**Time series data**

| Time (hh:mm:ss) | Rain (mm) | Sewer Loss (mm) | Net Rain (mm) | Runoff ($m^3/s$) | Baseflow ($m^3/s$) | Total Flow ($m^3/s$) |
|---|---|---|---|---|---|---|
| 00:00:00 | 0.823 | 0.000 | 0.510 | 0.000 | 0.389 | 0.389 |
| 00:15:00 | 1.274 | 0.000 | 0.797 | 0.034 | 0.384 | 0.418 |
| 00:30:00 | 1.967 | 0.000 | 1.246 | 0.154 | 0.380 | 0.534 |
| 00:45:00 | 3.021 | 0.000 | 1.951 | 0.409 | 0.377 | 0.786 |
| 01:00:00 | 4.607 | 0.000 | 3.064 | 0.875 | 0.375 | 1.250 |
| 01:15:00 | 6.923 | 0.000 | 4.807 | 1.672 | 0.376 | 2.048 |
| 01:30:00 | 9.017 | 0.000 | 6.623 | 2.947 | 0.382 | 3.328 |
| 01:45:00 | 6.923 | 0.000 | 5.363 | 4.846 | 0.394 | 5.240 |
| 02:00:00 | 4.607 | 0.000 | 3.703 | 7.333 | 0.415 | 7.748 |
| 02:15:00 | 3.021 | 0.000 | 2.486 | 10.099 | 0.447 | 10.547 |
| 02:30:00 | 1.967 | 0.000 | 1.643 | 12.774 | 0.490 | 13.264 |
| 02:45:00 | 1.274 | 0.000 | 1.075 | 14.942 | 0.543 | 15.486 |
| 03:00:00 | 0.823 | 0.000 | 0.699 | 16.159 | 0.603 | 16.762 |
| 03:15:00 | 0.000 | 0.000 | 0.000 | 16.254 | 0.664 | 16.918 |
| 03:30:00 | 0.000 | 0.000 | 0.000 | 15.471 | 0.724 | 16.195 |
| 03:45:00 | 0.000 | 0.000 | 0.000 | 14.111 | 0.778 | 14.888 |
| 04:00:00 | 0.000 | 0.000 | 0.000 | 12.452 | 0.825 | 13.277 |
| 04:15:00 | 0.000 | 0.000 | 0.000 | 10.725 | 0.864 | 11.590 |
| 04:30:00 | 0.000 | 0.000 | 0.000 | 9.070 | 0.896 | 9.966 |
| 04:45:00 | 0.000 | 0.000 | 0.000 | 7.539 | 0.921 | 8.460 |
| 05:00:00 | 0.000 | 0.000 | 0.000 | 6.171 | 0.939 | 7.110 |
| 05:15:00 | 0.000 | 0.000 | 0.000 | 4.929 | 0.951 | 5.880 |
| 05:30:00 | 0.000 | 0.000 | 0.000 | 3.798 | 0.959 | 4.756 |
| 05:45:00 | 0.000 | 0.000 | 0.000 | 2.781 | 0.962 | 3.743 |
| 06:00:00 | 0.000 | 0.000 | 0.000 | 1.900 | 0.960 | 2.861 |
| 06:15:00 | 0.000 | 0.000 | 0.000 | 1.194 | 0.955 | 2.150 |
| 06:30:00 | 0.000 | 0.000 | 0.000 | 0.702 | 0.948 | 1.651 |
| 06:45:00 | 0.000 | 0.000 | 0.000 | 0.386 | 0.939 | 1.325 |
| 07:00:00 | 0.000 | 0.000 | 0.000 | 0.192 | 0.930 | 1.122 |
| 07:15:00 | 0.000 | 0.000 | 0.000 | 0.080 | 0.919 | 1.000 |
| 07:30:00 | 0.000 | 0.000 | 0.000 | 0.023 | 0.909 | 0.932 |
| 07:45:00 | 0.000 | 0.000 | 0.000 | 0.002 | 0.898 | 0.900 |
| 08:00:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.888 | 0.888 |
| 08:15:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.877 | 0.877 |
| 08:30:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.867 | 0.867 |

| Time (hh:mm:ss) | Rain (mm) | Sewer Loss (mm) | Net Rain (mm) | Runoff ($m^3/s$) | Baseflow ($m^3/s$) | Total Flow ($m^3/s$) |
|---|---|---|---|---|---|---|
| 08:45:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.857 | 0.857 |
| 09:00:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.847 | 0.847 |
| 09:15:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.837 | 0.837 |
| 09:30:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.827 | 0.827 |
| 09:45:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.817 | 0.817 |
| 10:00:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.808 | 0.808 |
| 10:15:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.798 | 0.798 |
| 10:30:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.789 | 0.789 |
| 10:45:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.780 | 0.780 |
| 11:00:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.771 | 0.771 |
| 11:15:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.762 | 0.762 |
| 11:30:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.753 | 0.753 |
| 11:45:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.744 | 0.744 |
| 12:00:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.735 | 0.735 |
| 12:15:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.727 | 0.727 |
| 12:30:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.718 | 0.718 |
| 12:45:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.710 | 0.710 |
| 13:00:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.701 | 0.701 |
| 13:15:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.693 | 0.693 |
| 13:30:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.685 | 0.685 |
| 13:45:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.677 | 0.677 |
| 14:00:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.669 | 0.669 |
| 14:15:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.661 | 0.661 |
| 14:30:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.653 | 0.653 |
| 14:45:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.646 | 0.646 |
| 15:00:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.638 | 0.638 |
| 15:15:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.631 | 0.631 |
| 15:30:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.623 | 0.623 |
| 15:45:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.616 | 0.616 |
| 16:00:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.609 | 0.609 |
| 16:15:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.602 | 0.602 |
| 16:30:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.595 | 0.595 |
| 16:45:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.588 | 0.588 |
| 17:00:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.581 | 0.581 |
| 17:15:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.574 | 0.574 |
| 17:30:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.567 | 0.567 |

| Time (hh:mm:ss) | Rain (mm) | Sewer Loss (mm) | Net Rain (mm) | Runoff ($m^3/s$) | Baseflow ($m^3/s$) | Total Flow ($m^3/s$) |
|---|---|---|---|---|---|---|
| 17:45:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.561 | 0.561 |
| 18:00:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.554 | 0.554 |
| 18:15:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.548 | 0.548 |
| 18:30:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.541 | 0.541 |
| 18:45:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.535 | 0.535 |
| 19:00:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.529 | 0.529 |
| 19:15:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.522 | 0.522 |
| 19:30:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.516 | 0.516 |
| 19:45:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.510 | 0.510 |
| 20:00:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.504 | 0.504 |
| 20:15:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.498 | 0.498 |
| 20:30:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.493 | 0.493 |
| 20:45:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.487 | 0.487 |
| 21:00:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.481 | 0.481 |
| 21:15:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.475 | 0.475 |
| 21:30:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.470 | 0.470 |
| 21:45:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.464 | 0.464 |
| 22:00:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.459 | 0.459 |
| 22:15:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.454 | 0.454 |
| 22:30:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.448 | 0.448 |
| 22:45:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.443 | 0.443 |
| 23:00:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.438 | 0.438 |
| 23:15:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.433 | 0.433 |
| 23:30:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.428 | 0.428 |
| 23:45:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.423 | 0.423 |
| 24:00:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.418 | 0.418 |
| 24:15:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.413 | 0.413 |
| 24:30:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.408 | 0.408 |
| 24:45:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.403 | 0.403 |
| 25:00:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.398 | 0.398 |
| 25:15:00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.394 | 0.394 |

## Appendix

**Catchment descriptors ***

| Name | Value | User-defined value used? |
|---|---|---|
| Area ($km^2$) | 4.77 [4.73] | **Yes** |
| ALTBAR | 322 | No |
| ASPBAR | 231 | No |
| ASPVAR | 0.42 | No |
| BFIHOST | 0.26 | No |
| BFIHOST19 | 0.27 | No |
| DPLBAR (km) | 2.38 | No |
| DPSBAR ($mkm^{-1}$) | 101.6 | No |
| FARL | 1 | No |
| LDP | 4.25 | No |
| PROPWET (mm) | 0.61 | No |
| RMED1H | 9.3 | No |
| RMED1D | 43.4 | No |
| RMED2D | 58 | No |
| SAAR (mm) | 1453 | No |
| SAAR4170 (mm) | 1564 | No |
| SPRHOST | 56.9 | No |
| Urbext2000 | 0 | No |
| Urbext1990 | 0 | No |
| URBCONC | 0 | No |
| URBLOC | 0 | No |
| DDF parameter C | -0.02 | No |
| DDF parameter D1 | 0.48 | No |
| DDF parameter D2 | 0.55 | No |
| DDF parameter D3 | 0.27 | No |
| DDF parameter E | 0.27 | No |
| DDF parameter F | 2.29 | No |
| DDF parameter C (1km grid value) | -0.02 | No |
| DDF parameter D1 (1km grid value) | 0.47 | No |
| DDF parameter D2 (1km grid value) | 0.55 | No |
| DDF parameter D3 (1km grid value) | 0.27 | No |
| DDF parameter E (1km grid value) | 0.27 | No |
| DDF parameter F (1km grid value) | 2.25 | No |

*Values in square brackets are the original values loaded from the FEH Web Service or FEH CD-ROM*

# Appendix F

# Drainage Calculations

| | |
|---|---|
| **Project** | Carnbuck |
| **Ref** | M01616-08 |
| **Date** | 04/04/2022 |

**Purpose**

To estimate the indicative (1-hr) change in runoff rate on a site caused by the proposed development. Note that proposed / indicative runoff rates are outline only and rely on the routing equation within the Modified Rational and Wallingford methods; actual runoff rates may differ significantly dependant on the nature of the surface water drainage network proposed and should be determined using hydraulic modelling.

| **Existing Site** | A1 | A2 | A3 | A4 | **Effective Area** | |
|---|---|---|---|---|---|---|
| Roof | | | | | 0 | $m^2$ |
| Bitmac / Paved / Hardstanding | | | | | 0 | $m^2$ |
| | | | | | **0** | $m^2$ |

| **Proposed Site** | A1 | A2 | A3 | %-Runoff | **Effective Area** | |
|---|---|---|---|---|---|---|
| Roof | | | | 95% | 0 | $m^2$ |
| Bitmac / Paved / Hardstanding | 86472 | | | 65% | 56207 | $m^2$ |
| | | | | | **56207** | $m^2$ |

**Site Details**

| | | | |
|---|---|---|---|
| **Total Development Area** | 8.65 | **Ha** | |
| **SAAR** | 1453 | **mm** | From FEH3 |
| **SAAR4170** | 1564 | **mm** | From FEH3 |
| **UCWI** | 116 | **mm** | |
| **IOH124 region** | I | | from map -> |
| **SOIL** | 5 | | From WRAP maps |
| **SOIL** | 0.50 | | |
| **DEEPSTOR** | 0.42 | | |

