WHITEHAVEN COAL LIMITED

Assessment of Geotechnical Stability of Residual Voids at Daunia Mine

February 2026

henderson geotech pty ltd

11 Olive St
MORNINGSIDE 4170
ph: 07 3399 5020

CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

Dr Sue Henderson (RPEQ 4952) of Henderson Geotech Pty Ltd was requested to provide assessment of pit wall geotechnical stability for inclusion in void closure plans for Daunia Mine. The work, for the proposed final landform LF3-1-2 and associated land uses, was undertaken in February 2026.

The assessments described in this report were made in accordance with the principles of the Guidelines for Assessment of Geotechnically Safe and Stable Post-Mining Landforms (Simmons et al, 2024).

1.1 Limitation

This report has been prepared by Henderson Geotech Pty Ltd for Whitehaven Coal Limited (Client) for the purpose of supporting preparation of Progressive Rehabilitation and Closure Plan for Daunia Mine. It shall not be used or relied on for any other purpose. No parties other than the Client and the Department of Environment, Tourism, Science, and Innovation (DETSI) are authorised to rely on this report without the prior written consent of Henderson Geotech Pty Ltd.

This report is, in part, based on information provided by the Client or by other parties on behalf of the Client (Client-supplied information) in addition to data collected by Henderson Geotech Pty Ltd from the public domain. Henderson Geotech Pty Ltd has not always verified the accuracy of such information and makes no representations regarding its accuracy. Henderson Geotech Pty Ltd is not responsible for the consequences of any error or omission in Client-supplied information.

Henderson Geotech Pty Ltd has prepared this report in a manner consistent with the level of care, skill and diligence ordinarily provided by members of the same specialist field for projects of a similar nature and at the time and in the jurisdiction where the services were rendered. Henderson Geotech Pty Ltd makes no warranty, express or implied.

2. STATEMENT OF LANDFORM DESIGN INTENT

This assessment of geotechnical stability for residual voids at Daunia Mine was undertaken to support Daunia Mine's transitional Progressive Rehabilitation and Closure Plan, to demonstrate that the final voids can be rehabilitated as non-use management areas (NUMAs) that will not adversely impact nearby woodland and grazing PMLUs for at least 60 years.

The geotechnical stability analyses and assessment described in this report are applicable only to the scenarios and inputs also described herein. A new assessment will be required if there are:

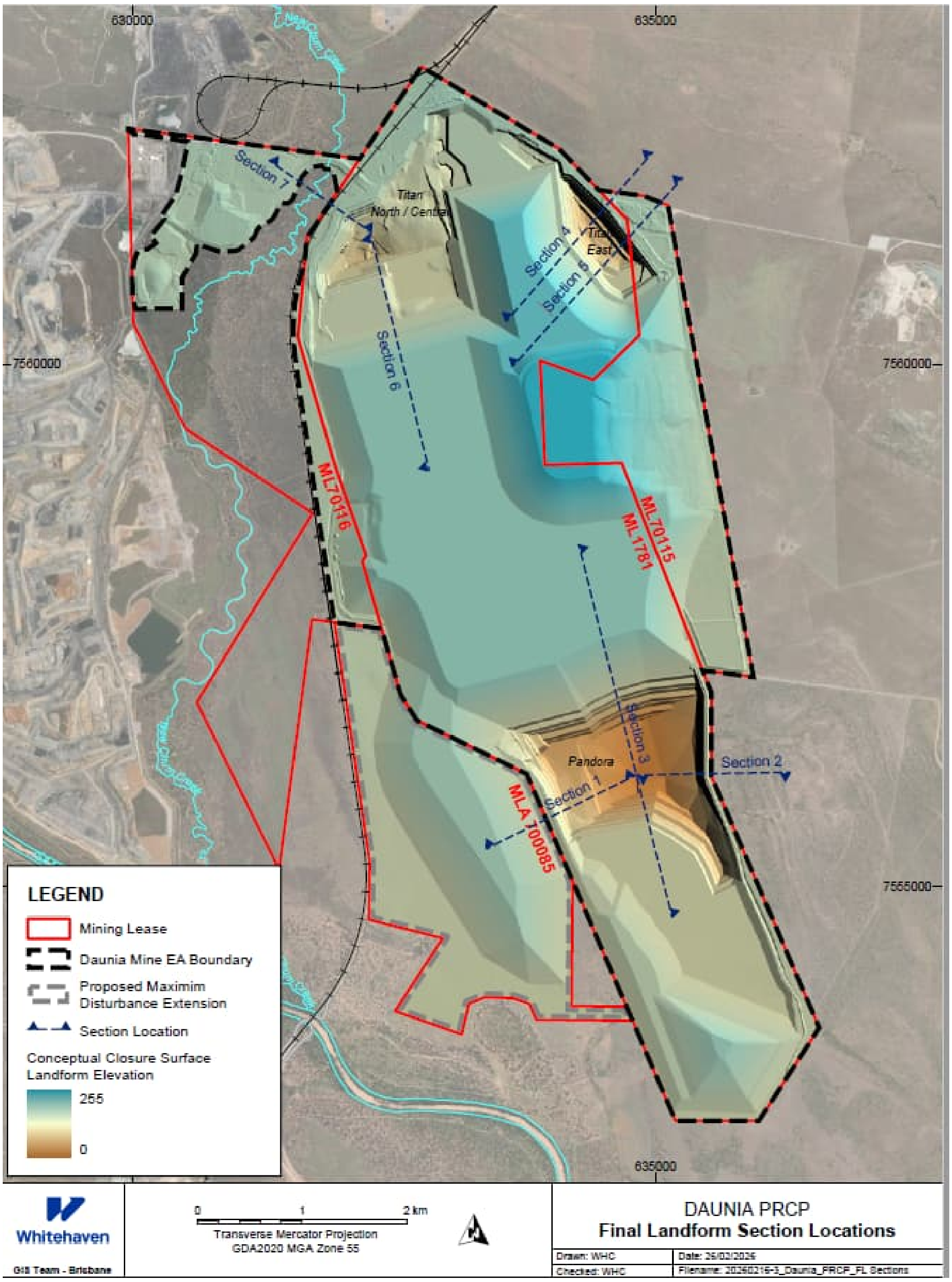
- Non-trivial changes to the location or geometry of the planned residual voids;
- Changes to proposed post-mining land uses of the voids or adjoining lands;
- Substantial changes to the understanding of stratigraphy or geotechnical properties; or

- Substantial changes to the understanding of end-of-mining and long-term groundwater levels or long-term pit lake levels.

3. GEOTECHNICAL MODEL

A topographic model of the proposed final landform included three significant NUMA voids, Pandora in the south, Titan North at the north-west and Titan East at the north-east. Seven cross-sections were selected to intersect greatest void depth, greatest spoil height, proximity to New Chum Creek, and typical highwall in each void, as shown on Figure 3-1.

Figure 3-1: Location of Cross-sections analysed



3.1 Strata and Properties

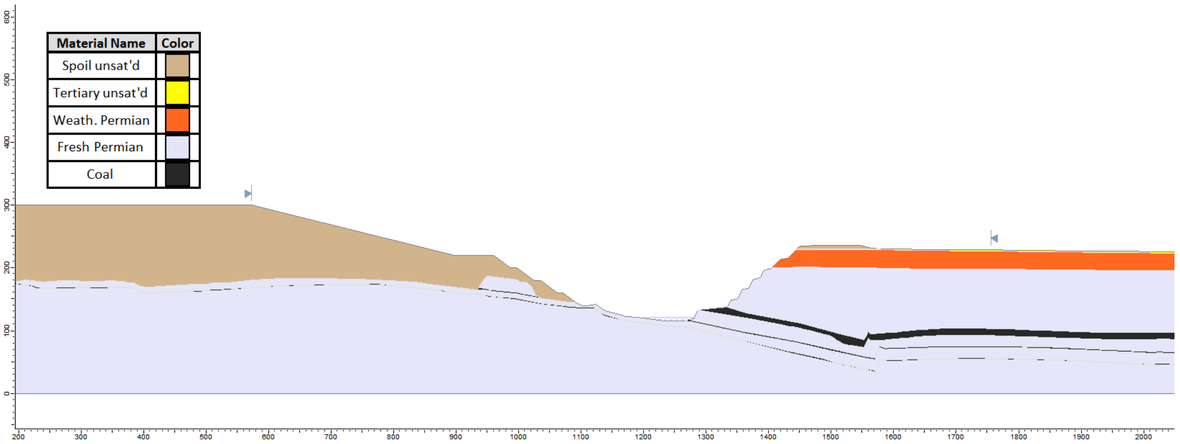
For each cross-section, the Client provided base of Tertiary overburden, base of weathering, coal seam roofs and floors, mined pit shell, and final landform surface.

Strength properties were sourced from BHP (March 2019), Table 6. The coefficient of permeability of the spoil was based on industry experience and is typical of silt-sand/gravel mixtures. Coefficients of permeability for coal and overburden were calibrated average values reported in SLR (2025a). Strength and hydraulic properties are summarised in Table 3-1. An example of a cross-section set up for stability analysis is included as Figure 3-2.

