

High Speed Rail (Crewe – Manchester)

Background information and data

Water resources and flood risk

BID WR-002-OR003

Off-route works: Annandale depot

Water Framework Directive preliminary
compliance assessment baseline data

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Department
for Transport

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

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1 Introduction

- 1.1.1 This report presents baseline data relating to the Water Framework Directive (WFD) preliminary compliance assessment which has been undertaken for the Proposed Scheme.
- 1.1.2 This document presents the baseline data for the off-route works at Annandale depot.
- 1.1.3 The Environmental Statement¹ should be referred to for details of:
- the WFD preliminary compliance assessment (Volume 5: Appendix WR-001-OR003);
 - the Water resources assessment, (Volume 5: Appendix WR-003-OR003); and
 - a Draft water resources and flood risk operation and maintenance plan (Volume 5: Appendix WR-007-00000).
- 1.1.4 The route-wide WFD compliance assessment and WFD compliance assessment baseline data should be referred to for the WFD assessment of the main route works.
- 1.1.5 Additional information is also included in Background Information and Data (BID) Water resources assessment baseline data.
- 1.1.6 Off-route works WFD maps are set out in the Volume 5, Water resources and flood risk Map Book: Map Series WR-03².

¹ High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

² High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement, Volume 5 Water resources and flood risk Map Book*. Available online at: <http://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

2 Surface water baseline

2.1 WFD surface water bodies

- 2.1.1 Table 1 presents the baseline information for the WFD surface water bodies in the study area and indicates whether they have been screened in for WFD preliminary compliance assessment based on their potential to be affected by the Proposed Scheme.
- 2.1.2 Location of the WFD surface water bodies is shown Figure 1 displays all surface water bodies in the vicinity of the study area. The surface water bodies outside the study area are not considered within this assessment.
- 2.1.3 The status and status objectives information for the WFD surface water bodies is then provided in the below sections.

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Table 1: Summary of WFD surface water bodies within the study area, 2015 Cycle 2 and interim Cycle 3 status (2018) classification

WFD water body	WFD water body ID	River Basin District / Management Plan	Catchment	Water body type (hydro-morphological designation)	Heavily modified or artificial water body	2015 WFD Cycle 2			2018 WFD interim Cycle 3			Screened in for WFD preliminary assessment
						Overall status	Overall ecology	Overall chemistry	Overall status	Overall ecology	Overall chemistry	
Kirtle Water d/s Waterbeck	10666	Solway and Tweed	Gretna Coastal	River	Not heavily modified or artificial	Poor	Poor	N/A	Poor	Poor	N/A	Yes
Logan Burn/ Black Sark	10671	Solway and Tweed	Gretna Coastal	River	Not heavily modified or artificial	Poor	Poor	N/A	Poor	Poor	N/A	No – not affected by Proposed Scheme
River Sark	10669	Solway and Tweed	Gretna Coastal	River	Not heavily modified or artificial	Poor	Poor	Pass	Poor	Poor	Pass	No – not affected by Proposed Scheme

River Basin Management Plans are produced every six years by the Scottish Environment Protection Agency (SEPA) and present the WFD status of all assessed waterbodies.³

³ Scottish Environment Protection Agency (2021), *Water Classification data*. Available online at: <https://www.sepa.org.uk/data-visualisation/water-classification-hub/>.

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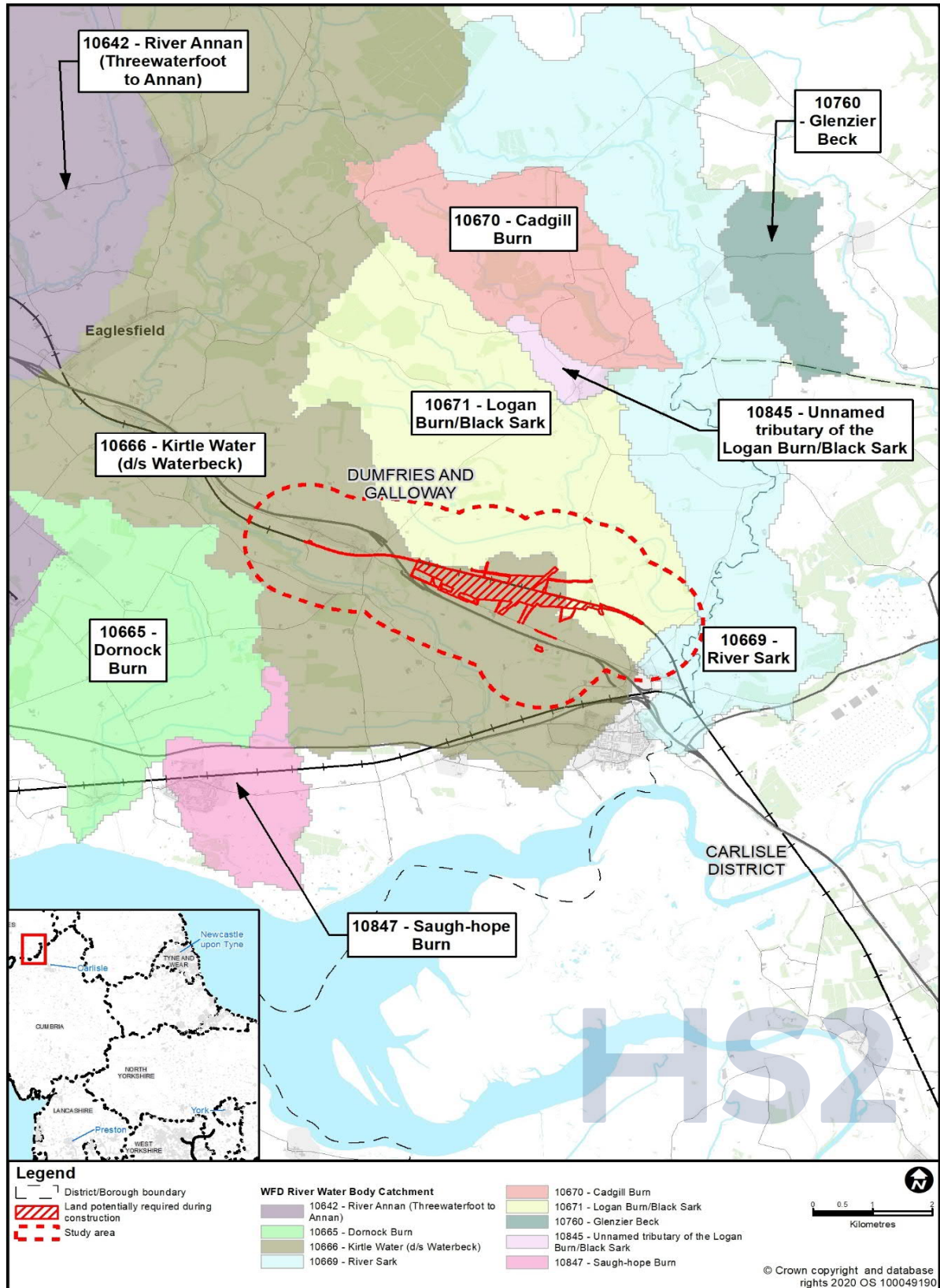
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Figure 1: WFD surface water bodies



