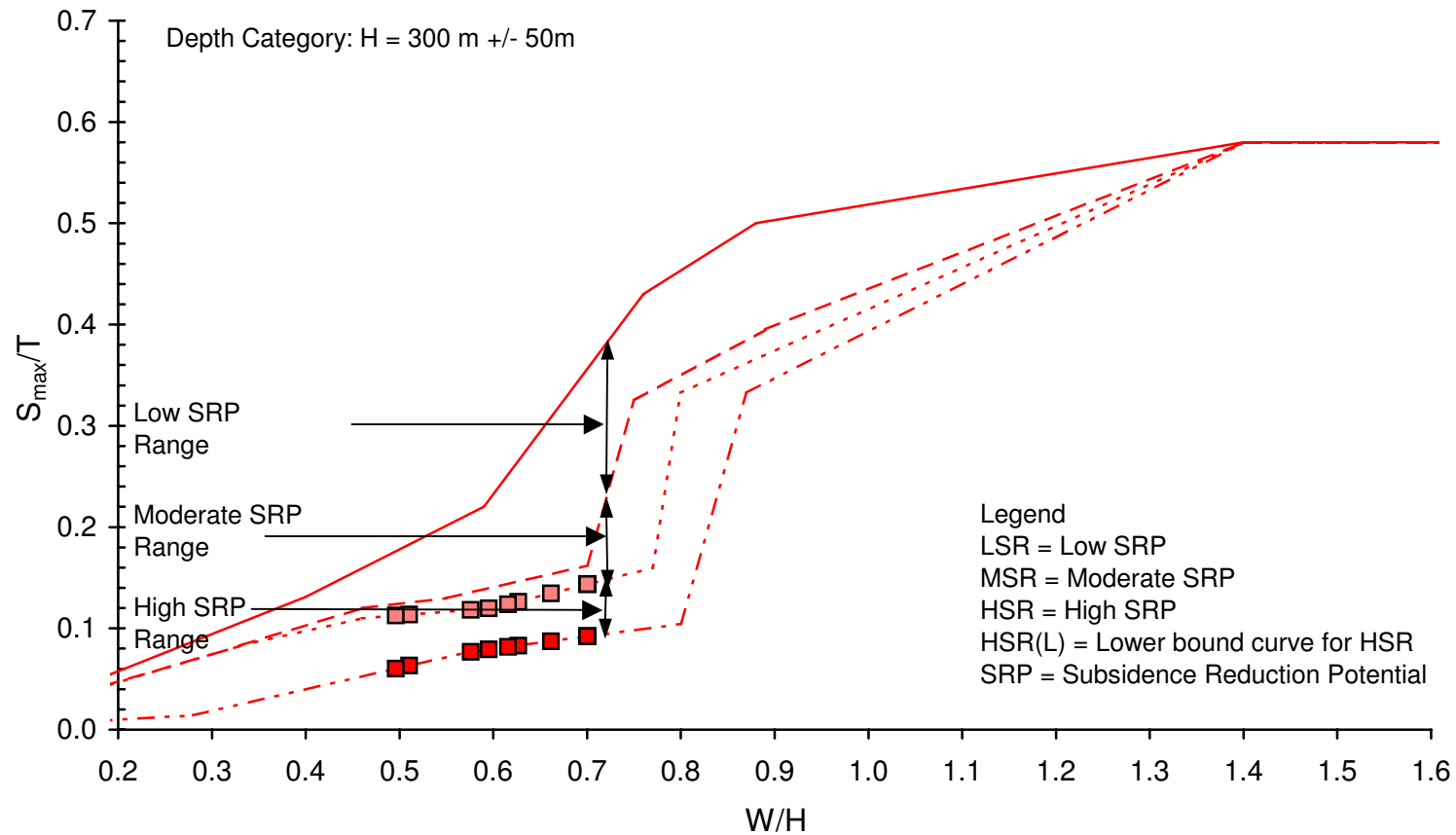
Client: West Wallsend Colliery

WWD-012/1

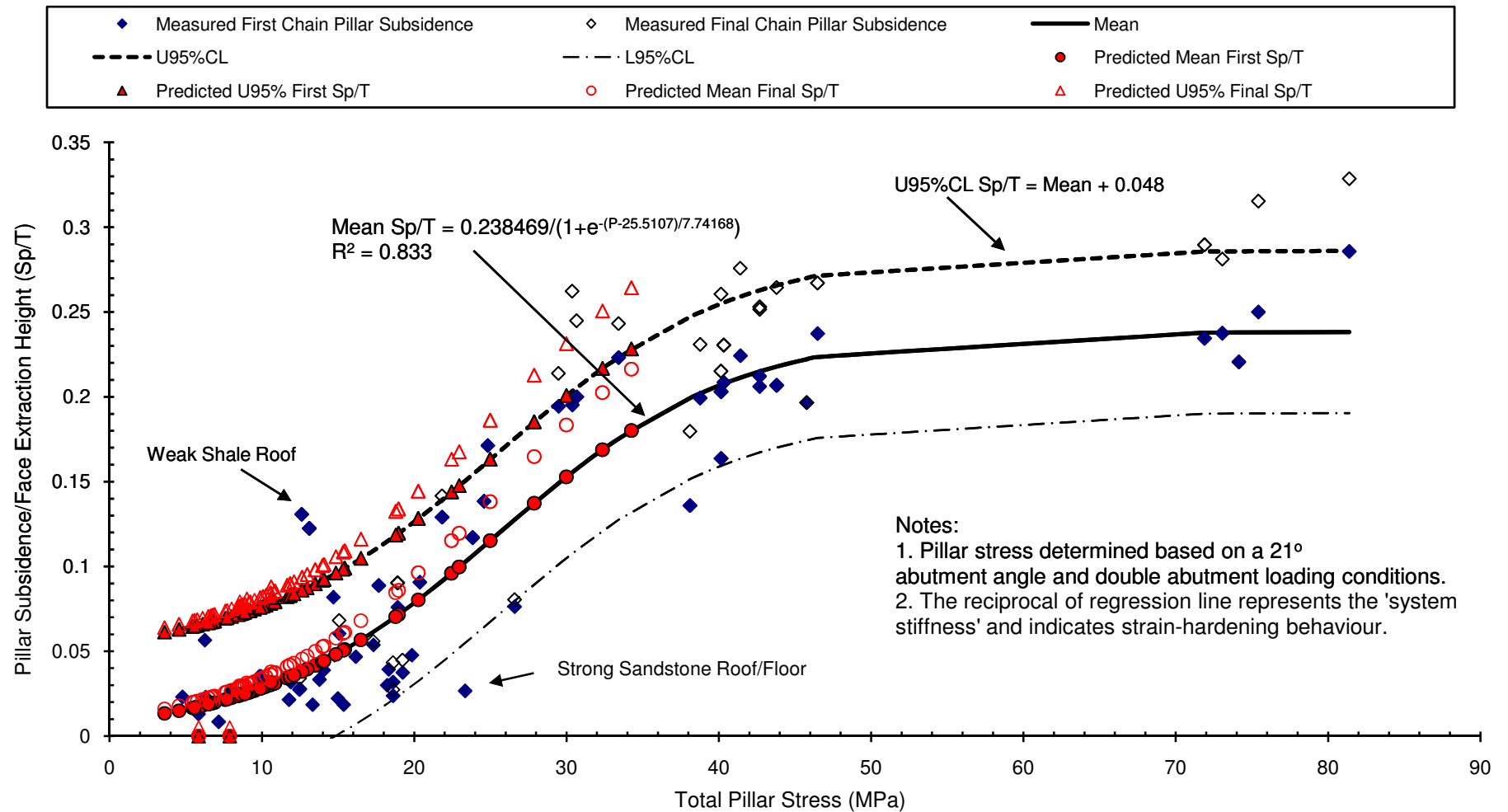
Title: Predicted Maximum Single Panel Subsidence for Longwalls in Western and Southern
Domains with Cover Depths from 150 m to 250 m

