



RHONDDA  
GEOTECHNICAL  
SERVICES

SLOPE STABILITY ANALYSIS  
GROUND LEVEL REDUCTION  
METHODOLOGY STATEMENT  
  
MERTHYR MOTOR AUCTIONS  
PANT ROAD  
DOWLAIS  
MERTHYR TYDFIL  
CF48 3SH  
22/06/2021

## **INTRODUCTION**

Merthyr Motor Auctions have been established for many years at Pant Road, Dowlais. The planned dualling of the A465 will result in the loss of a significant proportion of their vehicle storage area which is vital to the function of the business. At the request of Dean Davies, the owner of M.M.A., Rhondda Geotechnical Services were commissioned to investigate the possibility of removing an embankment from within the site to create some additional yard space. Subsequent to the initial investigation the planning consultant was informed that a 9 metre stand-off zone was necessary to gain planning approval. This resulted in new profiles being drawn. M.T.C.B.C Planning have requested a new report be produced to assess the stability of the new slope profile.

### **1. SITE DESCRIPTION**

The site is centred on Grid Reference 306480, 208430 with the yard at an elevation of approximately 330m A.O.D. A topographic survey of the existing embankment shows is a maximum of 5 metres higher than the yard. The site is a working commercial yard of featureless gently sloping tarmac. The eastern perimeter of the yard is a high rockface. The yard then narrows and passes to a lower area still under the ownership of M.M.A. There are no surface watercourses. The site location, site boundary and site history have been detailed in the original report. In addition a Coal Mining Risk Assessment has been produced as a separate report.

### **2. SITE INVESTIGATION**

A detailed inspection of the embankment was carried out on Monday 2/11/2020. The embankment is at the same level as the elevated garden of no. 43 Llewellyn Street and is separated from it by a steel palisade fence with dense conifers behind it. It should be emphasised that the houses in Llewellyn Street are at approximately the same level as the existing yard of the auctions, only the gardens are at a higher level. These back onto the former railway cutting mentioned in the site history. The embankment has a flat top running away from the palisade fence and ranging from 8m-12m wide before running down to the yard level at an average slope of 30°. The top of the embankment and the slope are grassed over with three medium sized trees on the western part of the slope. A small hand dug trial pit was excavated on the top of the embankment. This revealed a gravelly soil which appeared to be Made Ground. The pit position is labelled TP4 on Figure 1 which is a recent photograph taken from a drone. In

addition two trial pits were machine excavated for infiltration tests. These were subsequently inspected by the author and samples for chemical analysis taken. At the author's request a third trial pit (TP3) was excavated. All three trial pits were excavated in gravelly made ground. This was mainly railway ballast, with occasional brick, ironworks slag and masonry. On the eastern flank of the embankment the underlying bedrock is exposed. This is a thinly interbedded series of Siltstone and Mudstone with Ironstone nodule horizons. Photographs are included in the original report. The bedrock has been cut back, presumably as part of the railway cutting. The slope angle is approximately 70°. Apart from very minor frost spalling this slope angle appears completely stable and has been so for a period of at least 150 years. As part of the planning application a series of ten sections of the existing and proposed embankments were produced by Utopia Designs. The four most relevant to the stability of the embankment are superimposed on the aerial photo in Figure 1.

In addition to the visible bedrock and the trial pits historic aerial photographs were studied. The M.M.A. site was cleared and constructed in its present form in 1994-1995. The northern slope of the embankment was profiled at this time. This process was well recorded in a series of aerial photos. Only framed hard copies exist, and so cannot be reproduced here. The photographs are large and show the site with no vegetation. This has allowed a reasonable estimate of bedrock levels beneath the present embankment. These levels are shown in Figures 2-5.

### **3. CONCLUSIONS**

The important point about the stability of the slope is that the depth of the bedrock underneath is irrelevant. The necessity for a 9 metre standoff zone means that all new slopes shown in the sections overleaf are 30°. This was the safe angle of repose proposed by the author for the Made Ground in the original report. This angle was based on an anticipated high internal friction angle of the granular material. Because of the source area seen in the aerial photos there is no possibility of any clay material being incorporated anywhere within the Made Ground in the current embankment. The existing slope is a minimum of 30° with no signs of any instability. The combination of stand-off and slope angle also allows a 2.5m strip of ground to remain undisturbed adjacent to the garden boundary perimeter fence. This was also a recommendation of the original report.

It is anticipated that the bedrock surface will fall away to the west as shown through Figures 2-5. This will have no detrimental effect on slope stability. The original proposal was to cut the bedrock back at a much steeper angle. Because of the standoff restrictions this is no longer being proposed. Both bedrock and the Made Ground will be stable at the new uniform lower angle of 30°.

