



Appendix 6.4

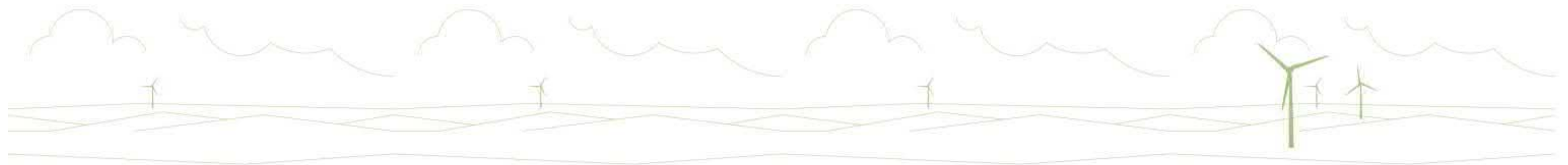
Private Water Supply Assessment

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1 Private Water Supply Assessment

1.1 Background

1. This appendix should be read in conjunction with **Chapter 6: Hydrology, Hydrogeology, Geology and Soils** of the EIAR.
2. The information within this appendix covers Private Water Supplies (PWS) considered to be potentially hydrologically connected to the Site prior to detailed assessment. These supplies are shown in relation to the Site on **Figure 6.4.1 Carrick PWS overview & surface water catchments**, and on **Figure 6.4.2 to Figure 6.4.7** within this appendix.

1.2 Methodology

3. The PWS locations were evaluated based on their position relative to the Site, and on the potential for the Proposed Development to affect the PWS in order to determine if there could be potential pollutant-source-pathway-receptor relationships. This took into account water supply source type and location, distance from Proposed Development infrastructure, groundwater pathways, intervening topography and other surface water features. Potential effects on water supply and on infrastructure of the PWS were also considered.
4. South Ayrshire Council (SAC) provided data for PWS within 10 kilometres (km) of the Site Boundary. These data identify whether a supply represents a small domestic supply (known as Type B) or a supply to a larger population and/or for commercial purposes (known as Type A). Type A PWSs supply more than 10 m³ per day, or serve at least 50 people, or supply a commercial or public activity (irrespective of volume). Type B PWS categorise the remaining supplies which do not meet the Type A criteria.
5. Groundwater sources within a 1km buffer zone and surface water sources within a 5km buffer zone of the Site Boundary were considered. In addition, sources within a 100 metre (m) buffer around tracks and other ancillary infrastructure, and those within a 250m buffer around wind turbines and borrow pits, were considered further as per Scottish Environment Protection Agency (SEPA) (2017) Land Use Planning System Guidance Note 31 (LUPS-GU31) with regards to potential groundwater monitoring. All other PWS were scoped out, as were judged unlikely to be hydrologically connected to the Proposed Development.
6. Based on an address list provided by SAC and following a desktop review, a preliminary questionnaire was sent out to six properties connected to PWS sources of interest. This information was used to plan the site visit to assess PWS sources and properties served, which took place during the week commencing 3 August 2020. During that survey, one further property was identified as of interest and included in the assessment; therefore, a total of seven PWS are considered in this assessment.
7. As noted above, seven PWS (ref. PWS01 to PWS07) have been identified as receptors that are potentially at risk from the Proposed Development. Relevant details for each PWS are presented in **Table 6.4.1** and summarised as follows:
 - three PWS are spring fed (PWS04, PWS06 & PWS07); all are understood to supply a single property each;
 - four PWS are surface water supplies (PWS01, PWS02, PWS03 & PWS05), each PWS supplying a single property; were identified within 5km of the Site Boundary;
 - all PWS assessed are classified as Type B apart from PWS04 which is classified as Type A due to it supplying a commercial activity understood to be for a holiday let; and
 - none of the properties investigated were determined to be on mains supply.
8. As part of the data collection exercise, each PWS owner was contacted in order to provide consent for ancillary information gathered during the site visit to be presented in this assessment as per the General Data Protection Regulation (GDPR). These data relate specifically to the actual location of the PWS source i.e. are not limited to a

generalised location associated with a property supplied by SAC. Of the seven PWS, two consented to their data to be used (PWS02 & PWS06); the remaining five did not provide consent and therefore PWS source information collected during the site visit is not included within this assessment.

9. The succeeding sections of this assessment present a desk-based review of published hydrological, geological and hydrogeological information in order to assess potential source-pathway-receptor linkages between the Proposed Development and each PWS. To support the assessment, a series of maps and cross-sections presented as **Figures 6.4.1 to 6.4.7** have been produced to illustrate:
 - superficial and bedrock geology underlying each PWS;
 - surface water and/or groundwater catchments supplying each PWS;
 - indicative groundwater flow directions, and;
 - potential source-pathway-receptor linkages between the Proposed Development and each PWS.

1.3 Hydrology

10. A detailed discussion of the Site specific and regional hydrology relevant to the Site is presented in **Chapter 6: Hydrology, Hydrogeology, Geology and Soils** of the EIAR. Information relating to hydrological features pertinent to each PWS is discussed in the following paragraphs.
11. Catchment delineation using GIS hydrological analysis tools has been undertaken for each PWS. By assessing the hydrology of a PWS using a catchment-based system, interpretations can be made regarding potential influences that the Proposed Development may have on a PWS. In addition, specific catchments for surface water sourced PWS01, PWS02, PWS03 and PWS05 have been calculated in order to estimate the areal extent supplying the PWS. **Figure 6.4.1 to Figure 6.4.4** illustrate site-specific hydrology for each PWS.
12. PWS01, PWS02 and PWS03 are situated within the catchment of the River Stinchar, downstream and south of the Proposed Development (**Figure 6.4.2 Carrick PWS01, PWS02 & PWS03 surface water catchments & geology**). The headwaters of the catchment originate along the southern boundary of the Proposed Development and from Linfern Loch; flow is generally directed to the southwest and west along the River Stinchar. The PWS are all located on unnamed tributaries of the River Stinchar; any surface water on the hillslopes is likely to flow downhill, following topography, and drain into the River Stinchar mapped as flowing in the low ground. The PWS catchments are not hydrologically connected to the Proposed Development and can generally be described as follows:
 - PWS01 – an area of approx. 0.68km² draining the northeast and northern facing hillslopes of Bencallen and Pinbreck Hill;
 - PWS02 – an area of approx. 0.17km² draining the southern facing hillslope of Whiterow Scaurs; and
 - PWS03 – an area of approx. 0.26km² draining the southern facing hillslope of Dunamoddie (The Tappins).The closest features of the Proposed Development located within the same catchment (River Stinchar) are the proposed access track, substation, temporary construction compound and footprint for wind turbine 13, wind turbine 11, and two borrow pits situated adjacent to wind turbines 06 and 11 respectively. The PWS are between approx. 3.1km (PWS03) and 4.7km (PWS01) downstream to the southwest of these features measured from the closest point of the River Stinchar to the Proposed Development.
13. PWS04 and PWS05 are both located within the catchment of Tairlaw Burn (**Figure 6.4.3 Carrick PWS04 & PWS05 surface water catchments & geology**). The eastern extent of the Proposed Development is located in the headwater of the catchment; flow is generally towards the northeast and north to the Water of Girvan. PWS04 is located approximately 250m northeast of the Northern Site Access. PWS05 is located approximately 1.8km north from the point where the proposed access track crosses the Tairlaw Burn.

14. PWS04 is a groundwater fed spring understood to be located on the southwestern facing hillside of Tairlaw Ring above the supplied property. PWS04 is sited on the eastern banks of Tairlaw Burn i.e. on the opposite side of the burn to the Proposed Development, therefore there is considered to be no hydrological connection between Site and the PWS. Further details regarding the groundwater catchment that supplies the spring are outlined in **Section 1.5 Hydrogeology**.
15. PWS05 is located on an unnamed tributary of Tairlaw Burn, the catchment for the tributary has an area of approx. 0.16km² and drains the northwest facing slope of Tairlaw Ring. Any surface water on the hillslopes is likely to flow downhill, following topography, and drain into Tairlaw Burn mapped as flowing in the lower ground. The PWS and tributary are not hydrologically connected to the Proposed Development.
16. PWS06 and PWS07 are both situated within the Palmullan Burn catchment (**Figure 6.4.4 Carrick PWS06 & PWS07 surface water catchments & geology**). The northern central and northwest extent of the Proposed Development are located in the headwaters of this catchment; flow is generally towards the north from the Proposed Development to the Palmullan Burn which flows into the Water of Girvan. PWS06 is approximately 1.5km northwest of the proposed wind turbine 2. PWS07 is located around 2.5km northeast of the proposed wind turbine 3.
17. PWS06 is a groundwater fed spring supply confirmed to be located on the eastern facing slopes of Knockinculloch around 400m northwest upslope from the Glenalla property. PWS07 is a groundwater fed spring supply understood to be situated somewhere on the eastern facing slopes of Knockskae. Both PWS are sited to the north of Palmullan Burn i.e. are on the opposite side of the burn to the Proposed Development, therefore there is considered to be no hydrological connection between the Site and the PWS. A summary of the groundwater catchment information for PWS06 and PWS07 is presented in **Section 1.5**.

1.4 Geology

18. Information on regional geology is provided in published information by the British Geological Survey (BGS) and SEPA listed in **Section 1.7**. A summary of the geological domain specific to the Proposed Development is presented in **Chapter 6 Hydrology, Hydrogeology, Geology and Soils** of the EIAR. A summary of the geological setting for each PWS is discussed in the following paragraphs. **Figure 6.4.2 to Figure 6.4.4** present superficial and bedrock geology maps for each PWS and the Proposed Development.
19. A search of the BGS GeoIndex record of onshore boreholes indicates that no publicly available ground investigation locations (boreholes, trial pits etc.) are available for the Proposed Development. The nearest records are >750m southeast of PWS04 at the site of the Loch Bradan dam; these data are considered unrepresentative of the geology of the Proposed Development and are not considered further.
20. All PWS are situated within a complex faulted geological setting comprising of sedimentary rocks, igneous intrusions and volcanoclastic rocks from the Devonian, Silurian and Ordovician period.
21. In the surface water catchment supplying PWS01, the lower elevation slopes of Bencallen and Pinbreck Hill are underlain by glacial till likely comprising principally of clay with a heterogenous mixture of sands, gravels and boulders. Hummocky (moundy) glacial deposits are mapped on Pinbreck Hill which typically comprise a complex assortment of poorly to well-stratified sand and gravel, rock debris and clayey till. Drift deposits are indicated as absent (or likely to be thin if present) on the uppermost slopes of Bencallen and Pinbreck Hill. The superficial deposits are principally underlain by bedrock of the Dalreoch Formation consisting of sandy and pebbly greywackes, and, the Kirkcolm Formation described as a sandstone/siltstone turbidite sequence. The Glen App Fault (Southern Uplands Fault) trace is indicated as bisecting the catchment for PWS01, trending SW-NE. Bedrock is indicated to dip steeply to the southeast i.e. into the hillside (**Figure 6.4.2 Carrick PWS01, PWS02 & PWS03 surface water catchments & geology**).
22. The surface water catchments for PWS02 and PWS03 are similar in nature, comprising of glacial till on the lower slopes whilst superficial deposits are mapped as absent (or likely to be very thin if present) on the upper slopes of Whiterow Scaurs and Dunamoddie (The Tappins) respectively. The catchment for PWS02 is principally underlain by bedrock of the Dalreoch Formation whilst the summit of Dunamoddie comprises of basaltic/andesitic lavas of the Duneaton Volcanic Formation (**Figure 6.4.2 Carrick PWS01, PWS02 & PWS03 surface water catchments & geology**).

23. The bedrock geology within the catchment for PWS03 is relatively complex with interbedded sedimentary and igneous rocks. The Duneaton Volcanic Formation subcrops on the lower slopes of Whiterow Scaurs whilst the uppermost slopes are mapped as Southern Midland Valley Felsite Sills; the igneous units are separated by the Greywacke Conglomerate Formation. Sedimentary strata are indicated as generally dipping moderately to the north i.e. into the hillside.
24. The PWS04 spring is considered to be supplied by groundwater derived from the southwest facing slopes of Tairlaw Ring hill above the supplied property. Superficial deposits on the slope are largely mapped as absent (or likely to be very thin if present), in these areas, bedrock is likely to be present at or near surface. Discontinuous deposits of till and hummocky (moundy) glacial deposits are mapped on the lower slopes, the thickness of which is unknown. Bedrock forms the limb of a syncline (axis approx. SW-NE) which abuts against the Southern Upland Fault immediately to the south. Bedrock principally comprises of basaltic/andesite lavas and tuff of the Duneaton Volcanic Formation interbedded with conglomerate and pebbly sandstone of the Greywacke Conglomerate Formation (**Figure 6.4.3 Carrick PWS04 & PWS05 surface water catchments & geology**).
25. The catchment for the tributary supplying PWS05 is situated entirely on the Duneaton Volcanic Formation, which is described as comprising mainly of andesitic and basaltic lavas with subordinate volcanic breccias, tuffs and minor sandstone interbeds. Superficial deposits are mapped as absent in the tributary catchment meaning that bedrock is likely to be at outcrop or subcrop near to surface beneath a thin veneer of soil or drift (**Figure 6.4.3 Carrick PWS04 & PWS05 surface water catchments & geology**).
26. The PWS06 spring is considered to be supplied by groundwater derived from the southeast facing slopes of Knockinculloch. Drift is largely mapped as absent on the hillside although some till is indicated at a higher elevation to the spring. Bedrock comprises a sequence of the Benan Conglomerate Formation and the Swanshaw Sandstone Formation interbedded with a dolerite/basalt intrusion of the Midland Valley Siluro-Devonian Mafic Intrusion Suite. Bedrock units are bound to the north by a southeast dipping fault trending SW-NE across Knockinculloch hill. The Swanshaw Sandstone Formation is defined as medium and coarse-grained terrestrial sandstones with subordinate pebble beds and conglomerates, and minor fine-grained sandstones, siltstones and mudstones. The Benan Conglomerate Formation is described as a boulder conglomerate (**Figure 6.4.4 Carrick PWS06 & PWS07 surface water catchments & geology**).
27. The PWS07 spring is thought to be supplied by groundwater derived from the eastern slopes of Knockskae. Glacial till is present on the lower slopes of Knockskae whilst superficial deposits are mapped as absent (or likely to be very thin) on the upper slopes and summit of Knockskae. Underlying bedrock comprises of the Swanshaw Sandstone Formation on the lower slopes of Knockskae and dacitic rocks of the Southern Midland Valley Felsite Sills on the upper slopes and summit of Knockskae. Strata are indicated to dip moderately towards the east roughly parallel with the slope (**Figure 6.4.4 Carrick PWS06 & PWS07 surface water catchments & geology**).