Scale: NTS

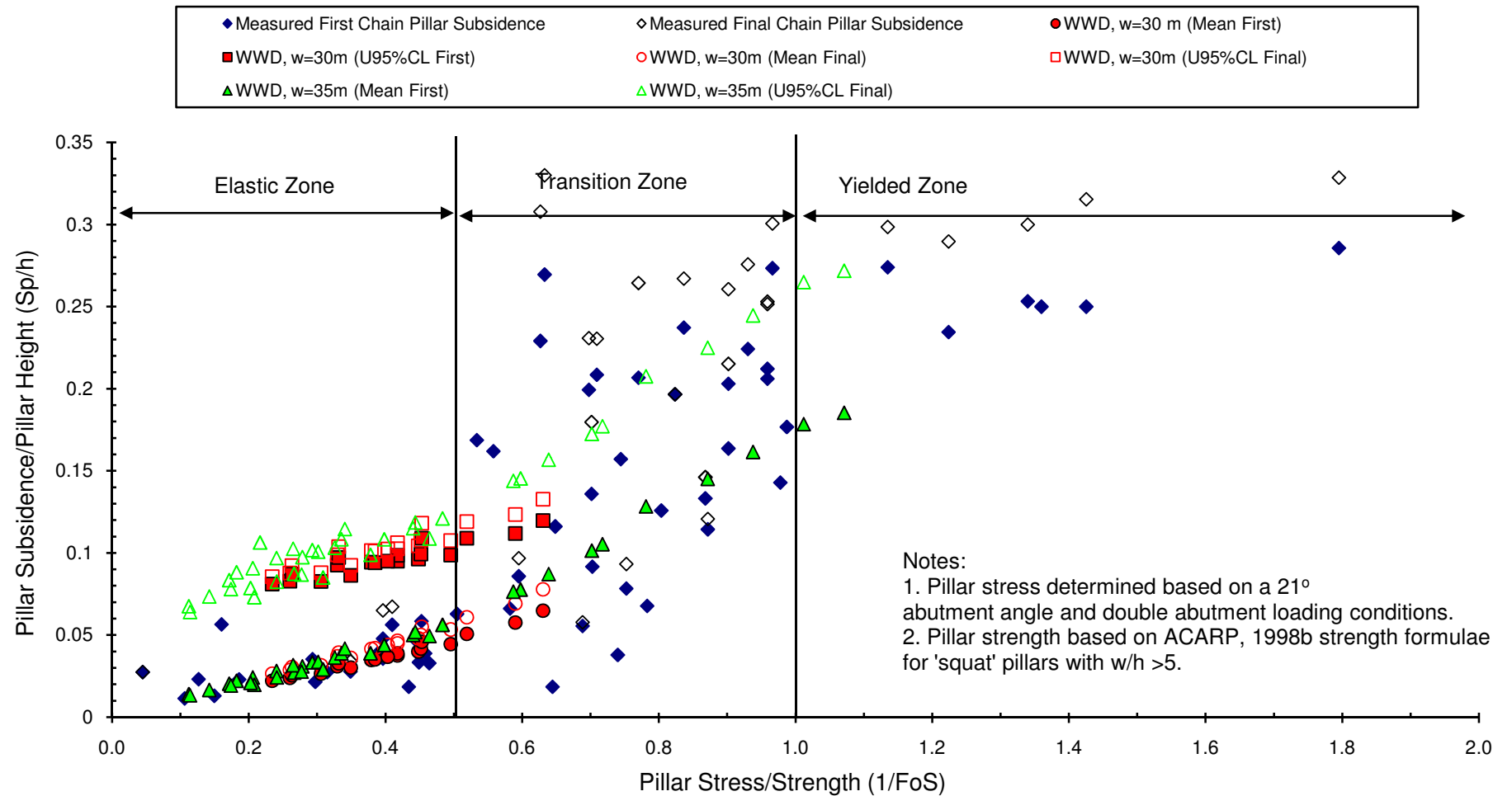
Figure No: 23b



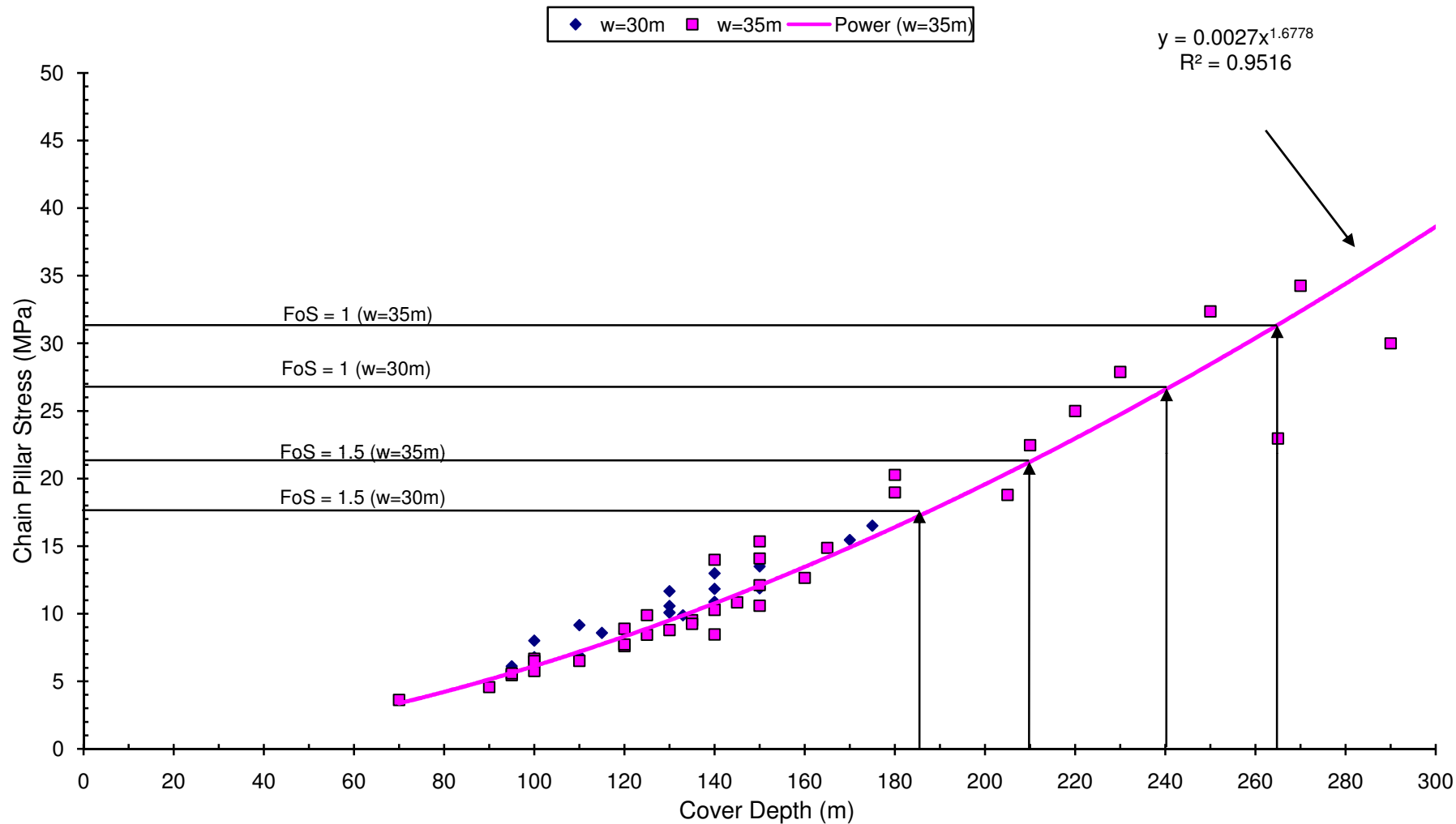
	Engineer:	S.Ditton	Client:	West Wallsend Colliery			
	Drawn:	S.Ditton		WWD-012/1			
	Date:	02.12.08	Title:	Predicted Maximum Single Panel Subsidence for Longwalls in Western and Southern			
	Ditton Geotechnical			Domains with Cover Depths from 250 m to 360 m			
	Services Pty Ltd		Scale:	NTS		Figure No:	23c



