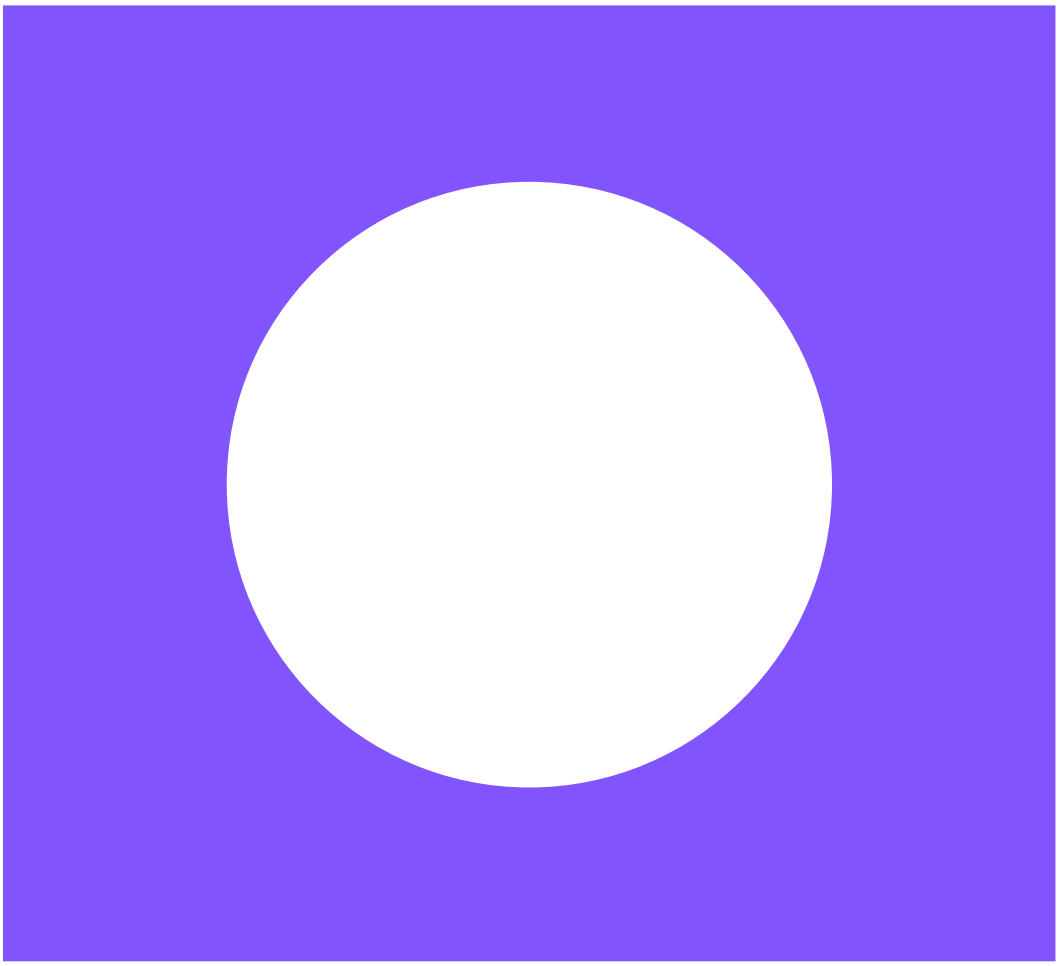
MOTT MACDONALD



EGL4 - SPEN - Drainage Strategy

Westfield Converter Station Drainage Strategy

September 2025

This page left intentionally blank for pagination.

Mott MacDonald
1st Floor
10 George Street
Edinburgh EH2 2PF
United Kingdom

T +44 (0)131 221 2300
mottmac.com

EGL4 - SPEN - Drainage Strategy

Westfield Converter Station Drainage Strategy

September 2025

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
P01	10/03/25	K.Harrison	N.Cowper	R.McGowan	For Comment
P02	28/03/25	K.Harrison	N.Cowper	R.McGowan	Formal Issue
P03	15/08/25	K.Harrison	R.McGowan	R.McGowan	Second Issue post comments
P04	12/09/25	K.Harrison	R.McGowan	R.McGowan	Final Issue

Document reference: 113643-MMD-SPEN-XX-DR-CE-0578 | P04

Contents

1 Introduction

1.1 Purpose of Report

Mott MacDonald Limited (MML) have been commissioned by SP Energy Networks (SPEN) to prepare a drainage strategy report to support the planning application for the Converter Station as part of the Scotland to England Green Link 4 project. This report details the Drainage Strategy for the Westfield Converter Station situated east of Ballingry, Fife.

This report will review the existing site information, confirm the design intent, construction methodology and include a high-level review of any flood risk to the development or surrounding areas from discharge from the site. It will outline the proposed surface water and foul water drainage strategy for the proposed site, in line with the drainage hierarchy and the requirements of national and local guidance documents.

1.2 Terms of Reference

MML will follow accepted procedure in providing the services, but given the residual risk associated with any prediction and the variability which can be experienced in flood conditions, they take no liability for and give no warranty against actual flooding of any property (Client's or third party) or the consequences of flooding in relation to the performance of the service.

2 Existing Site Conditions

2.1 Site Location

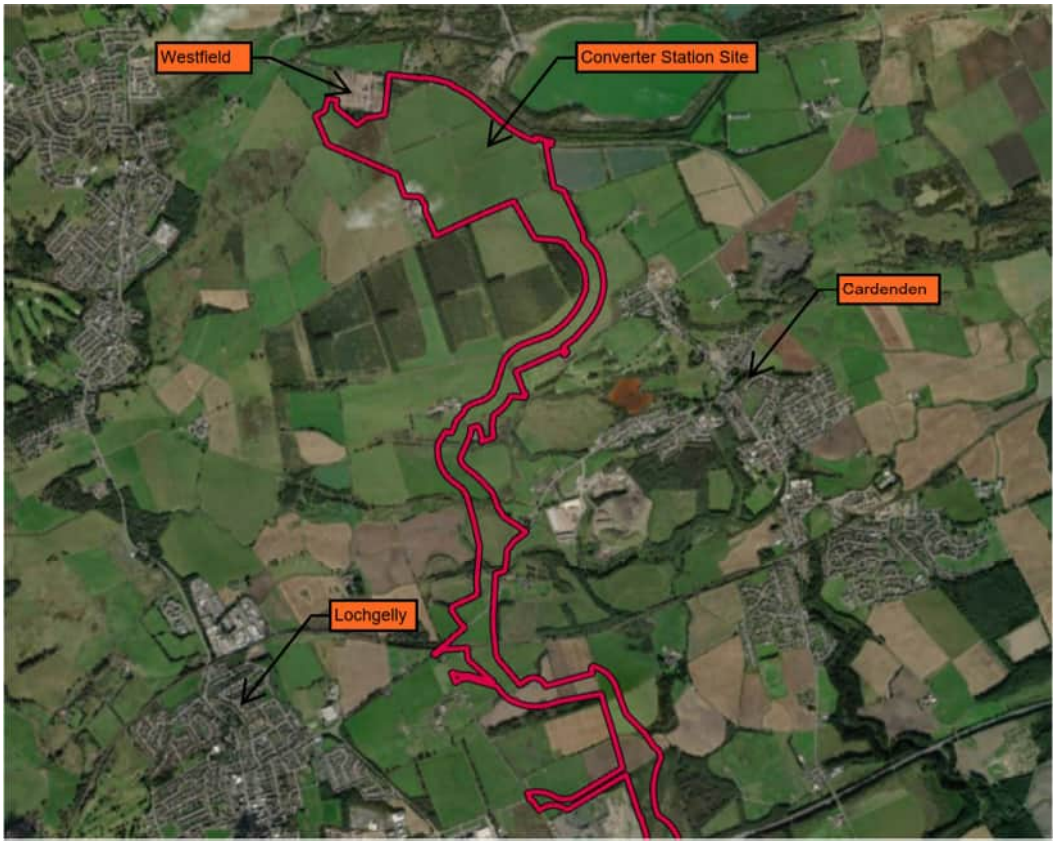
The Converter Station site is located approximately 2km east of Ballingry, Fife and east of the existing Westfield substation. Its approximate grid reference is OS X:320002m, Y:697207m and the site has an area of approximately 48ha.