1.5 Hydrogeology

28. A summary of the hydrogeological regime specific to the Proposed Development is presented in **Chapter 6: Hydrology, Hydrogeology, Geology and Soils** of the EIAR. A summary of the hydrogeological regime for each PWS is discussed in the following paragraphs. Information on hydrogeology is provided in published information by BGS and SEPA listed in **Section 1.7**.
29. PWS01, PWS02, PWS03 and PWS05 are surface water sourced supplies from relatively small unnamed tributaries. The catchments for the PWS generally comprise low permeability clay rich till on the lower slopes and bedrock at or near surface on the upper slopes of the catchments. The hydrogeological regime can generally be described as follows:
 - glacial till, which makes up most or all of any superficial deposits present on the lower slopes in the PWS catchments, usually has low permeability, allows only small volumes of groundwater storage, and low groundwater flow rates. At most, groundwater flow is limited to usually small seepages through lenses of sandier or gravellier sediment within the dominantly clay and silt deposits. Any patches of glacial till that are present are likely to contain little groundwater and act to largely restrict infiltration of rainfall and surface water into the underlying bedrock aquifer. A small

proportion of rainfall is likely to infiltrate into any glacial till patches, but most is likely to be diverted to flow over the surface of the till and off the edge of till patches towards the tributaries; and


- the bedrock underlying the catchments for PWS01 and PWS03 are considered to be low productivity aquifers with low to moderate permeability. The catchment for PWS02 is partially underlain by the Greywacke Conglomerate Formation which is considered to be a moderately productive aquifer. These rocks have virtually no primary (intergranular) porosity or permeability. Groundwater storage and flow occur only in weathered zones and in fractures in the rock; weathered zones tend to occur at rockhead. The upper few metres are often most fractured due to past glacial action and weathering and this forms the principal layer for groundwater movement; groundwater flow paths are likely to be relatively short and localised. The unnamed tributaries are likely to receive some component of shallow groundwater flow.
30. PWS04, PWS06 and PWS07 are groundwater fed springs located on relatively steep hillslopes. The hydrogeological regime for the springs can generally be described as follows:
- Glacial till (and hummocky (moundy) glacial deposits for PWS04) is the predominant drift cover where present on the lower slopes in the PWS spring catchments. These deposits usually have low permeability, store small volumes of groundwater, and possess low groundwater flow rates. Small groundwater seepages occur through lenses of sandier or gravellier sediment within the dominantly clay and silt deposits where these are present. Any areas of glacial till that are present are likely to contain little groundwater and will largely restrict infiltration of rainfall into the underlying bedrock aquifer. A small proportion of rainfall is likely to infiltrate into any glacial till patches, but most is likely to be diverted to flow over the surface of the till and off the edge of till patches;
 - the bedrock underlying the spring catchments are considered to be low productivity volcanic aquifers interbedded with moderately productive sedimentary aquifers with low to moderate permeability. These rocks have virtually no primary (intergranular) porosity or permeability. Groundwater storage and flow occur only in weathered zones and in fractures in the rock; weathered zones tend to occur at rockhead. The upper few metres are often most fractured due to past glacial action and weathering and this forms the principal layer for groundwater movement;
 - groundwater flow paths will follow the network of fractures in the bedrock aquifer, but overall, will be from higher to lower ground downhill, following local topography. It is not possible to confidently define the catchment areas for the springs without local data, including groundwater level measurements, but the catchment area for any gravity outflow spring source is always higher in elevation than the spring outflow; and
 - groundwater flow paths are likely to be relatively short and localised and therefore the catchment area for these springs will be small, encompassing only the area of hill higher in elevation and sloping towards the springs. Recharge to the catchment areas can only derive from rainfall on the highest parts of the hill/slope, of which a proportion will infiltrate into the upper part. From there, this shallow groundwater will flow downhill in the direction of

slope, from where some will discharge at springs, and some will continue to flow to the base of the slope where it is likely to discharge to watercourses.

31. **Figure 6.4.5 to Figure 6.4.7** present schematic cross sections between each PWS and the Proposed Development and illustrate likely groundwater flow paths in the subsurface. It should be noted that the sections are drawn as direct lines between the Proposed Development i.e. are not parallel or perpendicular with breaks of topographic slope, therefore arrows depicting groundwater flow direction are shown for indicative purposes only. The sections help to demonstrate that there are no feasible source-pathway-receptor linkages between the Proposed Development and the seven PWS.

1.6 Results

32. Information relating to the respective PWS is presented in **Table 6.4.1**. Grid references noted in **Table 6.4.1** relate to data provided by SAC unless otherwise stated. Grid references for PWS02 and PWS06 were verified by GPS during the site visit and the PWS owners have given permission for their data to be presented in the assessment.
33. After review of all collated information, no PWS have been identified as potentially at risk of adverse effects from the Proposed Development, and no PWS have been identified as being within the SEPA buffer. The conclusions regarding the assessment are listed in the 'Potential for Impact on Supply from Proposed Development' and 'Mitigation Measures' columns of **Table 6.4.1**.

| Source ID (Supply Name) | Source Type (A or B) | Grid Reference and Location Description | Number of Properties Served | Location Relative to Infrastructure | Potential for Impact on Supply from Proposed Development | Mitigation Measures | Photographs |
|-------------------------------|-----------------------------------|--|---|---|--|------------------------|---|
| PWS01 Aldinna | Surface Water (Type B) | NGR 235100, 595315 Based on SAC dataset, surface water abstraction is situated within Aldinna property, adjacent to the River Stinchar. | One property: Aldinna Farm | Supply is likely to be sourced from an unnamed tributary of the River Stinchar on the slopes of Bencallen and Pinbreck Hill, approximately 4.7km south west from the closest point of the River Stinchar to the Proposed Development, at the proposed access track to the Substation. | The source is likely to be located within a sub-catchment of the River Stinchar, which is not hydrologically connected to the Proposed Development. | None required. | No photo available. |
| PWS02 White Row | Surface Water (Type B) | NGR 234541, 595881 Based on the site visit notes, surface water abstraction is situated approximately 70m north of White Row Farm. | One property: White Row Farm | Supply is understood to be from an unnamed tributary of the River Stinchar on the slopes below the Whiterow Scaurs, approximately 3.9km south west from the closest point of the River Stinchar to the Proposed Development, at the proposed access track to the Substation. | The source is located within the Whiterow Burn catchment, a sub-catchment of the River Stinchar, which is not hydrologically or hydrogeologically connected to the Proposed Development. | None required. |  Photograph 6.4.1: PWS02, looking downstream towards the house from the filter tank at NGR, 234550, 595864. |
| PWS03 Black Row | Surface Water (Type B) | NGR 236080, 595465 Based on SAC dataset, surface water abstraction is situated within the Black Row property, north of the confluence of the River Stinchar with Loch Burn. | One property: Black Row Farm | Supply is likely to be sourced from an unnamed tributary of the River Stinchar, approximately 3.1km south west from the closest point of the River Stinchar to the Proposed Development, at the proposed access track to the Substation. | The source is likely to be located within a sub-catchment of the River Stinchar, which is not hydrologically or hydrogeologically connected to the Proposed Development. | None required. | No photo available. |
| PWS04 Tallaminnoch Cottage | Groundwater Spring (Type A) | NGR 240023, 598251 Based on SAC dataset, the spring is situated within the Tallaminnoch Cottage property, on the lower northern slopes of Linnshalloch Hill. | One property: Tallaminnoch Cottage | The spring source is located on the southwest facing slope of Tairlaw Ring, located approximately 250m north east of the Site northern entry access. | The source is likely to be located upstream of the Proposed Development, on the lower slopes of Tairlaw Ring, and is therefore not hydrologically or hydrogeologically connected to the Proposed Development and not considered at risk of impact. | None required. | No photo available. |
| PWS05 Tairlaw Toll House | Surface Water (Type B) | NGR 239791, 599523 Based on SAC dataset, the surface water abstraction is located within the Tairlaw Toll House property, adjacent to the Tairlaw Burn. | One property: Tairlaw Toll House | This source is likely to be sourced from an unnamed tributary of Tairlaw Toll, approximately 1.8km north from the point where the proposed access track crosses the Tairlaw Burn. | This source is likely to be located within a sub-catchment of the Tairlaw Burn, which is not hydrologically or hydrogeologically connected to the Proposed Development. | None required. | No photo available. |

| Source ID (Supply Name) | Source Type (A or B) | Grid Reference and Location Description | Number of Properties Served | Location Relative to Infrastructure | Potential for Impact on Supply from Proposed Development | Mitigation Measures | Photographs |
|----------------------------|-----------------------------------|--|-----------------------------------|--|--|------------------------|---------------------|
| PWS06 Glenalla | Groundwater Spring (Type B) | NGR 234363, 600576 Based on site visit notes, the spring is located on the lower slopes of Knockinculloch Hill, approximately 400m north west of Glenalla property. | One property: Glenalla | As confirmed by the owners, the source of the supply is located on the lower slopes of Knockinculloch Hill, approximately 1.5km north west of the proposed wind turbine 2. | The source is located within a sub-catchment of the Palmullan Burn, which is not hydrologically or hydrogeologically connected to the Proposed Development. | None required. | No photo available. |
| PWS07 Knockskae | Groundwater Spring (Type B) | NGR 237281, 601390 Based on SAC dataset, the spring is located within the Knockskae property, on the lower eastern slopes of Knockskae. | One property: Knockskae | This groundwater source is likely to be located on the lower slopes of Knockskae, approximately 2.5km north east of the proposed wind turbine 3. | The source is likely to be located within a sub-catchment of the Palmullan Burn, which is not hydrologically or hydrogeologically connected to the Proposed Development. | None required. | No photo available. |

Table 6.4.1 Details of Private Water Supplies

1.7 References

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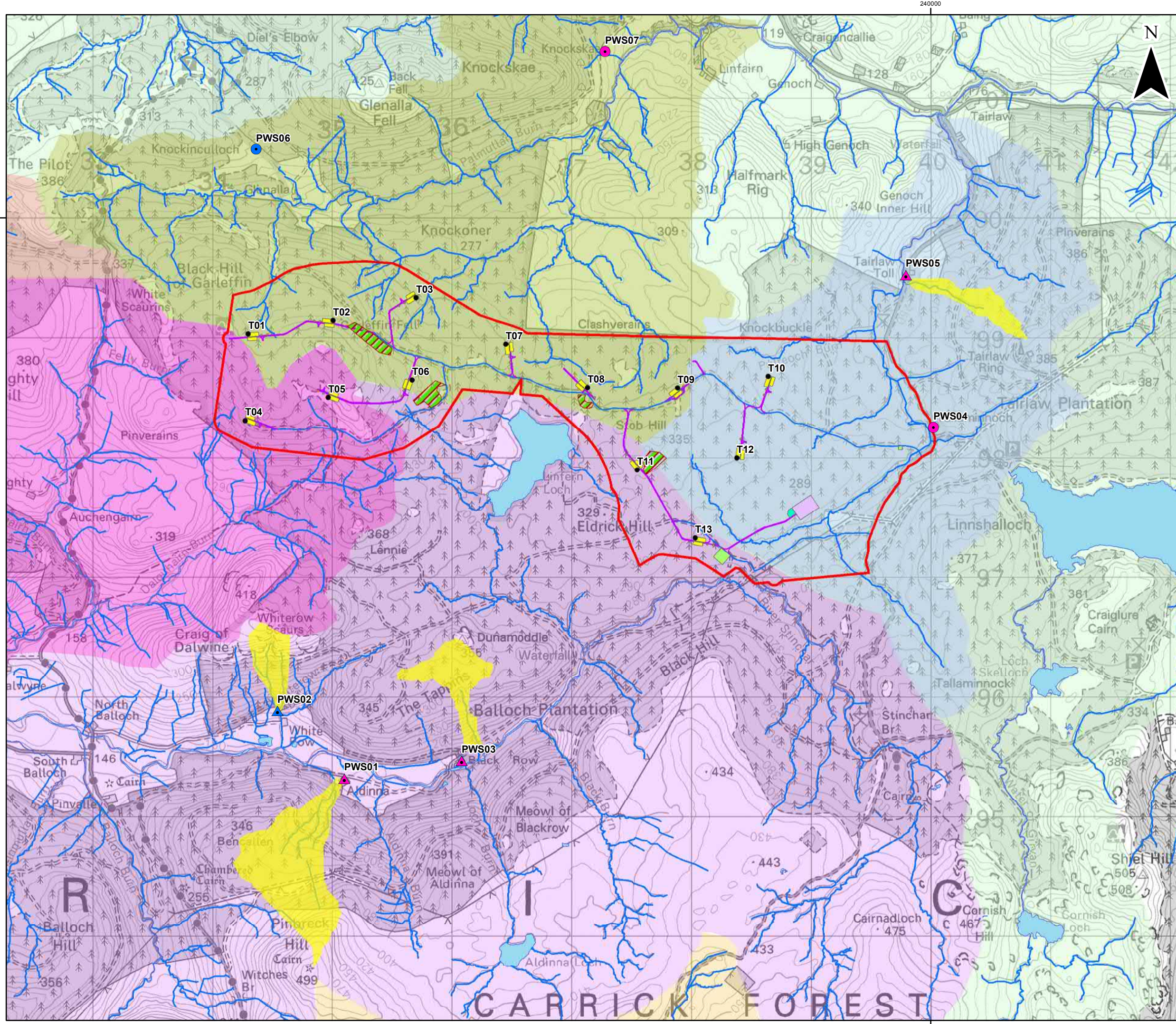
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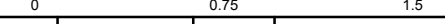
carrickwindfarm@scottishpower.com