**Modified Rational Method (MRM):**

| | ***Existing*** | | ***Proposed*** | | |
|---|---|---|---|---|---|
| **Max Drained Length (m)** | 2564 | **m** | 2564 | **m** | From Site Maps |
| **Impermeable Area (ha)** | 0.000 | **Ha** | 5.621 | **Ha** | |
| **Max Height** | 366 | **mAOD** | 366 | **mAOD** | From Survey |
| **Min Height** | 289 | **mAOD** | 289 | **mAOD** | From Survey |
| **DeltaH** | 77.000 | | 77.000 | | |
| **Slope (%)** | 3.00 | | 3.00 | | |
| **Te (mins)** | 15.64 | | 15.64 | | |
| **ARF** | 0.000 | | 0.977 | | |

| | Existing Site | | Proposed Site | |
|---|---|---|---|---|
| **PIMP** | 0.000 | **%** | 100.000 | **%** |
| **Percentage Runoff PR** | 0.50 | **%** | 83.72 | **%** |
| **Cv** | 0.00 | | 0.84 | |
| **Cr** | 1.3 | | 1.3 | |

**Institute of Hydrology Report 124 (IoH 124) "Flood Estimation on Small Catchments" method**

| | ***Existing*** | | ***Proposed*** | |
|---|---|---|---|---|
| Remaining Greenfield Area | 8.65 | **Ha** | 0.00 | **Ha** |
| % Greenfield | 100.00 | **%** | 0.00 | **%** |

**Existing Site - Peak (1-hr) Runoff Rates**

| Return Period | Permeable Runoff (IOH124) (lps) | Impermeable Runoff (MRM) (lps) | Total Runoff (lps) |
|---|---|---|---|
| 1 in 2 year (1hr) | 116 | 0 | 116 |
| 1 in 30 year (1hr) | 201 | 0 | 201 |
| 1 in 100 year (1hr) | 239 | 0 | 239 |

**Proposed Site - Peak (1-hr) Runoff Rates**

| Return Period | Permeable Runoff (IOH124) (lps) | Impermeable Runoff (MRM) (lps) | Total Runoff (lps) |
|---|---|---|---|
| 1 in 2 year (1hr) | 0 | 175 | 175 |
| 1 in 30 year (1hr) | 0 | 499 | 499 |
| 1 in 100 year (1hr) | 0 | 677 | 677 |

**Summary - Peak (1-hr) Runoff Rates**

| Return Period | Existing Site (lps) | Proposed Site (lps) | *Increase (lps)* | Increase (%) |
|---|---|---|---|---|
| 1 in 2 year (1hr) | 116 | 175 | *59* | *51%* |
| 1 in 30 year (1hr) | 201 | 499 | *298* | *148%* |
| 1 in 100 year (1hr) | 239 | 677 | *438* | *183%* |

| By | Checked | Revision | Reason for Change | Date |
|---|---|---|---|---|
| DKS | DKS | Original | | 04/04/2022 |
| | | | | |
| | | | | |
| | | | | |

**CRM Stormflow** Stormwater Management Software

| | |
|---|---|
| **Client:** | RES |
| **Project:** | M01616-08 |
| **Location:** | Carnbuck Wind Farm, Carnlough |
| **Catchment:** | Whole Drained Area |

**Catchment Details:**

| | | | |
|---|---|---|---|
| Buildings | 0 | $m^2$ | x 95 % |
| Dense surfacing | 84672 | $m^2$ | x 65 % |
| Effective Area | 55036.8 | $m^2$ | |

**Storage Details:**

| | | |
|---|---|---|
| Volume | 2550 | Cu.m |
| Porosity | 100 | % |
| Area Increase | 0 | % |

**Rainfall Details - FEH Method:**

| | | | |
|---|---|---|---|
| Return Period | | 100 | years |
| Climate Change Factor | | 20 | % |
| c | -0.024 | d1 | 0.48694 |
| d2 | 0.545 | d3 | 0.267 |
| e | 0.267 | f | 2.287 |

| | mm | mm/h | storage ($m^3$) |
|---|---|---|---|
| 30 min | 31.1 | 62.2 | 1558.267 |
| 45 min | 36.2 | 48.3 | 1764.270 |
| 60 min | 40.3 | 40.3 | 1916.109 |
| 2 hours | 52.4 | 26.2 | 2273.799 |
| 6 hours | 79.2 | 13.2 | 2532.634 |
| 24 hours | 139.0 | 5.8 | 340.559 |

**Outflow Details:**

| | | |
|---|---|---|
| Infiltration rate | 0 | m/hr |
| Attenuation Control | Fixed Outflow | |
| Control Diameter | - | mm |
| Discharge rate | 84.6 | l/s |

**Results:**

| | |
|---|---|
| Outcome: | Pass |
| Critical Storm Duration | 5.07 hrs |
| Hmax | 0.999 m |
| Time to half empty | 4.2 hrs |

# Appendix G

# Flood Mapping

311000

312000

421000

420000

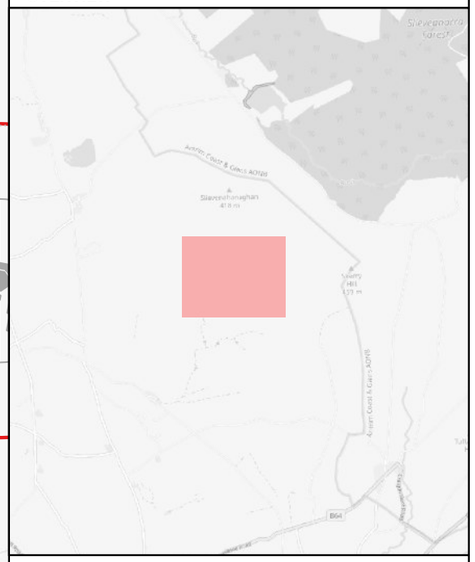
N

0

250

500 m

## OVERVIEW



## LEGEND

**The Site**

- Planning Application Boundary
- Preliminary Site Boundary
- Modelled Watercourse Extent

**Hydrology**

- Present Day 1% AEP Flood Extent

**Structure**

- Proposed Infrastructure


McCloy Consulting

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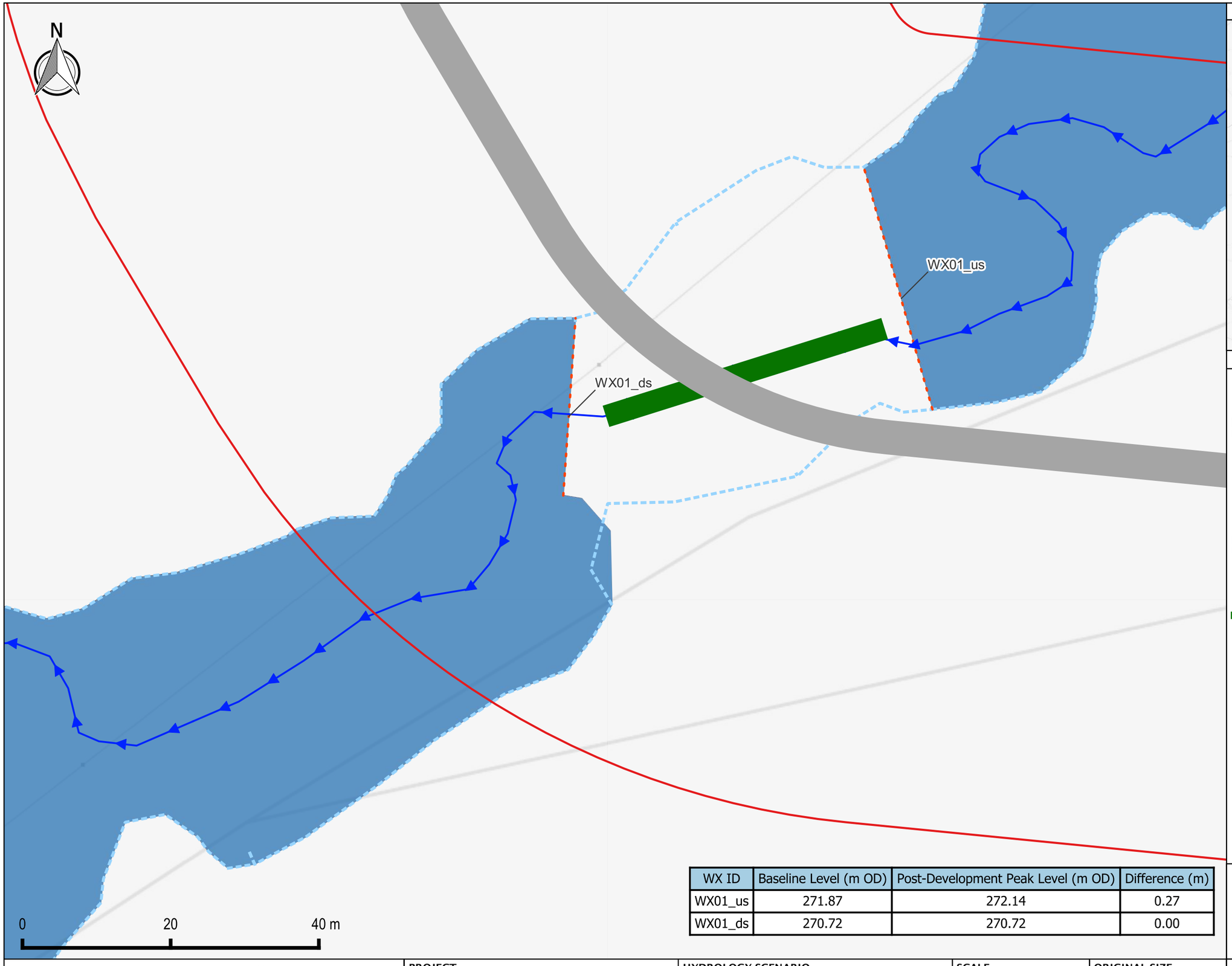
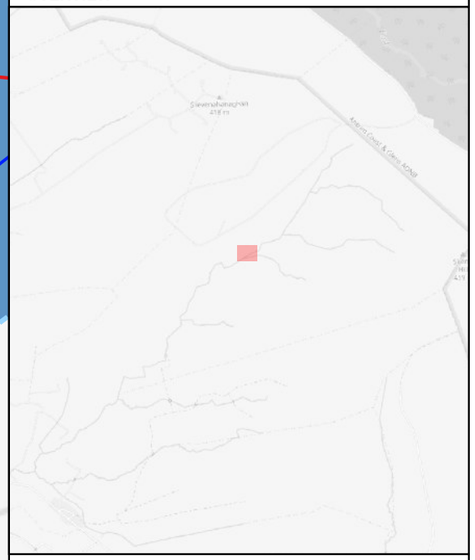
W: www.mccloyconsulting.com'


| | | | | |
|---|---|---|---|---|
| **PROJECT** CARNBUCK WIND FARM | | **HYDROLOGY SCENARIO** PRESENT DAY | **SCALE** AS SHOWN | **ORIGINAL SIZE** A3 |
| **MAP TYPE** FLOOD EXTENT | | **GEOMETRY SCENARIO** PRESENT DAY | **DRAWN BY** IM | **APPROVED** DKS |
| **SOURCE** FLUVIAL | **FLOOD EVENT** 1% AEP | **FIGURE NUMBER** M01616-08_FIG_FL_101 | **REVISION** 1 | **DATE** 20/06/2022 |