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Kirtle Water d/s Waterbeck (10666)

- 2.1.4 The Kirtle Water downstream (d/s) Waterbeck (10666) water body is currently assessed as having poor overall status, and poor overall ecological status. Overall chemistry was last assessed as a 'pass' in 2011. The water body currently has an objective to achieve an overall status of good by 2027.
- 2.1.5 The 2015 Cycle 2 and interim status (2018) status classification data⁴ for the water body are shown in Table 2. The status objectives for the water body are shown in Table 3. The water body is currently failing the overall status objective due to fish (poor), specifically fish ecology. Scottish Environment Protection Agency (SEPA) assessments indicate that fish populations in the water body are not in good condition, but there is no known cause⁵.

Table 2: Kirtle Water d/s Waterbeck – 2015 Cycle 2 and interim status (2018) classification

Status element	Status (2015)	Status (2018)
Overall status	Poor	Poor
Overall chemistry	N/A	N/A
Priority substances	N/A	N/A
Cadmium	N/A	N/A
Lead	N/A	N/A
Nickel	N/A	N/A
Overall ecology	Poor	Poor
Physico-chem	N/A	Moderate
Temperature	N/A	Moderate
Dissolved oxygen	High	High
Acidity	N/A	High
Acid neutralising capacity	N/A	High
pH	High	High
Biological elements	Poor	Poor
Invertebrate animals	Good	Good
Macroinvertebrates (River Invertebrate Classification Tool (RICT)/ Whalley Hawkes Paisley Trigg method (WHPT))	Good	Good
Macroinvertebrates (Average Score Per Taxon (ASPT))	Good	Good
Macroinvertebrates (Number of taxa (NTAXA))	High	High
Fish	Poor	Poor
Fish ecology	Poor	Poor
Fish barrier	High	High

⁴ Scottish Environment Protection Agency (2021), *River Basin Management Plan Water environment hub*. Available online at: <https://www.sepa.org.uk/data-visualisation/water-environment-hub/>.

⁵ Scottish Environment Protection Agency (2021), *Additional information on WFD objectives for Kirtle Water d/w Waterbeck (10666)*. Available online at: <https://informatics.sepa.org.uk/SpotfireReferenceData/RBMPPDFS/EDTI05.pdf>.

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Status element	Status (2015)	Status (2018)
Aquatic plants	Good	Good
Macrophytes	High	Good
Phytobenthos	Good	Good
Specific pollutants	N/A	Pass
Arsenic	N/A	N/A
Copper	N/A	N/A
Zinc	N/A	N/A
Ammonium	Pass	Pass
Chromium	N/A	N/A
Manganese	N/A	Pass
Hydromorphology	Good	Good
Morphology	Good	Good
Overall hydrology	High	Good
Modelled hydrology	High	Good
Hydrology (medium/high flows)	High	Good
Hydrology (low flows)	High	Good
Reactive phosphorus	Good	Good

Table 3: Kirtle Water d/s Waterbeck – status objectives

Status element	2021	2027	Long term
Overall status	Good	Good	Good
Access for fish migration	High	High	High
Water flows and levels	High	High	High
Physical condition	Good	Good	Good
Freedom from invasive species	High	High	High
Water quality	Good	Good	Good
Ecological condition	No objective	No objective	No objective

River Basin Management Plans present the WFD condition and future status objectives of all assessed waterbodies⁶.

2.2 Watercourses

- 2.2.1 Table 4 presents the baseline information for the watercourses potentially affected by the Proposed Scheme and indicates whether they have been screened in for WFD preliminary assessment based on their baseline condition.
- 2.2.2 The locations of the watercourses which are screened in are shown in Figure 2.
- 2.2.3 A summary of the baseline condition of each watercourse is then provided in the sections below.

⁶ Scottish Environment Protection Agency (2021), *WFD Condition and future objectives*. Available online at: <https://www.sepa.org.uk/data-visualisation/water-environment-hub/>.

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Table 4: Summary of all WFD watercourses potentially affected by the Proposed Scheme

WFD water body	Watercourse name	Watercourse designation	Watercourse upstream (u/s) / downstream (d/s) National Grid Reference (NGR)	Approx. watercourse length within water body extent (km)	Estimated Q95 (m ³ /s) at Proposed Scheme location	Watercourse receptor value at Proposed Scheme location	Watercourse screened in for WFD preliminary assessment?
Kirtle Water d/s Waterbeck (10666)	Ewes Burn	Minor watercourse	US: NY 30715 70040 DS: NY 29676 68725	2.3	0.004	Moderate	Yes
	Tributary of Ewes Burn 1	Minor watercourse	US: NY 29177 69902 DS: NY 29542 69672	0.475	<0.002	Moderate	Yes
	Tributary of Ewes Burn 2	Minor watercourse	US: NY 30702 70034 DS: NY 29966 69749	1.0	<0.002	Moderate	Yes
	Stand Burn	Minor watercourse	US: NY 30144 68964 DS: NY 29549 68272	1.5	0.006	Moderate	Yes
	Tributary of Stand Burn	Minor watercourse	US: NY 30656 68229 DS: NY 29544 68394	1.2	<0.002	Moderate	Yes
	Kirtle Water	River	US: NY 28003 84773 DS: NY 31355 65704	19.2	0.14	High	Yes

Minor watercourses are considered to be part of the WFD water body that they eventually flow into.

