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Global Centre for Rail Excellence

Phase 1- Railway Sidings

Lighting Design

Observations for Review by R Thompson

at the

Nant Helen Surface Mine site, Powys

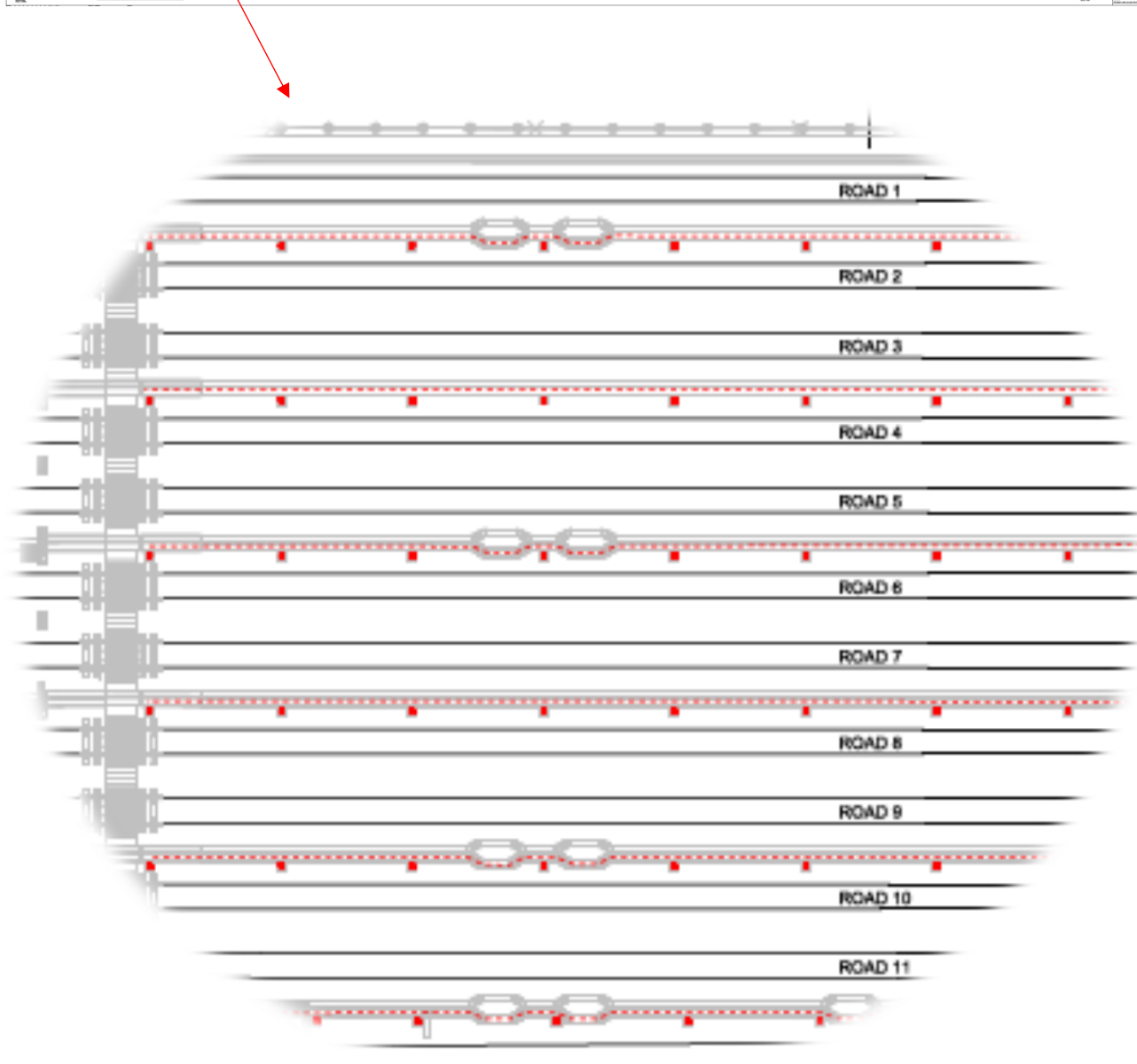
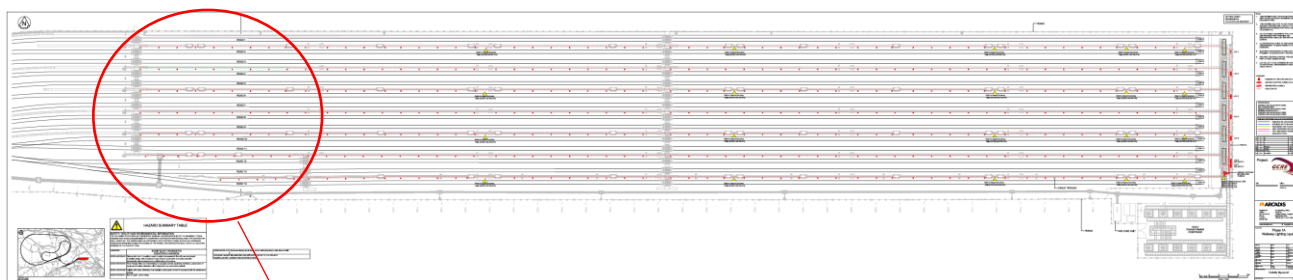
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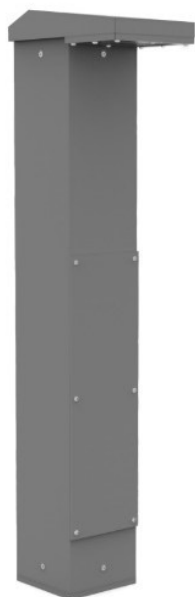
Onllwyn Distribution Centre, Neath Port Talbot



The installation at GCRE-PH1

The submitted design contains 387no. Designplan **TRK-1200-630N-MT** - Trackline Vandal Resistant Bollards. These are spaced between 7m and 8m apart, vertically mounted and rising in accordance with the terrain.