The site is located in arable land, bound to the north by the B9097 road and to the south and west by arable fields. The site is a steeply sloping field which drops from an elevation of 110m in the south-western corner of the site to 82m in the north end of the site. To the north east of the site, on the opposite side of the B9097, is a historic quarry site which has filled with water, and there is a history of mining in the area.

The site has a small, unnamed watercourse on the western and north-western border flowing in a north-eastern direction.

It is anticipated that an attenuation basin will be located to the north of the proposed Converter Station platform.

Figure 2-1 - Site Location with Red Line Boundary Shown

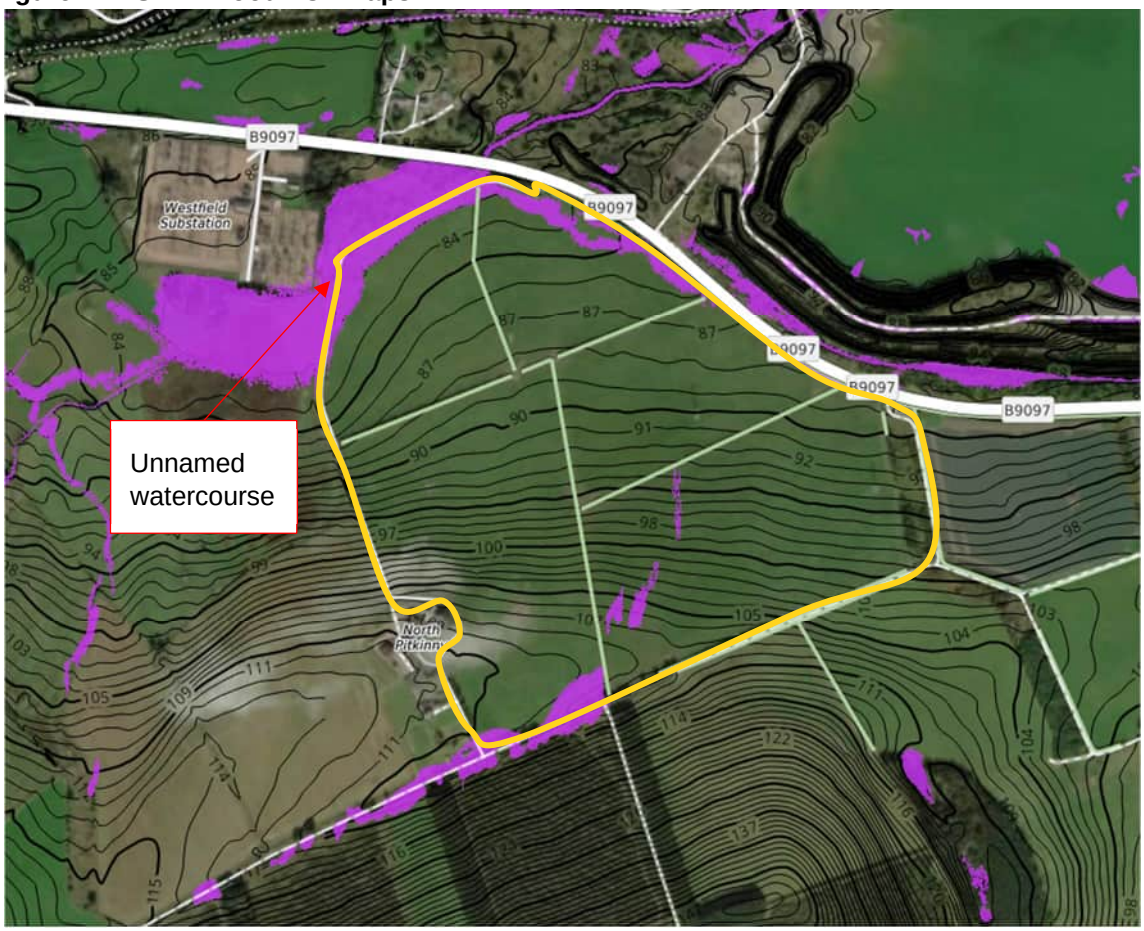


2.2 Modelled Flood Risk

The Flood Risk Assessment is being undertaken by AECOM and has not been received prior to issue of this document

The SEPA Flood Maps indicate that there is a risk of surface water flooding from the unnamed burn to the northern boundary of the site, as shown in Figure 2-2.

Figure 2-2: SEPA flood risk maps



Source: Scottish Environment Protection Agency Flooding Information, 2023-02-21

2.3 Ground Conditions

Figure 2-3 and Figure 2-4 show the available Geological Maps produced by the British Geological Survey (BGS) GeoIndex Onshore Interactive Map Viewer showing the Artificial and Superficial Geology and Bedrock Geology anticipated to underlay the site at the converter station.

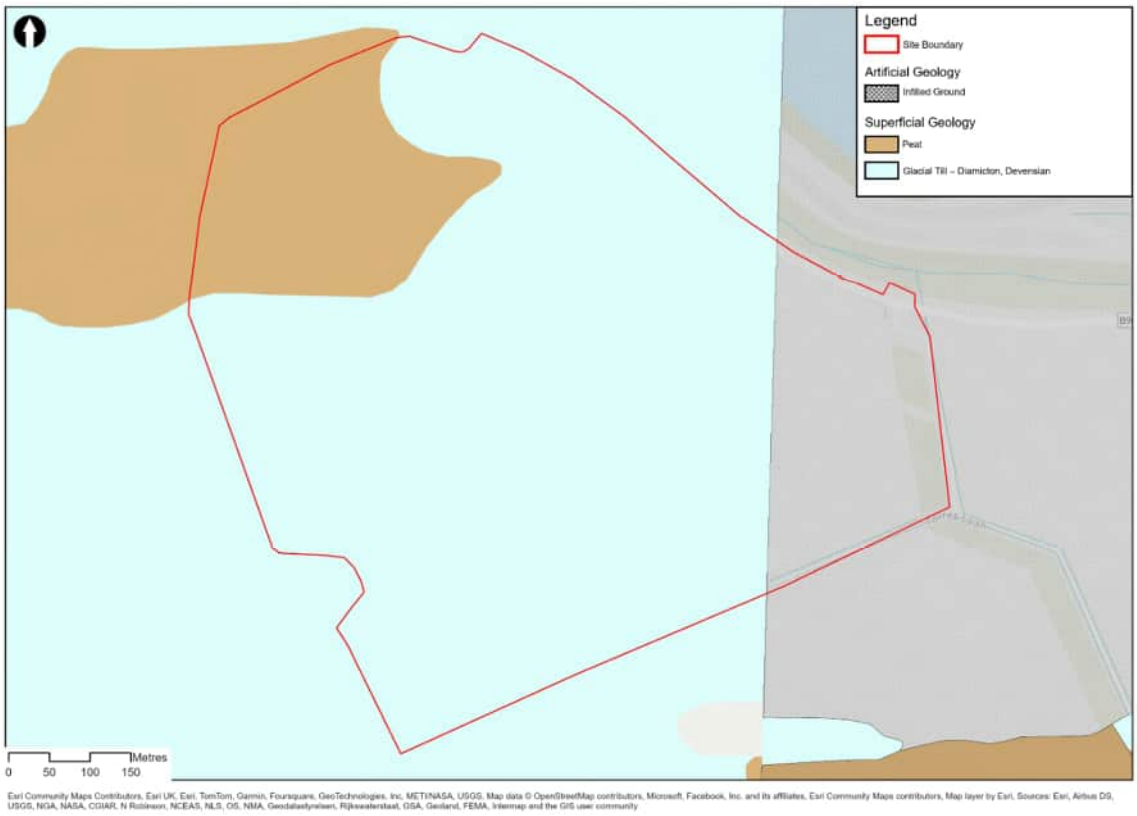
Intrusive ground investigation works have recently been undertaken by Igne.