**OVERVIEW**



**LEGEND**

**The Site**

- Planning Application Boundary
- Preliminary Site Boundary
- Open Watercourse
- Modelled Cross Section Locations

**Hydrology**

- Proposed 1% AEP + CC Flood Extent
- Pre-Development 1% AEP + CC Flood Extent

**Structure**

- Proposed Infrastructure
- Proposed Culvert WX01

| WX ID | Baseline Level (m OD) | Post-Development Peak Level (m OD) | Difference (m) |
|---|---|---|---|
| WX01_us | 271.87 | 272.14 | 0.27 |
| WX01_ds | 270.72 | 270.72 | 0.00 |

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W: www.mccloyconsulting.com'

| | | | | |
|---|---|---|---|---|
| **PROJECT** CARNBUCK WIND FARM | | **HYDROLOGY SCENARIO** CLIMATE CHANGE | **SCALE** 1:500 | **ORIGINAL SIZE** A3 |
| **MAP TYPE** FLOOD EXTENT | | **GEOMETRY SCENARIO** PROPOSED | **DRAWN BY** IM | **APPROVED** DKS |
| **SOURCE** FLUVIAL | **FLOOD EVENT** 1% AEP + CC | **FIGURE NUMBER** M01616-08_FIG_FL_WX01 | **REVISION** 1 | **DATE** 20/06/2022 |

# Appendix H

# Watercourse Crossing Schedule

| REF | DESCRIPTION | Easting | Northing | |
|---|---|---|---|---|
| SIGNIFICANT WATERCOURSE CROSSINGS | | | | |
| WX01 | NEW 1.5M (H) X 3M (SPAN) BOTTOMLESS CULVERT OR SPRUNG ARCH EQUIVALENT. SOFFIT LEVEL MIN 272.44 m OD.<br><br>CATCHMENT MAP INCLUDED IN ANNEX B<br><br>DESIGNED FOR FREE INLET CONDITIONS 1% AEP + CLIMATE CHANGE<br><br>CHANNEL MORPHOLOGY AND FLUVIAL PROCESSES CHARACTERISED BY POOLS / RIFFLES WITH LARGE BOULDERS, COBBLES AND SOME BEDROCK.<br><br>FISHERIES INTEREST WITH REGARDS TO GOOD NURSERY GROUND AND RESTING POOLS.<br><br>CLEAR SPAN CROSSING PROPOSED TO COMPLY WITH ENVIRONMENTAL STATEMENT MITIGATION. | 311881 | 420621 |  |

| REF | DESCRIPTION | Easting | Northing | |
|---|---|---|---|---|
| MINOR WATERCOURSE CROSSINGS | | | | |
| WX02 | EXISTING GRUIG WF ACCESS CULVERT TO BE EXTENDED LIKE-FOR-LIKE TO SUIT WIDENED SITE ACCESS | 313241 | 421724 |  |
| WX03 | NEW MIN 0.75 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT), SUBJECT TO DESIGN POST PLANNING APPROVAL.<br><br>TO BE DESIGNED FOR FREE INLET CONDITIONS 1% AEP + CLIMATE CHANGE<br><br>VEGETATED CHANNEL, NO FISHERIES INTEREST - CLOSED CULVERT ACCEPTABLE | 313373 | 421022 |  |

| REF | DESCRIPTION | Easting | Northing | |
|---|---|---|---|---|
| MINOR WATERCOURSE CROSSINGS | | | | |
| WX04 | NEW MIN 0.75 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT), SUBJECT TO DESIGN POST PLANNING APPROVAL.<br><br>TO BE DESIGNED FOR FREE INLET CONDITIONS 1% AEP + CLIMATE CHANGE<br><br>ROCKY MORPHOLOGY, FISHERIES ASSESSMENT CONFIRMS NO FISHERIES INTEREST - CLOSED CULVERT ACCEPTABLE | 313234 | 421110 |  |

| REF | DESCRIPTION | Easting | Northing | |
|---|---|---|---|---|
| MINOR WATERCOURSE CROSSINGS | | | | |
| WX05 | NEW MIN. 0.75 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL.<br><br>TO BE DESIGNED FOR FREE INLET CONDITIONS 1% AEP + CLIMATE CHANGE<br><br>HEAVILY VEGETATED CHANNEL, NO FISHERIES INTEREST - CLOSED CULVERT ACCEPTABLE | 312699 | 420304 |  |

| REF | DESCRIPTION | Easting | Northing | |
|---|---|---|---|---|
| MINOR WATERCOURSE CROSSINGS | | | | |
| WX06 | REPLACEMENT MIN. 0.75 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) TO REPLACE EX. 0.3M PIPE. SUBJECT TO DESIGN POST PLANNING APPROVAL.<br><br>TO BE DESIGNED FOR FREE INLET CONDITIONS 1% AEP + CLIMATE CHANGE<br><br>HEAVILY VEGETATED CHANNEL, NO FISHERIES INTEREST - CLOSED CULVERT ACCEPTABLE | 312532 | 420142 |  |
| WX07 | NEW MIN. 0.75 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL.<br><br>DESIGNED FOR FREE INLET CONDITIONS 1% AEP + CLIMATE CHANGE<br><br>ARTIFICIALLY DREDGED / HEAVILY VEGETATED CHANNEL, NO FISHERIES INTEREST - CLOSED CULVERT ACCEPTABLE | 312271 | 419938 |  |

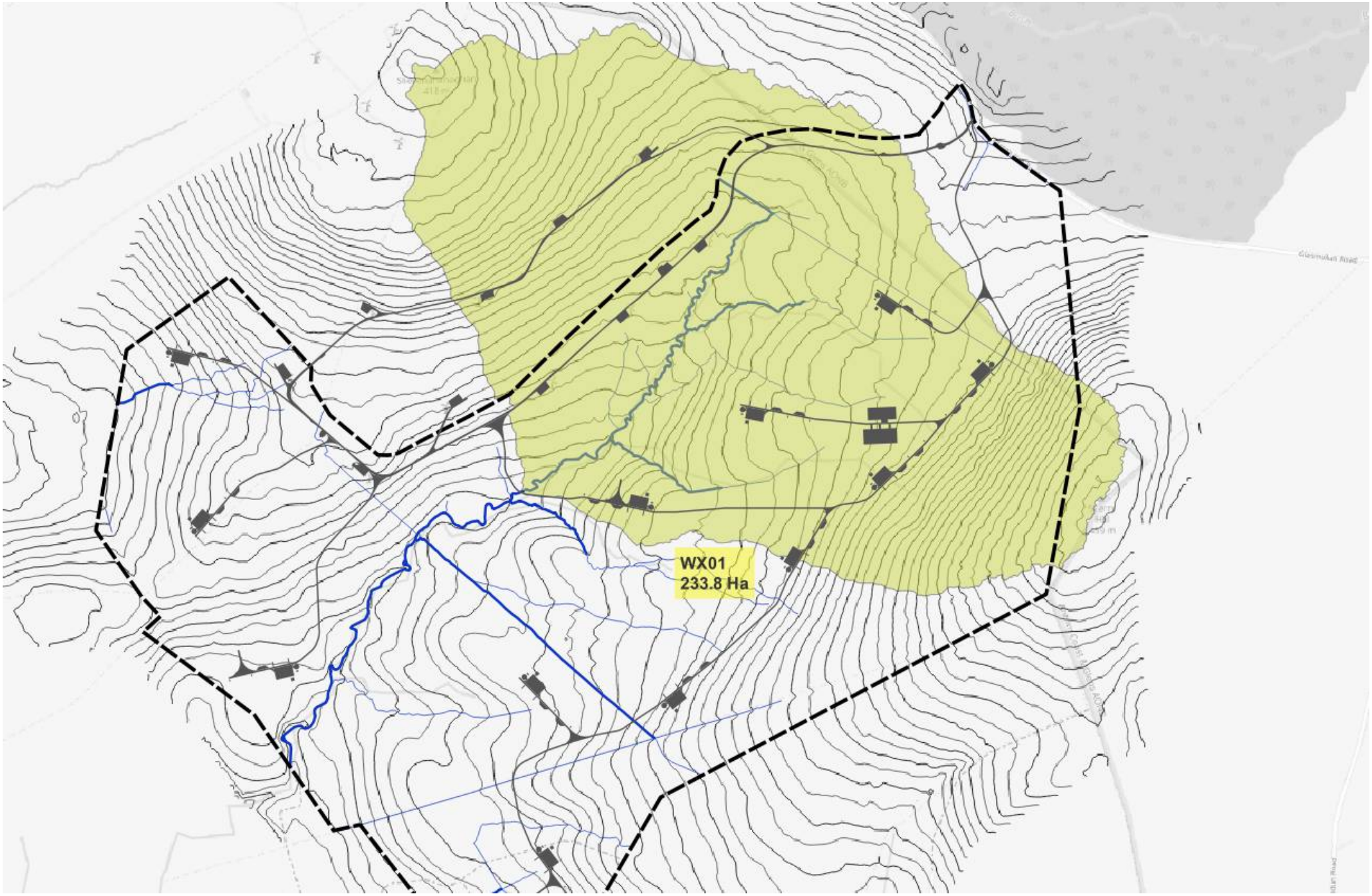
| REF | DESCRIPTION | Easting | Northing | |
|---|---|---|---|---|
| MINOR WATERCOURSE CROSSINGS | | | | |
| WX08 | NEW MIN. 0.75 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL.<br><br>DESIGNED FOR FREE INLET CONDITIONS 1% AEP + CLIMATE CHANGE<br><br>VEGETATED CHANNEL, NO FISHERIES INTEREST - CLOSED CULVERT ACCEPTABLE | 311903 | 419759 |  |
| WX09 | NEW MIN. 0.75 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL.<br><br>DESIGNED FOR FREE INLET CONDITIONS 1% AEP + CLIMATE CHANGE<br><br>VEGETATED CHANNEL, NO FISHERIES INTEREST - CLOSED CULVERT ACCEPTABLE | 311927 | 419639 |  |