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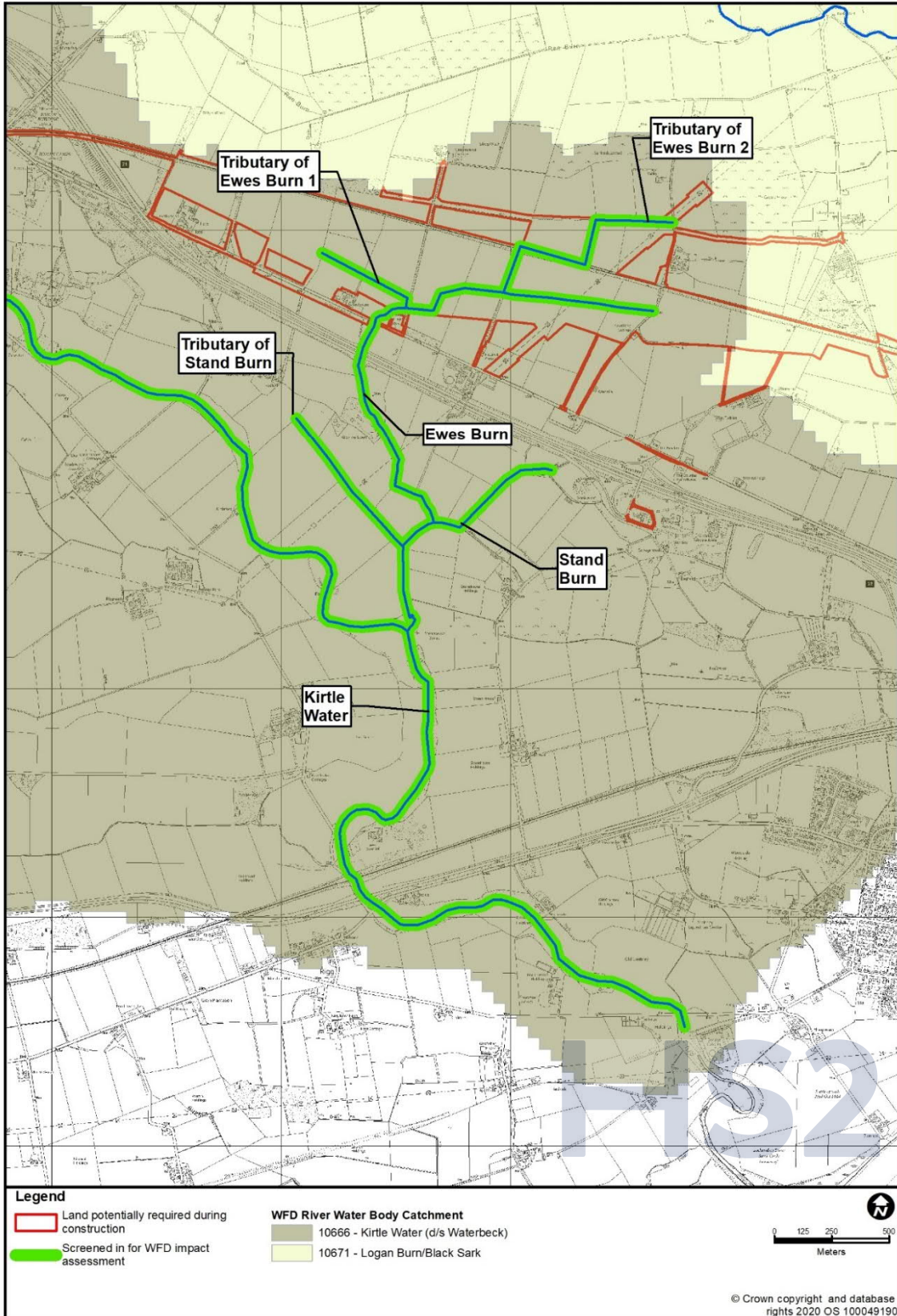
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Figure 2: Watercourses potentially affected by Proposed Scheme within WFD surface water body catchments



Kirtle Water d/s Waterbeck (10666)

Ewes Burn

- 2.2.4 The source of Ewes Burn is in agricultural land just north of the A74(M) and Gretna Green Motorway Services. The burn flows beneath the motorway and alongside Gavins Loch, before discharging into Stand Burn. A baseline desk study has been undertaken, but no field survey of the watercourse. Desk study evidence indicates that this is a small watercourse which has been modified and straightened for drainage purposes.
- 2.2.5 Based on the evidence from the baseline assessment the watercourse has been defined as a Moderate value on a precautionary basis (pending field survey) and has been screened in for WFD preliminary assessment.

Tributary of Ewes Burn 1

- 2.2.6 The source of Tributary of Ewes Burn 1 is in agricultural land just north of the A74(M). The tributary joins Ewes Burn between the B7076 Roman Road and the West Coast Main Line (WCML). A baseline desk study of the watercourse has been undertaken, but no field survey. Desk study evidence indicates that this is a small watercourse that has been modified and straightened for drainage purposes.
- 2.2.7 Based on the evidence from the baseline assessment the watercourse has been defined as Moderate value on a precautionary basis (pending field survey) and has been screened in for WFD preliminary assessment.

Tributary of Ewes Burn 2

- 2.2.8 The source of Tributary of Ewes Burn 2 is in agricultural land north of the WCML, at Cranberry Farm. The tributary joins Ewes Burn south of the WCML, upstream of the confluence of Ewes Burn with Tributary of Ewes Burn 1. A baseline desk study of the watercourse has been undertaken, but no field survey. Desk study evidence indicates that this is a small watercourse that has been modified and straightened for drainage purposes.
- 2.2.9 Based on the evidence from the baseline assessment the watercourse has been defined as Moderate value on a precautionary basis (pending field survey) and has been screened in for WFD preliminary assessment.

Stand Burn

- 2.2.10 Stand Burn originates just south of the A74(M) and to the west of Gretna Green Motorway Services. The burn flows in a south-westerly direction and is joined by three tributaries drains and Ewes Burn, before discharging into Kirtle Water. A baseline desk study of the watercourse has been undertaken, but no field survey. Desk study evidence indicates that this is a small watercourse that has been modified and straightened for drainage purposes.

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- 2.2.11 Based on the evidence from the baseline assessment the watercourse has been defined as Moderate value and has been screened in for WFD preliminary assessment.

Tributary of Stand Burn

- 2.2.12 Tributary of Stand Burn is located in agricultural land to the west of Gavins Loch. The tributary joins Stand Burn around 170m south of the confluence with Ewes Burn. A baseline desk study of the watercourse has been undertaken, but no field survey. Desk study evidence indicates that this is a straightened field drain.
- 2.2.13 Based on the evidence from the baseline assessment the watercourse has been defined as Moderate value and has been screened in for WFD preliminary assessment on a precautionary basis (pending field survey).