Table 3-1: Geotechnical parameters used in stability analyses

Material	Weight kN/m^3	Cohesion kPa	Friction Angle degree	Coeff. of Permeability m/s	k_v/k_h
Unsaturated spoil (down dip spoil)	18	40	30	5e-5	0.25
Saturated spoil (down dip spoil)	20	23	25	5e-5	0.25
Unsaturated Tertiary overburden	20	50	30	7.1e-7	0.01
Saturated Tertiary overburden	20	15	30	7.1e-7	0.01
Weathered Permian overburden	24	75	30	4.5e-6	0.02
Fresh Permian over/interburden	24	450	42	1.9e-9	0.01
Fresh coal	15	30	35	1.1e-7	0.01

Figure 3-2: Example cross-section for analysis



3.2 Groundwater Pressure Model

Piezometric heads at the ends of each cross-section were provided by the Client based on hydrogeological modelling (SLR, 2025), and were applied as total head boundaries at the edges of each cross-section.

Void lake water levels were obtained from void water balance modelling (WRM, 2025).

Three groundwater scenarios were applied in highwall and lowwall stability analyses for each cross-section, namely:

- end-of mining;
- 20 years after end of mining; and
- 100 years after end of mining.

Water pressures throughout the sections were then obtained by finite element analyses. Obviously, groundwater conditions change over time after the end of mining; however. the rate of such change is slow enough that steady state analysis was considered sufficiently accurate.

3.3 Potential Geotechnical Instability Mechanisms

Aside from the coal seams themselves, the geological model did not indicate dominant structural features close to the highwall face along the cross-sections selected for analyses. Sudden changes in coal seam levels suggested faults in Sections 4, 5 and 7 but these were not close enough to the highwall faces to produce credible slip mechanisms. The impact of minor structures such as for example bedding and general jointing is accommodated in the rock-mass strength parameters. Daunia Mine is a truck-and-shovel operation and as such, the spoil dumps are unlikely to have fabric structures that persist over a scale sufficient to affect geotechnical stability

In this context, 2D circular and non-circular slip surfaces were considered. Circular slips are typical of spoil and sedimentary rock masses while non-circular slips might be dictated by material interfaces such as: coal seams in the highwalls, the pit floor and the interface between saturated and unsaturated spoil.

Rainfall runoff over the highwalls and endwalls will be limited by exclusion bunds and/or flood protection landforms as necessary. The level of geotechnical profile detail available for this assessment did not indicate strong overburden strata underlain by weaker strata that could be susceptible to undercutting. On the lowwall side, rainfall runoff will mainly flow straight down the batters, with vegetation in the grazing and woodland PMLUs limiting the quantity of such runoff. On these bases, it was concluded that erosion is not likely to materially affect long-term geotechnical stability.

The absence of major structure close to the highwall faces also suggests that, within the time frame of 60 years nominated for this assessment, further weathering on highwalls and endwalls is unlikely to penetrate deeply enough to cause anything more than surface fretting that is not geotechnically significant. The open porous character of dumped spoil may allow physical weathering, such as slaking, to some depth, however, the associated strength reduction is already accommodated in the adopted strength parameters.

WMR (2026) modelled 1:1000 AEP flows in New Chum Creek, which showed that the spoil landforms south of Pandora would prevent inundation of the void under that event frequency. New Chum Creek passes behind the Titan North final highwall and the modelling indicated that the floodplain did not extend to the void. There is no watercourse close to Titan East.

Flood modelling was also undertaken for a probable maximum flood (PMF) event. This conceptual flood is applicable to dam design, specifically dams with major or catastrophic failure consequence (ANCOLD, 2000), and flood emergency management planning (Geoscience Australia, 2019). The consequences of geotechnical instability of landforms at Daunia Mine range from negligible to medium (refer Section 4) and therefore PMF is not an appropriate design standard to apply in this assessment.

The void water balance modelling covered a period of 500 years, and the resultant long-term pit lake levels were included in each cross-section analysed. In summary, the effects of severe hydrological events appropriate to the consequences of void geotechnical instability have been addressed in this assessment.

3.4 Statement of Model Uncertainty

The stability assessment methodology described in Simmons et al (2024) includes a matrix to consider and score the confidence in the geotechnical model, based on the quality of input data for various aspects of the model. This subsidiary assessment is included as Appendix A. In summary. the combined geotechnical and groundwater pressure model has a reliability score of 49/100 and is therefore ranked at the margin of High to Medium Uncertainty.

As outlined in Simmons et al (2024), the model uncertainty rating is not a reflection on the reliability of the geotechnical assessment process. Rather, it is a tool to guide selection of appropriate Design Acceptance Criteria (refer Section 5).

4. CONSEQUENCE ASSESSMENT

A consequence assessment, also undertaken in accordance with Simmons et al (2024), is included as Appendix B and the outcomes are summarised in Table 4-1.

Table 4-1: Consequence category assessment for geotechnical instability

Scenario	Consequence of Geotechnical Instability
Highwall instability that extends into grazing PMLU behind crest	Medium
Highwall instability that extends to watercourse channels or flood protection structures behind crest	Medium
Highwall instability that extends into woodland PMLU behind crest	Low
Highwall instability that does not extend outside NUMA	Negligible
Lowwall instability that extends into grazing PMLU	Low
Lowwall instability that extends into woodland PMLU	Low
Lowwall instability that does not extend outside NUMA	Negligible

5. DESIGN ACCEPTANCE CRITERIA

Instability along potential slip surfaces is most commonly assessed using limit equilibrium analyses. Results expressed as Factor of Safety, with the typical range in factor of safety adopted for slope design being 1.2 to 1.5. In a particular stability assessment, the target values of Factor of Safety that are adopted as Design Acceptance Criteria depend on both model uncertainty and consequences of instability – the high end of the arrange is appropriate for higher model uncertainty and higher consequence. Consideration of the geotechnical model as High Uncertainty in conjunction with the consequence levels listed in Section 4, led to selection of the minimum factors of safety set out in Table 5-1.

Table 5-1: Adopted design acceptance criteria

Scenarios	Minimum Factor of Safety
Instability extending into grazing PMLUs	1.50
Instability extending to watercourses or flood protection structures	1.50
Instability extending into woodland PMLU	1.35
Instability contained wholly within NUMA	1.25

6. STABILITY ANALYSES

The cross-sections were analysed using Slide2 Modeler, 2D Limit Equilibrium Analysis for Slopes. The analytical methods used were Morgenstern/GLE - Vertical Slices - Circular Surfaces and Sarma - Vertical Slices - Non-Circular Surfaces, both with Auto Refine Search Method. Generally, the Sarma method produced lower minimum Factors of Safety because it was better able to generate potential slip surfaces that ran along strata interfaces.

Results for the cross-sections initially analysed are presented in Table 6-1. All sections met the design acceptance criteria applicable to the associated land uses except Section 2. In that section, representing the eastern wall of Pandora void, coal seams dipping steeply out of the wall provided presential paths for sliding failure. That wall design was subsequently revised to replace the upper coal seam and overburden above it with spoil, which increased the factor of safety. Section 7 met design acceptance criteria; however, a drain close to the highwall crest was recognised as having potential for small-scale geotechnical instability if water ponded in the drain and saturated the weathered overburden. The feature was also revised by cut-and-fill to remove the drain. Results of stability analyses for those two revised sections are presented in Table 6-2.

In summary, with those two revisions applied, voids in the proposed post-mining landform met the design acceptance criteria for geotechnical stability.

Table 6-1: Geotechnical stability results for final void walls

Location/scenario	**Minimum Factor of Safety**			
	NUMA	Grazing / Creek	Woodland	
Section 1 highwall				
End-of-mining	1.62	1.62	n/a	
Interim pit lake	1.62	1.62	n/a	
Long-term pit lake	1.62	1.62	n/a	
Section 2 highwall				
End-of-mining	1.13	1.5	n/a	PMLU 47m behind crest
Interim pit lake	1.13	1.5	n/a	PMLU 47m behind crest
Long-term pit lake	1.13	1.5	n/a	PMLU 47m behind crest
Section 3 northern lowwall				
End-of-mining	1.58	n/a	2.07	
Interim pit lake	1.60	n/a	1.81	
Long-term pit lake	1.39	n/a	1.70	
Section 3 southern lowwall				
End-of-mining	1.54	n/a	1.94	
Interim pit lake	1.59	n/a	1.75	
Long-term pit lake	1.38	n/a	1.70	
Section 4 lowwall				
End-of-mining	1.65	n/a	1.65	
Interim pit lake	1.65	n/a	1.65	
Long-term pit lake	1.65	n/a	1.65	
Section 4 highwall				
End-of-mining	1.87	1.87	n/a	
Interim pit lake	1.87	1.87	n/a	
Long-term pit lake	1.87	1.87	n/a	
Section 5 lowwall				
End-of-mining	1.60	n/a	1.64	
Interim pit lake	1.64	n/a	1.64	
Long-term pit lake	1.64	n/a	1.64	
Section 5 highwall				
End-of-mining	2.22	2.22	n/a	
Interim pit lake	2.22	2.22	n/a	
Long-term pit lake	2.22	2.22	n/a	
Section 6 lowwall				
End-of-mining	1.60	n/a	1.60	
Interim pit lake	1.60	n/a	1.60	
Long-term pit lake	1.60	n/a	1.60	
Section 7 highwall				
End-of-mining	1.27	3.08	n/a	
Interim pit lake	1.27	3.08	n/a	
Long-term pit lake	1.27	3.08	n/a	