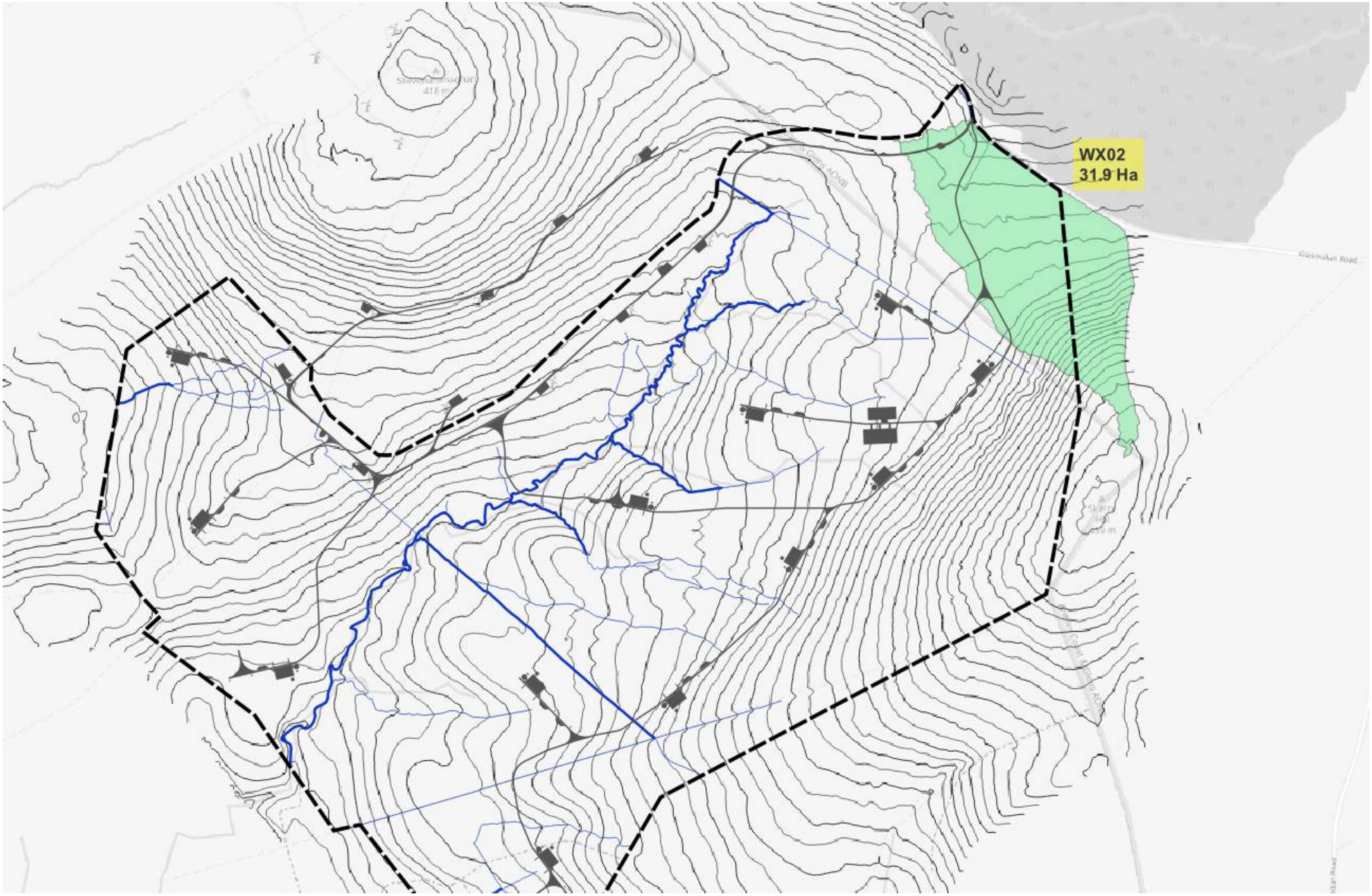
| REF | DESCRIPTION | Easting | Northing | |
|---|---|---|---|---|
| MINOR WATERCOURSE CROSSINGS | | | | |
| WX10 | NEW MIN. 0.75 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL.<br><br>DESIGNED FOR FREE INLET CONDITIONS 1% AEP + CLIMATE CHANGE<br><br>ROCKY / VEGTATED MORPHOLOGY, FISHERIES ASSESSMENT CONFIRMS NO FISHERIES INTEREST - CLOSED CULVERT ACCEPTABLE | 311483 | 420616 |  |
| WX11 | NEW MIN. 0.75 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL.<br><br>DESIGNED FOR FREE INLET CONDITIONS 1% AEP + CLIMATE CHANGE<br><br>EXCAVATED CHANNEL, FISHERIES ASSESSMENT CONFIRMS NO FISHERIES INTEREST - CLOSED CULVERT ACCEPTABLE | 311292 | 420770 |  |

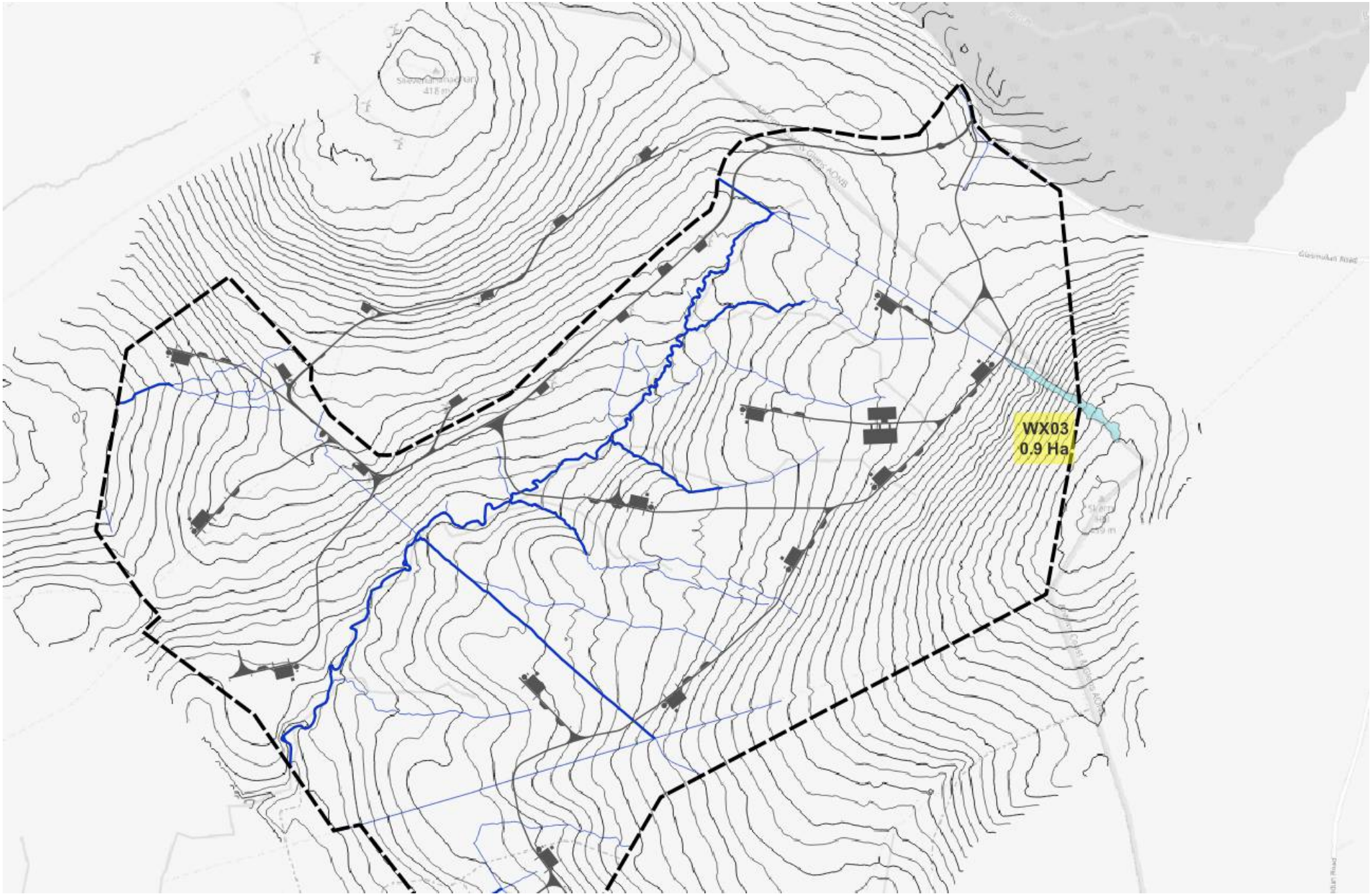
| REF | DESCRIPTION | Easting | Northing | |
|---|---|---|---|---|
| MINOR WATERCOURSE CROSSINGS | | | | |
| WX12 | NEW MIN. 0.75 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL.<br><br>DESIGNED FOR FREE INLET CONDITIONS 1% AEP + CLIMATE CHANGE<br><br>VEGTATED MORPHOLOGY, FISHERIES ASSESSMENT CONFIRMS NO FISHERIES INTEREST - CLOSED CULVERT ACCEPTABLE | 311192 | 420929 |  |
| WX13 | NEW MIN. 0.6 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL.<br><br>DESIGNED FOR FREE INLET CONDITIONS 1% AEP + CLIMATE CHANGE<br><br>EXCAVATED MORPHOLOGY, FISHERIES ASSESSMENT CONFIRMS NO FISHERIES INTEREST - CLOSED CULVERT ACCEPTABLE | 311143 | 420972 |  |