- Private Water Supply (PWS) location**
- Spring, Location confirmed by owner/site visit (1)
 - Spring, SAC provided coordinates. Not confirmed by owner/site visit (2)
 - ▲ Surface Water, Location confirmed by owner/site visit (1)
 - ▲ Surface Water, SAC provided coordinates. Not confirmed by owner/site visit (3)
 - PWS surface water catchment
 - Site Boundary
- Proposed Infrastructure**
- Substation Compound
 - Wind Turbine
 - Temporary Construction Compound
 - Crane Pad
 - Hardstanding
 - Temporary SPEN Construction Compound
 - Borrow Pit Search Area
 - Carrick Access Track - New Construction
 - Carrick Access Track - Existing Forestry Track to be Upgraded
- Drainage**
- OS Watercourse (1:10,000)
 - OS Water Body (1:10,000)
- Surface water catchments**
- Water of Minnoch catchment
 - Tairlaw Burn catchment
 - Palmullan Burn catchment
 - Dobbington Burn catchment
 - Dalquhairn Burn catchment
 - Water of Girvan catchment
 - River Stinchar catchment

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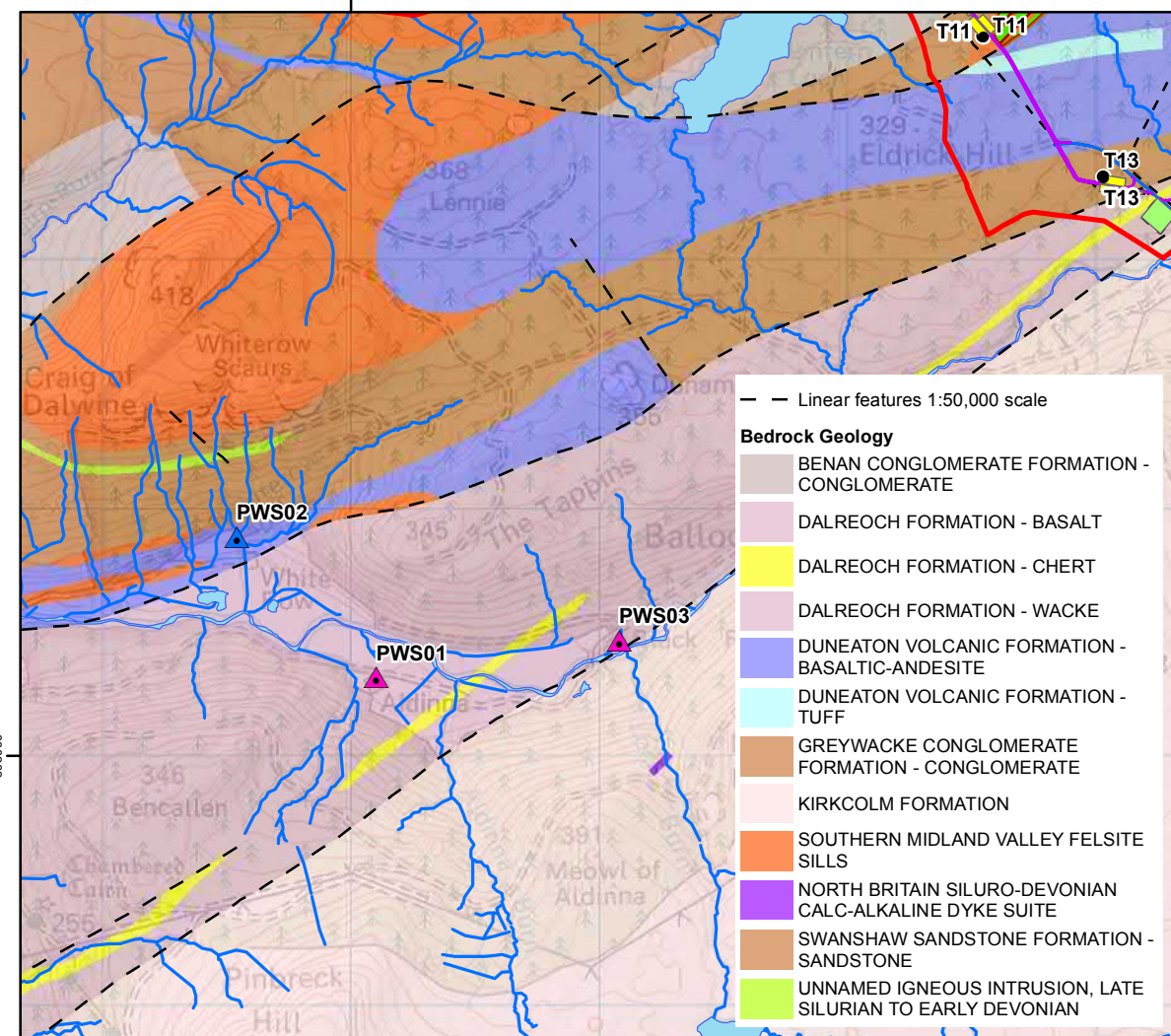
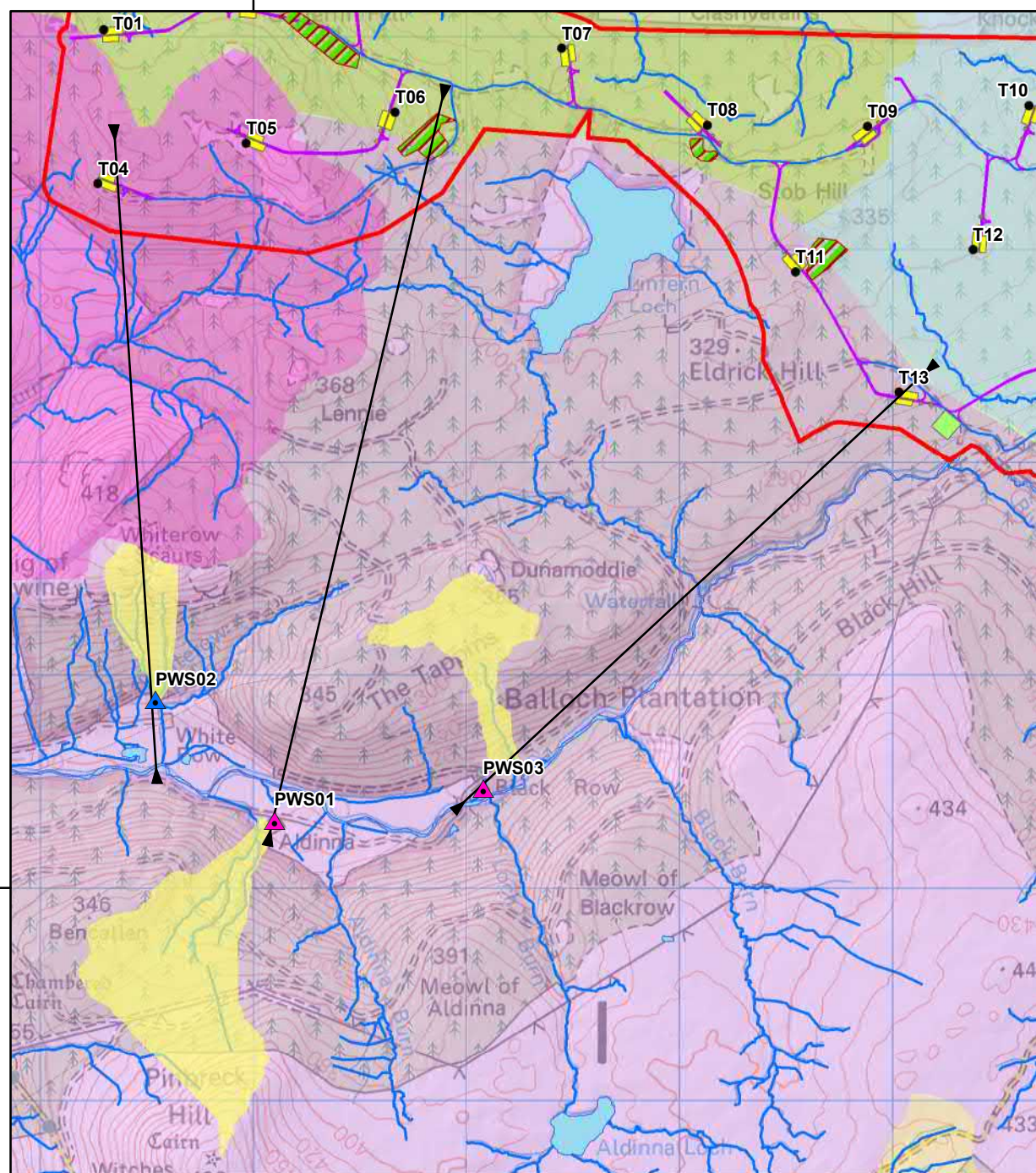
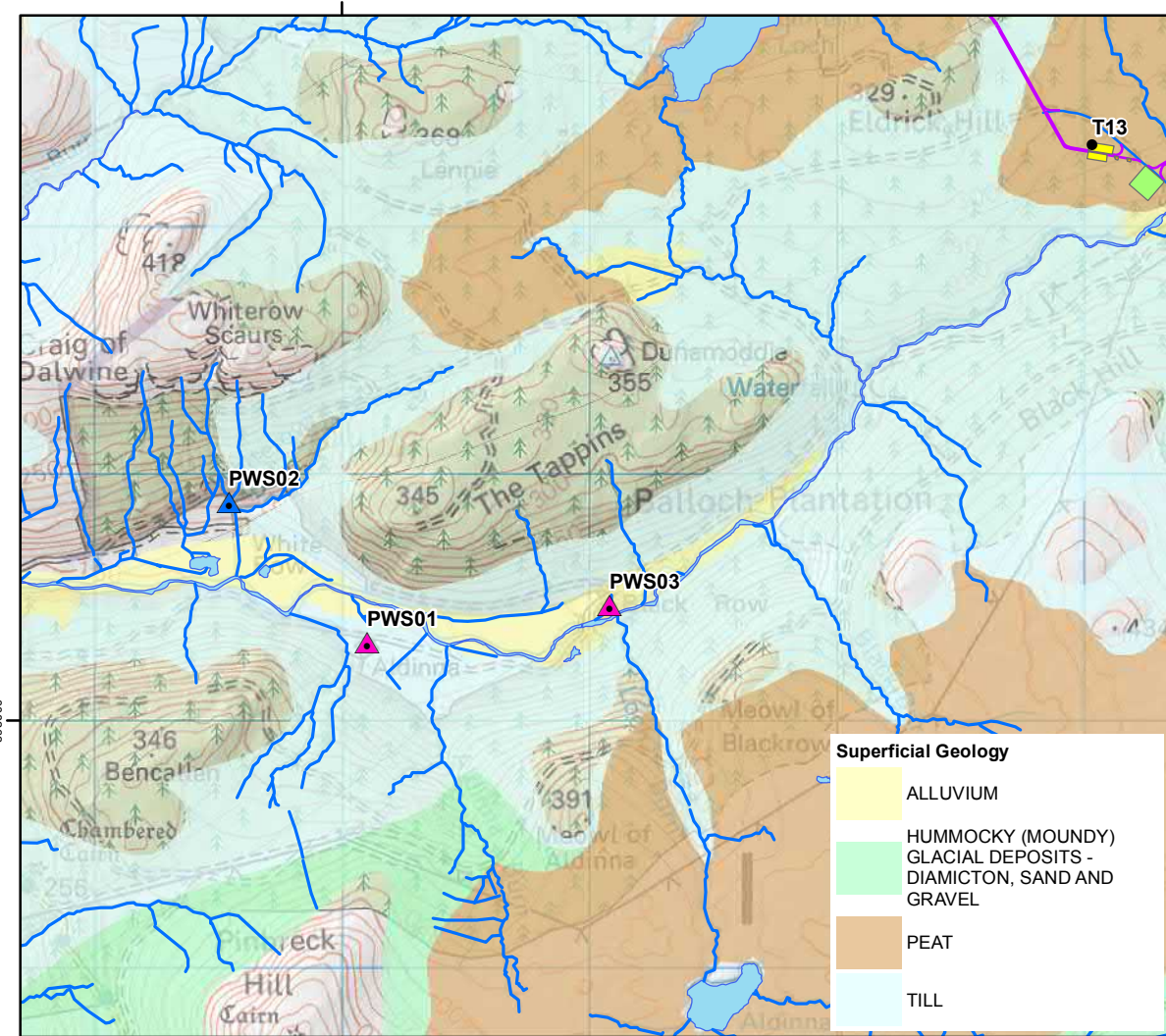
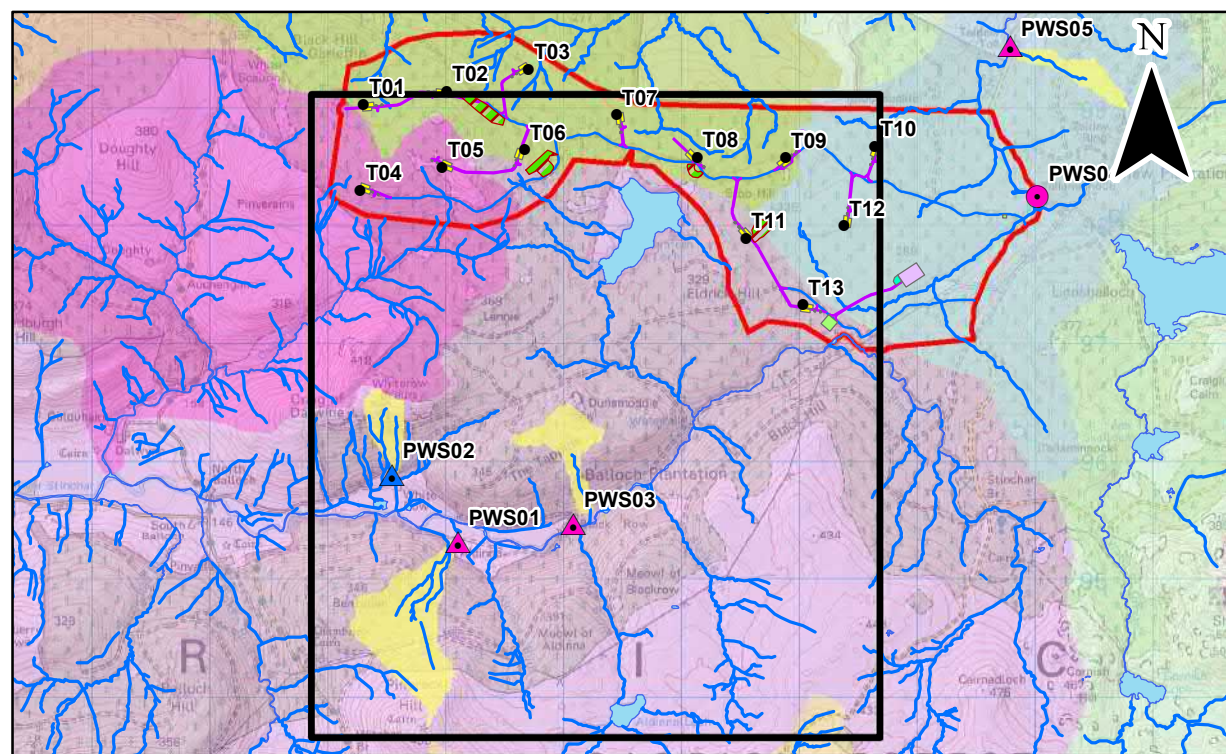


