Volume 5: Appendix 13.2 - Private Water Supply and Groundwater Abstractions Assessment

February 2026 – Additional Information

Scottish & Southern Electricity Networks

TRANSMISSION

CONTENTS

LIST OF ABBREVIATIONS

BGS – British Geological Survey
CEMP – Construction Environmental Management Plan
CIRIA – Construction Industry Research and Information Association
DTM – Digital Terrain Model
ECoW – Environmental Clerk of Works
EIA – Environmental Impact Assessment
EIAR – Environmental Impact Assessment Report
EPZ – Equipotential Zone
GEMP – General Environmental Management Plans
GPP – Guidance for Pollution Prevention
GWDTE – Groundwater Dependent Terrestrial Ecosystems
LOD – Limit of Deviation
LiDAR – Light Detection and Ranging
mAOD – Metres Above Ordnance Datum
NVC – National Vegetation Classification
OHL – Overhead Line
PWS – Private Water Supplies
SEPA – Scottish Environment Protection Agency
SuDs – Sustainable Drainage Systems

1. INTRODUCTION

1.1.1 This appendix details the assessment undertaken to identify Private Water Supplies (PWS) and groundwater abstractions that may be affected by the proposed Kintore to Tealing 400 kV Overhead Line (OHL) and associated infrastructure (the 'Proposed Development') as described in **Volume 1, Chapter 3: Project Description**. This document should be read in conjunction with **Volume 1, Chapter 3: Project Description** and **Volume 2, Chapter 13: Hydrology, Hydrogeology, Geology and Soils** of the Kintore to Tealing 400 kV OHL Environmental Impact Assessment Report (EIAR).

1.1.2 The Proposed Development is located within the administrative boundaries of Angus Council and Aberdeenshire Council. The Site is located between Tealing in Angus and Kintore in Aberdeenshire and is approximately 105.2 km in length. PWS and groundwater abstractions located within a 1 km buffer from the Site boundary have been identified and potential risk to the source and associated properties assessed based on topography and distance from the proposed infrastructure.

1.1.3 Scottish Environment Protection Agency (SEPA) guidance[1] on assessing the effects of developments on groundwater abstractions (including public and private water supplies) states that the relevant buffer zones for groundwater abstractions for all proposed infrastructure, both temporary and permanent are:

- 10 m for all activities;
- 100 m radius of all subsurface activities less than 1 m in depth; and
- 250 m of all subsurface activities deeper than 1 m.

1.1.4 A 250 m buffer was applied to all proposed infrastructure due to uncertainties in excavation depths of the Proposed Development. Excavations for towers will be ~4 m deep. It is likely that most access tracks, working and laydown areas will require excavations of less than 1 m, however, there may be some areas where more than 1 m of cut is required on access tracks, working platforms and equipotential zone (EPZ) locations, dependent on further detailed design. Given the uncertainty, a conservative approach has been taken, assuming a 250 m buffer from all proposed infrastructure. A 250 m buffer was also used for surface water abstractions to account for potential effects arising through surface water runoff.

1.1.5 SEPA provided a consultation response to the Section 37 Application (SEPA Letter, PCS-20006787, 20 October 2025), which requested that the PWS assessment be updated to include all PWS sources/groundwater abstractions lying within a 250 m buffer of the Limit of Deviation (LOD), as it is possible that excavations for the Proposed Development may occur up to the LOD boundary. This appendix has been updated in January 2026 to include all PWS sources/groundwater abstractions within a 250 m buffer from the LOD (as requested by SEPA). It also includes data collected during site visits carried out post submission, in November 2025, which were undertaken to obtain further information pertaining to previously assumed PWS. This additional data on PWS was collected to inform the design/ construction phase of the Proposed Development and is included herein for completeness.

1.1.6 The assessment methodology follows the methods in **Volume 2, Chapter 13: Hydrology, Hydrogeology, Geology and Soils** to determine the sensitivity of receptor, magnitude of change and significance of effect, as set out in **Table 13.3: Criteria to Assess the Sensitivity of Receptor** and **Table 13.4: Criteria for Estimating the Magnitude of Change** and **Table 13.5: Matrix for Determination of Significance of Effects**.

1.1.7 The SEPA (2024) guidance[1] provides a matrix which shows how both the scale of the effects and the importance of the abstraction must be considered when assessing potential impacts. This is captured in the methodology used herein, as SEPA's matrix is essentially the same as **Table 13.5: Matrix for Determination of Significance of Effects**, which considers magnitude (scale of effect) and sensitivity (importance of the abstraction/PWS) in the same way as the SEPA matrix. The criteria used to estimate the magnitude of effect and sensitivity of the abstraction/PWS are the same as SEPA's suggested criteria. In this assessment an effect assessed to be of **Minor** significance

[1] SEPA, 2024. *Guidance on Assessing the Impacts of Developments on Groundwater Abstractions*. Available at: https://www.sepa.org.uk/environment/land/planning/guidance-and-advice-notes/

equates to ‘Low’, and **Negligible** significance equates to ‘Negligible/No effect/Unimportant’ in the SEPA nomenclature.

1.1.8 It should be noted that the data on PWS and abstractions is the best available data at the time of writing and is based on consultation with Angus Council, Aberdeen City Council, Aberdeenshire Council, SEPA and local residents via questionnaire surveys, consultation events and property and source visits (**Section 2: Data Sources and Methodology).**

1.1.9 This appendix is supported by **Volume 3, Figures 13.3.1 – 13.3.15: Groundwater Abstractions, Water Supplies and GWDTE** in the EIAR. The figures have been updated in January 2026 to include the 250 m buffer from the LOD and to include the findings of the November 2025 PWS surveys.

2. DATA SOURCES AND METHODOLOGY

2.1.1 Angus Council, Aberdeen City Council and Aberdeenshire Council were consulted in July 2023 and provided data from their database of properties and businesses supplied by a PWS within a search area of a 1 km buffer from the Site boundary. It is noted that Council data may be incomplete and generally refers to the property (and not source) locations. The Aberdeenshire Council data has the following caveats:

- the information provided is unlikely to represent all of the private water supplies and the properties served within the search area specified;
- the supplies identified may no longer be in use or the properties identified may be served by a different source; and
- Aberdeenshire Council is not responsible for further use or interpretation of the data and all records should be subject to verification.

2.1.2 Within the 1 km search area, Angus Council provided a list of 49 addresses indicated to be served by PWS along with supply type, but no confirmed source locations. Aberdeenshire Council provided the locations of 56 PWS source locations and a list of 467 properties which are supplied by a PWS according to their records. PWS data from Aberdeen City Council data recorded no PWS sources or properties within 1 km of the Proposed Development.

2.1.3 SEPA was consulted in September 2023, October 2024 and November 2025. SEPA provided a list of licensed groundwater abstractions within the search area. There are four licensed groundwater abstractions and several surface water abstractions within the search area.

2.1.4 A detailed assessment and verification of the data was required to establish the definitive locations of existing, and unknown, PWS sources, abstractions and supplied properties that may be potentially affected by the Proposed Development.

2.1.5 The online Scottish Water Asset map[2] was consulted to eliminate groups of properties that are shown to be connected to the Scottish Water mains. PWS questionnaires were then posted to all properties within 1 km from the Site boundary, which have the potential of having a PWS to establish whether they were on a PWS or mains connection and to obtain further information on the PWS, if applicable. A total of 1,301 questionnaires were sent out in June 2024. Several questionnaires that were either not returned or were returned unanswered due to incomplete address information or other inabilities to be delivered were reissued in early September 2024. Four additional questionnaires were issued in June 2025 to cover a slightly wider area to account for layout changes. SSEN Transmission, hereby referred to “The Applicant” also collected PWS information at public consultation events in September and October 2024, providing residents with questionnaires if they had not received them in the post.

2.1.6 In total, 294 individual responses were received from the questionnaires, either via paper, email, consultation events or an online response. A door-knocking exercise to visit properties where information was still lacking was carried out in November 2024 and November 2025 to collect and verify the data. Numerous properties were visited by hydrologists from Kaya Consulting. It should be noted that the residents of some properties are also in discussions with the Applicant, who also collected relevant PWS information to inform this assessment, where possible.

2.1.7 Some information was still outstanding following the property visits. This was due to residents not being at home at the time of the door knocking visit and because information was outstanding from residents who are currently in discussions with the Applicant. Several residents provided returns stating it was not their obligation to provide data or that they would withhold data. Comments and assumptions that have been made for the properties with incomplete information are provided in **Section 3: PWS Assessment** for specific PWS.

2.1.8 A total of 97 PWS sources were identified from the questionnaire responses, Council data, consultation events and property visits. Several of these PWS sources are outside the 1 km buffer. An additional six disused PWS were also confirmed; these PWS are linked to properties which no longer utilise them and have a Scottish Water Mains

[2] Scottish Water, n.d. Scottish Water Asset Data. Scottish Water GIS Extranet. [Online] Available at: https://sw.cloud.esriuk.com/portal/apps/webappviewer/index.html?id=ee4bc6712ce64290b41b2d998ec7a749.

connection. A total of eight incomplete surveys were returned in which residents had either refused to provide data or were not aware of details on their water supply. Many of the questionnaire respondents noted that their properties were supplied by Scottish Water mains, so these were recorded and discounted from the assessment. Of the 97 total confirmed PWS sources identified, 38 PWS (including 43 individual PWS abstraction sources, as some PWS have more than one abstraction source) are within 250 m of the Proposed Development LOD. Of the 38 PWS, only one is assumed at Wattieston House (due to a lack of engagement from residents and nearby questionnaire/Scottish Water data to confirm a Mains connection).

2.1.9 **Volume 3, Figures 13.3.1 to 13.3.15: Groundwater Abstractions, Water Supplies and GWDTE** show the locations of PWS abstraction sources, alongside locations of properties served by PWS. The figures are labelled with information on the supply and property names.

2.1.10 Ongoing investigations and discussions with landowners are being conducted by the Applicant to establish the potential PWS source at the assumed PWS property at Wattieston House. This may confirm abstraction source location, reveal separate supply abstraction sources, or eliminate the assumed PWS source from consideration in future.

3. PWS ASSESSMENT

3.1.1 There are 38 total PWS, served by 43 PWS abstraction sources located within 250 m of the Proposed Development LOD. One surface water abstraction PWS, which is located ~500 m downstream of the Proposed Development, was included in the assessment as it draws water from a watercourse downstream of the infrastructure. Each PWS source/ abstraction and the potential effects from the Proposed Development are described below. Ten confirmed PWS sources are located within 100 m of proposed infrastructure.

3.1.2 In the absence of data on groundwater levels and groundwater flow paths, an analysis of topography and surface water flows paths and the type of PWS was used to infer hydrological and hydrogeological connectivity and identify if the Proposed Development could potentially have an effect on a PWS. **Plates 13.2.1** to **13.2.38** in this report show the surface water indicative flow paths, topography and a 250 m buffer from the LOD for each PWS.

3.1.3 Flow path analysis was undertaken for sources and properties to assess potential hydrogeological and hydrological connectivity to the Site. Flow routeing was carried out in QGIS software using Light Detection and Ranging (LiDAR) terrain data, where available, or using Ordnance Survey (OS) contour mapping if detailed topographic data was not available. Subsequently, in areas where LiDAR data is unavailable, the assessment figures may only include indicative flow pathways arrows, as opposed to detailed flow paths.

3.1.4 For PWS and abstractions that are sourced from groundwater (wells, boreholes and/or springs) this assumes that groundwater flows paths are similar to surface water flows paths (a reasonable inference in the absence of groundwater levels and groundwater flow data). The results of the flow routeing analysis were used to determine the potential effect on PWS and what additional mitigation may be required.

3.1.5 The assessment is undertaken assuming that a suite of applied mitigation measures is implemented during construction. Applied mitigation measures are an integral part of the Proposed Development and reflect best practice guidance and recognised industry standards, as well as the Applicant's experience of constructing OHLs. They will comprise a Construction Environmental Management Plan (CEMP) that will comprise, among other requirements, a suite of SSEN Transmission General Environmental Protection Plans (GEMPs) and contractor authored documentation. This will detail general and site-specific measures that will be implemented to avoid or mitigate likely significant effects and that will be effected through planning conditions, construction contract wording or both. These plans and documentation will incorporate best practice guidance and recognised industry standards (eg SEPA guidance, including their *Guidance for Pollution Prevention* (GPPs)[3], CIRIA (Construction Industry Research and Information Association) The SuDS (Sustainable Drainage Systems) Manual[4] and CIRIA control of water pollution guidance[5,6,7]). Forestry felling and removal will follow the good practice guidance and legal requirements set out in Section 9 (Forests and Water) of the *UK Forestry Standard* (2023)[8].

3.1.6 The CEMP will capture all mitigation measures required in respect of hydrology and water quality, as identified in the EIAR and in order to comply with relevant legislation. This will be implemented during construction and operation of the Proposed Development. The applied mitigation will include SSEN Transmission's GEMP TG-NET-ENV-512 (Working in or Near Water), TG-NET-ENV-515 (Watercourse Crossings), TG-NET-ENV-519 (Forestry), TG-NET-ENV-518 (Private Water Supplies), TG-NET-ENV-523 (Bad Weather), GEMP: Soil Management and TG-NET-ENV-520 (Dust Management). The implementation and audit of the measures in the CEMP and GEMP will be overseen by an Environmental Clerk of Works (ECoW). Further details of applied mitigation measures and good practice

[3] Natural Resources Wales (NRW) Northern Ireland Environment Agency (NIEA), SEPA, Guidance for Pollution Prevention (GPPs 1,2,5,6,8,21,22,26) [online]. Available at: https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/ [Accessed: 20 May 2025].

[4] Woods Ballard, B., Wilson, S., Udale-Clarke, H. et al., (2015) CIRIA: The SuDS Manual (C753). CIRIA.

[5] Masters-William, H. (2001) Control of water pollution from construction sites. Guidance for consultants and contractors (C532). CIRIA.

[6] Murnane, E, Heap, A, Swain, A (2006) Control of water pollution from linear construction projects. Site guide (C649) CIRIA.

[7] Murnane, E, Heap, A, Swain, A (2006) Control of water pollution from linear construction projects. Technical guide (C648) CIRIA.

[8] Forest Research (2023) The UK Forestry Standard. Forest Research, Farnham, Fifth Edition [online]. Available at: https://www.forestresearch.gov.uk/tools-and-resources/fthr/uk-forestry-standard/ [Accessed 20 May 2025].

construction measures are provided in **Volume 2, Chapter 13: Hydrology, Hydrogeology, Geology and Soils**, **Table 13.14: Applied Mitigation**.

3.1.7 The following section describes the detailed assessments of all PWS sources within 250 m of the Proposed Development LOD (**Table 13.2.1: PWS sources and abstractions within 250 m of the Proposed Development LOD**) and is structured from Section A in the south to Section F in the north. This includes the one assumed PWS source.

3.1.8 Given the proximity of the Proposed Development to the 38 PWS identified, SSEN Transmission will commit to monitoring all 38 PWS before, during and after construction. The monitoring strategy will be developed in consultation with SEPA and will follow SEPA (2024)[1] guidance on monitoring. Baseline monitoring will commence at least 12 months ahead of the development works starting on site and will continue during the construction phase, and for a minimum of 12 months post-construction. A PWS monitoring plan will be provided prior to construction.

Table 13.2.1: PWS sources and abstractions within 250 m of the Proposed Development LOD[9]

ID	Source Name	Source type	Source Easting	Source Northing	PWS Council/ SEPA abstraction reference (if applicable)	No. of properties supplied	Usage	Additional information	Distance from infrastructure/LOD
Section A									
1	Balkemback Farm	Spring	338550	738750	CAR/L/1010489	1	Agricultural (other than irrigation)	N/A	The property is ~375m east of tower S205 and 100 m north of proposed access to this tower. The spring supply is located ~25 m east of existing track to tower S199
2	Coldstream	Spring x2	339396	739901	N/A	1 - Coldstream	Livestock and general farm use	Fed into storage tank located in the farm	190 m southeast of the proposed, permanent track between towers S196 and S195
			339461	740231					25 m from new, permanent access track near S195; 1 m from tower working compound
3	Nether Arniefoul	Spring (Ironharrow Well)	341009	743799	N/A	Unknown, only 1 confirmed	Domestic	N/A	~280 m east of tower working area
4	Upper Hayston Farm Cottage	Well	340495	745711	N/A	Unknown - the property is on a Scottish Water mains supply. It is assumed that the well may be for farm use	Unknown – possible farm use	N/A	125 m southwest of access track to tower S174

[9] The updated table includes PWS sources which are within 250 m buffer of Proposed Development Limit of Deviation (LOD), following a request from SEPA in October 2025 (SEPA Letter, PCS-20006787, 20 October 2025) to include all PWS sources within 250 m of the LOD. The updated table also includes the findings of data collected during PWS site visits in November 2025 (which was undertaken post EIAR submission to find out further details on assumed PWS). It is noted that several of the assumed PWS in the original Appendix submitted with the EIAR were either confirmed as PWS (with source locations now provided) or confirmed to be supplied by Scottish Water mains and removed from this table and subsequent assessment.

ID	Source Name	Source type	Source Easting	Source Northing	PWS Council/ SEPA abstraction reference (if applicable)	No. of properties supplied	Usage	Additional information	Distance from infrastructure/LOD
Section B									
5	Ballindarg Burn	Watercourse	340700	750200	CAR/L/1010577	1 - Upper Drumgley Farm	Agriculture	Abstraction along a 560 m section of the Ballindarg Burn	245 m west of S163; 216 m west of the temporary access track leading to S164
6	Kalulu House	Spring	346443	757852	N/A	1 - Kalulu House	Livestock, General Farm Use	Used for 4 Horses	~235m southeast of the Limit of Deviation (LOD) ~310m south of Tower S137 working area
7	Balmadity	Watercourse	350591	762220	N/A	2 - Balmadity Cottage, Boggie Cottage	Domestic	-	251 m north of Tower S120 and 180 m north of proposed access track
Section C									
8	Dalladies	Spring	362350	768040	CAR/L/1010417	1 - Dalladies Farm	Abstraction for agricultural irrigation (mobile plant) and drinking water supply	-	250 m northwest of existing track for proposed upgrade leading to S81
9	Cowieshill	Well	367297	772134	N/A	1 - Cowieshill Farmhouse	Domestic	-	165 m to S60; 112 m to proposed access trackway
10	Thornton Estate	Well	368122	772979	N/A	N/A	N/A	-	185 m northwest of temporary access track to Tower S56
Section D									
11	Black Burn	Watercourse	368650	773310	CAR/L/1010555	1 -The Bent	Abstraction for agriculture	Abstraction along a ~1.3 km section of the Black Burn	OHL span across the Black Burn; 120 m west of tower S55

ID	Source Name	Source type	Source Easting	Source Northing	PWS Council/ SEPA abstraction reference (if applicable)	No. of properties supplied	Usage	Additional information	Distance from infrastructure/LOD
12	Ducat Water	Watercourse	369300	774160	CAR/L/1010555	1 - The Bent	Abstraction for agriculture	Abstraction along an ~4.6 km section of the Ducat Water	OHL span across the Ducat Water; 86 m north of tower S50. 25 m from tower working areas
13	Cairnton Farm	Watercourse	372767	776856	CAR/L/1012369	1	General Farm Use	N/A	300m east of existing track for upgrade
14	Cushnie Farm	Spring	375213	77890	50036	1 - Cushnie Farm	Farm use	-	178 m south of the proposed temporary access track leading to S28
15	Burnhead of Monboddo	Spring	374568	779182	N/A	1 - Burnhead of Monboddo	Domestic, livestock, general farm use	Has never dried up	245 m from tower S28
		Stream – Hungeral Burn	374562	779237				Likely serves horses at the property	255 m from S28; 37 m south of proposed access trackway
16	Wattieston House	Assumed PWS-source type unknown	375211	779461	N/A	Unknown	Unknown	Unknown	Unknown, assumed to be at the property, ~220 m from proposed new temporary access track
17	Inches Cottage and Farm	Well (Subsurface Spring)	376649	782341	N/A	At least 12 including Inches Cottage and Farm, Glenbervie Church and Ice Cream Factory	Domestic, livestock, general farm use, commercial	Supplies at least 18 m^3/day, subject to testing by Aberdeenshire Council as it is a Type A1 supply	245 m east of tower S17 working area
18	Cotbank	Spring	376767	782760	N/A	9 houses, 2 farms and 3 steadings, serving up to 24 individuals	Domestic, livestock, general farm use, commercial	Two of three sources supplying properties in the surrounding area.	Spring is ~10 m from the working area for tower S15 and 62 m from the tower. The second source (well abstraction) is ~210 m northwest of the LOD.
		Well	376460	782931					

ID	Source Name	Source type	Source Easting	Source Northing	PWS Council/ SEPA abstraction reference (if applicable)	No. of properties supplied	Usage	Additional information	Distance from infrastructure/LOD
19	Jacksbank	Spring	376846	782985	N/A	4 - Jacksbank Farm, Jacksbank House, 1 + 2 Jacksbank Cottages	Domestic, livestock, general farm use	Supplies 10 people and 200 cattle; partially goes dry in the Summer	172 m northwest of tower S15
		Borehole	376796	783226					190 m northwest of working area around tower S14
20	Blererno	Well	377924	782921	71650	2 properties at Blererno Cottages	Domestic		103 m east of the existing track leading to Jacksbank Wind Farm which is to be upgraded for the Proposed Development
21	Cuttiesoutar	Well	379167	784558	N/A	1 - Cuttiesoutar	Domestic	Good quality, constant supply	~175 m southeast of the LOD around tower S6 at its nearest point, ~250 m southwest of proposed track LOD ~290 m southwest of proposed new stone temporary track and ~320 m southeast of Tower S6 working area
22	Fetteresso Substation	Rainfall-fed	378997	785876	175	1 Commercial - Substation	Commercial	-	70 m north of existing access track for upgrade
Section E									
23	Stonehouse Cottage[10]	Watercourse-Cowie Water	377060	787835	N/A	1 - Stonehouse Cottage	Domestic	Water supply used for 30 years, never had any issues	~500 m downstream of existing track for upgrade

[10] The PWS abstraction is ~500 m downstream of the Proposed Development but is included in the assessment as it is a surface water abstraction which draws water from a watercourse that is downstream of the proposed infrastructure.

ID	Source Name	Source type	Source Easting	Source Northing	PWS Council/ SEPA abstraction reference (if applicable)	No. of properties supplied	Usage	Additional information	Distance from infrastructure/LOD
24	Tillybreak	Watercourse- unnamed tributary of the Cowie Water	378290	788376	N/A	1 - Tillybreak	Unknown	-	30 m south of existing track for upgrade
25	Monearn Lodge	Borehole	377349	791741	N/A	1 - Monearn Lodge	Unknown	-	~150 m south of existing track for upgrade
26	Wester Durris	Spring	376591	795591	N/A	At least 3, including Wester Durris, Wester Durris Cottage and Milton, potentially Wainsgate	Domestic, potentially general farm use	N/A	~190 m west of existing track for upgrade ~244 m southwest of alignment deviation tower 492R working area
Section F									
27	Woodbank	Well	377360	798504	N/A	Unknown – Location informed by resident at Woodbank House however it is unclear whether the supply serves this property, or any others	Unknown	The well was visited during the field survey but it did not appear to be in use	14 m west of the proposed temporary access track leading to N55; 60 m south of working area of tower N55
28	Park Estate	Well	377534	798716	N/A	1 - Lochwood Cottage	Domestic	Used as a backup water supply for Lochwood Cottage	157 m east of the proposed OHL spanning between N55 and N54
		Surface Water Collection/Spring	377583	799342	35448	At least three - Lochwood Cottage, Westhills Cottage, Hill of Park		Fed to properties via pipework	205 m northwest of N53

ID	Source Name	Source type	Source Easting	Source Northing	PWS Council/ SEPA abstraction reference (if applicable)	No. of properties supplied	Usage	Additional information	Distance from infrastructure/LOD
29	King's Well	Well	377339	798901	N/A	Possibly Westhills Cottage and Woodbank House	Unknown - There is currently uncertainty from residents whether the well serves as a supply	It is noted that Westhills Cottage is also served by the Park Estate spring	84 m southwest of N54 and 32 m southwest of the proposed temporary access track
30	Templefold	Well	377144	803194	N/A	1	General Farm Use, Livestock	Well is around 4-5m depth	~210 m from temporary access track to tower N42 and 215m from tower N42 working area
31	East Finnercy	Spring/ Borehole	376753	804112	34535	At least one - Little Finnercy but likely up to 6	Domestic	-	~140 m south of proposed permanent track at tower N38
32	Stepsbrae Steading/Backhill of Glack	Well	374493	810670	498	2 - Stepsbrae Steading, Backhill of Glack	Domestic, livestock	New water supply	93 m northwest from OHL spanning between N15 and N14
33	Lauchintilly	Borehole	374602	812621	N/A	2	Domestic, General Farm Use. Livestock	Borehole is approximately 35m	60 m west of existing track for upgrade

ID	Source Name	Source type	Source Easting	Source Northing	PWS Council/ SEPA abstraction reference (if applicable)	No. of properties supplied	Usage	Additional information	Distance from infrastructure/LOD
34	Barnyards of Drumnaheath[11]	Potential Borehole or Well	375281	812354	N/A	At least six properties – 1 to 5 Barnyards of Drumnaheath and Drumnaheath Farm House	Domestic	Known to have limited supply in summer, Borehole is 25–30 m deep. Drainage source from field up hill to southwest. Quality and quantity fluctuate based on several factors in recharge area.	~200 m north of the LOD at its nearest point ~300 m north of Tower N9 working area
35	Osborne Leylodge	Well	375865	812752	N/A	1 – Osborne Leylodge	Domestic	Very good supply. Never runs dry	~150 m northwest of the LOD at its nearest point 336 m northeast of Tower N7 working area
36	Bogfold	Well	376001	812659	N/A	1 - Bogfold	Domestic, livestock	Fed into storage tank at 376018, 812672; good supply	196 m northwest from N7
37	Leylodge Schoolhouse	Spring	376474	812599	N/A	1 - Leylodge Schoolhouse	Domestic, Livestock	Water line installed in the 1950s; pipe is not buried deep and is brittle	170 m southeast of N6
38	Dewsford	Well	376399	814184	N/A	2 – Dewsford Cottage and Dewsford Farm House	Domestic	Concrete lined well with lid, very good quality	236 m northwest of the nearest point of the LOD ~310 m west of proposed track to N1

[11] This abstraction source is based on residents reported data and could not be confirmed as present in the field. There is a known borehole which supplies Barnyards of Drumnaheath just outwith the 250 m LOD buffer at NGR 375323, 812485, which is not included in the detailed assessment.

3.2 Section A

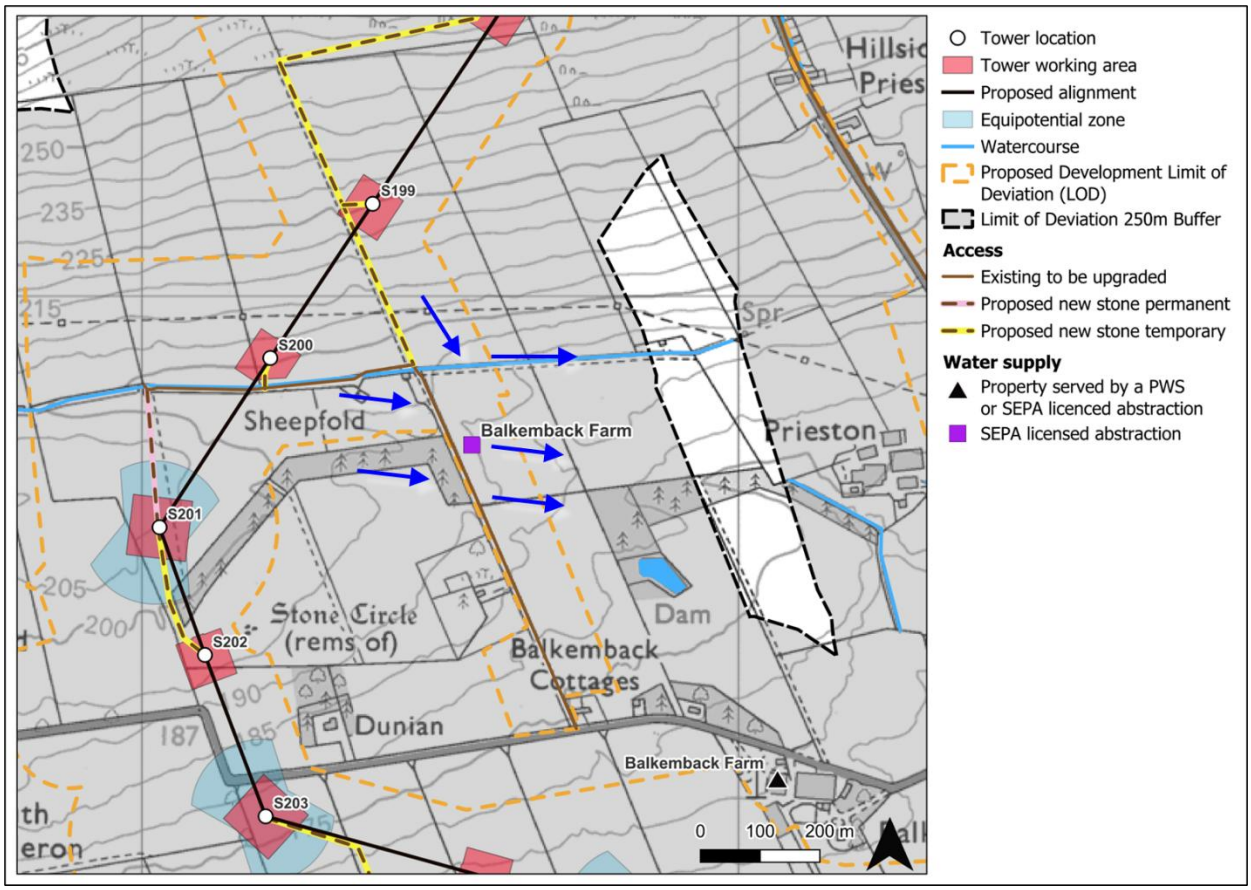
Balkemback Farm- PWS (SEPA CAR Licensed abstraction from groundwater spring)

3.2.1 Balkemback Farm is served by a spring, located around 500 m northwest of the property, as shown by the red diamond in **Plate 13.2.1: Balkemback PWS, topography and indicative surface flow paths (blue arrows)** marking the abstraction source location. The abstraction rate from the spring is unknown. A resident at the adjacent Balkemback Farm Cottages has confirmed they are served by a Scottish Water Mains supply, so it is likely that Balkemback Farm is also served by a Mains supply for domestic use and that the PWS is utilised for general farm use. There is no further additional information known regarding the supply.