A full description of the existing ground conditions and ground investigation results can be found in the Geotechnical Interpretive Report[1] which indicate that the ground is unsuitable for percolation.

[1] Mott MacDonald (2025) *Eastern Green Link 4 – HVDC Converter Station. Geotechnical Interpretive Report.* Document number 113643-MMD-SPEN-XX-RP-GE-0571. February 2025.

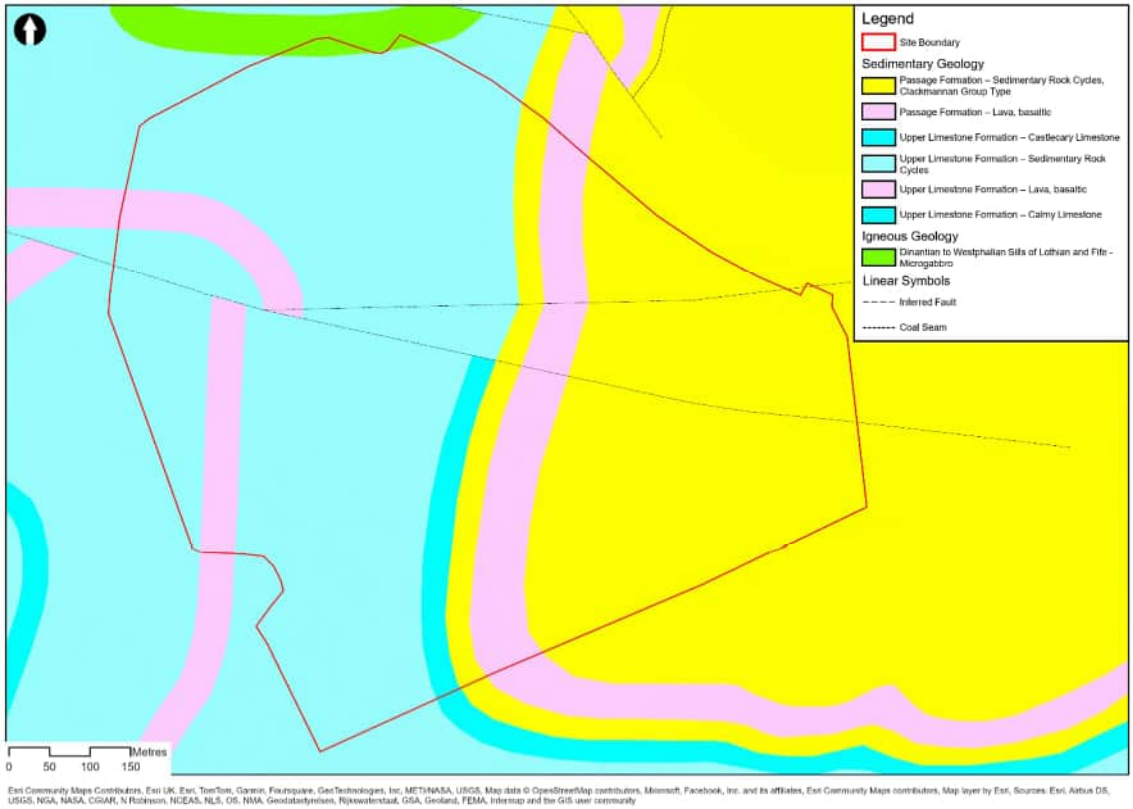
The results of the GI indicate that groundwater levels on site typically range between 80m OD and 85m OD in the centre and north of the site, reducing to around 78m OD in the area of the former opencast mine.

Figure 2-3 – Artificial and Superficial Geology on site



Source: Mott MacDonald, 2025

Figure 2-4 – Bedrock Geology on site



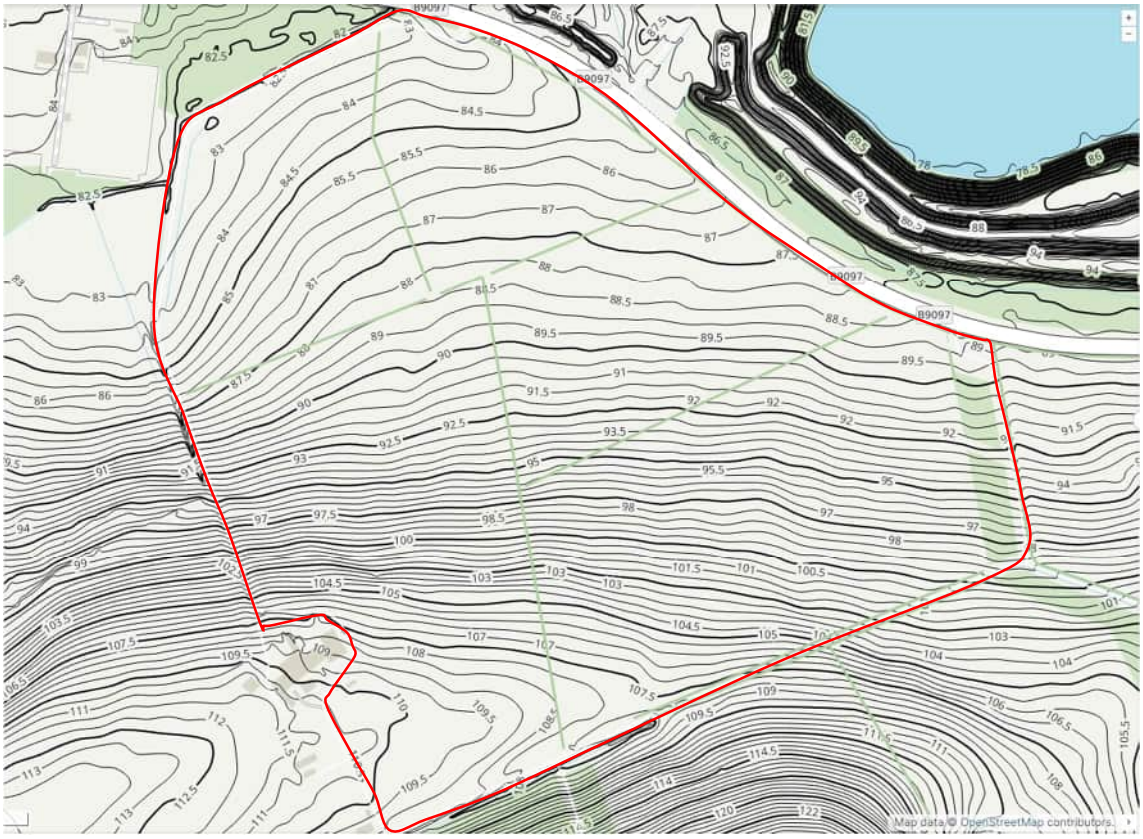
Source: Mott MacDonald, 2025

2.4 Ground Levels

Elevations across the site vary from 110mAOD to 82mAOD, according to OS topographic data. The high point of the site is to the south western corner, with steep falls and subsequent overland flow towards the north-west and north of the site.

A topographic survey was carried out by CyberHawk in December 2024 and is shown 113643-MMD-SPEN-XX-DR-CE-0455 to 0490 - Haulage Road General Arrangement and Profile (Sheet 1 to 36).

Figure 2-5 - Site Topography



Source: SCALGO Live (2025), including data from OpenStreetMap. Accessed at: https/scalgo.com/live (Accessed 20 January 2025)

2.5 Surface Water Drainage

Two surface water drainage pipe have been located crossing the site as seen in Figure 2-6. There is evidence of additional surface water drainage network present in the area around the site, but details and ownership are unknown. Further details will be established during detailed design.

