

**HYDROGEOLOGY AND CONTAMINATED LAND**

REBUTTALS

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ON BEHALF OF WILTSHIRE COUNTY COUNCIL

PUBLIC INQUIRY INTO:

WILTSHIRE COUNTY COUNCIL PLANNING APPLICATION W07.09002  
LAND TO THE EAST AND NORTH OF WESTBURY, WILTSHIRE, DEVELOPMENT:  
CONSTRUCTION OF A SINGLE CARRIAGEWAY ROAD WITH CLIMBING LANE OVER  
PART OF THE ROUTE, ROUNDABOUT JUNCTIONS, ASSOCIATED  
INFRASTRUCTURE  
CALLED IN FOR DETERMINATION BY THE SECRETARY OF STATE, COMMUNITIES  
& LOCAL GOVERNMENT (SECTION 77 TOWN AND COUNTRY PLANNING ACT 1990  
AS AMENDED)

THE WILTSHIRE COUNTY COUNCIL (A350 WESTBURY BYPASS CLASSIFIED  
ROAD) COMPULSORY PURCHASE ORDER 200'

THE WILTSHIRE COUNTY COUNCIL (A350 WESTBURY BYPASS CLASSIFIED  
ROAD) SIDE ROAD ORDER 200'



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## 1 Points of Objection

### 1.1 Point Raised by Mr Sargent on behalf of the White Horse Alliance OBJ/WHA/P14 - Second page, second paragraph

1.1.1 *Current guidance is that no development should take place within SPZ1, and this is acknowledged by the scheme promoters.*

### 1.2 Point Raised by Mr Sargent on behalf of the White Horse Alliance OBJ/WHA/P14 - End of second page and first three paragraphs of third page

1.2.1 *Given the importance of the abstraction source, it is essential that this liner works faultlessly over the lifetime of the scheme. I have three concerns regarding its ability to so do.*

1.2.2 *Firstly, liners have been developed largely for use in waste disposal sites where it is acknowledged that no liner installation can be guaranteed to be leakproof.*

1.2.3 *Secondly, where the fallibility of liners is acknowledged, it is common practice to install a secondary layer of impermeable material such as engineered clay. This is designed to work with the liner in a complementary fashion: the clay will prevent a rapid loss of pollutants through a small leak in the liner fabric. The proposed liner will not incorporate a low permeability clay layer. Indeed, it is specifically stated that the liner will be laid onto sand. Should a leak occur in the liner over the lifetime of the project, this sand layer will rapidly transmit any resultant leakage rapidly and directly into the underlying aquifer.*

1.2.4 *Thirdly, it is also considered best practice to install a leak detection layer, which will effectively route any leakage to a specific point where it can be monitored and early warning of a failure provided. There is no intention to provide such a layer for the scheme, and so monitoring of the performance of the liner will not be possible.*

**1.3 Point Raised by Mr Sargent on behalf of the White Horse Alliance  
OBJ/WHA/P14 - Third page, fifth paragraph**

*1.3.1 When asked about provision for monitoring. the promoter has stated that it is not recommended by their consultants but that Wessex Water will monitor the water abstraction point. Clearly monitoring at this stage can only detect pollution that has already occurred, by which time it would be too late to prevent discharge of pollutants into the aquifer. The consequent loss of the the water supply source, and the long term damage to the aquifer would then be unavoidable.*

**1.4 Point Raised by Mr Bowley - OBJ/Bowley/P/1 – JB: 1 Wellhead  
Water Risk. Second Paragraph.**

*1.4.1 The water supply network is interlinked; the risk is to all in the area.*

**1.5 Point Raised by Mr Bowley - OBJ/Bowley/P/1 – JB: 1 Wellhead  
Water Risk. Tenth paragraph.**

*1.5.1 It would be implausible to think that the inner ground-water zone has an impervious edge.*

**1.6 Point Raised by Mr Bowley - OBJ/Bowley/P/1 – JB: 1 Wellhead  
Water Risk. Thirteenth paragraph.**

*1.6.1 It emerges that assessment of the risk from the road when in use has not been carried out.*

## **2. Counter Response**

### **2.1 Point Raised by Mr Sargent on behalf of the White Horse Alliance OBJ/WHA/P14 - Second page, second paragraph.**

2.1.1 The guidance on groundwater protection is in the process of being superseded. The original document entitled "Policy and Practice for the Protection of Groundwater" was published in 1998. The new document entitled "Groundwater Protection: Policy and Practice" and published by the Environment Agency, is in four parts with the detail to be presented in Part 4: this part is currently at consultation stage. Common to both the previous document and the current document the policy approach is to object in principle to development in a source protection zone 1, but to accept development where the developer can demonstrate that the risk is not unacceptable.