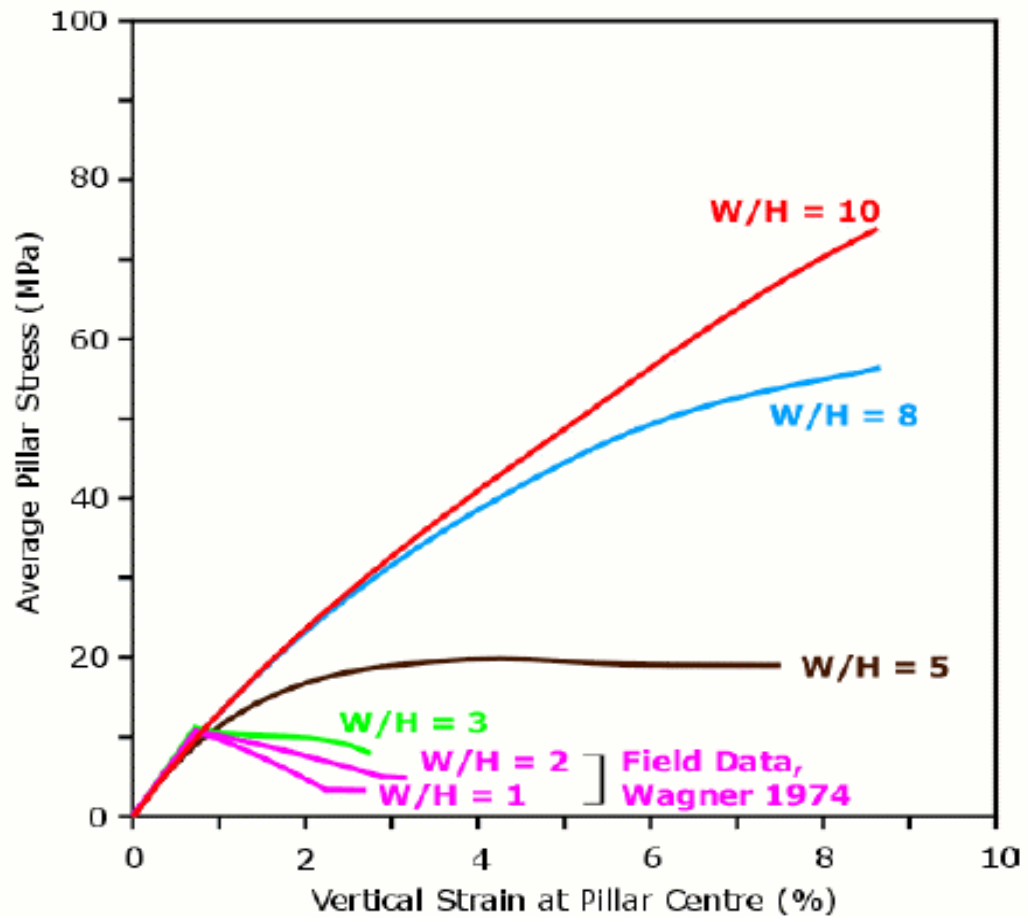
	Engineer:	S.Ditton	Client:	West Wallsend Colliery	
	Drawn:	S.Ditton		WWD-012/1	
	Date:	17.02.09	Title:	Empirical Chain Pillar Subsidence Prediction Model and the Predicted Outcomes for LWs 38 to 50	
	Ditton Geotechnical Services Pty Ltd		Scale:	NTS	Figure No: 24a



	Engineer:	S.Ditton	Client:	West Wallsend Colliery				
	Drawn:	S.Ditton		WWD-012/1				
	Date:	17.02.09	Title:	Longwall Chain Pillar Subsidence/Seam Thickness v. Pillar Stress over Strength Model derived from the Modified ACARP, 2003 Model Database				
	Ditton Geotechnical Services Pty Ltd			Scale:	NTS			Figure No:



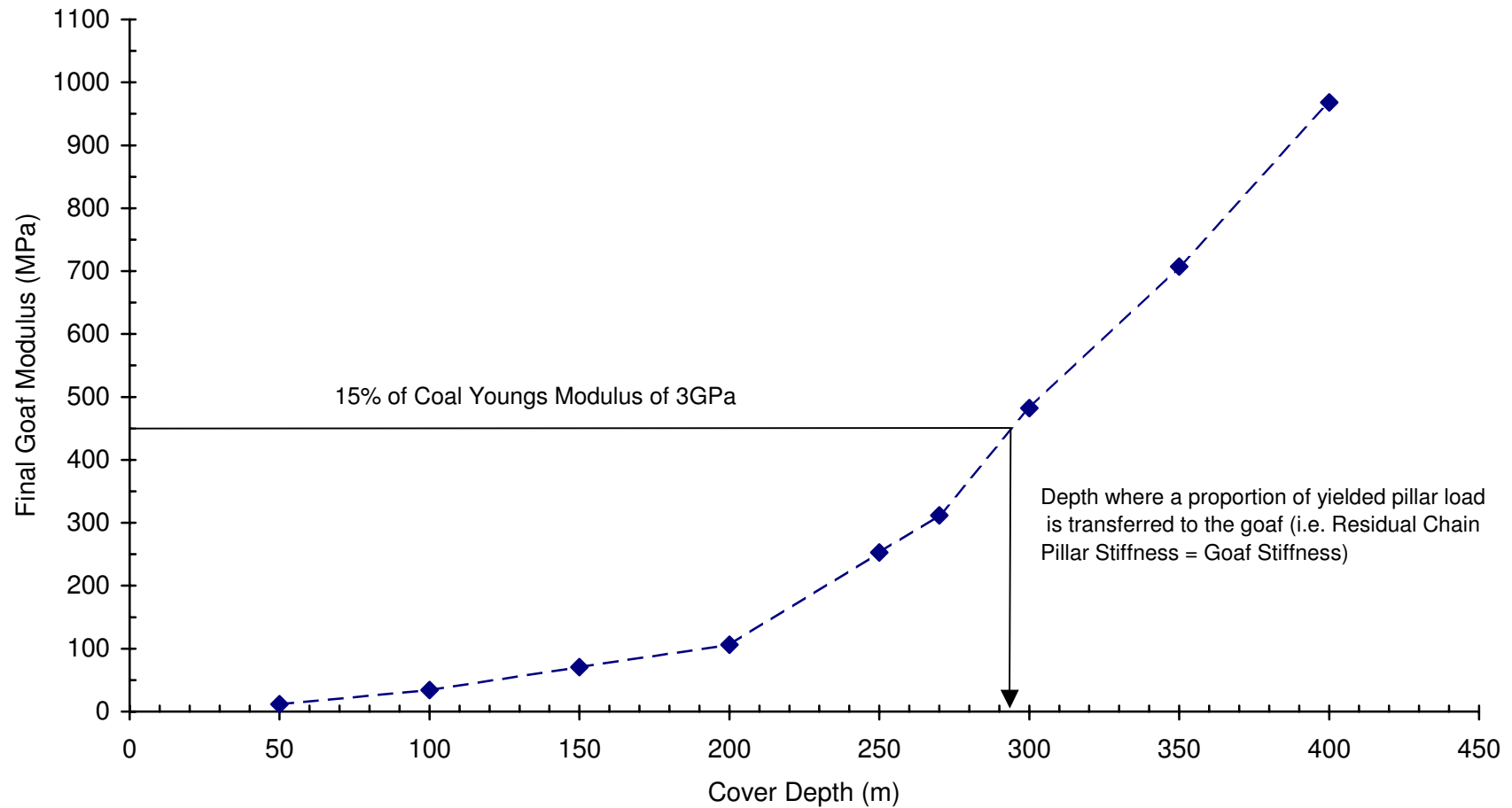
	Engineer:	S.Ditton	Client:	West Wallsend Colliery		
	Drawn:	S.Ditton		WWD-012/1		
	Date:	17.02.09	Title:	Chain Pillar Stress v. Cover Depth and FoS Estimates for Pillars under Double		
	Ditton Geotechnical		Abutment Loading (21 degree abutment angle assumed)			
	Services Pty Ltd		Scale:	NTS		Figure No: 24c