Figure 2-6 - Surface Water Pipes

As reported by Mott MacDonald in 2024[2], the land drainage system in this area was established in the 1800s and the drains were referred to as “cundies”. These drainage networks were handcrafted using stone. Locations and details of existing drainage systems are unknown at this stage and a review of natural overland flow paths on steeply sloping ground has not yet been undertaken.

2.6 Foul Water Drainage

There are no foul water connections within the area of the proposed site. The nearest Scottish Water sewers within the vicinity is a 355mm combined sewer located approximately 1000m west of the site, see Appendix A.

Connection to the existing sewers is unlikely for the proposed Converter Station site due to distance and associated cost.

Local farm buildings are believed to use their own foul system as no foul network is shown in the SW system.

[2] Mott MacDonald (2024), *Scotland Onshore Cable Route Drainage Strategy, Eastern Green Link 4.* August 2024. Doc. Ref: 113643-MMD-SPEN-XX-RP-ZZ-0184.

3 Surface Water Drainage Strategy

3.1 Design Standards

The following design standards and specifications will be used for the design of the new surface water drainage system:

- BRE Digest 365 (BRE, 2016),
- BS EN 752 2017 – Drain and sewer systems outside buildings. Sewer system management,
- TS 2.10.09 Generic Electricity Substation Design Manual for Civil, Structural and Building Engineering - Site Drainage, NGET 2017,
- Sewers for Scotland 4th Edition,
- SuDS Manual (C753), (CIRIA, 2015),
- Engineering in the Water Environment Good Practice Guide – Temporary Construction Methods (WAT-SG-29), (SEPA, 2009)
- SEPA Flood Risk and Controlled Activities Regulations,
- National Planning Framework 4 (NPF4), (Scottish Government, 2023),
- Planning Advice Note 61: Sustainable urban drainage systems,
- CIRIA C736 – Containment systems for the prevention of pollution 2014,
- SUB-03-025 – SPEN.
- SUB-01-018 – SPEN.

In line with National Planning Framework 4 (NPF4) any new development will reduce flood risk by controlling the water at source through a sustainable system (SuDS) and considering the exceedance flow route when the capacity of the drainage system is exceeded.

These documents indicate the “design” standards for the site are as follows:

- No standing water in a 1 in 1000-year return period event that could impact operation inspection and maintenance for critical infrastructure.
- No flooding in the surface water system during a 1 in 25 year-return period event (SUB-03-025 – section 12.8.1)

3.2 Methods of Surface Water Discharge

The proposed surface water drainage shall not be greater than 3.3 l/s/ha as per the standard set by Fife Council for sensitive watercourses, as opposed to the natural greenfield runoff characteristics of the existing site. This will be achieved by discharging the intercepted flows from access roads and the substation platform to the attenuation basin located on the north-north east corner of the site, prior to discharging to an outfall into the unnamed burn to the north of the site.

Given the elevation of the underground cable trenches that run parallel to the eastern burn, it has been determined that the outlet pipe cannot be routed beneath the trenches to discharge directly into the burn. Therefore an open channel will be constructed to facilitate the flow from the attenuation basin. This channel will navigate over the cable trench and will transition underneath the road through a specially designed cattle grate system. Ultimately, this arrangement will allow the water to flow into the burn, ensuring proper drainage while accommodating the existing infrastructure.

Additionally, a swale located parallel to the southern boundary of the platform will intercept overland flow, diverting it westwards where it is then discharged to the unnamed burn.

The eastern side of the platform will be protected by a swale which discharges into the attenuation basin.

3.3 Climate Change Allowances

NPF4 makes it a planning requirement to account for climate change in the proposed design, adhering to the Climate Change (Scotland) Act 2009.

Recommended contingency allowances for peak rainfall intensity are derived from the SEPA Guidance[3]. A value of 39% climate change allowance is proposed for the Converter Station site.

3.4 Surface Water Discharge Control

3.4.1 Greenfield Runoff

Surface water drainage systems proposed for the development are designed to mimic and maintain the greenfield characteristics of the site, particularly at the point where water is discharged, to avoid increasing the risk of increased surface water flooding as per the Scottish Planning Policy[4].

The total site area within the red line boundary is 48ha with approximately 10.5ha being positively drained. The greenfield runoff rate have been summarised below and calculated using the Wallingford online calculator[5] (see Appendix B for full calculation).

Additionally, an allowance has been made for overland flows to be intersected by Permanent Swale 1, seen in Appendix A,

Table 3-1 -Estimated Greenfield runoff rates using FEH methodology

				Greenfield Runoff (l/s)		
Location	**Area (ha)**	**Fife Council 3.3 l/s/ha limit (l/s)**	**Qbar (l/s)**	**1 in 30-year**	**1 in 100-year**	**1 in 200-year**
Northern Basin	10.5	34.65	77.99	152.1	205.1	233.2

3.5 Proposed Development Areas

Discharge from the attenuation basin to burns will not exceed the specified 3.3 l/s/ha for a 200yr event (protected Watercourse).

3.5.1 Contractor's Site Compound

The temporary construction compounds are located east of the proposed platform and will provide the area for offices, welfare facilities, car parking and the general laydown area. The earthworks, access roads and utilities for the construction compound will be completed by others.

[3] LUPS-CC1 - SEPA Guidance – Climate change allowances for flood risk assessment in land use planning Version 3

[4] Scottish Planning Policy – Scottish Government - 2014

[5] HR Wallingford – Greenfield runoff rate estimation. Accessed on 22/11/2023 https://www.uksuds.com/tools/members/greenfield-runoff-rate-estimation-members

The compound drainage layout plan contained in Appendix C shows the proposed external drainage for the compound platforms and parking areas and where they will be discharged to. The compounds will be drained using a combination of internal surface water drainage pipes and swales. Runoff from the compound will be attenuated in the basin to the north of the proposed platform prior to discharge to the unnamed burn which borders the north of the site. The internal drainage arrangements for the compound will be designed by others.

Upon completion of the main works, the construction compounds, temporary swales and parking area will be reinstated using stockpiled topsoil. The attenuation basin shall remain in place as it will continue to receive surface water runoff from the permanent access road and platform. However, it will be modified to remove berms which form the settlement ponds, making the basin act as one.

3.5.2 External Access Roads

Permanent and temporary external roads will have a crossfall that will direct runoff to swale along the track edges. The swales are connected via a pipe, providing adequate capacity to convey flows. Road ACO drains will be used to intercept any additional flows and disperse into the field margin.

3.5.3 Car park

The Temporary Carpark will be designed with a 1:100 fall from south to north to reduce the risk of water pooling on the platform. The carparking area will be drained via the swales located to the north before tying into the attenuation basin.

3.5.4 Cable Trenches and Draw Pits

Cable trenches are proposed to be covered with individual precast concrete slabs or glass-reinforced plastic covers. A local soakaway or gravity outlet pipe, is proposed for cable trenches in case of any water ingress. This will be connected to the surface water drainage system.

Cable trench covers detail to be discussed in detailed design.

3.5.5 Converter Station Platform

The platform area is a mixture of a cut formation to the south-east with runoff falling towards the proposed developed site and fill to the north-west. Overland flow which runs towards the cut slope runoff will be collected and conveyed in a perimeter drainage swale that directs the flows west to be discharged to the burn. Any further runoff will be collected by the on platform drainage. The runoff from the fill slopes will be collected by swales and connect into the attenuation basin before discharging into the unnamed burn at a maximum of 3.3l/s/ha. For areas of fill slope where the topography is sloping away from the platform, runoff will be allowed to naturally flow.