| C | | | |
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| B | | | |
| A | 28/10/2021 | PML | First Issue |
| Rev | Date | By | Comment |



Carrick Windfarm
 Figure 6.4.1:
 Carrick PWS overview
 & surface water catchments

| | |
|---------------|---------------|
| Drg No | |
| Rev | A |
| Date | 05/11/2021 |
| Scale | 1:30,000 @ A3 |



- Private Water Supply (PWS) location**
- ▲ Surface Water, Location confirmed by owner/site visit
 - ▲ Surface Water, SAC provided coordinates. Not confirmed by owner/site visit
 - Line of cross section (see Figure 6.4.5)
- Surface water catchment**
- Yellow shaded area
- Site Boundary**
- Red outline
- Proposed Infrastructure**
- Substation Compound (Purple shaded area)
 - Wind Turbine (Black dot)
 - Temporary Construction Compound (Green shaded area)
 - Crane Pad (Orange shaded area)
 - Hardstanding (Yellow shaded area)
 - Temporary SPEN Construction Compound (Cyan shaded area)
 - Borrow Pit Search Area (Green and yellow hatched area)
 - Carrick Access Track - New Construction (Purple line)
 - Carrick Access Track - Existing Forestry Track to be Upgraded (Blue line)
- Drainage**
- OS Watercourse (1:10,000) (Blue line)
 - OS Water Body (1:10,000) (Light blue area)
- Surface water catchments**
- Water of Minnoch catchment (Light orange)
 - Tairlaw Burn catchment (Light blue)
 - Palmullan Burn catchment (Light green)
 - Dalquhairn Burn catchment (Pink)
 - Water of Girvan catchment (Light green)
 - River Stinchar catchment (Light purple)

- Superficial Geology**
- ALLUVIUM (Yellow)
 - HUMMOCKY (MOUNDY) GLACIAL DEPOSITS - DIAMICTON, SAND AND GRAVEL (Light green)
 - PEAT (Brown)
 - TILL (Light blue)

- Bedrock Geology**
- BENAN CONGLOMERATE FORMATION - CONGLOMERATE
 - DALREOCH FORMATION - BASALT
 - DALREOCH FORMATION - CHERT
 - DALREOCH FORMATION - WACKE
 - DUNEATON VOLCANIC FORMATION - BASALTIC-ANDESITE
 - DUNEATON VOLCANIC FORMATION - TUFF
 - GREYWACKE CONGLOMERATE FORMATION - CONGLOMERATE
 - KIRKCOLM FORMATION
 - SOUTHERN MIDLAND VALLEY FELSITE SILLS
 - NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE
 - SWANSHAW SANDSTONE FORMATION - SANDSTONE
 - UNNAMED IGNEOUS INTRUSION, LATE SILURIAN TO EARLY DEVONIAN