Table 6-2: Geotechnical stability results for revised wall profiles

Location/scenario	Minimum Factor of Safety			
	NUMA	Grazing / Creek	Woodland	
Section 2 rev 1 highwall				
End-of-mining	1.38	1.50	n/a	PMLU 22m behind crest
Interim pit lake	1.38	1.50	n/a	PMLU 22m behind crest
Long-term pit lake	1.38	1.50	n/a	PMLU 22m behind crest
Section 7 rev 1 highwall				
End-of-mining	2.01	2.93	n/a	
Interim pit lake	2.01	2.93	n/a	
Long-term pit lake	2.01	2.93	n/a	

7. SAFETY ASSESSMENT

Simmons et al (2024) requires a qualitative safety risk assessment to be undertaken for the designed slopes, to identify further risk reduction measures aligned with the ALARP principle. That is, even though compliance with the Design Acceptance Criteria achieves an appropriate level of risk, further mitigative measures should be considered if the cost and difficulty are "reasonable" in the context of the incremental reduction in safety risk.

The safety risk assessment is included as Appendix D. In essence, the recommended additional measures consist of exclusion bunds on the highwall, exclusion fencing all around the NUMA, and explanation of the function of the bunds and fences in the Land Management Plan that will be attached to the land when leases are relinquished.

8. CONCLUSIONS

For the final landform geometry provided, geotechnical stability of void walls and slopes will meet appropriate Design Acceptance Criteria, except at the eastern wall of Pandora void. The revised geometry provided by the Client for this location meets appropriate Design Acceptance Criteria.

9. REFERENCES

ANCOLD, March 2000, Guidelines on Selection of Acceptable Flood Capacity for Dams, Australian National Committee on Large Dams Incorporated.

BHP, September 2020, Geotechnical Design, Operating and Monitoring Manual, company internal document

Geoscience Australia, 2019, Australian Rainfall and Runoff – a Guide to Flood Estimation version 4.2, Commonwealth of Australia.

Simmons J, Henderson S and Kennedy G, June 2024, Guidelines for Assessment of Geotechnically Safe and Stable Post-Mining Landforms, ACARP C34028 project report.

SLR, 2025a, Daunia Mine Transitional PRC Plan Hydrogeology Rev 5.

SLR, 2025, Daunia West Infrastructure Project – Groundwater Modelling Calibration and Prediction Report.

WRM, 2025, Daunia West Infrastructure Project – Surface Water Assessment.

WRM, 2026, PRCP Flood Modelling Daunia Mine, PRCP Flood Report.

APPENDIX A MODEL RELIABILITY STATEMENT

Model Element	Max.		Uncertainty Level	and Weighting		Score
	Score	Introductory	High	Medium	Low	
		0.0	0.2	0.6	1.0	
Strata & landform profile information	10	Basic surfaces with unreliable or absent data	Assessment based on 'typical' regional conditions.	Geological surfaces extracted from site geological model.	Use of information such as drill logs and field mapping to define sub geotechnical units within broader geological units.	6
Structural Model	15	No information	Structure assumed typical of the region	Structure broadly understood from observation and experience at the site	Either no dominant structure OR structure well understood from mapping and drilling	12
Strata Complexity	5	No information	Strata or structure are highly variable with distance OR properties are greatly affected by moisture content.	Strata and structure do not vary rapidly with distance, AND properties not greatly affected by moisture content changes.	Strata quite uniform in thickness and properties AND structure clearly defines slip surfaces	3
Strength Properties	10	No information	Derived from published data for the material classifications, without specific regional data.	Derived from tests on key strata sampled from sites within the region.	Derived from site specific tests on key strata	6
Deformation Properties	5	No information, or not considered in stability assessment	Derived from published data for the material classifications, without specific regional data.	Derived from tests on key strata sampled from sites within the region.	Derived from site specific tests on key strata	0
Groundwater Pressure Model	20	No site measurements; conceptual hydrogeological assessment only	Pre-mining groundwater study OR sensitivity analyses included in stability analyses	>2 years measurement for site groundwater network, with interpretation.	>2 years measurement of at least 2 piezometers at the slope in question, with associated groundwater analysis	12

Method of Analysis	10	No quantitative analyses	Able to accurately represent the failure mechanism BUT there is limited industry experience interpreting the results	Able to approximately represent the failure mechanism AND there is wide industry experience in interpreting the results	Able to accurately represent the failure mechanism AND there is wide industry experience in interpreting the results	10
Reported field performance observations	25	<2 years visual observation of the slope in question.	2-5 years visual observation of the slope in question.	>5 years visual observation or > 2 years movement measurement	> 5 years movement measurement	0

TOTAL = 49

Rating	Ranking	Safety and Stability Implications
80 - 100	Low Uncertainty	Risk management to an ALARP standard is possible with due allowances for model elements ranked as medium or high uncertainty level
50 - 79	Medium Uncertainty	Risk management to an ALARP standard may not be possible without some combination of improvements to the model, significant increases in design acceptance criteria, or uncertainty allowances in observational stability acceptance criteria
< 50	High Uncertainty	Risk management to an ALARP standard is not likely to be possible. Assessment must be qualified accordingly, or significant improvements made to the model, significant increases in design acceptance criteria, or uncertainty allowances in observational acceptance criteria prior to finalising assessment.

APPENDIX B CONSEQUENCE CATEGORY ASSESSMENT

Consequence Category Levels and Thresholds

	N/A or Negligible	Low	Medium	High
Harm to Humans				
	People are not routinely present in the impacted area or only injuries requiring first aid are likely	Loss of life is not expected and only short-term disabling injuries are expected.	Single loss of life or long-term disabling injuries are expected	Multiple loss of life expected
Environmental Harm				
	Minor, temporary impact to the environment	Measurable impact to an area ≤ 1km^2; where remediation of damage is likely to take ≤ 1 year	Impact to an area ≤ 5km^2; where remediation of damage is likely to take ≤ 5 years	Impact to an area > 5km^2; where remediation of damage is likely to take > 5 years
Property Loss & Damage				
	Minor, temporary community impact that recovers with little intervention; Damage to property or compensation or repair costs < $0.5M	Measurable but limited community impact lasting less than six months; Damage to property or compensation or repair costs $0.5M - $10M	Serious impact on community lasting up to 12 months; Damage to property or compensation or repair costs $10M - $50M	Severe impact on community lasting more than 12 months; Damage to property or compensation or repair costs > $50M

Assessment for Daunia Mine Highwalls

Extent of Instability *(length or area affected)*	**Exposure** *(people, ecosystems & property within extent)*	**Harm to Humans**		**Environmental Harm**		**Property Loss & Damage**	
		Impacts	***Cat.***	***Impacts***	***Cat.***	***Impacts***	***Cat.***
Behind Crest							
Woodland PMLU	People will not routinely access the area	People not routinely present	Negl.	Measurable impact to area <1km^2 Stabilisation work to encourage re-establishment of vegetation would take <1year	**Low**	No repair or compensation costs	Negl.
Grazing PMLU	A small number of people likely to access the area due to cattle grazing operations Grassland habitat with some shade trees, suitable for managed grazing Property such as fencing and water troughs may be present	Single loss of life or long-term disabling injuries are possible	**Medium**	Measurable impact to area <1km^2 Stabilisation work to encourage re-establishment of grassland would take <1year	Low	Costs to replace damage property expected to be <$0.5M	Negl.
New Chum Creek	People will not routinely access the area. Ephemeral aquatic ecosystem	People not routinely present	Negl.	Measurable impact to area <1km^2 Repair work including to re-establish vegetation could take >1year	**Medium**	Damage to property or compensation or repair costs $0.5M - $10M	Low
Body of Slope							
Within NUMA	People will not routinely access NUMA Low value habitat on batter No property in NUMA	People not routinely present	Negl.	Minor impact to the environment	Negl.	No repair or compensation costs	Negl.

Extent of Instability *(length or area affected)*	**Exposure** *(people, ecosystems & property within extent)*	**Harm to Humans**		**Environmental Harm**		**Property Loss & Damage**	
		Impacts	***Cat.***	***Impacts***	***Cat.***	***Impacts***	***Cat.***
Toe Zone							
Within NUMA	People will not routinely access NUMA Low value habitat in pit lake No property in NUMA	People not routinely present	Negl.	Minor impact to the environment	Negl.	No repair or compensation costs	Negl.