Table 3-2 – Pipe Design Parameters

Criteria	Parameter
Rainfall	FEH 22 – Coordinates: 319882, 697270
Volumetric Runoff Coefficient	Cv – 1.0
Min Velocity	1.0 m/s for pipes
Velocity calculation formula for pipes	Colebrook-White – (k)
Climate change allowance	39% (SEPA guidance)

Criteria	Parameter
Catchment types	Roads ,Attenuation Basin and Swales[6]: Impermeable PIMP (Percentage Impervious area) 100% Converter Station, Compound and parking Platforms: Permeable PIMP 60% [7] ReFH2 is used for undeveloped slopes.
Design criteria	Southern Perimeter Swales: 1000 year + 39% climate change. Other Swales: 10yr + 39% climate change 200 year + 39% climate change -. Protection for 'operational areas', off-site flooding and attenuation 1000-year rainfall – Protection for 'critical equipment'
Time of Entry	Global Time of Entry = 5 min
Pipe Cover	Min. 1.2m pipe cover within carriageways and other trafficable locations, with normal bedding. Concrete surround required where this criteria is not met.

3.5.6 Attenuation Basins

One basin shall provide attenuation and treatment of the potentially contaminated converter station platform runoff prior to discharge to the outfall which shall be positioned on the unnamed burn to the north of the site. The basin shall be constructed during the construction phase to attenuate and treat the runoff water from the construction compound site. This will be constructed as per the dimensions and requirements for the permanent works and be part of the permanent finished product.

A penstock will be installed on the outgoing pipe from the attenuation basins to enable the flows to be isolated prior to discharge in the event that an incident occurs within the platform site.

The attenuation basin will be vegetated[8] and include three inlet forebays. This will provide treatment of the runoff by allowing for the settlement of silts, heavy metals and the removal of oxygen-demanding material. The maximum depth will be 1.3m with 0.3m being allocated to freeboard.

An InfoDrainage model has been developed to represent the drainage system for the temporary and permanent works. This model also included the surrounding fields that would naturally flow towards the attenuation basin. This modelling exercise established the required volume of the attenuation basin (excluding the freeboard) to be:

Permanent: 8,000 m^3 (200yr + 39% cc)

Temporary: 3,000 m^3 (10yr + 0% cc)

The attenuation design is summarised in Table 3-3.

[6] Whilst it is anticipated that temporary roads use permeable finishes and the swales and the attenuation basin have some percolation, for the purpose of this assessment, they have been assumed conservatively to be impermeable.

[7] Design assumption at this stage, assume car parking as permeable and where possible, compound make-up is permeable. If compound permeability differs when the contractor is appointed, this may need to be reassessed; however, note that attenuation is sized for the permanent case, which is more than the temporary case.

[8] Vegetation mix to be agreed with project ecologist, appropriate for local area

Further refinement of the model during the detailed design and construction stage may result in this attenuation volume being adjusted.

Table 3-3 - Attenuation Design

Case	Permanent	Temporary
Criteria	Parameter	
Return Period	200 years + 39%	10 years + 0%
Catchment Area	10.5 ha	15 ha
Volume	8000 m3	3000 m3
Discharge Rates	34.65 l/s	Free discharge - Discharged to be controlled in accordance with temporary works requirements (control of silt).
Flow Control	Hydro-Brake flow control with penstock	Berms within attenuation basin combined with orifice on outfall.

3.6 Operation & Maintenance of Surface Water Network

Maintenance of manhole chambers, pipework and gullies inside the red line boundary will be designed by others and should be undertaken in accordance with the manufacturer's product guidelines by a competent contractor following appropriate health, safety, and environmental practices. Maintenance should be undertaken as shown in Table 3-4, reproduced from the CIRIA SuDS Manual (C753).

Table 3-4 - Below ground drainage and manhole chamber maintenance summary

Maintenance Schedule	Required Action	Typical Frequency
Before Use	Remove any inappropriate material from within the chamber and dispose appropriately off-site.	At start
	All drains to be flushed with water to remove silt, and CCTV surveyed to check for blockages.	At start
Regular Maintenance and Inspection	Removal of debris (inc. leaves, rubbish and/or branches) from areas served by drainage.	Monthly
Remedial Actions	For blockages resulting in flooded manhole chambers drain down manhole chamber and unblock.	As required
	For pipework blockages, rod or jet between access points to unblock	As required
Monitoring	Lift covers and inspect chambers, inspect covers, surrounds, gullies, channels and drainage features for signs of damage and incorrect operation. Undertake any remedial action if required.	Annually (as a minimum)

Source: The SuDS Manual C753 (CIRIA, 2015)

The maintenance schedule for other SuDS features can be found in 113643-MMD-SPEN-XX-DR-CE-0608

3.7 Surface Water Runoff Exceedance Flows

The surface water drainage system has been designed to prevent flooding on the platform in a 1 in 200-year return period and a 1 in 1000-year return period protection for critical equipment which is situated on platform. Due to the south edge of the platform being in cut with steep hills sloping towards it, the southern boundary swale must be able to accommodate a 1:1000 yr to

prevent overland flow from flowing onto the platform. Additionally, a drainage ditch will be used to intercept any remaining flows which may accumulate from bunding. There is no proposal for any "on-platform" drainage intercepting runoff from the cut under this contract.

In the circumstances where these rainfall periods are exceeded, the attenuation basins will have further capacity up to the freeboard level to contain any excess water.

In the situation where the freeboard level is exceeded, the outfall manhole chamber will be fitted with a bypass weir set at the 200-year top water level. The outfall pipe will have a diameter of 300mm.

Water will follow the natural flow paths shown Appendix D. Due to the topography of the site any exceedance surface water will flow northwards away from the proposed converter station platform and into the existing drainage ditches on the west and northern borders.

3.8 Pollution Prevention

3.8.1 Water quality during construction phase

The process for water quality management will follow best practice guidance ensuring steps are taken to reduce pollution during construction (CIRIA C648 – Control of pollution from linear construction projects). An application for a Controlled Activities (Scotland) Regulations 2011 will be made to SEPA by the contractor prior to construction which will detail all the pollution prevention controls and construction methods. It is expected that this license will be authorised under General Binding Rule (GBR) 10 of The Water Environment (Controlled Activities) (Scotland) Regulations 2011[9].

There will be no direct discharges to watercourses without treatment. Mitigation measures to prevent pollution from arising from construction activities on the site include attenuation, drainage ditches, check dams and silt management techniques. During the construction phase, the attenuation basins shall include berms to prevent silt from areas under construction from polluting the water environment. All temporary drainage shall be fully reinstated to original condition.

During construction of the HVDC cable development, run-off from the excavated areas of the site will mobilise sediment and cause this material to be transported downstream. Excavated areas will be limited to current working areas to minimise the amount of sediment that is mobilised at any one time.

Swales will transport flows to the permanent detention basin which will be used as temporary settlement lagoons during the construction. The basin will be compartmentalised to allow settlement and enable the water quality standards to be achieved prior to a controlled discharge into the western burn. A swale will be created adjacent to the HVDC working area to prevent further runoff into the swathe. Any runoff in these drainage ditches will also connect to the temporary settlement basin.

3.8.2 Water quality during operational phase

Assessment of the level of pollution risk and determination of suitable pollution mitigation measures has been determined for the site based on the Simple Index Method detailed in CIRIA C753.

[9] "Water run-off from construction sites", SEPA, https://www.sepa.org.uk/regulations/water/pollution-control/water-run-off-from-construction-sites/ (accessed 22/11/2023)

Due to the limited traffic on the site the access roads can be considered “low traffic roads” and will require two levels of treatment. The road drainage will be collected by swales on the road edge. The resulting pollution mitigation indices are detailed in Table 3-5.

A sampling point will be located downstream of all attenuation basins prior to discharge to existing drainage ditch. This allows water quality to be tested regularly during construction and operations to ensure there is no contamination.

