
HYDROLOGICAL ASSESSMENT

Influence of proposed tree planting on private water supply near Flatt Farm,
Roxburghshire, Scottish Borders

Prepared for:

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List of Abbreviations

DTM	Digital Terrain Model (bare earth i.e., with all tree foliage and vegetation removed)
HACCP	Hazard Analysis and Critical Control Point
LiDAR	Light Detection And Ranging
REHIS	The Royal Environmental Health Institute of Scotland

Quality Assurance Statement

The data used in this document and their input and reporting have undergone a quality assurance review which follows established TransTech procedures. The information and results presented herein constitute an accurate representation of the data collected and analysed.

Document Details

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Disclaimer

All comments and opinions contained in this report, including any conclusions are based on information available to TransTech Environmental during our investigations. The conclusions drawn by TransTech could therefore differ if the information is found to be inaccurate, incomplete, or misleading.

1. EXECUTIVE SUMMARY

TransTech has been commissioned by EJD Forestry Ltd to carry out a hydrological assessment of a groundwater (spring) derived private water supply to determine what impact proposed tree planting will have on water availability. The supply serves three properties, Flatt Farm, Burn Cottage and Abbotshaw Cottage.

The assessment's conclusion is that no planting will take place within the spring's catchment and as such no significant negative impact on the sufficiency of the spring supply or its water quality is predicted.

The private water supply's pipeline runs adjacent to some of the proposed native broadleaves planting and the storage tank lies in proximity to an area of proposed mixed conifer and mixed broadleaves planting. Therefore, to protect the pipeline and the storage tank a 10 m buffer between them and the planting is recommended. With this in place no impact on the supply is predicted.

2. INFORMATION USED TO COMPILE THIS REPORT

Information gained from the following has been used to compile this report:

- Catchment area estimated from 50 cm spatial resolution Phase 4 LiDAR Digital Terrain Model data (DTM), available [here](#).
- Proposed planting from EJD Forestry Ltd.

3. SUPPLY DETAILS

The source of supply is a spring located at approximately 348490 E, 584413 N.

Groundwater flow tends to follow the landform's topography (i.e., travel downhill). For the subject supply, the flow towards the spring travels from the 266 mAOD summit of Carby Hill to the abstraction location at the c. 154 mAOD contour. From here it is piped to the properties on the supply.

The predicted catchment of the spring is shown in figure 1 which has been delineated using LiDAR Digital Terrain Model data.





<p>Legend</p> <ul style="list-style-type: none"> □ Predicted Spring Catchment - - Route of Water Supply Pipe — LiDAR Derived 2m Contours 	<p>Drawing Title: Predicted Spring Catchment</p> <p>Drawing No: LID-0923-1</p> <p>Drawn By: Garret Macfarlane</p> <p>Date: 11/10/2023</p>	<div style="text-align: center;">  </div> <div style="text-align: center;">  <p>Scale 1 : 7,500 @ A4</p> </div>	<p>TransTech Limited Caerthann House Connel Argyll PA37 1PQ</p>
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Figure 1. Predicted catchment of spring.

Rainfall falling within the catchment travels vertically through the soil where it reaches an impermeable layer of bedrock which creates an unconfined aquifer from which the spring emerges (see red rectangle in figure 2 below).

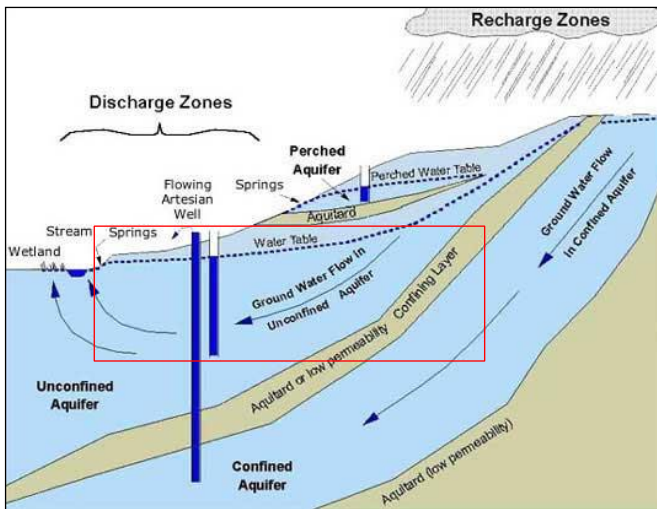


Figure 2. Groundwater schematic.

(source: <http://imnh.isu.edu/digitalatlas/hydr/concepts/gwater/imgs/6comp.jpg>).

Thus, all rainfall falling on the catchment will make its way towards the spring.

4. PROPOSED PLANTING

The proposed planting is provided in figure 3. This shows that no planting will take place in proximity to the spring's catchment or the abstraction location.