Negligible consequence for geotechnical instability contained within NUMA

Low consequence for geotechnical instability that extends into Woodland PMLU

Medium consequence for geotechnical instability that extends into Grazing PMLU or to New Chum Creek

Assessment for Daunia Mine Lowwall

Extent of Instability *(length or area affected)*	**Exposure** *(people, ecosystems & property within extent)*	**Harm to Humans**		**Environmental Harm**		**Property Loss & Damage**	
		Impacts	***Cat.***	***Impacts***	***Cat.***	***Impacts***	***Cat.***
Crest Zone							
Woodland PMLU	People will not routinely access the area	People not routinely present	Negl.	Measurable impact to area <1km^2 Stabilisation work to encourage re-establishment of vegetation would take <1year	**Low**	No repair or compensation costs	Negl.
Grazing PMLU	A small number of people likely to access the area due to cattle grazing operations Grassland habitat with some shade trees, suitable for managed grazing Property such as fencing and water troughs may be present	Only short-term disabling injuries expected	**Low**	Measurable impact to area <1km^2 Stabilisation work to encourage re-establishment of grassland would take <1year	Low	Costs to replace damage property expected to be <$0.5M	Negl.
Within NUMA	People will not routinely access NUMA Low value habitat on slope No property in NUMA	People not routinely present	Negl.	Minor impact to the environment	Negl	No repair or compensation costs	Negl.

Extent of Instability *(length or area affected)*	**Exposure** *(people, ecosystems & property within extent)*	**Harm to Humans**		**Environmental Harm**		**Property Loss & Damage**	
		Impacts	***Cat.***	***Impacts***	***Cat.***	***Impacts***	***Cat.***
Body of Slope							
Woodland PMLU	People will not routinely access the area	People not routinely present	Negl.	Measurable impact to area <1km^2 Stabilisation work to encourage re-establishment of vegetation would take <1year	**Low**	No repair or compensation costs	Negl.
Within NUMA	People will not routinely access NUMA Low value habitat on slope No property in NUMA	People not routinely present	Negl.	Minor impact to the environment	Negl	No repair or compensation costs	Negl.
Toe Zone							
Within NUMA	People will not routinely access NUMA Low value habitat in pit lake No property in NUMA	People not routinely present	Negl.	Minor impact to the environment	Negl.	No repair or compensation costs	Negl.

Negligible consequence for geotechnical instability in NUMA

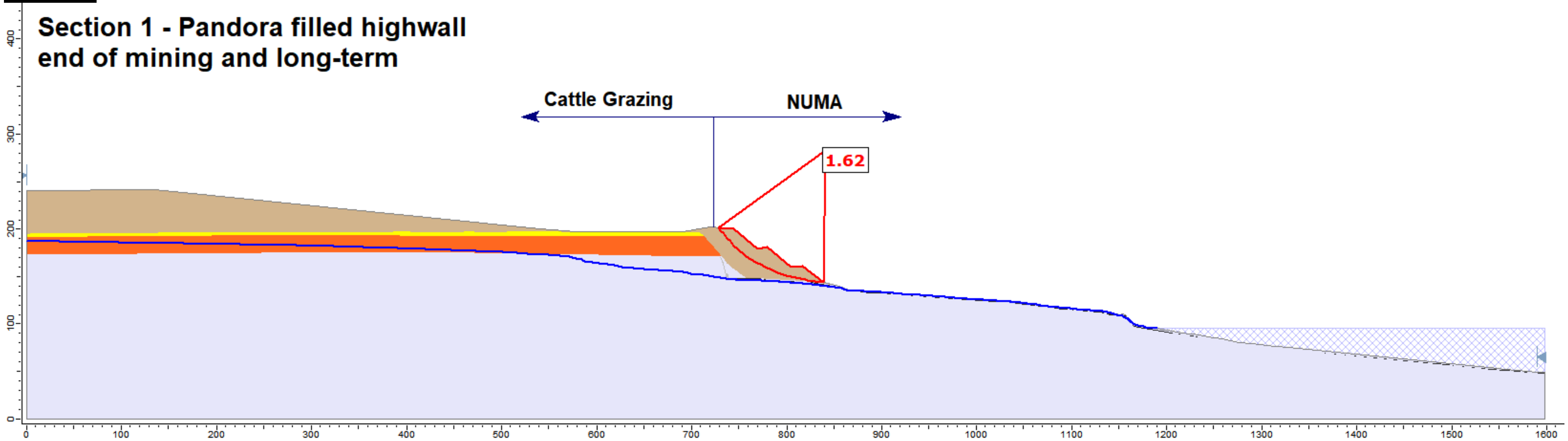
Low consequence for geotechnical instability that extends into Woodland PMLU

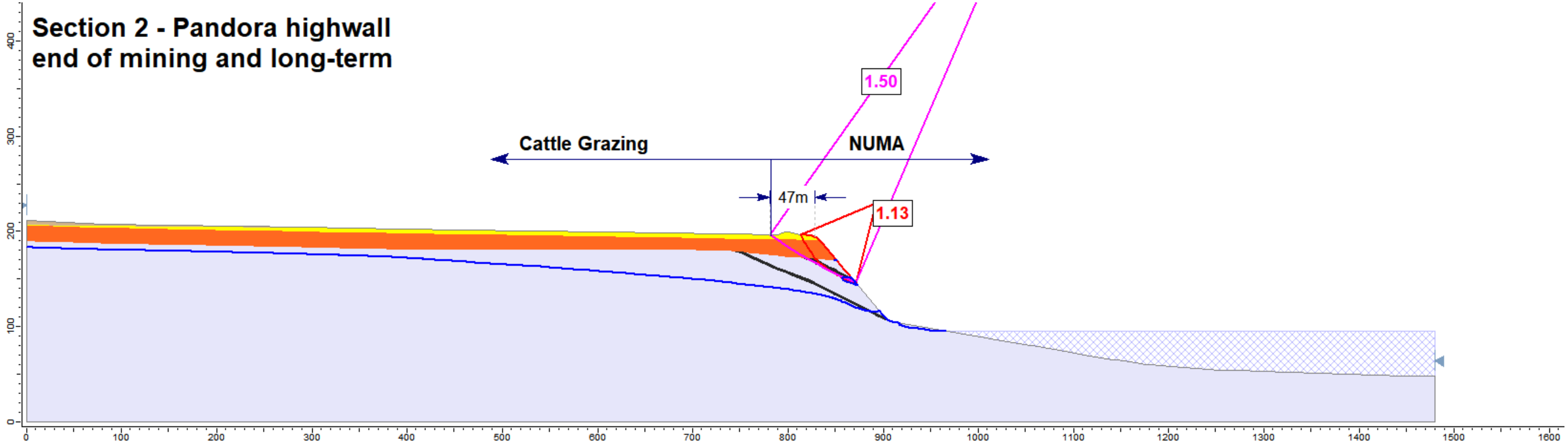
Low consequence for geotechnical instability that extends into Grazing PMLU