3.2.2 The topography of the Balkemback Farm spring slopes gently downhill to the southeast. The spring sits directly beside what was the previous, natural route of a watercourse which has since been diverted, which is shown clearly in topographic mapping. SEPA flood mapping indicates that this route and the area at the spring is part of a surface water flow pathway which is at flood risk, with surface flows draining to the southeast. The proposed permanent access to towers S200, S199 and S198 is located ~25 m west of the spring abstraction location, with the spring sited slightly downslope of the existing access. There is therefore minor potential for construction runoff to affect the PWS quality, which will be captured by the embedded mitigation measures such as SuDS, swales, silt fences etc. Since no excavation will be required for upgrading the track, there will be no effect on groundwater levels and the magnitude of impact is negligible. As the PWS is for general farm use it is considered to be of low sensitivity. The effect on the spring without additional mitigation is considered to be **Negligible** and no additional mitigation will be required.

3.2.3 Monitoring of the spring will be undertaken before, during and after construction to check there is no contamination of the supply. Monitoring will be undertaken by an ECoW, and monitoring would likely be at the abstraction location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons), or quantity decreases an alternative water supply will be installed, such as using the existing mains supply to the farm or using portable bowsers, to ensure minimal disruption of supply during construction.

Plate 13.2.1: Balkemback PWS, topography and indicative surface flow paths (blue arrows)

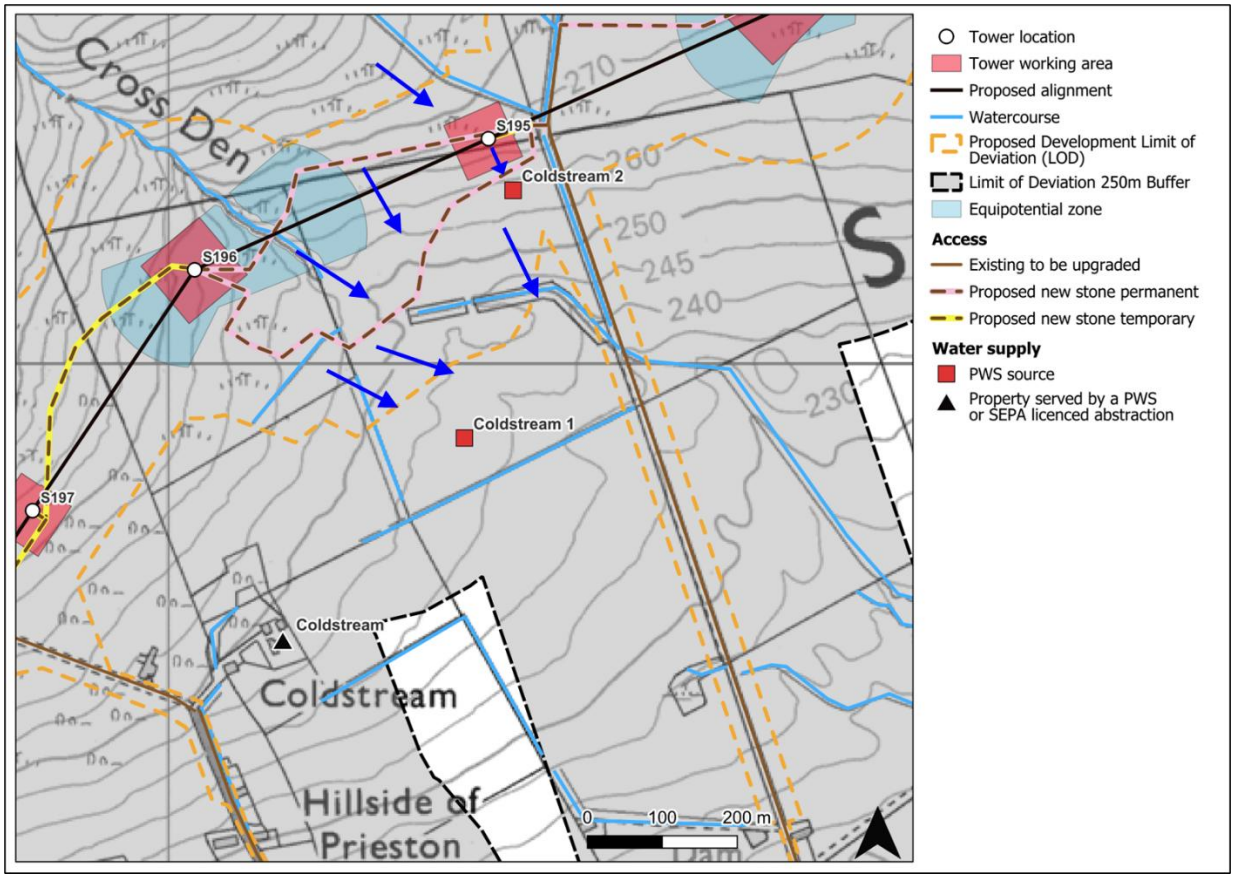


Coldstream PWS- PWS from two groundwater springs

3.2.4 Coldstream, Tealing is served by two springs, 380 m and 680 m northeast of the property (labelled 1 and 2 respectively on **Plate 13.2.2: Coldstream PWS, topography and indicative flow paths (blue arrows)**). The most prominent spring at the time of site visit, Spring 2 is shown in **Photo 1**. The abstraction rate from both springs is unknown. The resident noted that the springs provide a constant supply and excellent quality of water. The PWS is used for livestock and general farm use and is stored in a storage tank in the barn/shed by the property. The property has a Scottish Water Mains connection for domestic use.

3.2.5 The topography around Spring 1 slopes downhill to the southeast. A review of the topography and SEPA surface water flood maps[12] indicate that surface flows drain to the southeast in this area. The proposed permanent access track to tower S196 is located ~190 m northwest of Spring 1 and tower S195 is ~397 m north of the spring. Given the distance from infrastructure, it is considered that the magnitude of impact on the water quality and quantity at Spring 1 is negligible. As the PWS is for general farm use it is considered to be of low sensitivity and the significance of effect is considered to be **Negligible**.

Plate 13.2.2: Coldstream PWS, topography and indicative surface flow paths (blue arrows)



3.2.6 The topography around Spring 2 slopes downhill to the southeast/south. Generally, SEPA surface water flood maps indicate that surface flows drain away to the southeast in this area. The source was identified during field surveys and the spring was noted to have a constant minor, surficial flow at the time of the site visit. The proposed working area (holding out blocks) at tower S195 is around 1 m north of the spring head source. Excavation for the tower and working area so close to the spring source required would likely have an adverse effect on the PWS quantity and quality, assessed to be of high magnitude.

3.2.7 Tower S195 proposed permanent access track would also be located upslope of the Spring 2 abstraction source, ~25 m northwest, with an alternative access track route also proposed 90 m northwest. Flow pathways indicate that the track positioning has the potential to effect water quality of the PWS, as a result of run-off associated with

[12] SEPA, n.d. Scottish Water GIS. [Online] Available at: https://scottishepa.maps.arcgis.com/.

construction works. The sensitivity of the PWS is low, but with a high magnitude of impact, the significance of the effect on this spring source, without additional mitigation is considered to be **Moderate**.

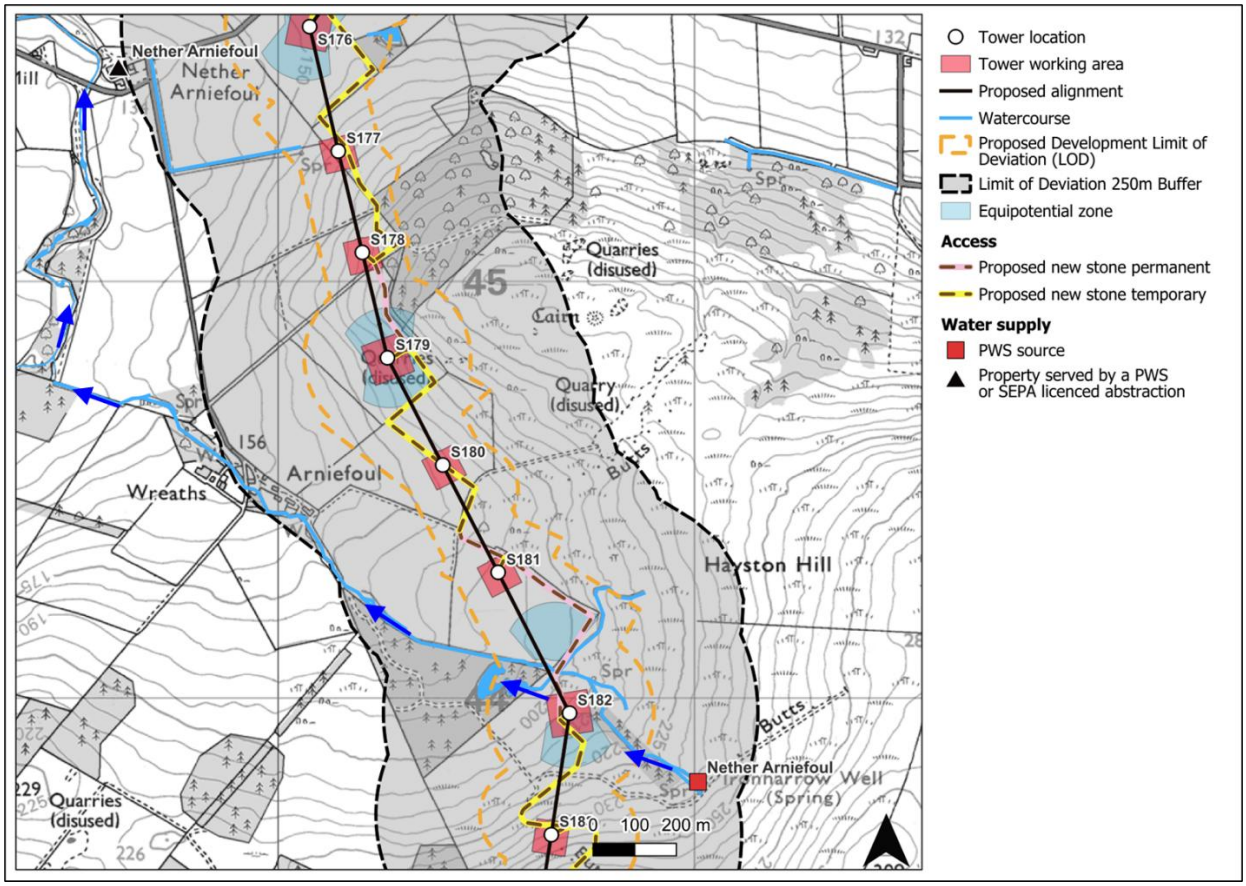
3.2.8 Additional site-specific measures will be set out in the CEMP to minimise the risk of surface water runoff draining from the construction site to the PWS sources (eg swales, settlement ponds, silt fences etc) and the working area around tower S195 will be modified to increase the buffer from the working area to Spring 2, where possible. Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by an ECoW, and monitoring would likely be at the storage tank tap. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed, such as portable bowsers, to ensure minimal disruption of supply during construction. The contractors will have a supply of bowsers ready to deploy, if required. In this case the property already has a Scottish Water Mains connection for domestic use, which could be used if the farm use PWS is temporarily compromised during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new private water supply for the farm.

Photo 1: Spring 2 upwelling at source abstraction location, no sign of abstraction equipment was noted

Nether Arniefoul - Ironharrow Well Spring

3.2.9 The location of the PWS serving Nether Arniefoul is located 2.2 km southeast of the property, shown on **Plate 13.2.3: Nether Arniefoul and PWS location at Ironharrow Well, topography and indicative flow paths (blue arrows)**. The residents of the property indicated that their PWS is a spring on Hayston Hill behind the woodland but were unsure about the exact location. OS 1:25k mapping shows a spring called Ironharrow Well, with aerial imagery showing a small shed adjacent to it, indicating that that this spring is likely used as a water supply. It is assumed that the water is piped underground to the property however there is no information on the location of the pipework. Online Scottish Water asset maps also show that the property has a mains connection.

Plate 13.2.3: Nether Arniefoul and PWS location at Ironharrow Well, topography and indicative flow paths (blue arrows).



3.2.10 There is no LiDAR data available but OS 1:25k mapping details ground levels. The spring is located 227 m southeast of the equipotential zone around S183, which will not be subjected to excavations. There is an elevation difference of around 15 m, with the spring sitting upslope of the Proposed Development. The PWS will therefore not be affected by surface water runoff. The spring abstraction source at Ironharrow Well is ~280m southwest of the working area of tower S182 and ~270m from the nearest proposed access track (or any construction activities requiring excavation) and therefore there is no requirement for consideration of the effects of excavation. The effect of construction activities at the proposed infrastructure on the Ironharrow Well supply is therefore expected of negligible magnitude. The sensitivity is low and the significance of effect is **Negligible**. However, there is a possible risk of disruption to the pipework, which may have to be crossed by the proposed permanent access track between towers S182 and S176.

3.2.11 A detailed investigation of the distribution network prior to construction will be carried out and cognisant during construction to ensure the pipes are avoided or managed accordingly. This will be set out in the CEMP. Monitoring of the well will be undertaken before, during and after construction. Monitoring will be taken at the groundwater springs at Ironharrow Well itself. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction.

Upper Hayston Farm Cottage PWS - Groundwater Well

3.2.12 Upper Hayston Farm Cottage PWS is a well located in the garden of the farm cottage property (**Plate 13.2.4: Upper Hayston Farm Cottage PWS, topography and indicative flow paths (blue arrows))** and **Photo 2**. There is little known information on the supply, as the residents could not be reached by both questionnaire and multiple site visits. Scottish Water mapping indicates the property is served by the mains supply but it is assumed that the well also serves the property, possibly for farm use. The well is located ~300 m east of the tower S175 and ~120 m southeast of the temporary access track to tower S174.

Plate 13.2.4: Upper Hayston Farm Cottage PWS, topography and indicative flow paths (blue arrows)

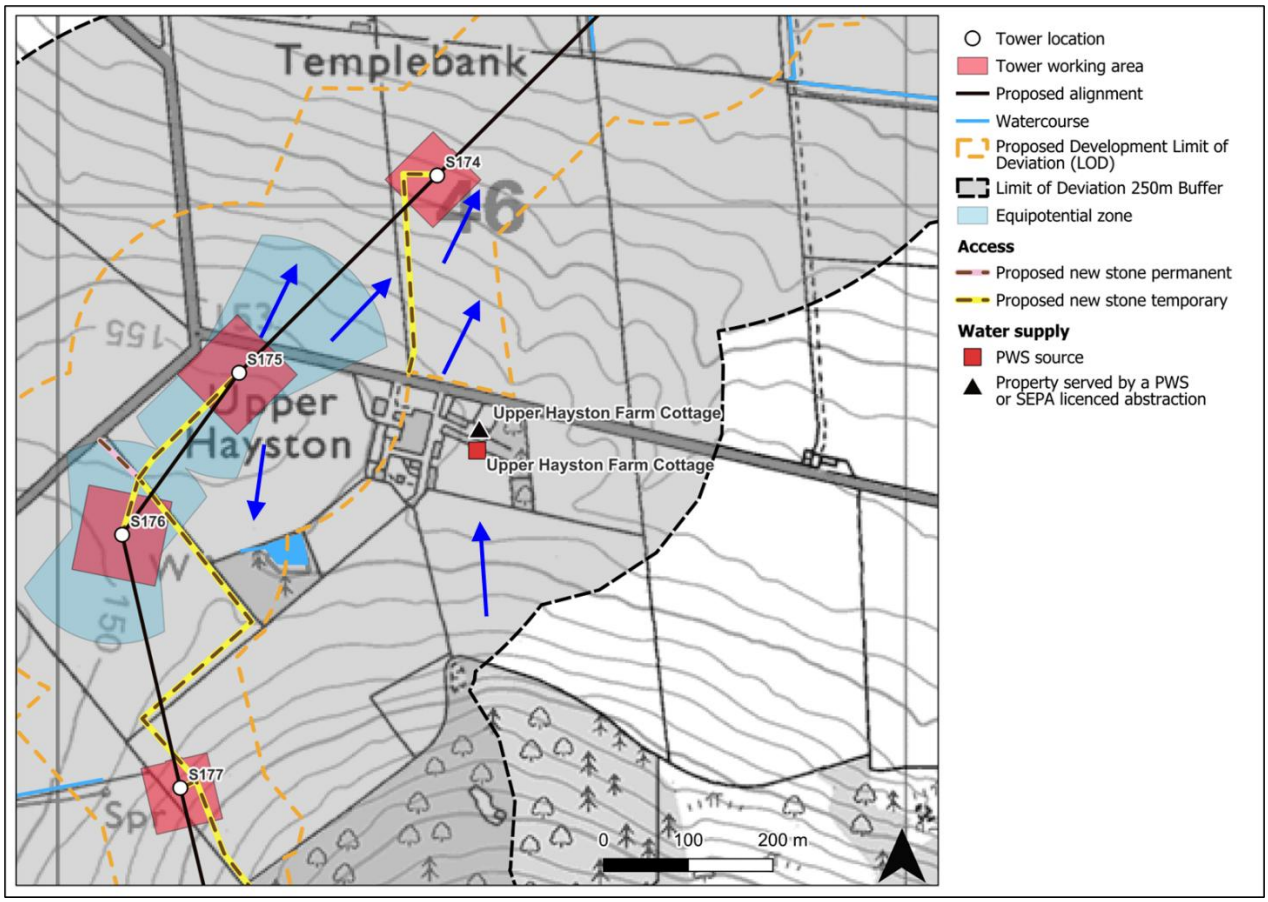


Photo 2: Abstraction source well at Upper Hayston Farm Cottage

3.2.13 OS 1:25k contour mapping indicates that there are no flow pathways from the proposed access track towards the PWS abstraction location, therefore it is very unlikely that there would be any effect on the water quality at the well. Excavation required for the access track is unlikely to be to a significant depth that would affect water quantity serving the well. The magnitude of impact is assessed to be negligible, and the sensitivity is low, resulting in an effect of **Negligible** significance and no additional mitigation is required.

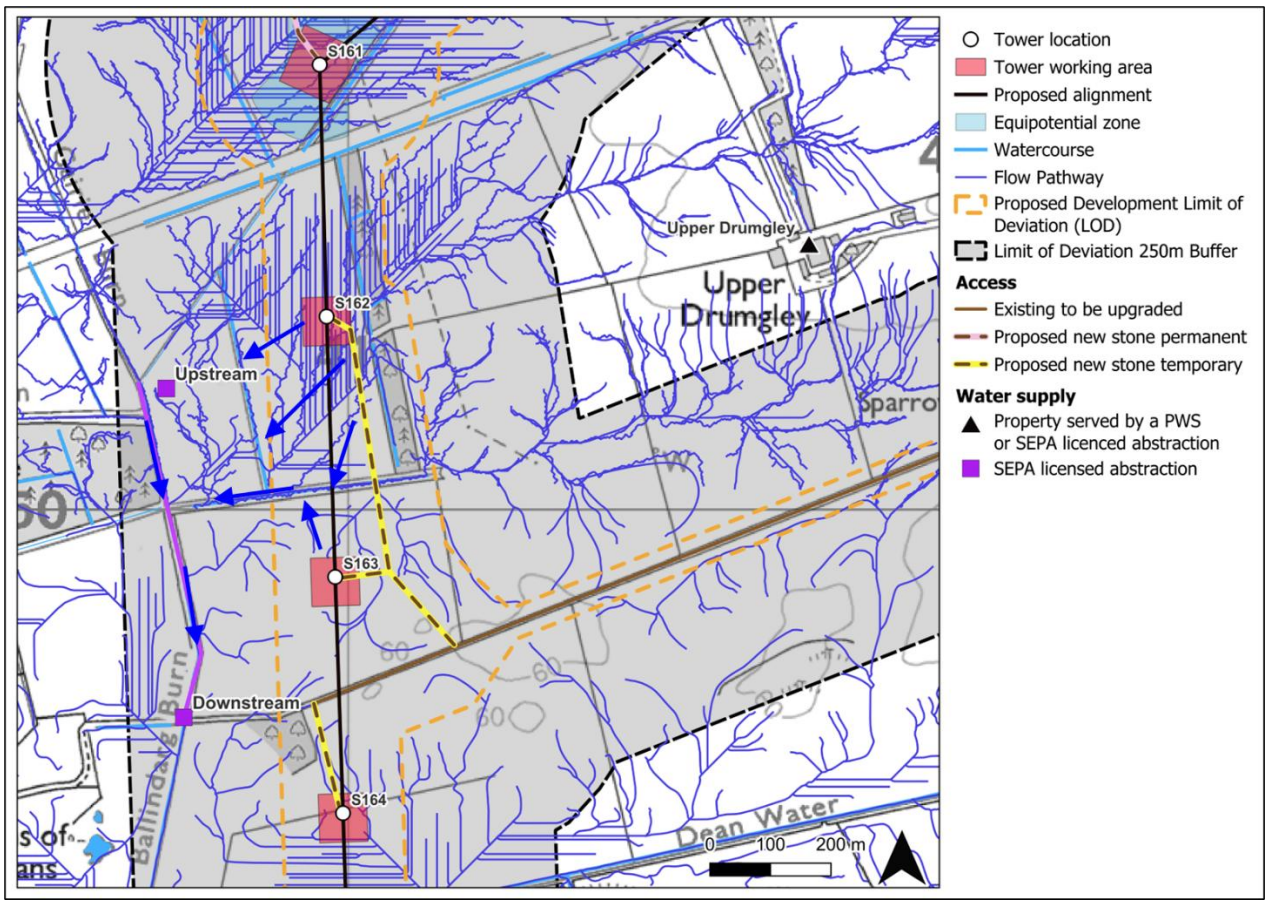
3.2.14 Monitoring of the well will be undertaken before, during and after construction. Monitoring will be undertaken from the well itself.

3.3 Section B

Ballindarg Burn - PWS (SEPA CAR Licensed abstraction from Ballindarg Burn)

3.3.1 A ~550 m section of Ballindarg Burn is a SEPA CAR licenced abstraction which serves Upper Drumgley Farmhouse (Licence: CAR/L/1010577) in Section B1 (**Plate 13.2.5: Ballindarg Burn SEPA licenced abstraction, topography and indicative flow paths (blue arrows)**). The SEPA abstraction point is not noted directly on the watercourse. There are no details on abstraction rates. The abstraction area extends from the confluence with the Roundy Burn to the track leading to Haughs of Cossans downstream. The property also has a Scottish Water Mains supply, so it is likely that the abstraction is for farm use.

Plate 13.2.5: Ballindarg Burn SEPA licenced abstraction, topography and indicative flow paths (blue arrows)



3.3.2 At the closest point, tower S163 would be 245 m west of the burn. The topography surrounding the proposed tower is flat and SEPA flood maps show surface water flooding pooling in the field, rather than draining towards the burn. Immediately upstream of the abstraction area, there is an unnamed drain which feeds into the burn and lies ~50 m southeast of tower S161. However, with applied mitigation measures in place, it is considered that surface water pollution from construction run-off entering the watercourse at the PWS abstraction is unlikely and of negligible magnitude. The sensitivity of the PWS is low. Therefore, the significance of effect on the abstraction is considered to be **Negligible**.

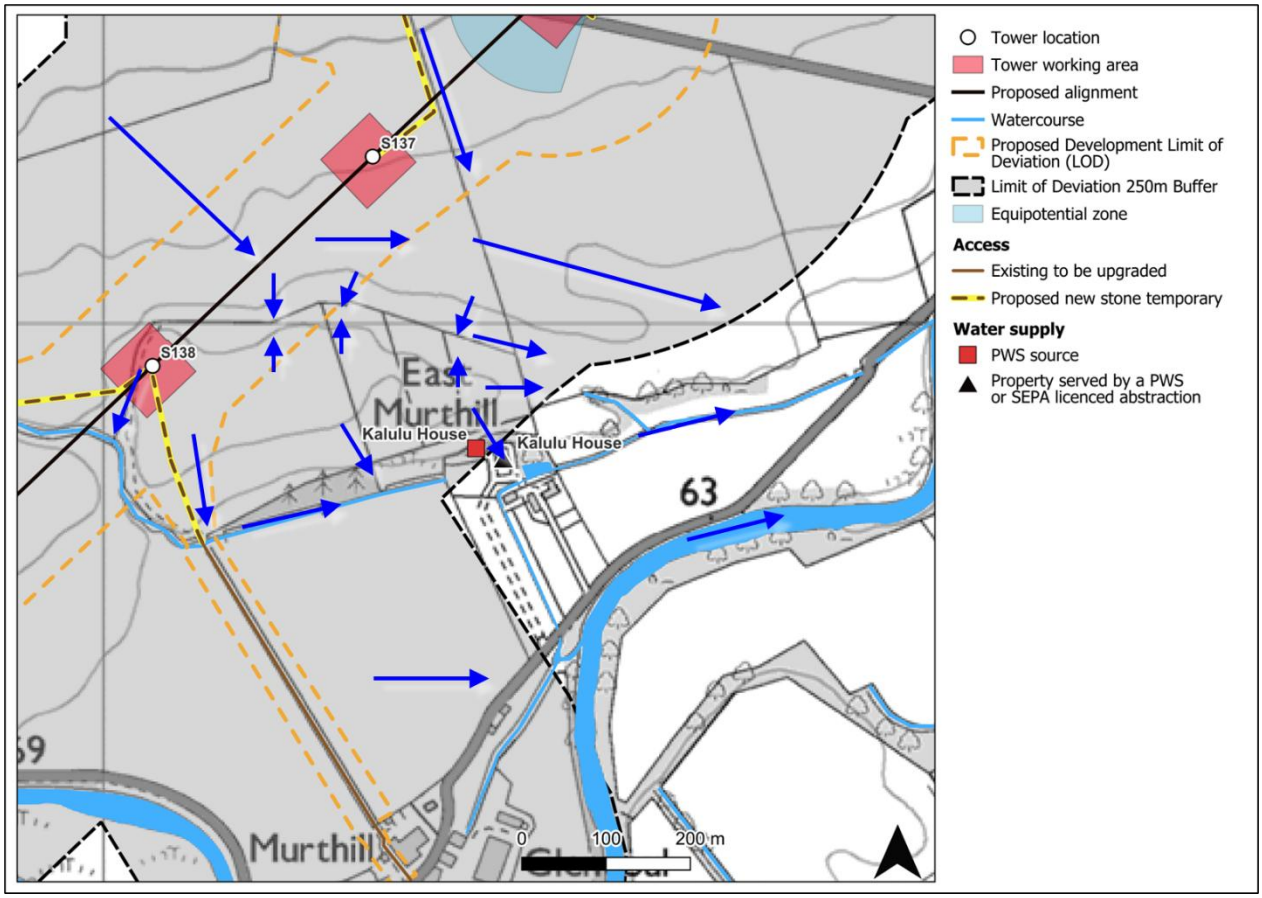
3.3.3 Monitoring of the burn will be undertaken before, during and after construction to check there is no contamination of the supply. Monitoring will be undertaken by an ECoW, and monitoring would likely be at the abstraction location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons), or quantity decreases an alternative water supply will be installed, such as using the existing mains supply to the farm or using portable bowsers, to ensure minimal disruption of supply during construction.

Kalulu House- Groundwater Spring

3.3.4 Kalulu House is a groundwater spring abstraction, located approximately 40 m northwest of the property, shown in **Plate 13.2.6: Kalulu House PWS, topography and indicative flow paths (blue arrows)**. The abstraction rate from

the spring is unknown. The resident notes that the spring is utilised for Livestock and General Farm Use and that the property has an existing Scottish Water Mains Connection. The resident has informed that the PWS is used for 4 horses, with no human consumption. There are no other additional details provided on the supply such as water quality.

Plate 13.2.6: Kalulu House PWS, topography and indicative flow paths (blue arrows)



3.3.5 The spring is sited at the southeast foot of a small hill, directly adjacent to an unnamed tributary of the River South Esk, which likely controls groundwater levels at the spring. The topography at the spring slopes downhill to the south/southeast, with the spring PWS abstraction located at approximately 70 mAOD. The abstraction source is located approximately 235 m southeast of the LOD at its closest point. The nearest proposed infrastructure is located approximately 310 m north of the abstraction at the working area of tower S137, which lies upslope at around 90 m AOD. There is a small topographic valley between the spring and tower S137, draining surface water to the southeast away from the spring. There is additionally proposed new stone temporary track approximately 340 m west of the spring abstraction source.

3.3.6 In the scenario that infrastructure is located at the edges of the LOD in the closest proximity to Kalulu house groundwater spring abstraction source, there are no surface water flow pathways from these areas to the spring. With applied mitigation measures in place, it is considered that surface water pollution from construction run-off from upslope of the PWS abstraction is unlikely and of negligible magnitude. Infrastructure would also be located at levels higher than the spring abstraction or on the opposite side of the valley to the north of Kalulu House and therefore would be hydrologically separated and very unlikely to affect the supply. The magnitude of impact is assessed to be negligible, and the sensitivity of the PWS is low, resulting in an effect of **Negligible** significance and no additional mitigation is required.

3.3.7 Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply. Monitoring will be undertaken by an ECoW, and monitoring will be at the abstraction location.

Balmadity Cottage PWS - Surface water abstraction from unnamed tributary to Cruick Water

3.3.8 Balmadity Cottage PWS is a stream abstraction from an unnamed tributary to the Cruick Water which flows to the east (**Plate 13.2.7: Balmadity PWS, topography and indicative flow paths (blue arrows)**) and **Photo 3**. The abstraction rate is unknown. The PWS supplies at least two properties including Balmadity Cottage and Boggie Cottage, and likely also serves Balmadity Farm and Boggie. It is assumed that it serves Balmadity Farm and Boggie as there are no other known PWS or mains in the area, and Boggie is in close proximity to Boggie Cottage, which is served by the Balmadity supply. There is no additional information known about the supply.