Table 3-5 - Summary of CIRIA Simple Index Approach Tool

Location	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Pollution Indices	0.5	0.4	0.4
Treatment 1 - Swales	0.5	0.6	0.6
Treatment 2 – Attenuation Basin	0.5	0.5	0.6
Aggregated Surface Water Pollution Mitigation Indices	0.75 (Sufficient)	0.85 (Sufficient)	0.9 (Sufficient)

4 Foul Water Drainage Strategy

4.1 Design Standards

The following design standards and specifications will be used for the design of the new foul water drainage system:

- TS 2.10.09 Site Drainage (NGET, 2017),
- Scottish Environment Protection Agency (SEPA) Guidance,
- British Water Flows and Loads – 4: Sizing Criteria, Treatment Capacity for Sewage Treatment Systems,
- Building Standards Technical Handbook June 2023: non-domestic

4.2 Method of foul discharge during construction

For the temporary site establishment, effluent from site accommodation will be appropriately managed by the respective Contractors.

Adequate facilities shall be provided for up to 450 staff.

4.3 Method of foul discharge during operation

In order to reduce excessive excavation for the treatment system, it is assumed that a small package pumping station will be required to lift foul flow. Foul flows will be collected and conveyed to a septic tank via a pumping station located within the north east of the platform area. The treated flows from the septic tank will then discharge via a soakaway system located to the north of the platform designed to BS. 6297:2007+A1:2008. Following receipt of the percolation test results, ground conditions were deemed not suitable for a traditional soakaway, therefore a raised soakaway system will be used. Refer to 113643-MMD-SPEN-XX-DR-CE-0635 for a typical soakaway arrangement.

It is anticipated that the foul drainage system will cater for 10 people during normal operation, and the foul flow from the site is therefore estimated to be 500 litres/day. During annual maintenance shutdowns, however, the number of personnel on site could significantly increase. Therefore, a septic tank with a minimum capacity of 7,500 litres has been conservatively assumed, based on a design population of approximately 30 and sized in accordance with BS6297. It is anticipated that the size of the septic tank and the associated raised soakaway could reduce once further details are developed of the staffing levels during maintenance periods, in order to optimise process performance. In selecting the required septic tank product, an example manufacturer such as SPEL provides adequate-sized tanks to meet the site's needed.

5 Conclusion

The site proposed for the converter station is located on arable land, bound to the north by the B9097 road and to the south and west by arable fields. The surface water runoff from the proposed platform should be restricted to greenfield runoff rates up to and including 1 in 200-year storm event + 39% climate change allowance for protection of operational areas and off-site flooding, and a 1 in 1000-year storm event + climate change for protection of critical equipment.

The surface water runoff will be managed through a combination of SuDS methods including swales and attenuation basins. Surface water will discharge into a burn located along the northeast field boundary.

The foul water treatment system is proposed to be a pumping station, septic tank and a raised soakaway on the north east side of the proposed platform.

Appendices

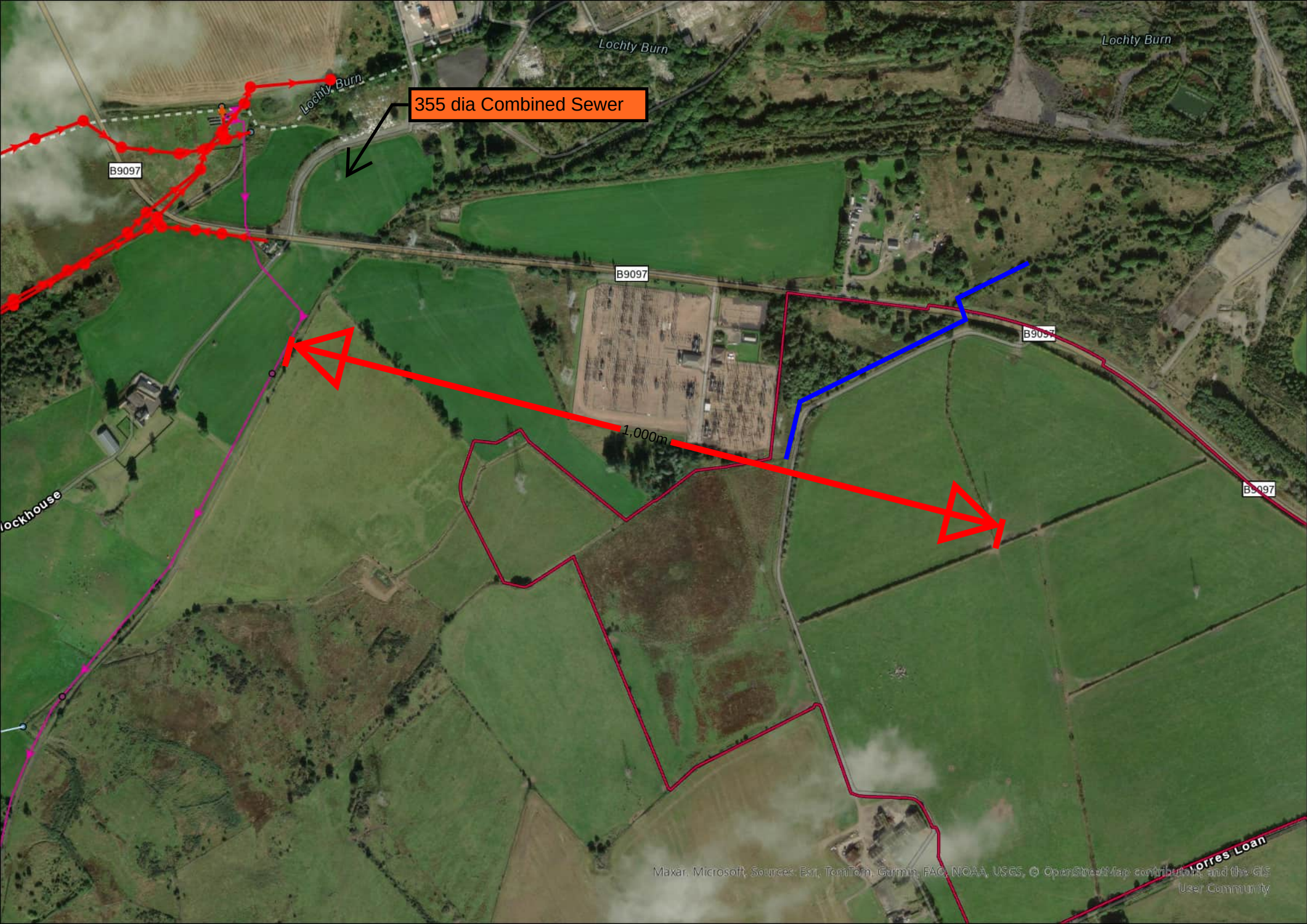
Appendix A – Scottish Water Network map

Appendix B – Green Field Runoff Calculations

Appendix C – Temporary Compounds

Appendix D – Flow Paths

A. Scottish Water Network Map


355 dia Combined Sewer
Lochty Burn
Lochty Burn
Lochty Burn
B9097
B9097
B9097
B9097
1,000m
Maxar, Microsoft, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