#### **4. METHODOLOGY**

It is intended to use a 14 ton or 17 ton excavator to remodel the embankment. All surplus material is to be removed from site with 20 ton tipper lorries at the time. Prior to work commencing the 9 metre stand-off will be surveyed in and marked on site. It will be a simple matter to keep to this limit. Everyone involved is aware that the embankment must be completed as shown in the planning application drawings. The 2.5m stand-off from the top palisade fence will also be marked. Initially the excavator will bench itself in on the existing slope. This is for ease of loading. The final profiling will need to be completed from the level of the existing yard. It is not anticipated that the job will take longer than three days. The main factor will not be the actual excavation, but the speed of removal of the excavated material from site.

The remodelled embankment will be subject to a final verification survey and geotechnical inspection upon completion.

Richard Davies BSc (Hons.), MSc, F.G.S.

22/06/2021

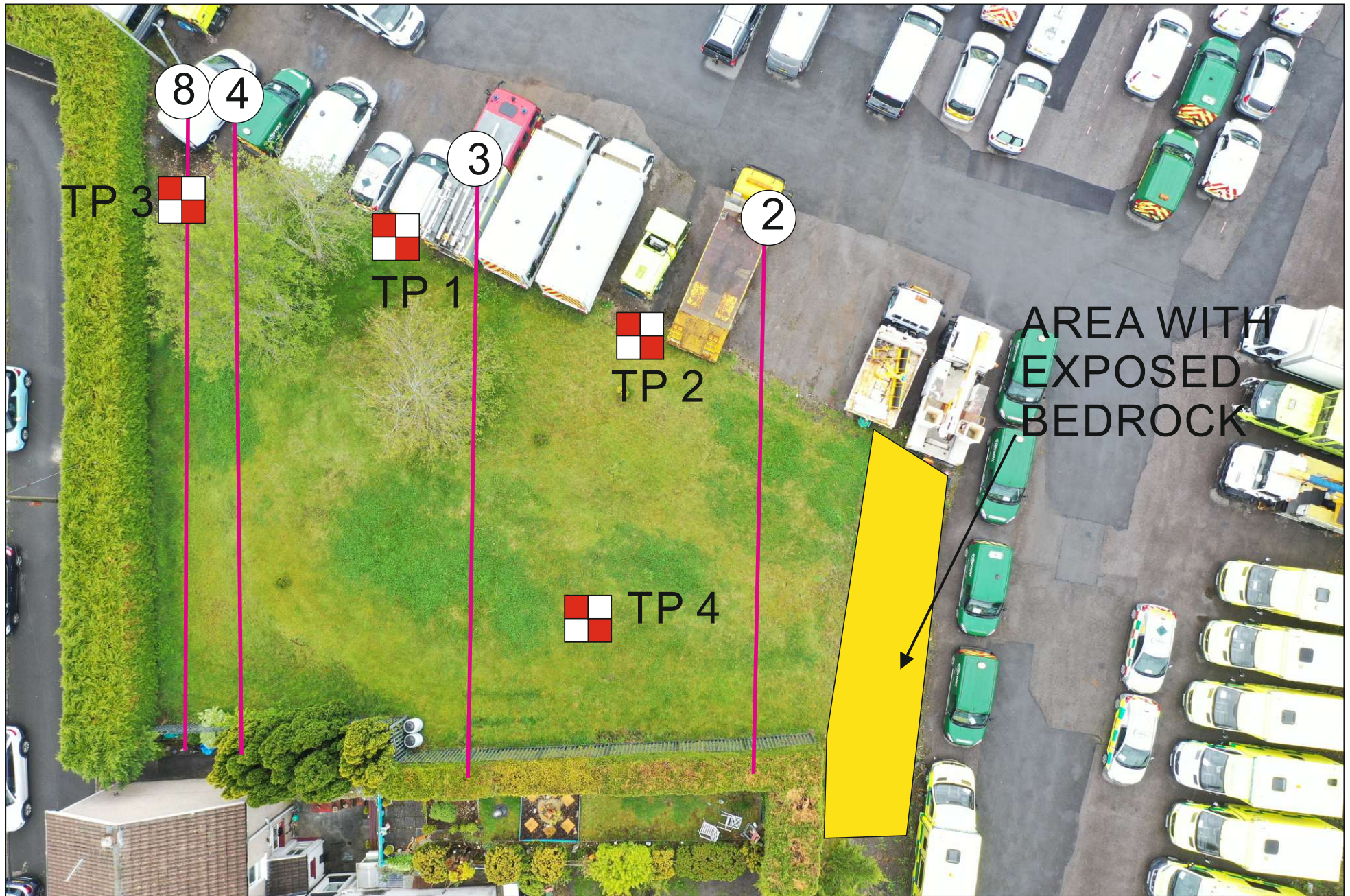


FIGURE 1  
AERIAL VIEW OF THE EMBANKMENT AT M.M.A. PANT WITH SECTION LINES