Plate 13.2.7: Balmadity PWS, topography and indicative flow paths (blue arrows)

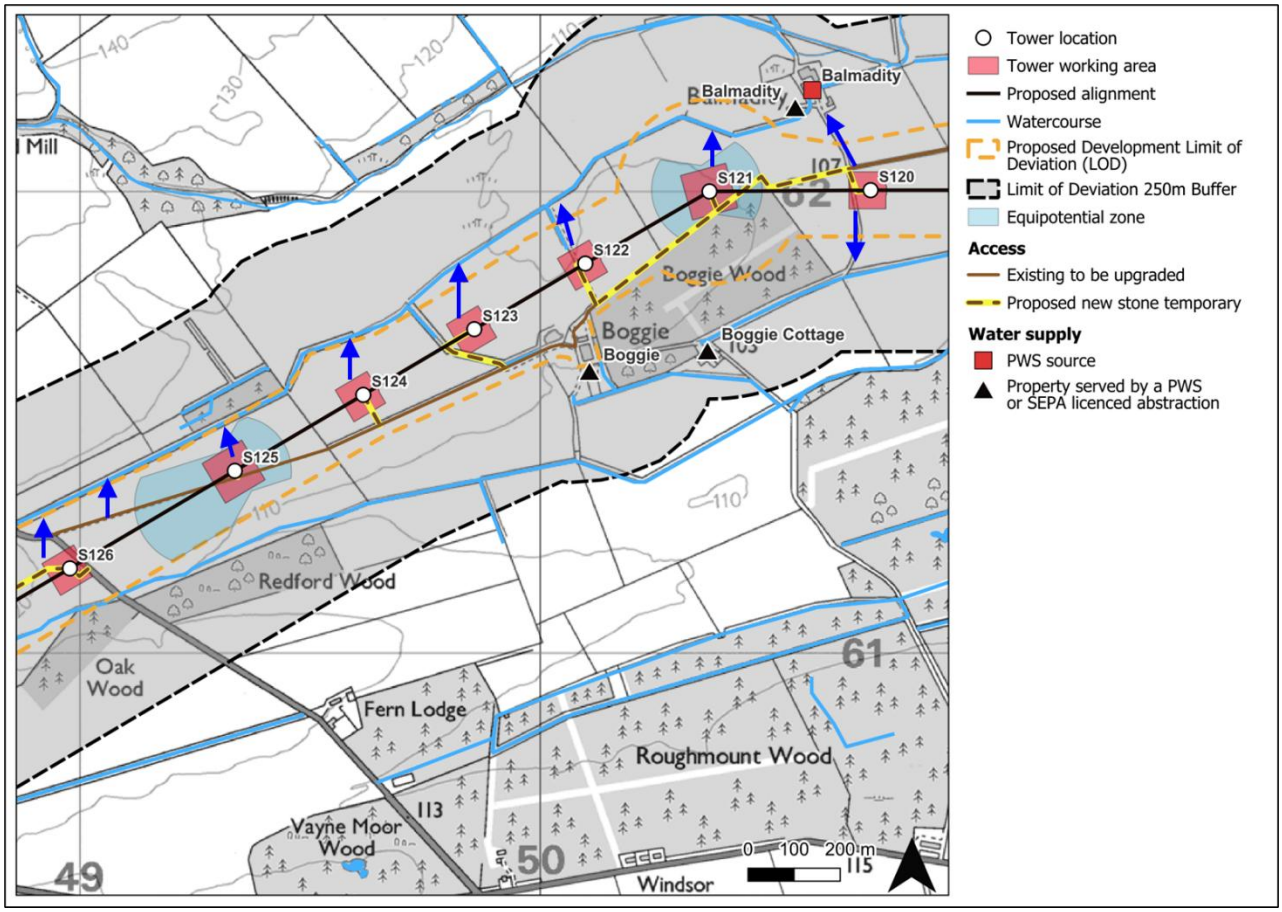


Photo 3: Shows the private water supply abstraction at the unnamed tributary to the Cruick Water

3.3.9 The PWS abstraction is located ~190 m north of the proposed tower S120 working area on the left bank of the watercourse. LiDAR data is currently unavailable for flow pathway analysis but OS 1:25k contour mapping indicates that flow paths from S120 are to the south towards the Coe Burn, away from the PWS abstraction.

3.3.10 While it appears that flow paths from S120 (the only infrastructure within 250 m of the PWS abstraction source) are to the south, away from the PWS abstraction, it should be noted that S121 (which would lie ~310 m southwest of the PWS, is within 250 m of the unnamed tributary watercourse and has the potential to affect the PWS abstraction water quantity. There is potential for towers S126, S125, S124, S123, S122 and S121 to affect the PWS quality via surface water runoff, with tower S121 being the closest upstream. There are likely also lesser flow paths to the north of tower S120, as indicated in **Figure 13.2.6.** All of these towers would be within 250 m of the unnamed tributary of the Cruick Water, upstream of the PWS abstraction. OS 1:25k contour mapping indicates that there are surface water flow pathways from the towers downslope towards the north/northwest to the watercourse. Therefore, there is potential for construction runoff from these tower working areas to flow downslope into the watercourse and affect the PWS abstraction further downstream to the east. None of the towers from S126 to S121 are within 250 m of the PWS abstraction location. The sensitivity of the PWS is medium however given the distance from the towers and the applied mitigation measures that will be implemented during construction, the magnitude of impact is considered to be negligible to low. The effect on the PWS without additional mitigation is considered to be temporary and of **Negligible** to **Minor** significance.

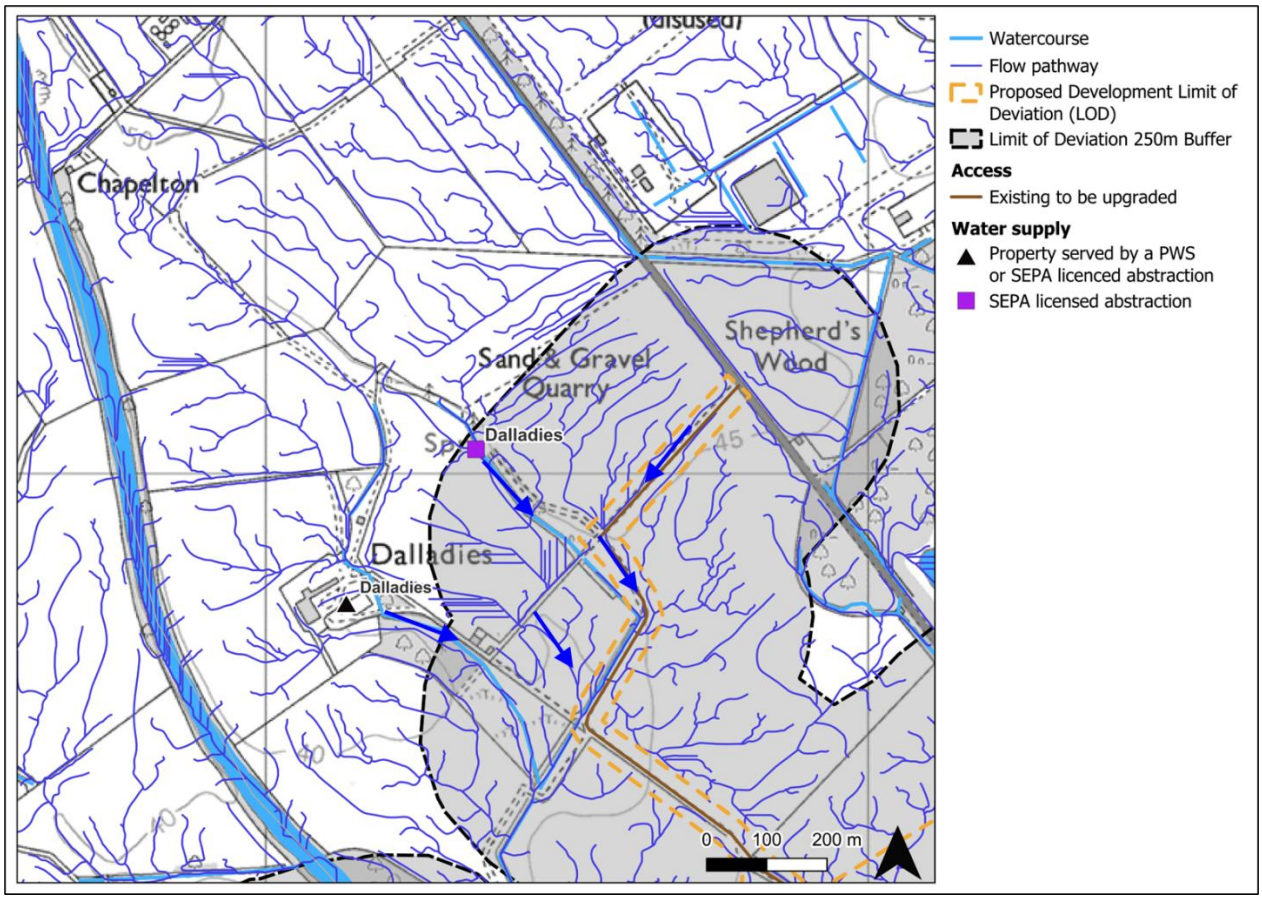
3.3.11 Additional site-specific measures will be set out in the CEMP to minimise the risk of surface water runoff draining from the construction site to the watercourse/PWS source (eg swales, settlement ponds, silt fences etc). Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply. Monitoring will be undertaken by an ECoW, and monitoring will be at the abstraction location in the watercourse. If the water quality temporarily deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases, an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction.

3.4 Section C

Dalladies PWS - (SEPA CAR Licensed abstraction from groundwater spring)

3.4.1 Dalladies PWS is a spring supply utilised for agriculture (irrigation- mobile plant) purposes and as a private drinking water supply (**Plate 13.2.8: Dalladies SEPA licenced abstraction, topography and indicative flow paths (blue arrows)**). This PWS was identified from SEPA CAR licence abstraction data. The spring is noted on OS 1:25K mapping. The maximum rate of abstraction from this source is noted at 11 m^3/day.

Plate 13.2.8: Dalladies SEPA licenced abstraction, topography and indicative flow paths (blue arrows)



3.4.2 The spring is located ~250 m to the northwest of proposed existing access track for upgrade. It is unlikely that significant excavation will be required for this upgrade and OS 1:25k contour mapping indicates that there are no surface water flow paths towards the PWS abstraction location from the existing track, therefore the magnitude of impact of the Proposed Development on the spring is assessed to be negligible.

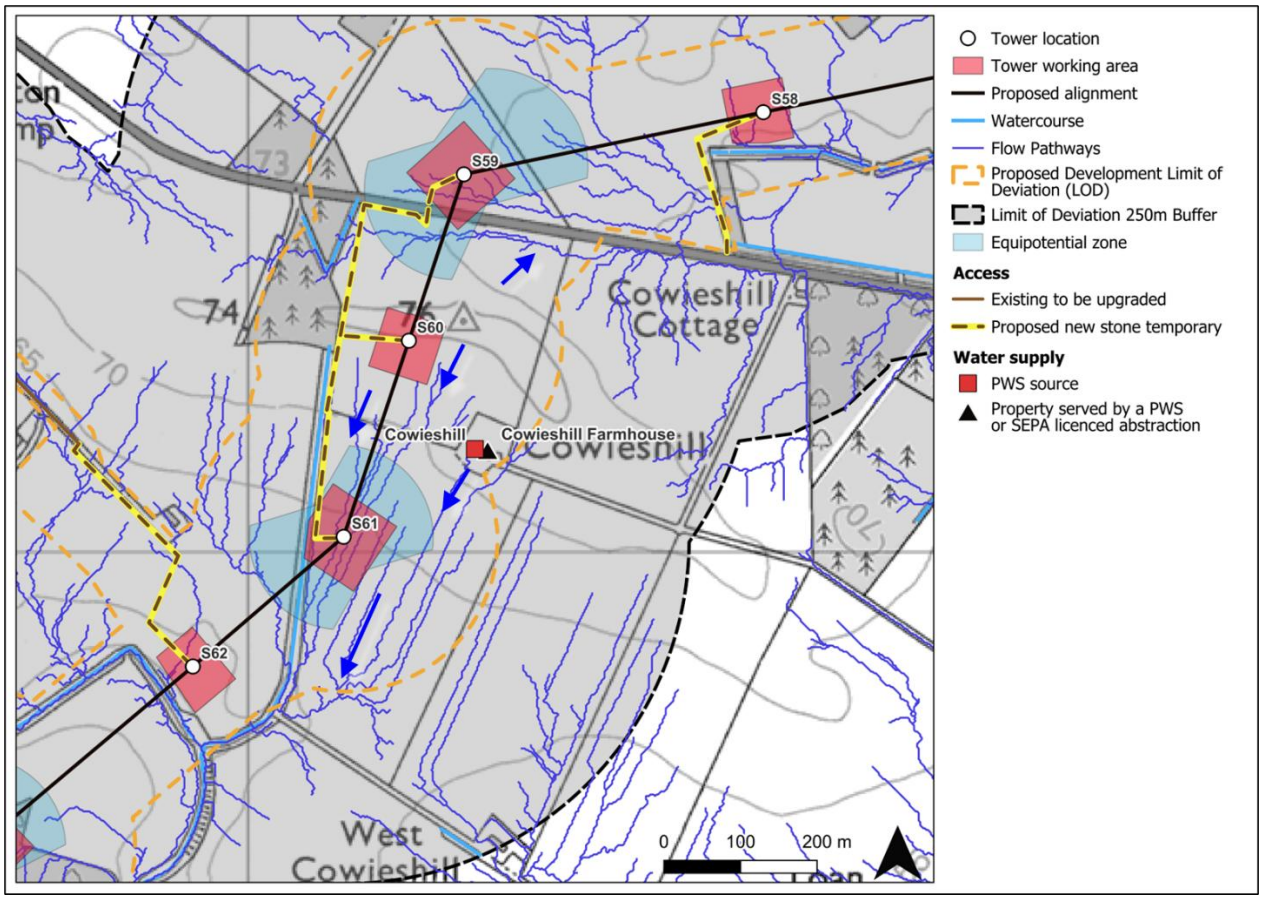
3.4.3 The sensitivity of the PWS is medium and the significance of effect on the PWS from the Proposed Development is **Negligible**.

3.4.4 Monitoring of the PWS will be undertaken before, during and after construction. Monitoring will be undertaken at the property tap.

Cowieshill PWS - Groundwater Well

3.4.5 Cowieshill PWS is a well located just west of Cowieshill Farmhouse on the Thornton Estate (**Plate 13.2.9: Cowieshill PWS, topography and indicative flow paths (blue arrows)**). This PWS supplies one known property, Cowieshill Farmhouse and is used for domestic purposes. The abstraction rate and the depth of the well are unknown. There is no additional information on the supply at the time of writing.

Plate 13.2.9: Cowieshill PWS, topography and indicative flow paths (blue arrows)



3.4.6 Tower S60 working area would be located ~105 m northwest of the PWS abstraction location. Tower S61 working area would be located ~145 m southwest of the PWS abstraction source. Tower S60 is located on slightly higher ground (~ 75 mAOD (metres above ordnance datum)) than the PWS abstraction location, which is at ~71 mAOD. Flow pathway analysis using the LiDAR topographic data indicates that there would be no surface water flow paths from the Proposed Development to the PWS.

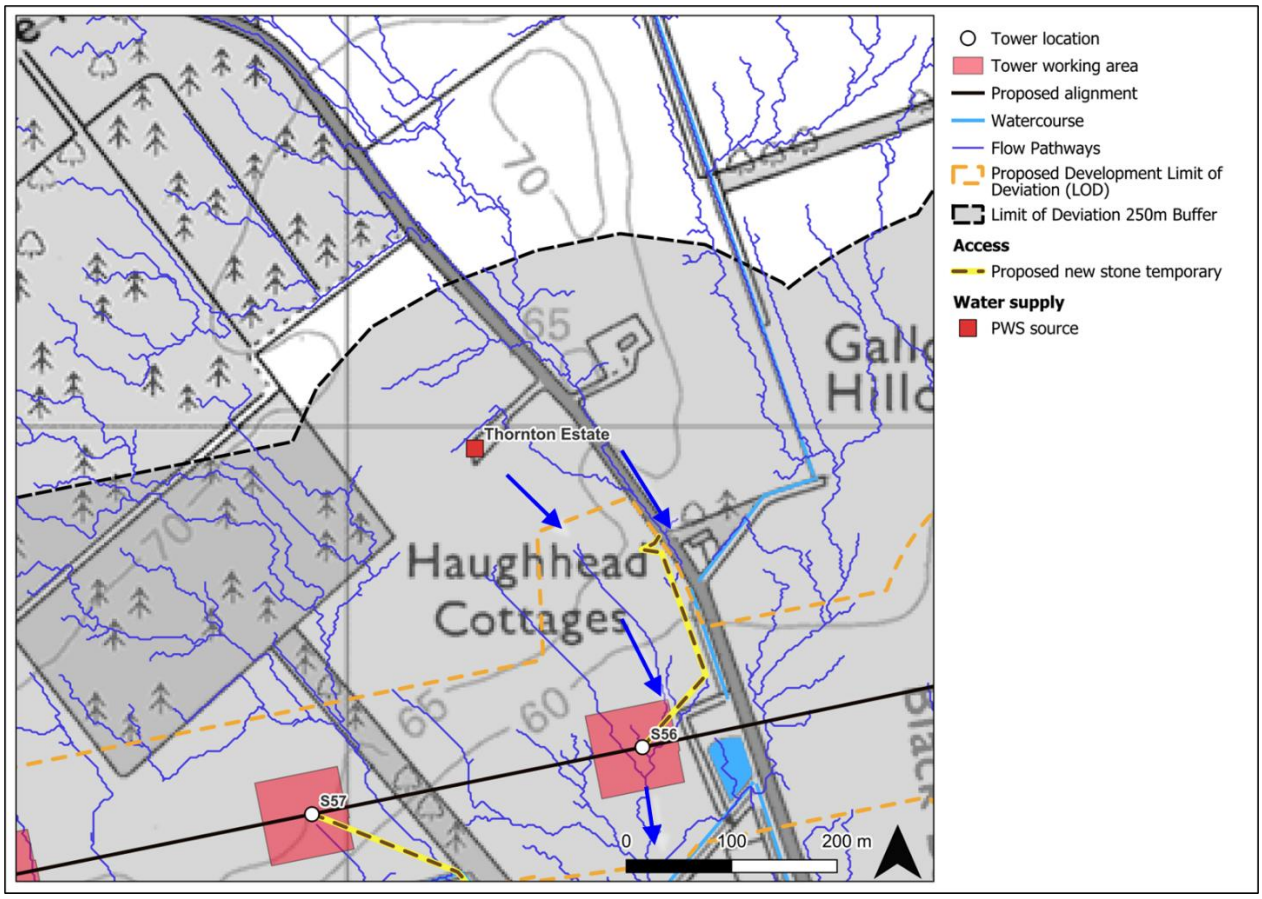
3.4.7 Tower S61 would be located downslope of the PWS location, at around 64-65 mAOD. There is a slight potential for the excavation to impact the quantity of the supply at the well as a consequence of the foundation excavations penetrating the groundwater table downslope, resulting in groundwater draining from downslope of the PWS, temporarily reducing the groundwater elevation level at the well. The sensitivity of the PWS is medium and the magnitude of impact is considered low. The effect on the PWS without additional mitigation is considered to be **Minor**.

3.4.8 Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by ECoW, and monitoring would likely be from the tap at the supplied property location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new private water supply for the property or provide a connection to the Scottish Water mains.

Thornton Estate PWS - Groundwater Well

3.4.9 Thornton Estate PWS is a well supply that the assessment was informed of during a site visit to the landowner (**Plate 13.2.10: Thornton Estate PWS, topography and indicative flow paths (blue arrows)**). It is unknown whether the well still supplies any properties on the estate as most other properties either have a Scottish Water Mains connection or an alternative PWS.

Plate 13.2.10: Thornton Estate PWS, topography and indicative flow paths (blue arrows)



3.4.10 The Thornton Estate PWS is located ~185 m northwest of the proposed temporary access track to tower S56 and over 300 m north of the tower itself. Flow pathway analysis indicates that there are no surface water flow paths from the infrastructure towards the PWS abstraction and tower excavations are unlikely to impact groundwater levels at the well and the magnitude of impact on the PWS is assessed to be negligible The PWS is considered to be of medium sensitivity and the effect on the PWS is of **Negligible significance.**

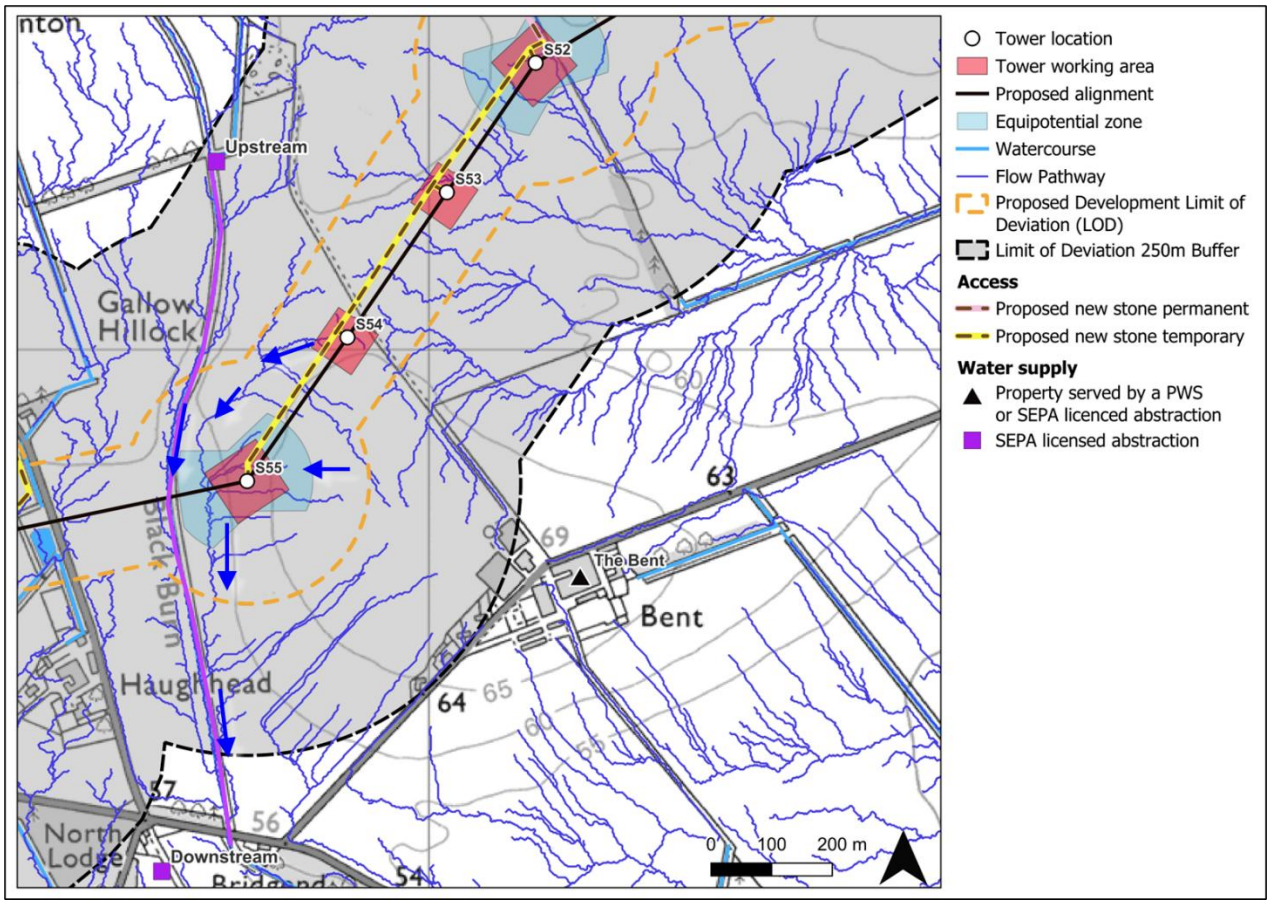
3.4.11 Monitoring of the well will be undertaken before, during and after construction. Monitoring will be undertaken from the well itself.

3.5 Section D

Black Burn PWS - (SEPA CAR Licensed abstraction from the Black Burn)

3.5.1 The OHL between proposed towers S57 and S56 crosses an ~1.3 km section of the Black Burn which is a SEPA CAR licenced abstraction serving Bent Farm (The Bent) for agricultural use (**Plate 13.2.11: Black Burn SEPA licenced abstraction, topography and indicative flow paths (blue arrows)**). The licence notes that the stretch of Black Burn extends to NO 6856 7214, which is further downstream, to the south of the OHL crossing point and associated nearby infrastructure. This is one of three abstractions which serve the farm for agriculture purposes, but all are covered by the same licence (CAR/L/1010555). The SEPA abstraction point is not noted directly on the watercourse. The OHL would cross the Black Burn abstraction, ~687 m west of Bent Farm. The exact location of the abstraction point/s along the Black Burn are unknown. Scottish Water mains drawings indicate that the farm also has a mains connection.

Plate 13.2.11: Black Burn SEPA licenced abstraction, topography and indicative flow paths (blue arrows)



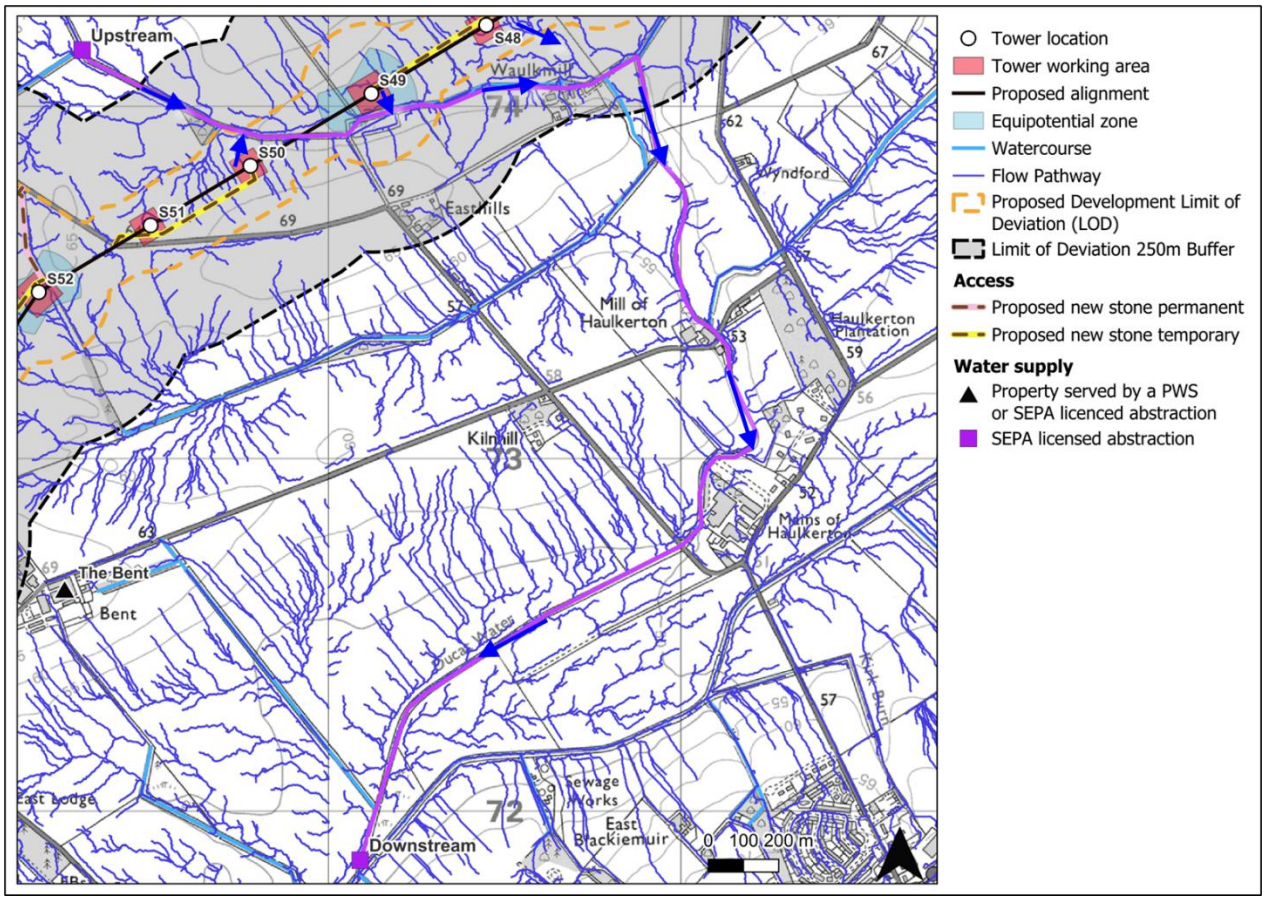
3.5.2 Tower S56 working area would sit ~65 m east of the Black Burn and ~3-4 m higher than the burn. As the exact location of the abstraction point/s along the Black Burn are unknown, it is assumed to extend to the furthest downstream extent of the noted stretch of Black Burn, which is downstream of tower S56. Flow pathway analysis indicates that the area around the tower drains directly towards the watercourse. There is therefore potential for runoff from construction activities to affect the quality of water at the abstraction. The abstraction may also receive surface water runoff from S54 working area which is located ~175 m east, and upslope, of the burn. The sensitivity of the abstraction is considered to be low (as it is for agricultural use) and the magnitude of change is negligible to low. Therefore, the significance of the effect on the abstraction without additional mitigation is considered to be **Negligible** to **Minor**.

3.5.3 Additional site-specific measures will be set out in the CEMP to minimise the risk of surface water runoff draining from the construction site to the abstraction source (eg swales, settlement ponds, silt fences etc) and micrositing the working area away from the drain to allow for additional construction SuDS. Monitoring of the burn will be undertaken before, during and after construction to check there is no contamination of the supply. Monitoring will be undertaken by an ECoW, and monitoring would likely be at the abstraction location in the burn. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons), or quantity decreases an alternative water supply will be installed, such as using the existing mains supply to the farm or using portable bowsers, to ensure minimal disruption of supply during construction.

Ducat Water PWS - (SEPA CAR Licensed abstraction from Ducat Water)

3.5.4 The OHL between proposed towers S50 and S49 crosses an ~4.6 km section of the Ducat Water which is an abstraction for agricultural use covered by the SEPA CAR licence held by Bent Farm (CAR/L/1010555). The licence notes that the stretch of Ducat Water utilised extends to NO 7009 7186, which is around 2 km south of the proposed tower S50 (**Plate 13.2.12: Ducat Water SEPA licenced abstraction, topography and indicative flow paths (blue arrows)**). The abstraction area extends from the confluence with an unnamed drain south of Stanneryhaugh to where the Ducat Water meets its confluence with the Luther Water. Scottish Water mains drawings indicate that the farm also has a mains connection.