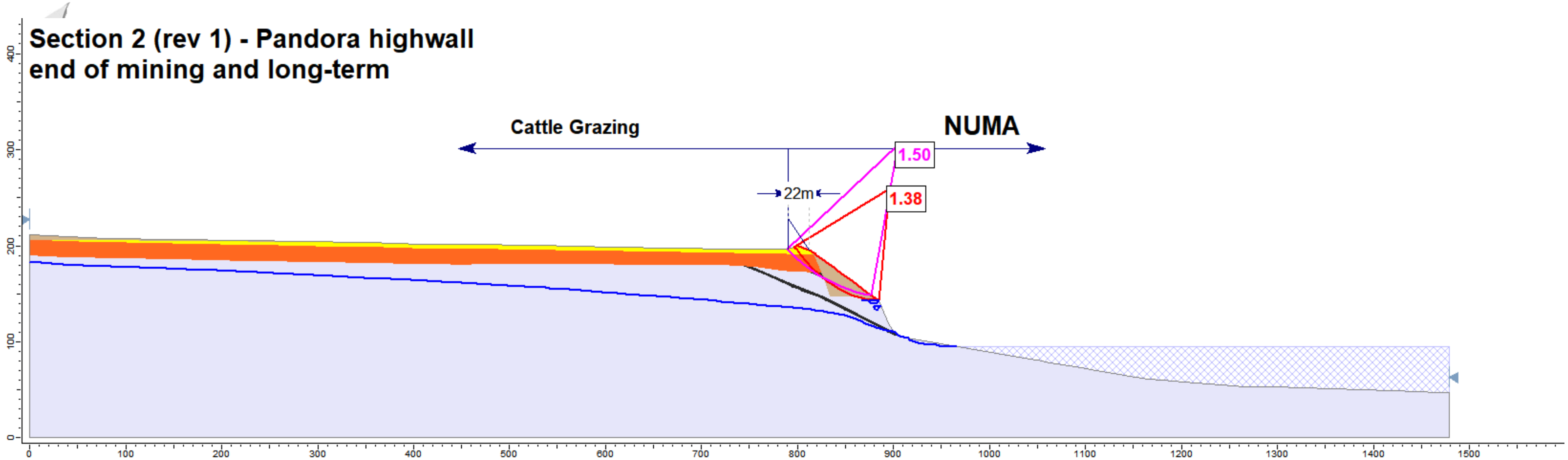
APPENDIX C STABILITY ANALYSES

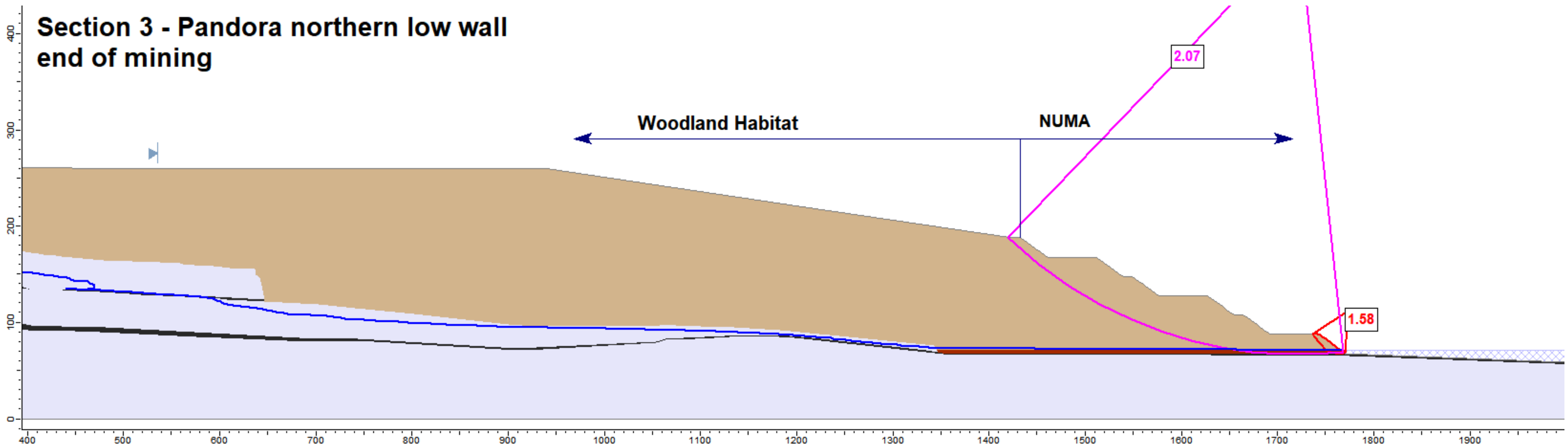
Material Name	Color
Spoil unsat'd	
Spoil sat'd	
Tertiary unsat'd	
Weath. Permian	
Fresh Permian	
Coal	

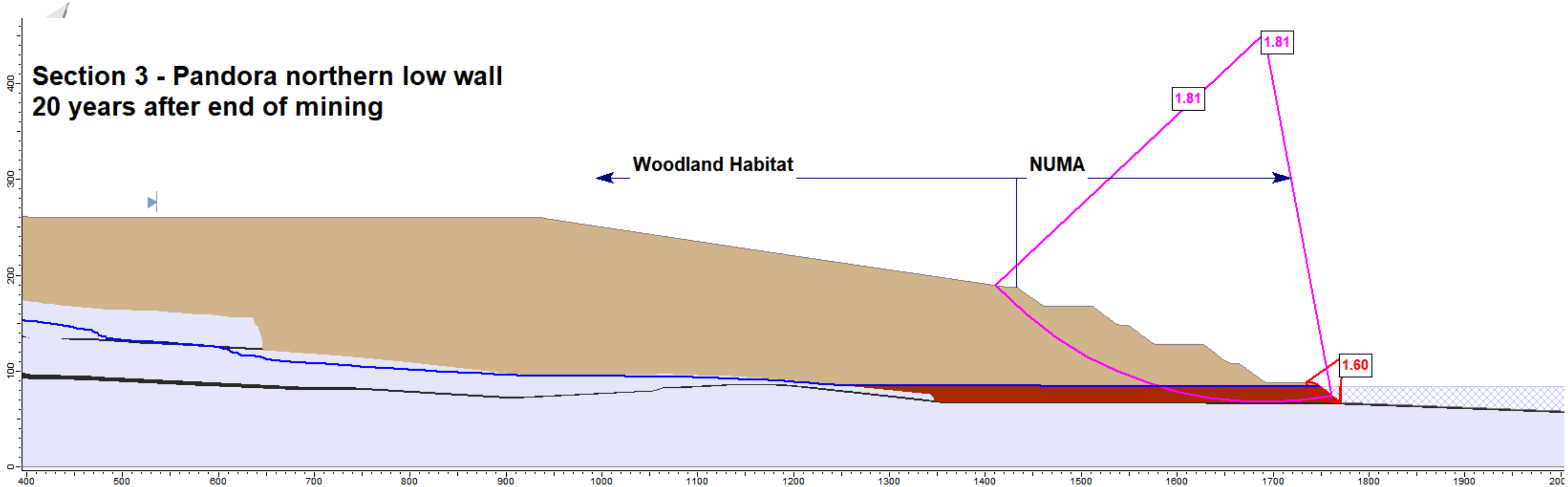
Pandora

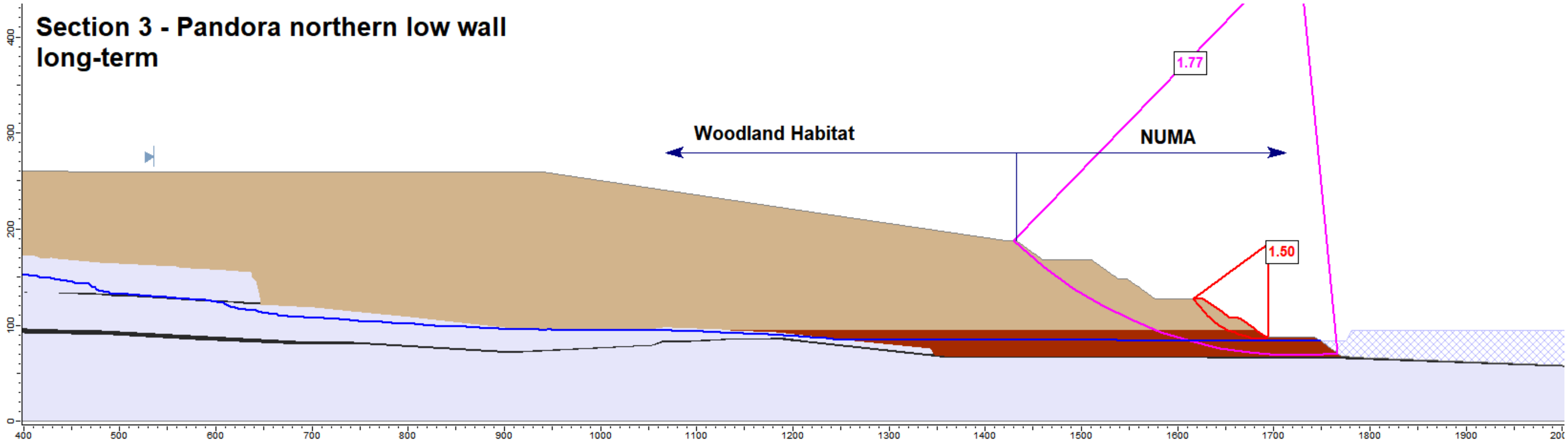

Section 1 - Pandora filled highwall
end of mining and long-term
Cattle Grazing
NUMA
1.62

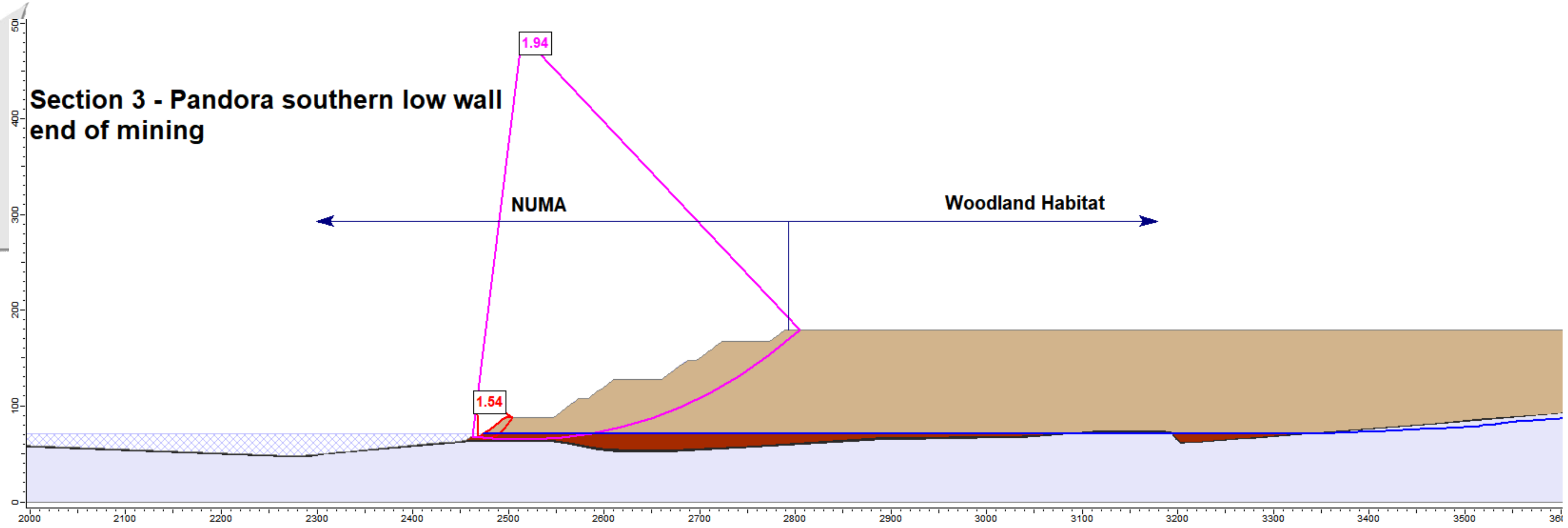

Section 2 - Pandora highwall
end of mining and long-term
Cattle Grazing
NUMA
47m
1.50
1.13