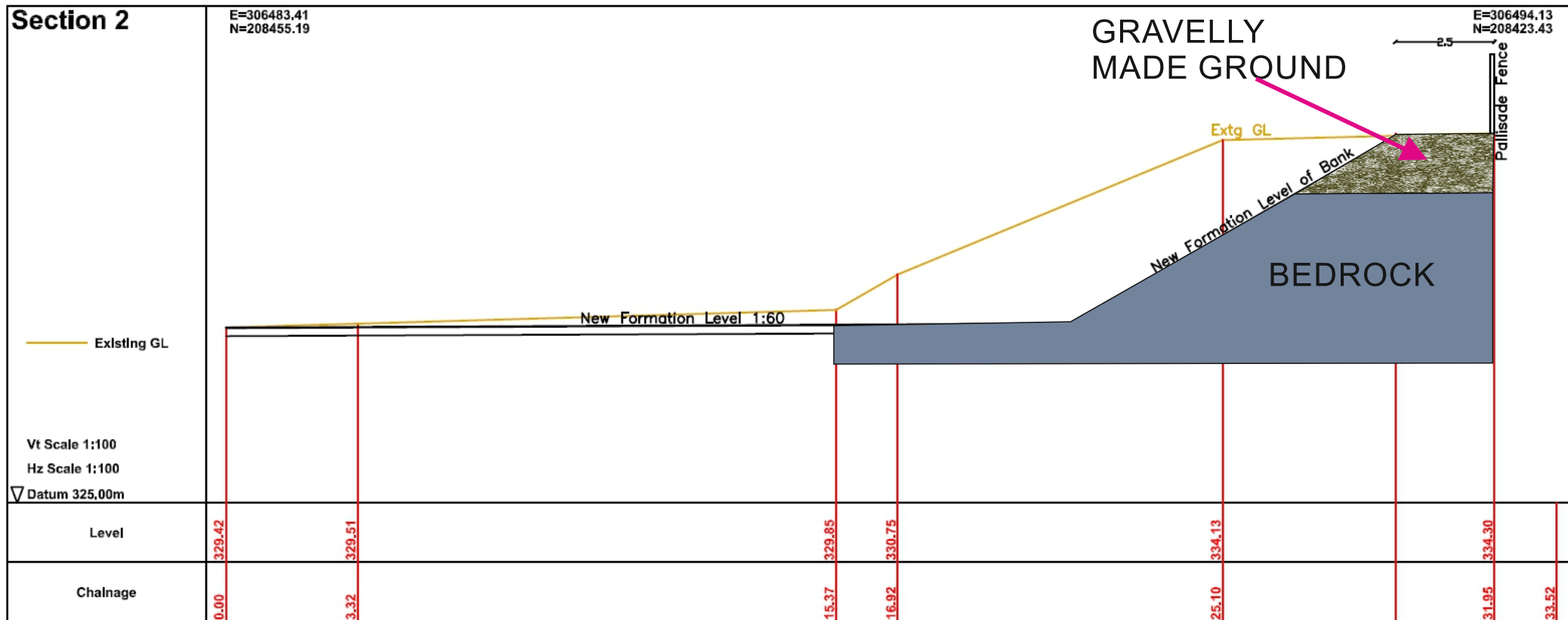


FIGURE 2  
ANTICIPATED GROUND CONDITIONS AT SECTION LINE 2

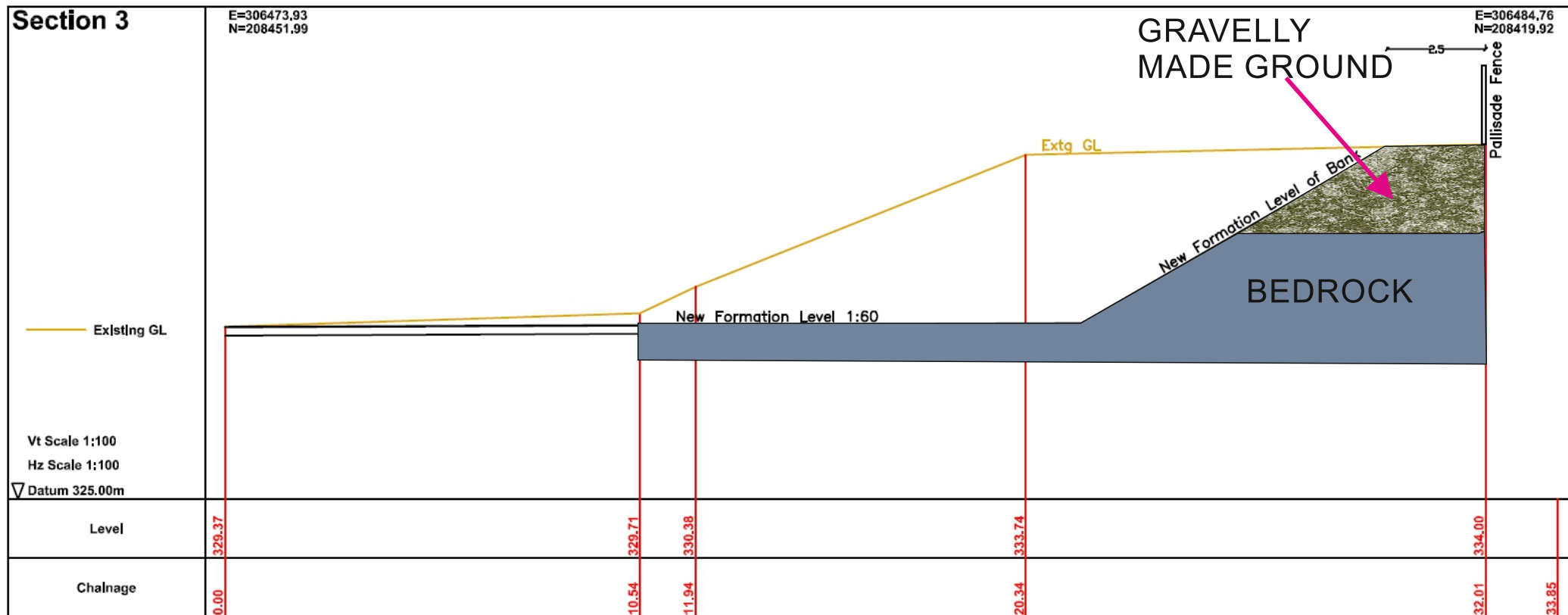


FIGURE 3 ANTICIPATED GROUND CONDITIONS AT SECTION LINE 3

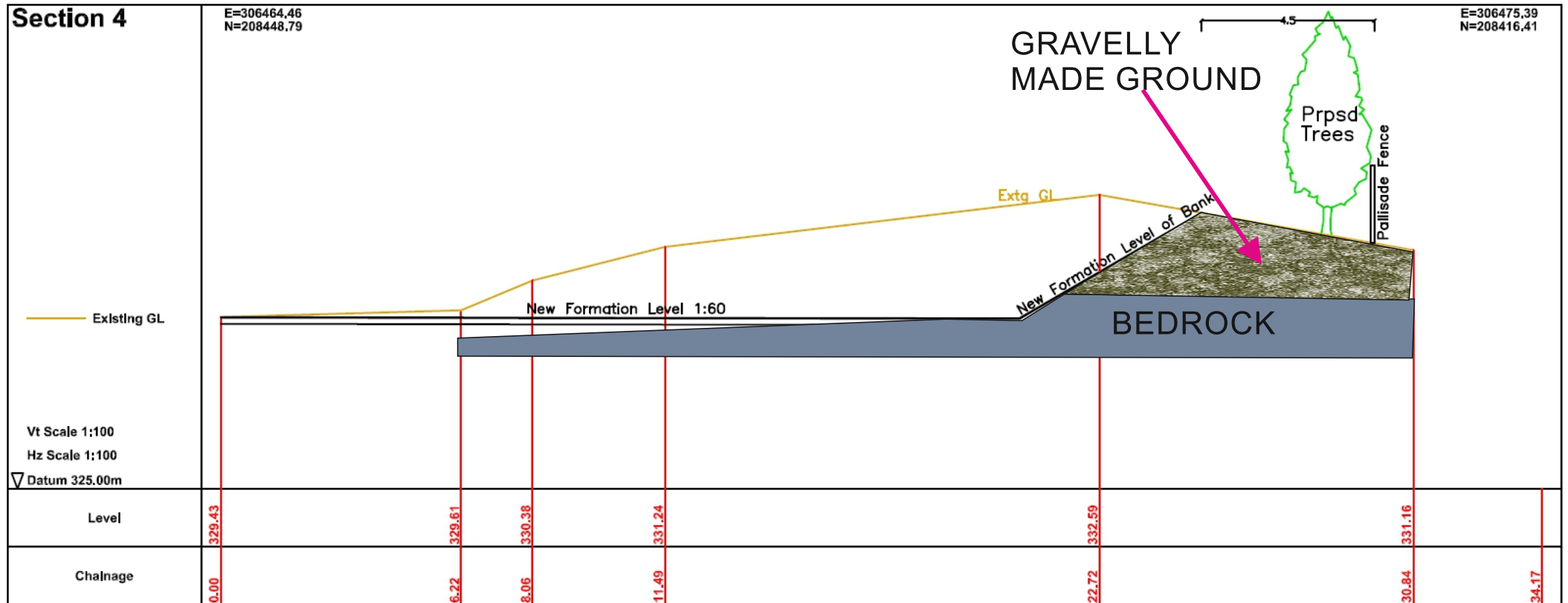


FIGURE 4 ANTICIPATED GROUND CONDITIONS AT SECTION LINE 4

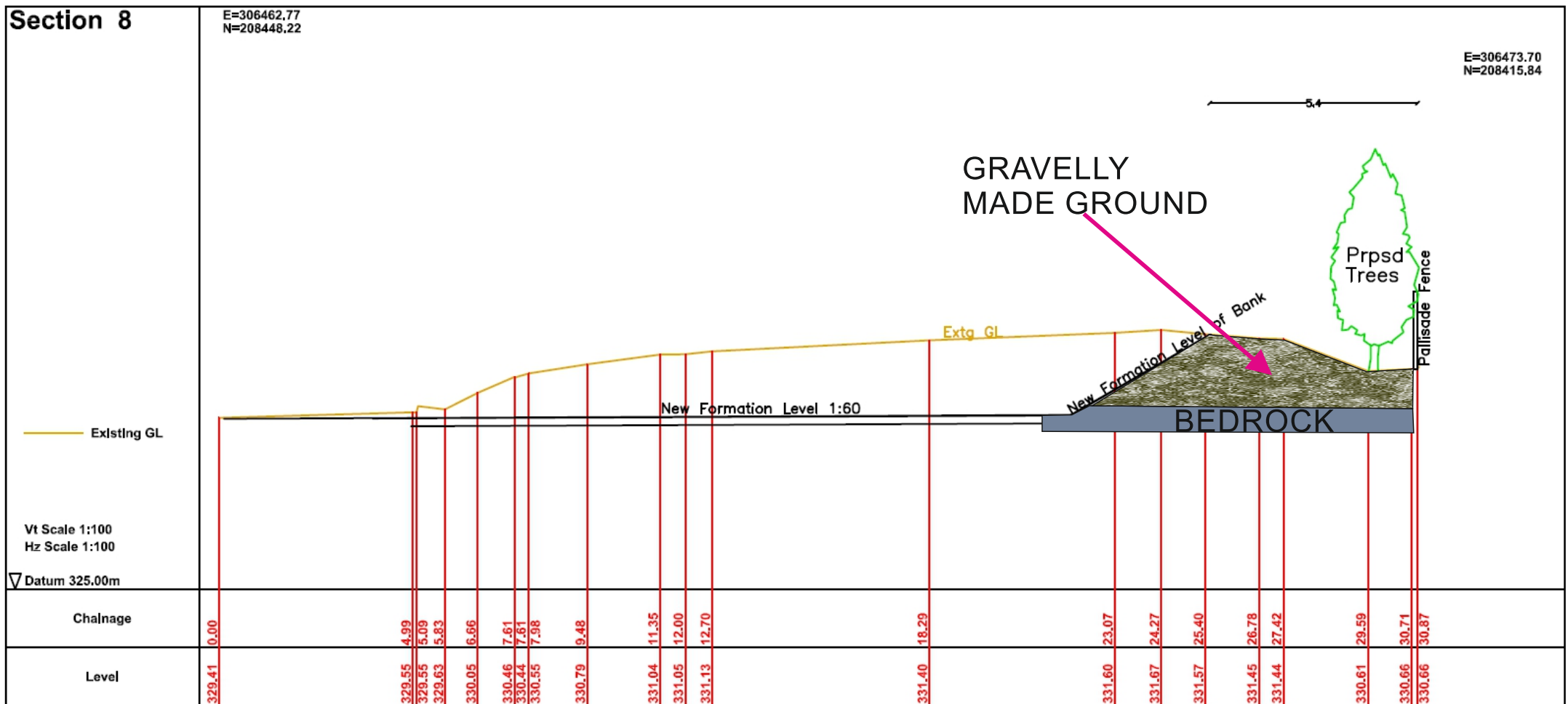


FIGURE 5 ANTICIPATED GROUND CONDITIONS ALONG SECTION LINE 8