Plate 13.2.12: Ducat Water SEPA licenced abstraction, topography and indicative flow paths (blue arrows)



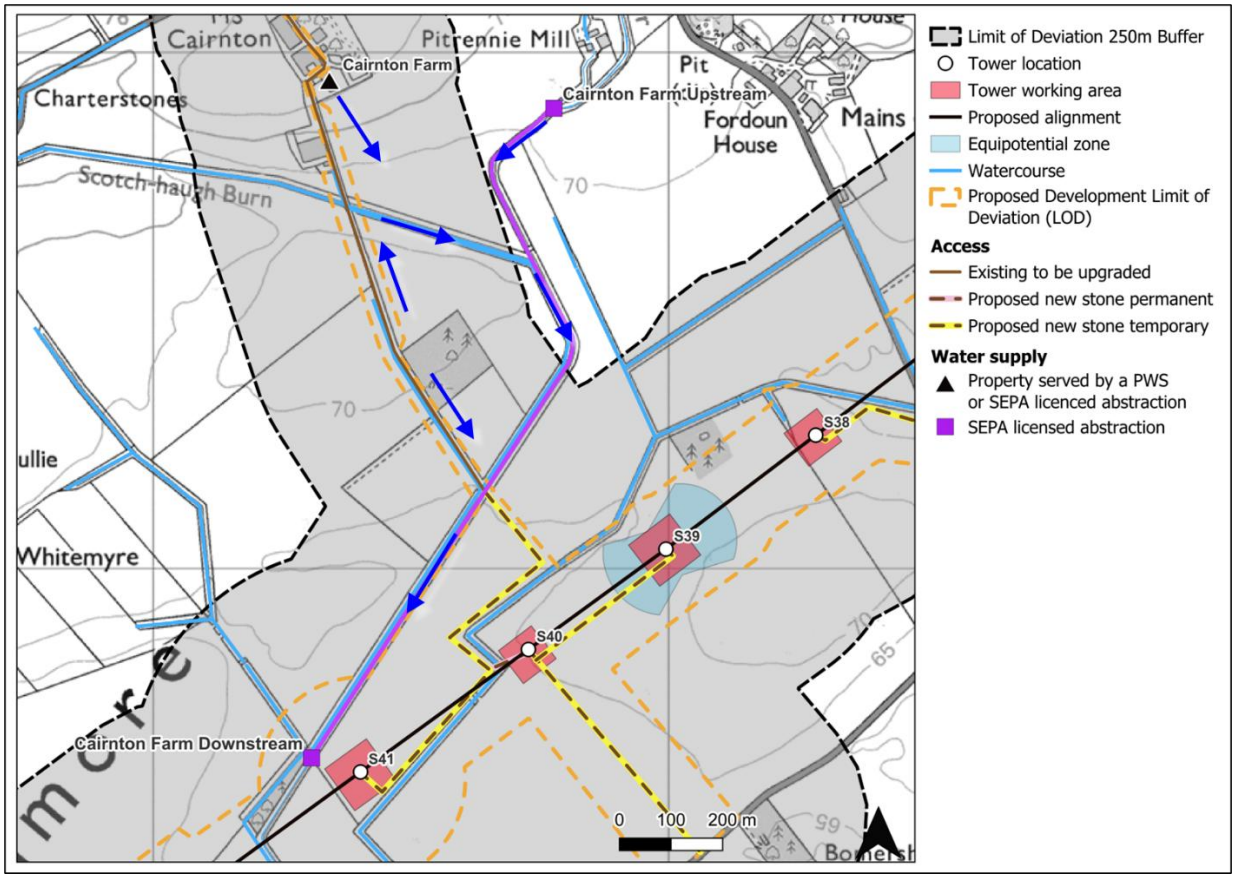
3.5.5 Tower S50 working area would be located ~30 m south of the abstraction area along the Ducat Water. The tower would drain directly towards the watercourse and the water quality could be affected by runoff during construction activities without additional mitigation. Tower S49 working area would be located ~25 m north of the Ducat Water (tower is around 62 m north of Ducat Water) and tower S48 working area is located ~115 m north of the Ducat Water. These two towers also have the potential to effect water quality of the abstraction without additional mitigation. Tower S51 working area is located around 300 m southwest of the Ducat Water and flow pathways analysis indicates that there are surface water pathways from here to the watercourse. The sensitivity of the abstraction is considered to be low (as it is for agricultural use) and the magnitude of effect considered to be low. The effect on the abstraction without additional mitigation is considered to be **Minor**.

3.5.6 Additional site-specific measures will be set out in the CEMP to minimise the risk of surface water runoff draining from the construction site to the abstraction source (eg swales, settlement ponds, silt fences etc) and micrositing the working area away from the watercourse to allow for additional construction SuDS. Monitoring of the burn will be undertaken before, during and after construction to check there is no contamination of the supply. Monitoring will be undertaken by an ECoW, and monitoring would likely be at the abstraction location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons), or quantity decreases an alternative water supply will be installed, such as using the existing mains supply to the farm or using portable bowsers, to ensure minimal disruption of supply during construction.

Cairnton Farm- SEPA CAR licensed abstraction from the Luther Water

3.5.7 The proposed access track route to towers S40 and S41 crosses the Scotch-haugh Burn and the Luther Water, from which these is an abstraction for agricultural use covered by the SEPA CAR licence held by Cairnton Farm (CAR/L/1012369). The licence notes that the abstraction location extends along a 1.5 km reach of the Luther Water. This is shown in **Plate 13.2.13: Cairnton Farm PWS, topography and indicative flow paths (blue arrows)**. The proposed access crossing over the Scotch-haugh Burn upstream of its confluence with the Luther Water. The surrounding properties immediately adjacent to the farm are known to also be provided by a Scottish Water Mains connection. A neighbour indicated Cairnton Farm is also served by a mains connection.

Plate 13.2.13: Cairnton Farm PWS, topography and indicative flow paths (blue arrows).



3.5.8 Tower S41 is located ~40 m east of the Luther Water at the downstream extend of the abstraction extent. The tower would drain directly towards the watercourse and the water quality could be affected by runoff during construction activities without additional mitigation. The proposed new temporary access track and existing track to towers S40 and S41 will also drain directly towards the Luther Water along the abstraction extent. The sensitivity of the abstraction is considered to be low (as it is for agricultural use) and the magnitude of effect considered to be low. The effect on the abstraction without additional mitigation is considered to be **Minor**.

3.5.9 Additional site-specific measures will be set out in the CEMP to minimise the risk of surface water runoff draining from the construction site to the abstraction source (eg swales, settlement ponds, silt fences etc) and micrositing the working area away from the watercourse to allow for additional construction SuDS. Monitoring of the burn will be undertaken before, during and after construction to check there is no contamination of the supply. Monitoring will be undertaken by an ECoW, and monitoring would likely be at the abstraction location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons), or quantity decreases an alternative water supply will be installed, such as using the existing mains supply to the farm or using portable bowsers, to ensure minimal disruption of supply during construction.

Cushnie Farm PWS- Groundwater Spring

3.5.10 The Cushnie Farm PWS is a spring source located in a topographic hollow around 400 m north of Cushnie Farm (**Plate 13.2.14: Cushnie Farm PWS, topography and indicative flow paths (blue arrows)**). Details about the PWS is based on reports from the local landowner and from Aberdeenshire Council PWS data. The spring supply has reportedly never dried up and was previously utilised as a domestic supply for five properties in the area. These properties have recently been connected to the Scottish Water Mains by the landowner, but the PWS is still used for general farm use.

3.5.11 The PWS is located ~180 m south of the proposed temporary access track to the proposed tower S28. OS 1:25k mapping and site survey indicates that there are no surface water flow pathways from the proposed track towards the spring PWS abstraction point. The sensitivity of the PWS is low (as it is for agricultural use) and the magnitude of

change is negligible. Therefore, the significance of the effect of the Proposed Development on the PWS is **Negligible** and no additional mitigation is required.

3.5.12 Monitoring of the spring will be undertaken before, during and after construction. Monitoring will be undertaken from the spring or farm supply itself.

Plate 13.2.14: Cushnie Farm PWS, topography and indicative flow paths (blue arrows)

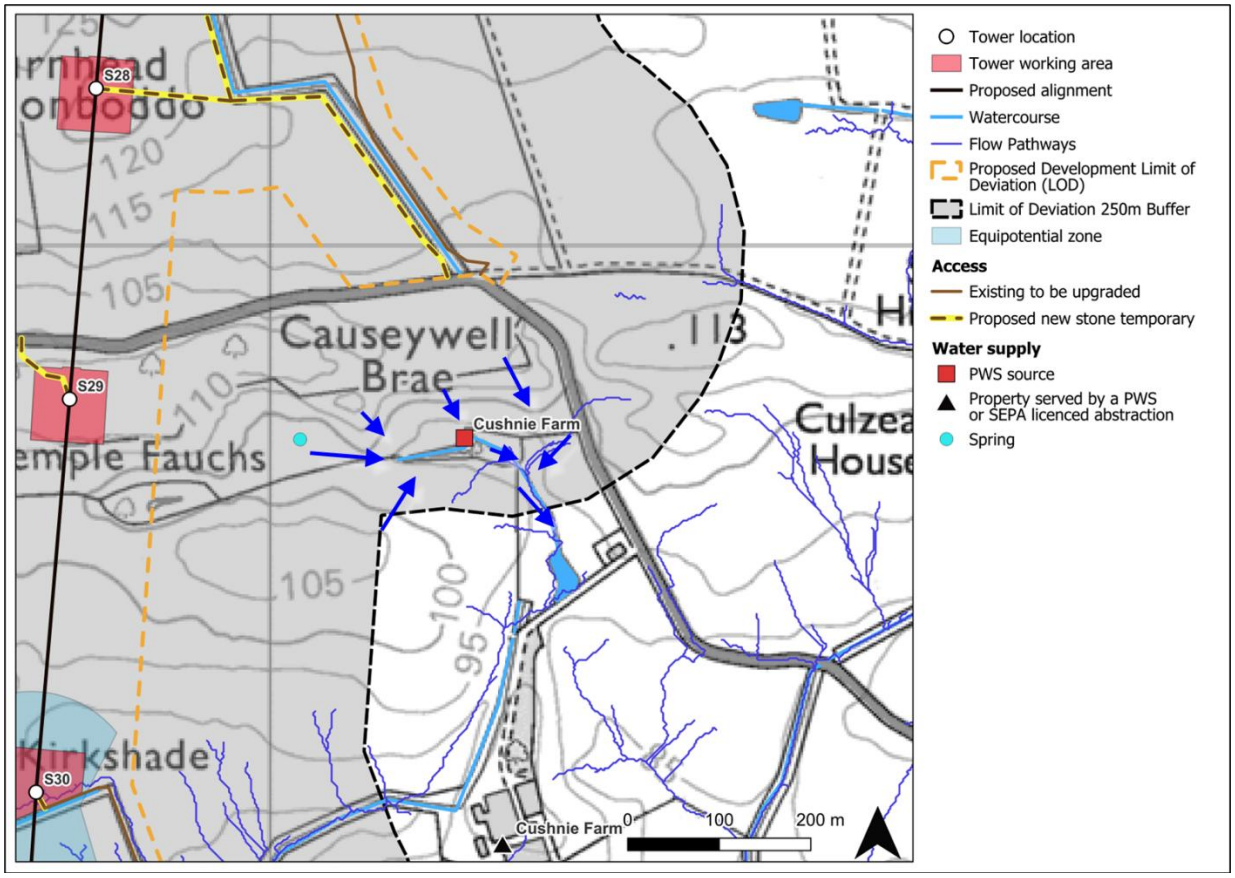


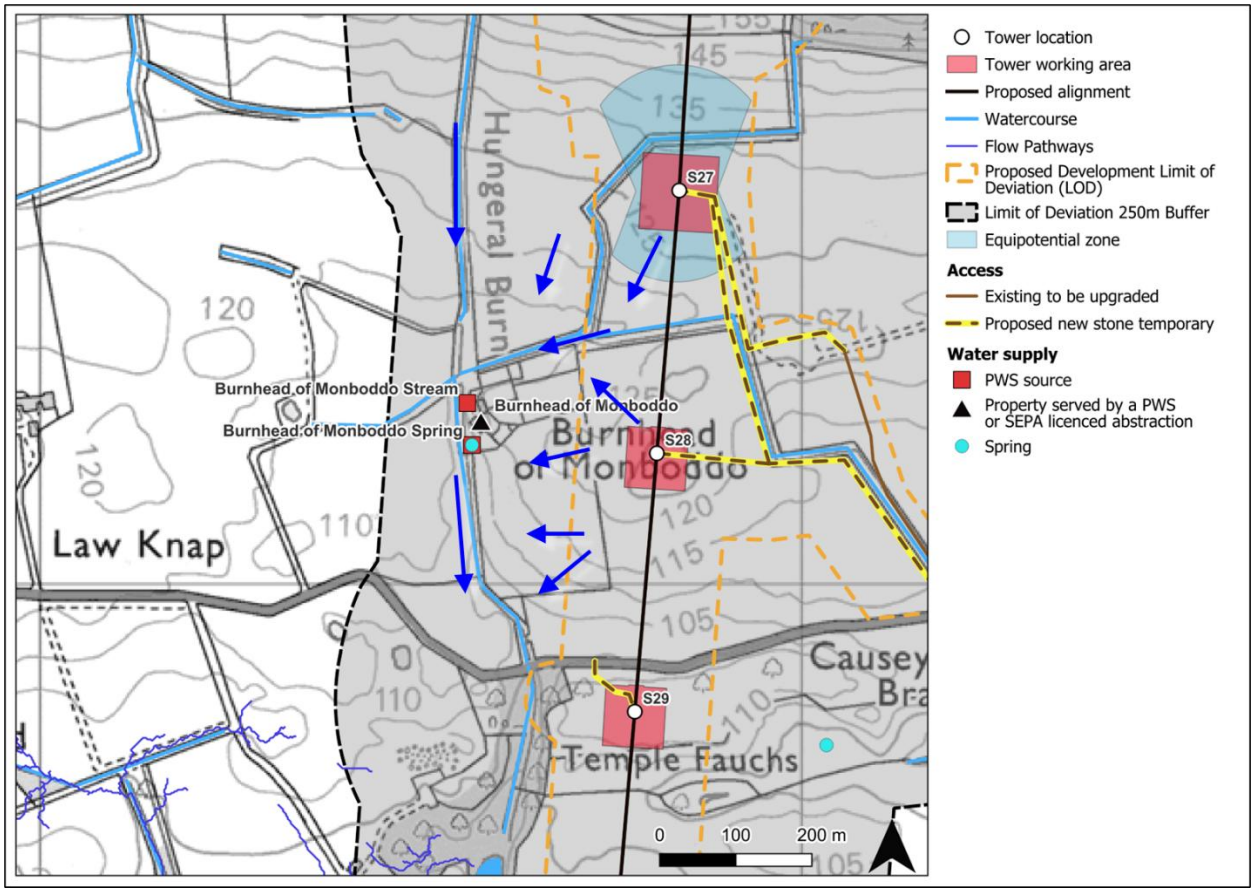
Photo 4: Cushnie Farm spring abstraction source, the spring water can be seen running through this depression

Burnhead of Monboddo PWS- Groundwater spring and surface water abstraction from Hungeral Burn

3.5.13 There are two PWS sources serving the property at Burnhead of Monboddo, a spring and a stream supply (**Plate 13.2.15: Spring and stream PWS at Burnhead of Monboddo, showing topography and indicative flow paths (blue arrows)**). The location of the spring is unknown by the resident, but historic mapping indicates that the spring is located close to the property, on the south side of the house, just east of the Hungeral Burn. The PWS is used for domestic, livestock and general farm use. The resident notes that the supply is very reliable and has never dried up. The PWS supplies only one property, Burnhead of Monboddo, with up to six people using this supply in the property.

3.5.14 Tower S28 working area would be located ~205 m to the east of the spring abstraction at the top of the hill at an elevation of ~126 mAOD. The spring is located downslope close to the Hungeral Burn at ~110 mAOD. There is a low likelihood that tower S28 may affect the quality of the supply at the spring through runoff affecting the PWS recharge. There is no LiDAR currently available, however OS 1:25k mapping indicates that there is likely a flow pathway towards the spring. Groundwater levels at the spring are likely predominantly controlled by water level in the Hungeral Burn, but there is also likely to be minimal recharge from the surrounding hill slopes. The magnitude of change is therefore considered to be low and the sensitivity of the PWS is medium. It is considered that tower S28 would not affect the quantity of water at the spring and the significance of effect on the spring PWS without additional mitigation is **Minor**.

Plate 13.2.15: Spring and stream PWS at Burnhead of Monboddo, showing topography and indicative flow paths (blue arrows)



3.5.15 The second source at Burnhead of Monboddo was noted as a stream supply from Hungeral Burn which was observed during site visits in 2024. There is evidence of this being installed on Google Maps Street View in October 2008, supporting the view that abstraction noted during the site visit is an additional source. PWS abstraction is located just north of the Burnhead of Monboddo property at the Hungeral Burn. This PWS likely serves the four horses noted by the resident, as the pipework appears to be connected to the stables.

3.5.16 Tower S28 working area would be located ~215 m east of this PWS abstraction. Additionally, towers S27, and S26 would lie within the catchment of the Hungeral Burn, upstream of the abstraction point. There is no available LiDAR for flow pathway analysis, but 1:25K OS contour mapping indicates that towers S28, S27 and S26 have potential to affect the quality of water at the PWS, via runoff. Ground level from these towers slope downhill into the Hungeral Burn, either directly or via minor tributaries of the Hungeral Burn, which feed in the Hungeral Burn just upstream of the abstraction point for the PWS.

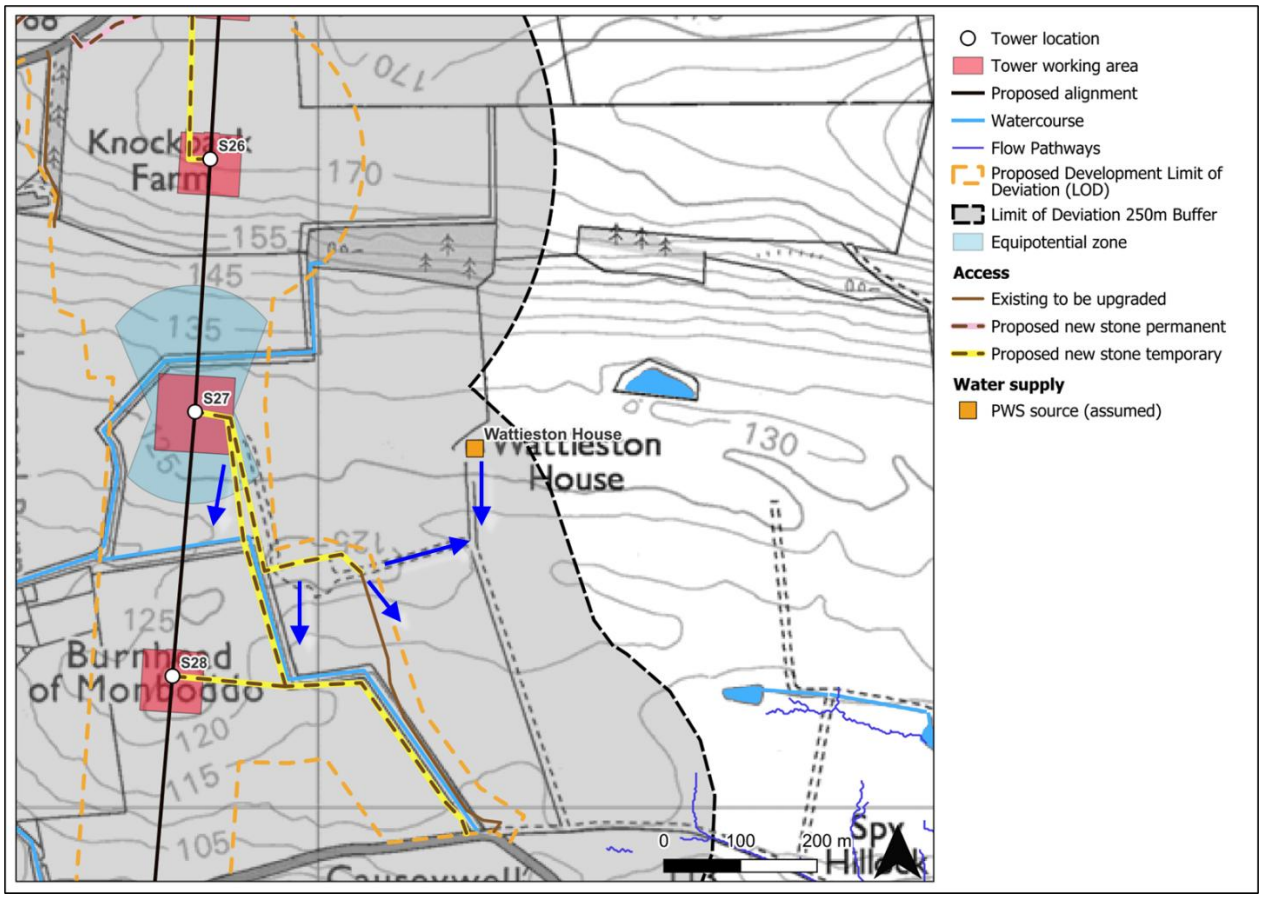
3.5.17 Several proposed trackway and access tracks in the area to Towers S28, S27 and EPZ positions have the potential to result in construction runoff to the smaller watercourses/tributaries upstream of Hungeral Burn and the PWS abstraction point. The sensitivity of the stream supply is low (as it is for livestock) and the magnitude of change is low. With applied mitigation measures in place, the significance of the effect on the stream PWS is **Minor**.

3.5.18 Additional site-specific measures will be set out in the CEMP to minimise the risk of surface water runoff draining from the construction site to the burn and PWS sources (eg swales, settlement ponds, silt fences etc). Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by an ECoW, and monitoring would be at tap of the supplied property. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new water supply for the affected property or provide a connection to the Scottish Water mains.

Wattieston House- assumed PWS

3.5.19 Wattieston House is likely to be served by a PWS however a lack of information from the resident and the nearby area means that this conclusion is uncertain. A questionnaire was sent to the resident but no response was received. This was followed up by a visit to the property to try to speak to the resident but the resident was not available. There are no Scottish Water assets indicated in the nearby area, with the nearest pipes running along Glenbervie Road 760 m northwest of the property. Nearby properties at Burnhead of Monboddo and Cushnie Farm are known to have PWS so it is likely that Wattieston is also supplied by a PWS. For the purposes of this assessment, the PWS is assumed to be at the property itself. This is shown in **Plate 13.2.16: Wattieston House assumed PWS, topography and indicative flow paths (blue arrows)**.

Plate 13.2.16: Wattieston House assumed PWS, topography and indicative flow paths (blue arrows).



3.5.20 Wattieston House is located 220 m northwest of a new temporary track connecting an existing track to tower S27. The property sits marginally upslope of the new track with an elevation difference of ~1 m. OS 1:25k contour mapping indicates that any potential sediment/runoff pollution arising from the construction of the track is likely to drain to the south or be routed along the existing tracks, away from the property, and will not impact the PWS. Excavations for the new track could have a slight, temporary impact of low magnitude on groundwater quantities feeding the assumed PWS by temporarily lowering the groundwater table in the vicinity of the property.

3.5.21 Further investigation into whether this property is served by the PWS will be required before groundworks commence. The sensitivity of the assumed PWS is medium. The significance of effect on the assumed PWS, if present, without additional mitigation is **Minor**.

3.5.22 Additional consultation will be undertaken to ascertain the exact location of the assumed PWS (if it does exist) serving this property. Monitoring of the assumed PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by ECoW, and monitoring would likely be from the tap at the supplied property location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during

construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new private water supply for the property or provide a connection to the Scottish Water mains.

Inches Cottage and Farm

3.5.23 Inches Farm PWS is a well located ~125 m north of the Inches Farm (Shown in **Plate 13.2.17: Inches Cottage and Farm PWS, topography and indicative flow paths (blue arrows)** and **Photo 5**). The PWS supplies at least 12 known properties in the Glenbervie area, including Glenbervie Church and Inches Farm which keeps around 200 animals. There is no additional information on the supply at the time of writing (eg depth of well) except that it is capable of supplying up to 18 m3/day and that Aberdeenshire Council holds sample data from 2023 and 2024 on the water quality.

Plate 13.2.17: Inches Cottage and Farm PWS, topography and indicative flow paths (blue arrows)

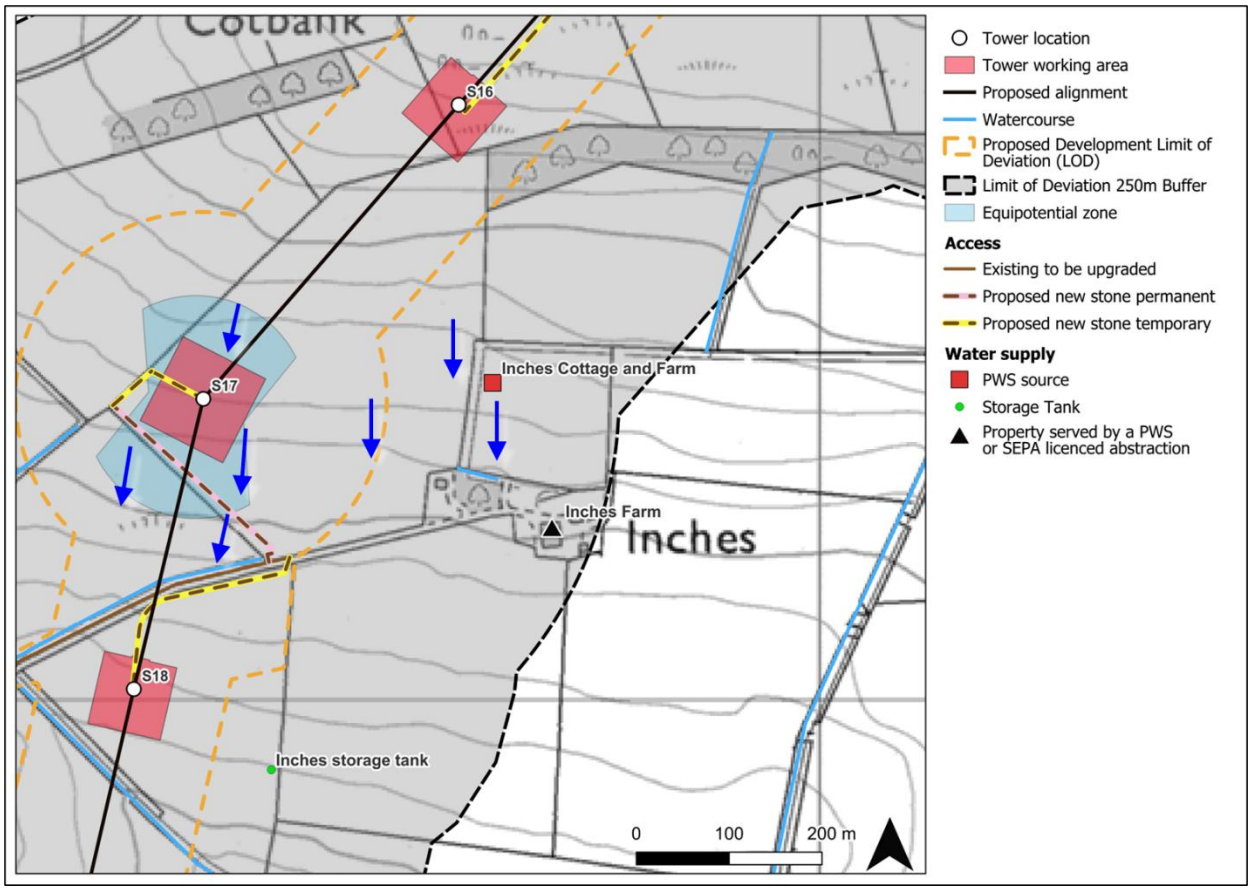


Photo 5: Inches Farm Well, which supplies numerous properties in Glenbervie, Inches Cottage and Farm

3.5.24 The well is situated 245 m east of the working area around tower S17 and 312 m from the tower itself. The tower and working area are located at approximately the same elevation as the PWS, meaning that there is potential for infrastructure excavations to penetrate the groundwater table, reducing the groundwater quantity/ groundwater level at the well. Groundwater levels have been noted to be high in this area by local residents. There is not any currently available data on groundwater levels but monitoring will be carried out prior to any construction activities. Excavation also has potential to affect groundwater quality adversely. Based on OS 1:25k mapping, there is also potential for sediment/runoff pollution from construction activities from tower S16 upslope of the well to affect groundwater quality at the PWS.

3.5.25 The well feeds into a storage tank which is located 480 m southwest of the well and downslope of the farm. Assuming the storage tank is raised above the ground and covered, surface water flow pathways draining to the tank from the proposed new access track to the north will be unlikely to affect the water quality. The exact location of the pipework is currently unknown. There is a very minimal risk of new track infrastructure compromising the pipework integrity based on the well and storage tank locations.

3.5.26 The magnitude of impact at the PWS is assessed to be medium. The sensitivity of the PWS is medium. The significance of the effect on the PWS before additional mitigation is **Moderate**.

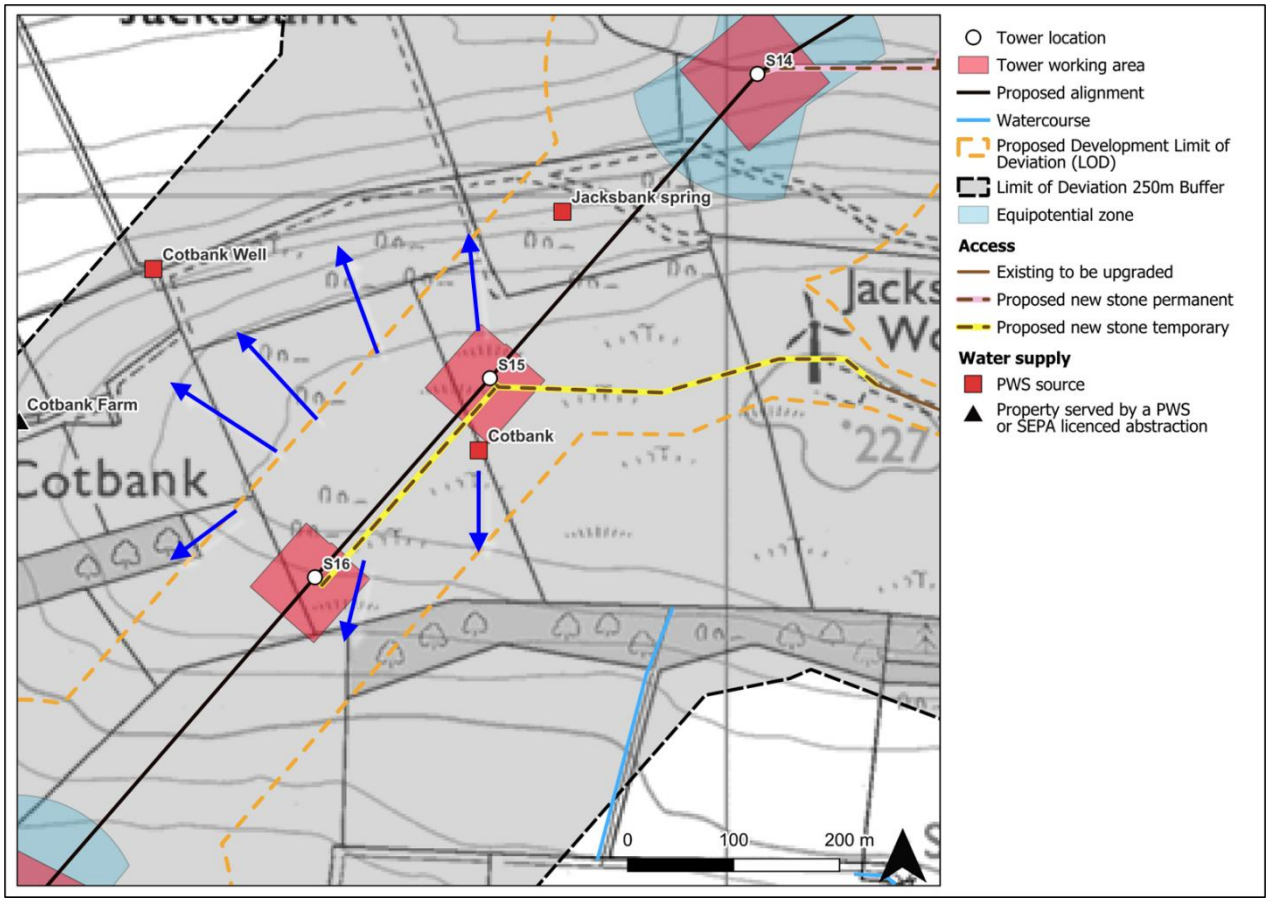
3.5.27 A detailed investigation of the pipework prior to construction will be carried out and cognisant during construction to ensure the pipes are avoided or managed accordingly. This will be set out in the CEMP. Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by ECoW, and monitoring would likely be from the tap at the supplied property location. If locally raised groundwater levels are identified during site investigations for towers, suitable engineering construction measures will be employed or the towers will be microsited appropriately. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new private water supply for the supplied properties or provide a connection to the Scottish Water mains.