Kirtle Water

- 2.2.14 Kirtle Water rises at Haggy Hill approximately 18km north west of Gretna. The headwaters, comprising Winterhope Burn, are impounded at Winterhope Reservoir. Downstream of the reservoir, the river flows in a southerly direction through Waterbeck, Eaglesfield, Kirtlebridge and Kirkpatrick-Fleming. The A74(M) and the WCML between Carlisle and Glasgow are located close to the river between Kirtlebridge and Kirkpatrick-Fleming. Downstream of Kirkpatrick-Fleming, Kirtle Water follows a meandering course to the south east, beneath a local rail line and the A75, before discharging into the River Esk to the south west of Gretna. A baseline desk study of the watercourse has been undertaken, but no field survey.
- 2.2.15 Based on the evidence from the baseline assessment the watercourse has been defined as High value and has been screened in for WFD preliminary assessment.

3 Groundwater baseline

3.1 WFD groundwater bodies

- 3.1.1 Table 5 presents the baseline information for the WFD groundwater body in the study area and indicates whether it has been screened in for WFD preliminary assessment based on its potential to be affected by the Proposed Scheme.
- 3.1.2 The location of the relevant WFD groundwater body is shown in Figure 3.

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Table 5: Summary of the WFD groundwater body within the study area and its Cycle 2 2015 and interim Cycle 3 status (2018) classifications

WFD water body	Water body ID	River Basin District / Management Plan	Catchment size (km ²)	2015 status			2018 WFD interim Cycle 3			Screened in for WFD preliminary assessment?
				Overall status	Quantitative status	Chemical status	Overall status	Quantitative status	Chemical status	
Annan	150623	Solway and Tweed	168.4	Good	Good	Good	Good	Good	Good	Yes

River Basin Management Plans are produced every six years by the Scottish Environment Protection Agency (SEPA) and present the WFD status of all assessed waterbodies³.

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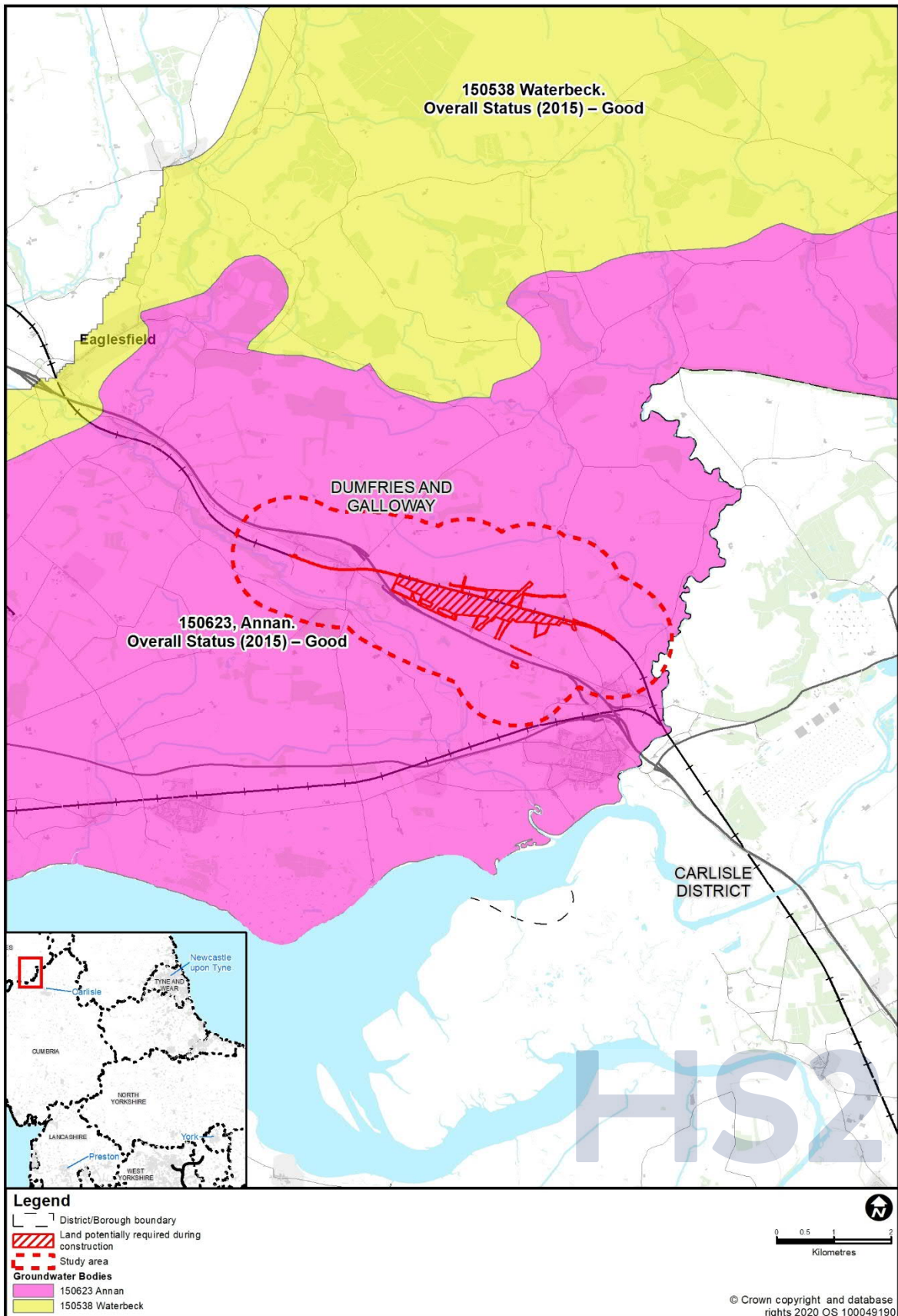
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Figure 3: WFD groundwater bodies within the study area



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Annan (150623)

3.1.3 The Annan groundwater body (150623) is currently assessed as having good overall status, with good quantitative and good chemical status. The water body currently meets the objective of good overall status.

3.1.4 The 2015 Cycle 2 and interim status (2018) status classification data for the water body are shown in Table 6. The status objectives for the water body are shown in Table 7.

