Appendix 11.4

Hydromorphology Assessment Part 4



Catchment No. 94 Catchment Name Nature of water course Drain Channel Nature Size of water course Other No Data Catchment Area (km²) **Quantitative Spatial** No Data Average slope in catchment (°) Elements % Catchment over 750m (for snow melt risk) No Data Water, flows and levels Good WFD classification Physical condition Good Overall ecological statu Good Gaick Psammite formation-Psammite resistant to weathering, impermeable Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 94) Geology Is an alluvial fan present at or near the crossing? No Environmental No Ramsar designations (see SAC No Drawing 11.4.3.1 c, SPA No SSSI Catchment 94) No Changes in slope and channel confinement See Drawing 11.4.3.2, Catchment 94 No Is peat present in the catchment No Is there a bog burst risk Current valley side or terrace erosion No Potential valley side or terrace erosion No Hill slope failures (including peat slides and debris flows and slides) No Sediment source and Hill slope failures coupled to channel No supply - Catchment Vertical incision present in catchment No Scale Bank erosion/lateral migration No Unvegetated bars No Wooded/forested areas in catchment No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 94) Yes Aqueduct, ETL construction track and tower sites Comment on sediment source potential in catchment Limited. ETL construction works possible source of sediment supply. Comment on sediment supply potential to crossing Limited. No well developed channels to carry sediment d/s to cr Plane bed Channel morphology Predominant sediment size Gravel Unvegetated bars No Cross-slope drain enters from left bank (south) near culvert entrance. There appears to be some Vertical incision Medium nick point migration up this channel, causing Morphology and Proces vertical incision and production of mobile fine Reach upstream of . and coarse sediment. crossing Low Deposition Lateral migration/bank erosion Low Presence and nature of infrastructure (Map 1d) Yes Aqueduct Infrastructure type (see Drawing 11.4.3.1 d, Catchment 94) No Might restrict d/s sediment supply and flows Channel realignment No Channel morphology Engineered Predominant sediment size Gravel Estimated discharge at 1:200 event (m³/s) 3.5 Unvegetated bars No Morphology and Process Vertical incision None At crossing Some gravel deposition at culvert outlet, likely Deposition Low generated from erosion immediately u/s of culvert Lateral migration/bank erosion None Damaged/unstable drains or armouring Yes Some damage to drain armouring Channel morphology Plane bed Predominant sediment size Fine Unvegetated bars No Morphology and Process Vertical incision Low Reach downstream of Low Deposition crossing Lateral migration/bank erosion Low Presence and nature of infrastructure (Map 1d) No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 94) No Channel realignment No Channel is continuation of drain to allow drainage from upslope to downslope of aqueduct. Cross-slope drain joins the main downslope drain just u/s of road Summary behaviour culvert. Some incision evident u/s of culvert, generating sediment. Coarsest sediment has not moved very far, some gravel deposited in and d/s of culvert. Sluggish flow d/s of culvert, little activity.

Catchment No. 95 Catchment Name Nature of water course Drain Channel Nature Size of water course Other No Data Catchment Area (km²) Quantitative Spatial No Data Average slope in catchment (°) Elements % Catchment over 750m (for snow melt risk) No Data Water, flows and levels Good WFD classification Physical condition Good Overall ecological status Good Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 95) Gaick Psammite formation-Psammite resistant to weathering, impermeable Geology Is an alluvial fan present at or near the crossing? No Environmental Ramsar No SAC designations (see No Drawing 11.4.3.1 c, SPA No Catchment 95) SSI No Changes in slope and channel confinement See Drawing 11.4.3.2, Catchment 95 Is peat present in the catchment No Is there a bog burst risk No Current valley side or terrace erosion No No Potential valley side or terrace erosion Hill slope failures (including peat slides and debris flows and slides) No No Hill slope failures coupled to channel Sediment source and /ertical incision present in catchment No supply - Catchment Scale Bank erosion/lateral migration No Unvegetated bars No Wooded/forested areas in catchment No nfrastructure type (see Drawing 11.4.3.1 d, Catchment 95) Yes Aqueduct Limited. Short catchment. Possible supply from ETL construction but this is u/s of aqueduct Comment on sediment source potential in catchment crossing Comment on sediment supply potential to crossing Limited. Short catchment and much likely to be retained at aqueduct crossing Channel morphology Engineered Predominant sediment size Unvegetated bars Morphology and Process Vertical incision None Reach upstream of None Deposition crossing Lateral migration/bank erosion None Presence and nature of infrastructure (Map 1d) Yes Aqueduct Infrastructure type (see Drawing 11.4.3.1 d, Catchment 95) Yes Likely to restrict flow and sediment delivery No Channel realignment Channel morphology Engineered Predominant sediment size Estimated discharge at 1:200 event (m³/s) 35 Morphology and Process Unvegetated bars No At crossing /ertical incision None Deposition None Lateral migration/bank erosion None Yes Damaged/unstable drains or armouring Limited damage to paving slabs u/s of road Plane bed Channel morphology Predominant sediment size Fine Unvegetated bars No Vertical incision None Morphology and Process Fines only, vegetation growing in channel due to Reach downstream of Deposition Medium sluggish water crossing None Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) None Infrastructure type (see Drawing 11.4.3.1 d, Catchment 95) No hannel realignment No Engineered drain to take flow from d/s of aqueduct to d/s of road. ETL construction is a potential source of sediment, but flow is restricted under aqueduct so Summary behaviour sediment delivery to crossing likely to be limited and no evidence for adverse delivery of sediment here.