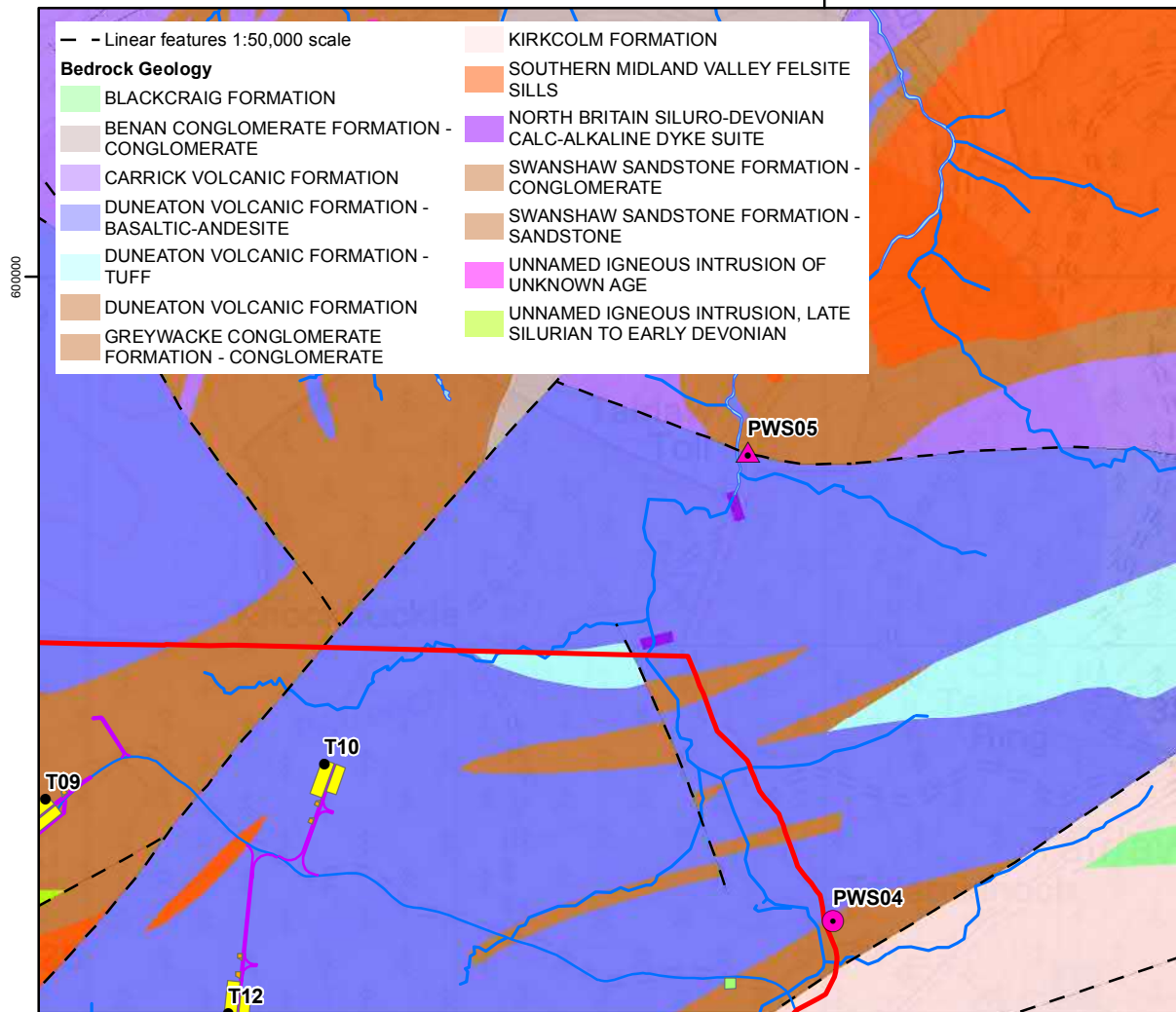
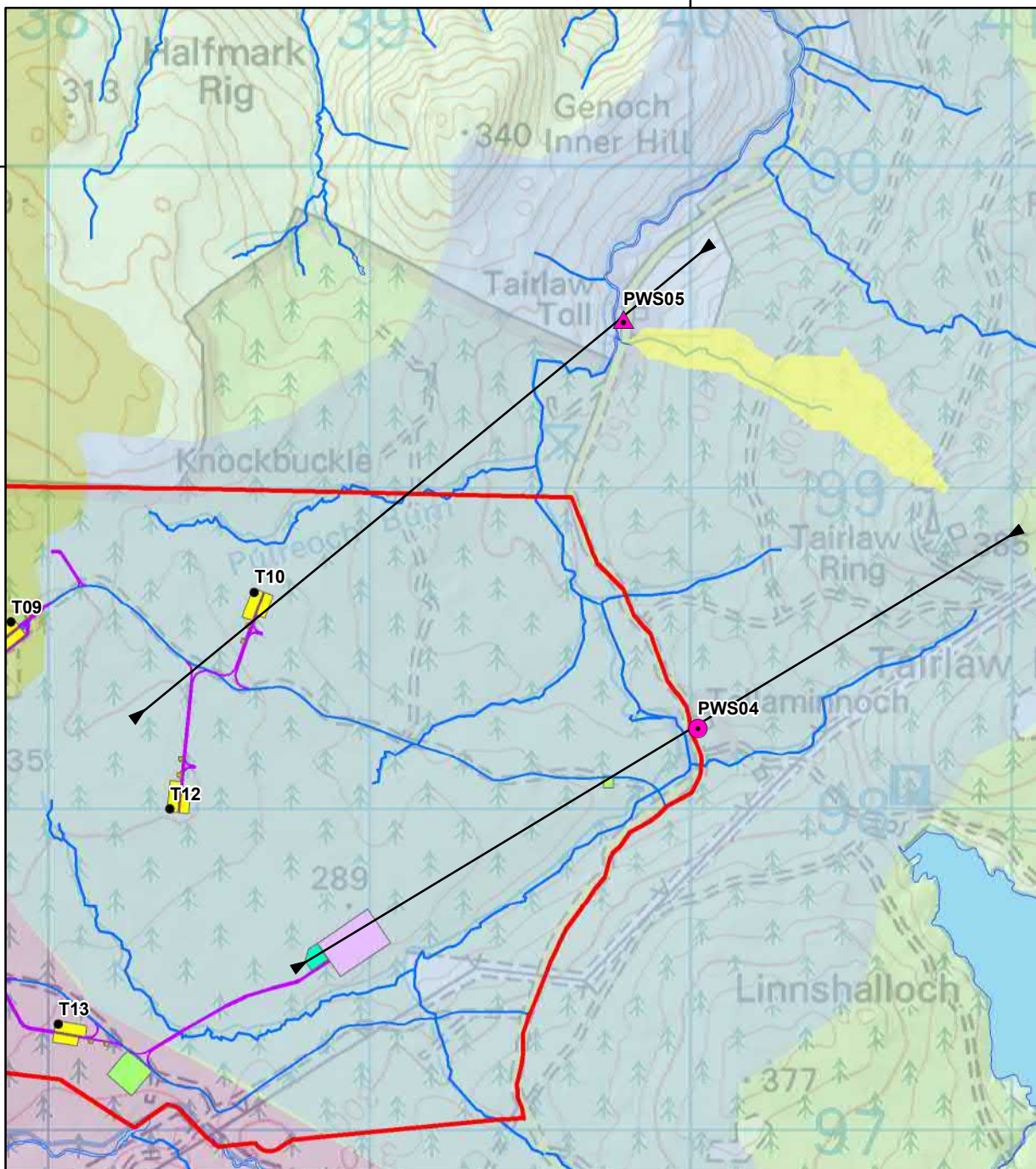
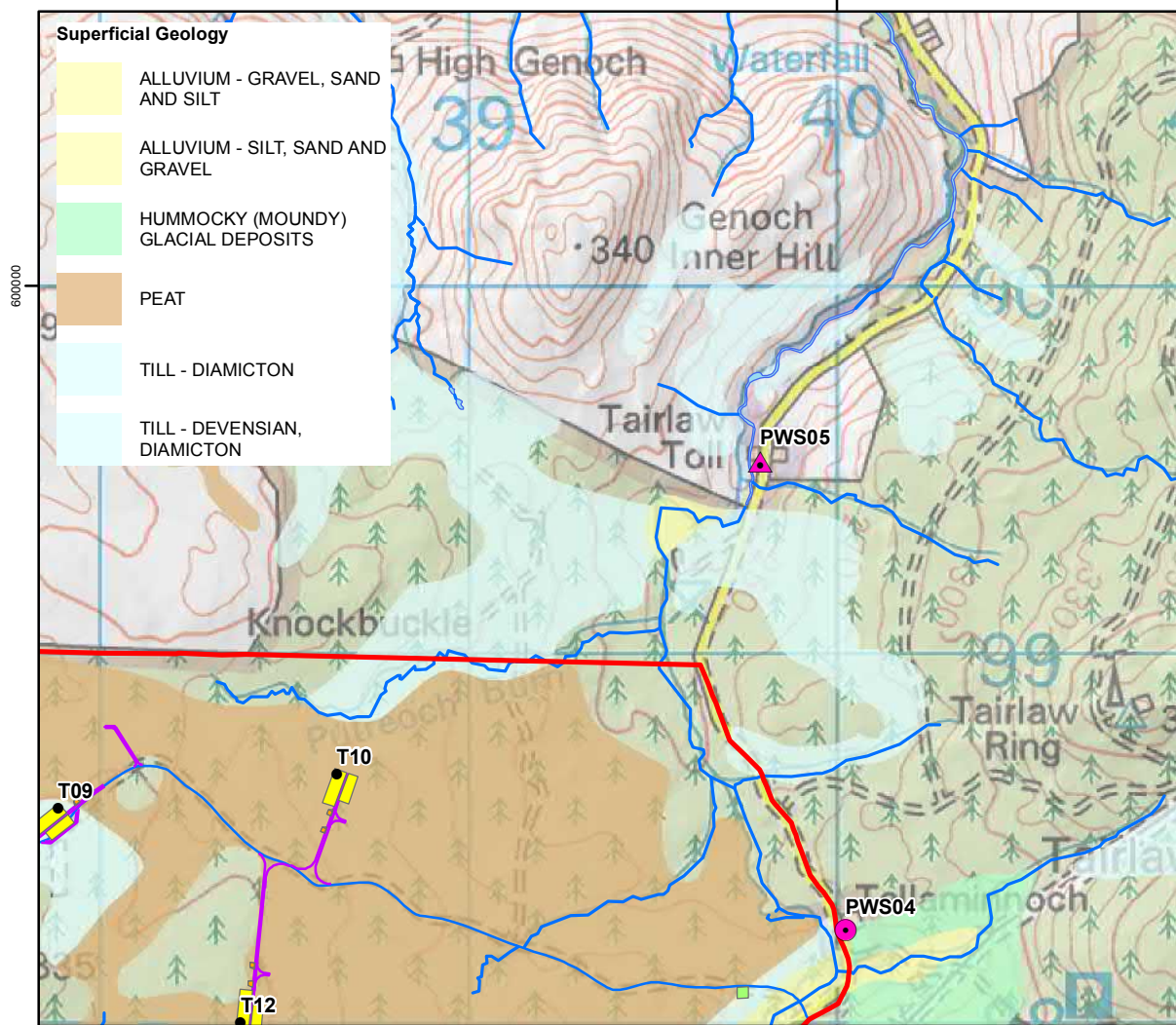
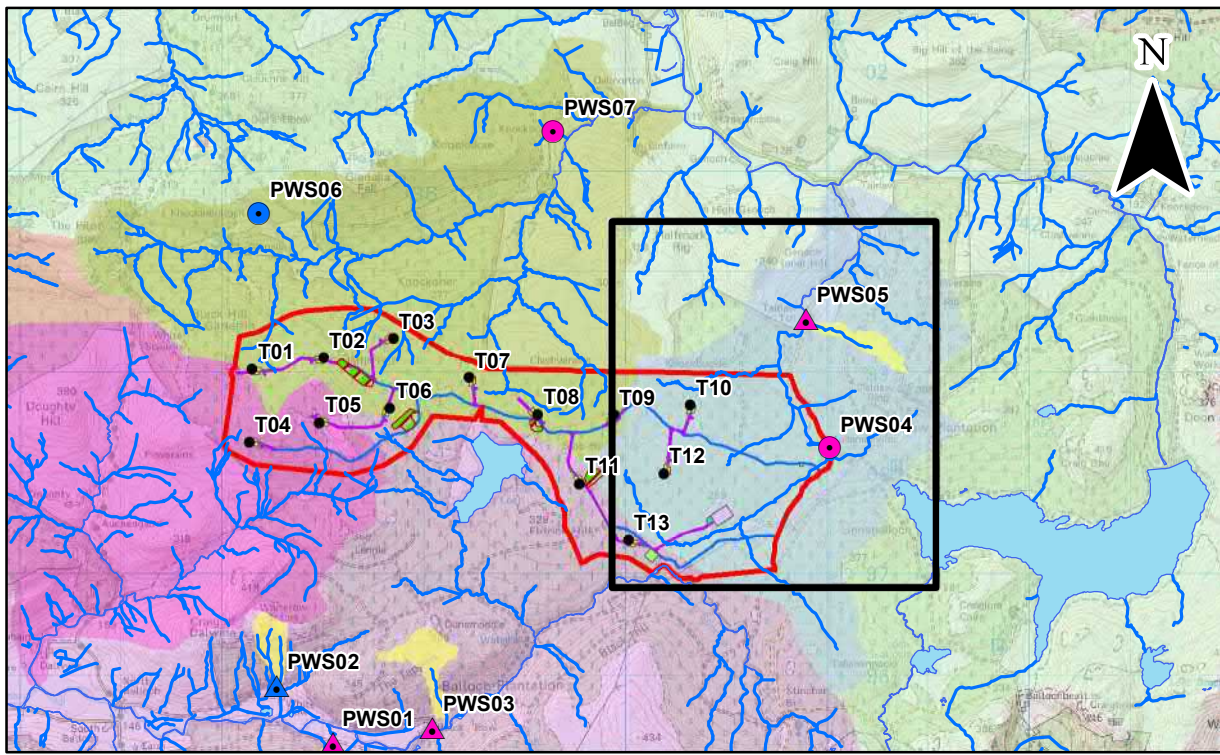
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Carrick Windfarm
Figure 6.4.2:
Carrick PWS01, PWS02 & PWS03
surface water catchments &
geology

| | |
|---------------|---------------|
| Drg No | |
| Rev | A |
| Date | 05/11/2021 |
| Scale | 1:30,000 @ A3 |



- Private Water Supply (PWS) location**
- Spring, SAC provided coordinates. Not confirmed by owner/site visit
 - Surface Water, SAC provided coordinates. Not confirmed by owner/site visit
- Line of cross section (see Figure 6.4.6)
- Surface water catchment
- Site Boundary
- Proposed Infrastructure**
- Substation Compound
 - Wind Turbine
 - Temporary Construction Compound
 - Crane Pad
 - Hardstanding
 - Temporary SPEN Construction Compound
 - Borrow Pit Search Area
 - Carrick Access Track - New Construction
 - Carrick Access Track - Existing Forestry Track to be Upgraded
- Drainage**
- OS Watercourse (1:10,000)
 - OS Water Body (1:10,000)
- Surface water catchments**
- Water of Minnoch catchment
 - Tairlaw Burn catchment
 - Palmullan Burn catchment
 - Dobbingsston Burn catchment
 - Dalquhaim Burn catchment
 - Water of Girvan catchment
 - River Stinchar catchment