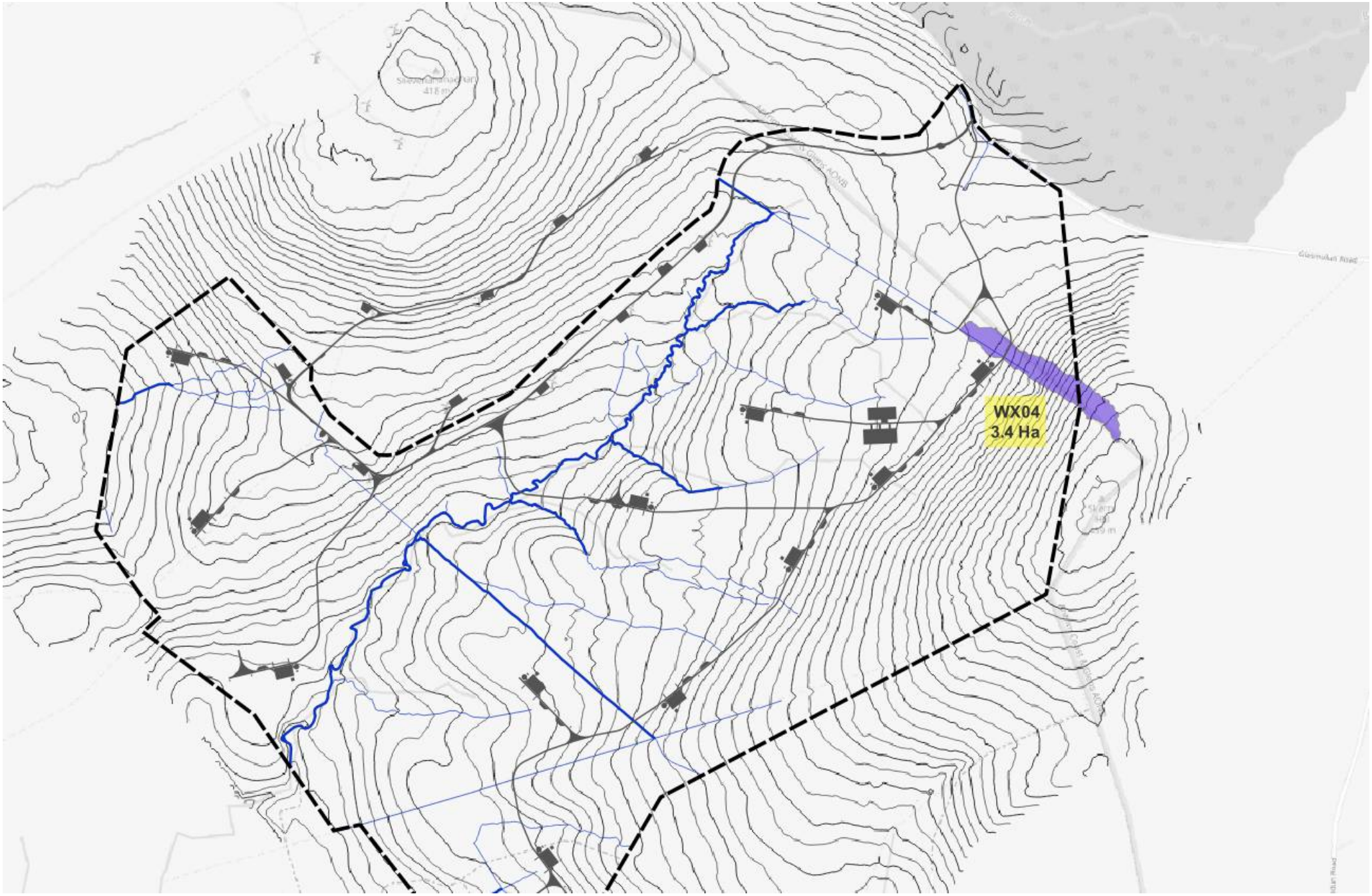
| REF | DESCRIPTION | Easting | Northing | |
|---|---|---|---|---|
| MINOR WATERCOURSE CROSSINGS | | | | |
| WX14 | NEW MIN. 0.6 M DIA CIRCULAR (CLASS 120 CONCRETE OR EQUIVALENT) SUBJECT TO DESIGN POST PLANNING APPROVAL.<br><br>DESIGNED FOR FREE INLET CONDITIONS 1% AEP + CLIMATE CHANGE<br><br>VEGTATED MORPHOLOGY, FISHERIES ASSESSMENT CONFIRMS NO FISHERIES INTEREST - CLOSED CULVERT ACCEPTABLE | 311085 | 421009 |  |