Source: **ACARP, 2005** (refer to text)



Engineer:	S.Ditton	Client:	West Wallsend Colliery	
Drawn:	S.Ditton		WWD-012/1	
Date:	12.12.08	Title:	In-situ Pillar Stress v. Strain Response for a Range of Pillar Width/Height Ratios	
Ditton Geotechnical Services Pty Ltd		Scale:	NTS	Figure No: 24d



DgS



Engineer: S.Ditton

Drawn: S.Ditton

Date: 02.12.08

Ditton Geotechnical
Services Pty Ltd

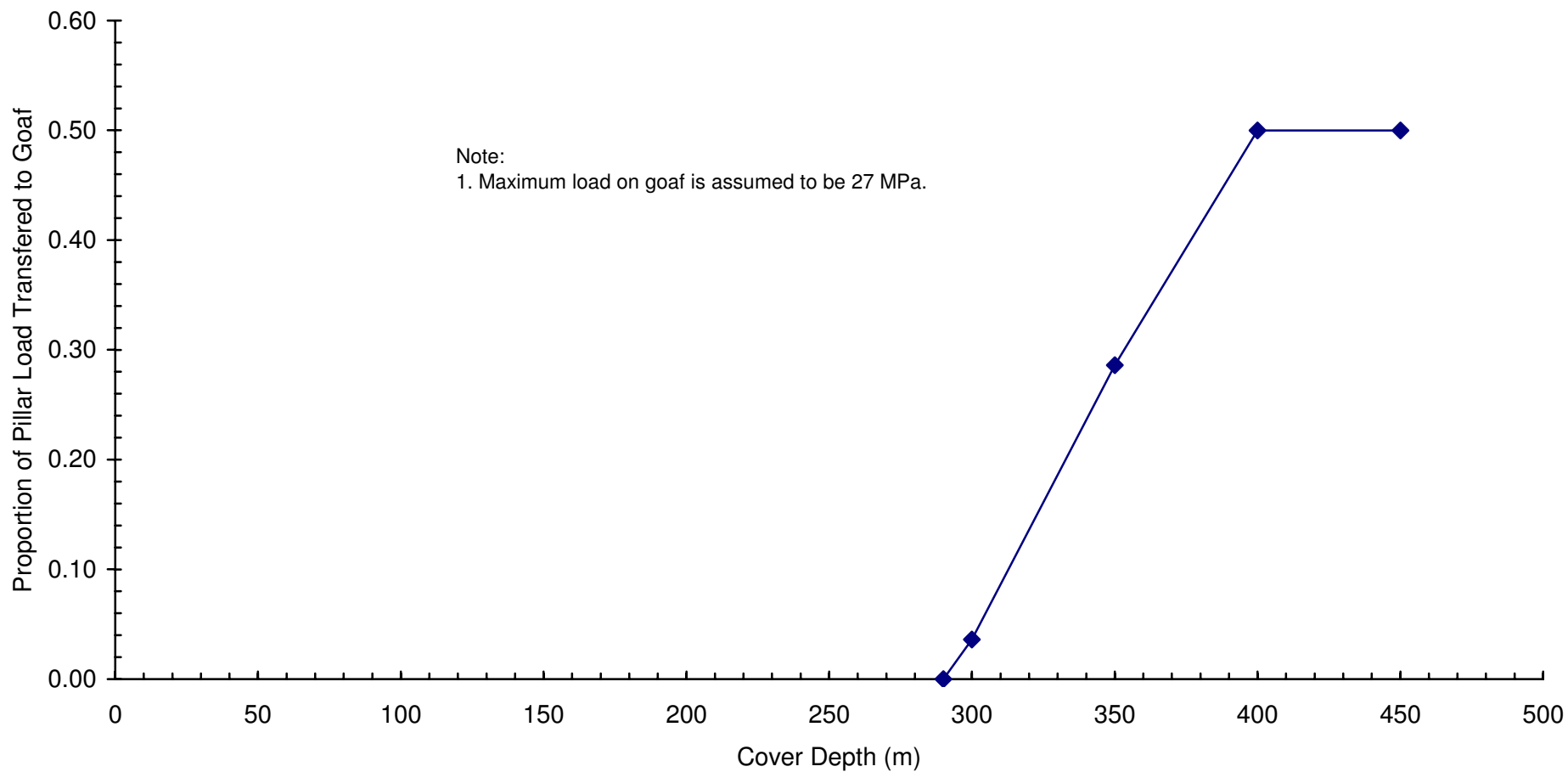
Client: West Wallsend Colliery

WWD-012/1

Title: Final Goaf Modulus Model for Estimating Load Transfer from Yielding Chain Pillars
(derived from the Modified ACARP, 2003 Model Database)

Scale: NTS

Figure No: 24e



DgS



Engineer: S.Ditton

Drawn: S.Ditton

Date: 02.12.08

Ditton Geotechnical
Services Pty Ltd

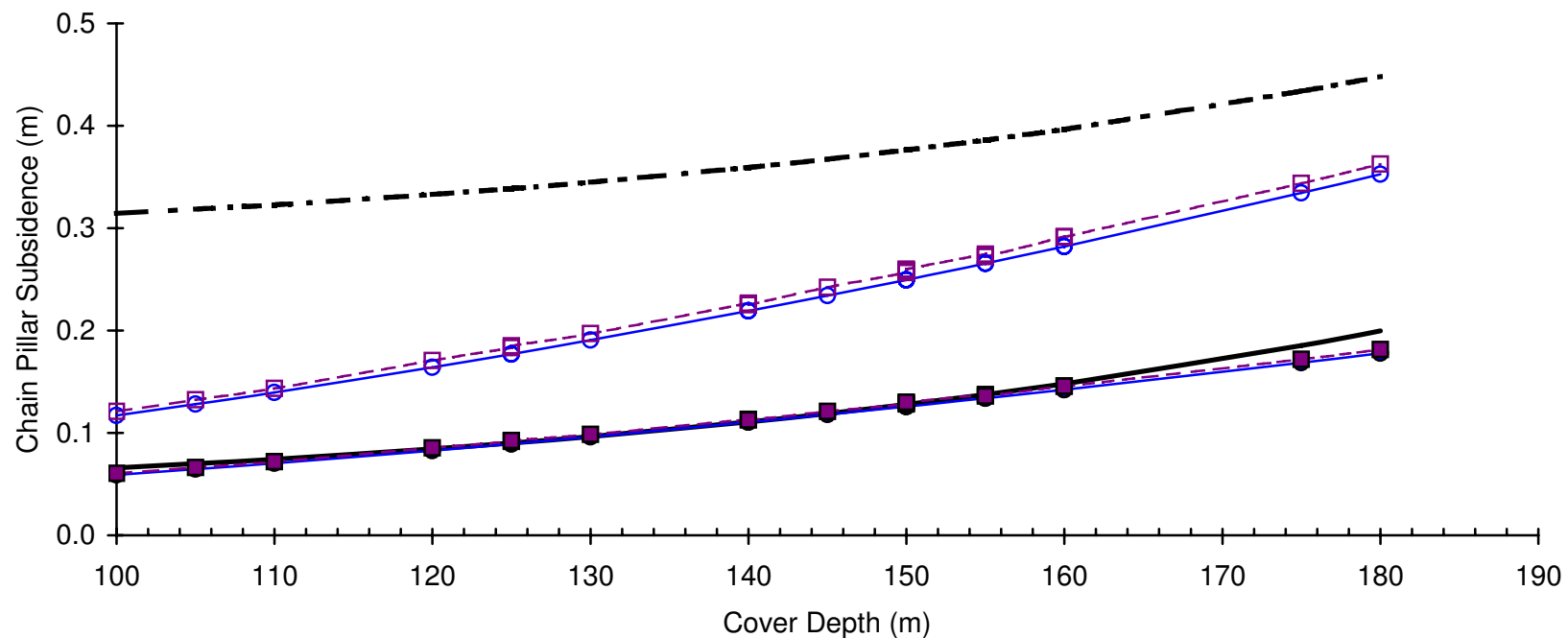
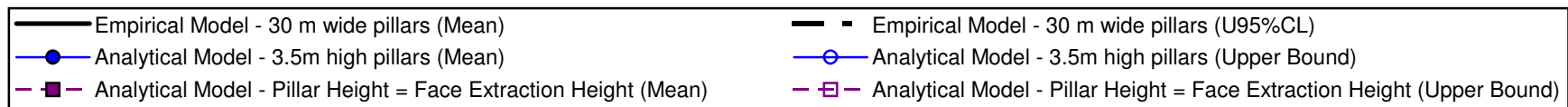
Client: West Wallsend Colliery