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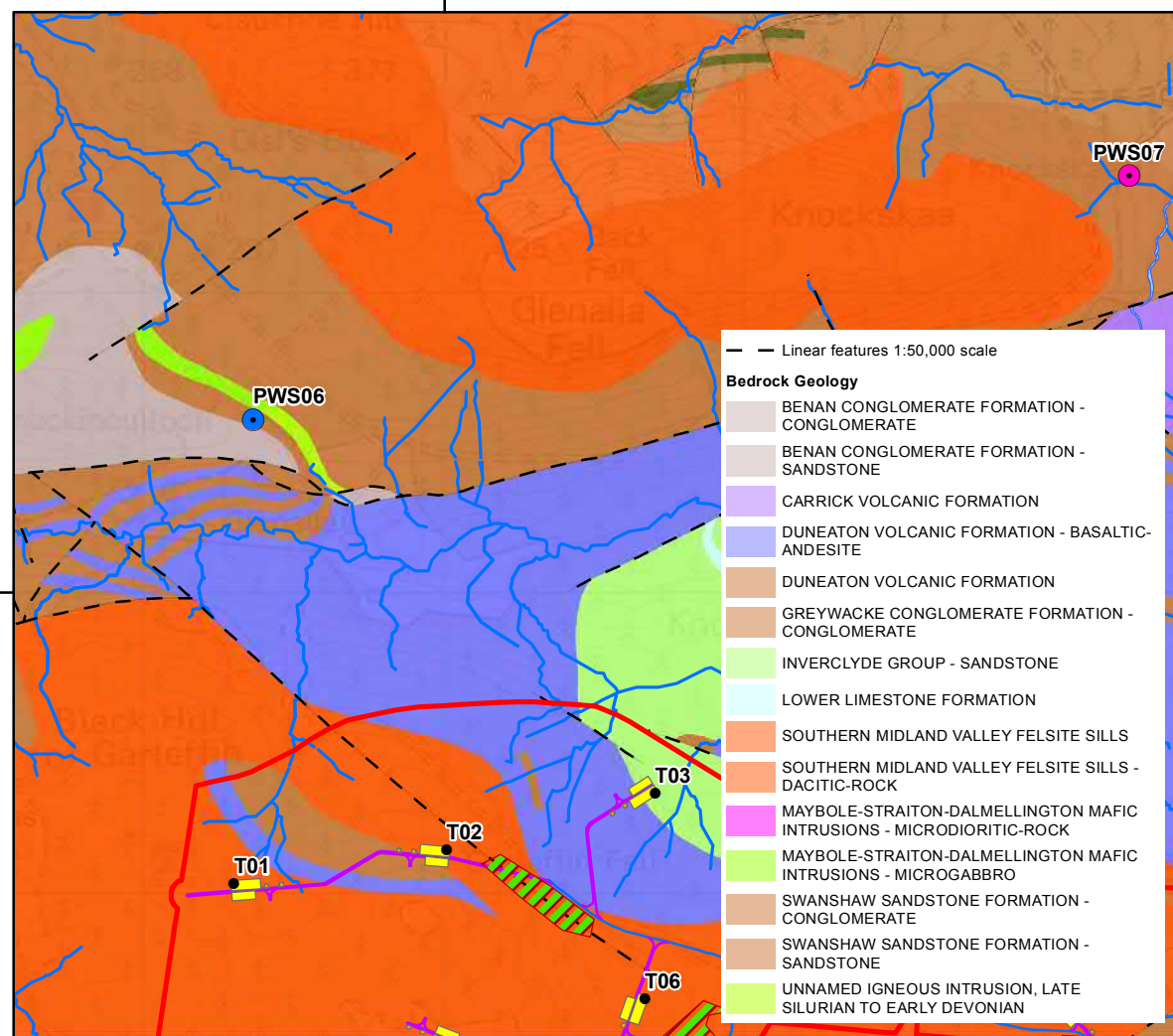
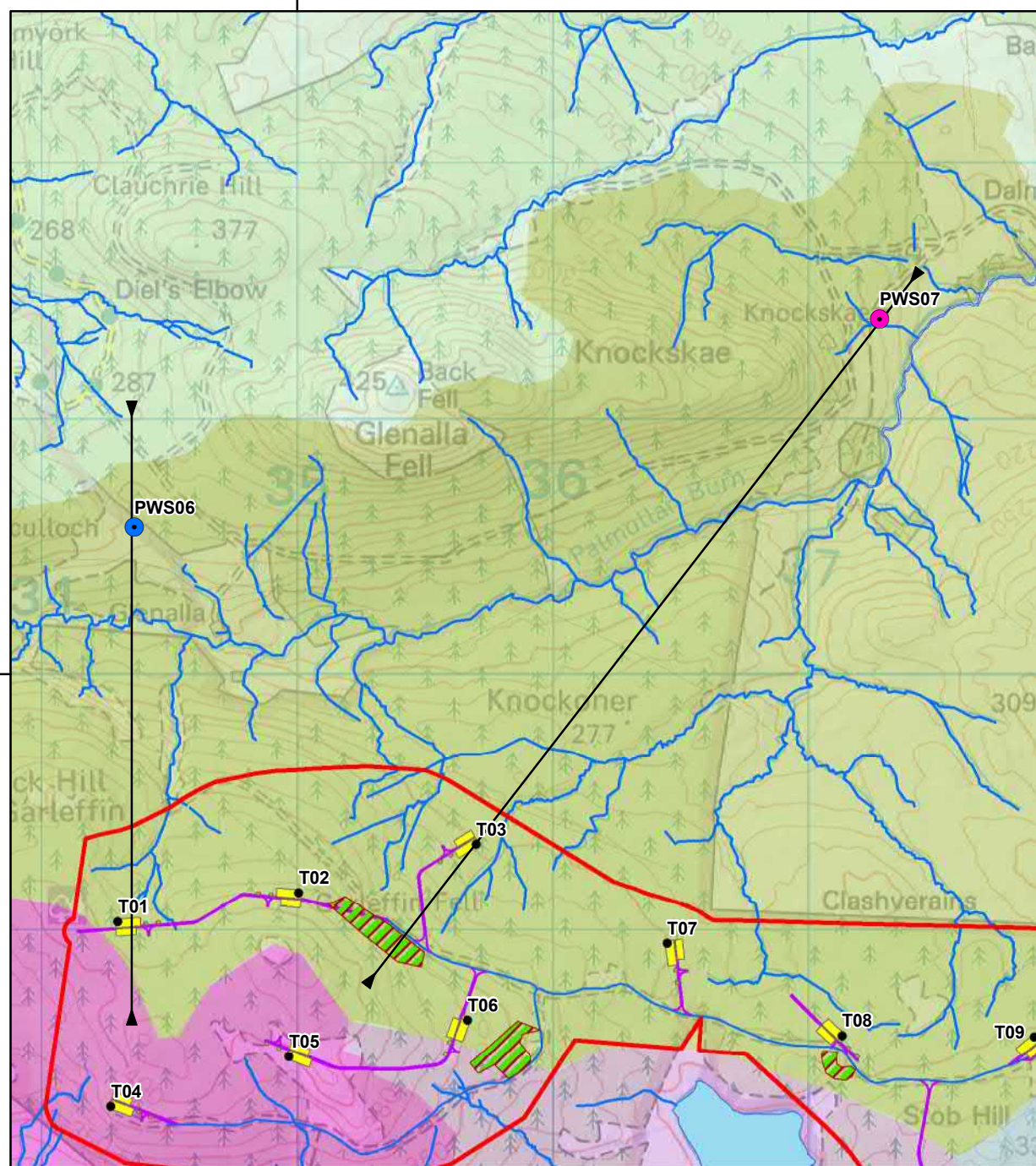
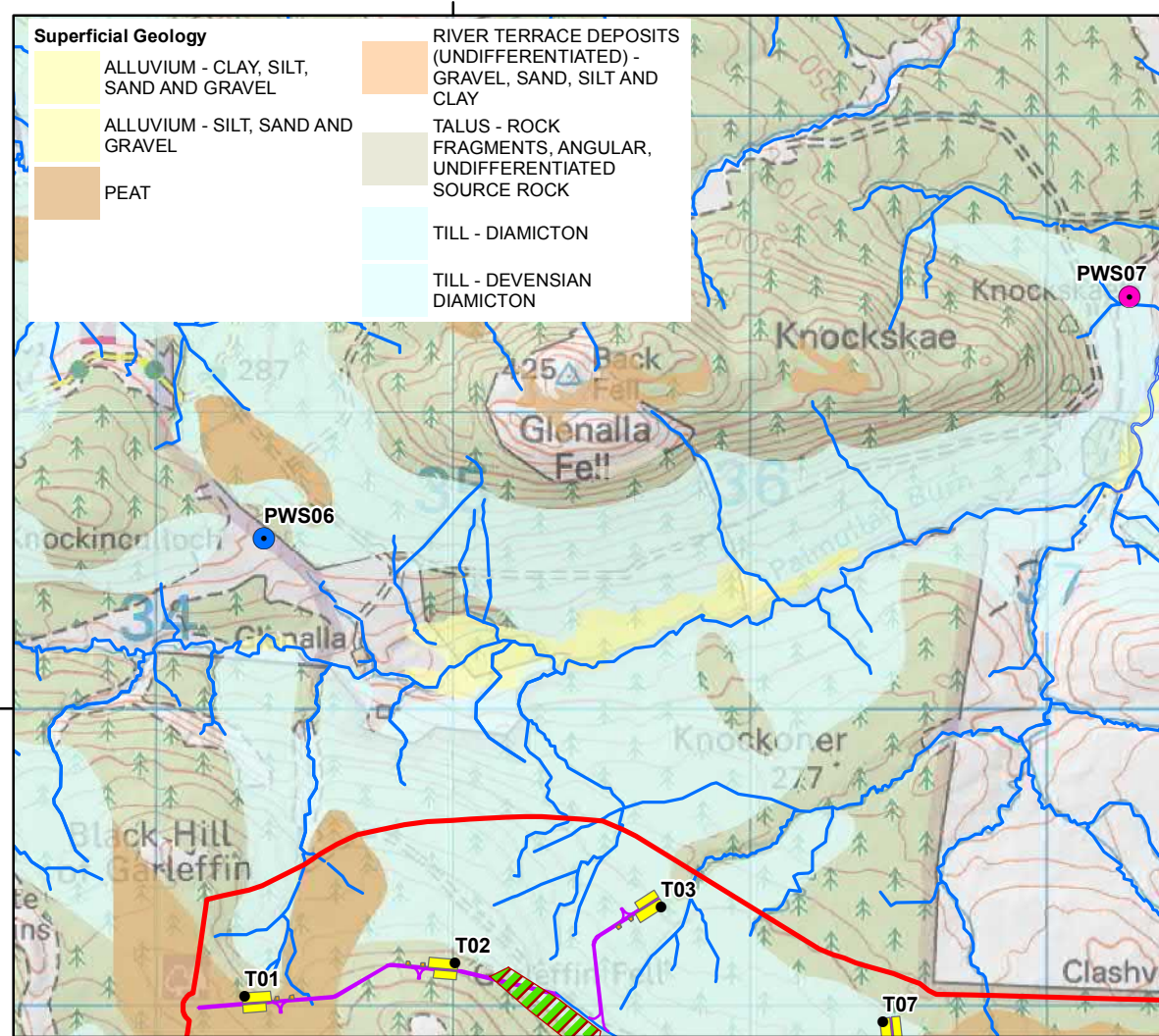
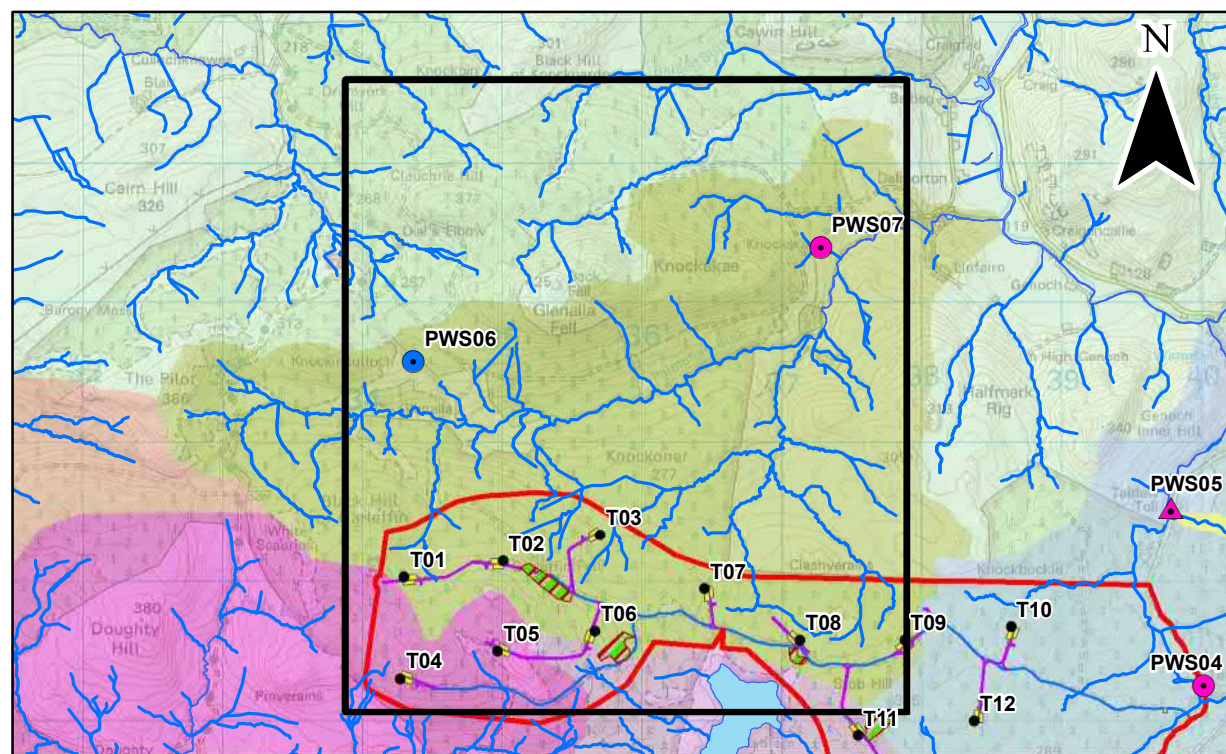
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| A | 28/10/2021 | PML | First Issue |



Carrick Windfarm
Figure 6.4.3:
Carrick PWS04 & PWS05
surface water catchments &
geology

| | |
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| Drg No | |
| Rev | A |
| Date | 05/11/2021 |
| Scale | 1:20,000 @ A3 |



- Private Water Supply (PWS) location**
- Spring, Location confirmed by owner/site visit
 - Spring, SAC provided coordinates. Not confirmed by owner/site visit
- Line of cross section (see Figure 6.4.7)
- Site Boundary**
- Proposed Infrastructure**
- Substation Compound
 - Wind Turbine
 - Temporary Construction Compound
 - Crane Pad
 - Hardstanding
 - Temporary SPEN Construction Compound
 - Borrow Pit Search Area
 - Carrick Access Track - New Construction
 - Carrick Access Track - Existing Forestry Track to be Upgraded
- Drainage**
- OS Watercourse (1:10,000)
 - OS Water Body (1:10,000)
- Surface water catchments**
- Water of Minnoch catchment
 - Tairlaw Burn catchment
 - Palmullan Burn catchment
 - Dobbingston Burn catchment
 - Dalquhairn Burn catchment
 - Water of Girvan catchment
 - River Stinchar catchment