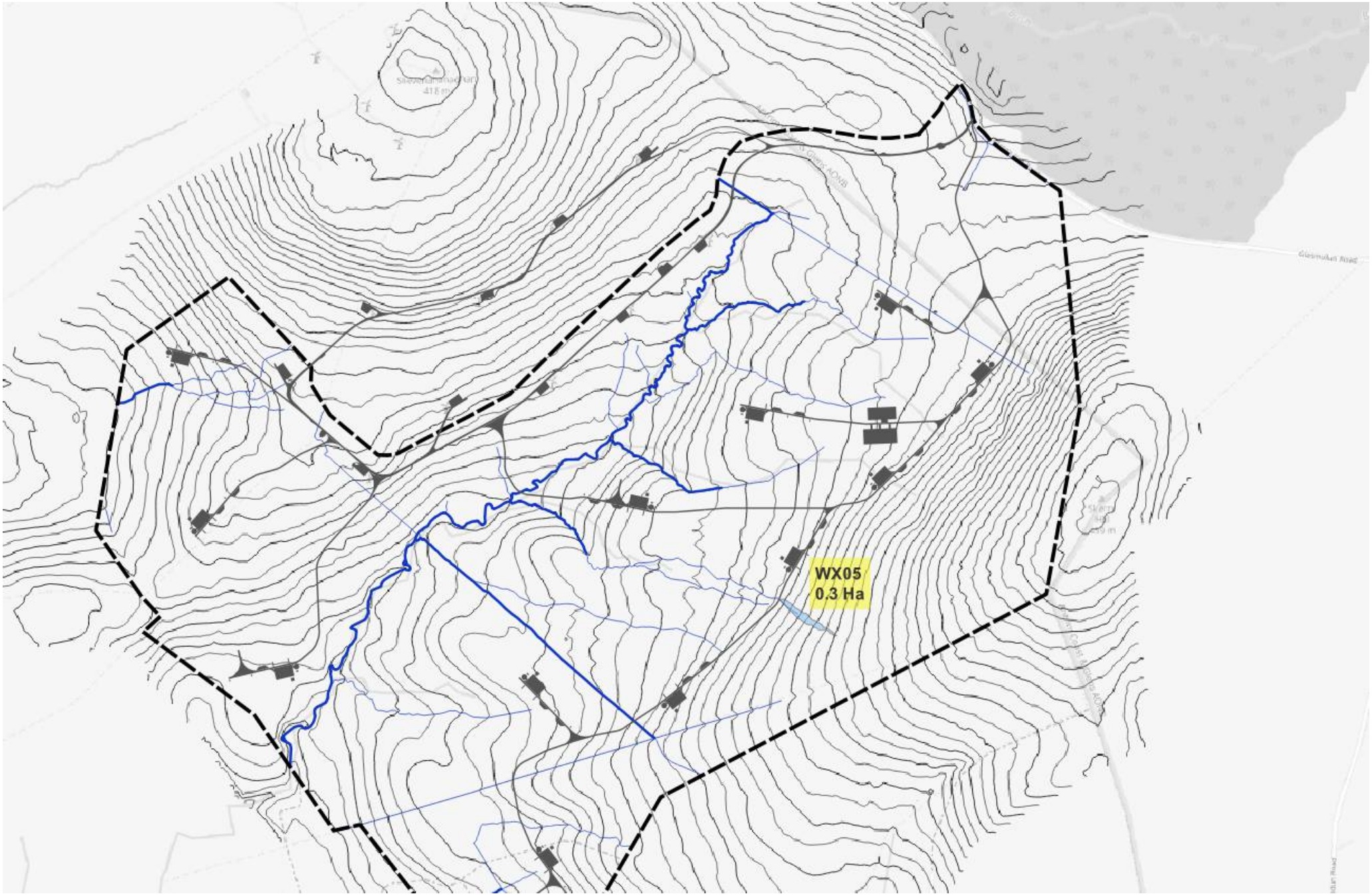
# ANNEX A – CATCHMENT MAPS

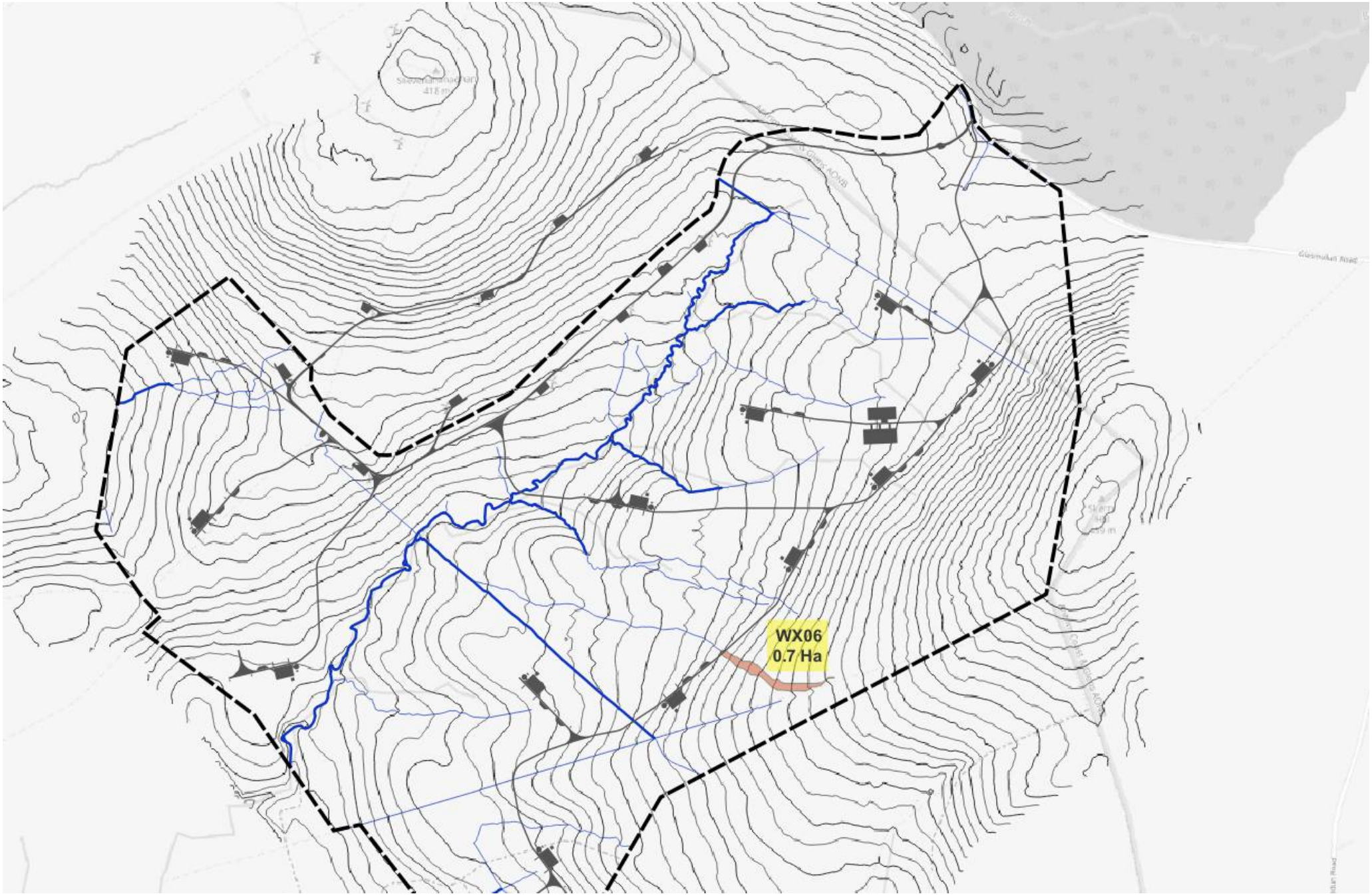

WX01
233.8 Ha

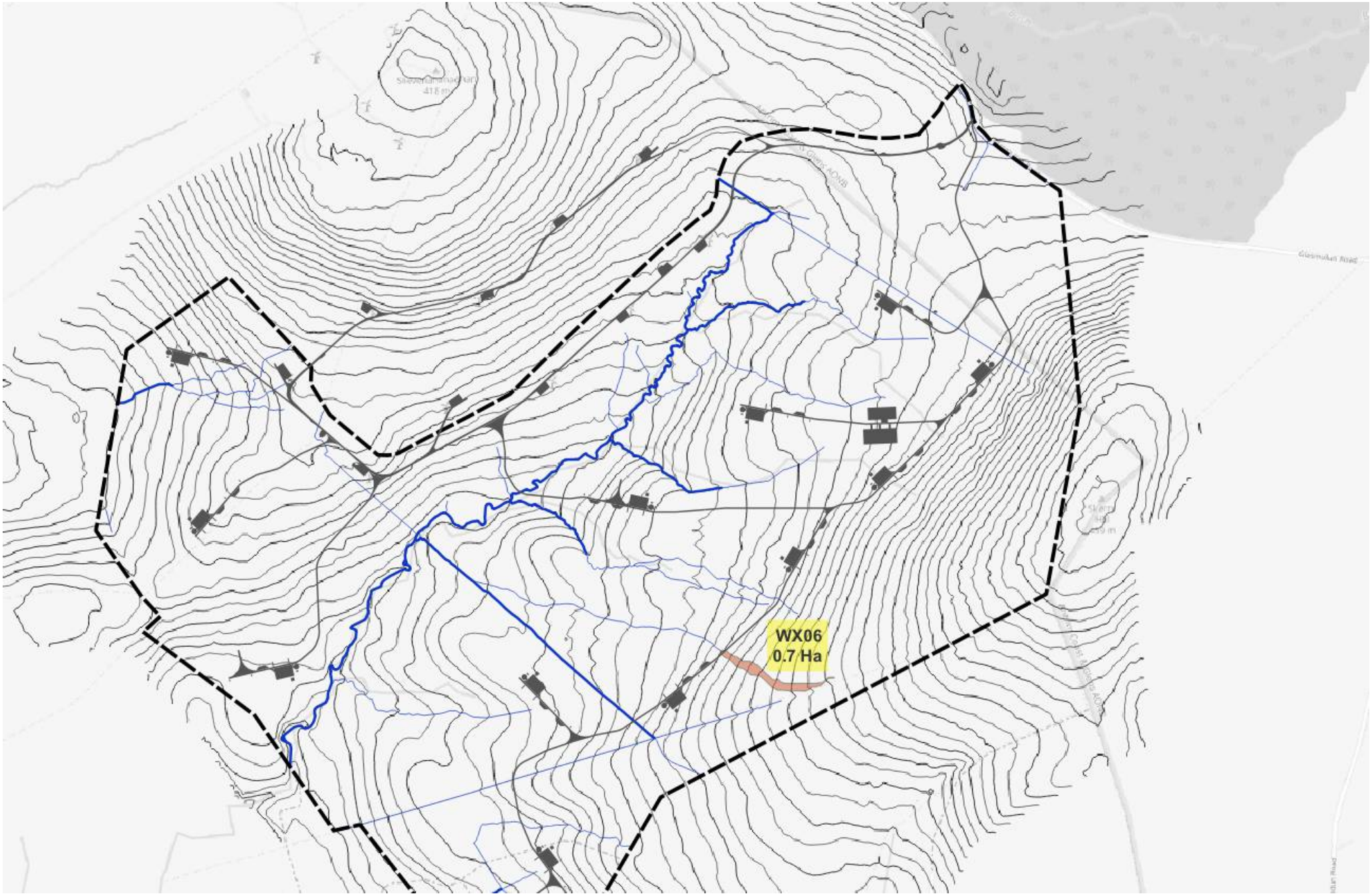

WX02
31.9 Ha

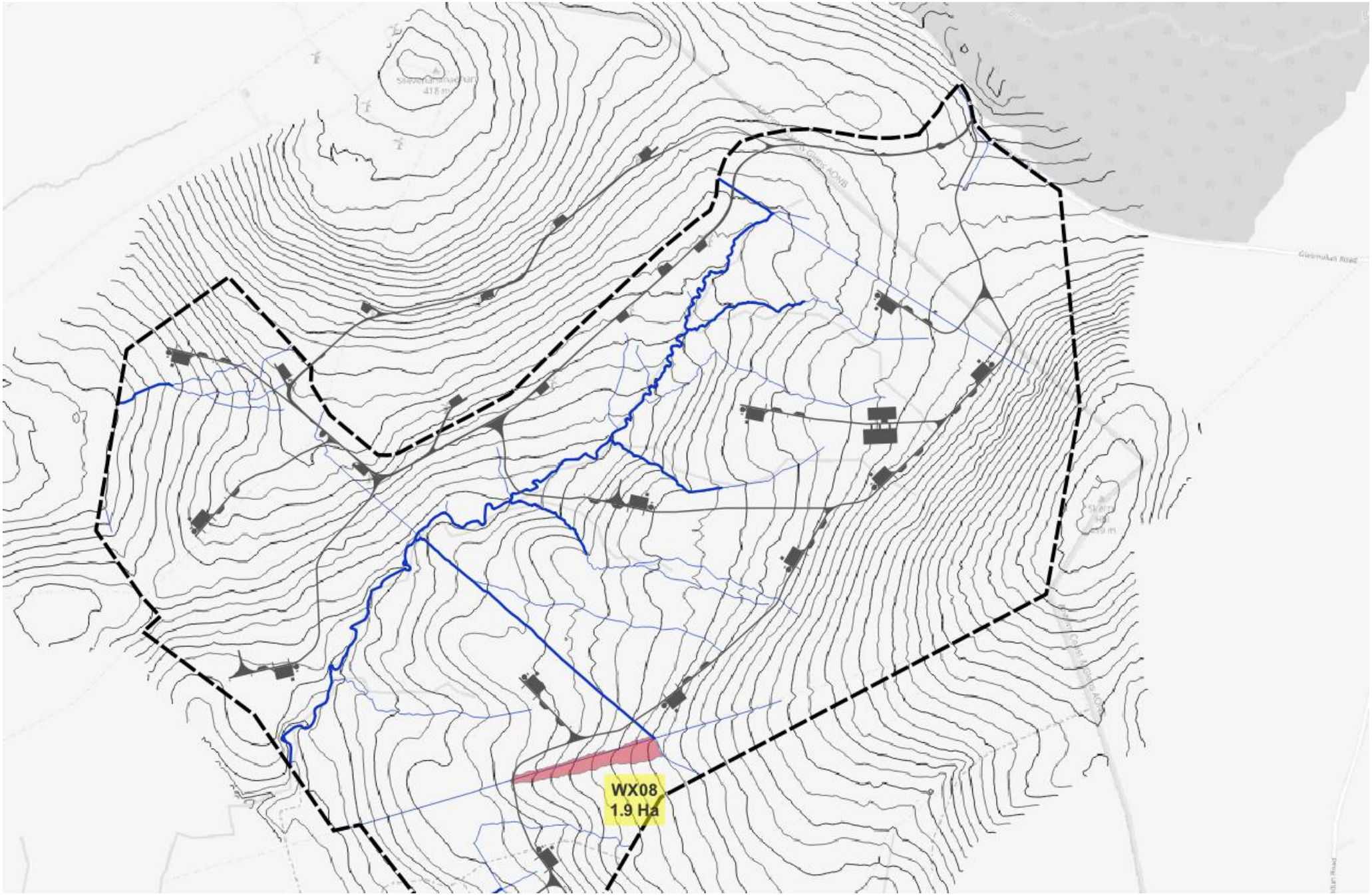