Table 6: Annan groundwater body 2015 Cycle 2 and interim status (2018) classifications

Status element	Status (2015)	Status (2018)
Overall status	Good	Good
Quantitative status	Good	Good
Quantitative saline intrusion	Good	Good
Quantitative surface water interaction (SWI)	Good	Good
Water balance	Good	Good
Chemical status	Good	Good
Chemical – saline intrusion (CSI)	Good	N/A
CSI – electrical conductivity	Good	N/A
Chemical – Surface water interaction (SWI)	Good	Good
Diffuse impacts	N/A	N/A
Point source impacts	N/A	N/A
SWI – specific pollutants	Good	Good
SWI – chromium	Good	Good
SWI – iron	Good	N/A
SWI – Zinc	Good	Good
SWI - Manganese	Good	Good
SWI – other substances	Good	Good
SWI – nitrate	Good	Good
SWI – priority substances	Good	Good
SWI – cadmium	Good	Good
SWI – lead	Good	Good
Drinking Water Protected Area (DWPA)	Good	Good
DWPA – Priority substances	Good	Good
DWPA – Atrazine	Good	Good
DWPA – Simazine	Good	Good
DWPA – other substances	Good	Good
DWPA – epoxiconazole	Good	Good

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Status element	Status (2015)	Status (2018)
DWPA – nitrate	Good	Good
Chemical – general tests (CGT)	Good	Good
General chemical test (other)	N/A	N/A
General chemical test (mining)	N/A	N/A
CGT – atrazine	Good	Good
CGT – simazine	Good	Good
CGT – trichloroethene	Good	Good
CGT – Benzene	Good	Good
CGT – specific pollutants	Good	Good
CGT – chromium	Good	Good
CGT – other substances	Good	Good
CGT – epoxiconazole	Good	Good
CGT – nitrate	Good	Good
CGT – free product	Good	Good
CGT – vinyl chloride	Good	Good

Table 7: Annan groundwater body – status objectives

Objective	2021	2027	Long term
Overall	Good	Good	Good
Water flows and levels	Good	Good	Good
Water quality	Good	Good	Good

River Basin Management Plans present the WFD condition and future status objectives of all assessed waterbodies⁶

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3.2 Groundwater features (characterisation of groundwater body baseline)

- 3.2.1 A range of features, such as springs, marshes and other groundwater dependent terrestrial ecosystems (GWDTE), have been used to characterise the baseline condition of the groundwater body.
- 3.2.2 Table 8 presents the baseline information for all potential groundwater body indicator features identified in the study area and identifies whether they have been screened in to support the WFD preliminary assessment.
- 3.2.3 The locations of these groundwater features are shown in Figure 4 and Figure 5.
- 3.2.4 A summary of the baseline condition of each groundwater feature screened in for assessment is then provided in the sections below. At this time no surveys have been undertaken.

Table 8: Summary of groundwater features potentially affected by Proposed Scheme

WFD groundwater waterbody (ID)	Characterisation feature type	NGR	WFD assessment reference ID	Receptor / feature name	Feature description	Screened in for WFD preliminary assessment?	Reason for screening out
Annan (150623)	Public water supply (PWS) abstraction	Unknown	Ab_01	Potential PWS abstraction	Potential groundwater supply. Assumed PWS on a precautionary basis	Yes	-
	Potential spring	NY308685	S_02	Potential spring in south of Gretna service area	Potential spring	Yes	-
	Potential spring	NY308685	S_03	Potential spring in south of Gretna service area	Potential spring	Yes	-
	Potential non-licensed abstraction	NY329686	UAb_04	Potential abstraction at Watchhill Well	Potential non-licensed abstraction	Yes	-
	Potential spring	NY309687	S_05	Potential spring in east of Gretna service area	Potential spring	Yes	-
	Potential spring	NY301689	S_06	Potential spring at Stand Burn ponds	Potential spring	Yes	-

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WFD groundwater waterbody (ID)	Characterisation feature type	NGR	WFD assessment reference ID	Receptor / feature name	Feature description	Screened in for WFD preliminary assessment?	Reason for screening out
	Potential GWDTE	NY293691	G_07	Fox Covert	Woodland	No	Not considered to be groundwater dependent
	Potential GWDTE	NY307691	G_08	Unnamed woodland	Woodland	No	Not considered to be groundwater dependent
	SEPA groundwater level monitoring borehole	NY310692	SAL_09	SEPA groundwater level monitoring borehole	SEPA groundwater level monitoring borehole	Yes	-
	Potential GWDTE	NY317692	G_10	Bensmoor Wood	Woodland	Yes	-
	Potential spring	NY318694	S_11	Potential spring 170m north east of Bensmoor Wood	Potential spring	Yes	-
	Potential spring	NY287694	S_12	Potential spring 220m west of Redhall Castle	Potential spring	Yes	-
	Potential spring	NY275694	S_13	Potential spring 150m east of Fairyrow Wood	Potential spring	No	No hydraulic pathway for impact
	Potential GWDTE	NY296695	G_14	Plantation east of Nook Cottage	Woodland	No	Not considered to be groundwater dependent
	Potential GWDTE	NY272695	G_15	Fairyrow Wood Ancient Woodland	Woodland	No	No hydraulic pathway for impact
	Potential GWDTE	NY283695	G_16	Mossknowe Wood	Woodland	No	Not considered to be groundwater dependent

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WFD groundwater waterbody (ID)	Characterisation feature type	NGR	WFD assessment reference ID	Receptor / feature name	Feature description	Screened in for WFD preliminary assessment?	Reason for screening out
	Potential spring	NY286695	S_17	Potential spring 300m north west of Redhall Castle	Potential spring	Yes	-
	Potential GWDTE	NY314696	G_18	Blacksike Wood	Woodland	Yes	-
	Potential spring	NY306696	S_19	Potential spring 200m south of Cranberry Farm	Potential spring	Yes	-
	Potential GWDTE	NY280698	G_20	Mossknowe Lodge Wood	Woodland	Yes	-
	Potential GWDTE	NY282699	G_21	Mossknowe Estate	Woodland	No	Not considered to be groundwater dependent
	Potential spring	NY307700	S_22	Potential spring 90m north of Cranberry Farm	Potential spring	Yes	-
	Potential spring	NY264701	S_23	Potential spring 274m east of Irvington	Potential spring	No	No hydraulic pathway for impact
	Potential non-licensed abstraction	NY278701	UAb_24	Potential abstraction at Well south of North Lodge	Potential non-licensed abstraction	Yes	-
	Potential GWDTE	NY287701	G_25	Woodland south of Railway Cottage	Woodland	Yes	-
	Potential GWDTE	NY279701	G_26	Plantation 2b; Mossknowe Estate	Woodland	No	Not considered to be groundwater dependent