Geology Is an alluvial fan present at or near the crossing? No Environmental designations (see Drawing 11.4.3.1 c, Catchment 98) Ramsar No Image: Comparison of the comparison	Banel Nature hannel Nature hannel Nature Etements Nature of water course Size of water course Drain Annel Nature Size of water course Other Other catchment Area (km ²) Average slope catchment (r) % Catchment over 750m (for snow melt risk) No Data FD classification Mater course Good Physical condition Good Good Overall excloped status Good Good Celopy Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) (s an alluvial fan present at or near the crossing? Gaick Psammite formation-Psammite resistant to weathering, inpermeable celopy Eansar No SAC signation (see signation (see sign	Catchment Name Channel Nature Channel Nature Quantitative Spatial Elements WFD classification Geology Geology Environmental designations (see Drawing 11.4.3.1 c, Sf	ize of water course atchment Area (km ²) verage slope in catchment (*) 5 Catchment over 750m (for snow melt risk) Vater, flows and levels hysical condition verall ecological status Aajority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) an alluvial fan present at or near the crossing?	Gaick Psammite formation-Psamm	Other No Data No Data No Data					
Channel Nature Size of water course Other Quantitative Spatial Elements Catchment Area (km ²) Average slope in catchment (') K Catchment VP 30m (for snow melt risk) No Data WFD classification Water, flows and levels Good Physical condition Good Overall ecological status Good Geology Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Galck Psammite formation-Psammite is an alluvial fan present at or near the crossing? No Drawing 11.4.3 SAC No Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Galck Psammite formation-Psammite is an alluvial fan present at or near the crossing? No Drawing 11.4.3 SAC No Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Galck Psammite formation-Psammite is an alluvial fan present at or near the crossing? No Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Galck Psammite formation-Psammite is an alluvial fan present at or near the crossing? No Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Galck Psammite formation-Psammite is an alluvial fan present in the catchment No Maiority Bedrock (see Drawing 11.4.3.2, Catchment 98) No Sediment source and sippely - Catchment Set Sode of transe crossion No	hannel Nature Size of water course Other initiative Spatial Elements Catchment Area (km ²) Average slope in catchment (f) & Catthment over 750m (for snow melt risk) No Data is Cathment over 750m (for snow melt risk) No Data Benents Coord PD classification Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Galck Planmitte formation-Psammite resistant to weathering, impermeable Beology Is an alluvial fan present at or near the crossing? No Coord Size No Size No invinnomental signation (see wing 11.4.3.1 c, 3C No Size No Size No Size No Size Changes in slope and channel confinement See Drawing 11.4.3.2, Catchment 98 According to BCS mapping but likely thin is path present in the catchment No Is there a log but sink No No No No iment source and intert source and intert source and intert source and infl alope falures (incluing paet sides and debris flows and sides) No No is peat present in the catchment is peat present in catchment wooded/forested areas in catchment infl alope falures (incluing peat sidles and debris flows and sides) No	Channel Nature Si Quantitative Spatial Elements 3 WFD classification 0 Geology 1 Environmental designations (see Drawing 11.4.3.1 c, 56	ize of water course atchment Area (km ²) verage slope in catchment (*) 5 Catchment over 750m (for snow melt risk) Vater, flows and levels hysical condition verall ecological status Aajority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) an alluvial fan present at or near the crossing?	Gaick Psammite formation-Psamm	Other No Data No Data No Data					
Channel Nature Size of water course Other Quantitative Spatial Elements Catchment Area (km ²) Average slope in catchment (¹) (K Catchment ver 250m, (for snow melt risk) No Data WFD classification Material confinence ver 250m, (for snow melt risk) Good WFD classification Water, flows and levels Good Dverall ecological status Good Good Geology Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) is an alluvial fan present at or near the crossing? Galck Psammite formation-Psammite resistant to weathering, impermeabl Section 11.4.3.2, Catchment 98) Salck Psammite formation-Psammite resistant to weathering, impermeabl Section 11.4.3.2, Catchment 98) Funviornmental designations (see Drawing 11.4.3.1 of and b Catchment 98) Salck Psammite formation-Psammite resistant to weathering, impermeabl Section 11.4.3.2, Catchment 98 Salch Psammite formation-Psammite resistant to weathering, impermeabl Section 11.4.3.2, Catchment 98 Section 11.4.3.2 SSI No Salch Psammite No Salch Psammite No Section 11.4.3.2 SSI No Salch Psammite No Salch Psammite No Section 11.4.3.1 Salch Psammite Salch Coroling to all misers (including part salles and debris flows and slides) No No Sectiment 3.2 No	hannel Nature Size of water course Other initiative Spatial Elements Catchment Area (km ²) Average slope in catchment (f) & Catthment over 750m (for snow melt risk) No Data is Cathment over 750m (for snow melt risk) No Data Benents Coord PD classification Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Galck Planmitte formation-Psammite resistant to weathering, impermeable Beology Is an alluvial fan present at or near the crossing? No Coord Size No Size No invinnomental signation (see wing 11.4.3.1 c, 3C No Size No Size No Size No Size Changes in slope and channel confinement See Drawing 11.4.3.2, Catchment 98 According to BCS mapping but likely thin is path present in the catchment No Is there a log but sink No No No No iment source and intert source and intert source and intert source and infl alope falures (incluing paet sides and debris flows and sides) No No is peat present in the catchment is peat present in catchment wooded/forested areas in catchment infl alope falures (incluing peat sidles and debris flows and sides) No	Channel Nature Si Quantitative Spatial Elements 3 WFD classification 0 Geology 1 Environmental designations (see Drawing 11.4.3.1 c, 56	ize of water course atchment Area (km ²) verage slope in catchment (*) 5 Catchment over 750m (for snow melt risk) Vater, flows and levels hysical condition verall ecological status Aajority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) an alluvial fan present at or near the crossing?	Gaick Psammite formation-Psamm	Other No Data No Data No Data					
Quantitative Spatial Bements No No Data WED classification Water, flows and levels Good Good WFD classification Water, flows and levels Good Good Geology Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Galck Psamite formation-Psammite resistant to weathering, impermeab Geology Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Galck Psamite formation-Psammite resistant to weathering, impermeab Bevironmental designations (see Drawing 11.4.3.1 c, SPA No No SAC No Catchment 98) SSI No SAC No SAC Septiment source and supply - Catchment 58) Changes in slope and channel confinement See Drawing 11.4.3.2, Catchment 98 See Trawing 11.4.3.2, Catchment 98 Seediment source and work values vide or trarce erosion No No No No Spepty - Catchment See Changes in slope and channel confinement Yes According to 8GS mapping but likely is breat present in the catchment No No Spepty - Catchment See No No Hill slope failures coupled to channel No	Antraitive Spatial No Data Elements No Data Water, flows and levels Good Po classification March (flows and levels) Good Po classification March (flows and levels) Good Geology Mainty Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Gatck Psammite formation-Psammite formatisame formatisally developsame formation-Psammite formation-Psamm	Quantitative spatial Ai Elements Ai WFD classification Pi O O Geology Is Environmental designations (see Drawing 11.4.3.1 c, Sif	verage slope in catchment (*) 5 Catchment over 750m (for snow melt risk) Vater, flows and levels hysical condition verall ecological status fajority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) an alluvial fan present at or near the crossing?	Gaick Psammite formation-Psamm	No Data No Data					
Quantitative Spatia No No Bernents Average slope in catchment (*) No No Data WFD classification Water, flows and levels Good Good WFD classification Physical condition Good Good Overall ecological status Good Good Good Geology Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Gaick Psamite formation-Psammite resistant to weathering, impermeable is an alluvial fan present at or near the crossing? No Environmental SAC No designations (see Drawing 11.4.3.1 c, SPA No SAC No SAC SAC Sediment source and supply - Catchment 98) Changes in slope and channel confinement See Drawing 11.4.3.2, Catchment 98 Secording to BGS mapping but likely is breat a obg burst risk No No No Sediment source and supply - Catchment Sole No No Hill slope failures oupled to channel No Wooded/foresteal areas in catchment Yes According to BGS mapping but likely is breat existing class and debris flows and slides) No Hill slope failures coupled to channel No<	Antraitive Spatial No Data Elements No Data Water, flows and levels Good Po classification March (flows and levels) Good Po classification March (flows and levels) Good Geology Mainty Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Gatck Psammite formation-Psammite formatisame formatisally developsame formation-Psammite formation-Psamm	Quantitative spatial Ai Elements Ai WFD classification Pi O O Geology Is Environmental designations (see Drawing 11.4.3.1 c, Si	verage slope in catchment (*) 5 Catchment over 750m (for snow melt risk) Vater, flows and levels hysical condition verall ecological status fajority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) an alluvial fan present at or near the crossing?	Gaick Psammite formation-Psamm	No Data No Data					
Elements Not Data Average slope in catchment (r) No Data WFD classification Water, flows and levels Good Physical condition Good Good Geology Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Gaick Psammite formation-Psammite is an alluvial fan present at or near the crossing? No Environmental designations (rese Drawing 11.4.3.1 c, SSA SAC No Environmental designations (rese Drawing 11.4.3.1 c, SSA SAC No Catchment 99 SSA No SSA No Seediment source and Hill slope failures including past slides and debris flows and slides) No Seediment source and Hill slope failures coupled to channel No <	Itements Average slope in catchment () No Data Vector K Catchment over 750m (for snow melt risk) No Data PD classification Physical condition Good Overall ecological status Good Good Geology Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Gaick Psammite formation-Psammite is an alluvial fan present at or near the crossing? No invironmental signations (see wing 11.4.3.1 c, SFA Ramsar No Image: Signation (see Signations (see Drawing 11.4.3.2, Catchment 98) No interest source and Hill slope failures (including peat sildes and debris flows and sildes) No Image: Signations (see Signations) No initerstru	Elements A WFD classification P Geology M Environmental designations (see Drawing 11.4.3.1 c, SF	s Catchment over 750m (for snow melt risk) Vater, flows and levels hysical condition verall ecological status Aajority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) : an alluvial fan present at or near the crossing?	Gaick Psammite formation-Psamm	No Data					
WFD classification Good Physical condition Good Overall ecological status Good Geology Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Gaick Psammite formation-Psammite resistant to weathering, Imperneabl Finitronmental designations (see Drawing 11.4.3.1 c, SAC No Imperation of the present at or near the crossing? Drawing 11.4.3.1 c, SAC No Imperation of the present at or near the crossing? No Drawing 11.4.3.1 c, SAC SPA No Imperation of the present at or near the crossing? Catchment 98) SSI No Imperation of the present in the catchment the crossing? No Seediment source and supply - Catchment 98) Changes in slope and channel confinement See Drawing 11.4.3.2, Catchment 98 Imperation of the present in the catchment 1 Seediment source and supply - Catchment See Changes in slope and channel confinement See Drawing 11.4.3.2, Catchment 98 Imperation of the present in catchment 1 Seediment source and supply - Catchment See Model of the present in catchment No Imperation of the present in catchment 1 Wooded/forested areas in catchment No Imperation of the present in catchment 1 No	Water, flows and levels Good PD classification Physical condition Good Overall ecological status Good Good Geology Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Gaick Psammite formation-Psammite resistant to weathering, impermeable is an allovial fan present at or near the crossing? No resistant to weathering, impermeable invironmental signation (see twing 11.4.3.1 a and b Catchment 98) Gaick Psammite formation-Psammite resistant to weathering, impermeable Signation (see twing 11.4.3.1 a grant b Catchment 98) No Signation (see twing 11.4.3.2, Catchment 98) invironmental signation (see twing 11.4.3.2, Catchment 98) Signation (see twing 11.4.3.2, Catchment 98) Signation (see twing 11.4.3.2, Catchment 98) is paper present in the catchment Yes According to BGS mapping but likely thin is there a bog burst risk No No Current valley side or terrace erosion No No Pretential valley side or terrace erosion No No It sill slope failures (including peat sides and debris flows and sides) No No Vertical Incision present in catchment Yes Aqueduct It wore generat	WFD classification Pi O Geology M Is Environmental Rai designations (see 5/ Drawing 11.4.3.1 c, 5/	Vater, flows and levels hysical condition verall ecological status Aajority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) : an alluvial fan present at or near the crossing?	Gaick Psammite formation-Psamm						
WFD classification Good Overall ecological status Good Geology Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Gaick Psammite formation-Psammite is an alluvial fan present at or near the crossing? No Environmental designations (see Drawing 11.4.3.1 c, SAC No Drawing 11.4.3.1 c, SPA No Catchment 98) SAC No Changes in slope and channel confinement is peat present in the catchment Yes According to BGS mapping but likely is there a bog burst risk Current valley side or terrace erosion No Sediment source and Hill Slope falures (uncluding peat sides and dehrs flows and sides) No supply - Catchment Scatter Hill Sope falures (uncluding peat sides and dehrs flows and sides) No Wooded/forsted areas in catchment Yes Agueduct Unvegetated bars No Wooded/forsted areas in catchment Vers Agueduct Comment on sediment source potential in catchment No Moophology and Process- Reach upstream of cosming to estimate tige - Order and thill slope falures counce barbit in catchment Univegetated bars	PD classification Physical condition (Drerall ecological status Good Good Bit cological status Good Good Bit cological status Gaick Psammite formation-Psammite is an alluvial fan present at or near the crossing? No Bit cological status Gaick Psammite formation-Psammite is an alluvial fan present at or near the crossing? No Bit cological status No Exercise (SC No Bit cological status No Exercise (SC No Bit cological status No Exercise (SC No Statument source (Current valley de cological status) No Exercise (SS) No Changes in slope and channel confinement is peat present in the catchment (Speat present in the catchment (Speat present in the catchment (Speat present in the catchment (Speat present in declamanel confinement) See Drawing 11.4.3.2, Catchment 98 (Speat present in the catchment (Speat present in the catchment (Speat present in the catchment (Speat present in the catchment) No Imment source and (- Catchment State) No Imment on the catchment (No No Vertical Incision present in catchment (Intrastructure type (see Drawing 11.4.3.1.4, Catchment 98) No Imment on sediment supply potential to crossing Vertical Incision Channel morphology Engineered (Intrastructure type (see Drawing 11.4.3.1.4, Catchment 98) Channel morphology of armoured section of drait towards aqueduct. Rod-parallel drain (Unaregued de Dars	WFD classification PI Geology M Environmental designations (see 5/ Drawing 11.4.3.1 c, 5/	hysical condition iverall ecological status Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) : an alluvial fan present at or near the crossing?	Gaick Psammite formation-Psamm	Good					
Overall ecological status Good Geology Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Is an alluvial fan present at or near the crossing? Gaick Psammite formation-Psammite resistant to weathering, impermeabl Environmental designations (see Drawing 11.4.3.1 c, Catchment 98) Ramsar No SSS No See Drawing 11.4.3.2, SSS I No Changes in slope and channel confinement is peat present in the catchment Yes According to BGS mapping but likely is there a bog burst risk Seediment source and supply - Catchment Stale Vertical incision present in catchment Yes Hill slope failures (including peat slides and debris flows and slides) No Hill slope failures (including peat slides and debris flows and slides) Vertical incision present in catchment Unvegetated bars No Hill slope failures (including peat slides and debris flows and slides) Vertical incision present in catchment Yes Aqueduct Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Aqueduct Unvegetated bars No Hill slope failures No Wooded/forested areas in catchment Unvegetated bars No Hill slope failures No Unvegetated bars No Hill sl	Overall ecological status Good Geology Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Gaick Psammite formation-Psammite is an alluvial fan present at or near the crossing? No isignations (see wing 11.4.3.1 c, signations (see wing 11.4.3.1 c, stachment 98) Ramsar No SAC SAC No No SAC No signations (see wing 11.4.3.1 c, stachment 98) SAC No SAC SS1 No SAC No SAC SS4 No SS5 No SAC SS5 No No See Drawing 11.4.3.2, Catchment 98 See Drawing 11.4.3.2, Catchment 98 Is pera present in the catchment Yes According to BGS mapping but likely thin See Drawing 10.4.3.2, Catchment 98 Imment source and + Itil Sope faitures (nucluding pera stildes and debris flows and slides) No Hill Sope faitures coupled to channel No Vertical incision present in achment Yers Aqueduct No Moded/forested areas in catchment No Unvegetated bars No No Infrastructure type (see Drawing 11.4.3.1.4, Catchment 98) Yers Aqueduct <th>Geology Environmental designations (see Drawing 11.4.3.1 c, Si</th> <td>verall ecological status Najority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) an alluvial fan present at or near the crossing?</td> <td>Gaick Psammite formation-Psamm</td> <td>6000</td>	Geology Environmental designations (see Drawing 11.4.3.1 c, Si	verall ecological status Najority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) an alluvial fan present at or near the crossing?	Gaick Psammite formation-Psamm	6000					
Geology Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) is an alluvial fan present at or near the crossing? Gaick Psammite formation-Psammite No resistant to weathering, impermeable No Environmental designations (see Drawing 11.4.3.1 c, Catchment 98) Ramsar No No SAC No No SAC No Catchment 98) SSI No SSI No Catchment 98) SSI No SSI No Sediment source and supply - Catchment Scale Unvegetated bars Sed or terrace erosion No No Sediment source and Potential valley side or terrace erosion No No Hill slope failures coupled to channel No Supply - Catchment Scale Verical incision present in catchment Yes Bank erosion/lateral migration No Unvegetated bars No No No Imited but channel is very steep and potential for lots of energy and beer Comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing i Unvegetated bars No Morphology and Process- Reach upstream of crossing Channel morphology Engineered No Possible incision u/s of armoured se towards aqueduct. Road-parallel dra (unarmoured also	Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) Gaick Psammite formation-Psammite resistant to weathering, impermeable Geology Is an alluvial fan present at or near the crossing? No Impermeable Impermeable Sinvironmental signations (see wing 11.4.3.1 c, 2atchment 98) Ramsar No Impermeable Impermeable Changes in slope and channel confinement (s peat present in the catchment) Yes According to BGS mapping but likely thin Is peat present in the catchment Yes According to BGS mapping but likely thin It is there a loog burst risk Current valley side or terrace erosion No Impermeable Immet source and r - Catchment Scale No Impermeable Impermeable Vertical incision present in catchment Unvegetated bars No Impermeable No Vertical incision present in catchment Yes Aqueduct Impermeable Comment on sediment source potential in catchment No Impermeable Impermeable Vertical incision No Impermeable No Impermeable Vertical incision Comment on sediment source potential in catchment No Impermeable Impermea	Geology Environmental designations (see 5/ Drawing 11.4.3.1 c, 5/	Aajority Bedrock (see Drawing 11.4.3.1 a and b Catchment 98) an alluvial fan present at or near the crossing?	Gaick Psammite formation-Psamm						
Geology Is an alluvial fan present at or near the crossing? No Environmental designations (see Drawing 11.4.3.1 c, Catchment 98) Ramsar No SAC Drawing 11.4.3.1 c, Catchment 98) SAC No SSI Environmental designations (see Drawing 11.4.3.1 c, Catchment 98) SSI No SSI Environment 98) SSI No SSI No Environment 98) SSI No SSI SSI Environment 98) Speat present in the catchment Yes According to BGS mapping but likely is there a bog burst risk No Current valley side or terrace erosion No No See Drawing 11.4.3.2, Catchment 98 Seediment source and Hill slope failures (including peat slides and debris flows and slides) No See Drawing 11.4.3.2, Catchment 98 Supply - Catchment Scale Verical incision present in catchment No See Drawing 11.4.3.2, Catchment 98 Supply - Catchment Scale Verical incision present in actchment No See Drawing 11.4.3.1 d, Catchment 98 Unvegetated bars No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Aqueduct	Geology Is an alluvial fan present at or near the crossing? No invironmental signations (see SAC No	Geology Is Environmental R: designations (see 5/ Drawing 11.4.3.1 c, 5/	an alluvial fan present at or near the crossing?	Gaick Psammite formation-Psamm	Good					
Environmental designations (see Drawing 11.4.3.1 c, Catchment 98) Ramsar No Environmental designations (see Drawing 11.4.3.1 c, Catchment 98) SAC No SS51 No No Environmental designations (see Drawing 11.4.3.1 c, Catchment 98) See Drawing 11.4.3.2, Catchment 98 Is peat present in the catchment Yes According to BGS mapping but likely lis there a bog burst risk Current valley side or terrace erosion No No Potential valley side or terrace erosion No No Seediment source and supply - Catchment Scale Vertical incision present in catchment Yes Moorded/forested areas in catchment Yes Aqueduct Unvegetated bars No No Wooded/forested areas in catchment No Aqueduct Infrastructure type (see Drawing 11.4.3.1 c, Catchment 98) Yes Aqueduct Comment on sediment source potential in catchment No Aqueduct Infrastructure type (see Drawing 11.4.3.1 c, Catchment 98) Yes Aqueduct Comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing in Morphology and	Is an alluvial tan present at or near the crossing? No invironmental signations (see wing 11.4.3.2, SPA No SAC No Sac No Campes in slope and channel confinement No SSSI No Changes in slope and channel confinement Yes According to BGS mapping but likely thin is there a bog burst risk. No Current valley side or terrace erosion No Potential valley side or terrace erosion No Pretential valley side or terrace erosion No Hill slope failures (ncluling perst slides and debris flows and slides) No Vertical incision present in actchment Yes Vertical incision present in catchment Yes Mooded/fibrorested areas in catchment No Unvegetated bars No Wooded/fibrorested areas in catchment No Infrastructure type (see Drawing 11.4.3.1.3, Catchment 98) Yes Comment on sediment succe potential in catchment No Unvegetated bars No Wooded/fibrorested areas in catchment No Unvegetated bars No	Environmental Ra designations (see S/ Drawing 11.4.3.1 c, SF		Geology						
designations (see Drawing 11.4.3.1 c, Catchment 98) SAC No SFA No No Catchment 98) SSI No Sediment source and supply - Catchment Scale Changes in slope and channel confinement See Drawing 11.4.3.2, Catchment 98 Sediment source and supply - Catchment Scale Changes in slope and channel confinement Yes According to BGS mapping but likely is there a bog burst risk Sediment source and supply - Catchment Scale Vertical incision present in catchment No Wooded/forestal areas in catchment Yes Bank erosion/lateral migration No Mooded/forestal areas in catchment No Vertical incision present in catchment No Moophology and Process- Reach upstream of crossing Channel morphology Engineered - Unvegetated bars Vertical incision No Vertical incision No Moophology and Process- Reach upstream of crossing Channel migration/bank erosion Low Possible incision u/s of armoured see towards aqueduct. Road-parallel dra (unarmoured also eroding on descet (unarmoured also eroding on descet	Signations (see wring 11.4.3.1 c, Eatchment 98) SAC No SPA No No SSSI No No Changes in slope and channel confinement See Drawing 11.4.3.2, Catchment 98 Is peat present in the catchment Yes Current valley side or terrace erosion No Current valley side or terrace erosion No Potential valley side or terrace erosion No Itili slope failures coupled to channel Yes Hill slope failures coupled to channel No Vertical incision present in catchment Yes Bank erosion/lateral migration No Unvegetated bars No Wooded/forested areas in catchment No Unvegetated bars No Comment on sediment source potential in catchment 98 Yes Comment on sediment source potential in catchment 98 Yes Comment on sediment source potential in catchment 98 Yes Vertical incision Yes Vertical incision Yes Vertical incision Yes Predominant sediment size -	designations (see SA Drawing 11.4.3.1 c, SF		No						
designations (see Drawing 11.4.3.1 c, SPA SAC No Catchment 98) SS1 No No SS1 No No No Experiment 98) SS1 No No Sediment 98) Changes in slope and channel confinement See Drawing 11.4.3.2, Catchment 98 Is peat present in the catchment Yes According to BGS mapping but likely Is there a bog burst risk No No Current valley side or terrace erosion No No Potential valley side or terrace erosion No Hill slope failures (including peat slides and debris flows and slides) No Sediment source and supply - Catchment Scale Vertical incision present in catchment Yes Bank erosion/lateral migration No Wooded/forestd areas in catchment No No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Aqueduct Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Aqueduct Comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing in Morphology and Process- Reach upstream of crossing Channel morphology	Signations (see wring 11.4.3.1 c, Eatchment 98) SAC No SPA No No SSSI No No Changes in slope and channel confinement See Drawing 11.4.3.2, Catchment 98 Is peat present in the catchment Yes Current valley side or terrace erosion No Current valley side or terrace erosion No Potential valley side or terrace erosion No Itili slope failures coupled to channel Yes Hill slope failures coupled to channel No Vertical incision present in catchment Yes Bank erosion/lateral migration No Unvegetated bars No Wooded/forested areas in catchment No Unvegetated bars No Comment on sediment source potential in catchment 98 Yes Comment on sediment source potential in catchment 98 Yes Comment on sediment source potential in catchment 98 Yes Vertical incision Yes Vertical incision Yes Vertical incision Yes Predominant sediment size -	designations (see SA Drawing 11.4.3.1 c, SF								
Drawing 11.4.3.1 c, Catchment 98) SPA No SSI No No Exclusion 198 SSI No Sediment 98 Changes in slope and channel confinement See Drawing 11.4.3.2, Catchment 98 Is peat present in the catchment Yes According to BGS mapping but likely Is there a bog burst risk No No Current valley side or terrace erosion No No Potential valley side or terrace erosion No Hill slope failures (including peat slides and debris flows and slides) No Hill slope failures (including peat slides and debris flows and slides) No Hill slope failures (including peat slides and debris flows and slides) No Vertical incision present in catchment Yes Bank erosion/lateral migration No Unvegetated bars No No Wooded/forested areas in catchment No Unvegetated bars No No More penerated from channel bet erosion likelihood of supply to crossing i Morphology and Process- Channel morphology Engineered - Predominant sediment size - - - Unve	No No (atchment 98) SSI No SSSI No No (speat present in the catchment Yes According to BGS mapping but likely thin (speat present in the catchment Yes According to BGS mapping but likely thin (speat present in the catchment Yes According to BGS mapping but likely thin (speat present in the catchment Yes According to BGS mapping but likely thin (current valley side or terrace erosion No Potential valley side or terrace erosion No (current valley side or terrace erosion No Hill slope failures (including peat slides and debris flows and slides) No (- Catchment Scale Vertical incision present in catchment Yes Bank erosion/lateral migration No (urregetated bars No Unvegetated bars No Unvegetated bars No (comment on sediment source potential in catchment Limited but channel is very step and potential for lots of energy and bed erosion Ikelihood of supply to crossing is high due to (comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing is high due to Ikereal migrator/ban	Drawing 11.4.3.1 c, SF								
Catchment 98) SSSI No Changes in slope and channel confinement See Drawing 11.4.3.2, Catchment 98 Is peat present in the catchment Yes According to BGS mapping but likely Is there a bog burst risk No Current valley side or terrace erosion No Current valley side or terrace erosion No Potential valley side or terrace erosion No Hill slope failures (including peat sildes and debris flows and sildes) No Image: See Drawing 11.4.3.1 See Drawing 11.4.3.2 supply - Catchment Scale Vertical incision present in catchment No Image: See Drawing 11.4.3.1 See	Catchment 98) SSSI No Indext (Control of the second									
Sediment source and supply - Catchment Scale Is peat present in the catchment Yes According to BGS mapping but likely Sediment source and supply - Catchment Scale Is peat present in the catchment No No Supply - Catchment Scale Hill slope failures (including peat slides and debris flows and slides) No No Supply - Catchment Scale Vertical incision present in catchment Yes According to BGS mapping but likely Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) No No No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Aqueduct Comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing i Morphology and Process- Reach upstream of crossing Vertical incision Medium Possible incision u/s of armoured see towards aqueduct. Road-parallel dra (unarmoured also eroding on descer (unarmoured also eroding on descer	Is peat present in the catchment Yes According to BGS mapping but likely thin Is there a bog burst risk No Intervalue yide or terrace erosion No Current valley side or terrace erosion No Intervalue yide or terrace erosion No Imment source and Hill slope failures (including peat slides and debris flows and slides) No Intervalue yide or terrace erosion No Vertical incision present in catchment Yes No Intervalue yide or terrace erosion No Vertical incision present in catchment Yes No Intervalue yide or terrace erosion No Unvegetated bars No No Intrastructure type (see Drawing 11.4.3.1 d, Catchment 98) No Comment on sediment supply potential to crosing Where generated from channel bed erosion likelihood of supply to crossing is high due to Nology and Processact Channel morphology Engineered - Predominant sediment size - - - Unvegetated bars No - - Vertical incision Medium Possible incision u/s of armoured section of drai Unvegetated bars No	Catchment 98) SS	SSI	No						
Sediment source and supply - Catchment Scale Is peat present in the catchment Yes According to BGS mapping but likely Sediment source and supply - Catchment Scale Is peat present in the catchment No No Supply - Catchment Scale Hill slope failures (including peat slides and debris flows and slides) No No Supply - Catchment Scale Vertical incision present in catchment Yes According to BGS mapping but likely Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) No No No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Aqueduct Comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing i Morphology and Process- Reach upstream of crossing Vertical incision Medium Possible incision u/s of armoured see towards aqueduct. Road-parallel dra (unarmoured also eroding on descer (unarmoured also eroding on descer	Is peat present in the catchment Yes According to BGS mapping but likely thin Is there a bog burst risk No Intervalue yide or terrace erosion No Current valley side or terrace erosion No Intervalue yide or terrace erosion No Imment source and Hill slope failures (including peat slides and debris flows and slides) No Intervalue yide or terrace erosion No Vertical incision present in catchment Yes No Intervalue yide or terrace erosion No Vertical incision present in catchment Yes No Intervalue yide or terrace erosion No Unvegetated bars No No Intrastructure type (see Drawing 11.4.3.1 d, Catchment 98) No Comment on sediment supply potential to crosing Where generated from channel bed erosion likelihood of supply to crossing is high due to Nology and Processact Channel morphology Engineered - Predominant sediment size - - - Unvegetated bars No - - Vertical incision Medium Possible incision u/s of armoured section of drai Unvegetated bars No	0	hannes in slave and sharped confinement	See Dray	wing 11 4 3 2 Catchment 98					