Cotbank PWS- Groundwater spring abstraction and Groundwater Well

3.5.28 Cotbank PWS is a subsurface spring and well that feeds several properties in the local area. There is also an additional well abstraction known as Cotbank Well (**Plate 13.2.18: Cotbank PWS and Cotbank Well, showing topography and indicative flow paths (blue arrows)**). The Cotbank PWS (spring) is located around 430 m east of Cotbank Farm and Cotbank Well is located approximately 190 m northeast of Cotbank Farm. The properties served include nine houses, two farms and three steadings, serving up to 24 individuals. The spring water has been tested

five times in the past 35 years. Abstraction rates are unknown. The PWS is utilised for domestic, livestock, general farm and commercial purposes. The resident reports that the underlying rock is '*rotten and prone to fracture*' and that the spring water has a high copper content from the underlying geology. The resident reports a high groundwater table in the area, however there are no British Geological Survey (BGS) borehole records in the nearby area to confirm this. From discussions with residents, it is understood that Scottish Water has previously attempted to provide a mains connection to the area, but several residents noted that this failed to supply adequate pressure for any supply.

Plate 13.2.18: Cotbank PWS and Cotbank Well, showing topography and indicative flow paths (blue arrows)



3.5.29 The PWS spring abstraction point is located near the top of the local hill, to the west of Jacksbank Wind Farm. The spring is located ~10 m southwest of the proposed tower S15 and 62 m south of tower S15 itself. The PWS source is also around 160 m northeast of the tower S16 working area. A section of temporary track linking these two towers is located around 25 m northwest of the spring at its closest point. Flow pathways analysis and OS 1:25k mapping indicates that there no surface water flow paths from infrastructure towards the PWS abstraction point. There is, however, significant potential for the excavation required for towers S16 and S15 to affect the quantity and quality of groundwater supply at the PWS so the magnitude of change is considered medium. With the sensitivity of the PWS medium, the significance of effect on the PWS without additional mitigation is considered to be **Moderate**.

3.5.30 Cotbank Well abstraction is downslope of the nearest proposed infrastructure and potential siting within the LOD, at its closest point the abstraction is approximately 210 m northwest of the LOD. The well abstraction is located at around 202 mAOD and any potential excavations within 250 m of the well are no lower than 215mAOD. Therefore, it is considered there is negligible risk of any excavations affecting groundwater quantities. However, there is limited potential for surface water runoff during construction to affect the groundwater quality at the abstraction as there are flow pathways from the higher ground down towards Cotbank Well. The magnitude of change is considered low and the sensitivity of the PWS is medium, the significance of effect on the PWS source before additional mitigation at the Cotbank Well abstraction is considered **Minor**.

3.5.31 Additional site-specific measures will be set out in the CEMP to minimise the risk of surface water runoff draining from the construction site to the PWS source (eg swales, settlement ponds, silt fences etc). Monitoring of the PWS will be

undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by an ECoW, and monitoring would likely be at the supplied properties taps. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. The contractors will have a supply of bowsers ready to deploy to affected PWS, if required. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new water supply for the affected properties or provide a connection to the Scottish Water mains.

Jacksbank PWS- Groundwater spring and borehole abstractions

3.5.32 The properties around Jacksbank are served by two PWS: a spring and a borehole (**Plate 13.2.19: Jacksbank spring and borehole, showing topography and indicative flow pathways (blue arrows)**). The borehole abstraction source area by the cottages is shown in **Photo 6** and the spring source area on the hillside in **Photo 7**. Between the two PWS sources, they serve four properties: Jacksbank Farm, Jacksbank House and 1 and 2 Jacksbank Cottages, all located to the north of the spring. One of the properties is tenanted. The sources supply 10 people and 200 cattle. The resident stated that the spring partially dries up in Summer.

Plate 13.2.19: Jacksbank spring and borehole, showing topography and indicative flow pathways (blue arrows)

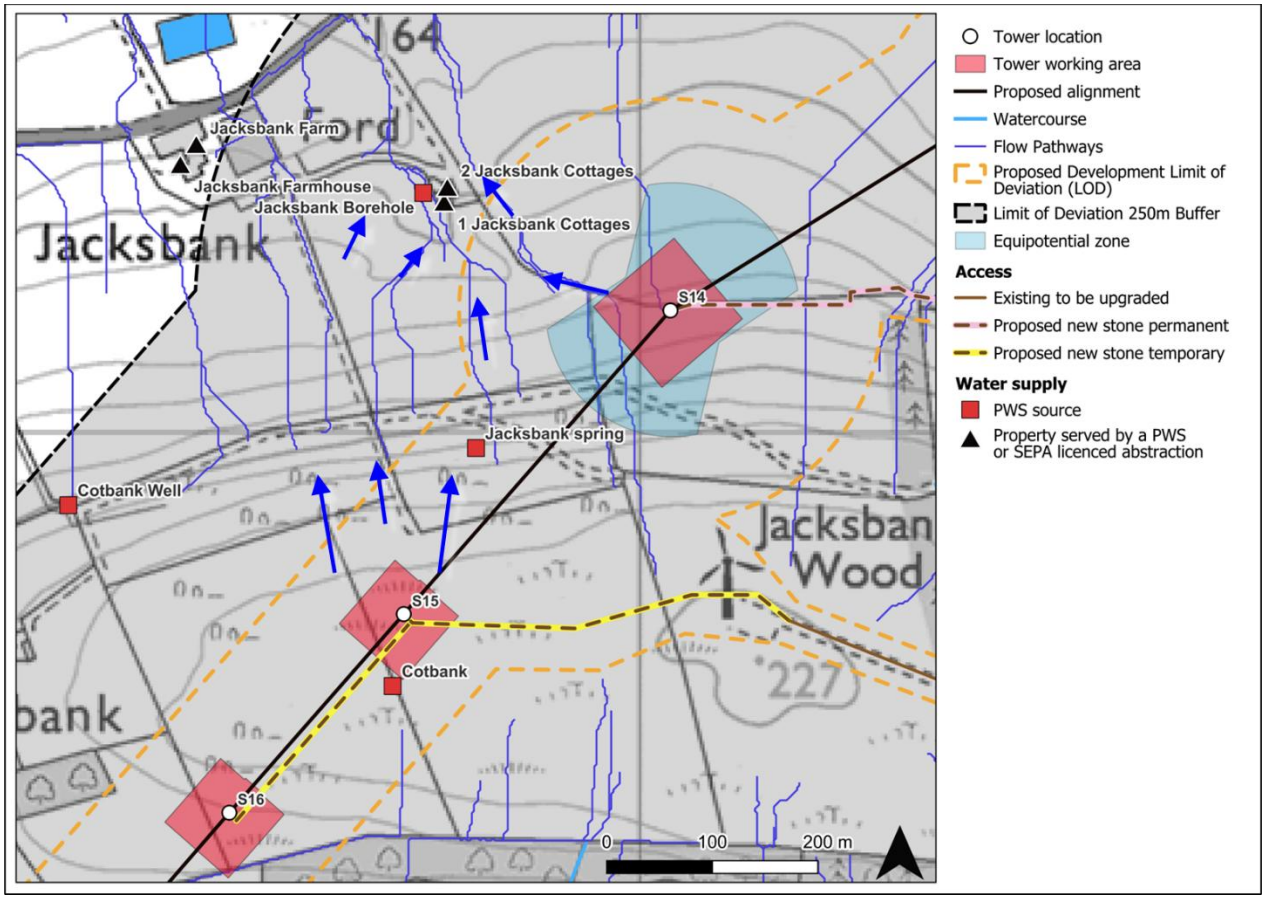


Photo 6: Jacksbank Cottages, the borehole abstraction is noted directly beside the north (left) cottage

Photo 7: The spring serving Jacksbank lies at the top of the line of dark vegetation, easily visible on the hillside

3.5.33 The spring is situated on the steep, northern slope of the hill to the east of Cotbank, with Jacksbank Farm lying to the north. The spring lies 130 m northeast of the proposed tower S15 working area and 170 m southwest of tower S14 working area. The spring is located at around 205 mAOD; tower S15 would be at a higher elevation at around 221 mAOD and tower S14 at a lower elevation of around 192 mAOD. Excavation activities at tower S15 are unlikely to impact groundwater levels at the spring as there is an elevation difference of ~20 m. However, excavation activities at tower S14 have the potential to temporarily impact groundwater levels at the spring. Surface water flow pathway analysis indicates that surface water will likely flow downslope to the east of the spring from tower S15 and not flow directly towards it. Tower S14 would be downslope of the spring, hence there are no risks from surface water runoff

during construction of the tower. However, the temporary access track to tower S15 has the potential to impact the spring from surface water runoff during construction activities. The magnitude of impact on the PWS is considered to be low. The sensitivity of the PWS is medium, and the significance of effect on the spring source before additional mitigation is **Minor**.

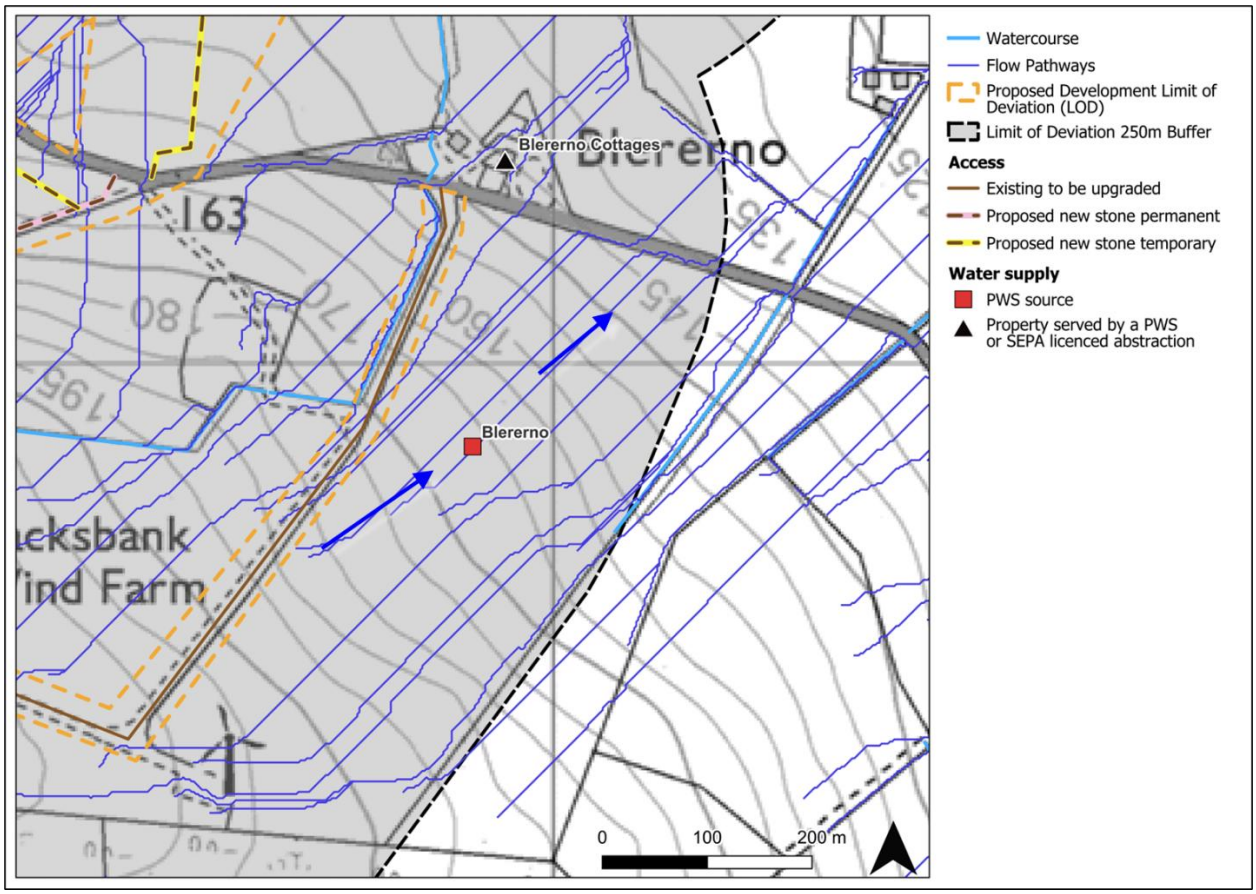
3.5.34 The borehole is located ~190 m northwest of the proposed tower S14 working area. The resident noted that water is fed into a storage tank but did not provide its location. The borehole is adjacent to Jacksbank Cottages, and the resident noted that it serves both the Jacksbank Cottages 1 and 2, alongside the spring. The borehole does not run dry. Tower S14 would be situated upgradient of the borehole. Due to the elevation difference of ~18 m, groundwater levels are unlikely to be affected. Underlying topography and flow pathway analysis indicates that the tower would drain north and northwest, generally avoiding the PWS, but there is very limited potential for surface water runoff during construction to affect the groundwater recharge for the borehole. With the magnitude of change considered low and the sensitivity of the PWS medium, the significance of effect on the borehole source before additional mitigation is **Minor**.

3.5.35 Additional site-specific measures will be set out in the CEMP to minimise the risk of surface water runoff draining from the construction site to the PWS source (eg swales, settlement ponds, silt fences etc). Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by an ECoW, and monitoring would likely be at the source locations. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new water supply for the affected property or provide a connection to the Scottish Water mains.

Blererno PWS- Groundwater Well

3.5.36 Blererno PWS is a well located in an agricultural field ~280 m south of the two properties it serves (Blererno Cottages) and 103 m east of an existing access track which would be upgraded (**Plate 13.2.20: Blererno PWS, showing topography and indicative flow pathways (blue arrows)**). The track currently gives access to Jacksbank wind farm. The PWS is situated on the northeastern slope of the hill on which Jacksbank wind farm is positioned. A supply reference for this source is provided by the Aberdeenshire Council (71650) however the Council's grid reference shows the PWS to be 76 m south of the grid reference provided by the resident. Based on satellite imagery, it appears that there may be two well structures, with one structure 22 m west of the coordinates given by the resident. It is equally possible the Council has the wrong coordinates. Regardless, both coordinates are a very similar distance from the track. The existing track to the west of the well runs perpendicular to the contours and therefore generally drains downslope.

Plate 13.2.20: Blererno PWS, showing topography and indicative flow pathways (blue arrows)



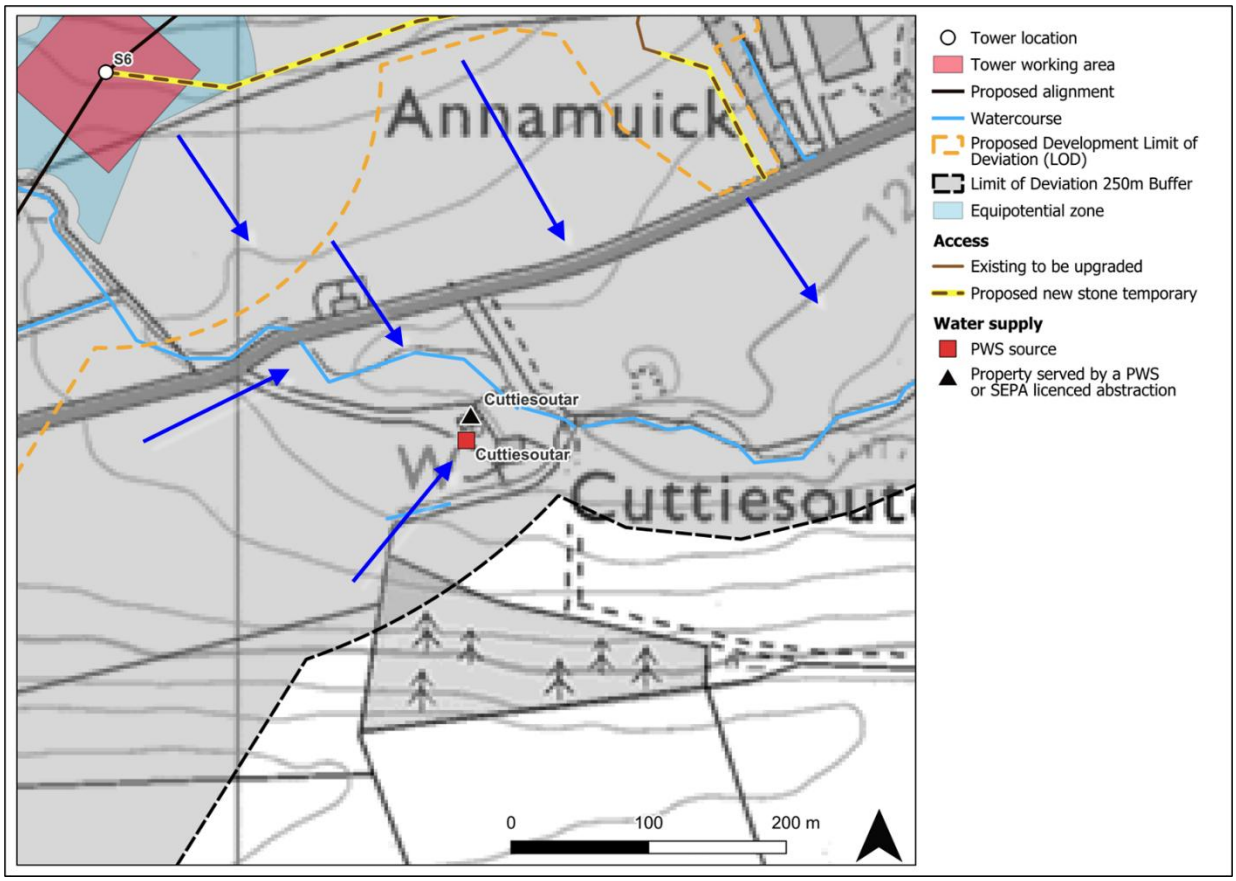
3.5.37 Flow pathway analysis using available LiDAR DTM (Digital Terrain Model) data does indicate surface flow pathways from the track further upslope, but this is considered unlikely to impact groundwater quality at the well. Since no excavation will be required for upgrading the track, there will be no effect on groundwater levels, resulting in an impact of negligible magnitude. The sensitivity of the PWS is medium and the significance of the effect on the well is **Negligible** and no additional mitigation will be required.

3.5.38 Monitoring of the well will be undertaken before, during and after construction. Monitoring will be undertaken from the well itself.

Cuttiesoutar PWS- Groundwater Well

3.5.39 Cuttiesoutar PWS is a groundwater well located directly adjacent to and on the south side of the property it serves (Cuttiesoutar). This is shown in **Plate 13.2.21: Cuttiesoutar PWS, showing topography and indicative flow pathways (blue arrows)**. The resident notes that the supply is utilised only for domestic purposes and that it has a good, constant supply. It is known that the adjacent property at Thistlebank Steading is connected to the Scottish Water mains but the resident at Cuttiesoutar has not indicated a mains connection.

Plate 13.2.21: Cuttiesoutar PWS, topography and indicative flow paths (blue arrows)



3.5.40 Cuttiesoutar is located approximately 175 m southeast of the LOD around tower S6 at its nearest point. Additionally, the LOD surrounding the proposed new stone permanent track to tower S6 is approximately 250 m northeast of the abstraction course at its nearest point. The Burn of Annamuick flows east approximately 45 m north of the Cuttiesoutar PWS abstraction point, between the PWS abstraction and the proposed infrastructure. As the infrastructure is on the opposite side of this large watercourse, it is considered that there is no risk of the PWS being affected by potential surface water runoff contamination during construction activities. Any excavation occurring at closer proximity within the LOD would remain on the opposite side of the Burn of Annamuick and is hydrologically disconnected from the recharge zone of the well, as well as being located further upslope. Therefore, it is considered that there will be no effect on groundwater quantity at the PWS abstraction location as a result of construction activities. The sensitivity of the PWS is medium however given the location of nearby infrastructure on the opposite side of the Burn of Annamuick and applied mitigation measures that will be implemented during construction, the magnitude of impact is considered to be negligible. The effect on the PWS without additional mitigation is considered to be temporary and of **Negligible** significance.

3.5.41 Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply. Monitoring will be undertaken by an ECoW, and monitoring will be at the abstraction location in the watercourse. If the water quality temporarily deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases, an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction.

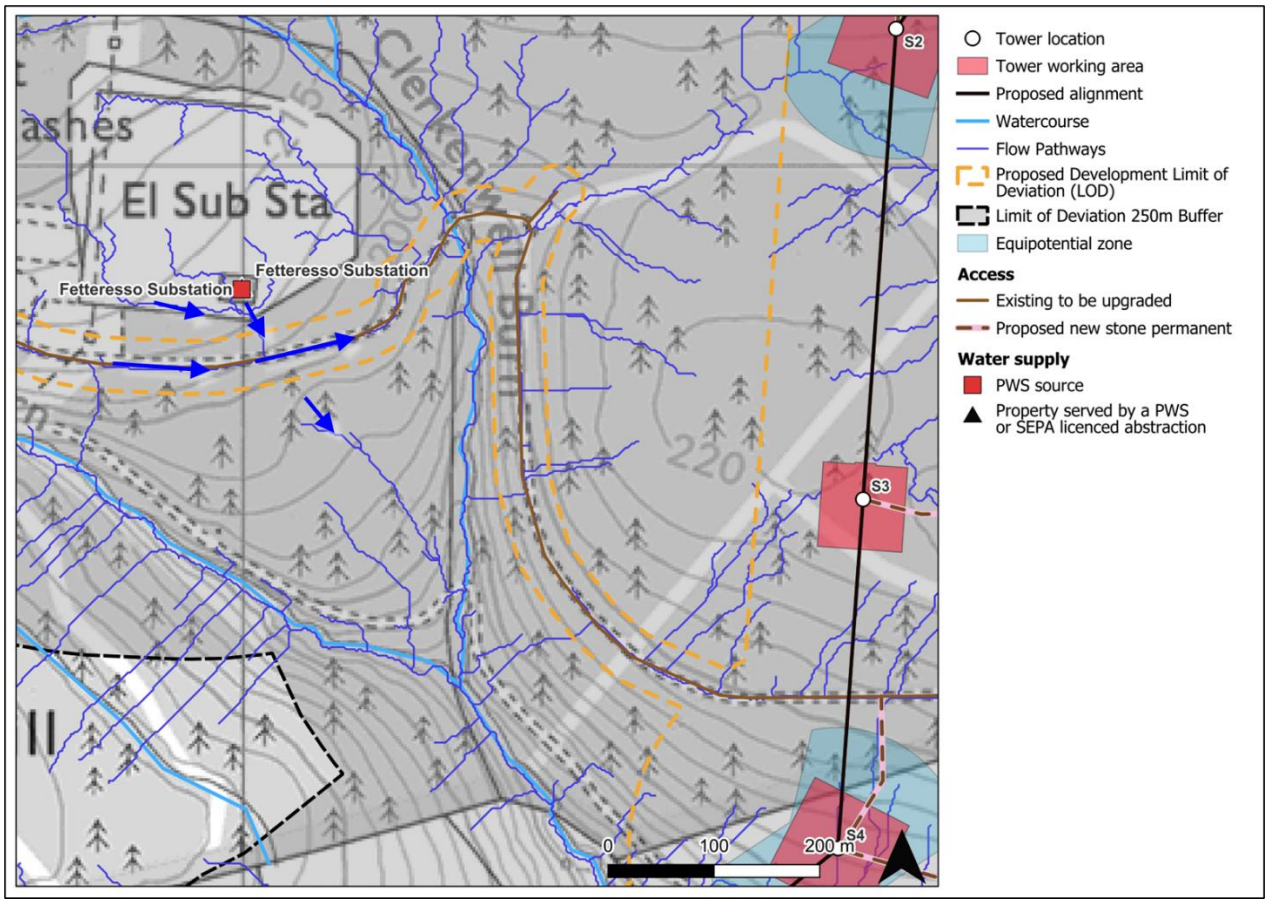
Fetteresso Substation PWS - Rainfall Capture

3.5.42 Fetteresso Substation is a rainfed PWS servicing the existing Fetteresso substation building, which is located 70 m north of existing track that will be upgraded and used for the Proposed Development (**Plate 13.2.22: Fetteresso Substation PWS, showing topography and indicative flow pathways (blue arrows).** The rainfall capture and collection apparatus is located on the roof of the substation and subsequently there is no 'catchment' flowing towards it. A supply reference for this source is provided by the Aberdeenshire Council (175).

3.5.43 No flow pathway analysis is required as the PWS captures rainwater directly from rainfall and is located on the roof. Therefore, there is no potential for sediment/runoff pollution from construction activities and the PWS is not influenced by groundwater levels. The magnitude of change is therefore negligible and with the sensitivity considered medium, the significance of the effect on the PWS is **Negligible** and no additional mitigation will be required.

3.5.44 No monitoring of Fetteresso PWS is proposed, as the PWS is rainfed and is located on the roof, so it cannot be affected by the Proposed Development.

Plate 13.2.22: Fetteresso Substation PWS, showing topography and indicative flow pathways (blue arrows).

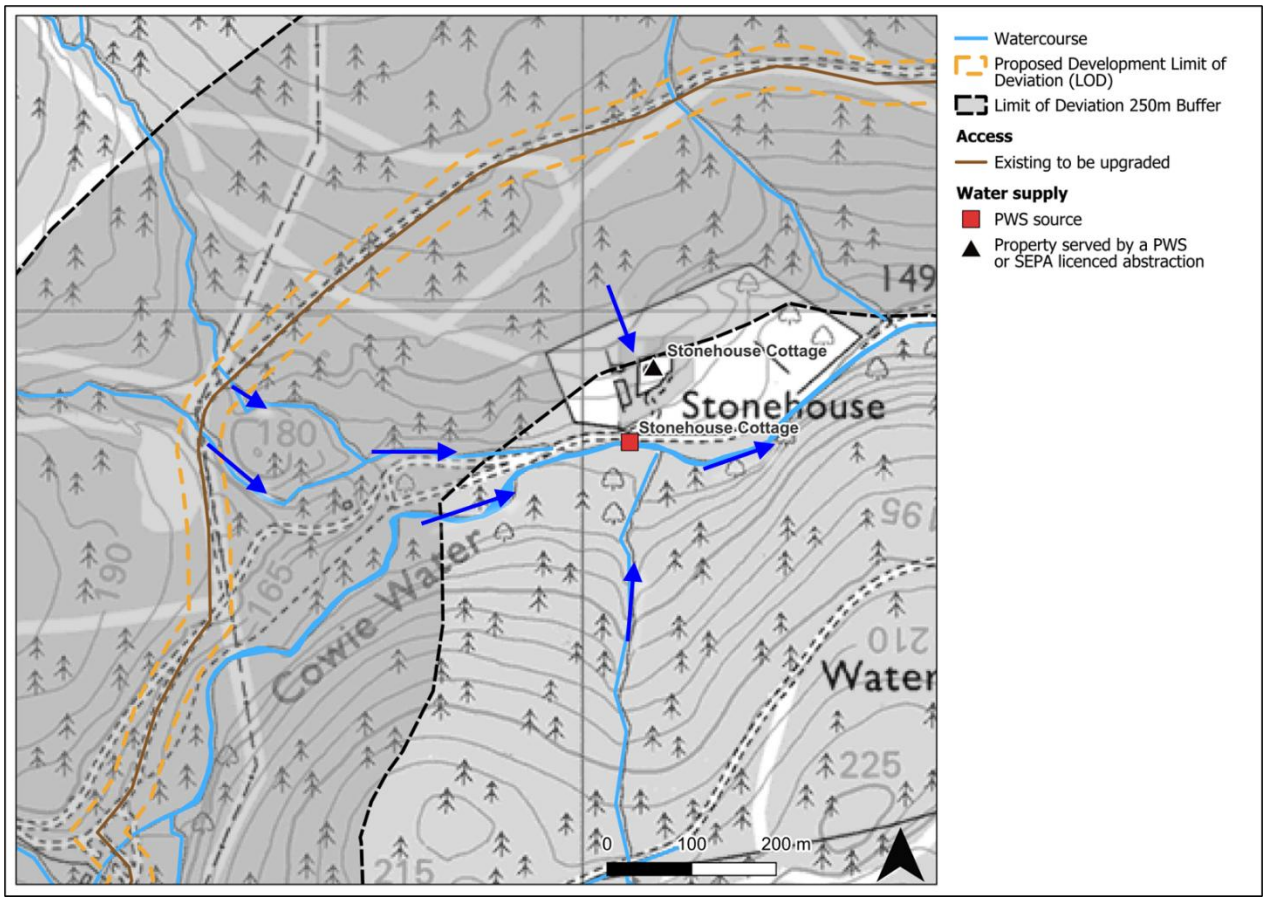


3.6 Section E

Stonehouse Cottage PWS – Surface Water abstraction from Cowie Water

3.6.1 Stonehouse Cottage PWS is a direct watercourse abstraction from the Cowie Water, ~500 m downstream (east) of the existing track, which will be used during construction (**Plate 13.2.23: Stonehouse Cottage PWS, showing topography and indicative flow pathways (blue arrows)**). The abstraction serves Stonehouse Cottage and has been utilised for 30 years, with no issues with water quality or quantity. Water quality is noted as consistently very clean. No other additional information such as abstraction rate was provided.

Plate 13.2.23: Stonehouse Cottage PWS, showing topography and indicative flow pathways (blue arrows)



3.6.2 Coordinates provided by the resident indicates that the PWS abstraction from the Cowie Water is located just south of Stonehouse Cottage, downstream of the confluence between the Cowie Water and the Dumer Burn. The existing track crosses three watercourse crossings (the East Dumer Burn, West Dumer Burn and Cowie Burn) – all of which are ~500 m upstream of the abstraction.

3.6.3 With Embedded and Applied Mitigation measures in place, the magnitude of the impact of increased sediment/silt runoff causing a deterioration in surface water quality in the Cowie Water downstream of the Proposed Development during construction will be temporary and of short duration and the magnitude of impact is considered to be negligible. Stoneshouse PWS relies on surface water abstraction and is considered to be of medium sensitivity. The significance to the effect during construction is assessed to be **Negligible**. Monitoring will be put in place to monitor any potential effects on the PWS. Monitoring will be undertaken by an ECoW and will be at the property tap. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) a temporary alternative water supply will be installed at the PWS, such as portable bowsers.