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WFD groundwater waterbody (ID)	Characterisation feature type	NGR	WFD assessment reference ID	Receptor / feature name	Feature description	Screened in for WFD preliminary assessment?	Reason for screening out
	Potential GWDTE	NY291701	G_27	Woodland east of Grahamshill Railway Cottages	Woodland	Yes	-
	Potential spring	NY263702	S_28	Potential spring 45m east of Irvington	Potential spring	No	No hydraulic pathway for impact
	Potential spring	NY312702	S_29	Potential spring at Gretna Flow	Potential spring	No	No hydraulic pathway for impact
	Potential GWDTE	NY274702	G_30	Manse Wood	Woodland	No	No hydraulic pathway for impact
	Potential GWDTE	NY275702	G_31	Kirkpatrick Burn	Woodland	No	No hydraulic pathway for impact
	Potential spring	NY299703	S_32	Potential spring at Sheepwash east of Williamsfield Cottage	Potential spring	No	No hydraulic pathway for impact
	Potential licensed abstraction	NY322703	Ab_33	Potential abstraction at Lochinvar BH34 & BH35, Chapelknowe, Canonbie	Potential licensed abstraction	No	No hydraulic pathway for impact
	Potential GWDTE	NY285704	G_34	Billy's Wood	Woodland	Yes	-
	Potential spring	NY277705	S_35	Potential spring at Kirkpatrick Fleming	Potential spring	Yes	-
	Potential spring	NY264709	S_37	Potential spring west of Newton	Potential spring	No	No hydraulic pathway for impact

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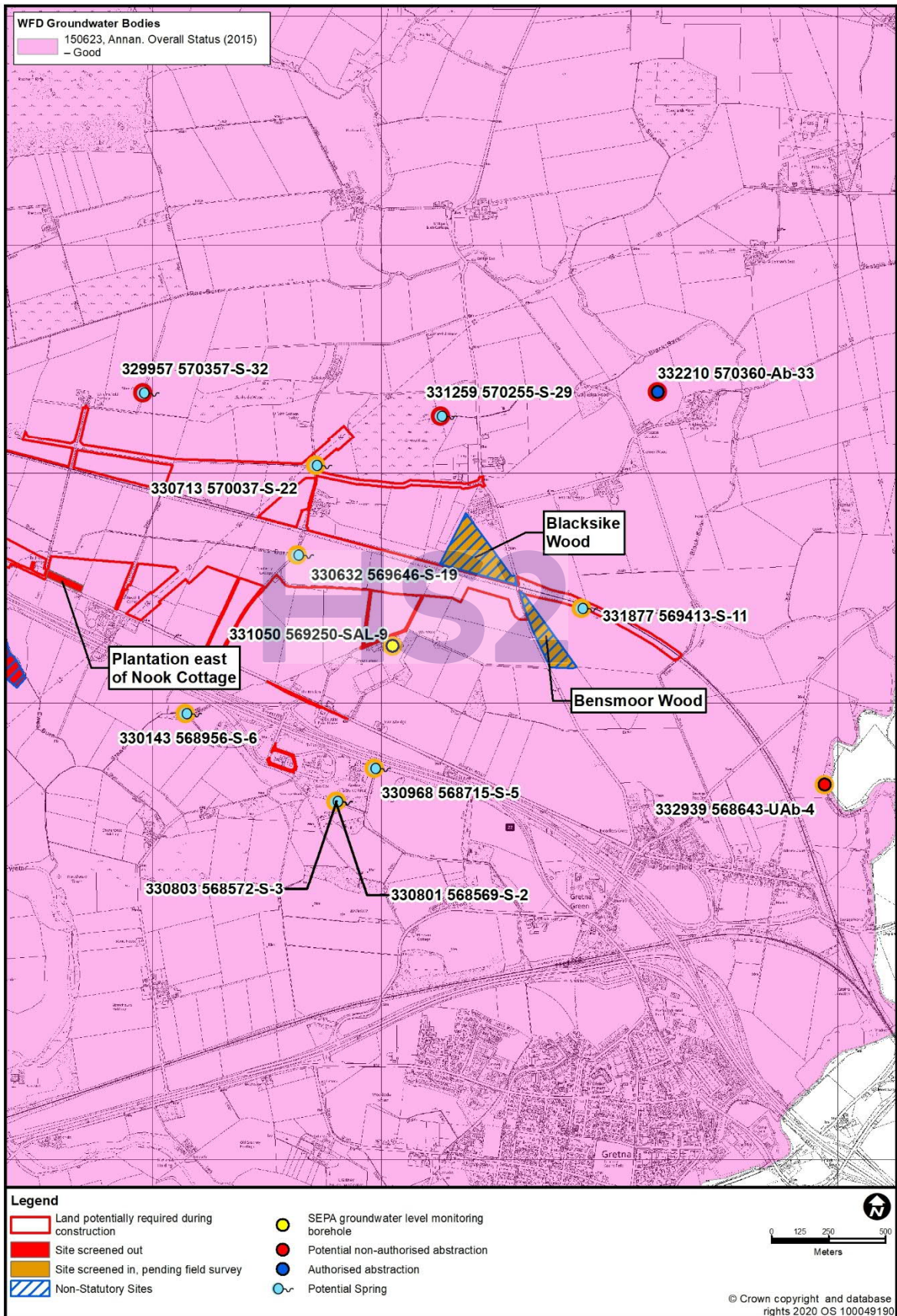
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Figure 4: Groundwater features potentially affected by the Proposed Scheme (Part 1)



