

APPENDIX 4.1 WATERCOURSE CROSSINGS

- 4.1 Table A.1 has been updated to reflect the revised layout of the Proposed Development. Two watercourse crossings (WC10 and WC11) have been removed; four new watercourse crossings are required. Whilst the number of watercourse crossings has increased overall by two, it allows the northern section of track to be removed from an area of deep peat, and redesigned to areas of shallow peat.
- 4.2 The relevant level of CAR licence consent required for each crossing is stated. Detailed design of the crossing, including peak flow calculation to a 1 in 200 year design flood flow, will be submitted separately to SEPA following initial planning consent.
- 4.3 Whilst a closed culvert crossing is unfavourable due to the increased impact they pose on the ecology of the watercourse (SEPA Best Practice Guidance¹), the crossing design must be most appropriate to the watercourse size and ecological sensitivities. The watercourses within the Proposed Development can be classified as either small watercourses with no ecological sensitivity, or flushes. In this instance closed culverts are considered to be of no greater impact on the watercourses than any other design, and, are most appropriate for the watercourse size.
- 4.4 Watercourse crossings on flushes are proposed to be of a multiple pipe design. A flush delineates an area where water is moving diffusely within the vegetation or subsurface. Flows need to be maintained across the track, and, in accordance with best practice² the crossing design will comprise a wrapped, free draining drainage blanket with perforated pipes, spaced across the width of the flush.
- 4.5 The watercourse crossings will be designed such that flood flows beyond the capacity of the culvert can safely pass around the structure and to the same downstream watercourse. Culverts will be regularly maintained to reduce the potential for blockage; details on the proposed maintenance will be issued to SEPA with the detailed design.

¹ Engineering in the water environment: good practice guide – river crossings, second edition, 2010, SEPA.

² Floating Roads on Peat, 2010, SNH.

Table A.1 Watercourse Crossings

Reference (Figure 12.1)	Type	Easting	Northing	Photograph	Width (m measured toe to toe)	Depth (m)	Comments
1	Existing	251950	609225		0.94	0.19 – 0.24	Existing double culvert crossing on the main Beoch Lane. The watercourse has limited gradient with localised evidence of out-of-bank flow. The watercourse crossing will be reviewed and upgraded with a closed culvert. As the watercourse is less than 2 m in width, a CAR registration will be required for the proposed upgrade works.

2	Existing	251679	609410		0.79	0.16	Existing double culvert crossing on a tributary of the main Beoch Lane. The watercourse has been heavily modified along the downstream reach and a notable proportion of the inflow joins downstream from areas of forestry. A CAR registration will be required for the proposed upgrade works to the closed culverts.
3	Existing	251128	610688		0.29 (widens to 0.46 at upper bank)	0.08-0.17	Existing double culvert crossing on a small tributary of the Black Water. The channel has a variable depth. The second culvert has been encroached with vegetation. A CAR registration will be required for the proposed upgrade works to the closed culverts.

4	New	251372	611868		0.41	0.25-0.30	Flush with no surface conveyance. Width represents inner saturated area; outer extent of flush ill-defined though greater than 2m. A multiple pipe crossing is proposed in accordance with best practice. Based on the wider flush width, a simple CAR licence is required.
5	New	251161	612145		2.3	0.17	Flush with no surface conveyance. Width represents inner saturated area; outer extent of flush ill-defined and depth of saturated vegetated may be greater. A multiple pipe crossing is proposed in accordance with best practice. A simple CAR licence is required.

6	New	251415	612800		2.98	0.16-0.22	Flush with no surface conveyance. Width represents inner saturated area; outer extent of flush ill-defined and depth of saturated vegetated may be greater. A multiple pipe crossing is proposed in accordance with best practice. A simple CAR licence is required.
7	New	251563	612835		8.4-8.5	0.2-0.4	Wide defined flush with no surface conveyance and limited visible water unless vegetation compressed. A multiple pipe crossing is proposed in accordance with best practice. A simple CAR licence is required.
8	New	251590	612859		0.56	0.10-0.19	Defined channel with a small flow. The watercourse is hagged and is split at the proposed crossing location. Micro-siting approximately 2 m downstream is recommended (stated grid reference) for a single crossing with minimal disturbance. A closed culvert is proposed

								requiring a CAR registration.
9	New	251692	612989			0.37	0.02-0.05	Small channel with a defined watercourse, though, heavily vegetated. A CAR registration will be required for the proposed closed culvert.
10	No Longer Required							
11	No Longer Required							

12	New	252370	612102		0.94	0.08 - 0.14	Flush with no surface conveyance. Width represents inner saturated area; outer extent of flush ill-defined and depth of saturated vegetated may be greater. A multiple pipe crossing is proposed in accordance with best practice. A simple CAR licence is required.
13	New	252214	611928		2.88	0.16	Flush with no surface conveyance. Width represents inner saturated area; outer extent of flush ill-defined and depth of saturated vegetated may be greater. A multiple pipe crossing is proposed in accordance with best practice. A simple CAR licence is required.

								
14	New	252087	611574	Snow covered. Details to be issued to SEPA with detailed design and CAR Licence, as agreed with SEPA.				
15	New	252045	610935	Snow covered. Details to be issued to SEPA with detailed design and CAR Licence, as agreed with SEPA.				
16	New	251956	610797	Snow covered. Details to be issued to SEPA with detailed design and CAR Licence, as agreed with SEPA.				
17	New	251969	610685	Snow covered. Details to be issued to SEPA with detailed design and CAR Licence, as agreed with SEPA.				