Sediment source and supply - Catchment Source and hill slope failures (including peat slides and debris flows and slides) No Sediment source and supply - Catchment Sediment source and supply - Catchment Sediment source and supply - Catchment Sediment source and infrastructure type (sed raving flat) No Sediment source and supply - Catchment Sediment source and supply - Catchment Sediment source potential in catchment No Bark erosion/lateral migration No Unvegetated bars No Wooded/forested areas in catchment No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yers Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and beer Comment on sediment source potential in catchment Vertical incision Sediment source - Morphology and Process- Reach upstream of crossing Channel morphology Engineered Deposition Low No It wards aqueduct. Road-parallel dra (unarmoured also eroding on descer	Is there a bog burst risk No Current valley side or terrace erosion No Potential valley side or terrace erosion No Potential valley side or terrace erosion No Hill slope failures (including peat slides and debris flows and slides) No Vertical incision present in catchment Yes Bank erosion/lateral migration No Unvegetated bars No Wooded/forested areas in catchment No Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and bed erosion Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and bed erosion Comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing is high due to Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) No Vertical incision Medium Predominant sediment size - Unvegetated bars No Vertical incision Medium Possible incision u/s of armoured section of drait to wards aqueduct. Road-parallel drain (unarmoured also eroding on descent to culvert towards aqueduct. Road-parallel drain (unarmoured al									
Sediment source and supply - Catchment Scale Potential valley side or terrace erosion No Supply - Catchment Scale Hill slope failures (including peet sildes and debris flows and slides) No Supply - Catchment Scale Vertical incision present in catchment Yers Bank erosion/lateral migration No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Unvegetated bars No Aqueduct Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and bec Comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing i Morphology and Process- Reach upstream of crossing Channel morphology Engineered Deposition Low Possible incision u/s of armoured see roding on descer	Potential valley side or terrace erosion No Hill slope failures (including peat slides and debris flows and slides) No Hill slope failures (including peat slides and debris flows and slides) No r - Catchment Scale Vertical incision present in catchment Yes Bank erosion/lateral migration No Intrastructure type (see Drawing 11.4.3.1 d, Catchment 98) No Wooded/forested areas in catchment Limited but channel is very steep and potential for lots of energy and bed erosion Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and bed erosion Comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing is high due to roology and Processach Channel morphology Engineered Vertical incision No Vertical incision u/s of armoured section of drait to wards aqueduct. Road-parallel drain (unarmoured also eroding on descent to culvert unarmoured also eroding on descent to culvert (unarmoured also eroding on descent to culvert (unarmoured for infrastructure (Map 1d) Presence and nature of infrastructure (Map 1d) Yes Aqueduct likely to limit sediment supply, fixing channel alignment									
Sediment source and supply - Catchment Scale Hill slope failures (including peat slides and debris flows and slides) No Supply - Catchment Scale Hill slope failures coupled to channel No No Supply - Catchment Scale Vertical incision present in catchment Yes Section (Jateral migration) Bank erosion/lateral migration No No Unvegetated bars No Wooded/forested areas in catchment No No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Aqueduct Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and bed comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing i Vertical incision Engineered - Unvegetated bars Morphology and Process- Reach upstream of crossing Vertical incision Medium Possible incision u/s of armoured see towards aqueduct. Road-parallel dra (unarmoured also eroding on descer (unarmoured also eroding on descer	Hill slope failures (including peat slides and debris flows and slides) No Hill slope failures coupled to channel No Vertical incision present in catchment Yes Bank crosion/lateral migration No Unvegetated bars No Wooded/forested areas in catchment No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and bed erosion Comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing is high due to Predominant sediment size - Unvegetated bars No Vertical incision Medium Vertical incision Medium Vertical incision u/s of armoured section of drait to armoured also eroding on descent to culvert to culvert corssing Chanel morphology Low Presoniant sediment size - Unvegetated bars No Presoniant sediment size - Unvegetated bars No Presoniant sediment size - Unvegetated bars No Presoniant sediment size									
Sediment source and supply - Catchment Scale Hill slope failures coupled to channel No Vertical incision present in catchment Yes Bank erosion/lateral migration No Unvegetated bars No Wooded/forested areas in catchment No Wooded/forested areas in catchment No Moded/forested areas in catchment No Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and beer Comment on sediment source potential to crossing Where generated from channel bed erosion likelihood of supply to crossing i Channel morphology Engineered - - Predominant sediment size - - - Unvegetated bars No Possible incision u/s of armoured see towards aqueduct. Road-parallel dra (unarmoured also eroding on descer towards aqueduct. Road-parallel dra (unarmoured also eroding on descer towards aqueduct. Road-parallel dra (unarmoured also eroding on descer towards aqueduct. Road-parallel dra (unarmoured also eroding on descer towards aqueduct. Road-parallel dra (unarmoured also eroding on descer towards aqueduct. Road-parallel dra (unarmoured also eroding on descer towards aqueduct. Road-parallel dra (unarmoured also eroding on descer towards aqueduct. Road-parallel dra (unarmoured also eroding on descer towards aqueduct. Road-parallel dra (unarmoured also eroding on descer towards aqueduct. Road-parallel dra (unarmoured also eroding on descer towards aqueduc	iment source and Hill slope failures coupled to channel No in catchment Scale Vertical incision present in catchment Yes Bank erosion/lateral migration No Unvegetated bars No Wooded/forested areas in catchment No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and bed erosion Comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing is high due to Predominant sediment size - Unvegetated bars No Vertical incision Medium Vergetated bars No Unvegetated bars No Unvegetated bars No Unvegetated bars No Unvegetated bars No Vertical incision Medium Unvegetated bars No Predominant sediment size - Unvegetate bars No Vertical incision Medium Unvegetate bars No Possible incision u/s of armoured section of drait t									
Bank erosion/lateral migration No Unvegetated bars No Wooded/forested areas in catchment No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and bed Comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing i Predominant sediment size - Unvegetated bars No Vertical incision Medium Vertical incision Medium Deposition Low Lateral migration/bank erosion Low	Bank erosion/lateral migration No Unvegetated bars No Wooded/forested areas in catchment No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and bed erosion Comment on sediment source potential to crossing Where generated from channel bed erosion likelihood of supply to crossing is high due to Predominant sediment size - Unvegetated bars No Vertical incision Medium Vertical incision Medium Possible incision v/s of armoured ascent to culvert Deposition Low Lateral migration/bank erosion Low Presence and nature of infrastructure (Map 1d) Yes Aqueduct likely to limit sediment supply, fixing channel alignment									
Unvegetated bars No Wooded/forested areas in catchment No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and beer Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and beer Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and beer Comment on sediment source potential to crossing Where generated from channel bed erosion likelihood of supply to crossing i Predominant sediment size - Unvegetated bars No Vertical incision Medium Vertical incision Medium Deposition Low Lateral migration/bank erosion Low	Unvegetated bars No Wooded/forested areas in catchment No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing is high due to Comment on sediment supply potential to crossing Engineered Predominant sediment size - Unvegetated bars No Vertical incision Medium Vertical incision Medium Possible incision u/s of armoured section of drait to crossing Low Lateral migration/bank erosion Low Presence and nature of infrastructure (Map 1d) Yes Aqueduct likely to limit sediment supply, fixing channel alignment									
Wooded/forested areas in catchment No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Aqueduct Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and bed Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and bed Comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing i Predominant sediment size - Unvegetated bars No Vertical incision Medium Vertical incision Medium Deposition Low Lateral migration/bank erosion Low	Wooded/forested areas in catchment No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Aqueduct Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and bed erosion Comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing is high due to Comment on sediment supply potential to crossing Engineered Predominant sediment size - Unvegetated bars No Vertical incision Medium Vertical incision Medium Deposition Low Lateral migration/bank erosion Low Presence and nature of infrastructure (Map 1d) Yes Aqueduct likely to limit sediment supply, fixing channel alignment									
Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Aqueduct Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and bee Comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing i Channel morphology Engineered Predominant sediment size - Unvegetated bars No Vertical incision Medium Vertical incision Medium Deposition Low Lateral migration/bank erosion Low	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Aqueduct Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and bed erosion Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and bed erosion Comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing is high due to Channel morphology Engineered Predominant sediment size - Unvegetated bars No Vertical incision Medium Vertical incision Medium Deposition Low Lateral migration/bank erosion Low Presence and nature of infrastructure (Map 1d) Yes Aqueduct likely to limit sediment supply, fixing channel alignment Aqueduct likely to limit sediment supply, fixing channel alignment									
Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and bed Comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing i Channel morphology Engineered Predominant sediment size - Unvegetated bars No Vertical incision Medium Vertical incision Medium Deposition Low Lateral migration/bank erosion Low	Comment on sediment source potential in catchment Limited but channel is very steep and potential for lots of energy and bed erosion Comment on sediment supply potential to crossing Where generated from channel bed erosion likelihood of supply to crossing is high due to Channel morphology Engineered Predominant sediment size - Unvegetated bars No Vertical incision Medium Vertical incision Medium towards aqueduct. Road-parallel drain (unarmoured also eroding on descent to culvert coverts and nature of infrastructure (Map 1d) Low Presence and nature of infrastructure (Map 1d) Yes Aqueduct likely to limit sediment supply, fixing channel alignment				Agueduct					
Morphology and Process- Reach upstream of crossing Channel morphology Predominant sediment size Engineered Morphology and Process- Reach upstream of crossing - - Deposition Lateral migration/bank erosion Low Possible inclision u/s of armoured see (unarmoured also eroding on descer Low	Channel morphology Engineered Predominant sediment size - Unvegetated bars No Vertical incision Medium Vertical incision Medium towards aqueduct. Road-parallel drain (unarmoured also eroding on descent to culvert Lateral migration/bank erosion Low Presence and nature of infrastructure (Map 1d) Yes Aqueduct and armoured drain Aqueduct likely to limit sediment supply, fixing channel alignment				ep and potential for lots of energy and bed erosion					
Predominant sediment size - Unvegetated bars No Worphology and Process- Reach upstream of crossing Vertical incision Deposition Low Lateral migration/bank erosion Low	Predominant sediment size - Unvegetated bars No Vertical incision Vertical incision pology and Process- ach upstream of crossing Vertical incision Deposition Low Lateral migration/bank erosion Low Presence and nature of infrastructure (Map 1d) Yes Aqueduct likely to limit sediment supply, fixing channel alignment	Co	omment on sediment supply potential to crossing	Where generated from channel bee	d erosion likelihood of supply to crossing is high due					
Morphology and Process- Reach upstream of crossing Unvegetated bars No Deposition Medium Possible incision u/s of armoured see towards aqueduct. Road-parallel dra (unarmoured also eroding on descer Lateral migration/bank erosion Low	Unvegetated bars No vology and Process- ach upstream of crossing Vertical incision Medium Possible incision u/s of armoured section of drait towards aqueduct. Road-parallel drain (unarmoured also eroding on descent to culvert Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Yes Aqueduct and armoured drain (hind section of the parallel drain (unarmoured also eroding on descent to culvert Lateral migration/bank erosion Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Aqueduct likely to limit sediment supply, fixing channel alignment	CI	hannel morphology	Engineered						
Morphology and Process- Reach upstream of crossing Vertical incision Possible incision u/s of armoured see towards aqueduct. Road-parallel dra (unarmoured also eroding on descer Lateral migration/bank erosion Low L	Delogy and Process- ach upstream of crossing Vertical incision Medium Possible incision u/s of armoured section of drai towards aqueduct. Road-parallel drain (unarmoured also eroding on descent to culvert Lateral migration/bank erosion Deposition Low Lateral migration/bank erosion Low Presence and nature of infrastructure (Map 1d) Yes Aqueduct and armoured drain Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Aqueduct likely to limit sediment supply, fixing channel alignment									
Morphology and Process Reach upstream of crossing Vertical incision Medium towards aqueduct. Road-parallel dra (unarmoured also eroding on descer Deposition Low	Notogy and Process ach upstream of crossing Vertical incision Medium towards aqueduct. Road-parallel drain (unarmoured also eroding on descent to culvert Lateral migration/bank erosion Lateral migration/bank erosion Low Presence and nature of infrastructure (Map 1d) Yes Aqueduct and armoured drain (hannel alignment Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Aqueduct likely to limit sediment supply, fixing channel alignment	U	nvegetated bars	No						
Morphology and Process- Reach upstream of crossing Deposition Low Low Lateral migration/bank erosion Low	Dology and Process- ach upstream of crossing Deposition Low Lateral migration/bank erosion Low Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Aqueduct likely to limit sediment supply, fixing channel alignment									
Keach upstream of crossing Deposition Low Lateral migration/bank erosion Low	ach upstream of crossing Low Lateral migration/bank erosion Low Presence and nature of infrastructure (Map 1d) Yes Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes	Morphology and Process-	ertical incision	Medium						
Lateral migration/bank erosion Low	Lateral migration/bank erosion Low Presence and nature of infrastructure (Map 1d) Yes Aqueduct and armoured drain Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Aqueduct likely to limit sediment supply, fixing channel alignment	-			(unarmoured also eroding on descent to cuiver					
	Presence and nature of infrastructure (Map 1d) Yes Aqueduct and armoured drain Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Aqueduct likely to limit sediment supply, fixing channel alignment									
	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 98) Yes Aqueduct likely to limit sediment supply, fixing channel alignment				Aqueduct and armoured drain					
Infrastructure type (see Drawing 11.4.3.1.d. Catchment 98) Ves Aqueduct likely to limit sediment sup	channel alignment									
channel alignment	Channel realignment				channel alignment					
			lamerrealignment	NO						
Channel morphology Engineered	Channel morphology Engineered			Engineered						
			-	- 25						
Unvegetated hars No	Predominant sediment size -	11								
Morphology and Process Vertical incision	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unweetated have No	Morphology and Process-	=							
Deposition Some deposition of gravel-cobbles a	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low		eposition	Medium						
culvert where gradient reduces	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical inclision Low Penosition Medium Some deposition of gravel-cobbles at u/s end of	D								
	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Some deposition of gravel-cobbles at u/s end of culvert where gradient reduces		ateral migration/bank erosion	Low	LOW					
	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low	La			Armouring seems to be in good condition					
	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical inclision Low beposition Medium Lateral migration/bank erosion Low Damaged/unstable drains or armouring No	La Di	amaged/unstable drains or armouring	No	Armouring seems to be in good condition					
Unvegetated bars No	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low Damaged/unstable drains or armouring No Armouring seems to be in good condition	La Di Cl	amaged/unstable drains or armouring hannel morphology	No	Armouring seems to be in good condition					
Vertical incision Medium Appears scour has occurred where e	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low Damaged/unstable drains or armouring No Kennel morphology Engineered Predominant sediment size -	Lz Lz Ci Pr	amaged/unstable drains or armouring hannel morphology redominant sediment size	No Engineered -	Armouring seems to be in good condition					
Morphology and Process-	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Culvert where gradient reduces Lateral migration/bank erosion Low Damaged/unstable drains or armouring No	La Di Ci Pr U	amaged/unstable drains or armouring hannel morphology redominant sediment size Invegetated bars	No Engineered - No	Appears scour has occurred where engineered					
Reach downstream of Deposition Deposition Medium possibly generated by scour effect a	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low Damaged/unstable drains or armouring No Arrmouring seems to be in good condition Vertical incision - Unvegetated bars No Deposition Medium Calment migration/bank erosion Low Damaged/unstable drains or armouring No Arrmouring seems to be in good condition Vertical incision - Vertical incision No	La Di Ci Pr U	amaged/unstable drains or armouring hannel morphology redominant sediment size Invegetated bars	No Engineered - No	Appears scour has occurred where engineered drain finishes					
crossing	Interview Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low Damaged/unstable drains or armouring No Arrmouring seems to be in good condition Vertical incision Low Lateral migration/bank erosion Low Damaged/unstable drains or armouring No Arrmouring seems to be in good condition Vertical incision - Vertical incision No Vertical incision No Arrmouring seems to be in good condition	Ci Pr Vi Morphology and Process- Reach downstream of	amaged/unstable drains or armouring hannel morphology redominant sediment size Invegetated bars ertical incision	No Engineered - No Medium	Appears scour has occurred where engineered drain finishes Deposition of coarse sediment, although this is					
engineered section.	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low Damaged/unstable drains or armouring No Armouring seems to be in good condition Vertical incision Low Damaged/unstable drains or armouring No Armouring seems to be in good condition Vertical incision Unvegetated bars Vertical incision No Armouring seems to be in good condition Vertical incision No Vertical incision Armouring seems to be in good condition Vertical incision No Vertical incision No Vertical incision Medium Peposition for coarse sediment, although this is possibly generated by scour effect at end of engineered drain finishes Deposition for coarse sediment, although this is possibly generated by scour effect at end of engineered section.	La D: Pr U Worphology and Process- Reach downstream of crossing	amaged/unstable drains or armouring hannel morphology redominant sediment size invegetated bars ertical incision	No Engineered - No Medium Medium	Appears scour has occurred where engineered drain finishes Deposition of coarse sediment, although this is possibly generated by scour effect at end of					
Lateral migration/bank erosion None	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low Damaged/unstable drains or armouring No At crossing Channel morphology Engineered - Unvegetated bars No Vertical incision Low Deposition Low Lateral migration/bank erosion Low Damaged/unstable drains or armouring No Vertical incision Vertical incision Vertical incision - Vertical incision - Vertical incision No Vertical incision No Vertical incision Medium Predominant sediment size - Unvegetated bars No Vertical incision Medium Deposition of coarse sediment, although this is possibly generated by scour effect at end of engineered drain finishes Lateral migration/bank erosion <t< td=""><th>Ci Pr U Morphology and Process- Reach downstream of crossing</th><td>amaged/unstable drains or armouring hannel morphology redominant sediment size invegetated bars ertical incision eposition ateral migration/bank erosion</td><td>No Engineered - No Medium Medium None</td><td>Appears scour has occurred where engineered drain finishes Deposition of coarse sediment, although this is possibly generated by scour effect at end of</td></t<>	Ci Pr U Morphology and Process- Reach downstream of crossing	amaged/unstable drains or armouring hannel morphology redominant sediment size invegetated bars ertical incision eposition ateral migration/bank erosion	No Engineered - No Medium Medium None	Appears scour has occurred where engineered drain finishes Deposition of coarse sediment, although this is possibly generated by scour effect at end of					
Lateral migration/bank erosion None Presence and nature of infrastructure (Map 1d) None	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low Damaged/unstable drains or armouring No Vertical incision Low Channel morphology Engineered Predominant sediment size - Unvegetated bars No Vertical incision No Lateral migration/bank erosion Low Channel morphology Engineered Predominant sediment size - Unvegetated bars No Vertical incision Medium Appears scour has occurred where engineered drain finishes Unvegetated bars No Vertical incision Medium Deposition of coarse sediment, although this is possibly generated by scour effect at end of engineered drain finishes Lateral migration/bank erosion Medium Presence and nature of infrastructure (Map 1d) None	Morphology and Process- Reach downstream of crossing	amaged/unstable drains or armouring hannel morphology redominant sediment size Invegetated bars ertical incision leposition ateral migration/bank erosion resence and nature of infrastructure (Map 1d)	No Engineered - No Medium Medium None None	Appears scour has occurred where engineered drain finishes Deposition of coarse sediment, although this is possibly generated by scour effect at end of					
Predominant sediment size - Unvegetated bars No Vertical incision Medium Appears scour has occurred where e drain finishes Reach downstream of crossing Deposition Deposition Medium Deposition of coarse sediment, althor possibly generated by scour effect at the scour of the scour effect at the scour ef	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low Damaged/unstable drains or armouring No	La Di	amaged/unstable drains or armouring	No	Armouring seems to be in good condition					
	Channel morphology Engineered			Engineered						
Predominant sediment size -				-						
			-	3.5						
	Predominant sediment size -									
Morphology and Process Unvegetated bars No	Predominant sediment size -		nvegetated bars	No						
Morphology and Process- Vertical incision	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unweetated have No	Morphology and Process-	=							
	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No	At crossing	ertical incision	Low	Some denocition of gravel cabbles at u/c and a					
Deposition Some deposition of gravel-cobbles a	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 unvegetated bars No Vertical incision Low		eposition	Medium						
culvert where gradient reduces	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical inclision Low		eposition	Wediam						
	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Penosition Medium Some deposition of gravel-cobbles at u/s end of	D			Low					
Damaged/unstable drains or armouring No Armouring seems to be in good cond	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Some deposition of gravel-cobbles at u/s end of culvert where gradient reduces		ateral migration/bank erosion	Low						
Demografiansacie aranda er armoaning. No Primoaning seems to be in good com	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low	La			Armouring seems to be in good condition					
	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low	La			Armouring seems to be in good condition					
	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low	La			Armouring seems to be in good condition					
	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low Damaged/unstable drains or armouring No Armouring seems to be in good condition	La Di Cl	amaged/unstable drains or armouring hannel morphology	No	Armouring seems to be in good condition					
	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low Damaged/unstable drains or armouring No Kennel morphology Engineered Predominant sediment size -	La Di Ci Pr	amaged/unstable drains or armouring hannel morphology redominant sediment size	No Engineered -	Armouring seems to be in good condition					
Vertical inclsion	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low Damaged/unstable drains or armouring No Kennel morphology Engineered Predominant sediment size -	La La Ci Pr	amaged/unstable drains or armouring hannel morphology redominant sediment size	No Engineered -	Armouring seems to be in good condition					
Morphology and Process-	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Culvert where gradient reduces Lateral migration/bank erosion Low Damaged/unstable drains or armouring No	La Di Ci Pr U	amaged/unstable drains or armouring hannel morphology redominant sediment size Invegetated bars	No Engineered - No	Appears scour has occurred where engineered					
Reach downstream of Deposition of coarse sediment, altho	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low Damaged/unstable drains or armouring No Armouring seems to be in good condition Channel morphology Engineered Predominant sediment size - Unvegetated bars No Vertical incision Medium	L2 D2 P1 U U V0	amaged/unstable drains or armouring hannel morphology redominant sediment size Invegetated bars	No Engineered - No	Appears scour has occurred where engineered					
crossing Deposition Medium possibly generated by scour effect at	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low Damaged/unstable drains or armouring No Vertical incision Engineered Vertical incision - Vertical incision Low Lateral migration/bank erosion Low Damaged/unstable drains or armouring No Vertical incision - Vertical incision No	Li Li D: Vi Morphology and Process-	amaged/unstable drains or armouring hannel morphology redominant sediment size Invegetated bars	No Engineered - No	Appears scour has occurred where engineered drain finishes					
	Interview Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low Damaged/unstable drains or armouring No At crossing Armouring seems to be in good condition Channel morphology Engineered Predominant sediment size - Unvegetated bars No At crossing No	La La D: Pr Vorphology and Process- Reach downstream of	amaged/unstable drains or armouring hannel morphology redominant sediment size Invegetated bars ertical incision	No Engineered - No Medium	Appears scour has occurred where engineered drain finishes Deposition of coarse sediment, although this is					
engineered section.	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low Damaged/unstable drains or armouring No At crossing Channel morphology Predominant sediment size - Vertical incision Low Lateral migration/bank erosion Low Damaged/unstable drains or armouring No Armouring seems to be in good condition Vertical incision - Vertical incision No Armouring seems to be in good condition Vertical incision No Vertical incision No Vertical incision No Predominant sediment size - Unvegetated bars No Vertical incision Medium Vertical incision Medium Deposition of coarse sediment, although this is possibly generated by scour effect at end of engineered section.	La D: Pr U Vorphology and Process- Reach downstream of crossing	amaged/unstable drains or armouring hannel morphology redominant sediment size invegetated bars ertical incision	No Engineered - No Medium Medium	Appears scour has occurred where engineered drain finishes Deposition of coarse sediment, although this is possibly generated by scour effect at end of					
Lateral migration/bank erosion None engineered section.	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low Deposition Medium Lateral migration/bank erosion Low Damaged/unstable drains or armouring No At crossing Channel morphology Engineered - Unvegetated bars No Vertical incision Low Deposition Low Lateral migration/bank erosion Low Damaged/unstable drains or armouring No Vertical incision No Vertical incision - Vertical incision - Vertical incision No Vertical incision No Vertical incision Medium Predominant sediment size - Unvegetated bars No Vertical incision Medium Deposition of coarse sediment, although this is possibly generated by scour effect at end of engineered drain finishes Deposition Medium Depositio	Vorphology and Process- Reach downstream of crossing	amaged/unstable drains or armouring hannel morphology redominant sediment size invegetated bars ertical incision eposition ateral migration/bank erosion	No Engineered - No Medium Medium None	Appears scour has occurred where engineered drain finishes Deposition of coarse sediment, although this is possibly generated by scour effect at end of					
Lateral migration/bank erosion None engineered section.	Predominant sediment size - Estimated discharge at 1:200 event (m ³ /s) 3.5 Unvegetated bars No Vertical incision Low beposition Medium Culvert where gradient reduces Lateral migration/bank erosion Damaged/unstable drains or armouring No Kerical incision Low Channel morphology Engineered Predominant sediment size - Unvegetated bars No Vertical incision No Vertical incision No Ansatz Regineered Predominant sediment size - Unvegetated bars No Vertical incision Medium Appears scour has occurred where engineered drain finishes Deposition Medium Appears scour has occurred where engineered drain finishes Deposition Medium Precominant sediment size - Unvegetated bars No Deposition Poars escour has occurred where engineered drain finishes Deposition Poarsescour has	Aorphology and Process- Reach downstream of crossing	amaged/unstable drains or armouring hannel morphology redominant sediment size Invegetated bars ertical incision leposition ateral migration/bank erosion resence and nature of infrastructure (Map 1d) nfrastructure type (see Drawing 11.4.3.1 d, Catchment 98)	No Engineered - No Medium Medium None None None No	Appears scour has occurred where engineered drain finishes Deposition of coarse sediment, although this is possibly generated by scour effect at end of					