IP 66

IP 65

150 JOULES = IK 16

The bollard is designed specifically for trackside installations with a bilateral light distribution, emitted sideways at 90° to the luminaire aspect. The optics supplied also deliver a zero upward light element.

The units are fabricated in metal and powder coated to ensure a robust and long-lasting finish.

For the model chosen by the design team, at the spacings supplied, the expected results are observed considering the slightly different spacings in Phase 1.

The required illuminance on an open walkway is a maintained average of 10Lx, created by artificial light across the measurement planes.

The designed installation will be more than adequate for the requirement.

The datasheet for the fitting can be found in Appendix A at the rear of this report.

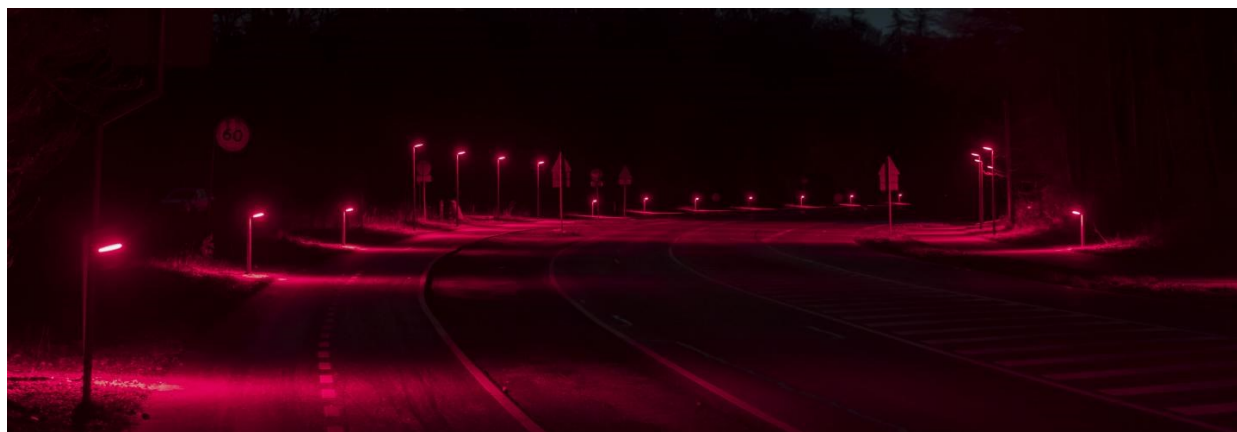
There are just a couple of items that may be questioned by a planning officer who understands lighting and, more specifically, lighting in and around areas of natural beauty or a Health and Safety Officer.

Light Quality - Planning Officer

Whilst the Correlated Colour Temperature (CCT) of the moon may be 4100°K, this light has a much lower blue content than artificial LED light; conservationists are growing more and more concerned regarding the blue and ultraviolet emissions from LED light sources and their impact on wildlife.

The LED light spectrum could not be obtained from Designplan but it may be prudent to request this from the design engineers, just to ensure that the intensity of the blue frequencies are suitable just in case you are required to extend the environmental impact to include a full bat study.

Many conservationists are pushing for warm white or even red night lights for bats and nocturnal birds of prey, after recent studies in Gladsaxe, Denmark:



Gladsaxe Municipality in Denmark switches to red light to limit behavioural effects on bats and other nocturnal and light-shy species along Frederiksborgvej near Skovbrynet. This design is based on studies on bat-friendly lighting, which show that red light is less disruptive on wildlife while allowing for people to find their way and even maintaining peoples' dark adaption for night-time viewing.

Therefore, it may be worth asking Designplan if they can use a lower CCT, with a reduced blue content, just in case the planning officer asks the question.

Operation & Maintenance - H&S

I believe that the switching operation of the bollards is going to be via time-lag switches mounted at various points along the pathways or even switched from control sheds near the Western end of the sidings.

Lighting controls are required for almost every installation to ensure energy efficiency targets are met and light pollution is kept to an absolute minimum.

The control method for the bollards needs to be verified, so that you are happy with their operation, as this is a potential hazard if the lighting times out and an engineer has no other means of artificially lighting their way back to safety.

A number of solutions could be used, such as:

- absence detection PIRs, where an operator manually has to turn the lights on and they will stay on in a given circuit, until they detect no presence for a set period of time.
 - These circuits could be linked on dependency circuits - a bit like corridor hold for offices
- full scale, real-time personal ID location system to activate lights as necessary and locate staff in an emergency, such as the Bluetooth Low Energy (BLE) Real Time Location Systems (RTLS) used elsewhere in transportation. The locators can be concealed in staff badges or wearables, such as wrist devices or key tags. These use incidence over angle detection and "off the shelf" detectors can detect a signal from 300m away with an accurate location within 10cm.

I would recommend something with some sort of presence / absence detection as time lag switches, whilst reliable for operation, are not great when transit times through the lighting zones are known; I believe your engineers may be inspecting carriages for some considerable time and these time-lags would time out.

There are no maintenance concerns as such, but I would have expected there to be some form of emergency lighting design to go with the lighting layouts. Designplan do offer an emergency conversion (add suffix -E3 to the part code) and this should be explored if there are no other emergency lights provided.

In final summation, the design works using the Trackside bollards, but the concern regarding maintaining 387 bollards remains and I suggest that maybe the DALI monitoring option may be worth adopting to save the O&M budget in the long term.



Neil Tomkinson
Director
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