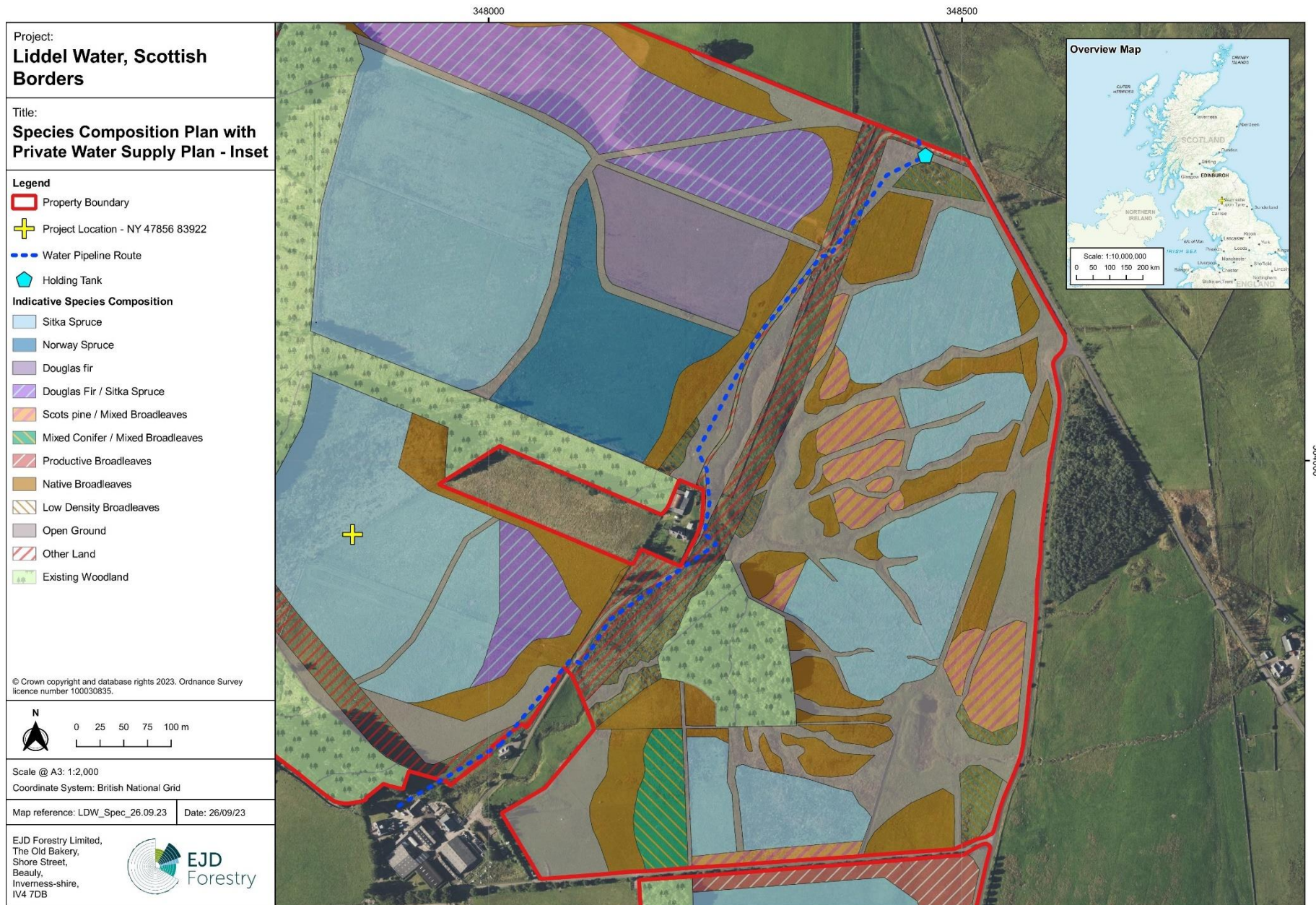


Figure 3. Proposed planting.

5. DISCUSSION & CONCLUSIONS

The proposed planting drawing provided by EJD Forestry Ltd (figure 3) indicates that some of the native broadleaves will lie in close proximity to the supply pipeline. Similarly, the storage tank lies close to an area of proposed mixed conifer and mixed broadleaves planting.

As such the guidance in the Forestry Commission’s “Managing forest operations to protect the water environment”⁽¹⁾ should be followed. This states that a buffer of 5 to 50 m should be provided for a water supply (table 1). Given that the location of the pipeline’s route is known it is deemed that a 10 m buffer from the adjacent woodland creation will be satisfactory. Likewise, a 10 m buffer between the storage tank and the planting is recommended.

Table 1. Defined buffer zones⁽¹⁾ for where ground preparation, drainage, fertilisers, herbicides, or establishment of conifers and broadleaves should not occur.

Forest operation	Watercourse		Water supply ²
	<2 m wide	>2 m wide ¹	
Buffer width	2-10 m	2-20 m	5-50 m
Cultivation	Mechanised cultivation limited to hinge or inverted mounding		
Drainage	Not permitted		
Fertilisers	Only hand applications of inorganic fertiliser. Organic fertiliser not permitted		
Pesticides	Only the dry planting of pretreated trees, unless the product is approved for use in or near water ³		
Roads/quarries	No quarrying. Roads should be kept out of buffer areas unless there is a need for a crossing		
Harvesting	No trafficking (except for watercourse crossings). Brush should be minimised		
Vehicle/machine maintenance	Not permitted (including the storage and handling of fuel oils, lubricants and chemicals)		

¹ The 20 m buffer width also applies to lakes, reservoirs, large ponds and wetlands, and should be measured from the edge of the standing water.

² Concentric buffers for wells and boreholes but focus on the upslope or upstream area of springs and intakes.

³ Note that the use of such products may require consent from the relevant water authority and users must adhere to the specific guidance on their use.

The conclusion of the assessment is that no planting will take place within the spring’s catchment and as such no significant negative impact on the sufficiency of the supply or water quality is predicted. With the implementation of a 10 m buffer to protect the private water supply’s pipeline and storage tank no impact on the supply is predicted.

REFERENCES

- (1) Forestry Commission. 2019. Managing forest operations to protect the water environment.
[Website link](#)