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right. All rights reserved. Transport Scotland Licence number 100046668, 2016. Contains British Geological Survey materials © NERC 2017.

	Legend	
	General	
	 Crossing Location 	
	Catchment Area	
	Solid Geology	
	Gaick Psammite Formation - Psam	mite
-	Drift Geology	
	Peat	
	Glaciofluvial Ice Contact Deposits	
	Gaick Plateau Moraine Formation	
	Hummocky Glacial Deposits	
	Ardverikie Till Formation - Diamictor	n
	Glaciofluvial Sheet Deposits	
	Alluvium	
	River Terrace Deposits	
	Alluvial Fan Deposits	
	Head	
	Talus - Rock Fragments	
	Talus Cone	
	Environmental Designations	
	Special Area of Conservation	
	Morphological Pressures	
	Culvert	
	• Step in Bed	
-	🔶 Dam or Weir	
	Discharge Location	
	Abstraction Location	
	Drainage Ditch	
	- Power Lines	
-		
-		
-		
-		
-		
-		
-		
-		
-		
_		
_		
-		
-		
_		19
_	CONTRACTOR AND A DECIMAL AND A	9
_	Ch2m. FAIRHURST	P
_	CH2MHILL Fairhurst JV C/C. City Park 368 Alexandra Parade Glasgow G31 3AU	9
_	CH2MHILL Fairhurst JV	9
	CH2MHILL Fairhurst JV C/C. City Park 368 Alexandra Parade Glasgow G31 3AU	9
	CH2MHILL Fairhurst JV C/C. City Park 368 Alexandra Parade Glasgow G31 3AU	9
_	CH2MHILL Fairhurst JV C/C. City Park 368 Alexandra Parade Glasgow G31 3AU	9
_	CH2MHILL Fairhurst JV C/O: City Park 368 Alexandra Parade Glasgow G31 3AU Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 2525	
_	CH2MHILL Fairhurst JV C/C City Park 368 Alexandra Parade Glasgow G31 3AU Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 2525	
_	CH2MHILL Fairhurst JV C/O: City Park 368 Alexandra Parade Glasgow G31 3AU Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 2525	
	CH2MHILL Fairhurst JV C/C City Park 368 Alexandra Parade Glasgow G31 3AU Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 2525	
_	CH2MHILL Fairfurst JV C/C: City Park 368 Alexandra Parade Glasgow G31 3AU Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 2525	
_	CH2MHILL Fairhurst JV C/C City Park 368 Alexandra Parade Glasgow G31 3AU Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 2525	
_	CH2MHIL Fairburst JV CYC: City Park 368 Alexandra Parade Glasgow G31 3AU Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 2525 Image: Comparison of the state of	
_	CH2MHIL Fairburst JV CH2MHIL Fairburst JV CYC: City Park 368 Alexandra Parade Glasgow G31 3AU Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 2525 Image: Comparison of the state	
_	CH2MHIL Fairfurst JV C/O: City Park 368 Alexandra Parade Glasgow G31 3AU Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 2525 Image: Comparison of the system Image:	
_	CH2MHIL Fairfurst JV C/C: City Park 368 Alexandra Parade Glasgow G31 3AU Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 2525 Image: Comparison of the state of	



Annex 11.4.3 - Hydromorphological Catchment Assessment - 99

	Annex 11.4.3 - Hydromorphologic	ar cateminent Assessment - 55	
Catchment No.	99]	
Catchment Name	-	J	
	-		
Channel Nature	Nature of water course		Drain
	Size of water course		Minor
Quantitative Spatial	Catchment Area (km ²)		0.04
Elements	Average slope in catchment (°)		8
	% Catchment over 750m (for snow melt risk)		0
	Water, flows and levels		Good
WFD classification	Physical condition		Good
	Overall ecological status		Good
	Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 99)	Gaick Psammite formation-Psammite	resistant to weathering, impermeable
Geology	Is an alluvial fan present at or near the crossing?	No	
		-	
For the second of	Ramsar	No	
Environmental designations (see	SAC	NO	
Drawing 11.4.3.1 c,	SPA	Ne	
Catchment 99)	SSSI	No	
	Changes in slope and channel confinement	See Drawing	11.4.3.2, Catchment 99
	Is peat present in the catchment	Yes	50k BGS mapping suggests very limited peat
			cover
	Is there a bog burst risk	No	
	Current valley side or terrace erosion Potential valley side or terrace erosion	NB	
	Hill slope failures (including peat slides and debris flows and slides)	No	
Sediment source and	Hill slope failures coupled to channel	No	
supply - Catchment Scale	Vertical incision present in catchment	No	
	Bank erosion/lateral migration	No	
	Unvegetated bars	No	
	Wooded/forested areas in catchment	No	
	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 99)	Yes	Aqueduct- reducing downstream sediment
	Comment on sediment source potential in catchment		transfer and flow Limited
	Comment on sediment supply potential to crossing	Limited as aqueduct cuts	upper catchment off from crossing
	Channel morphology	Engineered	the second second back when the second to the decide
	Predominant sediment size	Coarse (gravel-cobble)	Is engineered but also heavily incised.
	Unvegetated bars	No	
			Appears to be very high incision beyond d/s end
	Vertical incision	High	of engineered cascade d/s of aqueduct. Gabion
	Vertical incision	ngn	basket check dams put in place to slow flow and
Morphology and Process-	a. 111		limit this incision
Reach upstream of crossing	Deposition	Low	
crossing	Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d)	None Yes	Aqueduct, cascade, check dams
	Tresence and nature of innastructure (Map 10)	103	
		No.	This channel appears to be an overspill for the
	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 99)	Yes	aqueduct. This flow has caused incision which has needed to be controlled with check dams
			has needed to be controlled with check dams
	Channel realignment	No	
1	Channel morphology	Engineered	
	Predominant sediment size	-	
Membeloni and Process	Estimated discharge at 1:200 event (m ³ /s)	0.15	
	Unvegetated bars	No	
			Would be kick but represention has secured
	Vertical incision	Medium	Would be high but revegetation has occurred, either as incision occurred during one major
	* Creek inclusion		event, or check dams have worked.
	Deposition	Let us	
Morphology and Process- At crossing	Deposition Lateral migration/bank erosion	Low	
		2011	
			Gabion basket cascade is moderately deformed,
			particularly in its lower steps. D/s side of culvert right bank armouring is being 'outflanked' by
	Damaged/unstable drains or armouring	Yes	right bank armouring is being 'outflanked' by bank erosion. There is a drop of c.0.5-1m at end
	annopeo, anacabie aranna or armournig		of armouring indicating there is scour here and
			the armouring is becoming a nick point, although
			u/s migration of this is so far limited.
1	1	1	1

		Channel morphology	Plane bed	
		Predominant sediment size	Cobble with fine drape	Has revegetated.
		Unvegetated bars	No	
				D/s of engineered outfall, severe incision may
				have occurred, which has now stabilised
Mo	orphology and Process-	Vertical incision	High	although from photos it isn't possible to say
R	Reach downstream of			explicitly if the channel was actually cut to near
	crossing			this depth originally.
		Deposition	Low	
		Lateral migration/bank erosion	Low	
		Presence and nature of infrastructure (Map 1d)	No	
		Infrastructure type (see Drawing 11.4.3.1 d, Catchment 99)	No	
		Channel realignment	No	

Channel is an overspill from the aqueduct. Immediately d/s of the aqueduct a cascade has been created which appears to be formed from a series of concrete steps. At the end of the cascade the gradient reduces and the would-be flow becomes diffuse and unconstrained by the channel. However, after a further 30m the channel reappears and is heavily incised. Gabion basket check dams have been put in the channel to either slow flow or retain sediment (or both) and reduce incision. Immediately u/s of the crossing, a gabion basket cascade is present to bring the channel to the culvert. Incre is no evidence of substantial deposition at the entrance to the culvert. D/s of the culvert, there is a short section of armouring before the flow discharges over a c.0.5m-1m step (assumed to be formed by scour). Scour here has destabilised the right bank leading to outflanking of the armouring. From here the flow is in a channel which is either cut or deeply incised or partially both.

CAREFUL REDESIGN NEEDED WITH THIS CHANNEL. WHILST FLOW IS LIKELY TO BE VERY SPORADIC, IT WILL OCCUR IN EXTREME CONDITIONS WHEN THE AQUEDUCT IS UNABLE TO COPE AND THESE INTERMITTENT FLOWS ARE LIKELY TO BE HIGH ENERGY DUE TO VOLUME OF WATER AND STEEPNESS OF DROP.



Reproduced by permission of Ordnance Survey on behalf of HMSO. 🐵 Crown copyright and database right. All rights reserved. Transport Scotland Licence number 100046668, 2017. Contains British Geological Survey materials 🐵 NERC 2017.



•	Minor crossing
•	Other crossing
	Break in slope
	Incision
	Crossing catchme

DESIGN:	DRAWN:	CHK:	APP:	
EL	AB	EL	EL	
	I		1	
DATE: 14/07/2017				
PROJ: 495298				
DWG: A9P08-CFJ-EWE-X_ZZZZZ_ZZ-DR-EN-0002				
SHEET:	REVISI	ON:	SUITABILITY:	
1 of 1	C01		A3	

100 Catchment No. Catchment Na Nature of water course Natural Channel Nature Size of water course Major 0.8 Catchment Area (km²) Quantitative Spatial Average slope in catchment (°) 6.4 Elements % Catchment over 750m (for snow melt risk) 0 Water, flows and levels Good WFD classification Physical condition Good verall ecological status Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 100) Gaick Psammite formation-Psammite resistant to weathering, impermeable Geology Is an alluvial fan present at or near the crossing? No Environmental Ramsar No designations (see SAC No Drawing 11.4.3.1 c, Catchment 100) SPA No SSSI No Changes in slope and channel confinement See Drawing 11.4.3.2, Catchment 100 1:50k BGS mapping indicates limited small area Is peat present in the catchment Yes n mid catchment Is there a bog burst risk No Current valley side or terrace erosion No Potential valley side or terrace erosion Hill slope failures (including peat slides and debris flows and slides) No Yes In the upper catchment Hill slope failures coupled to channel No Some incision and geotechnical bank failure indicated u/s of reservoir, but also possibly soil ertical incision present in catchment Yes supply - Catchment pipe collapse. Scale Bank erosion/lateral migration No Unvegetated bars No No Wooded/forested areas in catchment Aqueduct- changing downstream flow and Infrastructure type (see Drawing 11.4.3.1 d, Catchment 100) Yes Yes sediment supply Possible collapsed pipe and associated nick points may supply some sediment. Comment on sediment source potential in catchment Unlikely to have large volumes reaching crossing from upper catchment due to flatter areas with lack of defined channel leading to flow diffusion and aqueduct creating a Comment on sediment supply potential to crossing barrier (although there is a culvert taking flow under the aqueduct) Channel morphology Predominant sediment size Plane bed Large gravel -small cobble No NB cut drain though Unvegetated bars Likely combination of incision in addition to /ertical incision Medium original drain cutting orphology and Proces Low Depositior Reach upstream of ateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Low Limited collapse of drain banks crossing Yes Aqueduct Splits catchment, probably limits flow and Infrastructure type (see Drawing 11.4.3.1 d, Catchment 100) Yes sediment transfer from u/s Channel must parallel aqueduct on its u/s side Channel realignment Yes before entering aqueduct culver nnel morphology Engineered In culvert, but plane bed on approach Predominant sediment size Large grave Estimated discharge at 1:200 event (m³/s) No Unvegetated bars Some incision and potential for nick point Vertical incision Low migration but limited ogy and Proces Deposition orpho Low At crossing Lateral migration/bank erosion Low Limited undermining of armouring at confluence of two drains c.10m u/s of culvert entrance. Damaged/unstable drains or armouring Possible potential for nick point migration. Damaged gabion opposite outflow of culvert Yes where channel must make 90° to parallel road Channel morphology Plane bed Predominant sediment size Gravel-Cobble nvegetated bars Deposit of coarse sediment at channel outflow Scour pool at culvert exit. Channel has possibly spilled out of cut channel which parallels road /ertical incision Medium and eroded floodplain, re-joining at where track Aorphology and Proces crosses channel. Reach downstream of Deposit of coarse sediment at channel outflow crossing where channel bends right to parallel road, at eposition Low outflow from scour pool. Lateral migration/bank erosion Low Presence and nature of infrastructure (Map 1d) No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 100) No Channel realigned to parallel road before Channel realignment Yes eading across floodpl Majority of catchment u/s of aqueduct. Whilst there is a culvert under the aqueduct, the run-off from the upper catchment to the lower catchment is restricted and sediment transfer from u/s to d/s of aqueduct is likely to be limited. Sources of sediment exist in the upper catchment, notably a possible natural pipe collapse. D/s of the aqueduct channelisation is limited and intermittent (reducing where gradient reduces), but drains have been cut on the approach to the crossing. There appears to be limited incision of these and potential for knickpoint migration where hard points have been put in place where the bed elevation Summary behaviour of the channel needs to change. D/s of the crossing, there is a scour pool and a gabion basket which has been damaged through the scour processes. The gabior is there to protect the bank opposite the outflow as the channel must make a 90° turn to parallel the road. This road-parallel channel has potentially been under capacity as flow has spilled across the floodplain eroded a secondary channel, which re-joins the main channel where the forest track crosses.



Photograph 11.4.3.65- Downstream to crossing

Gently sloping catchment

Potential for nick point migration



Photograph 11.4.3.66- Upstream to channel realignment creating a step in bed



Photograph 11.4.3.67-Upstream to channel in peat



Photograph 11.4.3.68 - Looking upstream to poorly defined channel



Incision in peat



Photograph 11.4.3.70 – Low lying catchment



Photograph 11.4.3.71 - Low lying catchment



Photograph 11.4.3.72 - Crossing exit- Over wide, shallow channel



Photograph 11.4.3.73- Downstream of diverted channel



Photograph 11.4.3.75- Floodplain erosion



Photograph 11.4.3.74-Pool downstream of culvert



Photograph 11.4.3.76- Downstream channel with cobble and gravel bed



Photograph 11.4.3.77-Downstream to wooded section- Gravel bed and influence of woody debris