WWD-012/1

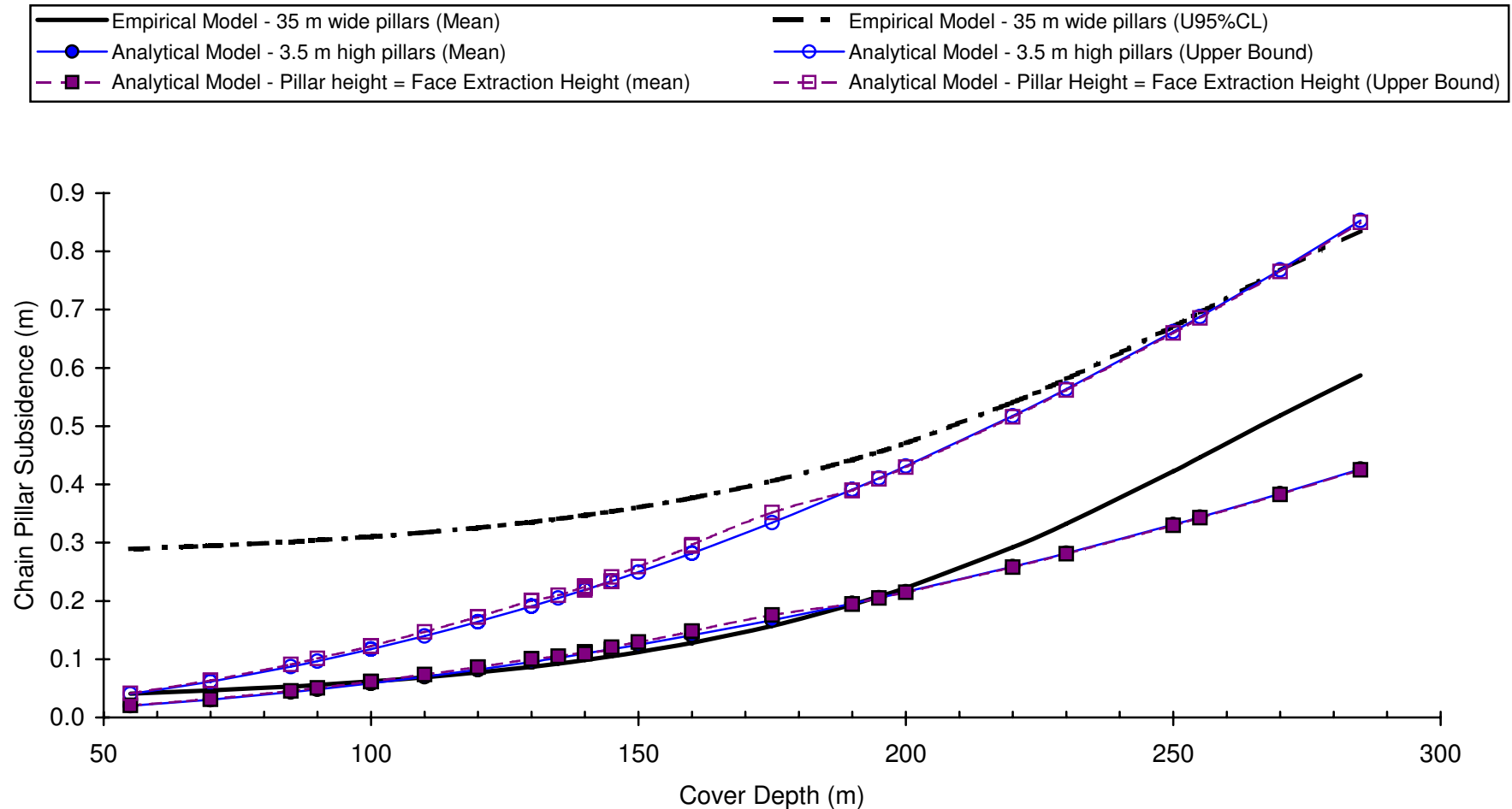
Title: Empirical Model for Estimating Load Transfer from Yielding Chain Pillars
(derived from the Modified ACARP, 2003 Model Database)