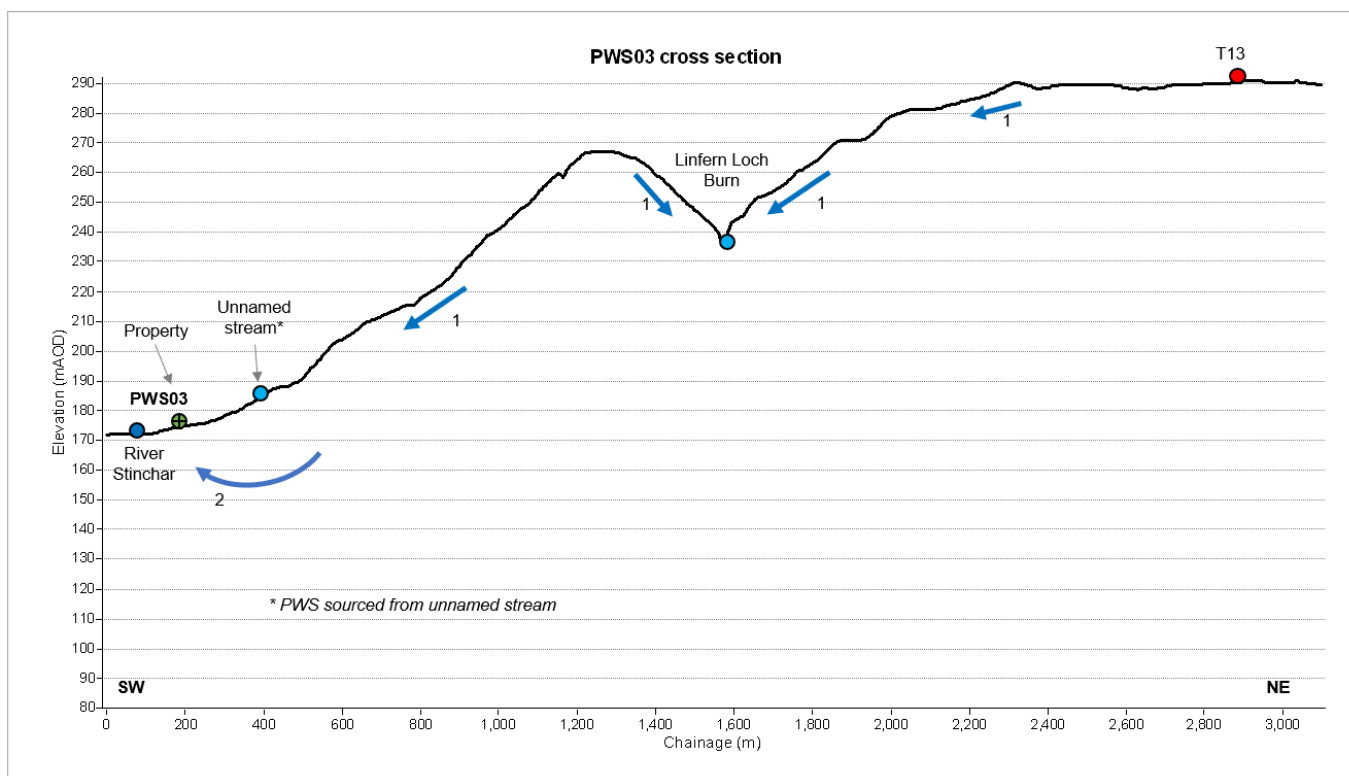
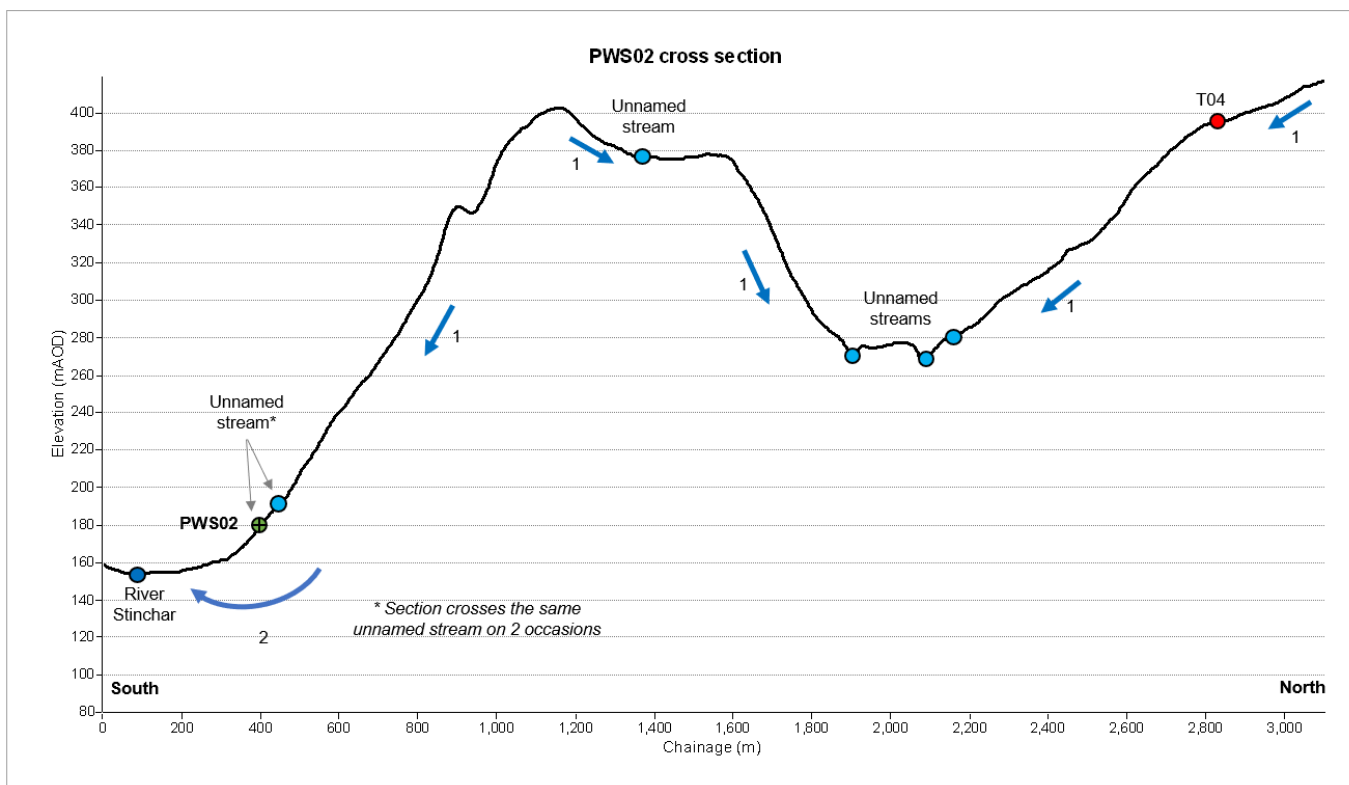
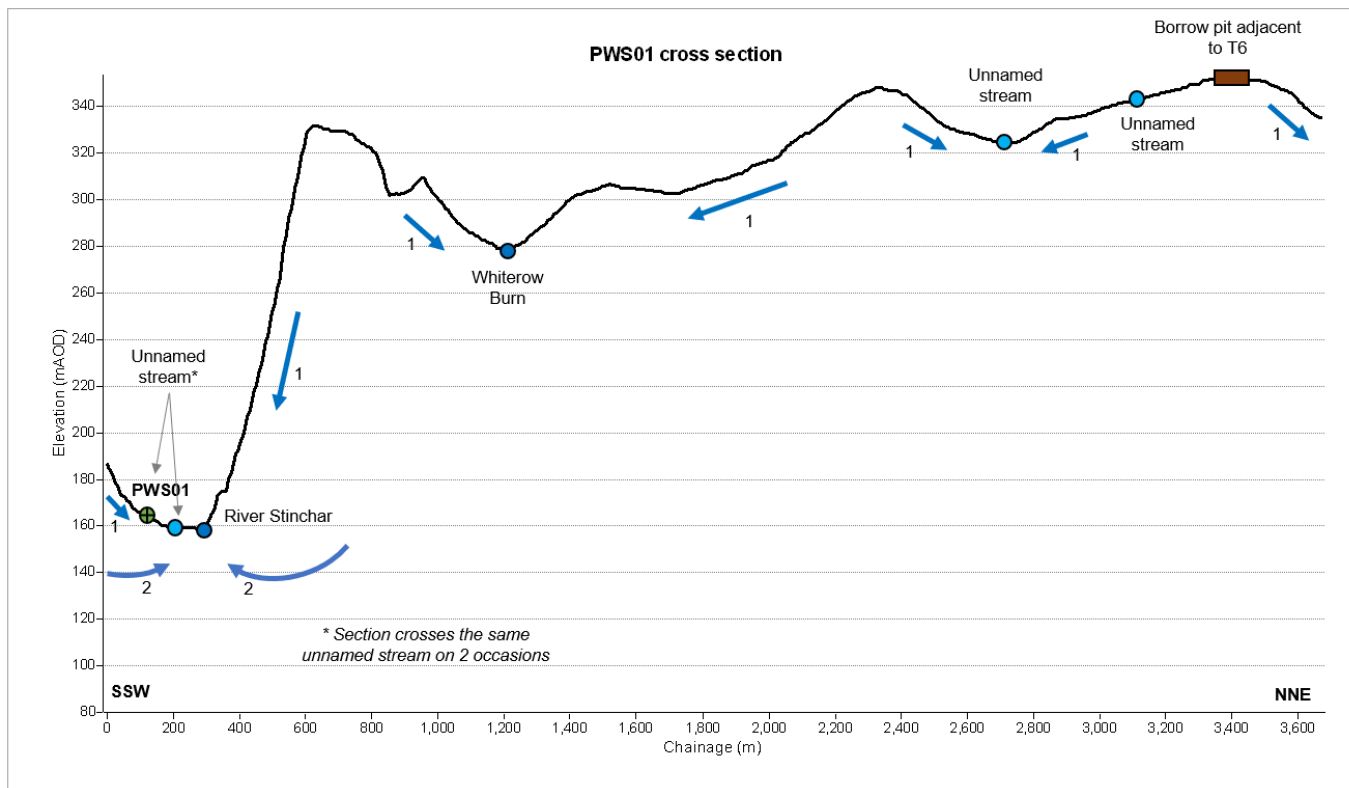
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Carrick Windfarm
 Figure 6.4.4:
 Carrick PWS06 & PWS07
 surface water catchments &
 geology

| | |
|---------------|---------------|
| Drg No | |
| Rev | A |
| Date | 05/11/2021 |
| Scale | 1:25,000 @ A3 |



Substation compound

Ground level

Private Water Supply (PWS)

Minor watercourse

Major watercourse

Proposed turbine with associated infrastructure

Proposed borrow pit

Carrick access track – upgraded existing track

Carrick access track – new construction

Shallow groundwater flow through near surface zone of enhanced fracturing/weathering

Deeper groundwater flow through less frequent fractures towards at depth



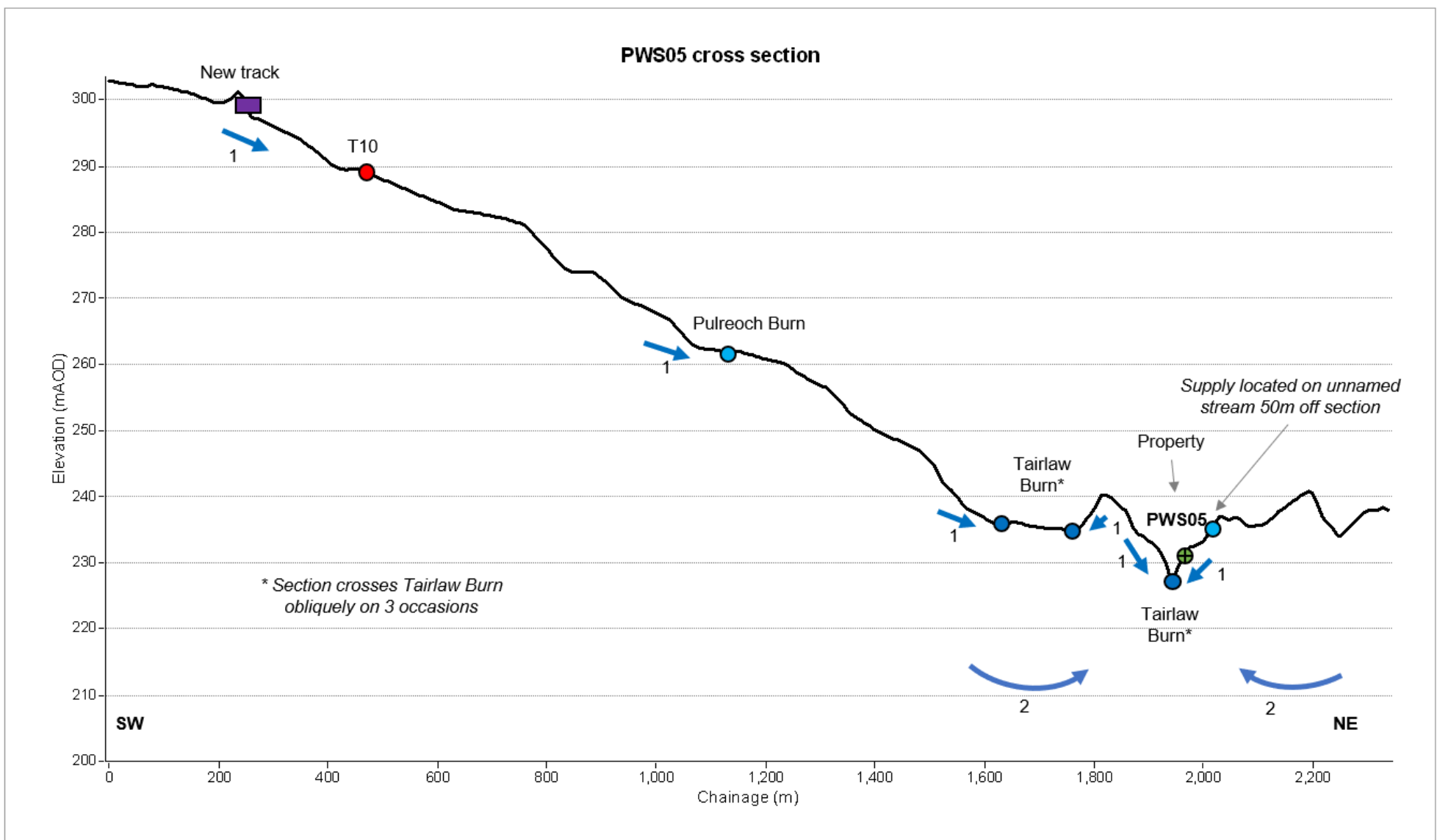
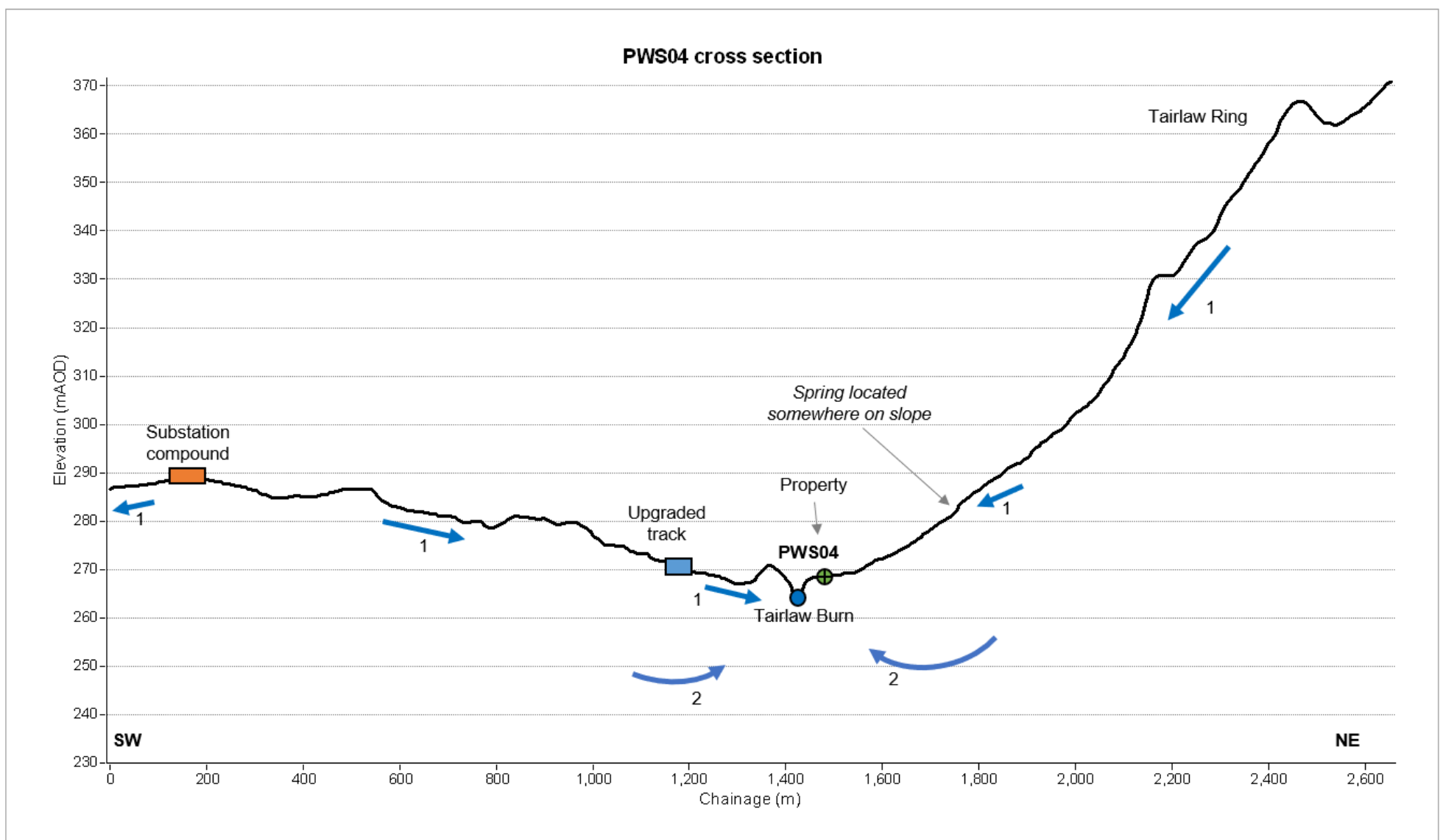
Carrick Windfarm