Cohome Name Data of value course Drain See of value course Drain Drain Drain Quantitative Spatial Calciment Aras (par) 0.077 Press Drain Drain Drain WP obsatification Drain Drain Drain WP obsatification Marging Reference Name (T) Drain Drain WP obsatification Marging Reference Name (T) Drain Drain WP obsatification Marging Reference Name (T) Grade Name Name (T) Drain Marging Reference Name (T) Marging Reference Name (T) Grade Name Name (T) Reference Name (T) Marging Reference Name (T) Marging Reference Name (T) Grade Name (T) Reference Name (T) Marging Reference Name (T) Name (T) Reference Name (T) Reference Name (T) Marging Reference Name (T) Name (T) Name (T) Reference Name (T) Marging Reference Name (T) Name (T) Name (T) Name (T) Marging Reference Name (T) Name (T) Name (T) Name (T) Marging Reference Name (T) <t< th=""><th>Catchment No.</th><th>102</th><th></th><th></th></t<>	Catchment No.	102				
Owner Nature See of source course Monor Quantitative Spatial Literative Spatial Extension 0.00 0.00 WD classification See of source (unit) 0.00 WD classification Good 0 WD classification Good 0 Geology Majority Bedirock (see Drawing 11.4.3.1 a and b Catchment 102) Gaick Paramete formation Paramete Good Good Geology Majority Bedirock (see Drawing 11.4.3.1 a and b Catchment 102) Gaick Paramete formation Paramete Good Reside and units of the source of the	Catchment Name	-				
Owner Nature See of source course Monor Quantitative Spatial Literative Spatial Extension 0.00 0.00 WD classification See of source (unit) 0.00 WD classification Good 0 WD classification Good 0 Geology Majority Bedirock (see Drawing 11.4.3.1 a and b Catchment 102) Gaick Paramete formation Paramete Good Good Geology Majority Bedirock (see Drawing 11.4.3.1 a and b Catchment 102) Gaick Paramete formation Paramete Good Reside and units of the source of the						
State Minor Quantitative Spatial Elements Exclonent Area (en/) Average sloge in a forberet (?) N.C.Ahoheni over Xoln (live sow mell risk) 0.09 WP classification Physics (a continue Downall ecological status 0.09 WP classification Physics (a continue Downall ecological status 0.00 Geology Is an allovial far present at or inser the cossing? Geold Parameters Instatute to weathering, impermeable its an allovial far present at or inser the cossing? Geold Parameters Instatute to weathering, impermeable its an allovial far present at or inser the cossing? Visi Its of avuigion into 104 Eventomental designations (see Space Statute to weathering, impermeable its an allovial far present at or inser the cossing? Visi Its of avuigion into 104 Eventomental designations (see Space Statute to weathering, impermeable its and allovial far present in continents No Its of avuigion into 104 Event and the continent its and its and its of the continent its inpop in continent and the continent its and its of the continent its inpop failures continent its inpop failures continent its and its of the continent its and its of the continent its and its of the continent its inpop failures continent its and its of the continent its and its of the continent its and contits and its of the continent its andits and its of the continent	Channel Nations	Nature of water course		Drain		
Quantities Spatial tennetit Association 3.5 WD classification 0 WD classification Good Overall acciding status Good Based Status Based Status Based Status	Channel Nature	Size of water course		Minor		
Quantityle Spatia Association 3.5 Binnist Marge aloge in catchment [1] 3.5 WPD lassification Good 0 WPD lassification Good Good Provide and sevels Good Good Centremet varia Good Good Centremet varia Good Good Centremet varia Majority Betroit (see Braving 11.4.3.1 a and b Catchment 102) Gaick Parameter formation-Parameter CentremeterVaria Majority Betroit (see Braving 11.4.3.1 a and b Catchment 102) Gaick Parameter formation-Parameter CentremeterVaria No Rak of availaon into 104 Rak of availaon into 104 EnvironmeterVaria No Rak of availaon into 104 Rak of availaon into 104 EnvironmeterVaria Sol No Rak of availaon into 104 Sol						
Quantityle Spatia Association 3.5 Binnist Marge aloge in catchment [1] 3.5 WPD lassification Good 0 WPD lassification Good Good Provide and sevels Good Good Centremet varia Good Good Centremet varia Good Good Centremet varia Majority Betroit (see Braving 11.4.3.1 a and b Catchment 102) Gaick Parameter formation-Parameter CentremeterVaria Majority Betroit (see Braving 11.4.3.1 a and b Catchment 102) Gaick Parameter formation-Parameter CentremeterVaria No Rak of availaon into 104 Rak of availaon into 104 EnvironmeterVaria No Rak of availaon into 104 Rak of availaon into 104 EnvironmeterVaria Sol No Rak of availaon into 104 Sol		Catchment Area (km ²)		0.09		
Leminus S clamment over 730m (for snow mell risk) 0 WPD desification Good WPD desification Good Geology Majority bedrook (see Drawing 11.4.3.1 a and b Cachment 102) Gaick Psammite formation Psammite for some that a subsiling present at or near the crossing? Gaick Psammite formation Psammite for some that a subsiling present at or near the crossing? Environmental designation (see Drawing 11.4.3.1 c, Drawing 11.4.3.1 c						
WPD dasification Monty Redrox (see Drawing 11.4.3.1 and b Catchment 102) Gaick Paramite formation-Paramite resistant to weathering, impermeable device Majority Redrox (see Drawing 11.4.3.1 and b Catchment 102) Gaick Paramite formation-Paramite resistant to weathering, impermeable device Banase No Excel No device Banase No Excel No powing 11.4.3.1 (see Drawing 11.4.3.1 (see Drawing 11.4.3.1 (see Drawing 11.4.3.2 (see Drawing 11.	Elements			0		
WPD dasification Monty Redrox (see Drawing 11.4.3.1 and b Catchment 102) Gaick Paramite formation-Paramite resistant to weathering, impermeable device Majority Redrox (see Drawing 11.4.3.1 and b Catchment 102) Gaick Paramite formation-Paramite resistant to weathering, impermeable device Banase No Excel No device Banase No Excel No powing 11.4.3.1 (see Drawing 11.4.3.1 (see Drawing 11.4.3.1 (see Drawing 11.4.3.2 (see Drawing 11.						
Overall ecological status Good Geology Majorth Betrock (see Drawing 11.4.3.1 a and b Catchment 102) Gaick Psammile formation-Psammile Risk of avuision into 104 Environmential designation (see a subscript of the second se		Water, flows and levels		Good		
Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 102) Gack Paramite formation-Paramite resistant to weathering, impermeable for analysis of the parameter of the parameter resistant to weathering, impermeable for analysis of the parameter resistant to weathering, impermeable for analysis of the parameter resistant to weathering, impermeable for analysis of the parameter resistant to weathering, impermeable for analysis of the parameter resistant to weathering, impermeable for analysis of the parameter resistant to weathering. Bears of the parameter resistant to resis	WFD classification	Physical condition		Good		
Geology Is an alluvial fan present at or near the crossing? Yes Risk of avuision into 104 Environmental designations (see Drong 11.4.5.1) Samaar No Image: Samaar No Solid No Solid No Image: Solid No Solidment tool Solid contract wells and dense in the catchinement No Image: Solid contract wells and dense in the catchinement No Image: Solid contract wells and dense in the catchinement No Image: Solid contract wells and dense in the catchinement No Image: Solid contract wells and dense in the catchinement No Image: Solid contract wells and dense in the catchinement No Image: Solid contract wells and dense in the catchinement No Image: Solid contract wells and dense in the catchinement No Image: Solid contract wells and dense in the catchinement No Image: Solid contract wells and dense in the catchinement No Image: Solid contrat wells and dense in the catchinement <t< td=""><td></td><td>Overall ecological status</td><td></td><td>Good</td></t<>		Overall ecological status		Good		
Geology Is an alluvial fan present at or near the crossing? Yes Risk of avuision into 104 Environmental designations (see Drong 11.4.5.1) Samaar No Image: Samaar No Solid No Solid No Image: Solid No Solidment tool Solid contract wells and dense in the catchinement No Image: Solid contract wells and dense in the catchinement No Image: Solid contract wells and dense in the catchinement No Image: Solid contract wells and dense in the catchinement No Image: Solid contract wells and dense in the catchinement No Image: Solid contract wells and dense in the catchinement No Image: Solid contract wells and dense in the catchinement No Image: Solid contract wells and dense in the catchinement No Image: Solid contract wells and dense in the catchinement No Image: Solid contract wells and dense in the catchinement No Image: Solid contrat wells and dense in the catchinement <t< td=""><td></td><td></td><td></td><td></td></t<>						
Is an allowal ran present at or hear the crossing? Yes Hick of avuision into 104 Environmental designation (p. 11.43.1 c, 35A Sec No Changes in slope and channel confinement Catchment 1021 Sec No Section 1021 SSS No Section 1021 SSS No Section 1021 Sec Drawing 11.4.3.2, Catchment 102 Sec Drawing 11.4.3.2, Catchment 102 Section 1021 Status 200 No Section 1021 Status 200 Section 1020 No Section 1021 Section 1021 No Section 1021 Section 1021 No <		Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 102)	Gaick Psammite formation-Psammite	resistant to weathering, impermeable		
designations (see Drawing 11.4.3.5, SiPA No Catchment 1021 SSS No SSS No No Authorn 1021 SSS No SepTawn 11.4.3.7, Catchment 102 SSS No Lipped present in the catchment No No Lipped present in the catchment No No SedTrawn 1021 SSS No No SedTrawn 1021 Step and their step and the	Geology	Is an alluvial fan present at or near the crossing?	Yes	Risk of avulsion into 104		
designations (see Drawing 11.4.3.1, Stathment 102) SAC Stathment 102 No SSB No No Authorn 1021 SSB No SSB No No Lipset present in the cathment No No Lipset present in the cathment No No Current values side or terrace erosion No No Full side failures (including present in cathment No No Hill side failures (including present in cathment No No Hill side failures (including present in cathment No No Wordcall incling present in cathment No No Unwegetated bara No No No Wordcall incling present in cathment No No No Unwegetated bara Infrastructure type (see Drawing 11.4.3.1, d, Cathment 102) Yes Upper end of cathment truncated by Aque Comment on sediment source potential in cathment No No Infrastructure type (see Drawing 11.4.3.1, d, Cathment 102) Wordphology and Process Comment on sediment source potential in cathment 102, Unwegetated bara Non Infra		-				
Drawing 11.4.3.1, c, Catchment 1021 IVA SS No Sediment 1021 SS No Sediment Source and supply - Catchment Set Sed Training Catchment 102 No Sediment Source and supply - Catchment Set Changes in slope and channel confinement 11 slope failures coupled to channel No Sediment Source and supply - Catchment Set Sed Training Catchment Set No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yeits Upper end of catchment truncated by Aque Umited to fines and organics. Low slope angles preclude mass movements and settin arising from roision of failure of short step trans slope (likely formed in hummo glacial deposit from review of SGS maj unikely to be transported far Unvegetated bars No Morphology and Process recossing Channel morphology Engineered Fine Unvegetated bars No No No Unvegetated bars No No No Unvegetated bars No No No Unvegetated bars No						
Catchneol 102 SSI No Catchneol 102 SSI SSI No Sections 1102 SSI SSI SSI Catchneol 102 SSI SSI SSI Sections 102 SSI SSI SSI Sections 102 SSI SSI SSI Sections 102 SSI No SSI Vertical incision present in catchment No SSI Wooded/forested ares in catchment No SSI Infrastructure type (see Drawing 11.4.3.1, Gatchment 102) Yes Upper end of catchment tuncated by Ague Comment on sediment supply potential to crossing Versi Under SSI SSI SSI SSI SSI SSI SSI SSI SSI SSI SSI SSI SSI						
Seediment source and supply - Catchment Seediment See Drawing 11.4.3.2, Catchment 102 See Drawing 11.4.3.2, Catchment 102 Seediment source and supply - Catchment See Supply - Catchment See Supposition Supply - Catchment See Supply - Catchment Se			No			
Sediment source and supply - Catchment Scale supply - Catchment Scale Sediment source and supply - Catchment Scale Supply - Catchment Scale Scale Supply - Catchment Scale						
Sediment source and Supply - Cathment Source and Supply - Cathment Source protocols and cath source protocols and source protocols and another and another and another and another anot		Changes in slope and channel confinement		1.4.3.2, Catchment 102		
Sediment source and supply - Catchment Scale Current valley side or terrace ension No Sediment source and supply - Catchment Scale No Image: Source and States (including pest sides and debris flows and sides) No Sediment source and supply - Catchment Scale Mo Image: Source and States (including pest sides and debris flows and sides) No Image: Source and States (including pest sides and debris flows and sides) No Image: Source and States (including pest sides and debris flows and sides) Supply - Catchment Scale Vertical incision present in catchment No Image: Source and states (including pest sides and debris flows and sides) Image: Source and states (including pest sides and debris flows and sides) No Image: Source and states (including pest sides and source potential in catchment Image: Source and states (including pest sides and source potential in catchment Umited to fines and organics. Low slope angles preclude mass movements and sedim (increasing from erosion flaiture of short steep terrase slope (likely formed in hummo glacial deposits for merve of SGS anglutilely to be transported far Comment on sediment size Fine Image: Source and antimet size Fine Image: Source and state or infrastructure (Map 1d) Yes Infrastructure (Map 1d) Yes Literal migration/bank erosion Mone Infrastructure						
Sediment source and supply - Catchment Source and supply - Catchment Source potential in catchment No Image: Catchment Source No Sediment source and supply - Catchment Source potential in catchment No Image: Catchment Source No No Supply - Catchment Source potential in catchment No Image: Catchment Source No No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yes Upper end of catchment truncated by Aque arrising from erosion of failure of short steep trave slope (likely/formed in humm) glacial deposits from review of BGS map unikely to be transported far Comment on sediment source potential in catchment Morphology and Process- versing Channel morphology Engineered Predominant addiment size Predominant addiment size crossing Channel morphology Engineered Predominant addiment size Presonand nature of infrastructure (Map 1d) Yes Access track immediately u/s infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yes Morphology and Process- Version Channel morphology Engineered Preson Access track immediately u/s infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yes Morphology and Process- Version Vertical incision None No Morphology and Process- Version Vertical incision None						
Sediment source and supply - Catchment Seal Hill slope failures coupled to channel No Interface Supply - Catchment Seal Mo No No No Upper text of the couple and text of the cou						
Sediment source and supply - Catchment Selat Hill slope failures coupled to channel No supply - Catchment Selat Eank erosion/lateral migration No No Unregated bars No No No Woodd/Orested areas in catchment No No No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yes Upper end of catchment truncated by Aque arising from revision of sediment source potential in catchment Unrited to fines and organics. Low slope angles preclude mass movements and sedim arising from revision of the prevance of BGS map) unlikely to be transported far Comment on sediment supply potential to crossing Very limited. Fine organic sediment only. Morphology and Process Channel morphology Engineered Prederoninant sediment size Fine Unregetated bars Morphology and Process Vertical incision None Lateral migration/Dark erosion Modelium Fines, organics Morphology and Process Channel realignment Yes Under access track Morphology and Process Channel realignment Yes Under access track Morphology and Process Channel morphology Engineered Fine						
Sediment source and supply - Catchment Scale Vertical incision present in catchment No Supply - Catchment Scale Wooded/forested areas in catchment No Infrastructure type (see Drawing 114.3.1 d, Catchment 102) Yets Upper end of catchment truncated by Aque united to fines and organics. Low slope angles preclude mass movements and sedir arising from erosion of failure of short steep terrace slope (likely formed in hummo glacial deposits from review of BGS map) unlikely to be transported far Comment on sediment supply potential to crossing Morphology and Process Channel morphology Engineered Predominant sediment size Fine Unvegetated bars No Morphology and Process Vertical incision Reach upstream of crossing Channel morphology Engineered Presence and nature of infrastructure (Map 1d) Yes Access track immediately u/s Infrastructure type (see Drawing 114.3.1.1, C, Catchment 102) Yes Likely limits flow reaching crossing Morphology and Process Channel morphology Engineered Fine Unvegetated bars None Engineered Fine Just process Channel morphology Engineered Fine Unvegetated bars None <td></td> <td></td> <td></td> <td></td>						
Sediment source and supply - Catchment Scale Bank erosion/lateral migration No Unvegetated bars No No Wooded/forested areas in catchment No No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yes Upper end of catchment truncated by Aque Comment on sediment source potential in catchment arising from erosion of failure of short steep terrace scape (likely formed in hummo glacial deposits from review of BGS map) unlikely to be transported far Comment on sediment supply potential to crossing Engineered Predominant sediment size Fine Unvegetated bars No Very limited. Fine organics sediment only. Engineered Presonce and true of infrastructure (Map 14) Yes Unvegetated bars No Unvegetated bars No Unvegetated bars No Infrastructure (Map 14) Yes Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yes Unvegetated bars None Presonce and nature of infrastructure (Map 14) Yes Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yes Unvegetated bars None						
Supply - Catchment Scale Bank erosion/lateral migration No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Ves Upper end of catchment truncated by Aque united to fines and organics. Low slope angles preclude mass movements and sedim arising from erosion of failure of short steep terrace slope (likely formed in hummo glacial deposits from review of BGS map) unlikely to be transported far Comment on sediment supply potential to crossing Limited to fines and organics. Low slope angles preclude mass movements and sedim arising from erosion of failure of short steep terrace slope (likely formed in hummo glacial deposits from review of BGS map) unlikely to be transported far Comment on sediment supply potential to crossing Morphology and Process Channel morphology Engineered Predominant sediment size Fine Univegetated bars No Presone and nature of infrastructure (Map 1d) None Presence and nature of infrastructure (Map 1d) Yes Univegetated bars None Morphology and Process Channel morphology Karonsing Channel morphology Estimated discharge et 12:00 event (m ² /s) 0.3 Univegetated bars None Vertical incision None Deposition Morelium Lateral migration/bank erosion None	Sediment source and					
Unregetated bars NO Woode/forested areas in catchment No Infrastructure type (see Drawing 11.4.3.1.4, Catchment 102) Yes Upper end of catchment truncated by Aque Comment on sediment source potential in catchment Imited to fines and organics. Low slope angles preclude mass movements and sedim arising from erosion of failure of short steep terrace slope (likely formed in hummo glacial deposits from review of BGS map) unlikely to be transported far Comment on sediment supply potential to crossing Very limited. Fine organic sediment only. Morphology and Process- Reach upstream of crossing Channel morphology Engineered Predominant sediment size Fine Upper conditional sediment size Unregetated bars None None Reach upstream of crossing Letral migration/bank erosion Mone Presoninant sediment size Fine Under access track immediately u/s. Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yes Ukely limits flow reaching crossing Channel morphology Engineered Fine Estimated discharge at 1:200 event (m ³ /s) At crossing Vertical incision None Estimated discharge at 1:200 event (m ³ /s) At crossing Channel morphology<						
Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yes Upper end of catchment truncated by Aque Comment on sediment source potential in catchment Limited to fines and organics. Low slope angles preclude mass movements and sedim arising from erosion of failure of short steep terrace slope (likely formed in hummo glacial deposits from review of BGS map) unlikely to be transported far Morphology and Process. Channel morphology Engineered Predominant sediment size No No Morphology and Process. Vertical incision None Presence and nature of infrastructure (Map 1d) Yes Likely limits flow reaching crossing Morphology and Process. Channel morphology Engineered Presence and nature of infrastructure (Map 1d) Yes Access track immediately u/s Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yes Under access track Morphology and Process. Channel morphology Engineered Presence and nature of infrastructure (Map 1d) Yes Likely limits flow reaching crossing Morphology and Process. Under access track Fine Estimated discharge at 1.200 event (m ³ /s) 0.3 Under access track Morphology and Process.		0				
Morphology and Process- Reach upstream of consing Cannel morphology (Channel morphology (Channel morphology) Engineered (None Linklet (Marking) Morphology and Process- Reach upstream of crossing Channel morphology (Channel morphology) Engineered (None No Morphology and Process- Reach upstream of crossing Channel morphology (Channel realignment (Data inckion) No No Morphology and Process- Reach upstream of crossing Channel morphology (Channel realignment) No No Morphology and Process- Reach upstream of crossing Channel morphology (Channel realignment) No No Morphology and Process- Reach upstream of crossing Channel morphology (Channel realignment) Yes Likely limits flow reaching crossing (Channel realignment) Morphology and Process- Reach downstream of crossing Channel morphology (Predominant sediment size Estimated discharge at 1:200 event (m ³ /s) 0.3 Immediately u/s Morphology and Process- Reach downstream of crossing Channel morphology (Predominant sediment size (Channel morphology) Fine (Date and morphology) Immediately (None Morphology and Process- Reach downstream of crossing Channel morphology (Predominant sediment size (Predominant sediment size (Predominant sediment size (Predominant sediment size (Predominant sediment size (Predominant sediment size (Predominant sediment size (Pr		Wooded/forested areas in catchment	No			
Comment on sediment source potential in catchment arising from erosion of failure of short steep terrace slope (likely formed in hummo glacial deposits from review of BGS map) unlikely to be transported far Comment on sediment supply potential to crossing Very limited. Fine organic sediment only. Morphology and Process Engineered Reach upstream of crossing Channel morphology Deposition Medium Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yes Morphology and Process Channel morphology Reach upstream of crossing Channel morphology Deposition Medium Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yes Unwegetated bars No Morphology and Process Channel morphology At crossing Engineered Predominant sediment size Fine Estimated discharge at 1:200 event (m ⁷ /s) 0.3 Vertical incision None Deposition Morphology Lateral migration/bank erosion None Vertical incision None Deposition Engineered Predominant sediment size		Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102)		Upper end of catchment truncated by Aqueduct		
Morphology and Process- rossing Channel morphology Predominant sediment size Engineered Morphology and Process- rossing Vertical incision No Reach upstream of crossing Deposition Medium Presence and nature of infrastructure (Map 1d) Yes Access track immediately u/s Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yes Likely limits flow reaching crossing Channel realignment Yes Under access track Morphology and Process- At crossing Channel morphology Engineered Vertical incision No Infrastructure (Ma ³ /s) 0.3 Deposition Medium Estimated discharge at 1:200 event (m ³ /s) 0.3 Vertical incision None Infrastructure (Map 1d) No Deposition Morphology and Process- Vertical incision None Infrastructure (Map 1d) Morphology and Process- At crossing Channel morphology Engineered Infrastructure (Map 1d) Morphology and Process- Vertical incision None Infrastructure (Map 1d) None Morphology and Process- Vertical incision Kend None Infrastructure (Ma		Comment on sediment source potential in catchment	arising from erosion of failure of short	steep terrace slope (likely formed in hummocky		
Morphology and Process Predominant sediment size Fine Morphology and Process Vertical incision None Each upstream of crossing Deposition Medium Fines, organics Presence and nature of infrastructure (Map 1d) Yes Access track immediately u/s Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yes Likely limits flow reaching crossing Channel realignment Yes Under access track Morphology and Process Channel morphology Engineered Predominant sediment size Fine Estimated discharge at 1:200 event (m ³ /s) Morphology and Process Unvegetated bars No Vertical incision Mone Predominant sediment size Lateral migration/bank erosion None Intrastructure type (see Drawing 11.4.3.1 d, Catchment mature) Morphology and Process Unvegetated bars No Intrastructure type (see Drawing 11.4.3.1 d, Catchment mature) Morphology and Process Vertical incision None Intrastructure) Unvegetated bars None Intrastructure) Intrastructure (Map 10) Deposition Fine		Comment on sediment supply potential to crossing	Very limited. Fin	ne organic sediment only.		
Morphology and Process Predominant sediment size Fine Morphology and Process Vertical incision None Each upstream of crossing Deposition Medium Fines, organics Presence and nature of infrastructure (Map 1d) Yes Access track immediately u/s Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yes Likely limits flow reaching crossing Channel realignment Yes Under access track Morphology and Process Channel morphology Engineered Predominant sediment size Fine Estimated discharge at 1:200 event (m ³ /s) Morphology and Process Unvegetated bars No Vertical incision Mone Predominant sediment size Lateral migration/bank erosion None Intrastructure type (see Drawing 11.4.3.1 d, Catchment mature) Morphology and Process Unvegetated bars No Intrastructure type (see Drawing 11.4.3.1 d, Catchment mature) Morphology and Process Vertical incision None Intrastructure) Unvegetated bars None Intrastructure) Intrastructure (Map 10) Deposition Fine						
Morphology and Process- Reach upstream of crossing Unvegetated bars None Morphology and Process- Reach upstream of crossing Deposition Medium Fines, organics Morphology and Process- Reach downstream of crossing Lateral migration/bank erosion None Medium Morphology and Process- At crossing Channel morphology Yes Likely limits flow reaching crossing Morphology and Process- At crossing Channel morphology Engineered More Morphology and Process- At crossing Channel morphology Fine More Morphology and Process- At crossing Channel morphology None More Morphology and Process- At crossing Channel morphology None More Morphology and Process- At crossing Channel morphology None More Morphology and Process- Reach downstream of crossing Channel morphology None More Morphology and Process- Reach downstream of crossing Channel morphology Engineered Looks like cut drain Morphology and Process- Reach downstream of crossing Channel morphology Engineered Looks like cut drain Morphology and Process- R		Channel morphology	Engineered			
Morphology and Process- Reach upstream of crossing Vertical incision None Lateral migration/bank erosion None None Presence and nature of infrastructure (Map 1d) Yes Access track immediately u/s Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yes Likely limits flow reaching crossing Channel realignment Yes Under access track Morphology and Process- A t crossing Channel morphology Engineered Vertical incision None None Deposition Morphology and Process- At crossing None Morphology and Process- Reach downstream of crossing Channel morphology Engineered Morphology and Process- Reach downstream of crossing Channel morphology None Morphology and Process- Reach downstream of crossing Channel morphology Engineered Morphology and Process- Reach downstream of crossing Channel morphology Engineered Looks like cut drain Morphology and Process- Reach downstream of crossing Channel morphology Engineered Looks like cut drain Morphology and Process- Reach downstream of crossing Channel morphology Engineered Looks li		Predominant sediment size				
Reach upstream of crossing Deposition Medium Fines, organics Deposition None None <td< td=""><td></td><td>Unvegetated bars</td><td></td><td></td></td<>		Unvegetated bars				
crossingLateral migration/bank erosionNonePresence and nature of infrastructure (Map 1d)YesAccess track immediately u/sInfrastructure type (see Drawing 11.4.3.1 d, Catchment 102)YesLikely limits flow reaching crossingChannel realignmentYesUnder access trackMorphology and Process-Channel morphologyEngineeredAt crossingUnvegetated barsNoVertical incisionNoneDepositionLateral migration/bank erosionNoneDamaged/unstable drains or armouringNoneMorphology and Process-Channel morphologyEstimated discharge at 1:200 event (m³/s)0.3Unvegetated barsNoVertical incisionNoneDepositionMediumLateral migration/bank erosionNoneDemoged/unstable drains or armouringNoneMorphology and Process-Vertical incisionReach downstream of crossingChannel morphologyPredominant sediment sizeFineInfrastructure (Map 1d)NoneInfrastructure (Map 1d)NoneInfrastructure (Map 1d)None						
Presence and nature of infrastructure (Map 1d) Yes Access track immediately u/s Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yes Likely limits flow reaching crossing Channel realignment Yes Under access track Morphology and Process- At crossing Channel morphology Engineered Vertical incision No Intervention Deposition Medium Intervention Damaged/unstable drains or armouring None Intervention Morphology and Process- At crossing Channel morphology Engineered Vertical incision None Intervention Deposition Medium Intervention Lateral migration/bank erosion None Intervention Damaged/unstable drains or armouring None Intervention Morphology and Process- Reach downstream of crossing Deposition None Intervention Predominant sediment size Fine Intervention Intervention Predominant sediment size None Intervention Intervention Intervention None None Inter				Fines, organics		
Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Yes Likely limits flow reaching crossing Channel realignment Yes Under access track Morphology and Process- At crossing Channel morphology Engineered Vertical incision No Intrastructure type (see Drawing 11.4.3.1 d, Catchment 102) Morphology and Process- At crossing Unvegetated bars No Vertical incision Medium Intrastructure type (see Drawing 11.4.3.1 d, Catchment 102) None Morphology and Process- Reach downstream of crossing Channel morphology Engineered Looks like cut drain Predominant sediment size Fine Intrastructure type (see Drawing 11.4.3.1 d, Catchment 102) None	crossing	-				
Channel realignment Yes Under access track Morphology and Process- At crossing Channel morphology Predominant sediment size Fine Morphology and Process- At crossing Unvegetated bars 0.3 Vertical incision None Deposition Medium Lateral migration/bank erosion None Damaged/unstable drains or armouring None Vertical incision Fine Vertical incision None Damaged/unstable drains or armouring None Vertical incision None Vertical incision None Vertical incision None Damaged/unstable drains or armouring None Vertical incision None Vertical incision None Vertical incision None Predominant sediment size Fine Unvegetated bars None Vertical incision None Presence and nature of infrastructure (Map 10) None Presence and nature of infrastructure (Map 10) None Infrastructure type (see Drawing 11.4.3.1 d, Catchmen						
Morphology and Process- At crossing Channel morphology Predominant sediment size Engineered Morphology and Process- At crossing Unvegetated bars Vertical incision 0.3 Deposition Medium Lateral migration/bank erosion None Damaged/unstable drains or armouring None Morphology and Process- Reach downstream of crossing Channel morphology Predominant sediment size Fine Morphology and Process- Reach downstream of crossing Deposition Deposition Looks like cut drain Morphology and Process- Reach downstream of crossing Deposition Deposition None Infrastructure (Map 1d) None Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102)						
Morphology and Process- At crossing Predominant sediment size Fine Morphology and Process- At crossing Unvegetated bars 0.3 Vertical incision None Deposition Medium Lateral migration/bank erosion None Damaged/unstable drains or armouring None Vertical incision Engineered Looks like cut drain Fine Vertical incision None Presonition Medium Lateral migration/bank erosion None Presence and nature of infrastructure (Map 1d) None Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) None		channel realignment	Yes	Under access track		
Morphology and Process- At crossing Predominant sediment size Fine Morphology and Process- At crossing Unvegetated bars No Vertical incision None Deposition Medium Lateral migration/bank erosion None Damaged/unstable drains or armouring None Vertical incision Engineered Looks like cut drain Fine Vertical incision None Predominant sediment size Fine Unvegetated bars None Vertical incision None Reach downstream of crossing Deposition Infrastructure of infrastructure (Map 1d) None Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) None		Channel mornhology	Engineered			
Morphology and Process- At crossing Estimated discharge at 1:200 event (m³/s) 0.3 Morphology and Process- At crossing Unvegetated bars No Vertical incision None Deposition Medium Lateral migration/bank erosion None Damaged/unstable drains or armouring None Vertical incision Reach downstream of crossing Channel morphology Reach downstream of crossing Deposition None Interal migration/bank erosion None None Interal migration/bank erosion None None Morphology and Process- Reach downstream of crossing Channel morphologk erosion None Infrastructure of infrastructure (Map 1d) None None			-			
Morphology and Process- At crossing Unvegetated bars No At crossing Vertical incision None Deposition Medium Lateral migration/bank erosion None Damaged/unstable drains or armouring None Channel morphology Engineered Looks like cut drain Fine Unvegetated bars None Vertical incision None Vertical incision Fine Unvegetated bars None Vertical incision None Unvegetated bars None Vertical incision None Predominant sediment size Fine Unvegetated bars None Vertical incision None Poposition Medium Lateral migration/bank erosion Mone Presence and nature of infrastructure (Map 1d) None Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) None						
At crossing Vertical incision None Deposition Medium Incision Lateral migration/bank erosion None Incision Damaged/unstable drains or armouring None Incision Morphology and Process- Channel morphology Engineered Looks like cut drain Predominant sediment size Fine Incision None Unvegetated bars None Vertical incision None Vertical incision Mone Incision Morphology Peoposition Mone Incision None Presence and nature of infrastructure (Map 1d) None Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) None	Morphology and Process-			1		
Deposition Medium Lateral migration/bank erosion None Damaged/unstable drains or armouring None Channel morphology Engineered Predominant sediment size Fine Unvegetated bars None Vertical incision None Deposition Medium Lateral migration/bank erosion None Predominant sediment size None Unvegetated bars None Deposition Medium Fines Infrastructure (Map 1d) None Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102)		-				
Lateral migration/bank erosion None Damaged/unstable drains or armouring None Morphology and Process- Channel morphology Reach downstream of crossing Deposition Presence and nature of infrastructure (Map 1d) None Presence and nature of infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) None						
Damaged/unstable drains or armouring None Fine Looks like cut drain Predominant sediment size Fine Unvegetated bars None Vertical incision None Pepsition Medium Presence and nature of infrastructure (Map 1d) None Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) None				1		
Channel morphology Engineered Looks like cut drain Predominant sediment size Fine Unvegetated bars None Morphology and Process- Vertical incision None Intervention Reach downstream of crossing Deposition Medium Fines deposited in channel Lateral migration/bank erosion None Presence and nature of infrastructure (Map 1d) None Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) None Intervention						
Predominant sediment size Fine Morphology and Process- Vertical incision None Reach downstream of crossing Deposition Mone Presence and nature of infrastructure (Map 1d) None Mone Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) None Mone						
Unvegetated bars None Morphology and Process- Reach downstream of crossing Vertical incision None Lateral migration/bank erosion Medium Fines deposited in channel Presence and nature of infrastructure (Map 1d) None Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102)		Channel morphology	Engineered	Looks like cut drain		
Morphology and Process- Vertical incision None Reach downstream of crossing Deposition Medium Fines deposited in channel Lateral migration/bank erosion None Presence and nature of infrastructure (Map 1d) None Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) None Presence			Fine			
Reach downstream of crossing Deposition Medium Fines deposited in channel Lateral migration/bank erosion None Presence and nature of infrastructure (Map 1d) None Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) None Deposition Deposited in channel		-				
crossing Lateral migration/bank erosion None Presence and nature of infrastructure (Map 1d) None Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) None						
Presence and nature of infrastructure (Map 1d) None Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) None				Fines deposited in channel		
Infrastructure type (see Drawing 11.4.3.1 d, Catchment 102) None	crossing			l		
Channel realignment Yes Cut drain, likely for farmland drainage d/s						
Summary behaviour Very limited activity. Some fine deposition u/s of crossing, but catchment area also very limited. Risk of avulsion into 104.	Summary behaviour					