B. Greenfield Runoff Calculations

Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

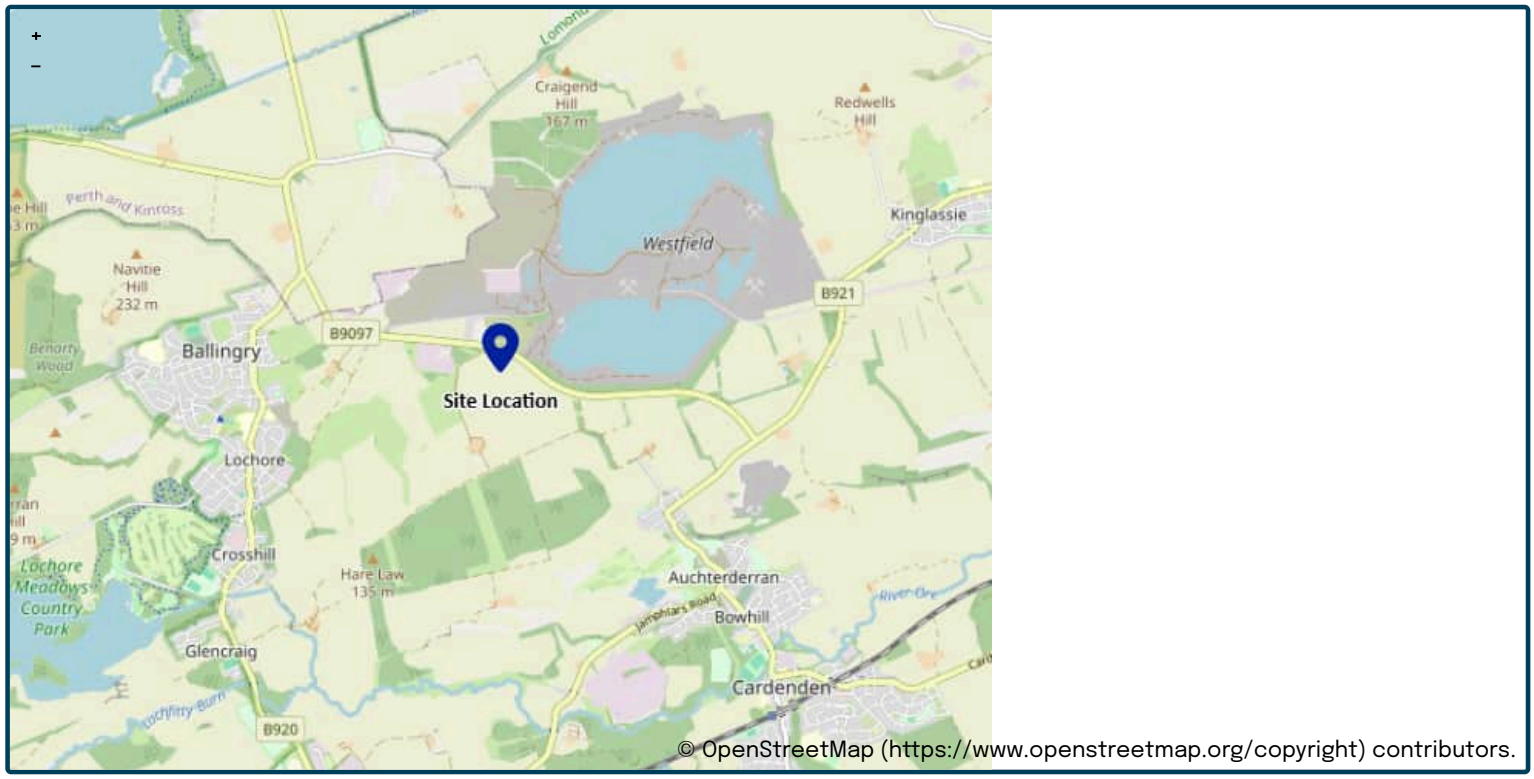
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	08/08/2025
Calculated by	Kane Harrison
Reference	
Model version	2.1.2

Location

Site name	EGL4
Site location	FIFE



Site easting (British National Grid)	319811
Site northing (British National Grid)	697339

Site details

Total site area (ha)	10.5 ha

Greenfield runoff

Method

Method	IH124

IH124

	My value		Map value
SAAR (mm)	860 mm		860
How should SPR be derived?	Estimate using BFI		
BFIHOST	0.312		
SPR	0.513		
QBar (IH124) (l/s)	77.99 l/s		

Growth curve factors

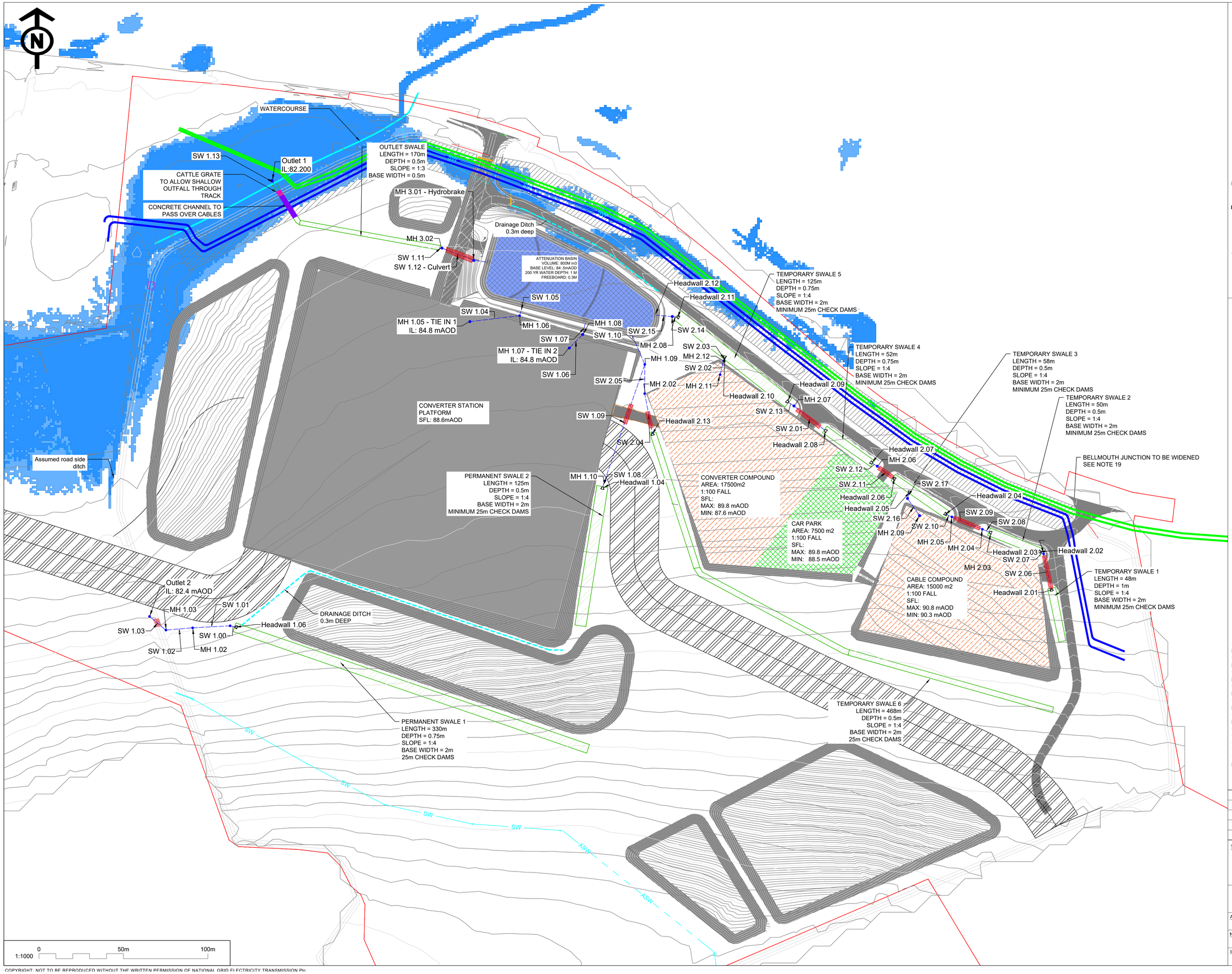
	My value		Map value
Hydrological region	2		2
1 year growth factor	0.87		
2 year growth factor	0.91		
10 year growth factor	1.42		
30 year growth factor	1.95		
100 year growth factor	2.63		
200 year growth factor	2.99		

Results

Method	IH124
Flow rate 1 year (l/s)	67.9 l/s
Flow rate 2 year (l/s)	71.0 l/s
Flow rate 10 years (l/s)	110.7 l/s
Flow rate 30 years (l/s)	152.1 l/s
Flow rate 100 years (l/s)	205.1 l/s
Flow rate 200 years (l/s)	233.2 l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