2.1.2 This is the process which has occurred with the full participation of the Environment Agency throughout the development of the project. Initially the Environment Agency objected to the scheme, but once they were convinced that the measures were adequate to protect the Wellhead Springs Public Water Supply, the objection was withdrawn. Accordingly there is no objection to the proposal on this basis.

### **2.2 Point Raised by Mr Sargent on behalf of the White Horse Alliance OBJ/WHA/P14 - End of second page and first three paragraphs of third page**

2.2.1 The premise of Mr Sargeant's arguments in these paragraphs is that sealing the road over the Source Protection Zone is equivalent to the process of containing leachate from waste in a landfill. There are however, significant differences between the two systems which need to be borne in mind. The principal differences between the two systems are as follows:

- In the case of the landfill the liner has to contain a head of water directly above it. This means that any holes will be subject to a

water pressure and may therefore result in a leak. The leak will continue until the pressure is removed.

- In the case of the road, the liner will be placed below the low permeability highway surface and its integrated drainage system (incorporating roadside gullies and a carrier pipe). The liner itself is cambered with a cross fall which will direct any water which does infiltrate through the road surface to filter drains on top of the liner. The road also slopes gently northwards throughout the lined section. Therefore there will be no significant head of water on the liner and no pressure to drive the water through the liner, should there be any defects.

My rebuttals to each of Mr Sargent's 3 points are set out below:

1 In the case of the proposed road, the liner system is essentially part of a double protection layer which is more sophisticated than a landfill liner. The first layer is the highway itself and the associated drainage system. The second layer is the liner. Both layers are drained, so a significant head of water cannot build up on them. Should the first layer fail to prevent leakage, the second layer will prevent any residual leakage which may get through the drainage systems from reaching the aquifer.

2 The system will allow for access to the deep drains along the sides of the liner. In the normal course of events, it is anticipated that these would be dry. These drains could act for the purpose of leak detection and in the event of a major spillage on the road, investigations would be undertaken to track the path of the liquid and recover as much as possible. Access to the drains for this type of investigation would be possible.

3 Whilst the liner cannot be guaranteed 100% leak proof, the risk of leakage of significant amounts of road run-off is minimal, even if holes develop since the road acts as a drainage layer above the liner and significant head of water cannot build up on the liner.

4 The Environment Agency has raised no objection to the proposal.

5 The existing A350 crosses the source protection zone 1 in a cutting at Upton Scudamore to the south of the proposed scheme, apparently causing no water quality problems to Wessex Water.

**2.3 Point Raised by Mr Sargent on behalf of the White Horse Alliance OBJ/WHA/P14 - Third page, fifth paragraph**

The leak detection layer must be above a low permeability layer for it to be able to collect water. In this instance the filter drain above the liner could act as the leak detection layer. However there is little prospect of altering the design of the liner or moving the road should leakage be detected. For this reason I see no benefit in monitoring. This is also why the liner system has been designed as a double layer which will be fail safe in the context of the proposal.

**2.4 Point Raised by Mr Bowley - OBJ/Bowley/P/1 - JB: 1 Wellhead Water Risk. Second Paragraph.**

2.4.1 The water supply is closely monitored by Wessex Water and any risk related to pollution from any source relates to Wessex Water's ability to supply the water (ie a commercial risk) rather than a risk to health of customers.

2.4.2 In the very unlikely event of a combination of leakage of the liner system and failure of Wessex Water's systems to detect contamination, I would expect any breach of water quality standards to be very short term. The type of contamination which could occur from road run-off or spillage is low level contamination which would only pose a chronic risk to the health of customers over a long time period if it were not detected in the water supply and was supplied to customers over a long period. The risk to health of Wessex water customers is therefore negligible.