Scale: NTS

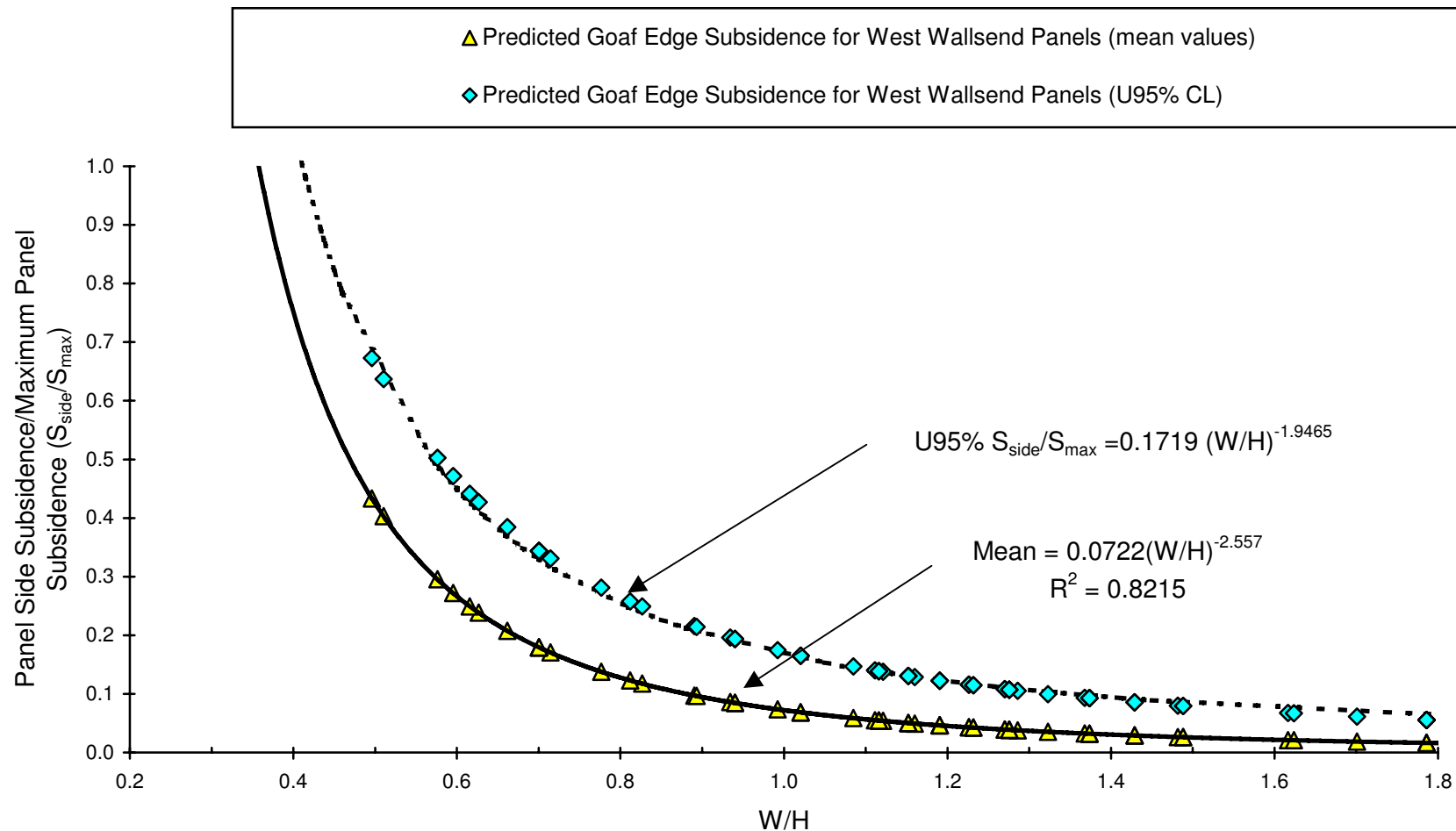
Figure No: 24f



	Engineer:	S.Ditton	Client:	West Wallsend Colliery			
	Drawn:	S.Ditton		WWD-012/1			
	Date:	02.12.08	Title:	Empirical v. Analytical Chain Pillar Subsidence Prediction Model Outcomes			
	Ditton Geotechnical			for West Wallsends 30m Wide (solid) Chain Pillars			
	Services Pty Ltd		Scale:	NTS		Figure No:	24g



Engineer: Drawn: Date: Ditton Geotechnical Services Pty Ltd	S.Ditton	Client:	West Wallsend Colliery		
	S.Ditton		WWD-012/1		
	02.12.08	Title:	Empirical v. Analytical Chain Pillar Subsidence Prediction Model Outcomes for West Wallsend's 35m Wide (solid) Chain Pillars		
		Scale:	NTS		Figure No: 24h



DgS



Engineer: S.Ditton

Drawn: S.Ditton

Date: 02.12.08

Ditton Geotechnical
Services Pty Ltd

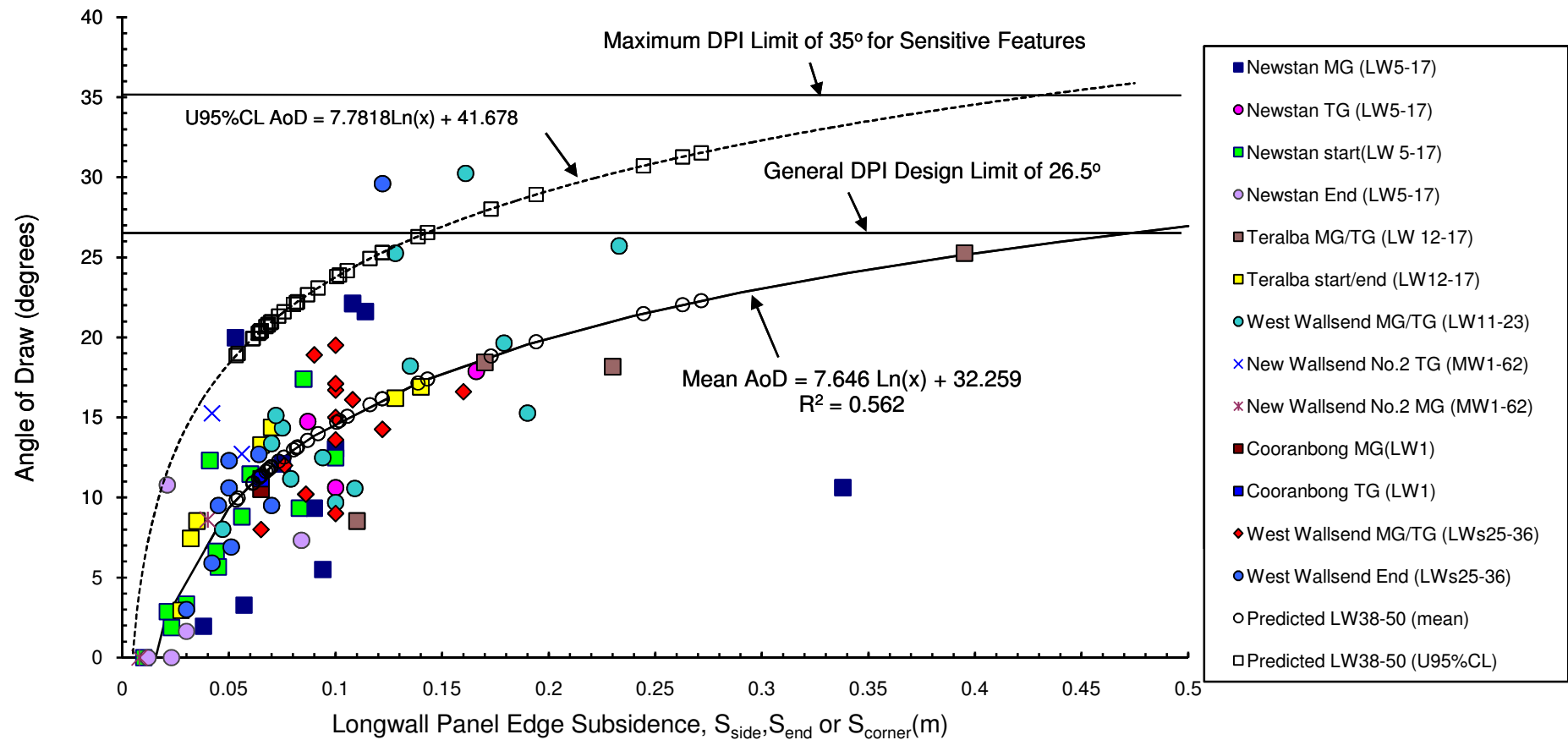
Client: West Wallsend Colliery

WWD-012/1

Title: Empirical Model for Goaf Edge Subsidence Prediction above Longwall Mines in the
Newcastle Coalfield

Scale: NTS

Figure No: 25



DgS



Engineer: S.Ditton

Drawn: S.Ditton

Date: 28.04.09

Ditton Geotechnical
Services Pty Ltd

Client: West Wallsend Colliery
WWD-012/1

Title: Empirical Model for Predicting the Angle of Draw from Longwall Panel Limits
in the Newcastle Coalfield with Predictions for the Western & Southern Domain LWs