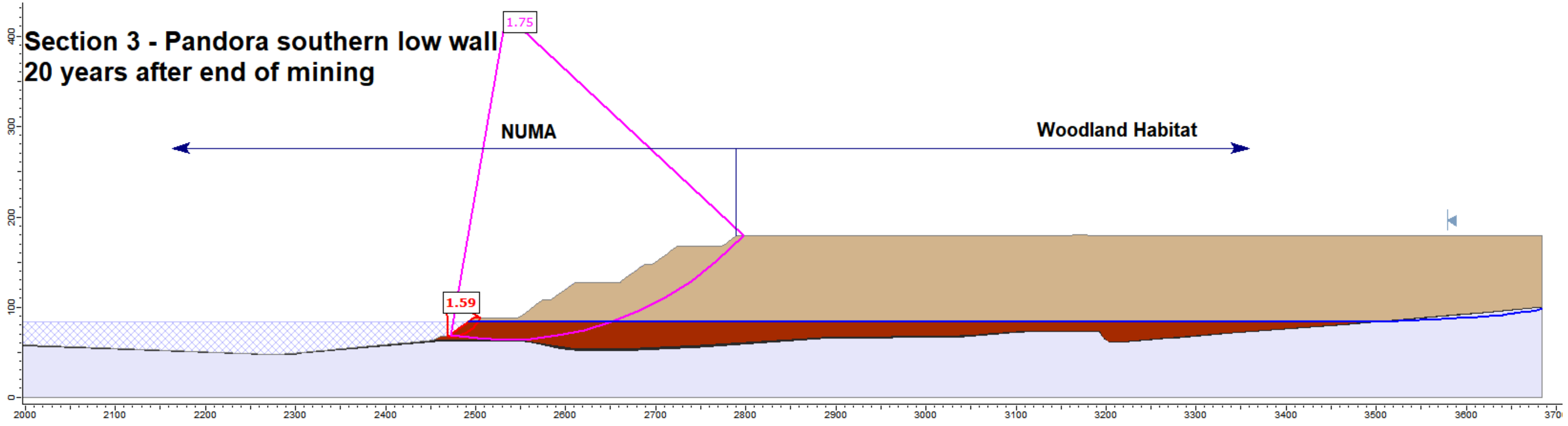

Section 2 (rev 1) - Pandora highwall
end of mining and long-term
Cattle Grazing
NUMA
1.50
22m
1.38

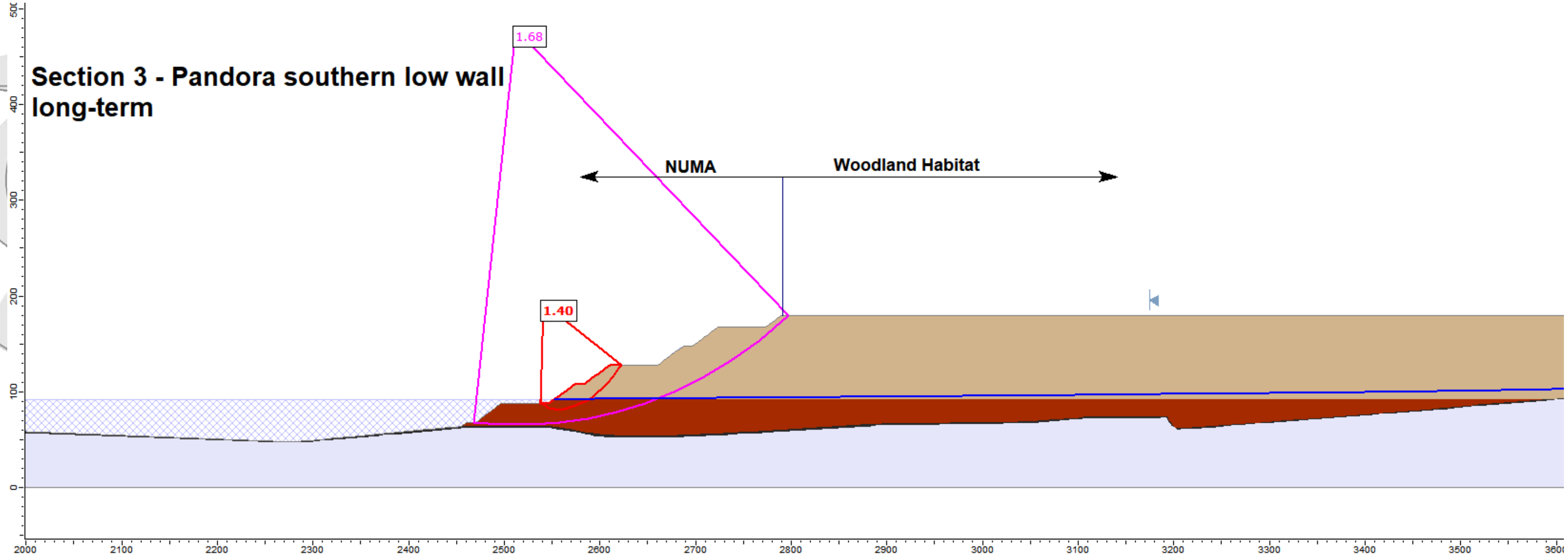

Section 3 - Pandora northern low wall
end of mining
Woodland Habitat
NUMA
2.07
1.58


Section 3 - Pandora northern low wall
20 years after end of mining
Woodland Habitat
NUMA
1.81
1.81
1.60