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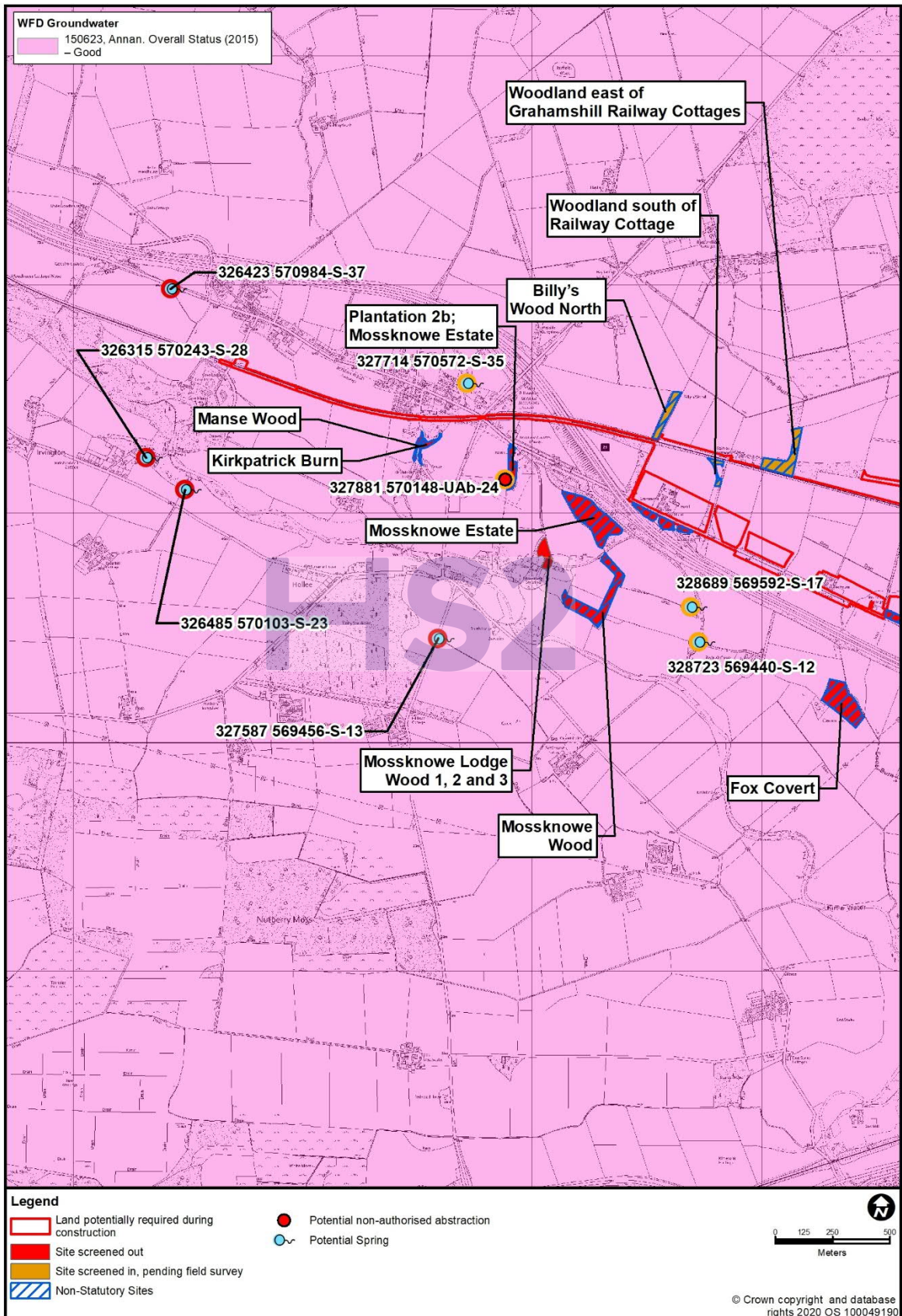
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Figure 5: Groundwater features potentially affected by the Proposed Scheme (Part 2)



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Annandale (150623)

Potential public water supply abstraction – Ab_01

- 3.2.5 The proposed Annandale depot is located within a drinking water protection area. Therefore, there is the potential that a drinking water supply could be located close to the Proposed Scheme, albeit outside of the 1km study area. A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.6 Based on the evidence from the baseline assessment the Ab_01 has been screened in to support the WFD preliminary assessment.

Potential spring – S_02

- 3.2.7 The potential spring S_02 is located to the south of the Gretna Services area (at NY308686). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.8 Based on the evidence from the baseline assessment the spring S_02 has been screened in to support the WFD preliminary assessment.

Potential spring – S_03

- 3.2.9 The potential spring S_03 is located to the south of the Gretna Services area (at NY308686). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.10 Based on the evidence from the baseline assessment the spring S_03 has been screened in to support the WFD preliminary assessment.

Potential non-licensed abstraction – Uab_04

- 3.2.11 The potential non-licensed abstraction Uab_04 is located at Watchhill Well (at NY329686). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.12 Based on the evidence from the baseline assessment the Uab_04 has been screened in to support the WFD preliminary assessment.

Potential spring – S_05

- 3.2.13 The potential spring S_05 is located to the east of the Gretna Services area (at NY310690). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.14 Based on the evidence from the baseline assessment the spring S_05 has been screened in to support the WFD preliminary assessment.

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Potential spring – S_06

- 3.2.15 The potential spring S_06 is located at Stand Burn ponds (at NY301689). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.16 Based on the evidence from the baseline assessment the spring S_06 has been screened in to support the WFD preliminary assessment.

SEPA groundwater level monitoring borehole – SAL_09

- 3.2.17 The SEPA groundwater level monitoring borehole SAL_09 is located near the wind turbine at Whinnyrig (at NY308693). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.18 Based on the evidence from the baseline assessment the SEPA monitoring borehole SAL_09 has been screened in to support the WFD preliminary assessment.

Potential GWDTE – G_10

- 3.2.19 The potential GWDTE G_10 is Bensmoor Wood (at NY317693). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.20 Based on the evidence from the baseline assessment the GWDTE G_10 has been screened in to support the WFD preliminary assessment.

Potential spring – S_11

- 3.2.21 The potential spring S_11 is located 170m north-east of Bensmoor Wood (at NY318694). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.22 Based on the evidence from the baseline assessment the spring S_11 has been screened in to support the WFD preliminary assessment.

Potential spring – S_12

- 3.2.23 The potential spring S_12 is located 220m west of Redhall Castle (at NY287694). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.24 Based on the evidence from the baseline assessment the spring S_12 has been screened in to support the WFD preliminary assessment.

Potential spring – S_13

- 3.2.25 The potential spring S_13 is located 150m east of Fairyrow Wood (at NY276695). A baseline desk study has been undertaken but no field survey has been undertaken at this time.

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- 3.2.26 Based on the evidence from the baseline assessment the spring S_13 has been screened out of the WFD preliminary assessment. This is because the potential spring is located on the other side of the Kirtle Water valley from the Proposed Scheme and there is no hydraulic connection between this feature and the Proposed Scheme.