**2.5 Point Raised by Mr Bowley - OBJ/Bowley/P/1 - JB: 1 Wellhead Water Risk. Tenth paragraph.**

2.5.1 This point relates mainly to a spill from an accident which could occur outside the area of containment of the road. This would be at least 30m outside the Source Protection Zone. Mr Bowley is correct that the

aquifer has no impervious edge. The Source Protection Zone is defined by the estimated groundwater travel time to the abstraction point. The Source Protection Zone 1 defines the estimated 50 day travel time to the well. This provides sufficient time for contaminants to degrade in the sub-surface before reaching the abstraction.

2.5.2 Activities and development within zone 1 are more restricted than those in zone 2. Therefore the road is lined and contained in zone 1 and the drainage system is sealed in zone 2 and over the rest of the aquifer.

## **2.6 Point Raised by Mr Bowley - OBJ/Bowley/P/1 – JB: 1 Wellhead Water Risk. Thirteenth to fifteenth paragraphs.**

2.6.1 The approach to assessing and managing the risk from the road in use is as follows:

- A spillage risk assessment was undertaken in 2003 to assess the potential for an accident to result in serious spillage along the section of the road over the Source Protection Zone 1. The risk assessment used the method set out in DMRB 11, Section 3, part 10, Annex III. The risk assessment indicated that the risk of such an accident occurring along the proposed route on the stretch above the Source Protection Zone 1 is 1 in 4330 years.
- The methodology was updated in 2006 and a revised risk assessment for serious accidental spillage has been undertaken using the revised methodology. The revised risk assessment is presented on the final page of this document and shows the calculated risk of serious accidental spillage to be one in 25280 years. This represents a minimal risk posed by accidental spillage even without the liner.
- It is not possible to quantify the risk of leakage of the drainage system which carries the everyday road run-off, but I would expect small quantities of water to leak through joints between the edge of the road and the gullies and potentially through defects in the carrier drain.

- Given the very small probability of a serious accidental spillage combined with the high potential consequence, and the higher probability and low consequence of leakage of the drainage system in everyday use, the road will be lined through the Source Protection Zone 1. The liner system breaks the pathway between the road and the aquifer and thus reduces the risks posed by the road to the water supply to acceptable levels.

**Water Quality**  
**Assessment of Pollution Impacts from Accidental Spillages**

The adopted method is described in DMRB Volume 11, Section 3, Part 10, HA 216/06 Annex I, Method D -Assessment of Pollution Impacts from Accidental Spillages

The probability of a serious accidental spillage is calculated as follows:

$$P_{acc} = RL \times SS \times (AADT \times 365 \times 10^{-9}) \times (\%HG\ V / 100)$$

where:

$P_{acc}$  = annual probability of an accidental spillage with the potential to cause a serious pollution incident  
 $RL$  = road length in kilometres  
 $SS$  = serious spillage rates from Table D.1  
 $AADT$  = Annual Average Daily Traffic  
 $\% HG\ V$  = percentage of Heavy Goods Vehicles

The probability of a spillage accident with an associated risk of causing a serious pollution incident is calculated thus:

$$P_{inc} = P_{acc} \times P_{pol}$$

where:

$P_{pol}$  = the probability that an accident will result in a serious pollution incident. It will depend on the sensitivity of the water course and emergency services response times. The value is to be selected from Table D.2.

Catchment length through GSPZ 1 and 2

$$RL \text{ (km)} = 0.480$$

$$SS \text{ (From Table D.1)} = 0.29 \text{ (Rural Trunk Road with no junction)}$$

$$AADT \text{ (High Growth, 2021)} = 21541$$

$$\%HG\ V = 12 \text{ (Typical value from 12 hour counts)}$$

$$\text{Therefore, } P_{acc} = 1.31E-04$$

$$P_{pol} \text{ (From Table D.2)} = 0.3 \text{ (Groundwater/Rural [response time to site <1 hour])}$$

Therefore,  $P_{inc} = 3.9E-05 \times 25380.46 = 0.004\%$  If less than 1% no further spillage prevention measures will be required to reduce the risk of a serious pollution incident.

**NB No risk reduction factors applied to account for the impermeable membrane & protective layers**