WX03
0.9 Ha

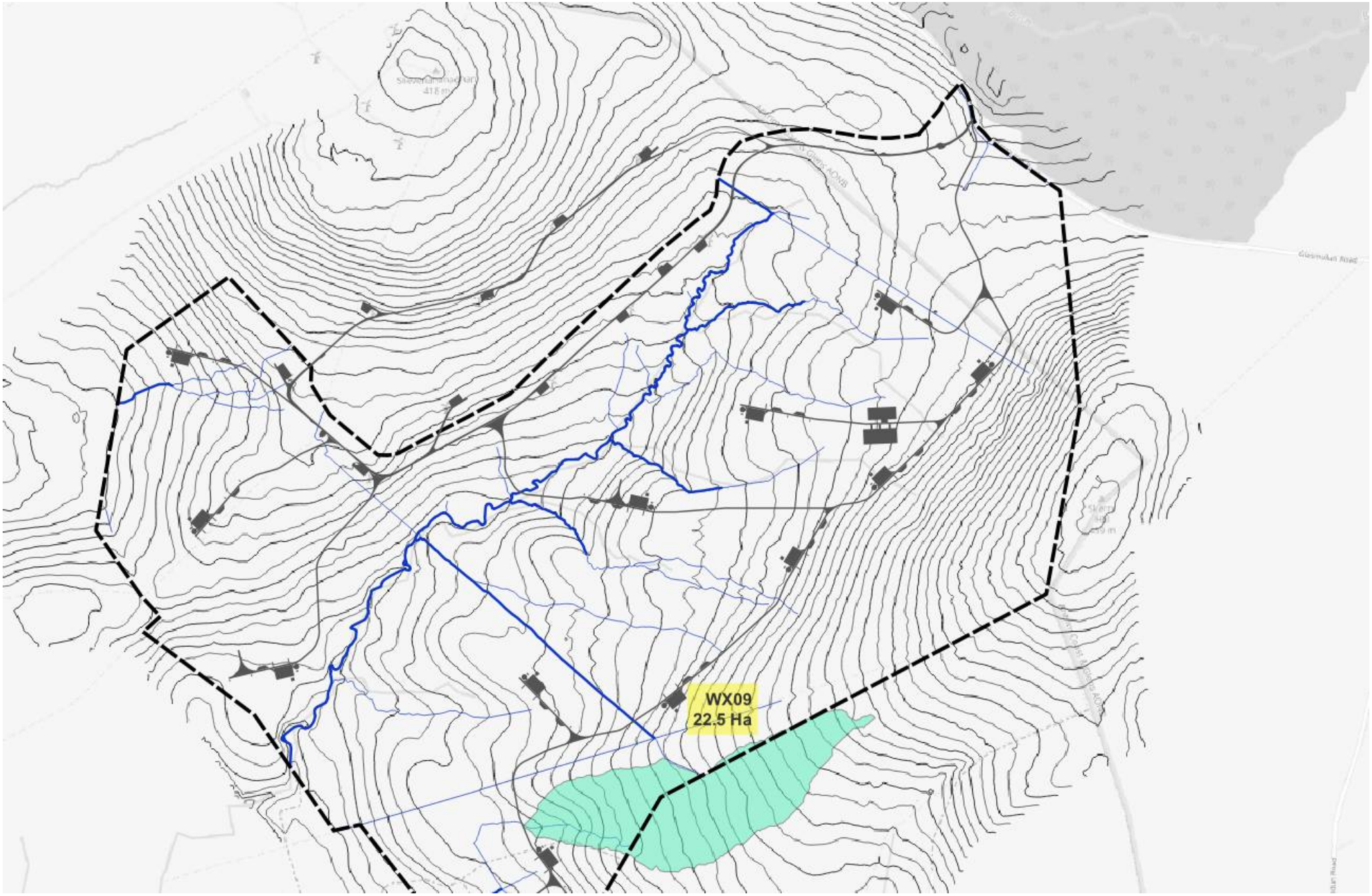

WX04
3.4 Ha

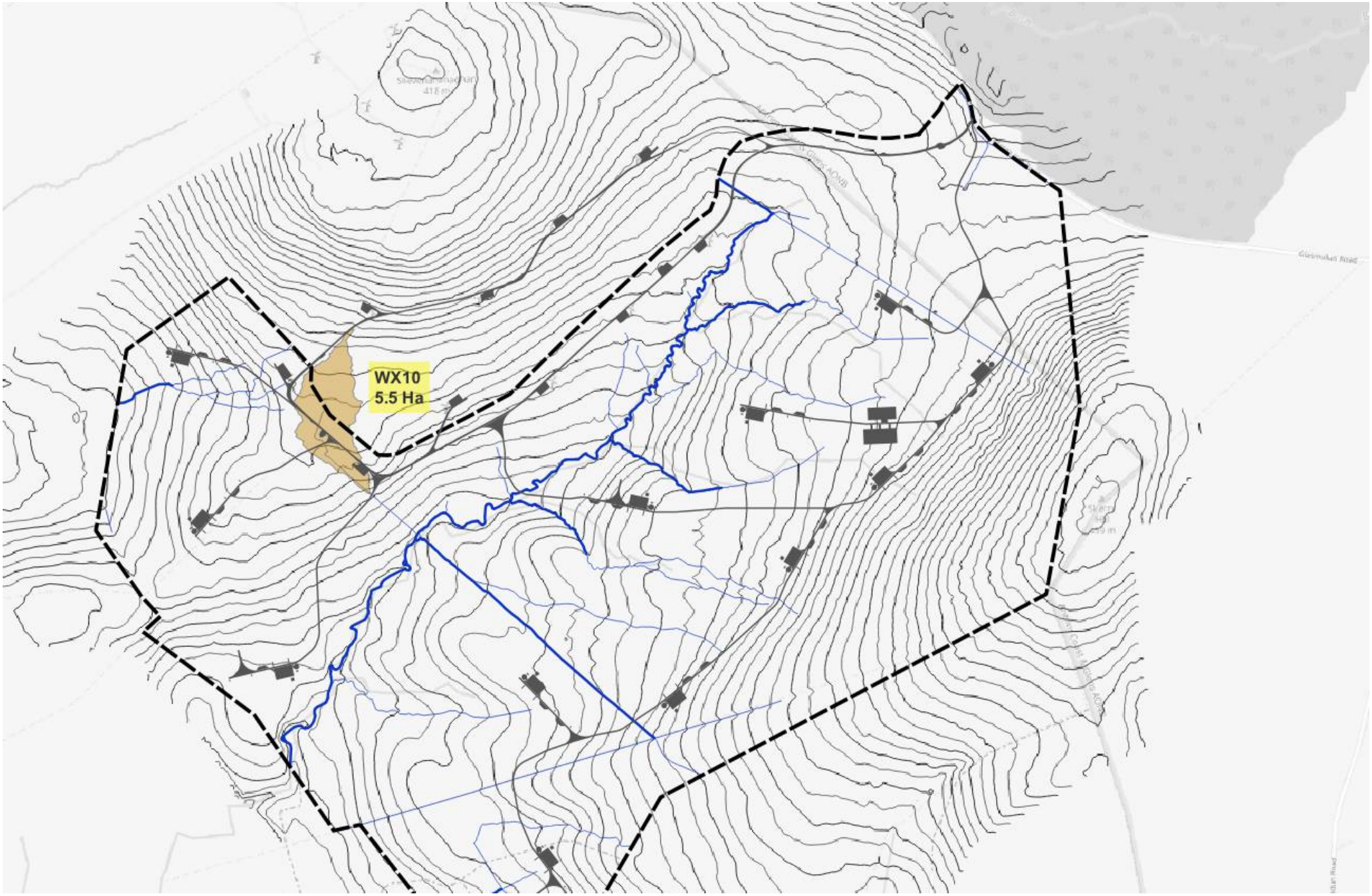

WX05
0.3 Ha

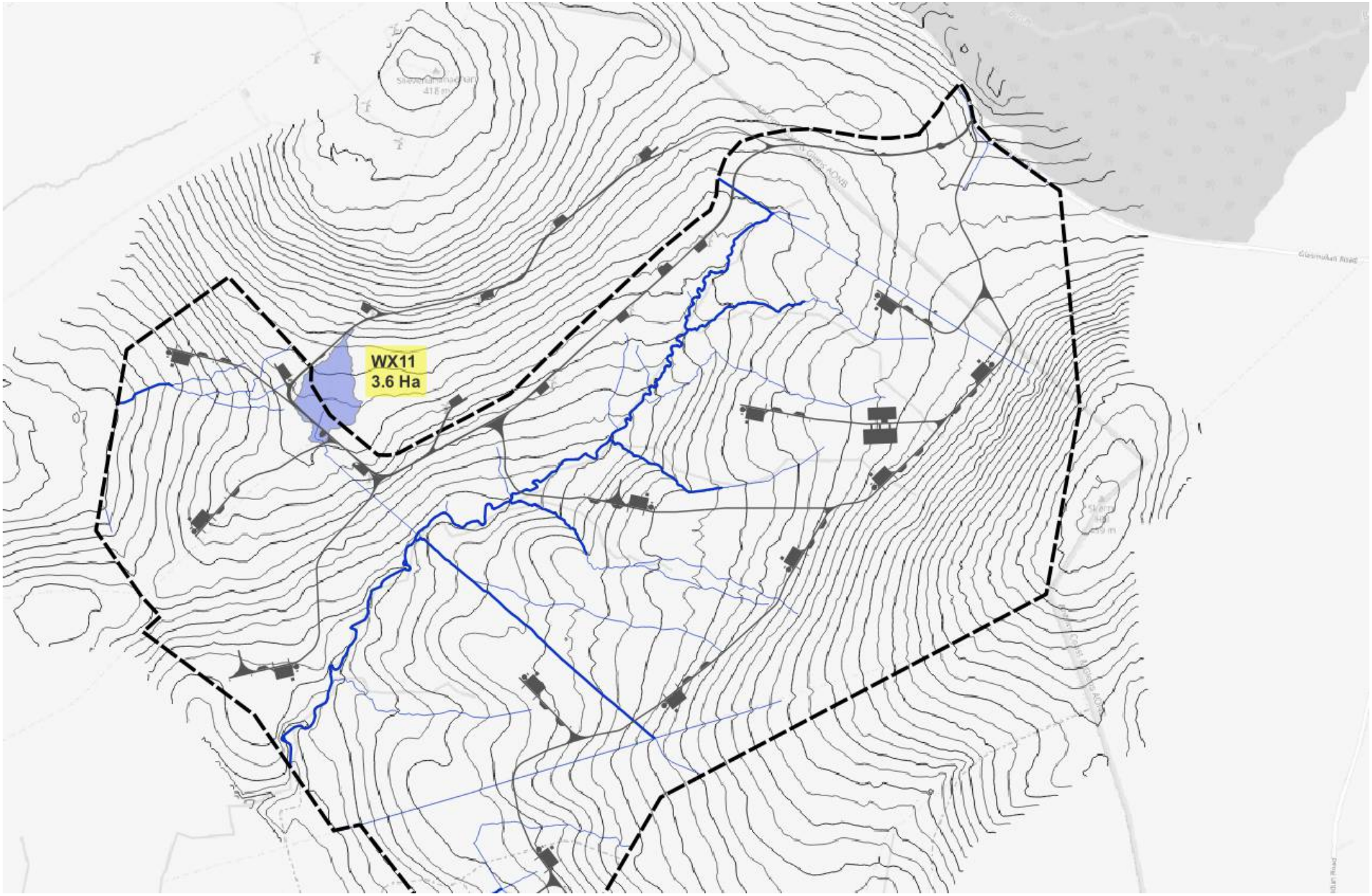

WX06
0.7 Ha

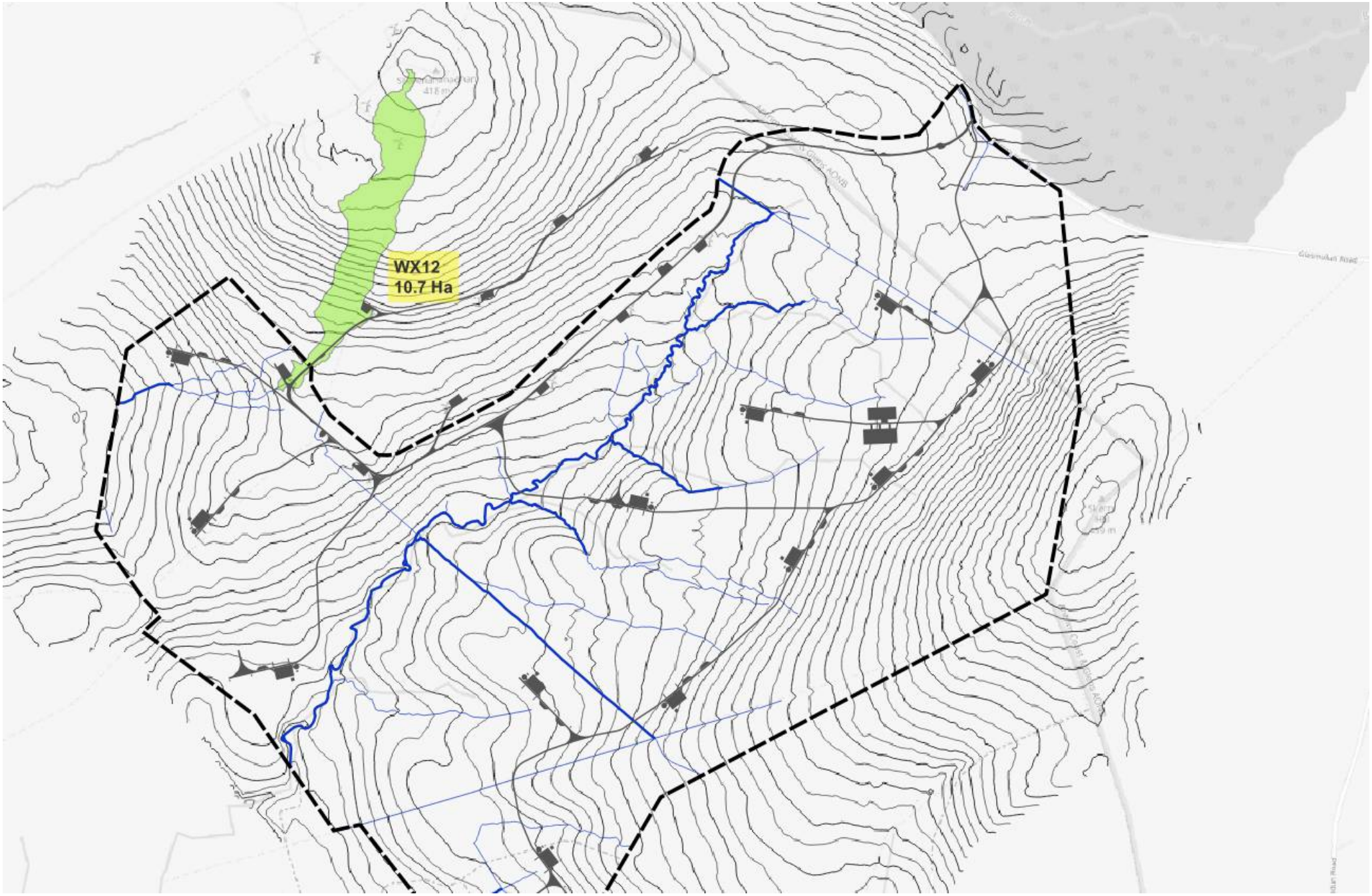