Potential GWDTE – G_14

- 3.2.27 The potential GWDTE G_14 is a plantation located east of Nook Cottage (at NY296695). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.28 Based on the evidence from the baseline assessment the GWDTE G_14 has been screened out of the WFD preliminary assessment. This is because the potential GWDTE is not likely to be groundwater dependent.

Potential GWDTE – G_15

- 3.2.29 The potential GWDTE G_15, known as Fairyrow Wood, is located south of Kirkpatrick Fleming and Kirtle Water (at NY273696). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.30 Based on the evidence from the baseline assessment the GWDTE G_15 has been screened out of the WFD preliminary assessment. This is because the potential GWDTE is located on the other side of the Kirtle Water valley from the Proposed Scheme and there is no hydraulic connection between this feature and the Proposed Scheme.

Potential spring – S_17

- 3.2.31 The potential spring S_17 is located 300m north west of Redhall Castle (at NY287696). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.32 Based on the evidence from the baseline assessment the spring S_17 has been screened in to support the WFD preliminary assessment.

Potential GWDTE – G_18

- 3.2.33 The potential GWDTE G_18 is known as Blacksike Wood (at NY314696). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.34 Based on the evidence from the baseline assessment the GWDTE G_18 has been screened in to support the WFD preliminary assessment.

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Potential spring – S_19

- 3.2.35 The potential spring S_19 is located 200m south of Cranberry Farm (at NY306696) and forms the source of the Ewes Burn. A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.36 Based on the evidence from the baseline assessment the spring S_19 has been screened in to support the WFD preliminary assessment.

Potential GWDTE – G_20

- 3.2.37 The potential GWDTE G_20 known as Mossknowe Lodge Wood is located south of Kirkpatrick Fleming and A74(M) (at NY281698). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.38 Based on the evidence from the baseline assessment the GWDTE G_20 has been screened in to support the WFD preliminary assessment.

Potential spring – S_22

- 3.2.39 The potential spring S_22 is located 90m north of Cranberry Farm (at NY307700) and forms the source of Tributary of Ewes Burn 2. A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.40 Based on the evidence from the baseline assessment the spring S_22 has been screened in to support the WFD preliminary assessment.

Potential spring – S_23

- 3.2.41 The potential spring S_23 is located 274m east of Irvington (at NY265701). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.42 Based on the evidence from the baseline assessment the spring S_23 has been screened out to support the WFD preliminary assessment. This is because the potential spring is located on the other side of the Kirtle Water valley from the Proposed Scheme and there is no hydraulic connection between this feature and the Proposed Scheme.

Potential non-licensed abstraction – Uab_24

- 3.2.43 The potential non-licensed abstraction Uab_24 is located south of North Lodge (at NY279701). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.44 Based on the evidence from the baseline assessment the Uab_24 has been screened in to support the WFD preliminary assessment.

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Potential GWDTE – G_25

- 3.2.45 The potential GWDTE G_25 is located south of Railway Cottages (at NY288702). A baseline desk study has been undertaken which indicates it is a woodland, but no field survey has been undertaken at this time.
- 3.2.46 Based on the evidence from the baseline assessment the GWDTE G_25 has been screened in to support the WFD preliminary assessment.

Potential GWDTE – G_27

- 3.2.47 The potential GWDTE G_27 is located east of Grahamshill Railway Cottages (at NY291702). A baseline desk study has been undertaken which indicates it is a woodland, but no field survey has been undertaken at this time.
- 3.2.48 Based on the evidence from the baseline assessment the GWDTE G_27 has been screened in to support the WFD preliminary assessment.

Potential spring – S_28

- 3.2.49 The potential spring S_28 is located 45m east of Irvington (at NY263702). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.50 Based on the evidence from the baseline assessment the spring S_28 has been screened out to support the WFD preliminary assessment. This is because the potential spring is located on the other side of the Kirtle Water valley from the Proposed Scheme and there is no hydraulic connection between this feature and the Proposed Scheme.

Potential spring – S_29

- 3.2.51 The potential spring S_29 is located at Gretna Flow (at NY309700). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.52 Based on the evidence from the baseline assessment the spring S_29 has been screened out to support the WFD preliminary assessment. This is because the potential spring is located upstream of the Proposed Scheme and there is no hydraulic connection between this feature and the Proposed Scheme.

Potential spring – S_32

- 3.2.53 The potential sheepwash which may be spring fed S_32 is located east of Williamsfield Cottage (at NY300704). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.54 Based on the evidence from the baseline assessment the spring S_32 has been screened out to support the WFD preliminary assessment. This is because the potential spring is located

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upstream of the Proposed Scheme and there is no hydraulic connection between this feature and the Proposed Scheme.

Licensed abstraction – Ab_33

- 3.2.55 The licensed abstraction Ab_33 is located at Lochinvar, Chapelknowe (at NY704704). Records of CAR licensed sites provided by Scottish Environment Protection Agency indicate that one site in the study area might be licensed to abstract groundwater (Lochinvar BH34 & BH35, Chapelknowe, Canonbie), although the data does not specify the purpose of the licence and the borehole reference could be to exploratory works for the Lochinvar coal project. On a precautionary basis, however, it is assumed that this site is licensed for groundwater abstraction as a drinking water supply. A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.56 Based on the evidence from the baseline assessment the licensed abstraction Ab_33 has been screened out to support the WFD preliminary assessment. This is because the licensed abstraction is located in a different valley to the Proposed Scheme and there is no hydraulic connection between this feature and the Proposed Scheme.

Potential GWDTE – G_34

- 3.2.57 The potential GWDTE G_34 is known as Billy's Wood North (at NY286704). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.58 Based on the evidence from the baseline assessment the GWDTE G_34 has been screened in to support the WFD preliminary assessment.

Potential spring – S_35

- 3.2.59 The potential spring S_35 is located at Kirkpatrick Fleming (at NY277705). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.60 Based on the evidence from the baseline assessment the spring S_35 has been screened in to support the WFD preliminary assessment.

Potential spring – S_37

- 3.2.61 The potential spring S_35 is located west of Newton (at NY264710). A baseline desk study has been undertaken but no field survey has been undertaken at this time.
- 3.2.62 Based on the evidence from the baseline assessment the spring S_37 has been screened out to support the WFD preliminary assessment. This is because the potential spring is located upstream of the Proposed Scheme and there is no hydraulic connection between this feature and the Proposed Scheme.

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4 References

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