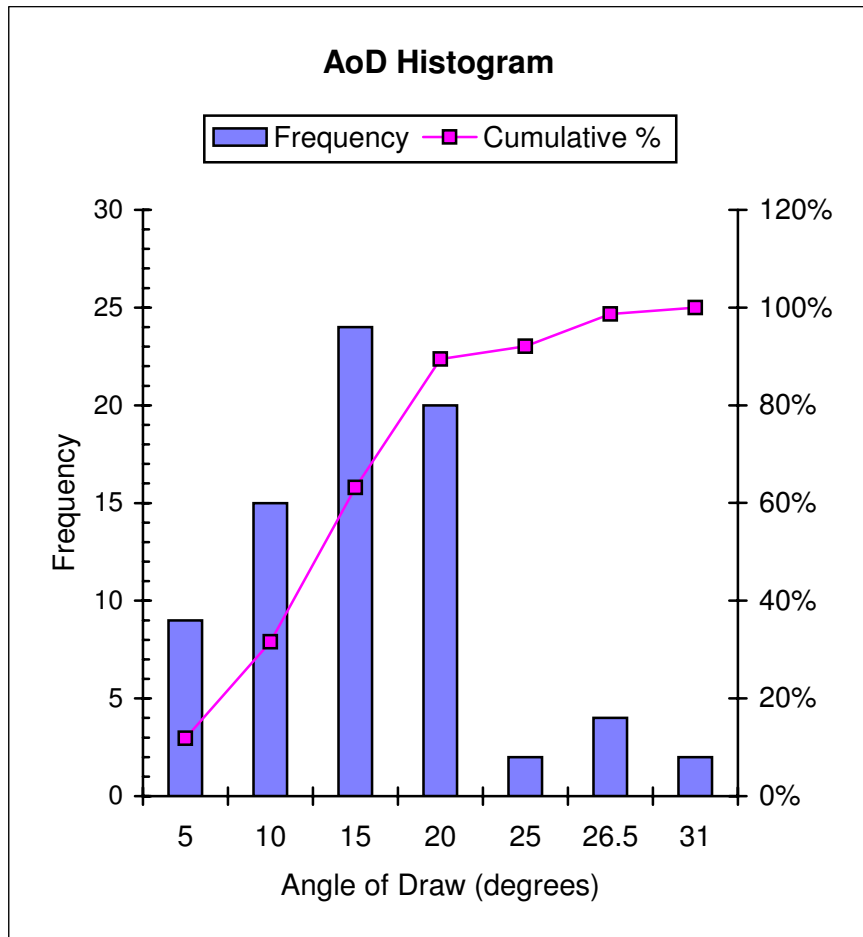
Scale: NTS

Figure No: 26a

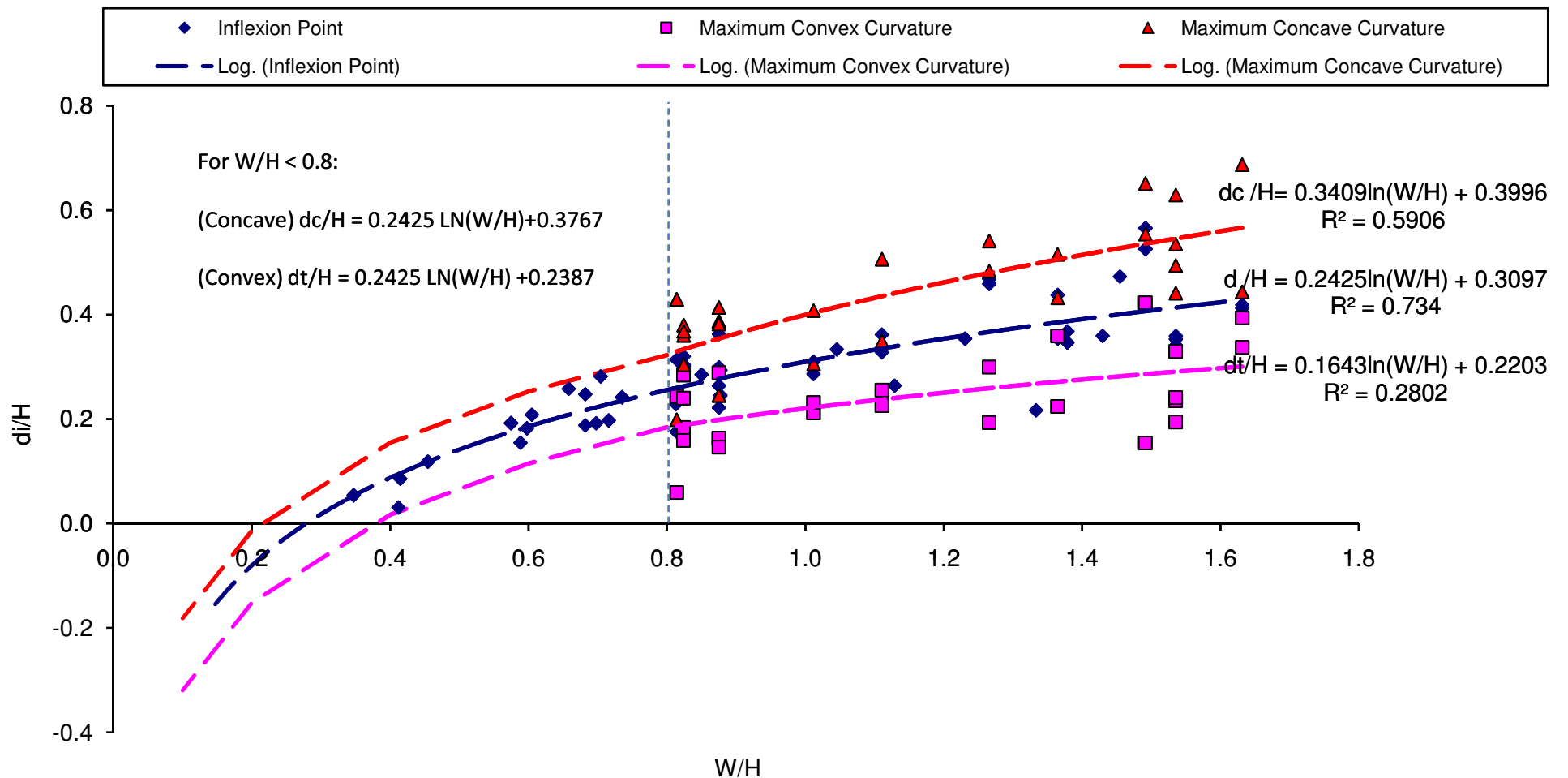
Bin	Frequency	Cumulative %
5	9	11.8%
10	15	31.6%
15	24	63.2%
20	20	89.5%
25	2	92.1%
26.5	4	98.7%
31	2	100.0%