Tillybreak PWS – Surface Water abstraction from unnamed tributary to Cowie Water

3.6.4 Tillybreak PWS is a direct watercourse abstraction from a minor, unnamed tributary to the Cowie Water (**Plate 13.2.24: Tillybreak PWS, showing topography and indicative flow pathways (blue arrows) Photo 8**). The abstraction point is ~30 m south and downslope of existing track infrastructure for upgrade. The abstraction serves only Tillybreak and no other known properties. There is no other additional information available on the supply. The watercourse is minor with a small catchment area.

Plate 13.2.24: Tillybreak PWS, showing topography and indicative flow pathways (blue arrows)

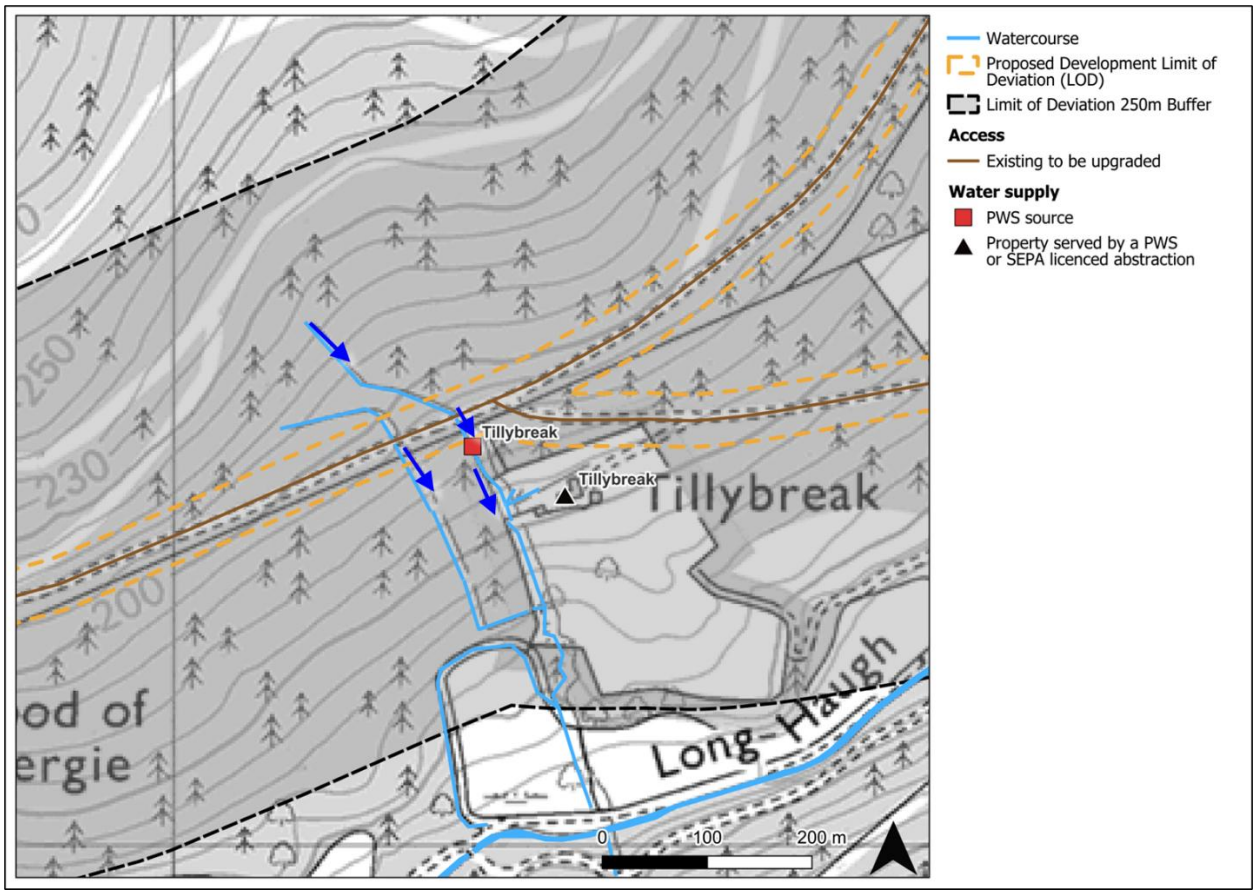


Photo 8: Abstraction source feeding into filtration system

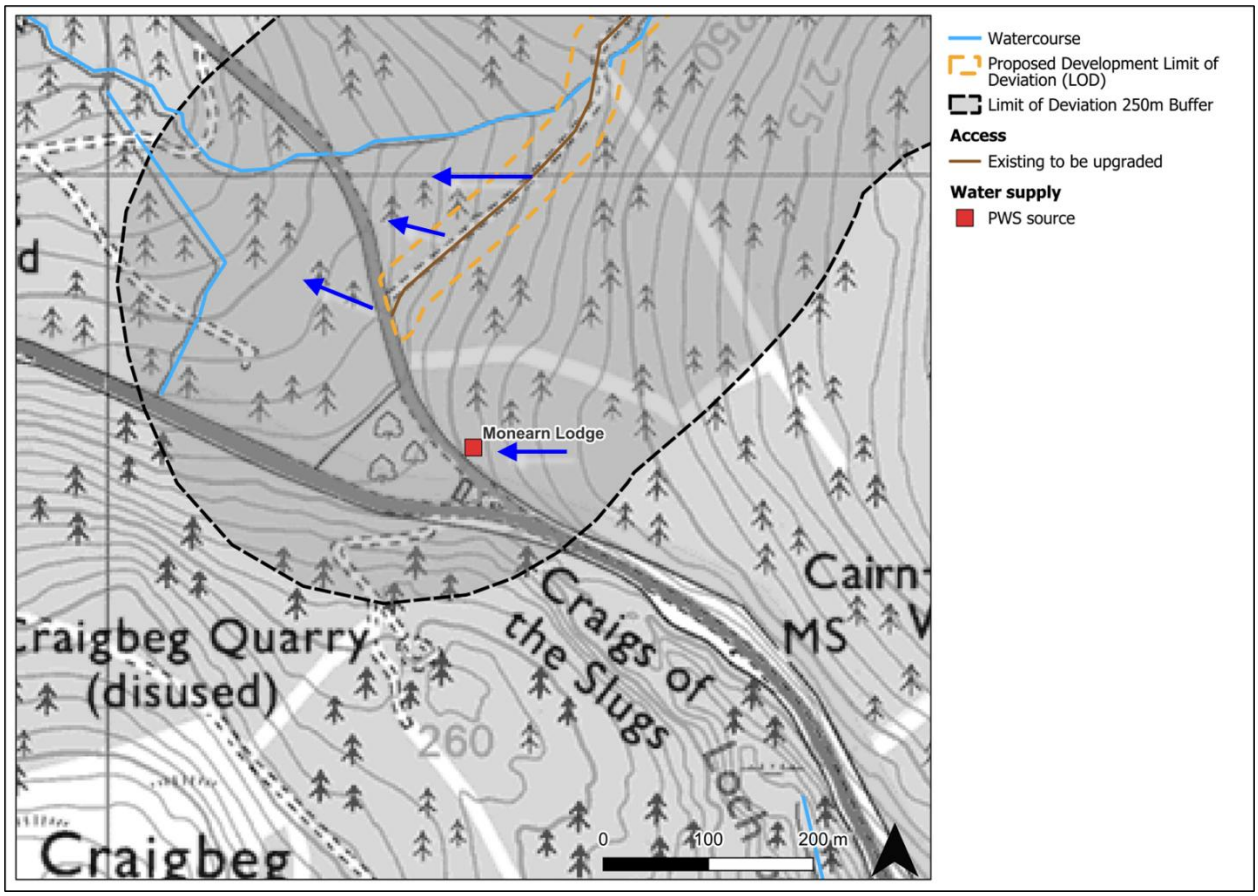
3.6.5 The abstraction point was observed during hydrology surveys and is downslope of the existing access track and existing track crossing. The existing track infrastructure drains towards the minor watercourse which feeds the PWS.

3.6.6 With Applied Mitigation measures in place, given the proximity of the abstraction offtake to the watercourse crossing, the magnitude of the effect of increased sediment/silt runoff and pollution causing a temporary deterioration in water quality at the PWS abstraction location during construction is considered to be low, temporary and of short duration. Tillybreak PWS relies on surface water abstraction and is considered to be of medium sensitivity and the effect during construction is assessed to be **Minor** (Not Significant). Site-specific additional mitigation (eg additional SuDS and silt traps/fences at the existing track crossing locations) and monitoring will be put in place to reduce any potential effects on the PWS. Monitoring will be undertaken by an ECoW, and monitoring will be at the property tap. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) a temporary alternative water supply will be installed at the PWS, such as portable bowsers.

Monearn Lodge PWS - Borehole

3.6.7 The PWS supplying Monearn Lodge is a borehole located 25 m north of the property on the opposite side of the road (**Plate 13.2.25: Monearn Lodge PWS, showing topography and indicative flow pathways (blue arrows)**). The borehole sits at the top of the road embankment, a few metres above the road level. There is no additional information on the supply at the time of writing.

Plate 13.2.25: Monearn Lodge PWS, showing topography and indicative flow pathways (blue arrows)



3.6.8 The PWS is 147 m southeast of an existing forestry track to be used during construction as part of the Proposed Development. The closest part of the track to the borehole sits at a lower elevation so the PWS would not be affected by any surface water runoff during any track upgrades, if required. Given that any proposed excavations are likely to be minor as part of track upgrades, it is unlikely that groundwater quantities of at the borehole will be impacted and the magnitude of impact is assessed to be negligible. The sensitivity of the receptor is medium.

3.6.9 The significance of the effect on the PWS is therefore considered to be **Negligible** (Not Significant).

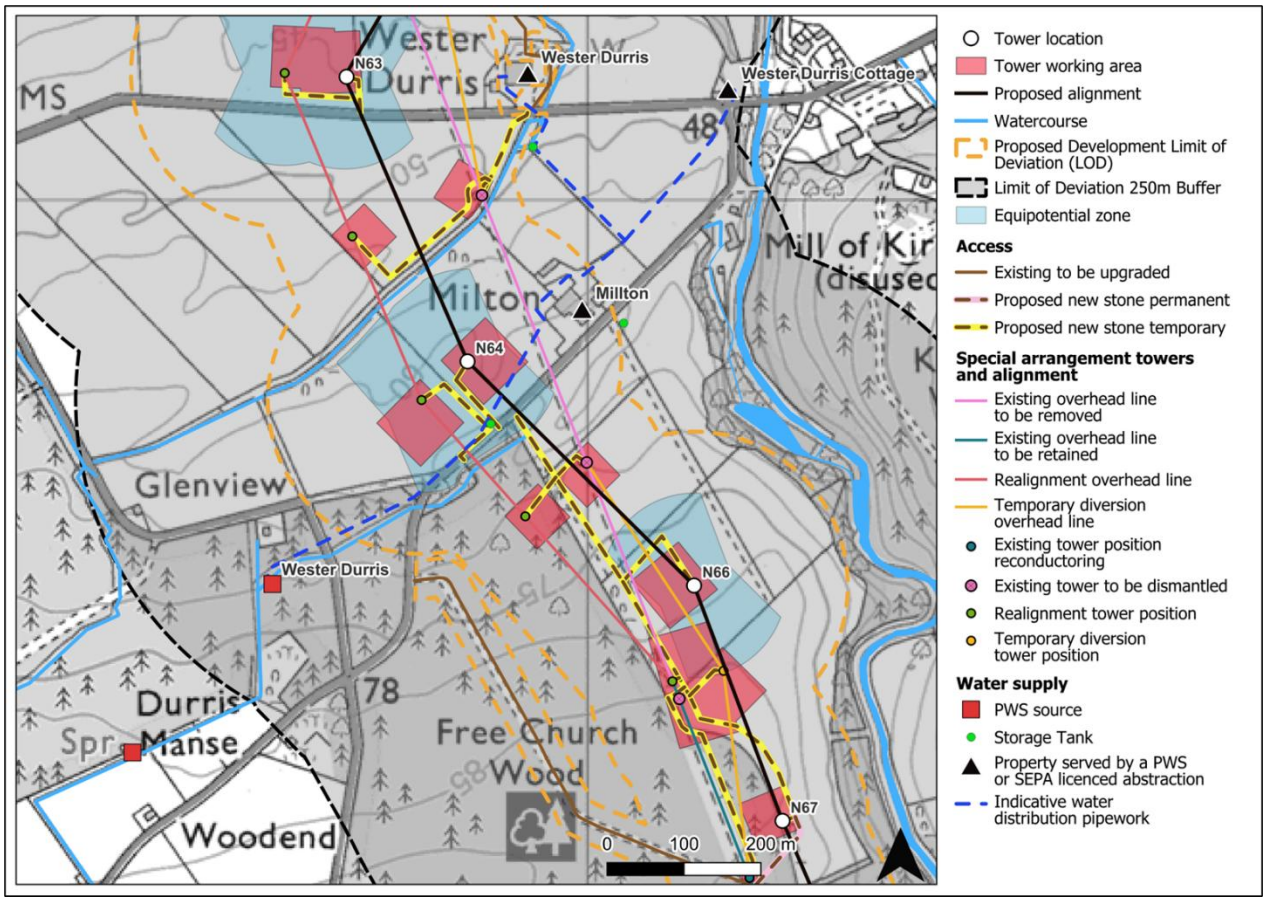
3.6.10 Monitoring of the borehole supply will be undertaken before, during and after construction. Monitoring will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by ECoW, and monitoring would likely be from property tap. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity

decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction.

Wester Durris PWS – Groundwater Spring

3.6.11 The PWS in the Wester Durris area is a spring supplying three known properties: Wester Durris, Wester Durris Cottage and Milton Farm (**Plate 13.2.26: Wester Durris PWS, showing topography**). The indicative water supply distribution pipework is also shown in the figure.

Plate 13.2.26: Wester Durris PWS, showing topography



3.6.12 Wester Durris PWS is located 190 m west of a track to be upgraded and 243 m southwest of tower 492R, part of the realignment around Kirkton of Durris. OS 1:25k contour mapping indicates that the Proposed Development sits at a lower elevation to the PWS and drains in a northerly direction so the PWS will not be affected by surface water runoff. Given that any proposed excavations are likely to be minor as part of track upgrades, it is unlikely that groundwater quantities of any potential supply will be affected. There is very minimal potential for dewatering of the spring source from excavations at tower 492R, but this is highly unlikely as there is a watercourse separating the spring source and tower working area. This watercourse likely contributes significantly to controlling local groundwater levels and any levels lowered by tower excavations are more likely to be on the north side of the watercourse. Given this context, it is considered very unlikely that groundwater quantities will be affected and the magnitude of change is considered negligible to low.

3.6.13 With the PWS being of medium sensitivity, the significance of effect on the PWS source is therefore considered to be **Negligible** to **Minor**, depending on the depth of excavation at the access track for upgrade.

3.6.14 There is proposed infrastructure close to the indicative PWS pipework and investigation and cognisance of the distribution network should be undertaken before, and during construction to avoid damage to the supply pipework. Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by ECoW, and monitoring would likely be from the tap at the supplied property location. If the water quality deteriorates during construction (eg discoloured,

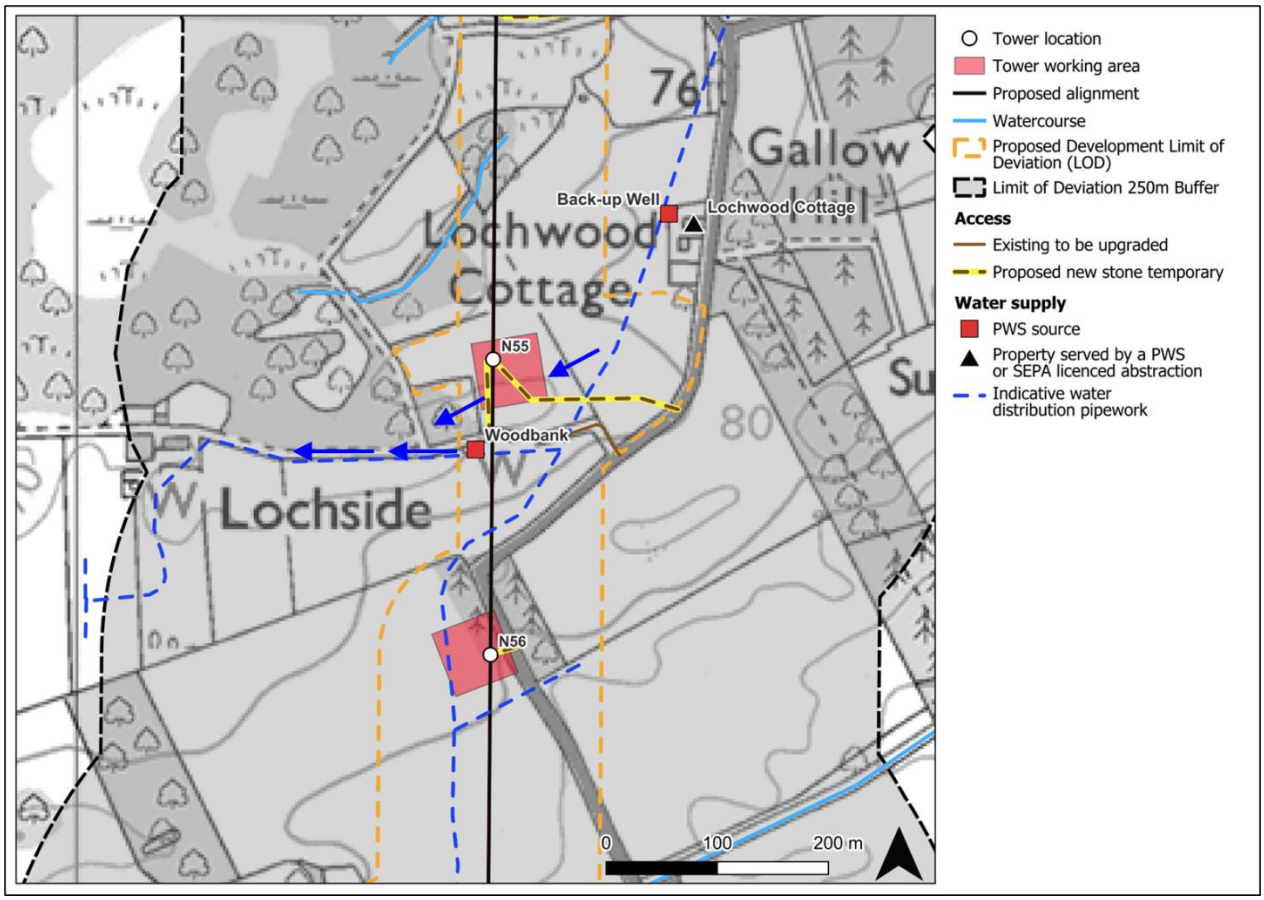
high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction.

3.7 Section F

Woodbank PWS – Groundwater Well

3.7.1 A resident of Woodbank House provided the location of this well which is ~14 m west of the proposed temporary access track to tower N55 and 60 m south of the proposed working area of tower N55 (**Plate 13.2.27: Woodbank PWS, showing topography, indicative water distribution pipework and indicative flow pathways (blue arrows) and Photo 9**). However, they gave no information on whether the well is in use, or which properties it serves. No further information on the well such as abstraction rate or water quality is currently available. Upon visiting the location provided, there was no evidence of the well or pipe connections (**Photo 9**).

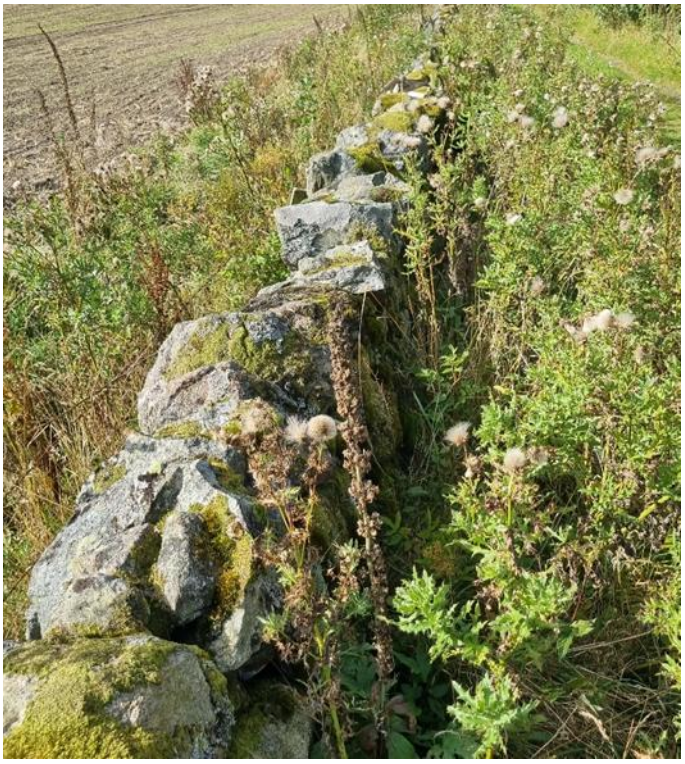
Plate 13.2.27: Woodbank PWS, showing topography, indicative water distribution pipework and indicative flow pathways (blue arrows)



3.7.2 Coordinates provided by the resident and OS 1:25k mapping indicates the well is located adjacent to the track leading to Lochside and is on the opposite side of the track to tower N55. The area around the proposed tower drains to the west and southwest towards the Loch of Park. With the track separating the tower from the well, any surface water runoff will be intercepted by the track and flow west. It is unlikely that surface water runoff will flow directly towards the well. The tower and well are at approximately the same elevation (70 mAOD) so any excavation at the tower could have a medium magnitude of change on groundwater levels at the well. The well is considered to be of low sensitivity (as it is not confirmed if the well is still there or used as a PWS). Hence, the significance of effect on groundwater levels within the well is considered to be **Minor**. Further investigation will be undertaken in advance of construction to decide the appropriate monitoring and additional mitigation required. Based on information from the hydrology site visits it is considered unlikely that the well is still in use.

3.7.3 Monitoring of the well (if present) will be undertaken before, during and after construction. Monitoring will be undertaken from the well itself.

Photo 9: Location of the marked well, no sign of the well at the surface was evident during survey

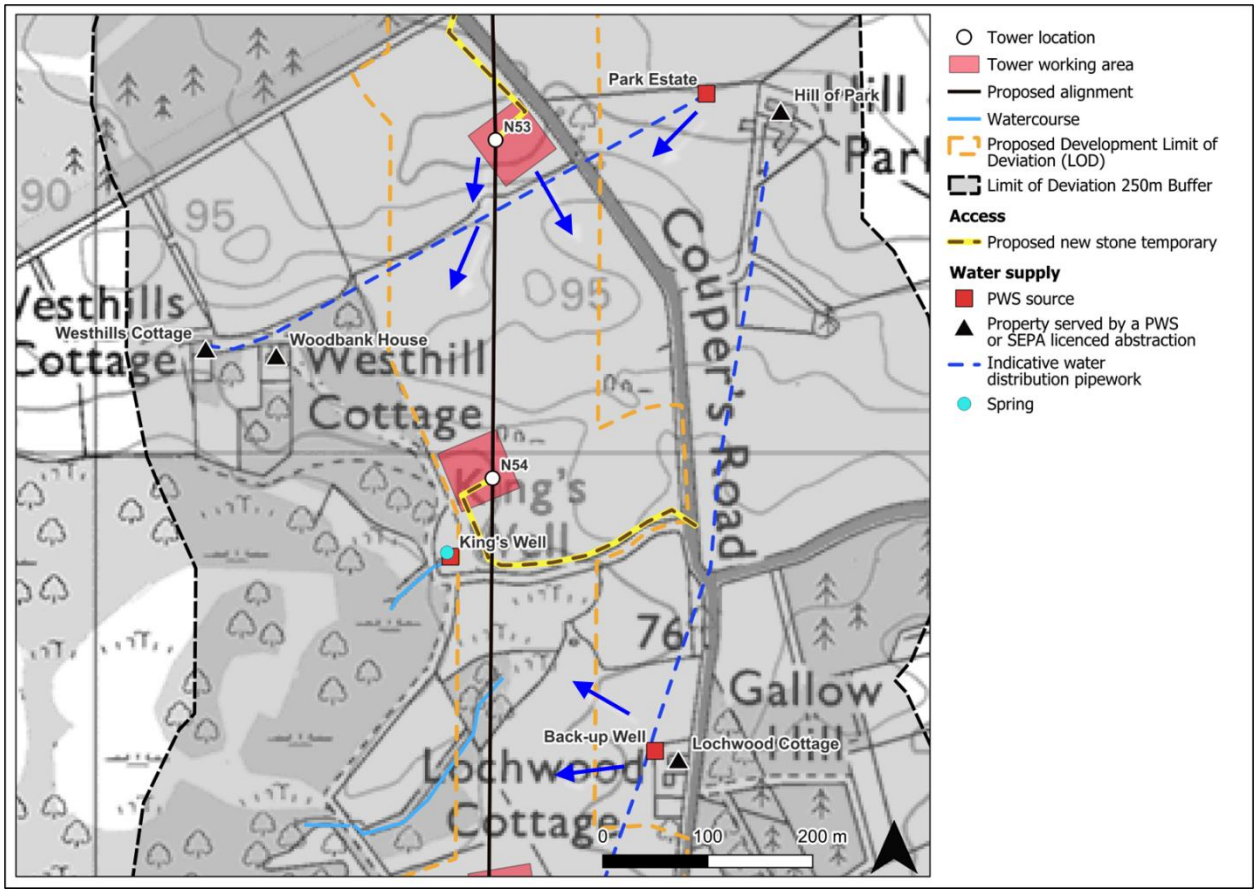


Park Estate PWS, including Lochwood Cottage – Surface Water Collection/Spring/Borehole and Back-up Well

3.7.4 Lochwood Cottage is served principally by the PWS for the Park Estate and by a well at the cottage itself which is used as a backup supply (**Plate 13.2.28: Park Estate PWS, showing Lochwood Cottage back-up well, indicative water distribution pipework and indicative flow pathways (blue arrows)**). The principal supply at Park Estate is noted as either a spring or surface water collection from Coldstream plantation (conflicting information from various residents) and is fed to a storage tank located ~150 m east of the proposed tower N53 working area. Mapping from the estate indicates it is a surface water fed collection system drained from the Coldstream Plantation down to the Hill of Park area. No evidence of a spring was noted during surveys. Therefore, it is considered that the PWS is a surface water fed supply. The PWS is utilised for domestic use. Aberdeenshire Council data indicates the PWS source for Park Estate as a borehole (Supply reference: 35448) ~97 m south of the coordinates that the resident provided and it is considered that this relates to the same source. The Park Estate PWS also supplies Hill of Park House. The area surrounding the surface water collection drains to the southwest direction towards Couper's Road based on 1:25k OS mapping. A resident has noted that if levels get low here the supply at Burnbrae can be connected and water pumped uphill from Burnbrae into the Park Estate supply.

3.7.5 An old estate map figure provided by a resident indicated approximate distribution connections to numerous properties in the area. The approximate route of the pipeline is shown on **Plate 13.2.28: Park Estate PWS, showing Lochwood Cottage back-up well, topography, indicative water distribution pipework and indicative flow pathways (blue arrows)**, based on information provided by the resident, however it would be prudent to further consult with the resident, Park Estate and Duncan Farms on the exact route of the pipeline to avoid damaging the connection between the PWS and the properties.

Plate 13.2.28: Park Estate PWS, showing Lochwood Cottage back-up well, topography, indicative water distribution pipework and indicative flow pathways (blue arrows).



3.7.6 The proposed tower N53, its associated working area and access track are situated downslope of the spring source and the tower at an elevation ~ 3 m lower than the spring/borehole. There is also a topographic hollow between the tower working area and the location of the spring. Therefore, any excavations around the tower and associated infrastructure would be unlikely to affect the groundwater supply to the spring and the magnitude of impact is considered to be temporary and low. The spring being is upslope of the Proposed Development and would not be impacted by surface water runoff during construction. The sensitivity of the spring is medium, hence the significance of effect on the PWS without additional mitigation is considered to be **Minor**.

3.7.7 A well at Lochwood Cottage is used by the property as a backup water supply. The well remains fully functional. No details on abstraction rates or the depth of the well were provided. The well is located 200 m south of the proposed access track for N54.

3.7.8 The surface of the PWS well abstraction is located at around 77 mAOD. The PWS would not be affected by surface water runoff from tower N55 due to the PWS being upslope of the tower, which lies at around 70 mAOD (**Plate 13.2.29: King's Well PWS, distribution network, topography and indicative flow pathways (blue arrows)**). Surface water flow paths from the access track to tower N54 generally flow downhill to the west to Loch of Park, away from the well, so runoff from here will not affect the PWS. However, tower N55 lies downslope of the well and tower excavation have the potential to temporarily impact groundwater levels and the quantity of supply to well, which was assessed as medium magnitude. The well is medium sensitivity and the significance of effect on the PWS (well) without additional mitigation is therefore considered to be **Moderate**.

3.7.9 A detailed investigation of the distribution network prior to construction will be carried out and cognisant during construction to ensure the pipes are avoided or managed accordingly. Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by an ECoW, and monitoring will be at the two source locations (ie the spring and the well or property tap). If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the supplied properties, such as

portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new water supply or provide a connection to the Scottish Water mains.

King's Well PWS – Groundwater Well/ Spring

3.7.10 The King's Well sits ~44 m south of the working area of tower N54 and ~33 m southwest of the proposed temporary access track to the tower (**Plate 13.2.29: King's Well PWS, distribution network, topography and indicative flow pathways** (blue arrows) and Photo 10). Information on this well was provided by the resident of Westhills Cottage and Lochwood Cottage, which the well may supply, although there remains uncertainty from residents whether the well serves as a supply. Westhills Cottage is 240 m northwest of the well and Lochwood Cottage is ~290 m southeast of the well. Westhills Cottage is also served by a spring/borehole at the Park Estate supply (as discussed above) and is fed to the cottage via a pipeline under Couper's Road. Lochwood Cottage is also served by the Park Estate's back-well (as discussed above), so it is considered unlikely that the King's Well is still in use as a domestic supply.

