

APP/21/00893 (Land north of Long Copse Lane, Emsworth) objection.



Commenter type: Complainant

Stance: Object

Comment

Natural England (NE) released updated guidance for nutrient neutrality in February 2022 (ref. [1]). NE's latest consultee response to APP/21/00893 (ref. [2]) says that L&P's shadow HRA (ref. [3]) should detail the proposed timing of the building works at site H8 to ensure that appropriate mitigation will be in place in advance of any potential effects from the development i.e. in advance of dwelling occupation. This is to ensure that planners take nitrate travel time to groundwater into account.

According to ref. [3], the proposed mitigation site at Horsepasture Farm "comprises a combination of Soilscape 18 (Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils which have impeded drainage and drain to stream network) and Soilscape 6 (Freely draining slightly acidic loamy soils which drain to groundwater and rivers)". Ref. [3] says that half the site area is Soilscape 18 and half Soilscape 6. Ref. [3] also says that "It does not contain (for example) Soilscape 3 (Shallow lime-rich soils over chalk or limestone which drain to chalk or limestone groundwater). There is therefore no potential risk of a significant temporal lag between mitigation and the effects of development."

Would that it were that simple. There is a large amount of scientific literature arguing against this.

Ref. [4], based partly on a study on the South Downs, says that "One known problem with catchment level solutions for nitrate is the lead time for seeing nitrate reductions in raw water due to the time of travel through groundwater"..... "Recovery times for groundwater can be long, potentially up to 40 years, so over the lifetime of the Local Plan (up to 2036) some reductions in nitrates would be expected but they would be relatively small (circa 10%)".

Ref. [5] says depth to groundwater (i.e. the depth of the unsaturated soil zone beneath the site's surface) is the most significant parameter affecting nitrate concentration in groundwater, with soil type being a secondary parameter.

At the nearest groundwater monitoring station to Horsepasture Farm (at Carpenter's Finchdean), the mean long term average groundwater level = 32 m (ref. [6]). The mean surface elevation of the mitigation site is 49 m. So the mean depth to groundwater at the site is 17 m.

Ref. [7] measured nitrate concentration dynamics in the unsaturated zone beneath a fertilized crop field as a function of time and depth. Good agreement was found between observed nitrate concentrations and those simulated using a nitrate transport model. The study had a similar depth to groundwater as the mitigation site. The authors found that it took 6 years for nitrogen to pass out through groundwater after agriculture on land above had ceased. Their study was on sandy soil. With the loamy/clayey soil present at the mitigation site, the time would be longer.

We object to L&P's simplistic estimate that there would be no significant temporal lag between mitigation and the effects of development. We believe that the actual travel time of nitrate through groundwater would be in excess of 6 years (ref. [7]) and could be significantly longer (order of decades) (ref. [4]).

In addition to the main mitigation site at Horsepasture Farm (8 ha), an additional mitigation site of 3.5 ha is proposed at Chilgrove Farm (ref. [3]). This is situated on Soilscape 3 soil (Shallow lime-rich soils over chalk or limestone which drain to chalk or limestone groundwater). At the Chilgrove groundwater monitoring station, the mean long term average groundwater level = 50 m (ref. [8]). The mean surface elevation of the mitigation site is 90 m, so the mean depth to groundwater at the site is 40 m. This is a significant depth, and, as stated in ref. [4], the actual travel time of nitrate through chalk to groundwater here could be on the order of decades.

As a precursor to a decision regarding APP/21/00893, it would seem reasonable to request that the hydrogeological systems at the mitigation sites be properly modelled to provide more accurate estimates of nitrate travel times. The type of modelling required is described in ref. [7], and depends on site-specific parameters such as depth to groundwater, nitrate concentration, pore-water velocity and nitrate retardation. Where possible the modelling should be validated by monitoring.

In addition, we believe that better guidance is needed from NE to allow planners to model nitrogen travel time to groundwater.

References

1. Nutrient Neutrality Generic Methodology. Natural England. February 2022.
2. APP_21_000893-CONSULTEE_RESPONSE_-_NATURAL_ENGLAND_1671886.pdf, NE, June 2022.
3. APP_21_00893-REPLACEMENT_SHADOW_HRA_APPENDIX_4-1673323.pdf, Tetra-Tech, June 2022.
4. Chichester District Council Water Quality Assessment. Amec Foster Wheeler. 2018.
5. Lockhart et al 2013. Identifying sources of groundwater nitrate contamination. J. Contaminant Hydrology, 151, 140-154.
6. Environment Agency, 2020. Flooding from groundwater. Hampshire.
7. Turkeltaub et al. 2016. Real-time monitoring of nitrate in the deep vadose zone under a crop field - implications for groundwater protection. Hydrol. Earth Syst. Sci., 20, 3099-3108.
8. Environment Agency, 2020. Flooding from groundwater. West Sussex.