Annex 11.4.3 - Hydromorphological Catchment Assessment - 102



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right. All rights reserved. Transport Scotland Licence number 100046668, 2017. Contains British Geological Survey materials © NERC 2017.

Legend General • Crossing location Solid Geology • Gaick Psammite Formation - Psamm Drift Geology • Peat • Glaciofluvial Ice Contact Deposits • Gaick Plateau Moraine Formation • Hummocky Glacial Deposits • Ardverikie Till Formation - Diamictor • Glaciofluvial Sheet Deposits • Alluvium • River Terrace Deposits • Alluvial Fan Deposits • Head • Talus Cone Morphological Pressures • Railway Bridge • Track/Footbridge • Culvert • Step in Bed • Catchpit • Abstraction Location • Drainage Ditch		
Crossing location Solid Geology Gaick Psammite Formation - Psamm Drift Geology Peat Glaciofluvial Ice Contact Deposits Gaick Plateau Moraine Formation Hummocky Glacial Deposits Ardverikie Till Formation - Diamictor Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Morphological Pressures Railway Bridge Track/Footbridge Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch Provide Glasgow G31 3AU	Leg	gend
Solid Geology Gaick Psammite Formation - Psami Drift Geology Peat Glaciofluvial Ice Contact Deposits Gaick Plateau Moraine Formation Hummocky Glacial Deposits Ardverikie Till Formation - Diamictor Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Morphological Pressures Railway Bridge Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch	Gen	neral
Solid Geology Gaick Psammite Formation - Psami Drift Geology Peat Glaciofluvial Ice Contact Deposits Gaick Plateau Moraine Formation Hummocky Glacial Deposits Ardverikie Till Formation - Diamictor Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Morphological Pressures Railway Bridge Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch	•	Crossing location
Gaick Psammite Formation - Psame Drift Geology Peat Glaciofluvial Ice Contact Deposits Gaick Plateau Moraine Formation Hummocky Glacial Deposits Ardverikie Till Formation - Diamictor Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Head Talus Cone Morphological Pressures Railway Bridge Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch		-
Prift Geology Peat Glaciofluvial Ice Contact Deposits Gaick Plateau Moraine Formation Hummocky Glacial Deposits Ardverikie Till Formation - Diamictor Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Morphological Pressures Railway Bridge Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch		
Peat Glaciofluvial Ice Contact Deposits Gaick Plateau Moraine Formation Hummocky Glacial Deposits Ardverikie Till Formation - Diamictor Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Morphological Pressures Railway Bridge Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch		
Revenue of the second state of the		•••
Gaick Plateau Moraine Formation Hummocky Glacial Deposits Ardverikie Till Formation - Diamictor Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Morphological Pressures Railway Bridge Track/Footbridge Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch		
Hummocky Glacial Deposits Ardverikie Till Formation - Diamictor Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Morphological Pressures Railway Bridge Track/Footbridge Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch		
Ardverikie Till Formation - Diamictor Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Morphological Pressures Railway Bridge Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch		
Review Surf Date Description Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Morphological Pressures Railway Bridge Track/Footbridge Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch		
Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Morphological Pressures Railway Bridge Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch		
River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Morphological Pressures Railway Bridge Railway Bridge Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch		•
Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Morphological Pressures Railway Bridge Track/Footbridge Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch		
Head Talus - Rock Fragments Talus Cone Morphological Pressures Railway Bridge Track/Footbridge Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch		
Talus - Rock Fragments Talus Cone Morphological Pressures Railway Bridge Track/Footbridge Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch		•
Talus Cone Morphological Pressures Railway Bridge Track/Footbridge Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch		
Morphological Pressures Railway Bridge Track/Footbridge Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch		
Railway Bridge Track/Footbridge Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch		
REV_SUIT_DATE DESCRIPTION BY AF CHZMHILL Fairfurs JV C/C. City Park 368 Alexandra Parade Glasgow G31 3AU		
Culvert Step in Bed Catchpit Abstraction Location Drainage Ditch		Railway Bridge
Step in Bed Catchpit Abstraction Location Drainage Ditch		Track/Footbridge
Catchpit Abstraction Location Drainage Ditch Drainage Ditch BY AF COMMENTATION BY AF COMMENTATION	\bigcirc	Culvert
Abstraction Location Drainage Ditch		
Drainage Ditch Drainage Ditch BY AF DESCRIPTION DESCRIPTION BY AF DESCRIPTION BY AF	0	Catchpit
REV SUIT DATE DESCRIPTION BY AF CH2MHILL Faithurst JV CH2MHILL Faithurst JV <td></td> <td>Abstraction Location</td>		Abstraction Location
CH2MHILL Fairhurst JV C/C City Park 368 Alexandra Parade Glasgow G31 3AU	—	Drainage Ditch
CH2MHILL Fairhurst JV C/C City Park 368 Alexandra Parade Glasgow G31 3AU		
	REV	CH2MHILL Fairhurst JV CH2MHILL Fairhurst JV C/C: City Park 368 Alexandra Parade Glasgow G31 3AU

DESIGN:

SHEET: 1 of 1

DATE: 20/07/2017

PROJ: 495298

DRAWN:

DWG: A9P08-CFJ-EWE-X_ZZZZZ_ZZ-DR-EN-0001

REVISION: C01

CHK:

APP:

SUITABILITY:

A3



cument Path:\\BHXEPP01\Pro\\Transportation\TNXUGM - TQ Business Development\Small Projects\A.9\GiS\Maps\Detailed assessment maps\Asse

Catchment No.	103 1 and 2	1			
Catchment Name	-				
		4			
	Nature of water course		Natural		
Channel Nature	Size of water course		Minor		
	Size of water course		WIIIO		
Quantitative Spatial	Catchment Area (km ²)		No Data		
Elements	Average slope in catchment (°)		No Data		
	% Catchment over 750m (for snow melt risk)		0		
	Water, flows and levels		Good		
WFD classification	Physical condition		Good		
	Overall ecological status		Moderate		
·					
	Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 103_1 and	Gaick Psammite formation-Psammite	resistant to weathering, impermeable		
Geology					
•,	Is an alluvial fan present at or near the crossing?	Yes	Risk of avulsion into 104		
Environmental	Ramsar	No			
designations (see	SAC	No			
Drawing 11.4.3.1 c,	SPA	No			
Catchment 103_1 and 2)	SSSI	No			
Changes in slope and channel confinement See Drawing 11.4.3			3.2, Catchment 103_1 and 2		
	Is peat present in the catchment	No			
	Is there a bog burst risk	No			
	Current valley side or terrace erosion	No			
	Potential valley side or terrace erosion	No			
	Hill slope failures (including peat slides and debris flows and slides)	No			
	Hill slope failures coupled to channel	No			
	Vertical incision present in catchment	No			
Sediment source and	Bank erosion/lateral migration	No			
supply - Catchment Scale	Unvegetated bars	No			
	Wooded/forested areas in catchment	Yes	D/s of road		
	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 103_1 and 2)	No			
			e when main channel of the Allt Cuaich (Crossing		
	Comment on sediment source potential in catchment		I supply of coarse sediment in the Allt Cuaich, but		
		this is unlikely to reach the ci	rossing for the reasons indicated below.		
		Sediment supply is likely to be limited	to that fines which drop out of suspension when		
	Comment on sediment supply potential to crossing	channel is in operation. Channel crosses	the flood plain of the Allt Cuaich and the gradient		
		is relatively low and coarse bed	load is unlikely to leave the main channel.		
		1			

Channel morphology Engineered Straight, cut drain Predominant sediment size Fine Unvegetated bars No Vertical incision None Deposition None Lateral migration/bank erosion None Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 103_1 and 2) Yes No Fences Norphology and Process-Reach upstream of On 1902 map, there is a secondary, slightly sinuous channel shown diverging from the main crossing channel c.30m u/s of the current divergence. This channel crosses the current road alignment Channel realignment Yes roughly where the current channel does. Mapping indicates that this channel was probably much larger and less ephemeral than present cut drain. Pipe culvert, possible two entrances and one Channel morphology Engineered exit? Predominant sediment size Fine Estimated discharge at 1:200 event (m³/s) Unvegetated bars ology and Pro No At crossing None None Vertical incision Lateral migration/bank erosion None Damaged/unstable drains or armouring None Channel morphology Predominant sediment size Engineered Fine Straight, cut drain Unvegetated bars No Vertical incision None Deposition None Lateral migration/bank erosion None Aorphology and Process Presence and nature of infrastructure (Map 1d) Reach downstream of No (Flow re-joins main 104 channel u/s of railway) crossing Infrastructure type (see Drawing 11.4.3.1 d, Catchment 103_1 and 2) No D/s of the road, the 1902 map shows the slightly sinuous secondary channel continuing, with the Channel realignment Yes Cuaich/Quoich farm sitting on top of a low terrace on it's left bank.

This channel is now a very minor artificial drain and flows only occur when the Allt Cuaich is out of bank. U/s of the road, the former large secondary channel shown in the 1902 map is no longer active. This drain may have been cut, and the channel shown in the 1902 map abandoned, well before road construction, as later map (1920s-1940s, 1:63k) indicates a much straighter, smaller channel in this location and it may be this rather than the original sinuous secondary channe that was incorporated into the original road design. D/s of the road crossing the channel is straight c. 50m away from the secondary channel shown on the 1902 map. Characteristics of the present channel d/s of the road are similar to those of the present channel u/s of the road. Former channel banks and bars from before road/rail construction are clearly visible in the floodplain morphology.

Summary behaviour

This crossing has been highlighted as one for potential improvement. Major changes would probably be required to return the channel to it's form shown on the 1902 map, including removal of the embankment, or at least incorporating a second major crossing in the embankment for a secondary channel of the Allt Cuaich to flow. Implications of this would need to consider the flood risk implications for the hamlet of Cuaich/Quoich. There is a risk of avulsion of flows into 104 and visa versa.

		T	
Catchment No. Catchment Name	104 Allt Coire Cuaich		
Catchment Name	Allt Coire Cuaich	l	
	Nature of water course		Natural
Channel Nature	Size of water course		Major
		1	
Quantitative Spatial	Catchment Area (km²)		36.4
Elements	Average slope in catchment (°) % Catchment over 750m (for snow melt risk)		12.3 21.5
	28 Catchinent over 750m (or show meit risk)		21.5
	Water, flows and levels		Bad
WFD classification	Physical condition		Good
	Overall ecological status		Bad
	Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 104)	Gaick Psammite formation-Psammite	resistant to weathering, impermeable
Geology	Is an alluvial fan present at or near the crossing?	Yes	Risk of avulsion at crossing to the east
			-
Environmental	Ramsar	No	
designations (see Drawing 11.4.3.1 c,	SAC SPA	Downstream of crossing is part of Spey No	
Catchment 104)	SSSI	No	
	Changes in slope and channel confinement Is peat present in the catchment	See Drawing Yes	11.4.3.2, Catchment 104
	Is there a bog burst risk	No	
	Current valley side or terrace erosion	Several locations	Med sediment input
	Potential valley side or terrace erosion Hill slope failures (including peat slides and debris flows and slides)	Yes Extensive in steep upper catchment	Med sediment input Very high availability of sediment
	Hill slope failures coupled to channel	Extensive in steep upper catchment	Very high availability of sediment
	Vertical incision present in catchment	Yes, in tributaries rather than in main	Main channel stream appears relatively stable
	Bank erosion/lateral migration	channel Extensive evidence of lateral channel	vertically High availability of sediment
	Unvegetated bars	Extensive and numerous undeleted bars	
			, , ,
Sediment source and	Wooded/forested areas in catchment	None	Low availability of floating debris
supply - Catchment Scale	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104)	Aqueduct	Do not seem to be stopping downstream sediment transfer, will be altering downstream
	initiastracture type (see brawing 11.4.5.1 d, cateriment 164)	Dams	discharge and sediment transport
		Very high sediment source potential	from debris flows, shallow slides and valley side
	Comment on sediment source potential in catchment	, , , , , , , , , , , , , , , , , , , ,	erosion
		Extensive areas of exposed a	gravel bars and lengths of bank erosion
			hort distance from hill side to main channel
			crossing will increase deposition here, reducing ng, but sediment will remain here for future
	Comment on sediment supply potential to crossing	transport	-0/
			wards crossing, funnelling sediment downstream
		Crossing is then on a flatter location (are	a or deposition)
	Channel morphology	Wandering	Actively laterally mobile channel
	Predominant sediment size	Cobbles	
	Unvegetated bars	Extensive	
Morphology and Process-		Medium	Lots of available sediment
Reach upstream of crossing	Vertical incision Deposition	Medium High	Lots of available sediment Due to volume of available sediment
	Deposition Lateral migration/bank erosion	High High	Due to volume of available sediment
crossing	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d)	High	Due to volume of available sediment N/A
crossing	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104)	High High None N/A	Due to volume of available sediment
crossing	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d)	High High None	Due to volume of available sediment N/A N/A
crossing	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104)	High High None N/A	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary
crossing	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment	High High None N/A Yes Engineered Cobbles	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary
crossing	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m ³ /s)	High High None N/A Yes Engineered Cobbles 103.1	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary
Morphology and Process-	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m³/s) Unvegetated bars	High High None N/A Yes Engineered Cobbles 103.1 Yes	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary
	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m ³ /s)	High High None N/A Yes Engineered Cobbles 103.1	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary channel cut off
Morphology and Process-	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m ³ /s) Unvegetated bars Vertical incision	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of
Morphology and Process-	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m³/s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary channel cut off
Morphology and Process-	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m ³ /s) Unvegetated bars Vertical incision Deposition	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of
Morphology and Process-	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m³/s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High No Wandering	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of
Morphology and Process-	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m ³ /s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High High No Wandering Cobbles	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of
Morphology and Process-	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m³/s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High No Wandering	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of
Morphology and Process- At crossing Morphology and Process-	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m³/s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High No Wandering Cobbles Some Medium High	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of the right bank/terrace
Morphology and Process- At crossing	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m³/s) Unvegetated bars Vertical inclision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical inclision Vertical inclisio	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High No Wandering Cobbles Some Medium High High	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of
Morphology and Process- At crossing Morphology and Process- Reach downstream of	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m ³ /s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Deposition Lateral migration/bank erosion Deposition Lateral migration/bank erosion Deposition Lateral migration/bank erosion	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High No Wandering Cobbles Some Medium High High High High High High High	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of the right bank/terrace
Morphology and Process- At crossing Morphology and Process- Reach downstream of	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m ³ /s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Deposition Lateral migration/bank erosion Deposition Lateral migration/bank erosion Deposition Lateral migration/bank erosion	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High No Wandering Cobbles Some Medium High High	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of the right bank/terrace Channel laterally mobile between crossings Increased deposition upstream Fixing channel position- Possible scour to base as
Morphology and Process- At crossing Morphology and Process- Reach downstream of	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m³/s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Deposition Lateral migration/bank erosion Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d)	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High No Wandering Cobbles Some Wandering Cobbles Some Medium High High High Railway bridge Impounding high flows and fixing	Due to volume of available sediment N/A N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of the right bank/terrace Channel laterally mobile between crossings Increased deposition upstream
Morphology and Process- At crossing Morphology and Process- Reach downstream of	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m³/s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant size Lateral migration/bank erosion Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104)	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High No Wandering Cobbles Some Medium High High Railway bridge Impounding high flows and fixing channel position	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of the right bank/terrace Channel laterally mobile between crossings Increased deposition upstream Fixing channel position- Possible scour to base as
Morphology and Process- At crossing Morphology and Process- Reach downstream of	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m³/s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant size Lateral migration/bank erosion Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104)	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High No Wandering Cobbles Some Medium High High Railway bridge Impounding high flows and fixing channel position	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of the right bank/terrace Channel laterally mobile between crossings Increased deposition upstream Fixing channel position- Possible scour to base as
Morphology and Process- At crossing Morphology and Process- Reach downstream of	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m ³ /s) Unvegetated bars Vertical inclision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical inclision Deposition Lateral migration/bank erosion Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High No Wandering Cobbles Some Medium High High High High High High Kailway bridge Impounding high flows and fixing channel position Yes	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of the right bank/terrace Channel laterally mobile between crossings Increased deposition upstream Fixing channel position - Possible scour to base as channel adjusts
Morphology and Process- At crossing Morphology and Process- Reach downstream of	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m³/s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Extensive sediment supply from the upper catchment transported to a	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High No Wandering Cobbles Some Wandering Cobbles Some Medium High High Railway bridge Impounding high flows and fixing channel position Yes	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of the right bank/terrace Channel laterally mobile between crossings Increased deposition upstream Fixing channel position- Possible scour to base as channel adjusts adering channel with extensive mobile bars. Flow
Morphology and Process- At crossing Morphology and Process- Reach downstream of	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m ³ /s) Unvegetated bars Vertical inclision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical inclision Deposition Lateral migration/bank erosion Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High No Wandering Cobbles Some Wandering Cobbles Some Medium High High Railway bridge Impounding high flows and fixing channel position Yes	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of the right bank/terrace Channel laterally mobile between crossings Increased deposition upstream Fixing channel position- Possible scour to base as channel adjusts adering channel with extensive mobile bars. Flow
Morphology and Process- At crossing Morphology and Process- Reach downstream of	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m³/s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Lateral migration/bank rosion Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Extensive sediment supply from the upper catchment transported to a and downstream sediment transport are reduced by the Hydropower Allt Cuaich from this structure (Enviro Centre, 2008).	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High No Wandering Cobbles Some Medium High High High Railway bridge Impounding high flows and fixing channel position Yes	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of the right bank/terrace Channel laterally mobile between crossings Increased deposition upstream Fixing channel position- Possible scour to base as channel adjusts Indering channel with extensive mobile bars. Flow rement to release any compensation flow to the
Morphology and Process- At crossing Morphology and Process- Reach downstream of crossing	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m³/s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Lateral migration/bank erosion Lateral migration/bank erosion Extensive sediment size Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Lateral migration/bank erosion Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Channel realignment Extensive sediment supply from the upper catchment transported to a and downstream sediment transport are reduced by the Hydropower of Allt Cuaich from this structure (Enviro Centre, 2008). Channel arerally mobile within the boundaries of the terraces, bu floodplain during a flood event.	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High No Wandering Cobbles Some Medium High High Rilway bridge Impounding high flows and fixing channel position Yes	Due to volume of available sediment N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of the right bank/terrace Channel laterally mobile between crossings Increased deposition upstream Fixing channel position- Possible scour to base as channel adjusts Indering channel with extensive mobile bars. Flow rement to release any compensation flow to the
Morphology and Process- At crossing Morphology and Process- Reach downstream of crossing	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m³/s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Lateral migration/bank rosion Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Extensive sediment supply from the upper catchment transported to a and downstream sediment transport are reduced by the Hydropower Allt Cuaich from this structure (Enviro Centre, 2008).	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High No Wandering Cobbles Some Medium High High Rilway bridge Impounding high flows and fixing channel position Yes	Due to volume of available sediment N/A N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of the right bank/terrace Channel laterally mobile between crossings Increased deposition upstream Fixing channel position- Possible scour to base as channel adjusts Indering channel with extensive mobile bars. Flow rement to release any compensation flow to the
Morphology and Process- At crossing Morphology and Process- Reach downstream of crossing	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m³/s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Lateral migration/bank erosion Lateral migration/bank erosion Extensive sediment size Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Lateral migration/bank erosion Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Channel realignment Extensive sediment supply from the upper catchment transported to a and downstream sediment transport are reduced by the Hydropower of Allt Cuaich from this structure (Enviro Centre, 2008). Channel arerally mobile within the boundaries of the terraces, bu floodplain during a flood event.	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High No Wandering Cobbles Some Medium High High Rilway bridge Impounding high flows and fixing channel position Yes	Due to volume of available sediment N/A N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of the right bank/terrace Channel laterally mobile between crossings Increased deposition upstream Fixing channel position- Possible scour to base as channel adjusts Indering channel with extensive mobile bars. Flow rement to release any compensation flow to the
Morphology and Process- At crossing Morphology and Process- Reach downstream of crossing	Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 104) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m³/s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Lateral migration/bank erosion Lateral migration/bank erosion Extensive sediment size Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Lateral migration/bank erosion Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Channel realignment Extensive sediment supply from the upper catchment transported to a and downstream sediment transport are reduced by the Hydropower of Allt Cuaich from this structure (Enviro Centre, 2008). Channel arerally mobile within the boundaries of the terraces, bu floodplain during a flood event.	High High None N/A Yes Engineered Cobbles 103.1 Yes Medium High High No Wandering Cobbles Some Medium High High Rilway bridge Impounding high flows and fixing channel position Yes	Due to volume of available sediment N/A N/A N/A Moved towards right bank, and secondary channel cut off Damage to gabions installed to prevent erosion of the right bank/terrace Channel laterally mobile between crossings Increased deposition upstream Fixing channel position- Possible scour to base as channel adjusts Indering channel with extensive mobile bars. Flow rement to release any compensation flow to the