Plate 13.2.29: King's Well PWS, distribution network, topography and indicative flow pathways (blue arrows)

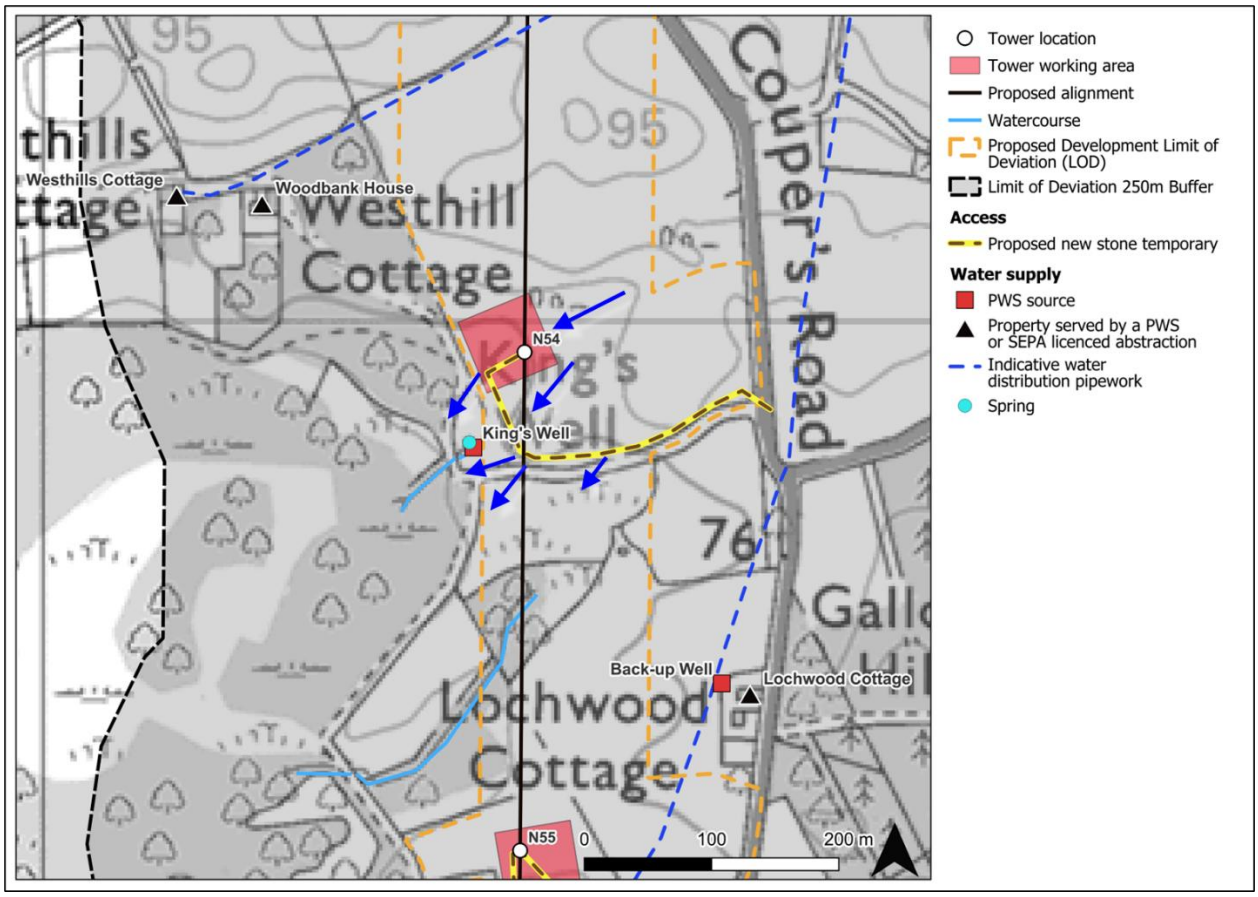
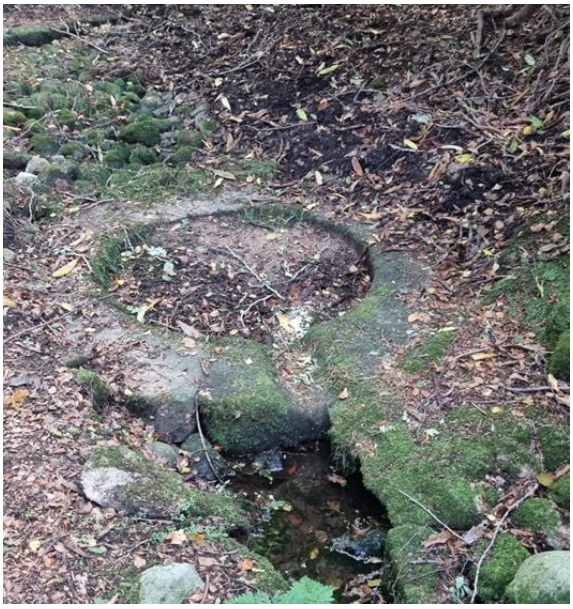


Photo 10: King's Well, a spring source was noted around 5 metres behind the well (northeast)



3.7.11 The well and the proposed tower are at a similar elevation, the well at around 72 mAOD and tower N54 around 73 mAOD, meaning that any excavations at the tower or at the temporary access track could potentially temporarily affect groundwater levels at the well. Based on topography and flow pathway analysis, surface water runoff from the track and tower could flow towards the well, although there is a stone wall around the well. The magnitude of change is considered to be medium and the sensitivity of the PWS, if still in use, is medium. The effect on the well without additional mitigation is considered to be of **Moderate** significance (if the King's Well serves as a PWS).

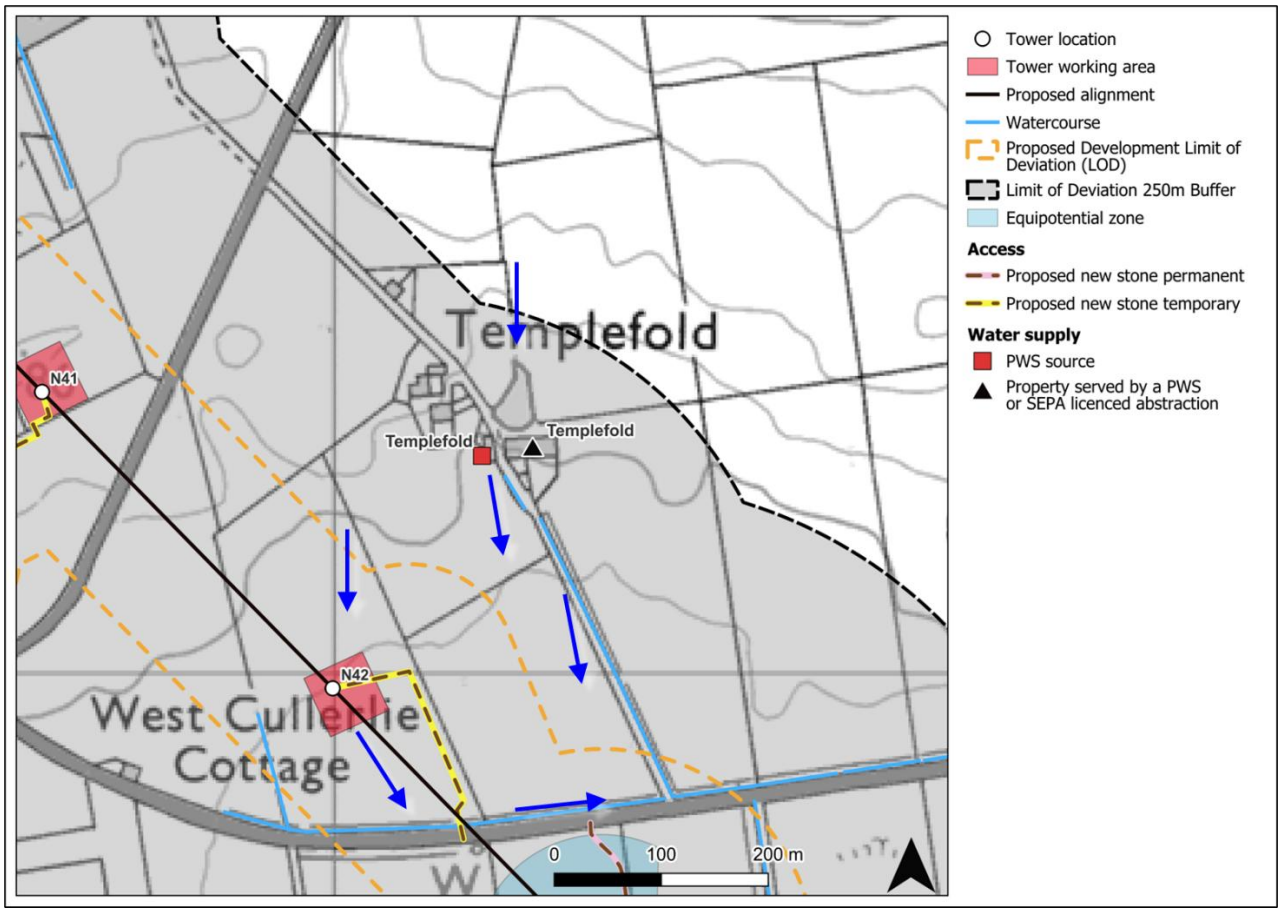
3.7.12 Further investigation is required to establish if the well is in use as a PWS, and then the appropriate monitoring and additional mitigation required will be decided.

3.7.13 Monitoring of the well will be undertaken before, during and after construction. Monitoring will be undertaken from the well itself.

Templefold PWS- Well

3.7.14 Templefold is served by a well PWS which is located on the west side of the property and ~215m northeast of the working area of tower N42. This is shown in **Plate 13.2.30: Templefold PWS, showing topography and indicative flow pathways (blue arrows)**. The borehole is approximately 4-5m deep and is utilised for General Farm Use and Livestock. Templefold also has a Scottish Water mains connection for domestic use.

Plate 13.2.30: Templefold PWS, showing topography and indicative flow pathways (blue arrows)).



3.7.15 The PWS abstraction source is situated ~210 m north of the proposed new temporary access track to tower N42 and ~215m northeast of the proposed working area of tower N42 at its closest point. The abstraction sits upslope of the Proposed Development, at an elevation difference of ~4-6 m. As the abstraction source sits upslope of the infrastructure, the water quality will not be affected by sediment/pollution runoff arising during construction. Given that any proposed excavations are likely to be minor as part of track upgrades, it is unlikely that groundwater quantities of any potential supply will be affected. Excavation at the tower working area could potentially temporarily impact groundwater levels at the PWS given that the well is only around 4-5m depth, although this is considered to be low magnitude

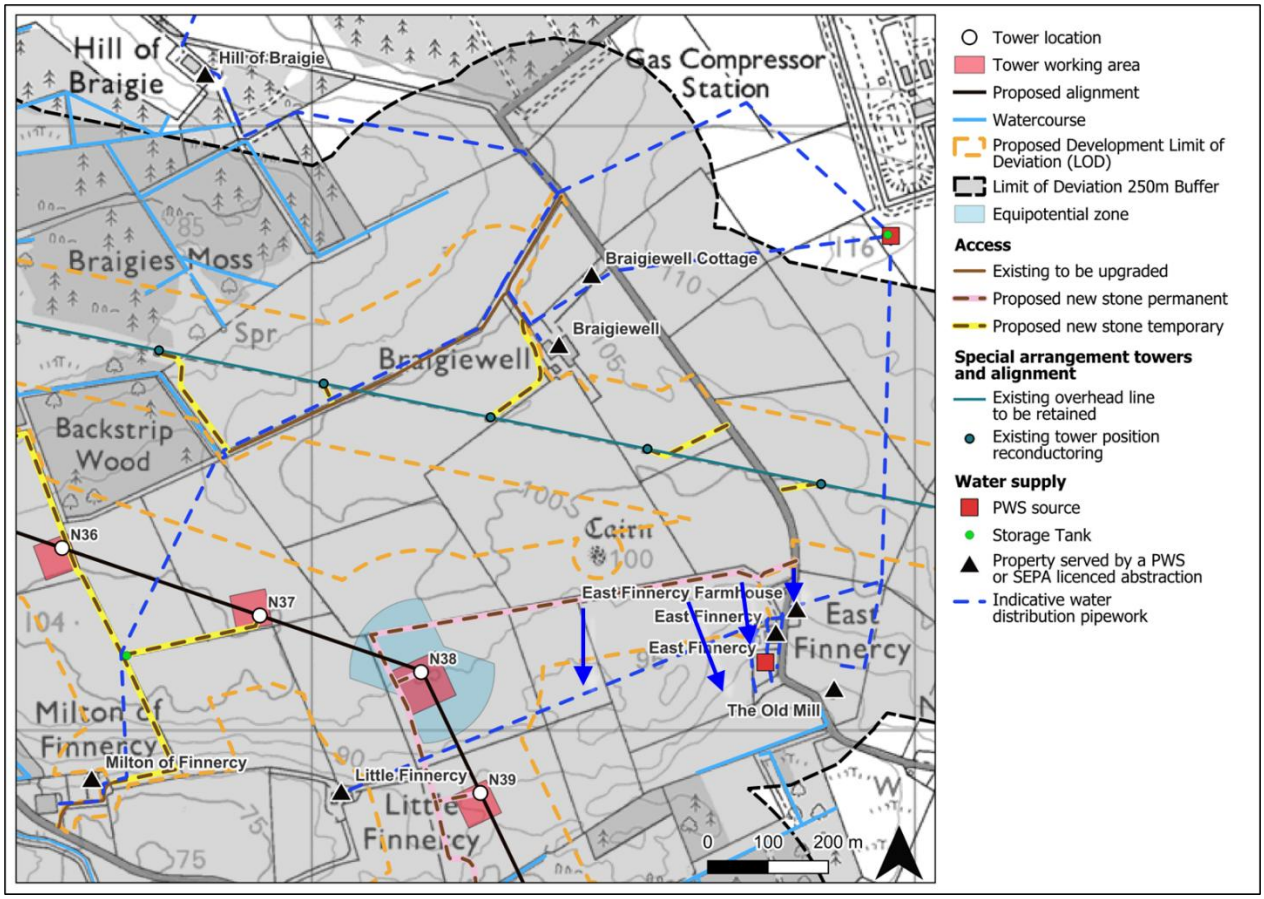
3.7.16 The sensitivity of the PWS is low, resulting in an effect of **Minor** significance.

3.7.17 Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by ECoW, and monitoring would likely be from the tap at the supplied property location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new private water supply for the property or provide a connection to the Scottish Water mains.

East Finnercy PWS – Groundwater Spring/Borehole

3.7.18 The East Finnercy PWS is a spring/borehole supply and is known to serve at least one property (Little Finnercy) (**Plate 13.2.31: East Finnercy PWS, showing indicative water distribution pipework, topography and indicative flow pathways (blue arrows)**), but there remains uncertainty regarding other properties supplied by this source. Aberdeenshire Council data (PWS source ref: 34535) notes that the East Finnercy supplies another six properties (The Old Mill, Cottage, Hill Of Braigie, East Finnercy, Braigiewell Cottage and Braigiewell). A meeting on-site with the Dunecht Estate management revealed the exact PWS source location and some supply connections, which are shown on **Plate 13.2.31**. The PWS is utilised for domestic use.

Plate 13.2.31: East Finnercy PWS, showing indicative water distribution pipework, topography and indicative flow pathways (blue arrows)



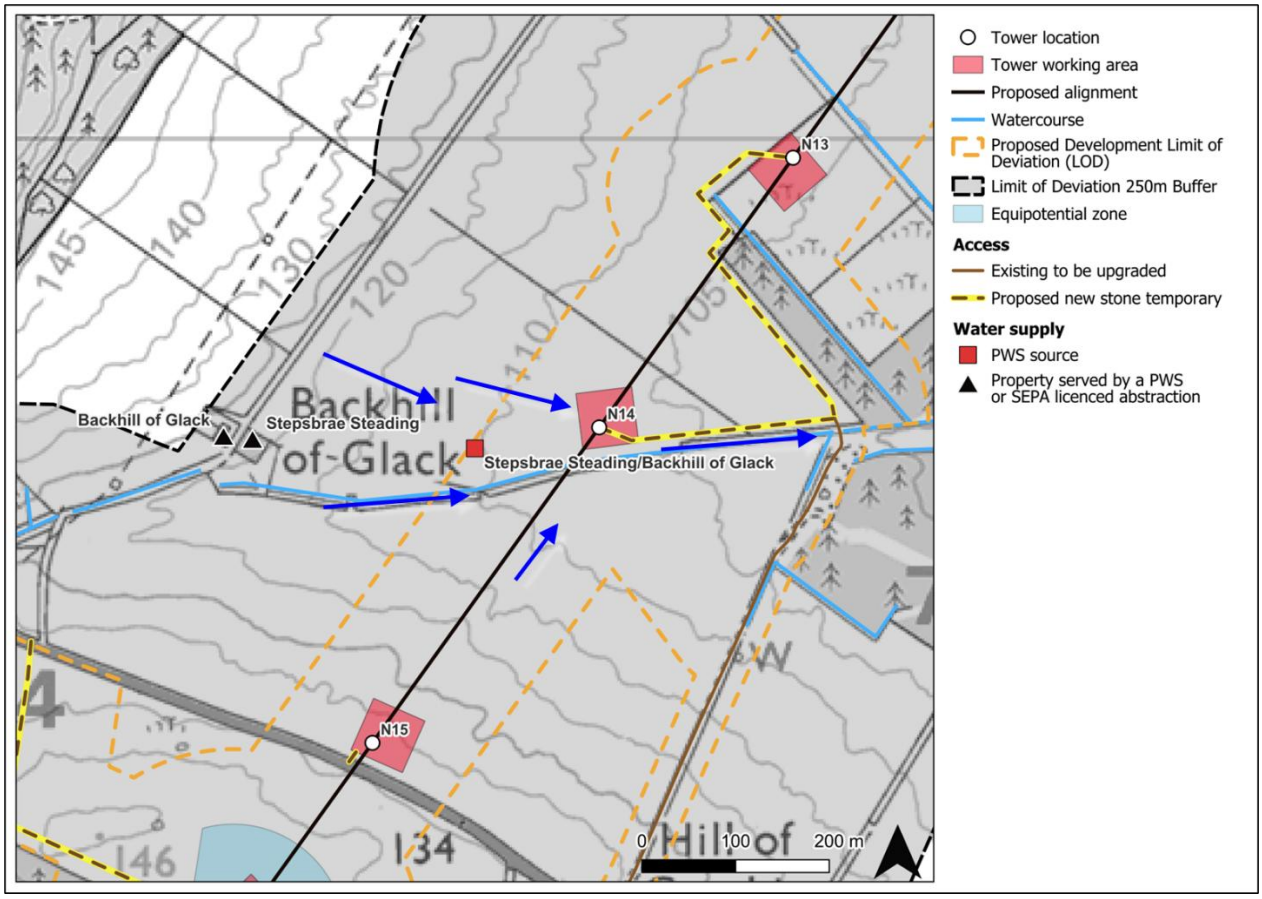
3.7.19 The PWS abstraction is located ~140 m south of the proposed permanent track at tower N38. The proposed track lies upslope of the PWS, and contour mapping indicates there is a slight potential for construction runoff from the track towards the PWS source, although given the distance from the track to the spring, the impact on water quality is considered to be of negligible magnitude. Excavations for the track are considered unlikely to affect groundwater quantity at the PWS, as the new track sits over 10 m higher (in elevation) than the PWS source and the magnitude of impact is considered negligible. With PWS being of medium sensitivity, the effect on the PWS is considered to be **Negligible**. However, there is a risk of disruption to the piped distribution network, as the proposed permanent access track passes over the indicated pipe network.

3.7.20 A detailed investigation of the distribution network prior to construction will be carried out and cognisant during construction to ensure the pipes are avoided or managed accordingly. Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by an ECoW, and monitoring will be at spring/borehole source. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction.

Stepsbrae Steading/Backhill of Glack- Groundwater Well/Borehole

3.7.21 Stepsbrae Steading/Backhill of Glack is a well/borehole supply utilised for domestic and livestock purposes, situated ~114 m southwest of proposed tower N14 (**Plate 13.2.32-: Stepsbrae Steading/Backhill of Glack PWS, showing topography and indicative flow pathways (blue arrows)**). It serves two properties (Backhill of Glack and Stepsbrae Steading) which are located ~240 m west, and upslope, of the source. Data provided by Aberdeenshire Council indicated a PWS source (reference: 498) ~149 m northwest of the coordinates the resident provided. This is the same supply and the resident's source location is taken to be correct. The resident noted that the supply is new and water quality is very good.

Plate 13.2.32: Stepsbrae Steading/Backhill of Glack PWS, showing topography and indicative flow pathways (blue arrows)



3.7.22 Tower N14 and its associated working area would be ~113 m downslope (east) of the well at an elevation difference of ~2 m. Therefore, excavations associated with the tower may have a temporary effect on groundwater levels and water supply at the well and the magnitude of effect is considered medium. The well would not be affected by surface water runoff as it is located upslope of the Proposed Development. The sensitivity of the PWS is medium, hence the significance of the effect on the PWS before additional mitigation is assessed to be **Moderate**.

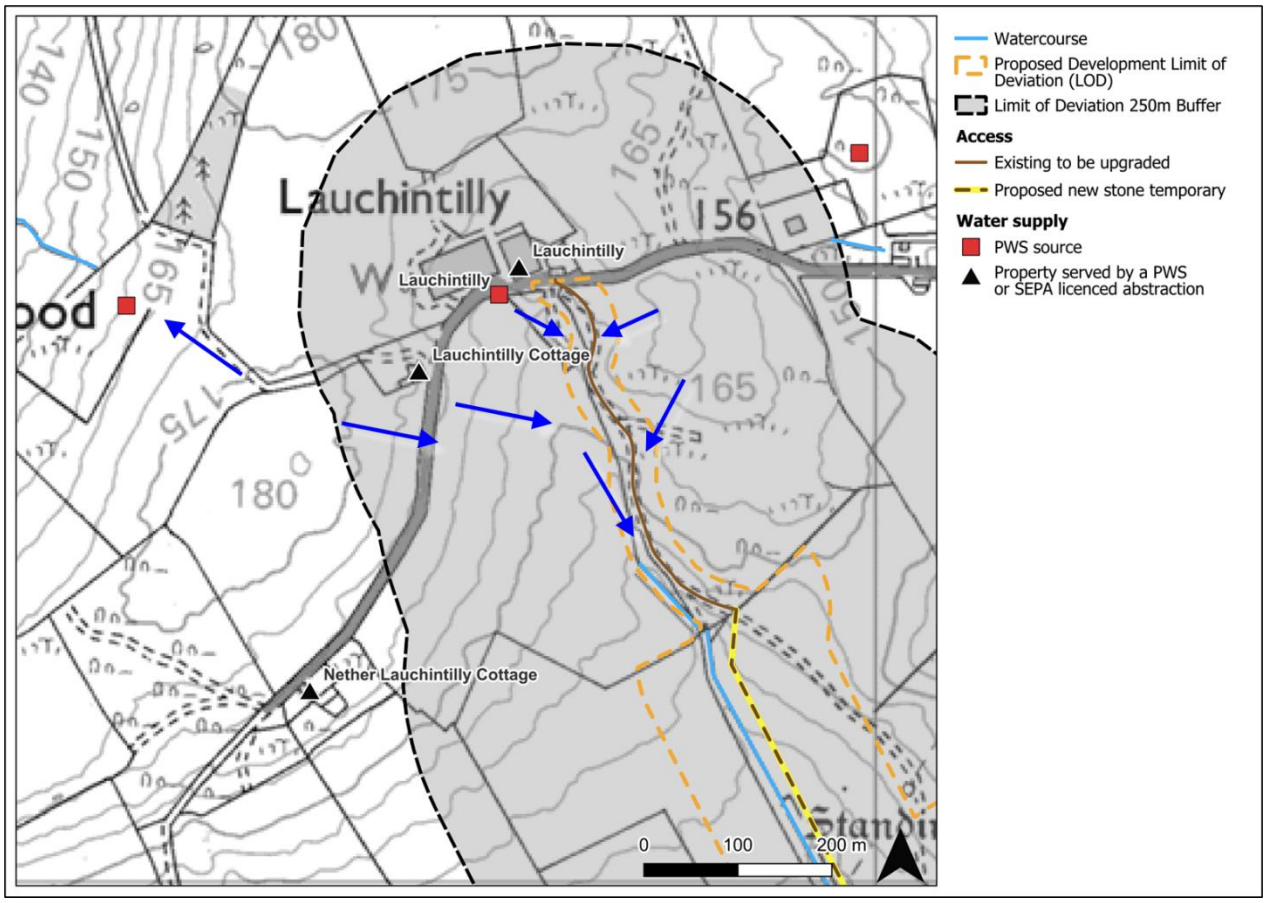
3.7.23 Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by an ECoW, and monitoring would be at the well. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new water supply or provide a connection to the Scottish Water mains.

Lauchintilly PWS - Borehole

3.7.24 Lauchintilly is served by a borehole abstraction directly beside the road, approximately 60 m west of the existing access track proposed for upgrade and just 20m southwest of Lauchintilly. The borehole is approximately 35 m deep

with consistent supply yield and is generally utilised for General Farm Use and Livestock but has the option for Domestic use. The farmer additionally reported that Lauchintilly Cottage, Nether Lauchintilly Cottage, Nether Lauchintilly and the Launchintilly are supplied by a separate spring supply outwith the 250 m buffer from the Limit of Deviation, located around 300 m west of Lauchintilly Cottage. This is shown in **Plate 13.2.33: Lauchintilly PWS, showing topography and indicative flow pathways (blue arrows)**.

Plate 13.2.33: Lauchintilly PWS, showing topography and indicative flow pathways (blue arrows).



3.7.25 Lauchintilly PWS abstraction source is located ~60 m west of proposed existing track to be used during construction of towers N9-N12. The property and PWS abstraction are elevated slightly above the highest point of the track, which varies in elevation itself along its route. The abstraction is also ~35 m below the ground levels of ~165 m AOD and the section of track which reaches this level is over 600m south with ground levels also sloping to the south/southeast. Subsequently there is no risk of surface water runoff from the track affecting water quality of any potential supply at the property. Given that any proposed excavations are likely to be minor as part of track upgrades (if required), and the borehole abstraction is so much deeper than potential excavation depths near the abstraction source, it is unlikely that groundwater quantities of any potential supply will be affected and the magnitude of change is considered to be Negligible.

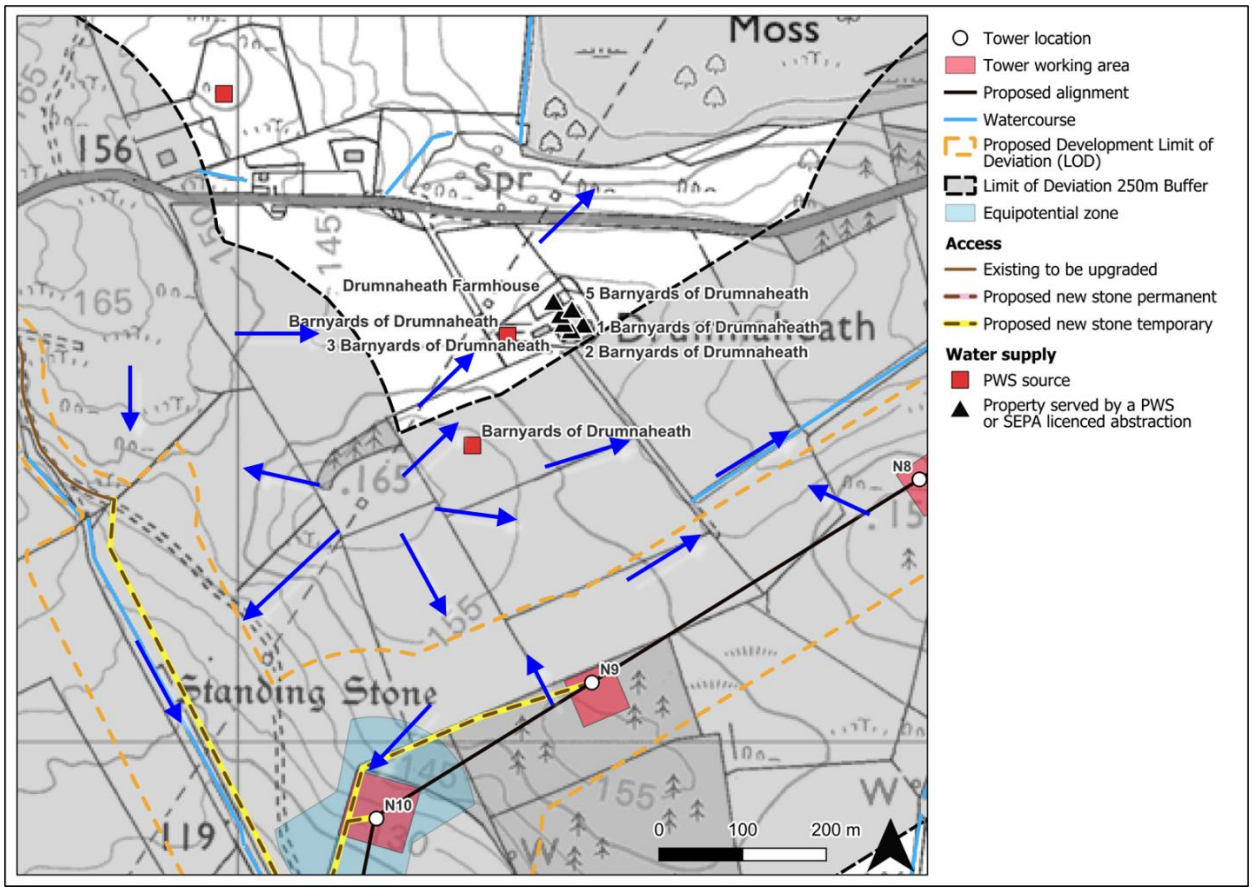
3.7.26 Therefore, with the sensitivity of the PWS being medium, the significance of effect at the PWS is **Negligible**.

3.7.27 Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by ECoW, and monitoring would likely be from the tap at the supplied property location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new private water supply for the property or provide a connection to the Scottish Water mains.

Barnyards of Drumnaheath PWS- Borehole

3.7.28 The properties at Barnyards of Drumnaheath (1-5 Barnyards of Drumnaheath and Drumnaheath Farmhouse) are served by a PWS borehole and potentially a well abstraction. There are two conflicting coordinates provided by residents here on the position of the PWS abstraction source, with one known borehole position reported directly beside the road into the properties which has been confirmed. This is outwith the 250 m buffer of the LOD. A second reported source details a borehole and well supply, with a position provided within the 250 m buffer of the LOD, southwest of the properties. Surveys could not identify any evidence of PWS here and could not define if this is a borehole or well. Both abstraction sources are shown in **Plate 13.2.34: Barnyards of Drumnaheath PWS, showing both reported abstraction locations, topography and indicative flow pathways (blue arrows)**. It is considered likely that there is only one borehole present, nearer to the properties outwith the 250 m LOD buffer. The PWS is utilised for domestic purposes. Residents note that supply has been very limited several summers in a row and the drainage source is up the hill to the southwest. The borehole is noted to be between 25-30 m deep. The abstraction rate is unknown.

Plate 13.2.34: Barnyards of Drumnaheath PWS, showing both reported abstraction locations, topography and indicative flow pathways (blue arrows).