Statistics

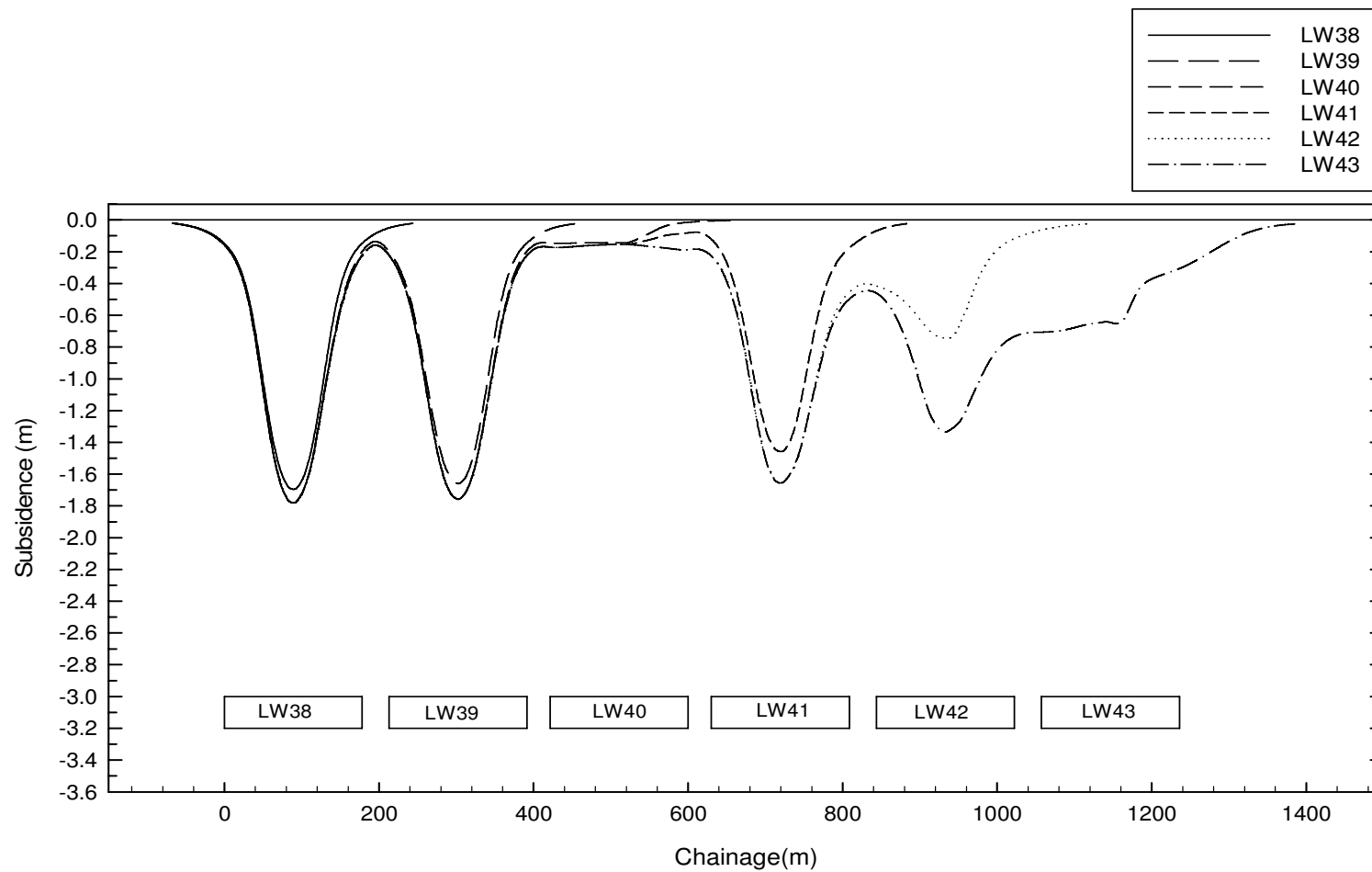
Mean	13.0 degrees
Standard Error	0.78
Median	12.88
Mode	0.00
Standard Deviation	6.80 degrees
Students t(U95%CL,n)	1.67
Upper 95% Confidence Limit	24.30 degrees
Sample Variance	46.24
Kurtosis	0.14
Skewness	0.17
Range	30.24
Minimum	0.00 degrees
Maximum	30.24 degrees
Sum	985.91
Count	76



	Engineer:	S.Ditton	Client:	West Wallsend Colliery			
	Drawn:	S.Ditton		WWD-012/1			
	Date:	28.04.09	Title:	Measured Angle of Draw from Longwall Panel Statistics (Sides and Ends of Panels)			
	Ditton Geotechnical			in the Newcastle Coalfield			
	Services Pty Ltd		Scale:	NTS		Figure No:	26b



	Engineer:	S.Ditton	Client:	West Wallsend Colliery			
	Drawn:	S.Ditton		WWD-012/1			
	Date:	08.05.09	Title:	Empirical Model for Predicting the Location of Inflexion Point, Maximum Tensile and Compressive Strain Peaks due to Longwall Panel Subsidence in the Newcastle Coalfield			
	Ditton Geotechnical Services Pty Ltd			Scale: NTS			
				Figure No:			27



DgS



Engineer: S.Ditton

Drawn: S.Ditton

Date: 30.06.09

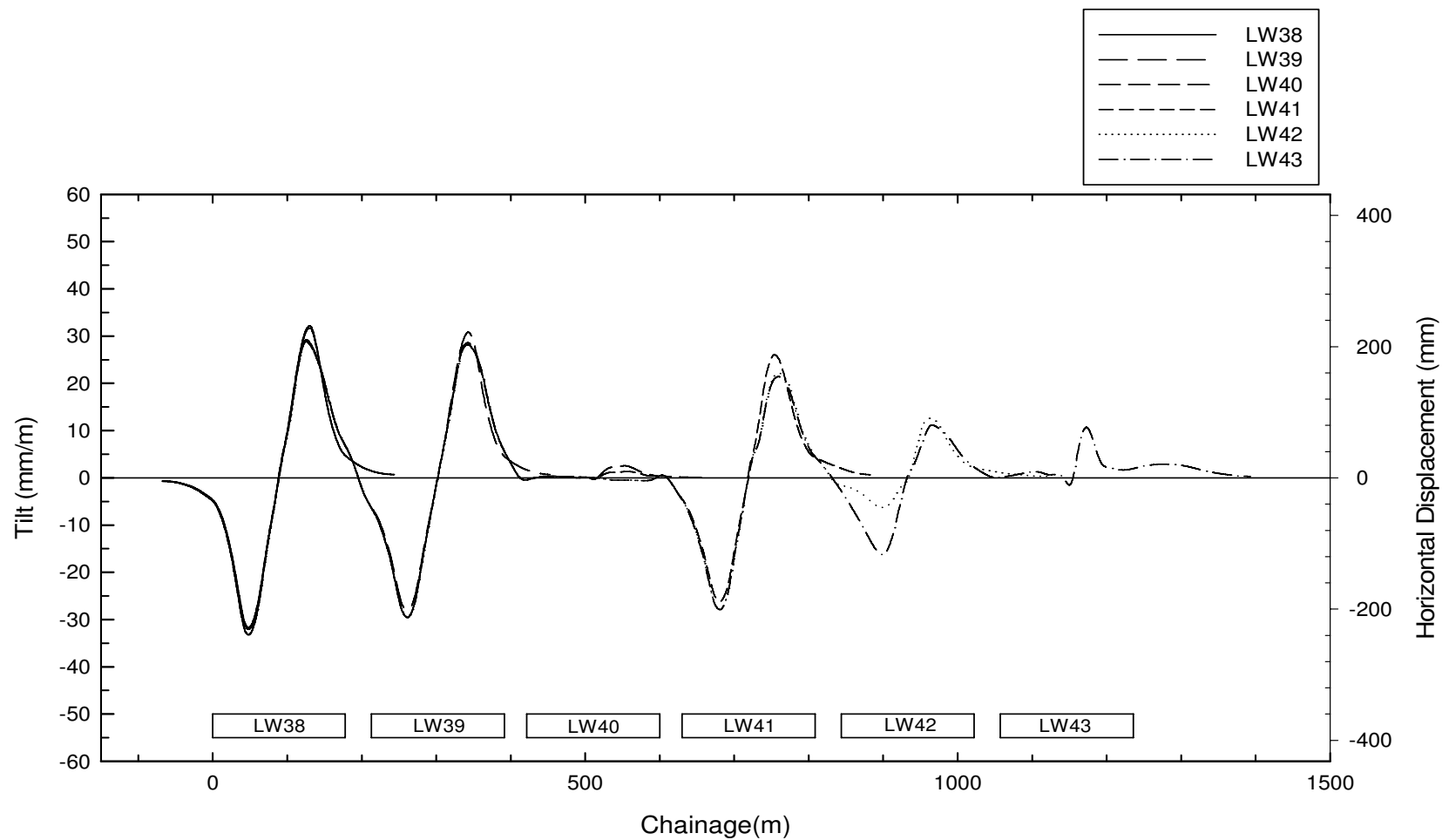
Ditton Geotechnical
Services Pty Ltd

Client: West Wallsend Colliery
WWD-012/1

Title: Predicted U95%CL Subsidence Profiles for XL 1 (looking south)
- see Figure 1a for Location

Scale: NTS

Figure No: 28a



	Engineer:	S.Ditton	Client:	West Wallsend Colliery			
	Drawn:	S.Ditton		WWD-012/1			
	Date:	30.06.09	Title:	Predicted U95% Confidence Limit Tilt Profiles for XL 1 (looking south)			
	Ditton Geotechnical			- see Figure 1a for Location			
	Services Pty Ltd		Scale:	NTS		Figure No:	28b