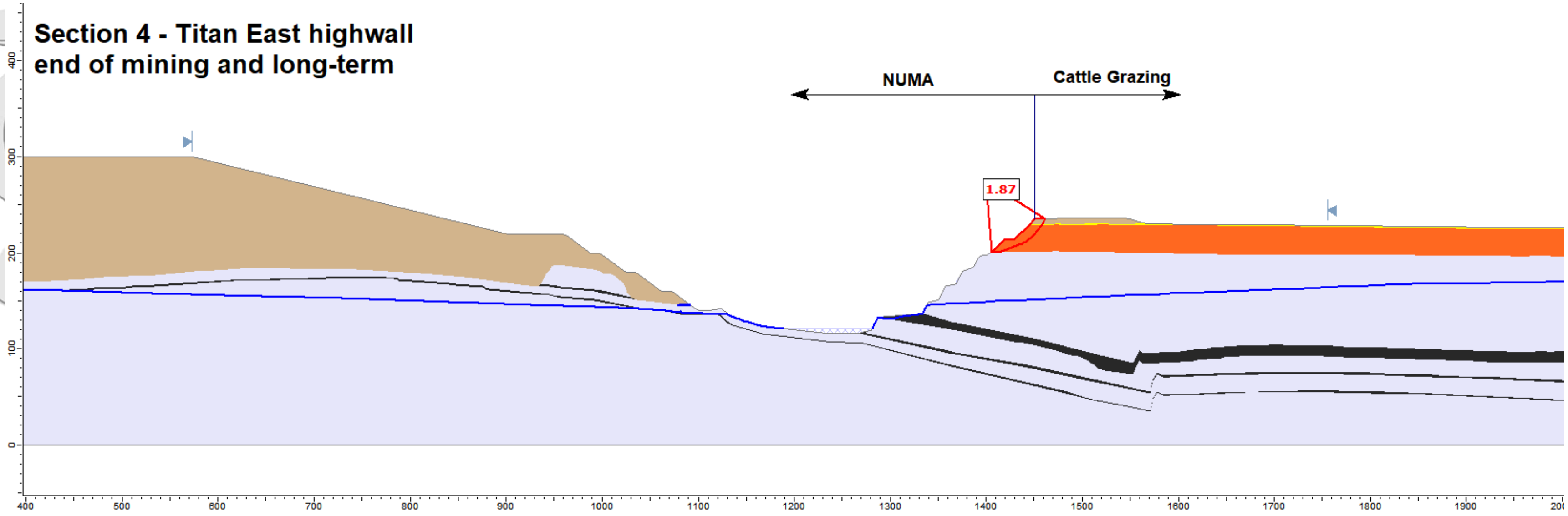

Section 3 - Pandora northern low wall
long-term
Woodland Habitat
NUMA
1.77
1.50

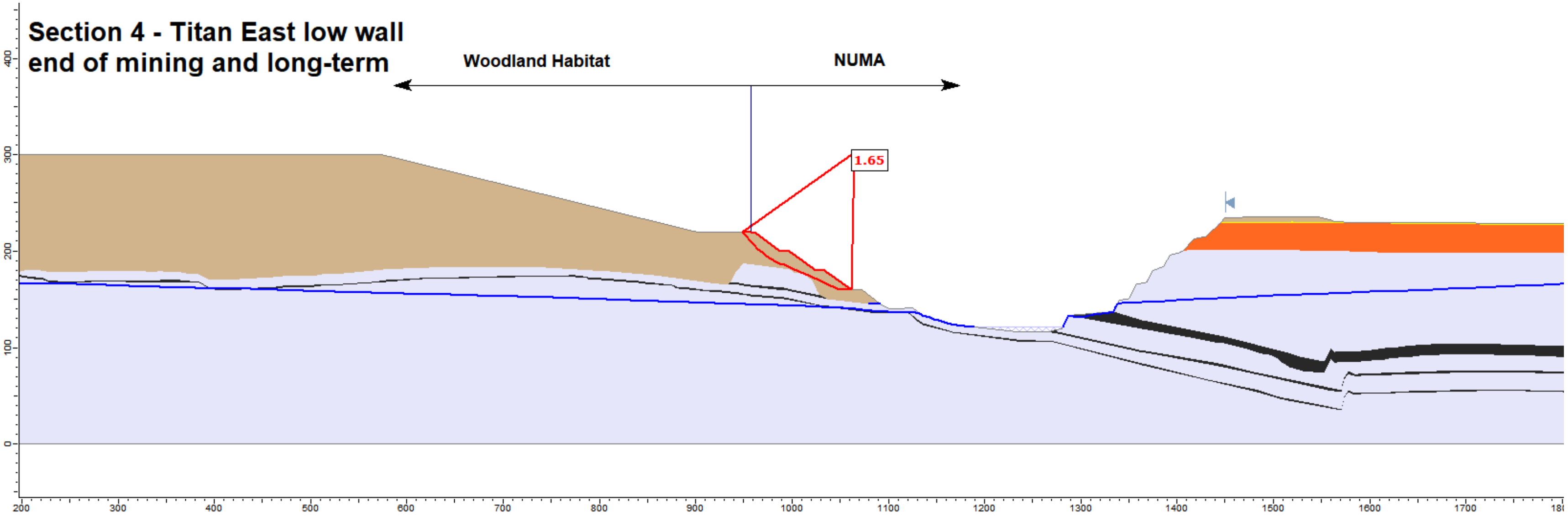

Section 3 - Pandora southern low wall
end of mining
1.94
1.54
NUMA
Woodland Habitat

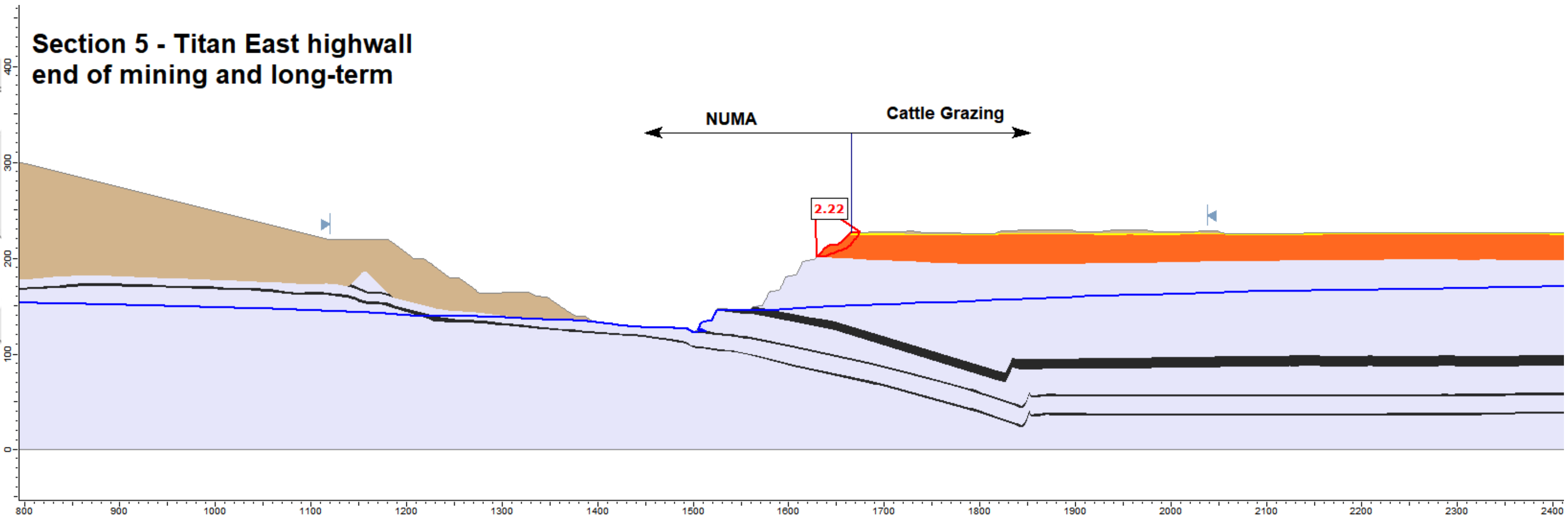

Section 3 - Pandora southern low wall
20 years after end of mining
1.75
1.59
NUMA
Woodland Habitat

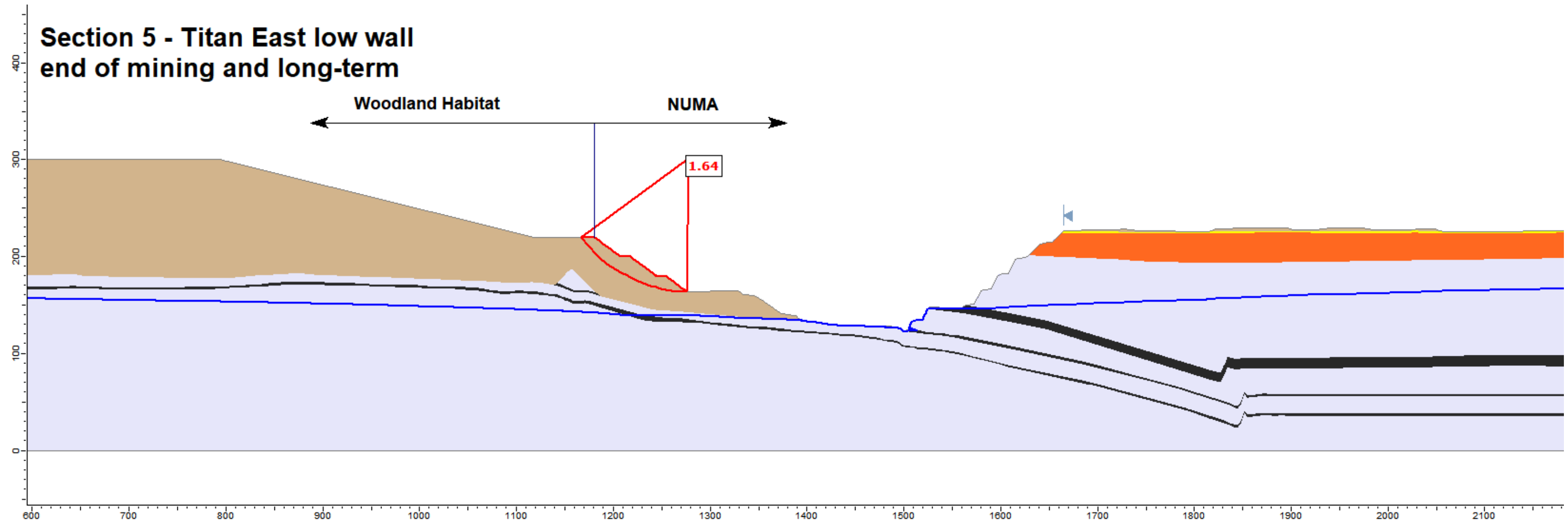

Section 3 - Pandora southern low wall long-term
1.68
1.40
NUMA
Woodland Habitat
2000
2100
2200
2300
2400
2500
2600
2700
2800
2900
3000
3100
3200
3300
3400
3500
0
100
200
300
400