C. Temporary Compounds



Legend

- Proposed Red Line Boundary
- Proposed Converter Station
- Temporary Compound
- Temporary Car Parking
- Attenuation Basin
- Swale
- Haul Road
- Concrete Surround to Protect Shallow Pipe
- HVDC/ HVAC Cable Route
- Cable Corridor
- Cattle Grate
- Watercourse
- Surface Water Pipe
- Headwall
- 33kV CABLE ROUTE (1280m) (Ø INTERNAL: 150mm, Ø OUTSIDE 160mm)
- 132kV DIVERTED CABLE ROUTE (1130m) (Ø INTERNAL: 188mm, Ø OUTSIDE 200mm)
- Drainage Ditch
- ACO Drain
- SW — Existing Surface Water Drainage (To Be Diverted By Others)
- Flood Zone
- Concrete Channel

Notes

1. Do not scale from this drawing.
2. All dimensions are in metres unless otherwise stated.
3. This drawing is to be read in conjunction with all relevant documents and drawings.
4. No unauthorised disclosure, storage or copying.
5. All spatial coordinates relate to the Ordnance Survey, British National Grid (OSGB36).
6. All levels are in metres and relate to AOD (Ordnance Survey, Newlyn).
7. Haul roads are assumed to be 7m minimum and wider at overrun areas due to abnormal load delivery.
8. On-platform drainage to be delivered under a separate contract.
9. Topsoil strip depth has been assumed at 400mm.
10. The assumed thickness of pavement is 775mm for the Converter Station, and 150mm for the Temporary Compounds.
11. Bulk factor applied to topsoil: 1
12. Compression factor applied to imported fill: 1.20
13. Bulk factor applied to unusable cut and stored excess volume: 1
14. Subgrade is not considered suitable to be used as fill.
15. Cut slopes: 1V:3H, fill slopes 1V:3H. These values are to be verified by the Contractor during Stage 2 Detailed Design.
16. Contours shown within the available data from existing LIDAR survey carried out by Cyberhawk.
17. Utility data presented is duplicated from the Utility Search Map Report dated 23/02/2024. Data is shown for information only and must not be used for locating services. Locations must be confirmed with the relevant service owner prior to undertaking work. See reference drawings for further details. Protection to utilities to be confirmed following liaison with statutory undertakers at detailed design. Contractor is to confirm depth and alignment of all existing utilities on site prior to beginning work
18. Berms are to be provided in temporary settlement lagoon to allow for settlement of sediment and may be modified for permanent use.
19. Existing 'bellmouth' junction to be widened. Filter drains to be provided along both edges, connected to existing road side drainage or dispersed to land if unavailable.

Reference Documents

113643-MMD-SPEN-XX-DR-CE-0582 - Drainage Details (Sheets 1 - 7)
113643-MMD-SPEN-XX-DR-CE-0636 - Permanent Drainage Site Overview
113643-MMD-SPEN-XX-DR-CE-0637 - Permanent Drainage Attenuation Basin GA
113643-MMD-SPEN-XX-DR-CE-0638 - Permanent Drainage Manhole Schedule
113643-MMD-SPEN-XX-DR-CE-0639 - Permanent Drainage Long sections
113643-MMD-SPEN-XX-DR-CE-0641 - Temporary Drainage Basin General Arrangement
113643-MMD-SPEN-XX-DR-CE-0642 - Temporary Drainage Manhole Schedule
113643-MMD-SPEN-XX-DR-CE-0643 - Temporary Drainage Long sections Sheet 1
113643-MMD-SPEN-XX-DR-CE-0644 - EGL4 -SPEN - Drainage – Temporary Drainage Long sections Sheet 2

Issue	Date	Remarks	Drawn	Checked	Approved
P04	12/09/2025	Final Issue	DM	NC	RM
P03	15/08/2025	Second Issue	DM	RM	JW
P02	02/04/2025	FORMAL ISSUE	KH	NC	RM
P01	28/02/2025	Draft	KH	NC	RM

Title

Eastern Green Link 4
North (Westfield) Site
Convertor Station
Temporary Drainage Site Overview

SP Energy Networks nationalgrid

Application Number

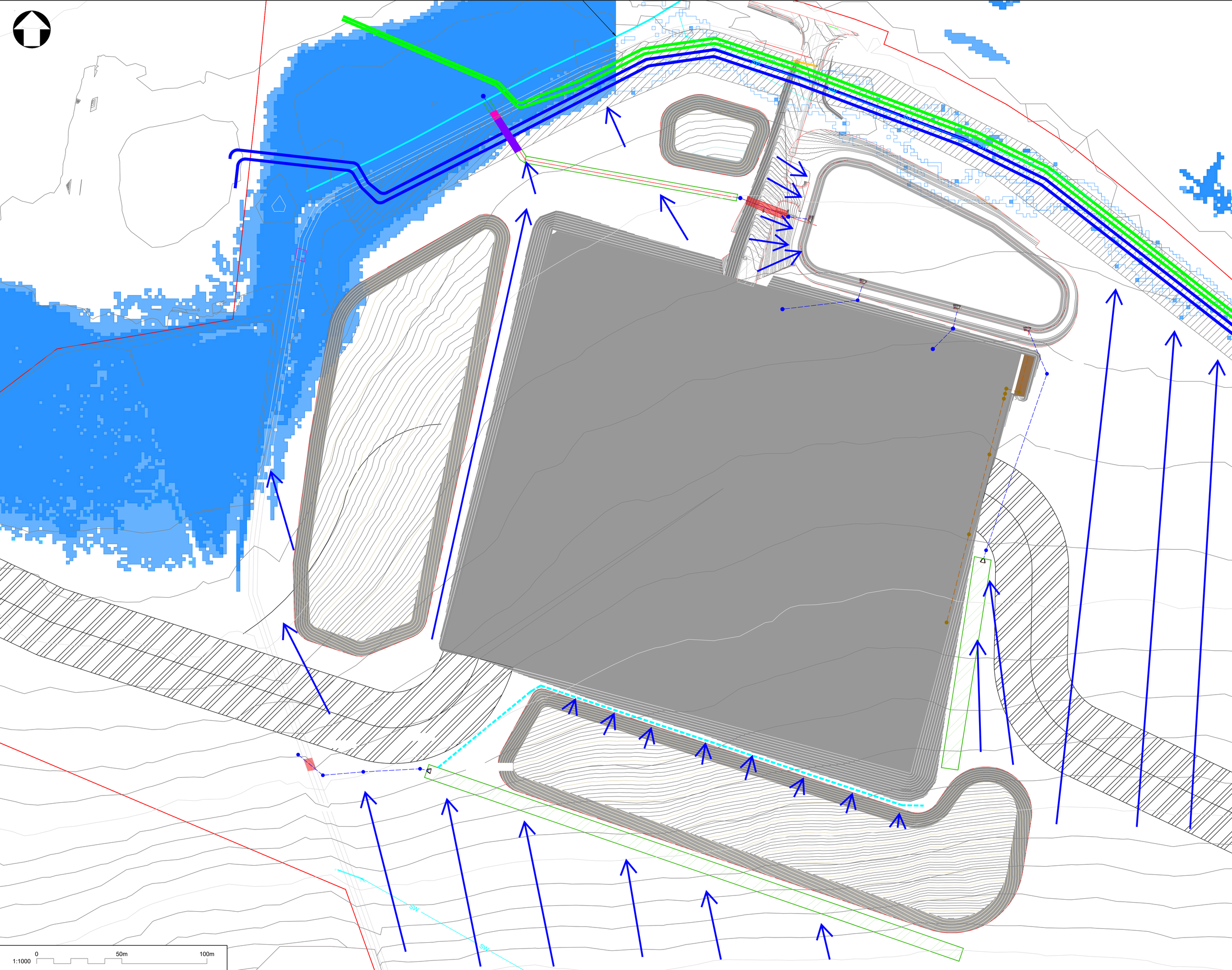
-

National Grid Drawing Reference

113643-MMD-SPEN-XX-DR-CE-0640

Scale	Sheet Size	Sheet	Issue
1:1000	A1	SHEET 1	P04

D. Permanent Flow Paths


SW
SW
0
50m
100m
1:1000