3.7.29 Both abstraction sources are located on the north side of a small hill, to the south of which is the nearest infrastructure at the proposed tower N9 and the proposed new stone temporary access track to N9. The nearest reported abstraction location is approximately 200 m north of the LOD at its nearest point and lies at around 156 mAOD. The LOD elevation is approximately 154 mAOD at its nearest point. Areas within the LOD slope downhill to the south southwest and northeast away from the abstraction locations. There are no surface water runoff pathways from the LOD areas towards the abstraction points or the abstraction recharge area. Therefore, it is considered that surface water runoff contamination associated with construction activities would not affect the PWS.

3.7.30 The borehole is noted by both resident responses to be at least 25 m deep, thus, regardless of whether there are boreholes at both coordinates provided, the boreholes abstraction elevation is at a considerably lower level than any nearby excavation within the LOD which would be at approximately 150-155 mAOD. Borehole abstraction levels would be approximately 130 mAOD to 120 mAOD. Additionally, potential development areas within the LOD are not

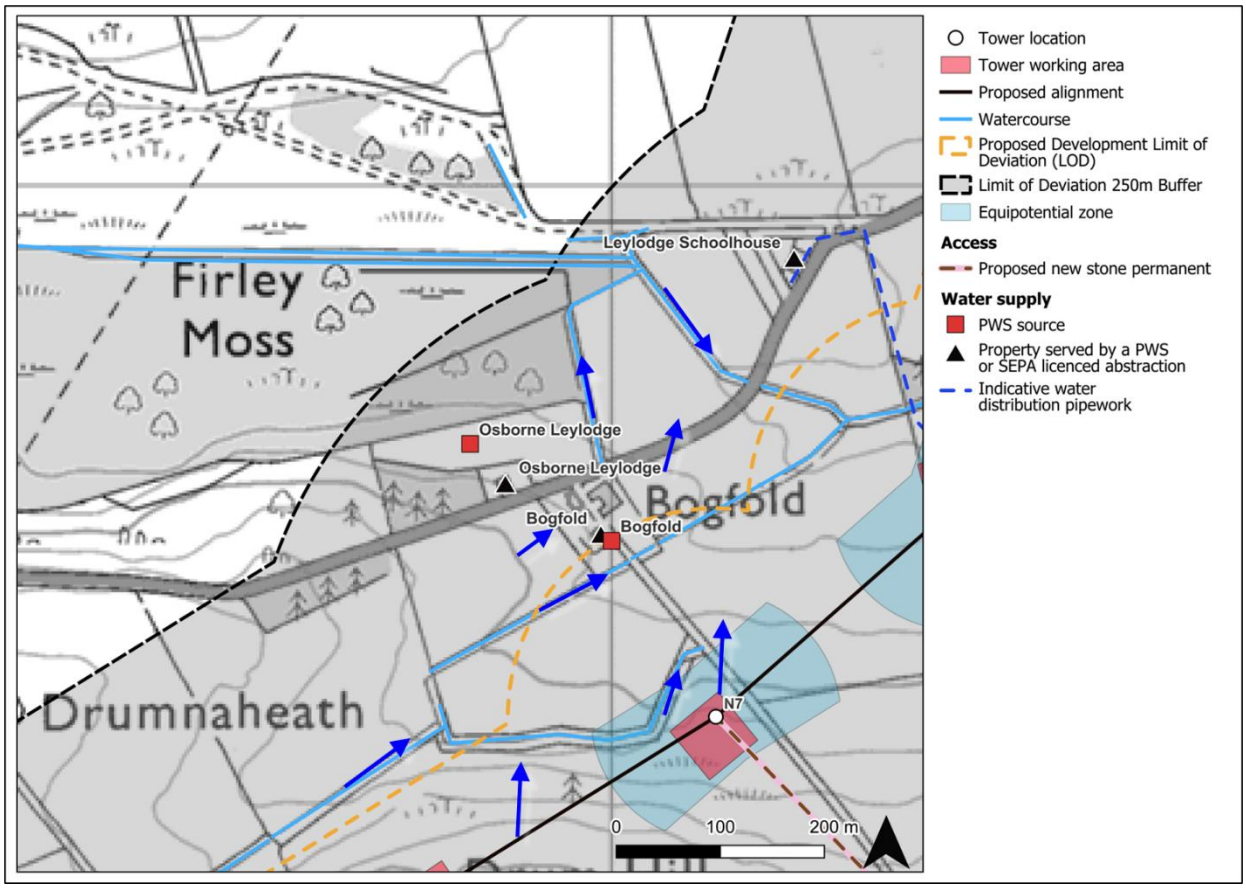
in the anticipated recharge zone for the boreholes based on topography, and the underlying lithology is impermeable igneous geology within which flow is virtually all through fractures and other discontinuities. Therefore, it is considered that any excavation associated with the proposed development will have an impact of negligible magnitude on groundwater quantity. The PWS is of medium sensitivity so the effect of the Proposed Development infrastructure on the PWS is considered to be **Negligible** and no additional mitigation is required.

3.7.31 Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by ECoW, and monitoring would likely be from borehole directly or the tap at the supplied properties. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new private water supply for the property or provide a connection to the Scottish Water mains.

Osborne Leylodge PWS – Well

3.7.32 Osborne Leylodge PWS is a groundwater well abstraction serving one property, Osborne Leylodge. This is shown in **Plate 13.2.35: Osborne Leylodge PWS, showing topography and indicative flow pathways (blue arrows)**. The well abstraction is located approximately 50 m northeast of the property. The PWS is utilised for domestic purposes and there is no Scottish Water Mains connection in this area. The abstraction rate is unknown. The residents report that the water quality is very good and the supply never runs dry.

Plate 13.2.35: Osborne Leylodge PWS, showing topography and indicative flow pathways (blue arrows).



3.7.33 The well is located approximately 350 m northwest of the proposed location of tower N7 and around 150 m northwest of the LOD at its nearest point. There are no surface water flow pathways from anywhere within the LOD towards the well abstraction location and additionally the Park Burn and several drains lie between any likely positions for siting proposed development infrastructure and the PWS source. Therefore, it is considered that there is negligible risk of surface water runoff affecting the PWS.

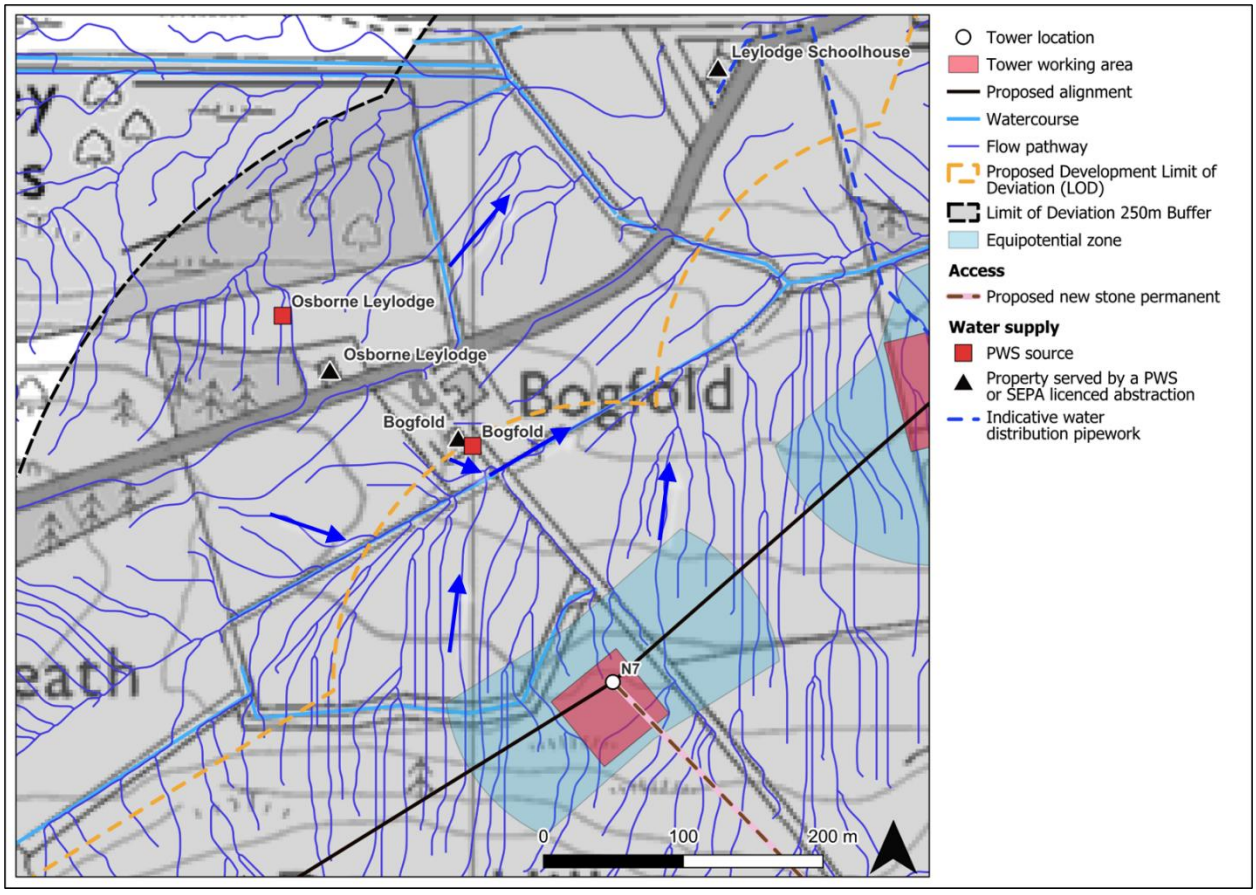
3.7.34 The PWS is separated from the proposed development areas within the LOD by the Park Burn and tributary drains. Therefore, the well abstraction area is hydrologically disconnected from the areas where excavation may affect groundwater levels/quantities and therefore it is considered that there is a negligible magnitude of change on groundwater quantities. The PWS is of medium sensitivity so the effect of the Proposed Development infrastructure on the PWS is considered to be **Negligible** and no additional mitigation is required.

3.7.35 Monitoring of the well will be undertaken before, during and after construction. Monitoring will be undertaken by ECoW, and monitoring would be undertaken from the well or the property tap. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new private water supply for the property or provide a connection to the Scottish Water mains.

Bogfold PWS – Groundwater Well

3.7.36 The PWS serving the property at Bogfold is a well located ~180 m northwest of the proposed tower N7 working area (**Plate 13.2.36: Bogfold PWS, showing topography and indicative flow pathways (blue arrows)**). The PWS is used for domestic and livestock purposes and the resident noted there has always been sufficient water supply. The PWS is fed into a storage tank located within the grounds of the property, close to the source. The PWS is located on the lower slopes of Drum Hill and ground levels in the area generally slope downhill northeast to the Park Burn.

Plate 13.2.36: Bogfold PWS, showing topography and indicative flow pathways (blue arrows)



3.7.37 Tower N7 would be situated upslope of the well at an elevation difference of 12 m. Therefore, any excavations around the tower and associated infrastructure would be unlikely to affect groundwater supply to the well. The underlying topography shows that the tower would drain in a northerly direction, therefore the well is not in the flow pathway and would not be affected.

3.7.38 Tower N8 would lie upslope of the PWS on the northern flanks of Drum Hill and there may have been surface flow paths from here towards the PWS, however the agricultural drainage ditches here between tower N8 and the PWS would capture any run-off prior to reaching the PWS, meaning that there would be a negligible magnitude of change.

The PWS is of medium sensitivity so the effect of the Proposed Development infrastructure on the PWS is considered to be **Negligible** and no additional mitigation is required.

3.7.39 Monitoring of the well will be undertaken before, during and after construction. Monitoring will be undertaken from the well itself.

Leylodge Schoolhouse PWS – Groundwater Spring

3.7.40 Leylodge Schoolhouse PWS is a spring located ~98 m south of the proposed permanent access track leading to tower N6 (**Plate 13.2.37: Leylodge Schoolhouse PWS, showing topography and indicative flow pathways (blue arrows), and Photo 11**). The spring is on the northern flank of Drum Hill and ground levels slope downhill to the north to the Park Burn. The spring serves five people and cattle at one property, Leylodge Schoolhouse, which is situated ~443 m northwest of the source. The resident also noted that the pipeline was installed by Aberdeenshire Council in the 1950s and that the pipe is not deep and is brittle.

Plate 13.2.37: Leylodge Schoolhouse PWS, showing topography and indicative flow pathways (blue arrows)

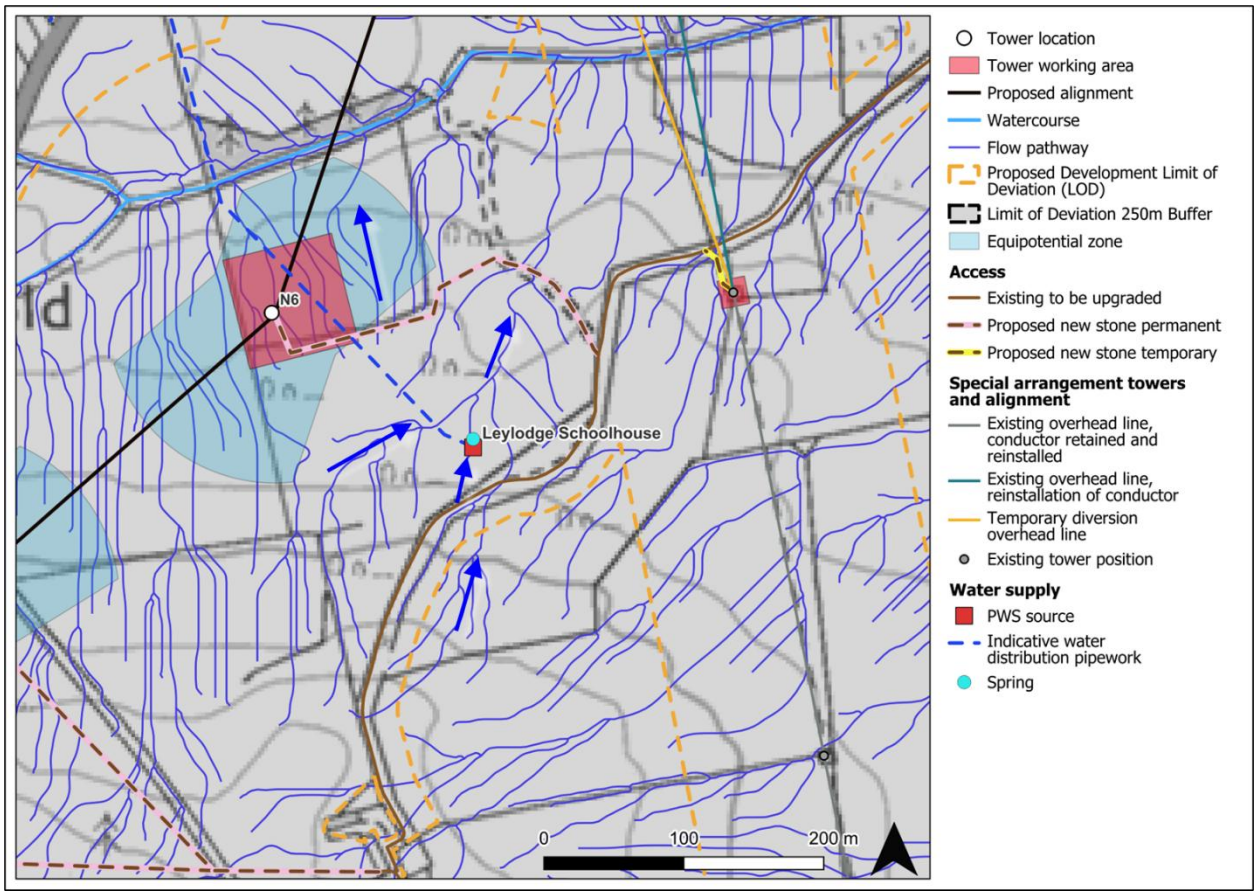


Photo 11: Leylodge Schoolhouse spring abstraction source

3.7.41 The working area of tower N6, located ~110 m northwest of the PWS abstraction, would be situated downslope of the spring at an elevation difference of ~5 m and drains north into the Park Burn. The proposed permanent access track cuts across the hill slope ~100 m north and between 3-8 m downgradient of the spring. Therefore, any excavations around the tower and associated track infrastructure may potentially affect groundwater quantity at the spring, which is assessed to be of medium magnitude. Being upslope of the Proposed Development, the spring will not be affected by surface water runoff from infrastructure. The sensitivity of the PWS is medium, hence the significance of effect on the PWS without additional mitigation is considered to be **Moderate**.

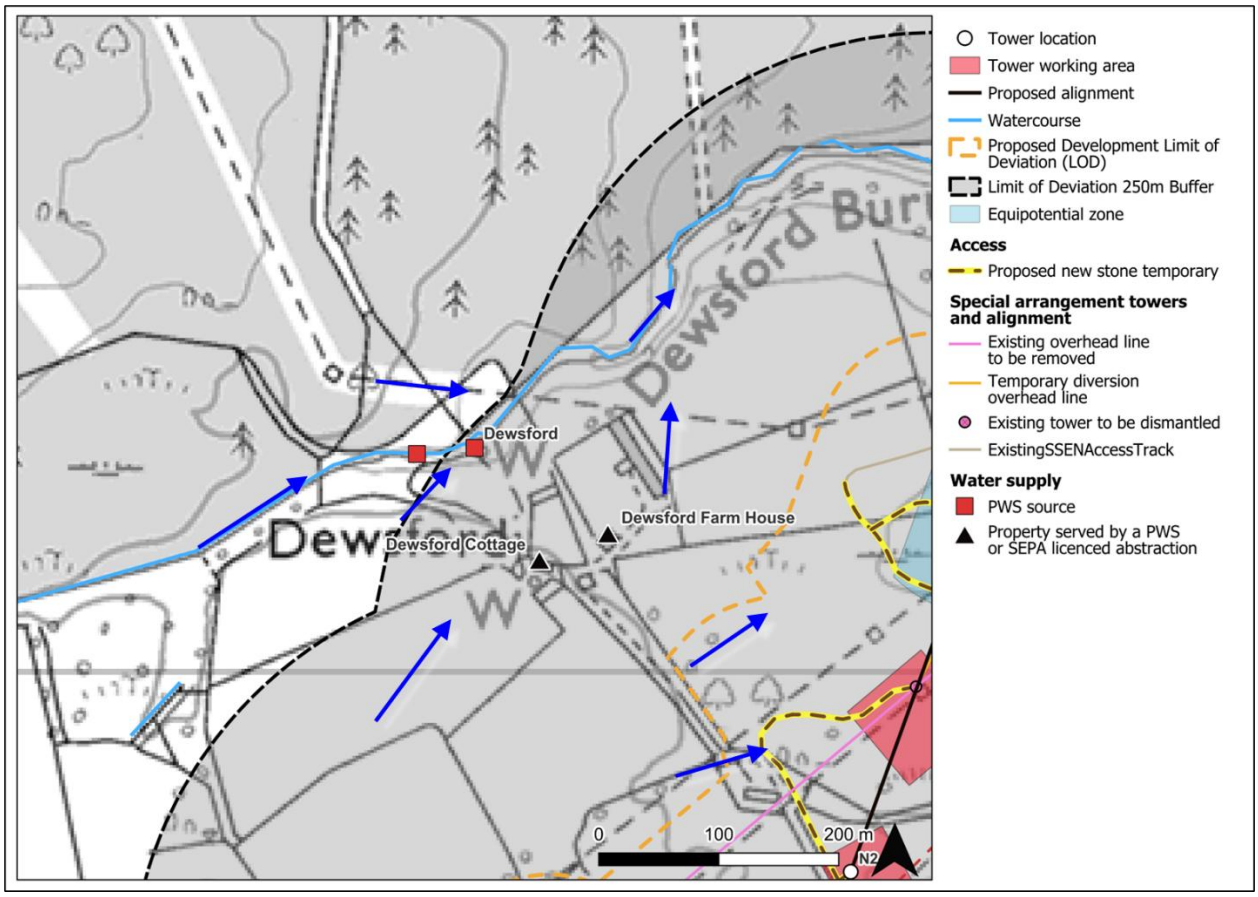
3.7.42 Since the tower lies directly between the spring and the property, it should be noted that it would be prudent to further consult with the resident and landowners on the exact route of the pipeline to avoid damaging the connection between the spring source and the property.

3.7.43 Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by an ECoW, and monitoring will be at tap of the supplied property. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new water supply or provide a connection to the Scottish Water mains.

Dewsford PWS- Well

3.7.44 Dewsford PWS is a groundwater well serving two properties including Dewsford Cottage and Dewsford Farm House. The well is located directly adjacent to the Dewsford Burn, approximately 110-130 m northeast of the two properties. This is shown in **Plate 13.2.38: Dewsford PWS, showing topography and indicative flow pathways (blue arrows**). The well is concrete lined with a lid and residents have reported that the water quality is very good. The PWS is utilised for domestic purposes. The abstraction rate is unknown and there are no other additional details on the supply. The residents at both properties have reported an existing Scottish Water Mains connection.

Plate 13.2.38: Dewsford PWS, showing topography and indicative flow pathways (blue arrows).



3.7.45 The well abstraction is located 236 m northwest of the nearest point of the LOD. The nearest working area of any new proposed tower infrastructure is approximately 415 m east of the well abstraction location at tower N1 and the nearest track is located around 310 m east of the well. There are no surface flow pathways from the nearest point of the LOD or any of the proposed infrastructure locations towards the well abstraction. Therefore, there is considered to be a negligible risk of surface runoff from construction activities to affect the PWS quality.

3.7.46 The well is located at approximately 94 mAOD and is located directly adjacent to the Dewsford Burn. Groundwater levels at the well are likely directly controlled by the adjacent watercourse. The nearby areas of the LOD which are within 250 m of the well abstraction are located between around 99 mAOD – 97 mAOD and thus it is unlikely that excavations will exceed the depth of the well abstraction, which is at minimum 94 mAOD. Even if excavations did exceed 94 mAOD, local topography and the location of the well dictates that the recharge area influencing the burn lies to the southwest of the abstraction (away from proposed infrastructure) and is controlled by water levels in the Dewsford Burn. Therefore, it is considered very unlikely that any excavations within the nearest areas of the LOD would affect groundwater quantities and would have a negligible magnitude of change on groundwater levels. The PWS is of medium sensitivity so the effect of the Proposed Development infrastructure on the PWS is considered to be **Negligible** and no additional mitigation is required.

3.7.47 Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by an ECoW, and monitoring will be at well itself or tap of the supplied properties. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers or use of the existing mains supply, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new PWS.

4. SUMMARY AND CONCLUSIONS

4.1.1 This appendix details the assessment undertaken to identify PWS and abstractions that may be affected by the infrastructure of the Proposed Development.

4.1.2 Aberdeenshire Council, Aberdeen City Council, Angus Council and SEPA provided data on PWS and groundwater abstractions within a 1 km buffer of the Site boundary. The Council data is caveated as the provided information cannot be guaranteed to be fully accurate, up-to-date or comprehensive. Data on PWS was also obtained through consultation with local residents and farms via questionnaires, public consultation events and property visits.

4.1.3 SEPA (2024) guidance on assessing the effects of developments on groundwater abstractions (including public and private water supplies) states that the relevant buffer zones for groundwater abstractions for all proposed infrastructure, both temporary and permanent are:

- 10 m for all activities;
- 100 m radius of all subsurface activities less than 1 m in depth;
- 250 m of all subsurface activities deeper than 1 m.

4.1.4 During design development any known PWS and groundwater abstractions were avoided and buffered appropriately, where possible. Given the length of the Proposed Development and the rural setting of the Site, it was not possible to meet the recommended infrastructure buffers in all cases. This assessment provides a detailed assessment of abstractions and PWS sources that are within 250 m of the Proposed Development LOD. A summary of the assessment of effects and additional mitigation measure is provided in **Table 13.2.2: Summary of Effects and Additional Mitigation**. During construction, the Applicant will be cognisant of the locations of PWS sources and abstractions (and associated pipework) and will follow the site-specific mitigation to minimise potential effects, undertake monitoring and provide alternate supplies if a PWS becomes compromised. With additional mitigation, the residual effect is either **Negligible** or **Minor** for all PWS or abstractions (see final column in **Table 13.2.2)**.

Table 13.2.2: Summary of Effects and Additional Mitigation

PWS/Abstraction Source Name	Significance of Effect before Additional Mitigation	Additional Mitigation	Residual Effect
Balkemback Farm	Negligible	Monitoring before, during and after construction.	Negligible
Coldstream	Spring 1 - Negligible Spring 2 - **Moderate**	Surface water run-off control (eg SuDS, silt fences); micrositing of working area; monitoring before, during and after construction; provide an alternative water supply if required, eg via the existing mains connection or portable bowsers.	Spring 1 - Negligible Spring 2 - Minor
Nether Arniefoul	Negligible	Investigation and cognisance of the distribution network before, and during construction. Monitoring before, during and after construction.	Negligible
Upper Hayston Farm Cottage	Negligible	Monitoring before, during and after construction.	Negligible
Ballindarg Burn	Negligible	Monitoring before, during and after construction; if required, install an alternative water supply, eg using the existing mains connection or via portable bowsers.	Negligible
Kalulu House	Negligible	Monitoring before, during and after construction.	Negligible

PWS/Abstraction Source Name	Significance of Effect before Additional Mitigation	Additional Mitigation	Residual Effect
Balmadity	Negligible to Minor	Surface water run-off control (eg SuDS, silt fences); monitoring before, during and after construction; provide an alternative water supply if required, eg portable bowsers.	Negligible
Dalladies	Negligible	Monitoring before, during and after construction.	Negligible
Cowieshill	Minor	Monitoring before, during and after construction; provide an alternative water supply if required, eg portable bowsers, new PWS or new mains connection.	Negligible
Thornton Estate	Negligible	Monitoring before, during and after construction.	Negligible
Black Burn	Negligible to Minor	Surface water run-off control (eg SuDS, silt fences); monitoring before, during and after construction; provide an alternative water supply if required, eg via the existing mains connection or portable bowsers.	Negligible
Ducat Water	Minor	Surface water run-off control (eg SuDS, silt fences); monitoring before, during and after construction; provide an alternative water supply if required, eg via the existing mains connection or portable bowsers.	Negligible
Cairnton Farm	Negligible to Minor	Surface water run-off control (eg SuDS, silt fences); monitoring before, during and after construction; provide an alternative water supply if required, eg via the existing mains connection or portable bowsers.	Negligible
Cushnie Farm	Negligible	Monitoring before, during and after construction.	Negligible
Burnhead of Monboddo	Spring - Minor Stream supply – Minor	Surface water run-off control (eg SuDS, silt fences); monitoring before, during and after construction; provide an alternative water supply if required, eg portable bowsers, new PWS or new mains connection.	Negligible
Wattieston House	Minor	Further investigation to establish whether there is a PWS at the assumed locality, which appears likely here. Monitoring before, during and after construction; provide an alternative, suitable, water supply if required, eg portable bowsers, new PWS or new mains connection.	Negligible
Inches Cottage and Farm	**Moderate**	Detailed investigation of the supply pipework prior to construction. Monitoring before, during and after construction; provide an alternative, suitable, water supply if required, eg portable bowsers, new PWS or new mains connection.	Minor
Cotbank	**Spring-Moderate** Well- Minor	Surface water run-off control (eg SuDS, silt fences); monitoring before, during and after construction; provide an alternative water supply if required, eg portable bowsers, new PWS or new mains connection.	Spring- Minor Well- Negligible

PWS/Abstraction Source Name	Significance of Effect before Additional Mitigation	Additional Mitigation	Residual Effect
Jacksbank	Spring - Minor Borehole – Minor	Surface water run-off control (eg SuDS, silt fences); monitoring before, during and after construction; provide an alternative water supply if required, eg portable bowsers, new PWS or new mains connection.	Negligible
Blererno	Negligible	Monitoring before, during and after construction.	Negligible
Cuttiesoutar	Negligible	Monitoring before, during and after construction; provide an alternative water supply if required, eg portable bowsers.	Negligible
Fetteresso	Negligible	None.	Negligible
Stonehouse Cottage	Negligible	Monitoring before, during and after construction; provide an alternative water supply if required, eg portable bowsers.	Negligible
Tillybreak	Minor	Surface water run-off control (eg SuDS, silt fences); monitoring before, during and after construction; provide an alternative water supply if required, eg portable bowsers.	Negligible
Monearn Lodge	Negligible	Monitoring before, during and after construction. Provide an alternative water supply if required, eg portable bowsers.	Negligible
Wester Durris	Negligible to Minor	Monitoring before, during and after construction; provide an alternative water supply if required, eg portable bowsers. Investigation and cognisance of the distribution network before, and during construction.	Negligible to Minor
Woodbank Well (from site visits this well does not appear to be in use)	Minor	Further investigation to establish whether the well is still in use will be undertaken before construction. This will inform appropriate mitigation. Monitoring and mitigation, if it is a PWS.	Negligible to Minor
Park Estate	Park Estate principal supply – Minor Lochwood Cottage back- up well - **Moderate**	Investigation and cognisance of the distribution network before, and during construction; monitoring before, during and after construction; provide an alternative water supply if required, eg portable bowsers, new PWS or new mains connection.	Park Estate principal supply – Negligible Lochwood Cottage - Negligible
King's Well	**Moderate** (although this is not an issue if the well is no longer used)	Further investigation to establish whether the well is in use will be undertaken before construction. This will inform appropriate mitigation. Monitoring and mitigation; investigation and cognisance of the distribution network before, and during construction.	Negligible to Minor (to be confirmed once it confirmed whether well is in use)
Templefold	Minor	Monitoring before, during and after construction; provide an alternative water supply if required, eg portable bowsers.	Negligible
East Finnercy	Negligible to Minor	Investigation and cognisance of the distribution network before, and during construction; Monitoring before, during and after construction; provide an alternative water supply during construction if required, eg portable bowsers.	Negligible

PWS/Abstraction Source Name	Significance of Effect before Additional Mitigation	Additional Mitigation	Residual Effect
Stepsbrae Steading/Backhill of Glack	**Moderate**	Monitoring before, during and after construction; provide an alternative water supply if required, eg portable bowsers, new PWS or new mains connection.	Negligible
Lauchintilly	Negligible	Monitoring before, during and after construction; provide an alternative water supply if required, eg portable bowsers.	Negligible
Barnyards of Drumnaheath	Negligible	Monitoring before, during and after construction; provide an alternative water supply if required, eg portable bowsers, new PWS or new mains connection.	Negligible
Osborne Leylodge	Negligible	Monitoring before, during and after construction; provide an alternative water supply if required, eg portable bowsers, new PWS or new mains connection.	Negligible
Bogfold	Negligible	Monitoring before, during and after construction.	Negligible
Leylodge Schoolhouse	**Moderate**	Investigation and cognisance of the distribution network before, and during construction; Monitoring before, during and after construction; provide an alternative water supply if required, eg portable bowsers, new PWS or new mains connection.	Negligible to Minor
Dewsford	Negligible	Monitoring before, during and after construction; provide an alternative water supply if required, eg portable bowsers, new PWS.	Negligible