Cross sections for PWS01, PWS02 and PWS03

Scale as indicated on section

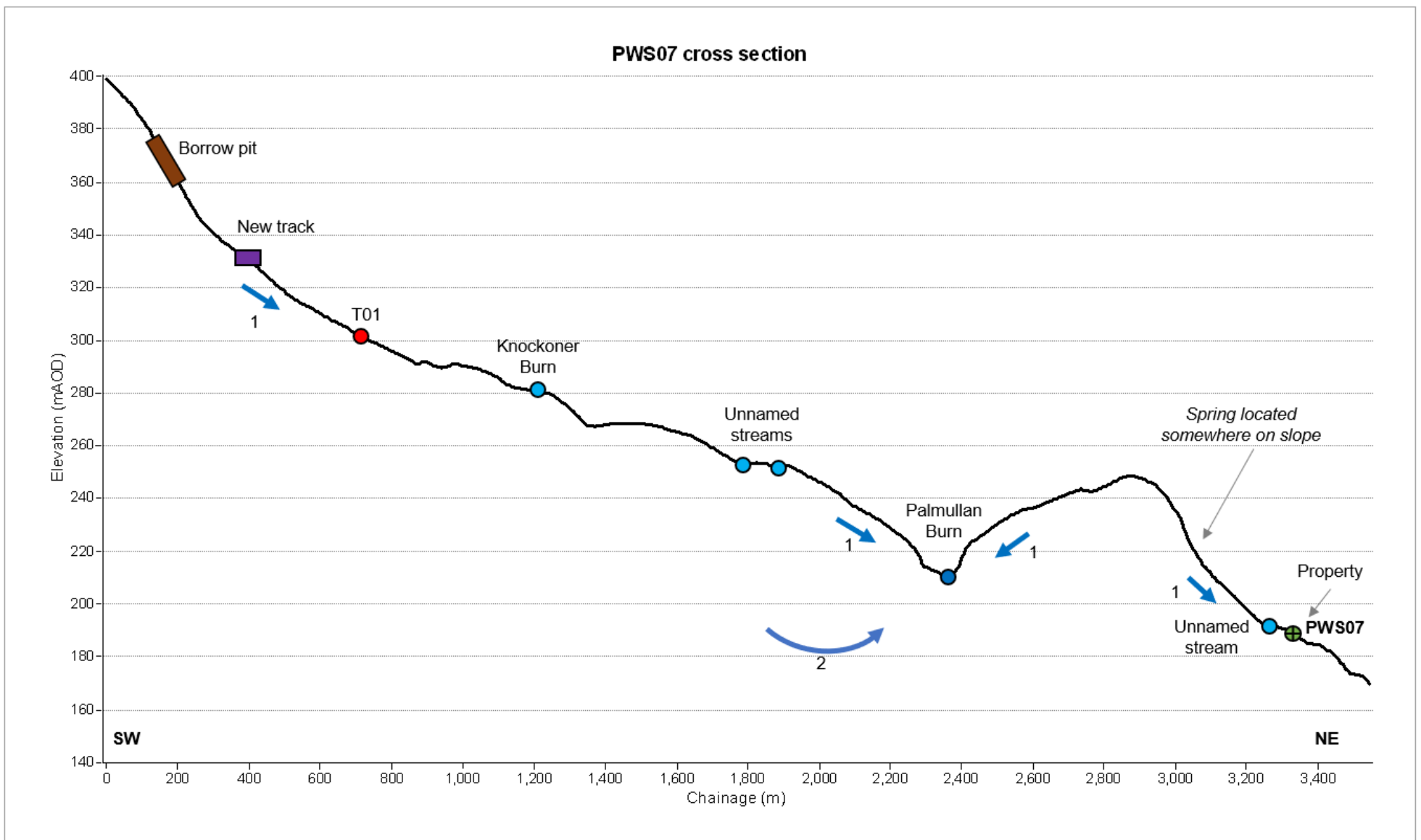
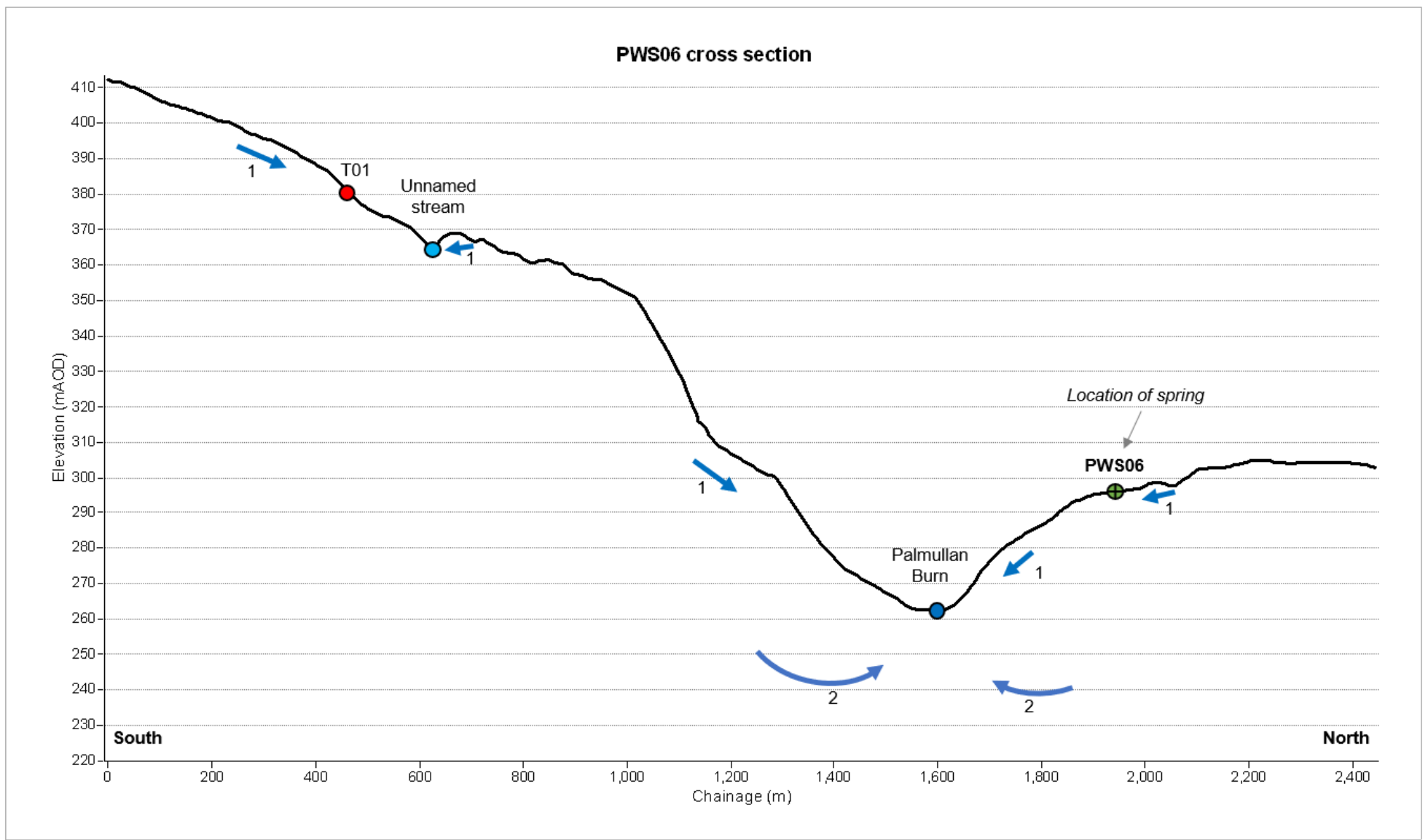
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| 6.4.5 | 29/10/21 | A | Carrick-WSP-I-094 | |



- Substation compound
- Ground level
- Private Water Supply (PWS)
- Minor watercourse
- Major watercourse
- Proposed borrow pit
- Carrick access track – upgraded existing track
- Carrick access track – new construction
- Proposed turbine with associated infrastructure
- Shallow groundwater flow through near surface zone of enhanced fracturing/weathering
- Deeper groundwater flow through less frequent fractures towards at depth

| | | | | | | | | |
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| | | | | <h2 style="margin: 0;">Carrick Windfarm</h2> <h3 style="margin: 0;">Cross sections for PWS04 and PWS05</h3> | | | | |
| | | | | Scale as indicated on section | | | | |
| A | 28/10/21 | PML | First Issue | Figure | Date | Rev | Dwg No. | Datum: OSGB36 Projection: TM |
| Rev | Date | By | Comment | 6.4.6 | 29/10/21 | A | Carrick-WSP-I-094 | |



- Substation compound
- Ground level
- Private Water Supply (PWS)
- Minor watercourse
- Major watercourse
- Proposed turbine with associated infrastructure
- Proposed borrow pit
- Carrick access track – upgraded existing track
- Carrick access track – new construction
- Shallow groundwater flow through near surface zone of enhanced fracturing/weathering
- Deeper groundwater flow through less frequent fractures towards at depth

| | | | | | | | | |
|-----|----------|-----|-------------|---|----------|-----|-------------------|---------------------------------|
| | | | | <h2 style="margin: 0;">Carrick Windfarm</h2> <h3 style="margin: 0;">Cross sections for PWS06 and PWS07</h3> | | | | |
| | | | | Scale as indicated on section | | | | |
| A | 28/10/21 | PML | First Issue | Figure | Date | Rev | Dwg No. | Datum: OSGB36 Projection: TM |
| Rev | Date | By | Comment | 6.4.7 | 29/10/21 | A | Carrick-WSP-I-094 | |