Photograph 11.4.3.78-Downstream



Photograph 11.4.3.80

Erosion of valley side adding sediment to the channel

Bar

Replaced gabion bank defence to protect bridge

Photograph 11.4.3.80 - Sheep crossing





Photograph 11.4.3.83-Upstream

Floodplain



Photograph 11.4.3.84- Upstream



Photograph 11.4.3.85

Bank erosion

Channel 103

Bars formed due to local sediment supply



Photograph 11.4.3.86



Photograph 11.4.3.87 - Paelochannel visible on the floodplain

Road embankment across floodplain

Valley side



Photograph 11.4.3.88 - Downstream



132

²⁷ 128

125, 126



11.4.3.1 b- Drift Geology-Catchment 103 and 104

191



A



Annex 11.4.3 - Hydromorphological Catchment Assessment - 106

Catchment No.	106			
Catchment Name	-			
		_		
	Nature of water course		Drain	
Channel Nature	Size of water course		Minor	
Quantitative Spatial	Catchment Area (km ²)		0.1	
Elements	Average slope in catchment (°)		4.3	
Liements	% Catchment over 750m (for snow melt risk)		0	
	Water, flows and levels		Good	
WFD classification	Physical condition	Good		
	Overall ecological status		Moderate	
	Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 106)	Gaick Psammite formation-Psammite	resistant to weathering, impermeable	
Geology	Is an alluvial fan present at or near the crossing?	No		

Environmental	Ramsar	No	
designations (see	SAC	No	
Drawing 11.4.3.1 c,	SPA	No	
Catchment 106)	SSSI	No	
	Changes in slope and channel confinement	See Drawing 1	1.4.3.2, Catchment 106
	Is peat present in the catchment	No	
	Is there a bog burst risk	No	
	Current valley side or terrace erosion	No	
	Potential valley side or terrace erosion	No	
	Hill slope failures (including peat slides and debris flows and slides)	No	
Sediment source and	Hill slope failures coupled to channel	No	
supply - Catchment Scale	Vertical incision present in catchment	No	
	Bank erosion/lateral migration	No	
	Unvegetated bars	No	
	Wooded/forested areas in catchment	No	
	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 106)	No	
	Comment on sediment source potential in catchment	Limited - no ex	posed sediment sources
	Comment on sediment supply potential to crossing	Likely to be supply	limited, and therefore little.

	Channel morphology	Engineered	
	Predominant sediment size	Fines	
	Unvegetated bars	No	
Morphology and Process-	Vertical incision	None	
Reach upstream of	Deposition	Low	
crossing	Lateral migration/bank erosion	Low	
	Presence and nature of infrastructure (Map 1d)	No	
	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 106)	No	
	Channel realignment	Yes	Drain to capture hillslope drainage
	Channel morphology	Engineered	

	Predominant sediment size	Fine	
	Estimated discharge at 1:200 event (m ³ /s)	0.4	
	Unvegetated bars	No	
Morphology and Process At crossing	Vertical incision	None	
	Deposition	Low	
	Lateral migration/bank erosion	None	
	Damaged/unstable drains or armouring	res	Very limited damage (displaced armouring stones) in otherwise intact cascade

	Channel morphology	Engineered	
	Predominant sediment size	Fine	
	Unvegetated bars	No	
	Vertical incision	Medium	Some scour at outflow from road culvert
Morphology and Process- Reach downstream of	Deposition	Low	Fines
	Lateral migration/bank erosion	Low	Immediately d/s of outflow, due to scour - see
crossing	Lateral Higration/Dalik erosion	EOW	above
	Presence and nature of infrastructure (Map 1d)	Yes	Railway (on embankment)
	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 106)	Yes	Impoundment of 104 at high flows
	Channel realignment	Yes	Cut drain, straight

Summary behaviour U/s of the road, a cut drain collects natural hillslope drainage from small channels. This descends to the road culvert on a principally intact cascade. D/s of the road culvert, there is a small amount of scour, before the drain crosses the flood plain/alluvial fan, close to its edge. At the railway embankment, flow goes through a railway crossing which appears oversized for channel 106. A large scour pool is also present on the d/s side of the railway crossing, which also appears very large for the limited flow that is likely to occur through crossing 106. Closer inspection of the LiDAR and aerial photographs indicate that this scour pool has likely been created when impounded high flows from channel 104 have drained through this railway crossing. These are more likely to have the energy to create the scour pool than the flow from channel 106 alone.



Photograph 11.4.3.89



Photograph 11.4.3.90 -Downstream crossing exit



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right. All rights reserved. Transport Scotland Licence number 100046668, 2017. Contains British Geological Survey materials © NERC 2017.



•	Major crossing
•	Minor crossing
•	Other crossing
	Break in slope
	Terrace
! 7	Crossing catchm

DESIGN:	DRAWN:	CHK:	APP:	
EL	AB	EL	EL	
DATE: 11/07/2017				
PROJ: 495298				
DWG: A9P08-CFJ-EWE-X_ZZZZ_ZZ-DR-EN-0002				
SHEET:	REVI	SION:	SUITABILITY:	
1 of 1	C01		A3	

107	1		
-			
	-		
Nature of water course		Natural	
Size of water course		Major	
$Cotchmont Area (km^2)$		0.38	
		4.5	
		0	
to catchine to very som (for show meternsky		ő	
Water flows and levels		Good	
		Good	
		Moderate	
	L		
Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 107)	Gaick Psammite formation-Psammite	resistant to weathering, impermeable	
	NL.	<u> </u>	
is an alluvial fan present at or near the crossing?	NO		
Ramsar	No		
5551	NO		
Channel and the second second	See Drawing 1	1 4 2 2 Catchmont 107	
		1.4.3.2, Catchment 107	
		Low sediment supply potential	
		Low sediment supply potential Low sediment supply potential	
		Low sediment supply potential	
· · · · · · · · · · · · · · · · · · ·		Low sediment supply potential	
		zow ocument supply potential	
		Low sediment supply potential	
		Low sediment supply potential	
•		Low sediment supply potential	
	Small relatively flat catchment, with little sediment supply to the channel from hillslopes		
Comment on sediment source potential in catchment	Incision noted upstream of crossing will be adding sediment to the channel and has		
potential to continue cutting back upstream releasing a large volume of sediment			
Comment on sediment supply potential to crossing	Low slopes reduce	sediment transport potential	
Channel morphology	Plane bed		
		Sediment input to channel	
		Sediment input to channel	
channel realignment	103		
Channel morphology	Cascade		
	None		
-			
	Yes	Drains undercut as channel incises	
· · · · ·	•		
Channel morphology	Plane bed		
Predominant sediment size	Gravel		
Unvegetated bars	None		
Vertical incision	Medium		
Deposition	Low		
Lateral migration/bank erosion	Low		
Presence and nature of infrastructure (Map 1d)	None		
Infrastructure type (see Drawing 11.4.3.1 d, Catchment 107)	N/A		
Channel realignment	Yes		
Low sediment supply from hillslope failure, but channel incision at and upstream of the crossing caused by a change in bed level and slope at the crossing (due to road being in cutting and channel being culverted under roadbed) is supplying some sediment to the crossing and has the potential to provide further sediment by under cutting banks and causing instability.			
	Size of water course Catchment Area (km ²) Average slope in catchment (') % Catchment over 750m (for snow melt risk) Water, flows and levels Physical condition Overall ecological status Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 107) Is an alluvial fan present at or near the crossing? Ramsar SAC SAC SAA SAA SSSI Changes in slope and channel confinement Is peat present in the catchment Is brear a bog burst risk Current valley side or terrace erosion Ptential valley side or terrace erosion Hill slope failures (including peet slides and debris flows and slides) Hill slope failures (including peet slides and debris flows and slides) Hill slope failures (including peet slides and debris flows and slides) Hill slope failures (including peet slides and debris flows and slides) Hill slope failures (including peet slides and debris flows and slides) Hill slope failures (including peet slides and debris flows and slides) Hill slope failures (including peet slides and tebris flows and slides) Hill slope failures (including peet slides and tebris flows and slides) Hill slope failures (including peet slides and tebris flows and slides) Hill slope failures (including peet slides and tebris flows and slides) Hill slope failures (including peet slides and tebris flows and slides) Hill slope failures (including peet slides and tebris flows and slides) Hill slope failures (including the component on sediment supply potential to crossing Channel morphology Predominant sediment size Unvegetated bars Vertical inclision Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 107) Channel realignment Low sediment sed intent size Unvegetated bars Vertical inclision Deposition Lateral migration/bank erosion Presence and nature of infrastr	Site of water course	



Channel confined by valley sides

floodplain

Crossing exit



Photograph 11.4.3.92-Dowstream

Cascade upstream of road

> Crossing exit-Steep channel gradient

Some deposition in culvert



Photograph 11.4.3.94-Crossing exit



Photograph 11.4.3.93-Crossing



Channel cut into bedrock

Channel incision upstream

Upstream cascade in bedrock



Photograph 11.4.3.96 - Upstream



Photograph 11.4.3.97 – Upstream of crossing, looking upstream

Channel incision upstream as bed level adjusts to crossing realignment



Photograph 11.4.3.98-Downstream to cascade



Incision of drain entering crossing Bank instability and erosion caused by channel incision



Photograph 11.4.3.100- Upstream of cascade

Photograph 11.4.3.99-Upstream of cascade



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right. All rights reserved. Transport Scotland Licence number 100046668, 2016. Contains British Geological Survey materials @ NERC 2017.


Catchment No.	109		
Catchment Name	-]	
	Niekowa of comban and come		Drain
Channel Nature	Nature of water course		Minor
	Size of water course		Minor
	Catchment Area (km ²)		No Data
Quantitative Spatial Elements	Average slope in catchment (°)		8.3
Elements	% Catchment over 750m (for snow melt risk)		0
WFD classification	Water, flows and levels Physical condition		Good Good
WID classification	Overall ecological status		Moderate
	Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 109)	Gaick Psammite formation-Psammite	resistant to weathering, impermeable
Geology	Is an alluvial fan present at or near the crossing?	No	
		I	
Environmental	Ramsar	No No	
designations (see Drawing 11.4.3.1 c,	SACSPA	No	
Catchment 109)	SSSI	No	
		Coo Description	14 4 2 2 Cotober and 400
	Changes in slope and channel confinement	See Drawing	11.4.3.2, Catchment 109 Possible peat upslope in delineated area, but
	Is peat present in the catchment	No	actually drains to catchment 111. Peaty lower slopes, but likely shallow.
	Is there a bog burst risk	No	
	Current valley side or terrace erosion Potential valley side or terrace erosion	No	
Sediment source and	Hill slope failures (including peat slides and debris flows and slides)	No	
	Hill slope failures coupled to channel	No	
	Vertical incision present in catchment	No	
	Bank erosion/lateral migration Unvegetated bars	No	
	Wooded/forested areas in catchment	No	
	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 109)	No	
	Comment on sediment source potential in catchment		and organic sediments
	Comment on sediment supply potential to crossing	Likely to reach catchment	through drain network via cascade.
Morphology and Process-	Channel morphology Predominant sediment size	Engineered Fine	
	Unvegetated bars	No	
	Vertical incision	Medium	Some incision into peaty soils on lower slopes and erosion of cascades
Reach upstream of	Deposition	Medium	Ponding of water and fines dropping out u/s of
crossing	Lateral migration/bank erosion	Low	cascade
	Presence and nature of infrastructure (Map 1d)	Yes	Cascade cut into bedrock in cutting
	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 109)	Yes	Steepens channel on approach to crossing
	Channel realignment	Yes	All realigned as is a cut drain
	Channel morphology	Engineered	
	Predominant sediment size	Fine	
	Estimated discharge at 1:200 event (m ³ /s)	0.4	
Morphology and Process-	Unvegetated bars Vertical incision	No Medium	
At crossing	Deposition	Medium	
	Lateral migration/bank erosion	Low	
	Damaged/unstable drains or armouring	Yes	Cobble-size angular blocks being eroded from
			cascade
	Channel morphology	Engineered	
	Predominant sediment size	Fine	
	Unvegetated bars Vertical incision	No Low	
Morphology and Process-	Deposition	Medium	
Reach downstream of	Lateral migration/bank erosion	Low	
crossing	Presence and nature of infrastructure (Map 1d)	Yes	Railway Channel realigned to join up with other drainage
	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 109)	None	channels to pass through railway embankment at just one point.
	Channel realignment	Yes	To take water through railway underpass.
Summary behaviour	This appears to be a drain cut to take hillslope overland flow and ver ponding and deposition of fines (particularly peaty, organic material). achieve the required drop in elevation. Some angular blocks have bec	The road is in a bedrock cutting at this po	int and a cascade has been cut into the bedrock to
	as flows are not great enough. Downstream of the culvert, the channe of railway construction,	I passes through a railway crossing, and a to allow drainage to pass through this cha	



Reproduced by permission of Ordnance Survey on behalf of HMSO. 🐵 Crown copyright and database right. All rights reserved. Transport Scotland Licence number 100046668, 2017. Contains British Geological Survey materials 🐵 NERC 2017.

REVISION:

C01

1 of 1



Catchment No. 111 Catchment Name Nature of water course Natura Channel Nature Size of water course Minor 02 Catchment Area (km²) Quantitative Spatial 64 Average slope in catchment (°) Elements % Catchment over 750m (for snow melt risk) 0 Water, flows and levels Good WFD classification Physical condition Good Overall ecological status Moderate Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 111) Gaick Psammite formation-Psammite resistant to weathering, impermeable Geology Is an alluvial fan present at or near the crossing? No Ramsar No Environmental River Spey - Atlantic salmon, freshwater pearl designations (see SAC Yes mussel, otter, sea lamprey Drawing 11.4.3.1 c, SPA No Catchment 111) SSI No See Drawing 11.4.3.2, Catchment 111 Changes in slope and channel confinement Possible limited peaty deposits on flatter slopes in Is peat present in the catchment Yes nid catchment Is there a bog burst risk No Current valley side or terrace erosion No No Potential valley side or terrace erosion Hill slope failures (including peat slides and debris flows and slides) No Sediment source and No Hill slope failures coupled to channel supply - Catchment Scale Evidence of historic incision to form terrace, but /ertical incision present in catchment Yes no current Bank erosion/lateral migration No No Unvegetated bars Wooded/forested areas in catchment No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 111) No Comment on sediment source potential in catchment Limited - no major sources of sediment evident. Channel appears stable Comment on sediment supply potential to crossing Supply-limited and just fines. Channel morphology Plane bed Predominant sediment size Gravel Jnvegetated bars No Morphology and Process Vertical incision Low Reach upstream of Deposition Low crossing ateral migration/bank erosion Low Presence and nature of infrastructure (Map 1d) No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 111) No Channel realignment No Channel morphology Engineered Small catch pit and culvert u/s. Fines - grave Predominant sediment size 0.5 Estimated discharge at 1:200 event (m³/s) Morphology and Proces Jnvegetated bars No At crossing None /ertical incision Deposition Medium Lateral migration/bank erosion None Damaged/unstable drains or armouring No Armouring in good condition Plane bed Channel morphology Fines and organics Predominant sediment size Jnvegetated bars No /ertical incision Morphology and Process None Reach downstream of Deposition Medium crossing Lateral migration/bank erosion None Presence and nature of infrastructure (Map 1d) Yes Infrastructure type (see Drawing 11.4.3.1 d, Catchment 111) Railway Channel realignment Possibly realigned to pass under railway. Yes Small catchment with historic incision which has created a terrace. Stabilisation now occurred and u/s of crossing the channel appears to wander with a small flood plain. Some gravel is deposited at the culvert entrance where gradient reduces. D/s of the culvert, the outflow appears to be partially blocked with fines and Summary behaviour vegetation is growing in this deposited sediment. Flow onwards across the Truim floodplain is sluggish, eventually passing through the railway embankment (railway crosses channel on a bridge)



Reproduced by permission of Ordnance Survey on behalf of HMSO. 🐵 Crown copyright and database right. All rights reserved. Transport Scotland Licence number 100046668, 2017. Contains British Geological Survey materials 🐵 NERC 2017.



Catchment No. 112 Catchment Name Nature of water course Natural Channel Nature Major Size of water course 0.2 Catchment Area (km²) Quantitative Spatial Average slope in catchment (°) 6.6 Elements % Catchment over 750m (for snow melt risk) 0 Water, flows and levels Good WFD classification Physical condition Good Overall ecological status Moderate Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 112) Gaick Psammite formation-Psammite resistant to weathering, impermeable Geology Is an alluvial fan present at or near the crossing? No Enviro menta No Ramsar designations (see SAC No SPA No Drawing 11.4.3.1 c, Catchment 112) SSSI No See Drawing 11.4.3.2, Catchment 112 Changes in slope and channel confinement Small amounts possible on lower slopes visible in Yes Is peat present in the catchment Google Is there a bog burst risk No Current valley side or terrace erosion No Potential valley side or terrace erosion No Hill slope failures (including peat slides and debris flows and slides) No Hill slope failures coupled to channel No Sediment source and Vertical incision present in catchment Yes for c.90m u/s of crossing upply - Catchment Scal Bank erosion/lateral migration No Unvegetated bars No Wooded/forested areas in catchment No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 112) No Channel development is limited until c.90m u/s of crossing, where vertical incision has Comment on sediment source potential in catchment occurred, seemingly generating large amounts of gravel. High - area of vertical incision proximal to crossing with limited opportunity for deposition Comment on sediment supply potential to crossing before reaching crossing Channel morphology Plane bed Gravel-Cobble Predominant sediment size No Unvegetated bars Morphology and Process Vertical incision Medium Reach upstream of Deposition Low crossing Lateral migration/bank erosion Low Presence and nature of infrastructure (Map 1d) No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 112) No Channel realignment No Channel morphology Engineered Predominant sediment size Gravel 0.6 Estimated discharge at 1:200 event (m³/s) Morphology and Process Unvegetated bars No At crossing Vertical incision None Deposition Medium Culvert with gravel bed Lateral migration/bank erosion None Damaged/unstable drains or armouring No Channel morphology Plane bed Predominant sediment size Fine Unvegetated bars No Vertical incision Low Deposition Medium **Morphology and Process** Low Lateral migration/bank erosion Reach downstream of Presence and nature of infrastructure (Map 1d) Yes Railway Infrastructure type (see Drawing 11.4.3.1 d, Catchment 112) crossing **Channel Realignment** Channel possibly realigned to join it to other more northerly channels to minimise numbers of Channel realignment Yes - Possibly railway crossings. Doesn't appear to have been realigned specifically for the road . Few signs of erosion or sediment supply in the upper catchment. A knickpoint is present c.90m u/s of the crossing d/s of which vertical incision has occurred. Stream gradient abruptly reduces at crossing and gravel eroded from vertical incision reach has been deposited in the culvert itself, reducing capacity by c.1/3. Ver Summary behaviour sluggish d/s of crossing as channel takes very long route across floodplain, possibly due to diversion for railway embankment construction.