WX06
0.7 Ha

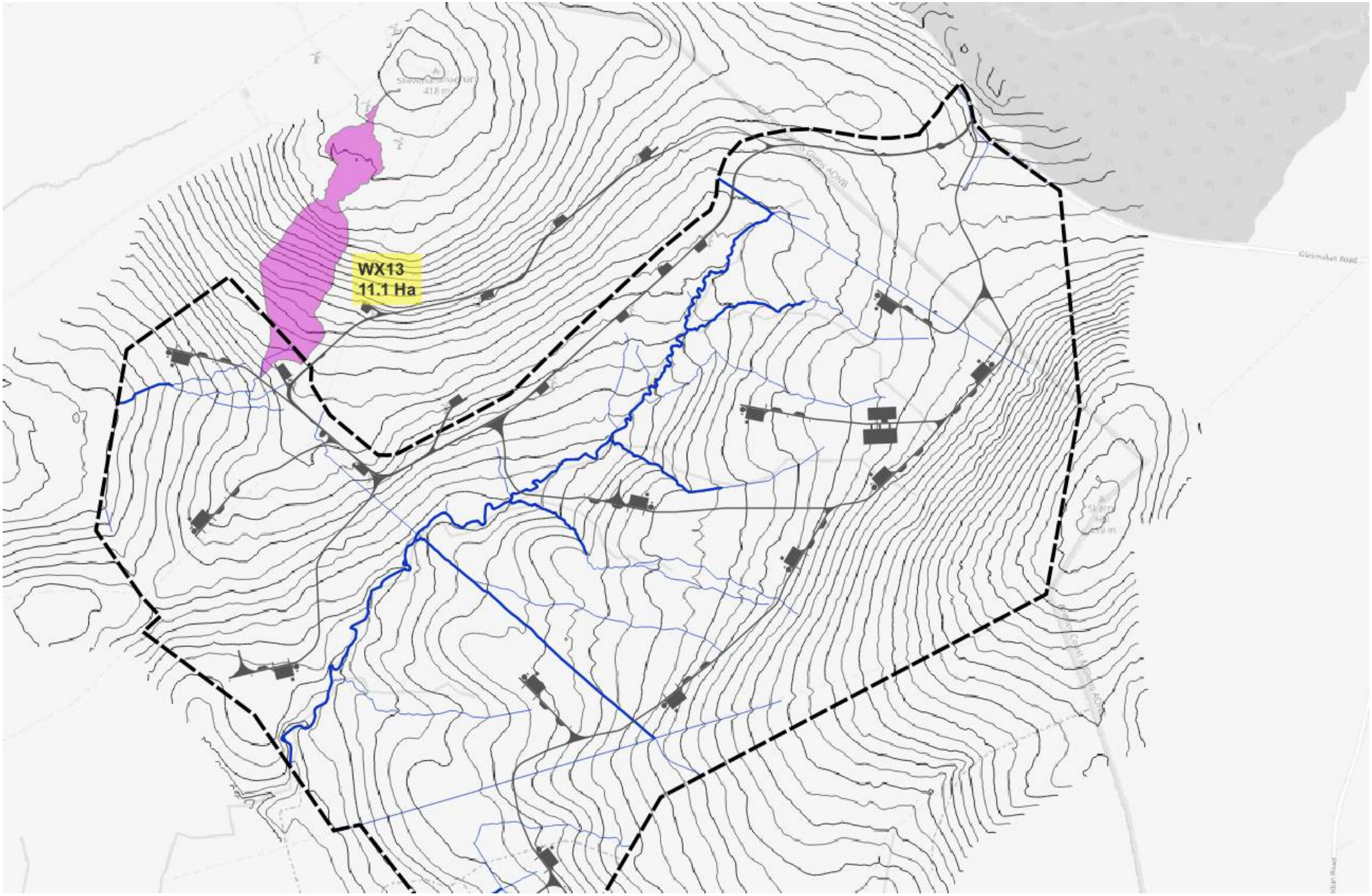

WX08
1.9 Ha

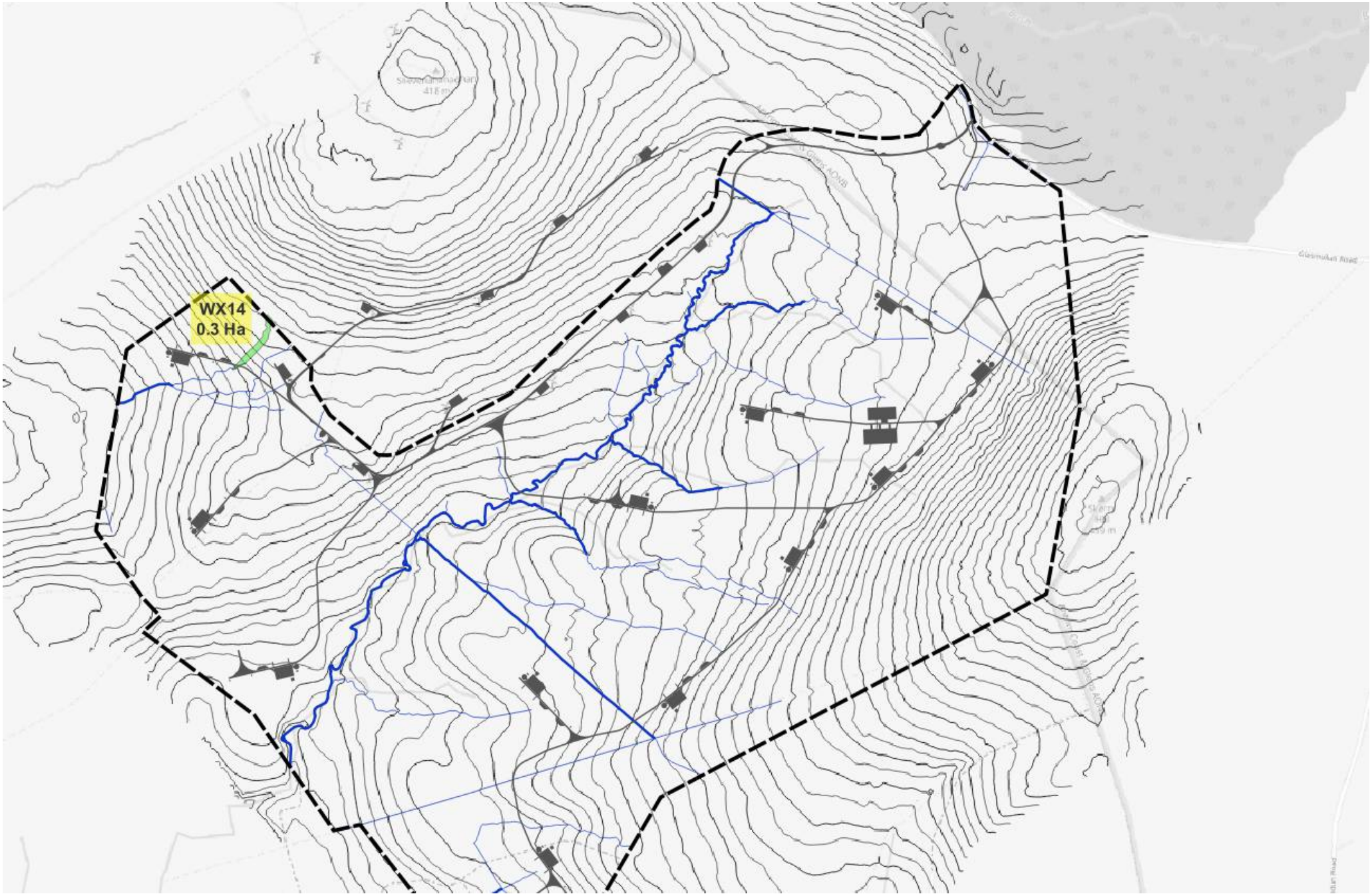

WX09
22.5 Ha


WX10
5.5 Ha


WX11
3.6 Ha


WX12
10.7 Ha


WX13
11.1 Ha


WX14
0.3 Ha