Titan East

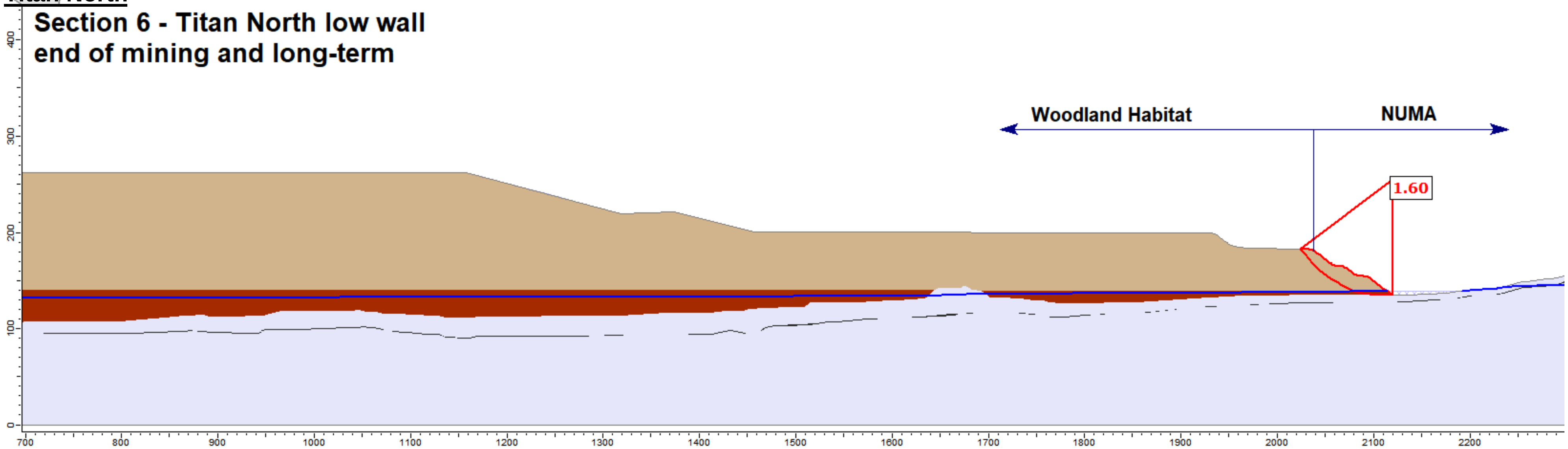

Section 4 - Titan East highwall
end of mining and long-term
NUMA
Cattle Grazing
1.87

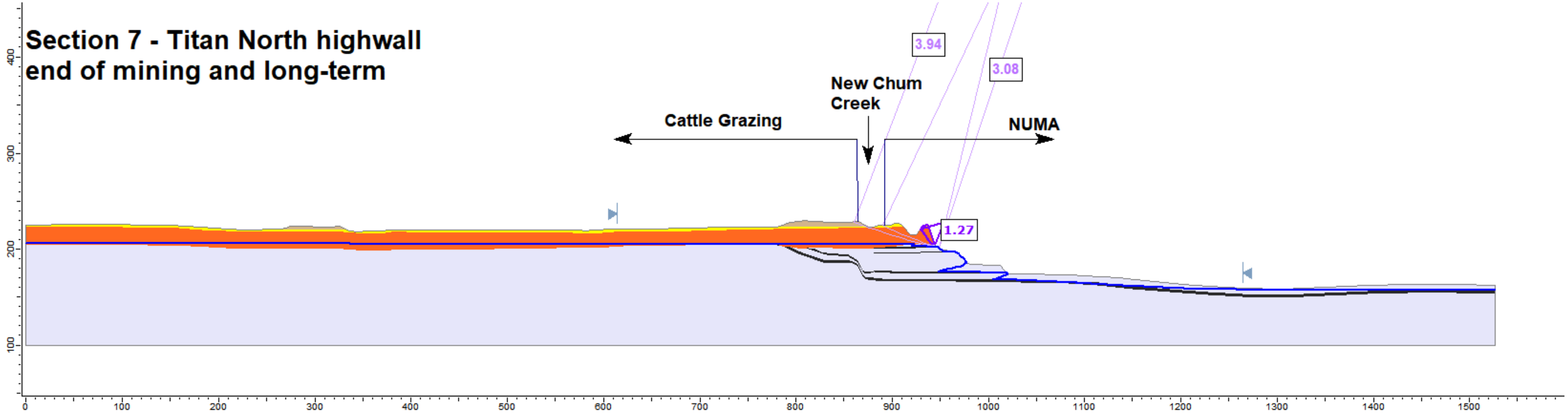

Section 4 - Titan East low wall
end of mining and long-term
Woodland Habitat
NUMA
1.65

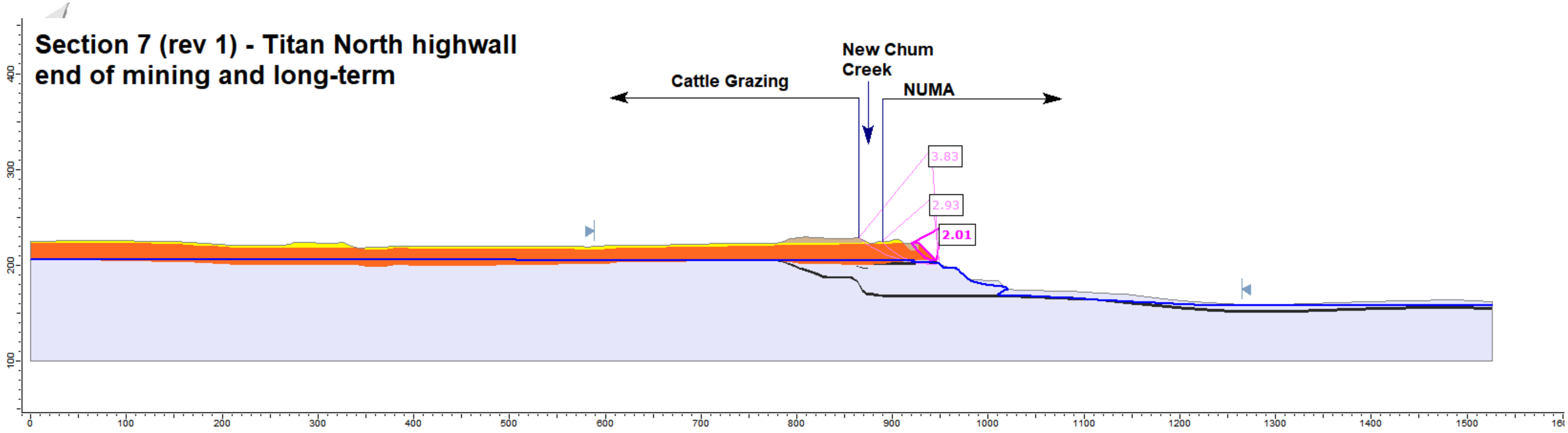

Section 5 - Titan East highwall
end of mining and long-term
NUMA
Cattle Grazing
2.22


Section 5 - Titan East low wall
end of mining and long-term
Woodland Habitat
NUMA
1.64

Titan North


Section 6 - Titan North low wall
end of mining and long-term
Woodland Habitat
NUMA
1.60


Section 7 - Titan North highwall
end of mining and long-term
3.94
3.08
New Chum
Creek
Cattle Grazing
NUMA
1.27


Section 7 (rev 1) - Titan North highwall
end of mining and long-term
Cattle Grazing
New Chum
Creek
NUMA
3.83
2.93
2.01
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
100
200
300
400

APPENDIX D SAFETY RISK ASSESSMENT

Safety (Risk) Assessment Matrix (from Simmons et al, 2024)

		Consequence		
		High	Medium	Low
Likelihood	High	High Risk	Medium Risk	Medium Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Medium Risk	Low Risk	Low Risk

Hazard	**Potential consequence**	**Factors affecting likelihood**	**Risk rating of design**	**Additional mitigation measures**
Arc- or wedge- slip instability of highwall	Person falls on rough ground (long-term injury)	Persons employed in grazing business will be familiar with hazard, but unauthorised person might access area	M-L = Low	Construct exclusion bunds at edge of grazing PMLU. Note function of bunds and need for maintenance in Land Management Plan. Note implications of future river channel mobility in Land Management Plan
	Damage to fencing or exclusion bunds	Bunds will not be constructed right at crest but area in front of bund might not be regularly inspected	L-L = Low	
	Damage to vegetation and change of overland flow paths could increase erosion		L-L = Low	
	New Chum Creek breaks into void	Voids are outside 1:1000 AEP flood extent but future channel movements might reduce the separation	M-L = Low	

Hazard	**Potential consequence**	**Factors affecting likelihood**	**Risk rating of design**	**Additional mitigation measures**
Fall of rock fragments from degrading/eroding highwall	Person struck by falling rock (long-term injury)	Void is a NUMA, so there will be no authorised access	H-L = Medium	Fence NUMA on all sides to prevent unauthorised access
	Minor damage to colonised vegetation		L-L = Low	Rely on natural recovery processes
	No infrastructure		n/a	
Arc- or wedge- slip instability of lowwall	Person falls on rough ground that is not steeply sloping (medium-term injury)	Unauthorised person might access lowwall side of void	L-L = Low	Fence NUMA on all sides to prevent unauthorised access. Locate lowwall fences outside the extent of the long term pit-lake Note function of exclusion fencing in Land Management Plan
	Damage to fencing		L-L = Low	
	Damage to vegetation		L-L = Low	Rely on natural recovery processes

Note: Lowwall slopes outside the long-term pit lake level are not steep enough to generate a rockfall hazard.