Photograph 11.4.3.101 – Upstream of crossing

Gravel deposition in culvert

Photograph 11.4.3.103- Entrance to crossing



Photograph 11.4.3.102 – Upstream of crossing



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right. All rights reserved. Transport Scotland Licence number 100046668, 2017. Contains British Geological Survey materials © NERC 2017.

Legend General • Crossing location Solid Geology Gaick Psammite Formation - Psamm Drift Geology Peat Glaciofluvial Ice Contact Deposits Gaick Plateau Moraine Formation Hummocky Glacial Deposits Ardverikie Till Formation - Diamicton Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Environmental Designations Special Area of Conservation Morphological Pressures Railway Bridge Culvert Cascade Step in Bed
 Crossing location Solid Geology Gaick Psammite Formation - Psamm Drift Geology Peat Glaciofluvial Ice Contact Deposits Gaick Plateau Moraine Formation Hummocky Glacial Deposits Ardverikie Till Formation - Diamicton Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Environmental Designations Special Area of Conservation Morphological Pressures Railway Bridge Culvert Cascade
Solid Geology Gaick Psammite Formation - Psamm Drift Geology Peat Glaciofluvial Ice Contact Deposits Gaick Plateau Moraine Formation Hummocky Glacial Deposits Ardverikie Till Formation - Diamicton Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Environmental Designations Special Area of Conservation Morphological Pressures Railway Bridge Culvert Cascade
Solid Geology Gaick Psammite Formation - Psamm Drift Geology Peat Glaciofluvial Ice Contact Deposits Gaick Plateau Moraine Formation Hummocky Glacial Deposits Ardverikie Till Formation - Diamicton Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Environmental Designations Special Area of Conservation Morphological Pressures Railway Bridge Culvert Cascade
 Gaick Psammite Formation - Psamm Drift Geology Peat Glaciofluvial Ice Contact Deposits Gaick Plateau Moraine Formation Hummocky Glacial Deposits Ardverikie Till Formation - Diamicton Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Environmental Designations Special Area of Conservation Morphological Pressures Railway Bridge Culvert Cascade
Drift Geology Peat Glaciofluvial Ice Contact Deposits Gaick Plateau Moraine Formation Hummocky Glacial Deposits Ardverikie Till Formation - Diamicton Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Environmental Designations Special Area of Conservation Morphological Pressures Railway Bridge Culvert Cascade
 Peat Glaciofluvial Ice Contact Deposits Gaick Plateau Moraine Formation Hummocky Glacial Deposits Ardverikie Till Formation - Diamicton Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Environmental Designations Special Area of Conservation Morphological Pressures Railway Bridge Culvert Cascade
 Glaciofluvial Ice Contact Deposits Gaick Plateau Moraine Formation Hummocky Glacial Deposits Ardverikie Till Formation - Diamicton Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Environmental Designations Special Area of Conservation Morphological Pressures Railway Bridge Culvert Cascade
 Gaick Plateau Moraine Formation Hummocky Glacial Deposits Ardverikie Till Formation - Diamicton Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Environmental Designations Special Area of Conservation Morphological Pressures Railway Bridge Culvert Cascade
 Hummocky Glacial Deposits Ardverikie Till Formation - Diamicton Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Environmental Designations Special Area of Conservation Morphological Pressures Railway Bridge Culvert Cascade
 Ardverikie Till Formation - Diamicton Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Environmental Designations Special Area of Conservation Morphological Pressures Railway Bridge Culvert Cascade
 Glaciofluvial Sheet Deposits Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Environmental Designations Special Area of Conservation Morphological Pressures Railway Bridge Culvert Cascade
 Alluvium River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Environmental Designations Special Area of Conservation Morphological Pressures Railway Bridge Culvert Cascade
 River Terrace Deposits Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Environmental Designations Special Area of Conservation Morphological Pressures Railway Bridge Culvert Cascade
 Alluvial Fan Deposits Head Talus - Rock Fragments Talus Cone Environmental Designations Special Area of Conservation Morphological Pressures Railway Bridge Culvert Cascade
 Head Talus - Rock Fragments Talus Cone Environmental Designations Special Area of Conservation Morphological Pressures Railway Bridge Culvert Cascade
 Talus - Rock Fragments Talus Cone Environmental Designations Special Area of Conservation Morphological Pressures Railway Bridge Culvert Cascade
 Talus Cone Environmental Designations Special Area of Conservation Morphological Pressures A Railway Bridge Culvert Cascade
 Environmental Designations Special Area of Conservation Morphological Pressures A Railway Bridge Culvert Cascade
 Special Area of Conservation Morphological Pressures Railway Bridge Culvert Cascade
Morphological Pressures Railway Bridge Culvert Cascade
 Railway Bridge Culvert Cascade
CulvertCascade
Cascade
-
Catchpit
- Drainage Ditch
REV SUIT DATE DESCRIPTION BY APP CH2MILL Faithurst JV FAIRHURST C/0: City Park 368 Alexandra Parade Glasgow G31 3AU Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 2525

Drawing 11	.4.3.1 Catchm	ent 112 Cato	hment Overview	
DESIGN: EL	DRAWN: EV	CHK: EL	APP: EL	
DATE: 20/07/201	17			
PROJ: 495298				
DWG: A9P08-CF	J-EWE-X_ZZZ	ZZ_ZZ-DR-EN-	0001	
SHEET: 1 of 1	REVISIO C01	DN:	SUITABILITY: A3	



Catchment No. 114 Catchment Name Nature of water course Natura Channel Nature Size of water course Major 0.5 Catchment Area (km²) Quantitative Spatial 10 Average slope in catchment (°) Elements % Catchment over 750m (for snow melt risk) 0 Water, flows and levels Good WFD classification Physical condition Good Moderate Overall ecological status Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 114) Gaick Psammite formation-Psammite resistant to weathering, impermeable Geology No Is an alluvial fan present at or near the crossing? Environmental Ramsar No designations (see SAC No Drawing 11.4.3.1 c, ΡA No SSSI No Catchment 114) Changes in slope and channel confinement See Drawing 11.4.3.2, Catchment 114 Is peat present in the catchment No Is there a bog burst risk No Current valley side or terrace erosion No Potential valley side or terrace erosion No Hill slope failures (including peat slides and debris flows and slides) No Hill slope failures coupled to channel No Sediment source and No /ertical incision present in catchment upply - Catchment Scal Bank erosion/lateral migration No Unvegetated bars No Wooded/forested areas in catchment No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 114) No Comment on sediment source potential in catchment Limited evidence for major sediment sources in catchment Low, but there is some evidence for bed mobility resulting in gravel sediment being Comment on sediment supply potential to crossing delivered to channel. Plane bed Channel morphology Predominant sediment size Gravel **Jnvegetated** bars Yes Bar deposit on inside of right-angle bend c.20m Morphology and Process /ertical incision Low Reach upstream of Deposition Medium crossing Lateral migration/bank erosion Medium Presence and nature of infrastructure (Map 1d) No nfrastructure type (see Drawing 11.4.3.1 d, Catchment 114) No Channel realignment Yes Channel realigned to run parallel to road Channel morphology Engineered Concrete box culvert sections Predominant sediment size Gravel Estimated discharge at 1:200 event (m³/s) 1.4 Unvegetated bars No Morphology and Process Vertical incision Low At crossing Deposition Medium ateral migration/bank erosion Low Damaged/unstable drains or armouring Yes Paving slab armour ripped up d/s of crossing Channel morphology Engineered Predominant sediment size Gravel Unvegetated bars No ertical incision None Morphology and Process Deposition Low Reach downstream of Lateral migration/bank erosion None crossing Railway Presence and nature of infrastructure (Map 1d) Yes Infrastructure type (see Drawing 11.4.3.1 d, Catchment 114) Yes Channel Realignment Channel realigned so several pass under railway Channel realignment Yes at one point Appears to be a natural channel which has been realigned to a drain. Around 20-40m u/s of the crossing the channel appears to be near to it's natural alignment, but is incising. At 20m u/s of the crossing, the channel reaches the road and turns sharply to enter a road parallel drain. At this turn, the channel is eroding the outer edge of the verge on the outside of the bend and depositing coarse sediment on the inside, reinforcing the pattern of channel migration. Gravel is present ir the road-parallel drain and is mobile. This gravel is not deposited u/s of the culvert where there is a catch pit, as the concrete bed is exposed, and is transported Summary behaviour through the culvert and deposited at the d/s end of the culvert. C.5m d/s of the culvert the paving slab armouring has been damaged, but flow is sluggish beyond this. OPPORTUNITY PRESENTED TO IMPROVE CHANNEL AND REDUCE LATERAL MIGRATION AT SHARP BEND C.20m U/S OF CROSSING, and REDUCE DEPOSTION d/s of culvert.



Concreate bed

Gravel in channel



Photograph 11.4.3.104-Entrance to crossing

Photograph 11.4.3.105-Channel



Reproduced by permission of Ordnance Survey on behalf of HMSO. 🐵 Crown copyright and database right. All rights reserved. Transport Scotland Licence number 100046668, 2017. Contains British Geological Survey materials 🐵 NERC 2017.

Legend
General
Crossing location
Solid Geology
Gaick Psammite Formation - Psammite
Drift Geology
Peat
Glaciofluvial Ice Contact Deposits
Gaick Plateau Moraine Formation
Hummocky Glacial Deposits
Ardverikie Till Formation - Diamicton
Glaciofluvial Sheet Deposits
Alluvium
River Terrace Deposits
Alluvial Fan Deposits
Head
Talus - Rock Fragments
Talus Cone
Environmental Designations
Special Area of Conservation
Morphological Pressures
A Railway Bridge
Culvert
 Step in Bed
- Drainage Ditch





of water course water course water course ent Area (km ²) eslope in catchment (°) iment over 750m (for snow melt risk) flows and levels condition ecological status y Bedrock (see Drawing 11.4.3.1 a and b Catchment 115)		Natural Minor 0.5 15 0 Good Good
water course ent Area (km ²) e slope in catchment (°) iment over 750m (for snow melt risk) flows and levels I condition ecological status		Minor 0.5 15 0 Good
ent Area (km ²) eslope in catchment (°) ment over 750m (for snow melt risk) flows and levels I condition ecological status	 	0.5 15 0 Good
e slope in catchment (°) Iment over 750m (for snow melt risk) flows and levels I condition ecological status		15 0 Good
ment over 750m (for snow melt risk) flows and levels I condition ecological status	N	0 Good
flows and levels I condition ecological status	N	Good
l condition ecological status	Ň	
ecological status	Λ	Good
	N	Aoderate
y Bedrock (see Drawing 11.4.3.1 a and b Catchment 115)		oderate
	Gaick Psammite formation-Psammite	resistant to weathering, impermeable
uvial fan present at or near the crossing?	No	
	No	
s in slope and channel confinement	See Drawing 1	1.4.3.2, Catchment 115
present in the catchment	No	
a bog burst risk	No	
	No	<u> </u>
e failures coupled to channel	No	
incision present in catchment	No	
· •		
d/forested areas in catchment	No	<u> </u>
ucture type (see Drawing 11.4.3.1 d, Catchment 115)	No	
nt on sediment source potential in catchment		etated so likely just fines from slope wash
nt on sediment supply potential to crossing	Gravel-Cobble bed in channel could p	otentially supply coarse sediment to channel
l morphology	Cascade	
inant sediment size	Coarse (Gravel-Cobble)	
ion	Low	<u> </u>
migration/bank erosion	None	
e and nature of infrastructure (Map 1d)	No	
Licture type (see Drawing 11.4.3.1 d, Catchment 115)		Appears to be a "new" drain from aerials and
l realignment	Yes	maps
l morphology	Plane bed	
inant sediment size	Gravel-Cobble	
ed discharge at 1:200 event (m ³ /s)		
ion		
migration/bank erosion	None	
ed/unstable drains or armouring	No	
	Plane hed	
inant sediment size	Gravel-cobble	
tated bars	No	
incision	None	
ion migration/bank erosion		<u> </u>
e and nature of infrastructure (Map 1d)	No	
ucture type (see Drawing 11.4.3.1 d, Catchment 115)	No	
l realignment	Yes	To take flow from several hillslope drains through single railway crossing further d/s
	a bog burst risk valley side or terrace erosion i valley side or terrace erosion failures (including peat slides and debris flows and slides) failures coupled to channel ncision present in catchment sion/lateral migration ated bars forested areas in catchment cture type (see Drawing 11.4.3.1 d, Catchment 115) it on sediment source potential in catchment it on sediment supply potential to crossing morphology nant sediment size ated bars ncision on nigration/bank erosion and nature of infrastructure (Map 1d) cture type (see Drawing 11.4.3.1 d, Catchment 115) realignment morphology nant sediment size ated bars ncision on morphology nant sediment size ated bars ncision on morphology nant sediment size ated bars ncision on morphology nant sediment size ated bars ncision on nigration/bank erosion d/unstable drains or armouring morphology nant sediment size ated bars ncision on nigration/bank erosion d/unstable drains or armouring morphology nant sediment size ated bars ncision on nigration/bank erosion and nature of infrastructure (Map 1d) cture type (see Drawing 11.4.3.1 d, Catchment 115)	No No in slope and channel confinement See Drawing 11 resent in the catchment No bog burst risk No valley side or terrace erosion No relatives (including peat slides and debris flows and slides) No relatives (including peat slides and debris flows and slides) No relatives (including peat slides and debris flows and slides) No relatives (including peat slides and debris flows and slides) No relatives (including peat slides and debris flows and slides) No relatives (including peat slides and debris flows and slides) No relatives (including peat slides and debris flows and slides) No relatives (including peat slides and debris flows and slides) No relatives (including peat slides and debris flows and slides) No relatives (including peat slides and debris flows and slides) No relatives (including peat slides and debris flows and slides) No relatives (including peat slides and debris flows and slides) No relatives (including peat slides and debris flows and slides) No relatives (see Drawing 114.3.1 d, Catchment 115) No relation No relation No relation No relaing relation No



Road drain joining channel

Small scale gravel deposition

Photograph 208



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right. All rights reserved. Transport Scotland Licence number 100046668, 2017. Contains British Geological Survey materials © NERC 2017.

Legend
General
Crossing location
Solid Geology
Gaick Psammite Formation - Psammite
Drift Geology
Peat
Glaciofluvial Ice Contact Deposits
Gaick Plateau Moraine Formation
Hummocky Glacial Deposits
Ardverikie Till Formation - Diamicton
Glaciofluvial Sheet Deposits
Alluvium
River Terrace Deposits
Alluvial Fan Deposits
Head
Talus - Rock Fragments
Talus Cone
Morphological Pressures
🔺 Railway Bridge
Culvert
 Step in Bed
Drainage Ditch
REV SUIT DATE DESCRIPTION BY APP
Ch2m. FAIRHURST
CH2MHILL Fairhurst JV





- ture of water course e of water course cchment Area (km ²) erage slope in catchment (°) Catchment over 750m (for snow melt risk) eter, flows and levels ysical condition erall ecological status ijority Bedrock (see Drawing 11.4.3.1 a and b Catchment 116) in alluvial fan present at or near the crossing?	Gaick Psammite formation-Psammite	Drain Minor No Data No Data 0 Good Good Moderate
e of water course cchment Area (km ²) erage slope in catchment (°) Catchment over 750m (for snow melt risk) eter, flows and levels ysical condition erall ecological status ijority Bedrock (see Drawing 11.4.3.1 a and b Catchment 116)		Minor No Data No Data 0 Good Good
e of water course cchment Area (km ²) erage slope in catchment (°) Catchment over 750m (for snow melt risk) eter, flows and levels ysical condition erall ecological status ijority Bedrock (see Drawing 11.4.3.1 a and b Catchment 116)		Minor No Data No Data 0 Good Good
cchment Area (km ²) erage slope in catchment (°) Catchment over 750m (for snow melt risk) iter, flows and levels sical condition erall ecological status jority Bedrock (see Drawing 11.4.3.1 a and b Catchment 116)		No Data No Data 0 Good Good
cchment Area (km ²) erage slope in catchment (°) Catchment over 750m (for snow melt risk) iter, flows and levels sical condition erall ecological status jority Bedrock (see Drawing 11.4.3.1 a and b Catchment 116)		No Data No Data 0 Good Good
erage slope in catchment (°) Catchment over 750m (for snow melt risk) iter, flows and levels sical condition erall ecological status jority Bedrock (see Drawing 11.4.3.1 a and b Catchment 116)		No Data 0 Good Good
erage slope in catchment (°) Catchment over 750m (for snow melt risk) iter, flows and levels sical condition erall ecological status jority Bedrock (see Drawing 11.4.3.1 a and b Catchment 116)		No Data 0 Good Good
Catchment over 750m (for snow melt risk) iter, flows and levels vsical condition erall ecological status ijority Bedrock (see Drawing 11.4.3.1 a and b Catchment 116)		0 Good Good
iter, flows and levels ysical condition erall ecological status jority Bedrock (see Drawing 11.4.3.1 a and b Catchment 116)		Good Good
ysical condition erall ecological status jority Bedrock (see Drawing 11.4.3.1 a and b Catchment 116)		Good
ysical condition erall ecological status jority Bedrock (see Drawing 11.4.3.1 a and b Catchment 116)		Good
erall ecological status jority Bedrock (see Drawing 11.4.3.1 a and b Catchment 116)		
jority Bedrock (see Drawing 11.4.3.1 a and b Catchment 116)		Moderate
· · · · -	Gaick Psammite formation-Psammite	
· · · · -	Gaick Psammite formation-Psammite	
n alluvial fan present at or near the crossing?		resistant to weathering, impermeable
	No	
nsar	No	
C	No	
Ą	No	
51	No	
anges in slope and channel confinement	See Drawing 1	1.4.3.2, Catchment 116
peat present in the catchment	No	
here a bog burst risk	No	
rrent valley side or terrace erosion	No	
tential valley side or terrace erosion	No	
slope failures (including peat slides and debris flows and slides)	No	
slope failures coupled to channel	No	
rtical incision present in catchment	No	
	No	
vegetated bars	No	
	No	
	No	
	Limited,	but drain incising.
		supply limited.
	,	
annel morphology	Plane bed	
		Drain has captured hillslope drainage
	103	Drain has captured missible drainage
annel mornhology	Engineered	
•		
maged/unstable drains or armouring	None	
annel morphology	Engineered	
dominant sediment size	Fine	
edominant sediment size vegetated bars	Fine No	
edominant sediment size vegetated bars rtical incision	Fine No None	
edominant sediment size vegetated bars rtical incision position	Fine No None None	
edominant sediment size vegetated bars rtical incision position eral migration/bank erosion	Fine No None None None	
edominant sediment size vegetated bars rtical incision position	Fine No None None	
edominant sediment size vegetated bars rtical incision position eral migration/bank erosion esence and nature of infrastructure (Map 1d)	Fine No None None None	Channel realigned to join others to pass under
edominant sediment size vegetated bars rtical incision position eral migration/bank erosion	Fine No None None None Railway	Channel realigned to join others to pass under railway at one single point. See above
arroed of the second se	at present in the catchment ere a bog burst risk ent valley side or terrace erosion initial valley side or terrace erosion loope failures (including peat slides and debris flows and slides) loope failures (coupled to channel ical incision present in catchment cerosion/lateral migration egetated bars dede/forested areas in catchment istructure type (see Drawing 11.4.3.1 d, Catchment 116) ment on sediment source potential in catchment ment on sediment source potential to crossing annel morphology cominant sediment size eggetated bars ical incision position and migration/bank erosion ence and nature of infrastructure (Map 1d) istructure type (see Drawing 11.4.3.1 d, Catchment 116) ment ensignment annel morphology cominant sediment size eggetated bars ical incision position ence and nature of infrastructure (Map 1d) istructure type (see Drawing 11.4.3.1 d, Catchment 116) ment eralignment annel morphology cominant sediment size mated discharge at 1:200 event (m ³ /s) eggetated bars ical incision position ral migration/bank erosion	ages in slope and channel confinement See Drawing 1 at present in the catchment No ere a bog burst risk No ent valley side or terrace erosion No initial valley side or terrace erosion No initial valley side or terrace erosion No initial valley side or terrace erosion No iope failures (including peat sildes and debris flows and slides) No ical incision present in catchment No cerosion/lateral migration No segetated bars No ded/forested areas in catchment No structure type (see Drawing 11.4.3.1 d, Catchment 116) No ment on sediment source potential in catchment Limited, ment on sediment size Cobble egetated bars No ical incision Low sicion None sicion None sitructure type (see Drawing 11.4.3.1 d, Catchment 116) No sequated bars No ical incision Low sition None nele and nature of infrastructure (

Annex 11.4.3 - Hydromorphological Catchment Assessment - 116